



KARARA IRON ORE PROJECT

LIFE OF MINE EXTENSION

Version 1.10

Prepared by **Greenbase Pty Ltd**

On behalf of **Karara Mining Limited**

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Rounding

All CO₂-e amounts included in this document have been rounded to the nearest tonne, except when rounding would result in a zero.

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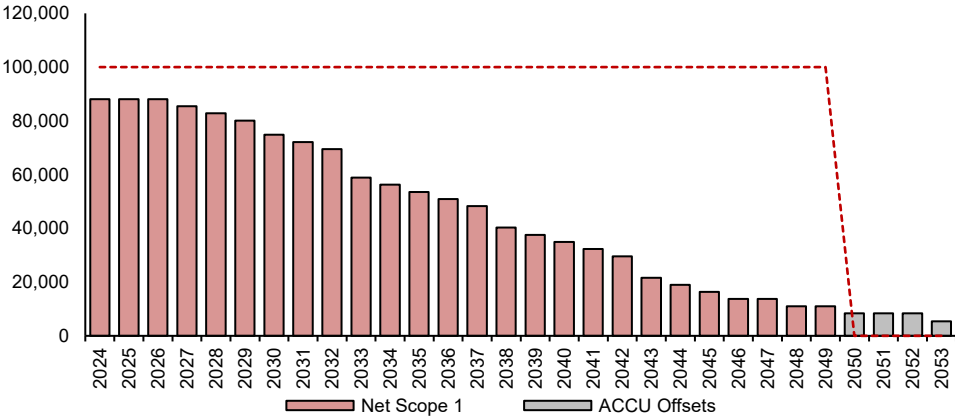
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1 Executive Summary

Table 2 Proposal Mine Life Extension GHG Management Plan Summary

SECTION 1	
Proposal name	Karara Iron Ore Project Mine Life Extension (the Proposal)
Proponent name	Karara Mining Limited (KML)
Proposal description and scope	KML is the proponent for a proposed mine life extension to the Karara Iron Ore Mine, located approximately 320 km northeast of Perth. The Proposal is predicted to have a mine life of approximately 40 years.
Purpose of the GHG EMP	The greenhouse gas (GHG) management plan has been prepared to support the <i>Environment Protection Act 1986</i> (EP Act) Section 38 assessment. The management plan takes into account the requirements outlined in the Environmental Protection Authority (EPA)'s Environmental Factor Guideline for Greenhouse Gas Emissions (EPA, 2023).
Emissions estimates	<p>Scope 1 emissions have been estimated as 1,753,419 t CO₂-e (1,308,397 t CO₂-e from fuel, 209,714 t CO₂-e from rail haulage, and 235,308 t CO₂-e from land clearing) over the life of mine. 30,483 t CO₂-e emissions offsets will be surrendered for regulatory purposes, resulting in net scope 1 emissions of 1,722,936 t CO₂-e. Annual average scope 1 emissions are estimated as 60,278 t CO₂-e/year (without offsets).</p> <p>Scope 2 emissions have been estimated as 3,284,721 t CO₂-e location-based emissions, with an annual average of 112,984 t CO₂-e/year, and 4,689,158 t CO₂-e market-based emissions, with an annual average of 161,369 t CO₂-e/year. Market-based emissions are calculated based on 8,389,179 MWh of Large-scale Generation Certificates (LGC) voluntarily surrendered to the Renewable Energy Certificate (REC) registry.</p> <p>Scope 3 emissions have been estimated as 353,766,597 t CO₂-e over the life of mine. Annual average scope 3 emissions are estimated as 12,156,517 t CO₂-e/year. Scope 3 emissions are assessed with the following emissions sources: purchased goods and services, capital goods, fuel and energy-related activities, upstream transportation and distribution, employee commute, downstream transportation and distribution, and processing of sold products.</p>
Trajectory of emissions reductions	<p>KML is aiming to reduce scope 1 emissions associated with the Proposal year on year by 3%, with an additional 10% reduction every five years, to reach net zero in 2050. This will be in accordance with the national and state frameworks and industry commitments.</p> <p>From 2050 onwards, to the end of the life of mine, KML will offset their scope 1 emissions to net zero emissions by surrendering Australian Carbon Credit Units (ACCUs). The total offset emissions are predicted to be 30,483 t CO₂-e.</p> <p>KML is also aiming to reduce scope 2 market-based emissions through Power Purchase Agreements (PPAs) with renewable energy generators; starting from 2031, around 80% of the Proposal's electricity requirements is expected to be purchased from renewable energy generators.</p>

<p>Other statutory decision-making processes which require reduction in GHG emissions</p>	<p>The Proposal is subject to the Safeguard Mechanism, which requires all large emitters to maintain scope 1 emission below a set baseline, with a default baseline of 100,000 tCO₂-e emissions. In any year where the Proposal exceeds 100,000 tCO₂-e emissions, it will be required to surrender ACCUs to offset the excess emissions.</p>  <p>The GHG management plan and GHG emissions reductions are required by the EPA for assessment of the Proposal. The GHG management plan is not required by the DCCEEW for the Proposal, but it is noted that the Proposal will be assessed by the EPA through a bilateral agreement with the DCCEEW.</p>
<p>Key components in the GHG EMP</p>	<p>KML will reduce scope 1 emissions through a staged replacement of the diesel light vehicle fleet and mining contractor fleet with electric vehicles. Electrification of the light vehicle fleet will be carried out from 2027 onwards, and electrification of the mining contractor fleet will be carried out at five-year intervals from 2032 onwards, with the contractor expected to reduce their diesel consumption by 10% every five years. The mining rail contractor is also expected to switch from diesel trains to zero emissions trains in 2031, further reducing scope 1 emissions. KML will also reduce scope 1 emissions by switching to high efficiency diesel.</p> <p>KML will offset scope 1 emissions through the purchase and surrender of ACCUs from 2050 onwards, in order to reach the statutory and non-statutory net zero emissions targets. KML will also surrender ACCUs in any year that the Proposal exceeds 100,000 tCO₂-e scope 1 emissions, in order to keep scope 1 emissions below 100,000 tCO₂-e.</p> <p>KML will reduce scope 2 emissions through a PPA with a renewable energy generator. The PPA is set to commence in 2031 and will supply around 80% of the Proposal's electricity requirements. Large-scale energy certificates (LGCs) generated from the renewable energy generator will be voluntarily surrendered by KML.</p> <p>KML is assessing potential reduction of scope 3 emissions from downstream storage of iron ore and employee commute.</p>
<p>GHG EMP reviews and reporting</p>	<p>The mitigation measures outlined in the GHG management plan were developed through internal and external stakeholder consultation. KML proposes to continue stakeholder engagement and consultation throughout the life of the GHG management plan for continuous improvement of emissions reductions.</p>
<p>Proposed construction date</p>	<p>Q2 2026.</p>
<p>GHG EMP required pre-construction?</p>	<p>No.</p>
<p>Proposed end of life</p>	<p>December 2053.</p>

2 Context, Scope and Purpose

2.1 Description and Scope

This GHG assessment and management plan has been prepared to support the assessment for the Proposal under Part IV of the EPA Act.

A summary of the project details is outlined in Table 3.

Table 3 Proposal Summary Table

PROPOSAL NAME	Karara Iron Ore Project Mine Life Extension
PROPONENT NAME	Karara Mining Limited (KML)
RELEVANT ENVIRONMENTAL DOCUMENTS	EPA Assessment No. 2369
KEY ENVIRONMENTAL FACTOR AND OBJECTIVE	Factor: Greenhouse Gas Emissions EPA Environmental Objective: To minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable. (EPA, 2023)
PROPOSED CONSTRUCTION DATE	Q2 2026

Karara Mining Limited (KML) plans to extend life of mine of the Karara Iron Ore Project (Proposal) to approximately 40 years. The Proposal includes a revised development envelope of 13,557 ha, extension of the tailings storage facility and waste rock landform, incorporation of the areas previously approved under the Mungada Iron Ore Project (MIOP), and areas required for maintenance of the infrastructure previously approved under Part V of the *Environmental Protection Act 1986*.

The location of the project and proposed development envelope are shown in Figure 1.

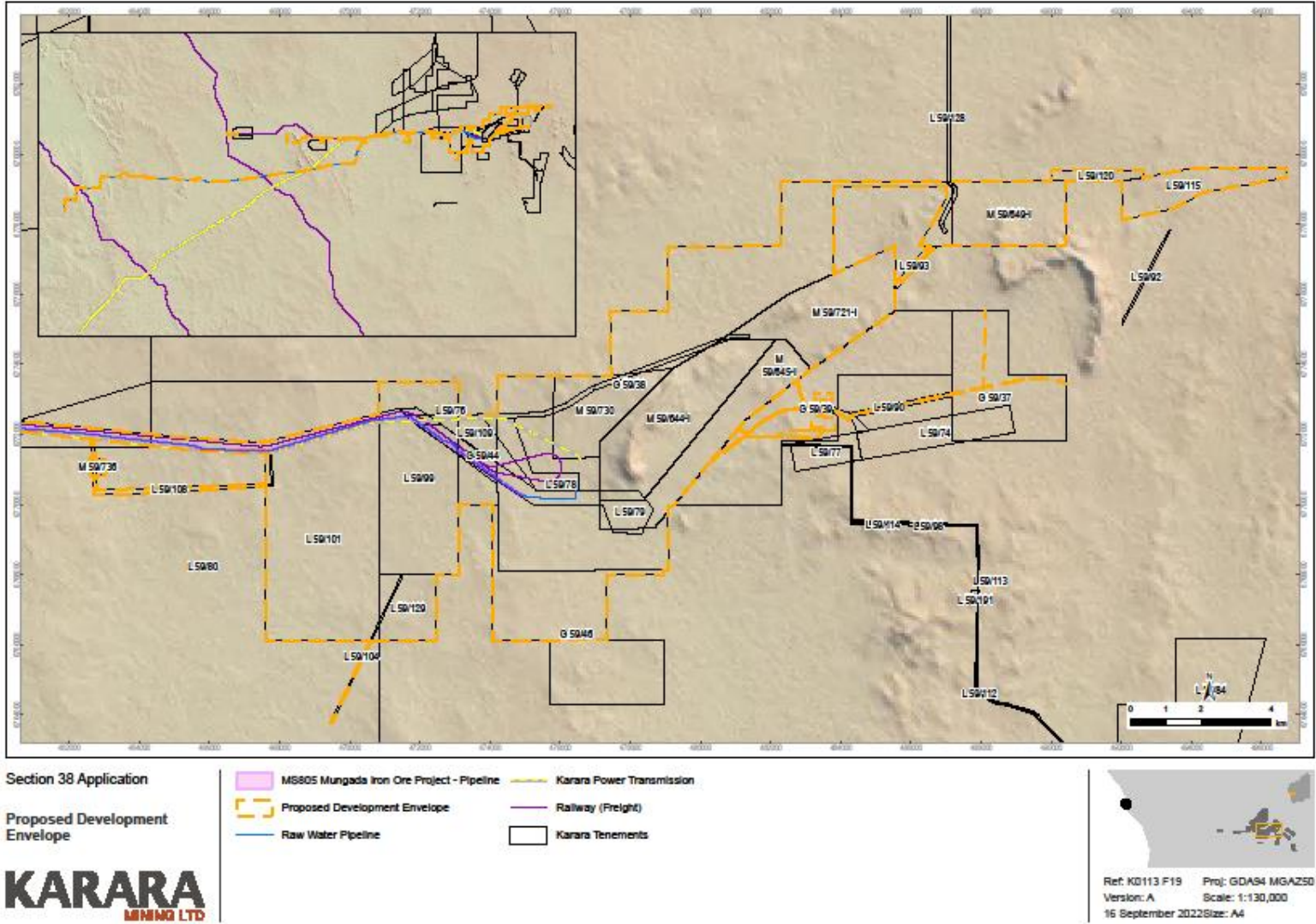


Figure 1 Location of the Proposal Development Envelope

2.2 Purpose of the Management Plan

This GHG management plan has been prepared to support the Environmental Protection Authority's (EPA) assessment for the Proposal under section 38 of the *Environmental Protection Act 1986* (EP Act), taking into account the requirements of the EPA's Environmental Factor Guideline for Greenhouse Gas Emissions (EPA, 2023).

The GHG emissions from the Proposal have been calculated in this assessment and the likely contribution to state and national emissions estimated.

The management plan has identified and discussed measures to manage and mitigate GHG emissions, aiming to achieve the following objectives:

- Provide a summary of scope 1, 2, and 3 emissions estimates.
- Demonstrate a clear pathway for mitigating scope 1 and 2 emissions, with adoption of best practice design, technology, and management appropriate to avoid, reduce, and offset emissions.
- Demonstrate consideration of mitigating scope 3 emissions.
- Align with Australia's national and Western Australia's state net zero target by 2050, as well as the commitment to reduce emissions to 43% below 2005 levels by 2030 (Government of Western Australia, 2020).

2.3 Applicable Environmental Factors

The EPA has identified greenhouse gas emissions as one of the key environmental factors that may be impacted by the Proposal. The objective of the greenhouse gas emissions environmental factors is '*to minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable*'.

According to the *Greenhouse Gas Emissions Environmental Factor Guideline* (EPA, 2023), GHG emissions from a proposal will be considered where they are reasonably likely to exceed:

- 100,000 tonnes CO₂-e of scope 1 emissions in any year; or
- 100,000 tonnes CO₂-e of scope 2 emissions in any year.

The GHG's included in the Greenhouse Gas Emissions Environmental Factor Guideline are covered by the UNFCCC's Reporting Guidelines on Annual Inventories and are listed below:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Sulphur hexafluoride (SF₆)
- Hydro fluorocarbons (HFCs)
- Perfluorocarbons (PFCs)

The main GHG emissions associated with the Proposal are CO₂, CH₄ and N₂O.

3 GHG Inventory

3.1 Activities Affecting GHG Emissions

The key infrastructure of the Proposal has been outlined below:

- Open pit mines including waste rock dump and tailings storage facilities;
- Processing plant;
- Other mine service areas, including explosives facilities, fuel storage facilities, labs, workshops, offices, accommodation village, airstrip; and
- Downstream transportation of iron ore to Geraldton Port.

3.2 GHG Emissions Calculation

GHG emissions can include both *direct* and *indirect* emissions: scope 1, scope 2, and scope 3 emissions. Sources of emissions identified for the Proposal have been outlined in the following sections.

3.2.1 Scope 1 GHG Emissions Calculation

Scope 1 emissions are *direct* emissions from sources within the boundary of the facility, e.g., fuel combusted on site.

Sources of scope 1 emissions from the Proposal are outlined below:

- Diesel combustion by the construction, mining, and rehabilitation fleets;
- Minor sources of emissions, including acetylene, liquified petroleum gas (LPG), sulphur hexafluoride (SF₆) in switchgear, and petroleum-based oils and greases;
- Diesel combustion by the rail contractor transporting iron ore from mine site to Geraldton Port; and
- Land clearing (loss of sequestration potential and decomposition of organic matter).

Diesel combustion by the rail contractor is not under the operational control of KML, however, it is included in scope 1 emissions for the purpose of this management plan because it directly results from the activities at the facility. It will not be included in estimates of emissions intensities or assessment against regulatory thresholds.

Fuel Combustion

Diesel consumption is estimated based on the quantity of ore and waste rock moved, and allocated between vehicles and equipment based on FY2023 diesel usages. Vehicles and equipment include haul trucks, excavators, dozers, drills, graders, loaders, water carts, light vehicles, field generators, pumps, and lighting plants.

Emissions from diesel combustion are estimated using methods and emissions factors from Schedule 1 of the National Greenhouse and Energy Reporting (NGER) Determination, applicable to the 2023-24 financial year. Emission factors, shown in Table 4, are provided in carbon dioxide equivalents (CO₂-e) and include global warming potentials (GWP). GWP's are based on the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) over a 100-year period.

Table 4 GHG Emission Factors for Fuel Combustion

FUEL	ENERGY CONTENT	EMISSION FACTOR (kg CO ₂ -e/GJ)			
		CO ₂	CH ₄	N ₂ O	Total
GWP		1	28	265	
Diesel (stationary)	38.6 GJ/kL	69.90	0.10	0.20	70.20
Diesel (transport)	38.6 GJ/kL	69.90	0.10	0.40	70.40

Minor Sources

Emissions from minor sources make up less than 1% of total scope 1 emissions. Minor sources of emissions include liquefied petroleum gas (LPG), petroleum-based oils, petroleum-based greases, acetylene, and sulphur hexafluoride (SF₆). Emissions from minor emissions sources are estimated based on the quantity of ore processed.

Rail Haulage

Iron ore produced by the Proposal is hauled to Geraldton Port by a rail contractor. The rail contractor uses diesel-powered trains but proposes to replace their diesel-powered trains with zero emissions trains after 2030.

Diesel consumption has been estimated for rail haulage up to 2030, and diesel emission factors from the NGER Determination have been applied.

Land Clearing

The area of land to be cleared is estimated to be 1,522 ha for the Proposal, not inclusive of the existing approved area for the Karara Iron Ore Project or Mungada Iron Ore Project.

Emissions associated with land clearing are estimated using the Full Carbon Accounting Model (FullCAM) Guidelines published by the Department of Climate Change, Energy, the Environment and Water (DCCEEW, 2020) and the methodology outlined in *Carbon Credits (Carbon Farming Initiative—Avoided Clearing of Native Regrowth) Methodology Determination 2015* (CER, 2018). Emissions are calculated by determining the carbon mass (tonnes of carbon per hectare) of the cleared vegetation, multiplying it by the cleared area (hectares), and converting the resulting carbon mass (tonnes of carbon) to CO₂ emissions.

The carbon mass is calculated in FullCAM using the project location coordinates. Other baseline settings in FullCAM are set up in accordance with the FullCAM Guidelines (DCCEEW, 2020). It is assumed that all cleared vegetation and debris will be converted into CO₂ emissions and released into the atmosphere over the life of mine.

3.2.2 Scope 2 GHG Emissions Calculation

Scope 2 emissions are *indirect* emissions from the consumption of purchased electricity, steam, heat, or energy produced by another organisation.

Sources of scope 2 emissions from the Proposal are outlined below:

- Electricity purchased from the South West Interconnected System (SWIS) grid; and

- Electricity purchased through a Power Purchase Agreement (PPA) with a renewable generator and supplied via the existing grid infrastructure.

Electricity Purchased from the Grid

Electricity requirements are estimated based on the quantity of ore processed in the processing plants.

The PPA with the renewable generator is expected to supply around 80% of electricity requirements each year, commencing in 2031 and extending until the end of the project. The remainder of the electricity is assumed to be purchased from the SWIS grid.

Scope 2 emissions for a facility can be calculated as location-based emissions or market-based emissions. Location-based emissions are based on the location of the facility, and do not recognise large-scale energy certificates (LGCs) generated or surrendered by the facility. Market-based emissions, on the other hand, are based on the facility's investment into the electricity market, and do recognise LGCs generated or surrendered by the facility.

Location-based scope 2 emissions are estimated using method A1 from the NGER Determination and projected grid emission factors from the DCCEEW's *Australia's Emissions Projections 2023*. Market-based scope 2 emissions are estimated using method A2 and national residual mix factor (RMF) from the NGER Determination, and Renewable Power Percentage (RPP) from the *Renewable Energy Regulations 2001*. The RMF (0.81 kg CO₂-e/kWh) and RPP (18.48%) used in the management plan are both from 2024, however, similar to location-based factors, they are also expected to change over time.

3.2.3 Scope 3 GHG Emissions Calculation

Scope 3 emissions are all other *indirect* emissions that are of a consequence of an organisation's activities but are not from sources owned or controlled by the organisation, e.g., the emissions associated with the extraction, refinement, and delivery of diesel to site.

The GHG Protocol (2011) categorises scope 3 GHG emissions into fifteen categories, divided into two groups depending on the financial transactions of the company:

- Upstream indirect emissions related to purchased or acquired goods and services,
- Downstream indirect emissions related to sold goods and services.

Table 5 outlines all scope 3 categories and their relevancy to the Proposal and indicates those included in the GHG assessment. A full list and description of the scope 3 categories, as well as definitions of their relevancy, are outlined in Appendix B.

Table 5 Scope 3 Categories and Materiality (GHG Protocol, 2011)

CATEGORY	RELEVANCY	INCLUDED
1. Purchased goods and services	Material and directly influenced by the company; should be calculated.	Included
2. Capital goods	Material and directly influenced by the company; should be calculated.	Included
3. Fuel- and energy-related activities (Not included in scope 1 or 2)	Material and directly influenced by the company; should be calculated.	Included
4. Upstream transportation and distribution	Material and directly influenced by the company; should be calculated.	Included in Category 1
5. Waste generated in operations	Not material.	N/A
6. Business travel	Not material.	N/A
7. Employee commuting	Not material but could be calculated with available data.	Included
8. Upstream leased assets	Not applicable.	N/A
9. Downstream transportation and distribution	Material and directly influenced by the company; should be calculated.	Included
10. Processing of sold products	Material and directly influenced by the company; should be calculated.	Included
11. Use of sold products	Material but not directly influenced by the company.	N/A
12. End-of-life treatment of sold products	Material but not directly influenced by the company. In addition, steel products likely undergo several cycles of recycling.	N/A
13. Downstream leased assets	Not applicable.	N/A
14. Franchises	Not applicable.	N/A
15. Investments	Not applicable.	N/A

To calculate scope 3 emissions, the GHG Protocol *Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011)* was consulted, and the GHG Protocol *Technical Guidance for Calculating Scope 3 Emissions (2013)* was referenced where required.

A variety of emission factor sources were used, including but not limited to:

- Australia DCCEEW's *National Greenhouse Accounts Factors (NGA, 2023)*,
- UK Department for Business, Energy & Industrial Strategy's *Conversion Factors (UK BEIS, 2023)*,

- US EPA's *Supply Chain Greenhouse Gas Emission Factors for US Industries and Commodities* (US EPA),
- World Steel Association, and
- Various scientific studies.

Emission factors from the NGA Factors and UK Conversion Factors are based on the IPCC AR5 over a 100-year period. Emission factors from the US EPA are based on the IPCC AR4. Emission factors from other sources do not include information on GWPs.

When estimating the scope 3 emissions, fuel-based or goods and distance-based methods are considered the most appropriate. These methods involve tracking the quantity of fuel, or goods used and the distance they travel, respectively. However, in cases where the necessary data is not available, spend-data methods are used. Spend-data methods involve estimating scope 3 emissions based on the expenditure involved for a given activity. While spend-data methods may not be as accurate as fuel-based or goods and distance-based methods, they still provide a useful estimate for calculating scope 3 emissions when the required data is not available.

The calculation methodologies selected for the GHG assessment are outlined in Table 6.

Table 6 Calculation Methodologies for Scope 3 Categories

CATEGORY	CALCULATION METHODOLOGY	EXPLANATION
1. Purchased goods and services	Spend-data	Expenditure on purchased goods and services was categorised by type (mining equipment, automobiles, etc.), and spend emission factors were applied. Expenditure on fuel and energy related activities were subtracted prior to calculating emissions with spend-data methods.
2. Capital goods	Spend-data	Expenditure on purchased capital goods was categorised by type (mining equipment, automobiles, etc.), and spend emission factors were applied.
3. Fuel and energy related activities	Fuel-based	Fuel and energy were aggregated by type (diesel, electricity, etc.), and industry average emission factors were applied.
4. Upstream transportation and distribution	Spend-data	Spend emission factors were applied to expenditure on transport of goods and capital goods.
7. Employee commuting	Distance-based	Industry average emission factors were applied to fly-in fly -out (FIFO) and drive-in drive -out (DIDO) passenger kilometres.
9. Downstream transportation and distribution	Distance-based	Industry average emission factors for rail and ship haulage were applied to the transport of iron ore to processing plants in China.
10. Processing of sold products	Goods-based	Industry average emission factors for iron ore processed in Chinese steelmaking plants were applied to the production of iron ore.

3.2.4 Limitations and Exclusions

The following sources of emissions were excluded from the assessment, as they were not considered material (exclusions from the scope 3 are outlined in Table 5):

- Hydro fluorocarbons (HFCs),
- Perfluorocarbons (PFCs),
- Nitrogen trifluoride (NF₃), and
- Wastewater treatment plant (WWTP).

Other exclusions are noted below:

- Exploration activities,
- Land clearing emissions that are covered by existing approvals, and
- Explosives; there are no methods in the NGER Determination to calculate emissions from explosives.

While emissions in the management plan have been estimated using the best available information, it should be noted that potential for changes in technology (implementation of best available technology) and updates to the Proposal may result in adjustments to the emissions estimates.

3.3 GHG Emissions Estimates

GHG emissions have been estimated based on the expected operational throughput and maximum capacity throughput.

3.3.1 Scope 1 GHG Emissions Estimates

Fuel Combustion

Inputs used to calculate emissions from fuel combustion are outlined Table 7.

Table 7 Input Data for Fuel Combustion

INPUT	VALUE
LOM (construction + operation + rehabilitation)	30 years (2024-2053)
Material mined (ore + waste rock)	LOM: 871,585,011 tonnes Maximum capacity: 41,000,000 tonnes/year
Saleable iron ore production	LOM: 232,800,000 tonnes Maximum capacity: 8,200,000 tonnes/year

Rail Haulage

Inputs used to calculate emissions from rail haulage are shown in Table 8.

Table 8 Input Data for Rail Haulage

INPUT	VALUE
Saleable iron ore hauled	LOM: 232,800,000 tonnes Maximum capacity: 8,200,000 tonnes/year
Contractor fuel intensity	0.005 L/t.km

Land Clearing

Inputs applied to the land clearing calculations are shown in Table 9. Input data is entered into the FullCAM simulation model to produce an estimated carbon biomass for the project area (Table 10). Emission factors are calculated from this carbon biomass via the Carbon Credits Methodology (CER, 2018).

Table 9 Input Data for Land Clearing

INPUT	VALUE
Project location coordinates	-29.185 North; 116.758 East
Vegetation type	Unclassified native vegetation
Other baseline settings	As outlined in FullCAM guidelines

Table 10 Estimated Carbon Biomass and GHG Emission Factor for Land Clearing

SCENARIO	ITEM	VALUE
Best Practice	Carbon mass of trees per hectare (t carbon)	31.57
	Carbon mass of forest debris per hectare (t carbon)	10.63
	Emission factor (t CO ₂ -e/ha)	154.60

Total Scope 1 GHG Emissions

Estimated scope 1 emissions from fuel combustion and land clearing are shown in Table 11.

Table 11 Estimated Scope 1 GHG Emissions

SCENARIO	SOURCES	EXPECTED THROUGHPUT		MAXIMUM CAPACITY
		EMISSIONS OVER LOM (t CO ₂ -e)	AVERAGE ANNUAL EMISSIONS ¹ (t CO ₂ -e/year)	AVERAGE ANNUAL EMISSIONS (t CO ₂ -e/year)
Best Practice	Fuel combustion	1,308,397	44,932	97,411
	Rail haulage	209,714	7,232	30,708
	Land clearing	235,308	8,114	8,039
	Total	1,753,419	60,278	136,159
No Mitigation	Fuel combustion	2,569,143	88,287	97,411
	Rail haulage	209,714	7,232	30,708
	Land clearing	235,308	8,114	8,039
	Total	3,014,166	103,632	136,159

¹Average annual emissions are calculated across the years of expected normal operations: 2024 to 2052. 2053 is excluded from calculated average annual emissions, as it is assumed not representative of standard operations.

3.3.2 Scope 2 GHG Emissions Estimates

The key inputs used to calculate the scope 2 GHG emissions from consumption of electricity purchased from the grid are outlined in Table 12.

Table 12 Input Data for Purchased Electricity

INPUT	VALUE OVER LOM
LOM - construction + operation + rehabilitation	30 years (2024-2053)
Ore processed	LOM: 597,600,765 tonnes Maximum capacity: 21,000,000 tonnes/year
Electricity grid	South West Interconnected System (SWIS)

The estimated scope 2 emissions from electricity purchased from the grid are shown in Table 13 and Table 14.

Table 13 Estimated Location-based Scope 2 GHG Emissions

SCENARIO	SOURCES	EXPECTED THROUGHPUT		MAXIMUM CAPACITY
		EMISSIONS OVER LOM (t CO ₂ -e)	AVERAGE ANNUAL EMISSIONS ¹ (t CO ₂ -e/year)	AVERAGE ANNUAL EMISSIONS (t CO ₂ -e/year)
Best Practice	Electricity	3,284,721	112,984	118,348
No Mitigation	Electricity	3,001,920	103,259	118,348

¹Average annual emissions are calculated across the years of expected normal operations: 2024 to 2052. 2053 is excluded from calculated average annual emissions, as it is assumed not representative of standard operations.

Table 14 Estimated Market-based Scope 2 GHG Emissions

SCENARIO	SOURCES	EXPECTED THROUGHPUT		MAXIMUM CAPACITY
		EMISSIONS OVER LOM (t CO ₂ -e)	AVERAGE ANNUAL EMISSIONS ¹ (t CO ₂ -e/year)	AVERAGE ANNUAL EMISSIONS (t CO ₂ -e/year)
Best Practice	Electricity	4,689,158	161,369	99,338
No Mitigation ²	Electricity	11,484,394	394,683	404,903

¹Average annual emissions are calculated across the years of expected normal operations: 2024 to 2052. 2053 is excluded from calculated average annual emissions, as it is assumed not representative of standard operations.

²No mitigation emissions are calculated without the voluntary surrender of LGCs.

3.3.3 Scope 3 GHG Emissions Estimates

Seven categories of scope 3 GHG emissions were determined to be material for the GHG management plan, as specified in Section 3.2.3.

- Purchased goods and services,
- Capital goods,
- Fuel and energy related activities,
- Upstream transportation and distribution,
- Employee commuting,
- Downstream transportation and distribution, and
- Processing of sold products.

The emissions in the following table are estimated based on expected operational throughput.

Table 15 Estimated Scope 3 GHG Emissions

SCENARIO	CATEGORY	EMISSIONS OVER LOM (t CO ₂ -e)	AVERAGE ANNUAL EMISSIONS ¹ (t CO ₂ -e)
Best Practice	Purchased goods and services	7,697,575	264,521
	Capital goods	198,669	6,622
	Fuel- and energy-related activities	620,736	21,338
	Upstream transportation	84,256	2,895
	Employee commuting	61,356	2,045
	Downstream transportation	19,358,607	665,094
	Processing of sold products	325,745,400	11,194,000
	Total	353,766,597	12,156,517

¹Average annual emissions are calculated across the years of expected standard operations: 2024 to 2052. 2053 is excluded from calculated average annual emissions, as it is assumed not representative of standard operations.

4 GHG Emissions Trajectories

The following tables show the emissions reduction trajectories over the life of the Proposal. Emissions are categorised into scope 1, 2, and 3 emissions, with scope 1 emissions further categorised by source: rail, fuel, and land clearing.

Table 16 shows the best-practice scope 1, 2, and 3 emissions trajectory, including emissions reduced through best practice design and operational measures, while excluding emissions offsets.

Table 16 Scope 1, 2, and 3 GHG Emissions Trajectory (t CO₂-e)

YEAR	SCOPE 1 (FUEL)	SCOPE 1 (RAIL)	SCOPE 1 (LAND CLEARING)	SCOPE 2	SCOPE 3	TOTAL
2024	88,094	29,959	0	265,000	12,184,227	12,567,281
2025	88,086	29,959	0	249,100	12,184,002	12,551,147
2026	88,086	29,959	0	233,200	12,178,379	12,529,624
2027	85,429	29,959	23,191	181,618	12,177,062	12,497,259
2028	82,773	29,959	30,921	156,118	12,170,652	12,470,424
2029	80,115	29,959	30,921	146,478	12,169,907	12,457,379
2030	74,801	29,959	30,921	99,153	12,168,012	12,402,845
2031	72,144	0	30,921	99,903	12,154,434	12,357,402
2032	69,488	0	23,191	89,470	12,153,647	12,335,796
2033	58,858	0	18,553	86,380	12,151,062	12,314,853
2034	56,201	0	7,730	87,006	12,150,436	12,301,373
2035	53,544	0	7,730	81,789	12,149,729	12,292,793
2036	50,888	0	7,730	82,373	12,149,103	12,290,094
2037	48,230	0	7,730	82,956	12,148,477	12,287,394
2038	40,259	0	7,730	84,708	12,146,599	12,279,296
2039	37,602	0	8,039	85,292	12,145,973	12,276,906
2040	34,946	0	0	85,875	12,145,347	12,266,168
2041	32,288	0	0	86,459	12,144,721	12,263,468
2042	29,631	0	0	87,043	12,144,094	12,260,768
2043	21,660	0	0	88,794	12,142,216	12,252,670
2044	19,004	0	0	89,378	12,141,590	12,249,972
2045	16,346	0	0	89,962	12,140,964	12,247,271
2046	13,689	0	0	90,545	12,140,338	12,244,572
2047	13,689	0	0	90,545	12,140,338	12,244,572
2048	11,033	0	0	91,129	12,147,778	12,249,940
2049	11,031	0	0	91,129	12,155,844	12,258,005
2050	8,374	0	0	91,713	12,163,284	12,263,371

YEAR	SCOPE 1 (FUEL)	SCOPE 1 (RAIL)	SCOPE 1 (LAND CLEARING)	SCOPE 2	SCOPE 3	TOTAL
2051	8,374	0	0	91,713	12,171,350	12,271,437
2052	8,376	0	0	91,713	12,179,416	12,279,504
2053	5,359	0	0	8,179	1,227,617	1,241,154
LOM	1,308,397	209,714	235,308	3,284,721	353,766,597	358,804,738

Table 17 shows the statutory scope 1 emissions target for the Proposal under the Safeguard Mechanism. The Safeguard Mechanism applies to facilities that emit more than 100,000 t CO₂-e of scope 1 emissions. Facilities are required to apply for a Safeguard baseline and keep their annual scope 1 emissions below the baseline. When the baseline is exceeded, the facility is obligated to 'make good' the excess emissions by surrendering Australian Carbon Credit Units (ACCUs). See Section 5.4.1 Safeguard Mechanism for further information.

Table 17 Statutory Scope 1 GHG Emissions Target (t CO₂-e)

YEAR	SAFEGUARD SCOPE 1 BASELINE ¹	COVERED SCOPE 1 EMISSIONS ²	ACCUS TO BE SURRENDERED ³	NET SCOPE 1 EMISSIONS ⁴
2024	100,000	88,094	0	88,094
2025	100,000	88,086	0	88,086
2026	100,000	88,086	0	88,086
2027	100,000	85,429	0	85,429
2028	100,000	82,773	0	82,773
2029	100,000	80,115	0	80,115
2030	100,000	74,801	0	74,801
2031	100,000	72,144	0	72,144
2032	100,000	69,488	0	69,488
2033	100,000	58,858	0	58,858
2034	100,000	56,201	0	56,201
2035	100,000	53,544	0	53,544
2036	100,000	50,888	0	50,888
2037	100,000	48,230	0	48,230
2038	100,000	40,259	0	40,259
2039	100,000	37,602	0	37,602
2040	100,000	34,946	0	34,946
2041	100,000	32,288	0	32,288
2042	100,000	29,631	0	29,631
2043	100,000	21,660	0	21,660
2044	100,000	19,004	0	19,004

YEAR	SAFEGUARD SCOPE 1 BASELINE ¹	COVERED SCOPE 1 EMISSIONS ²	ACCUS TO BE SURRENDERED ³	NET SCOPE 1 EMISSIONS ⁴
2045	100,000	16,346	0	16,346
2046	100,000	13,689	0	13,689
2047	100,000	13,689	0	13,689
2048	100,000	11,033	0	11,033
2049	100,000	11,031	0	11,031
2050	0	8,374	8,374	0
2051	0	8,374	8,374	0
2052	0	8,376	8,376	0
2053	0	5,359	5,359	0

¹Safeguard baseline is estimated using the calculation method in Section 11 of the Safeguard Mechanism Rule, with a zero emissions baseline from 2050 onwards.

²Covered emissions include scope 1 emissions required to be reported under the NGER regulations emissions: fuel and minor sources. Covered emissions do not include emissions from rail haulage or land clearing.

³Where emissions exceed the Safeguard target, ACCUs are surrendered to 'make good' excess emissions.

⁴Net emissions consider emissions offset by surrendered ACCUs.

Table 18 shows the non-statutory corporate scope 1 emissions target for the Proposal. KML proposes to reduce scope 1 emissions by approximately 3% each year until 2050 and reach net zero scope 1 emissions in 2050, in accordance with national and state frameworks and industry commitments. In addition, it is expected that the main contractor at the Proposal, responsible for over 80% of total scope 1 emissions, will reduce their scope 1 emissions by 10% every five years.

Table 18 Non-statutory Scope 1 GHG Emissions Target (t CO₂-e)

YEAR	KML SCOPE 1 TARGET	COVERED SCOPE 1 EMISSIONS ¹	ACCUS TO BE SURRENDERED ²	NET SCOPE 1 EMISSIONS ³
2024	88,094	88,094	0	88,094
2025	88,094	88,086	0	88,086
2026	88,094	88,086	0	88,086
2027	85,452	85,429	0	85,429
2028	82,888	82,773	0	82,773
2029	80,401	80,115	0	80,115
2030	77,989	74,801	0	74,801
2031	75,650	72,144	0	72,144
2032	73,380	69,488	0	69,488
2033	63,841	58,858	0	58,858
2034	61,925	56,201	0	56,201
2035	60,068	53,544	0	53,544
2036	58,266	50,888	0	50,888
2037	56,518	48,230	0	48,230

YEAR	KML SCOPE 1 TARGET	COVERED SCOPE 1 EMISSIONS ¹	ACCUS TO BE SURRENDERED ²	NET SCOPE 1 EMISSIONS ³
2038	49,170	40,259	0	40,259
2039	47,695	37,602	0	37,602
2040	46,264	34,946	0	34,946
2041	44,877	32,288	0	32,288
2042	43,530	29,631	0	29,631
2043	37,871	21,660	0	21,660
2044	36,735	19,004	0	19,004
2045	35,633	16,346	0	16,346
2046	34,564	13,689	0	13,689
2047	33,527	13,689	0	13,689
2048	29,169	11,033	0	11,033
2049	28,294	11,031	0	11,031
2050	0	8,374	8,374	0
2051	0	8,374	8,374	0
2052	0	8,376	8,376	0
2053	0	5,359	5,359	0

¹Covered emissions include scope 1 emissions from fuel and minor sources. Covered emissions do not include emissions from rail haulage or land clearing.

²Where emissions exceed the Safeguard target, ACCUs are surrendered to 'make good' excess emissions.

³Net emissions consider emissions offset by surrendered ACCUs.

Table 19 shows the scope 1 emissions mitigation trajectory over the life of the Proposal. The emissions mitigation trajectory was calculated by subtracting the best practice emissions scenario, where best-practice design and operational measures were adopted to avoid, reduce, and offset emissions, from the scenario where no emissions mitigation measures were adopted.

Measures to reduce emissions include electrification of vehicles, replacement of diesel-powered equipment with renewable energy assets (though the latter was not quantified in Table 19), and switching to high-efficiency diesel. Measures to offset emissions include the purchase and surrender of ACCUs. Further information on scope 1 emissions mitigation measures can be found in Section 5.1.

Table 19 Scope 1 GHG Emissions Mitigated (t CO₂-e)

YEAR	SCOPE 1 WITHOUT MITIGATION	SCOPE 1 AVOIDED	SCOPE 1 REDUCED	SCOPE 1 OFFSET	SCOPE 1 MITIGATED
2024	118,254	0	200	0	200
2025	118,245	0	200	0	200
2026	118,245	0	200	0	200
2027	141,436	0	2,857	0	2,857

YEAR	SCOPE 1 WITHOUT MITIGATION	SCOPE 1 AVOIDED	SCOPE 1 REDUCED	SCOPE 1 OFFSET	SCOPE 1 MITIGATED
2028	149,167	0	5,514	0	5,514
2029	149,166	0	8,171	0	8,171
2030	149,166	0	13,485	0	13,485
2031	119,207	0	16,142	0	16,142
2032	111,478	0	18,799	0	18,799
2033	106,839	0	29,428	0	29,428
2034	96,016	0	32,085	0	32,085
2035	96,016	0	34,742	0	34,742
2036	96,017	0	37,399	0	37,399
2037	96,016	0	40,056	0	40,056
2038	96,016	0	48,027	0	48,027
2039	96,325	0	50,684	0	50,684
2040	88,287	0	53,341	0	53,341
2041	88,286	0	55,998	0	55,998
2042	88,286	0	58,655	0	58,655
2043	88,286	0	66,626	0	66,626
2044	88,287	0	69,283	0	69,283
2045	88,286	0	71,940	0	71,940
2046	88,286	0	74,597	0	74,597
2047	88,286	0	74,597	0	74,597
2048	88,287	0	77,255	0	77,255
2049	88,286	0	77,255	0	77,255
2050	88,286	0	79,912	8,374	88,286
2051	88,286	0	79,912	8,374	88,286
2052	88,288	0	79,912	8,376	88,288
2053	8,833	0	3,474	5,359	8,833
LOM	3,014,165	0	1,260,746	30,483	1,291,229

Table 20 shows the scope 2 emissions mitigation trajectory over the life of the Proposal. The emissions mitigation trajectory was calculated by subtracting the best practice emissions scenario, where large-scale energy certificates (LGCs) were purchased and surrendered, from the scenario where no emissions mitigation measures were adopted. Further information on scope 2 emissions mitigation measures can be found in Section 5.2.

Table 20 Market-based Scope 2 GHG Emissions Mitigated (t CO₂-e)

YEAR	SCOPE 2 WITHOUT MITIGATION	SCOPE 2 AVOIDED	SCOPE 2 REDUCED	SCOPE 2 OFFSET	SCOPE 2 MITIGATED
2024	349,965	0	0	0	349,965
2025	349,965	0	0	0	349,965
2026	349,965	0	0	0	349,965
2027	352,719	0	0	0	352,719
2028	355,472	0	0	0	355,472
2029	358,225	0	0	0	358,225
2030	363,732	0	0	0	363,732
2031	366,485	0	276,572	0	89,913
2032	369,239	0	278,650	0	90,589
2033	380,252	0	286,962	0	93,291
2034	383,005	0	289,039	0	93,966
2035	385,759	0	291,117	0	94,642
2036	388,512	0	293,195	0	95,317
2037	391,265	0	295,273	0	95,993
2038	399,525	0	301,506	0	98,019
2039	402,279	0	303,584	0	98,695
2040	405,032	0	305,662	0	99,370
2041	407,785	0	307,740	0	100,046
2042	410,539	0	309,818	0	100,721
2043	418,799	0	316,051	0	102,748
2044	421,552	0	318,129	0	103,423
2045	424,305	0	320,207	0	104,099
2046	427,059	0	322,285	0	104,774
2047	427,059	0	322,285	0	104,774
2048	429,812	0	324,363	0	105,450
2049	429,812	0	324,363	0	105,450
2050	432,566	0	326,441	0	106,125
2051	432,566	0	326,441	0	106,125
2052	432,566	0	326,441	0	106,125
2053	38,576	0	29,112	0	9,464
LOM	11,484,394	0	6,795,235	0	4,689,158

The following figures present estimated trajectories of scope 1, 2, and 3 emissions over the life of mine. Scope 2 emissions are location-based unless otherwise stated.

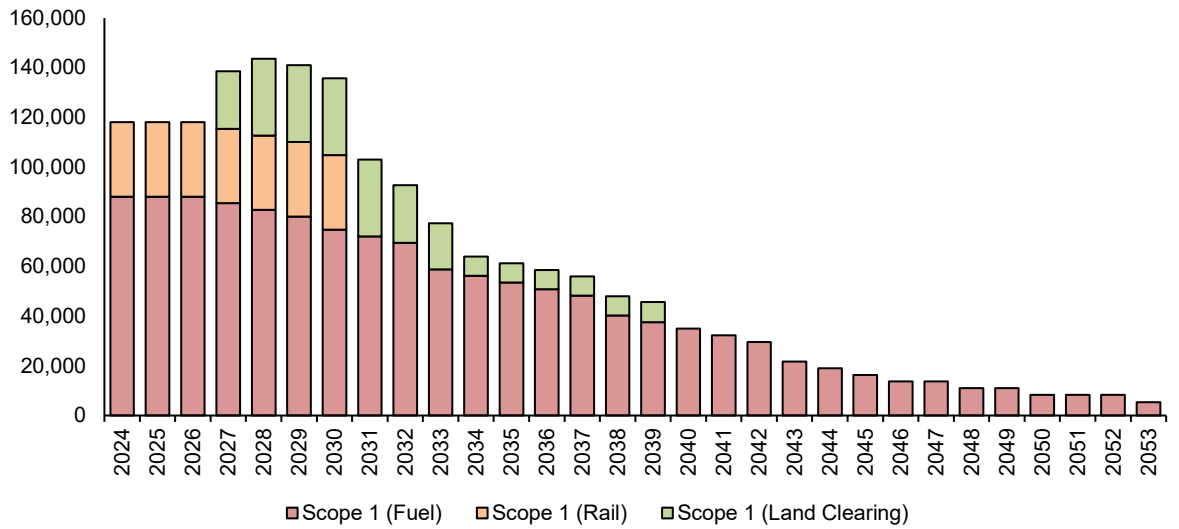


Figure 2 Scope 1 GHG Emissions Trajectory (t CO₂-e)

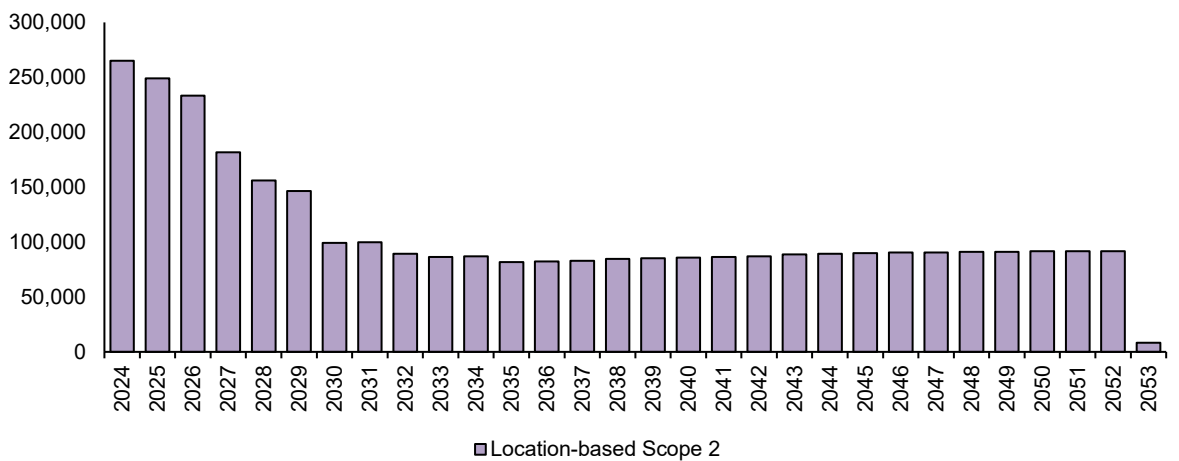


Figure 3 Location-based Scope 2 GHG Emissions Trajectory (t CO₂-e)

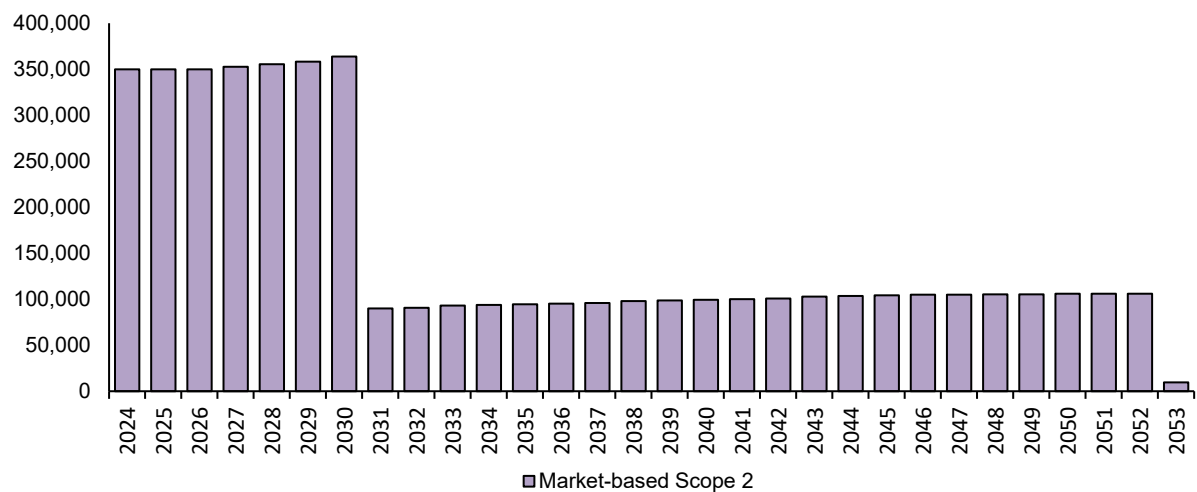


Figure 4 Market-based Scope 2 GHG Emissions Trajectory (t CO₂-e)

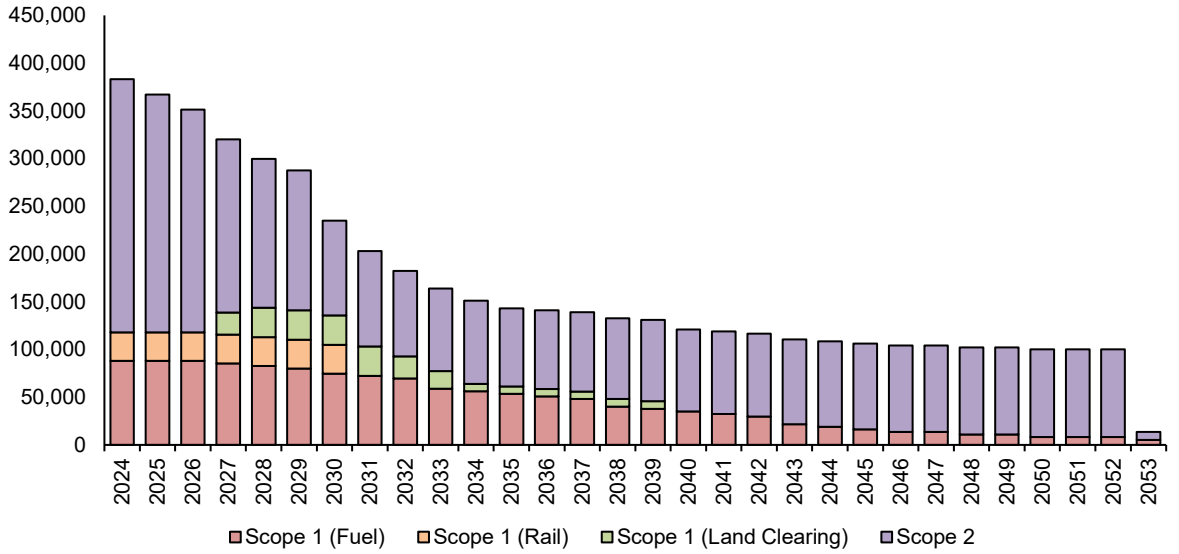


Figure 5 Scope 1 and 2 GHG Emissions Trajectory (t CO₂-e)

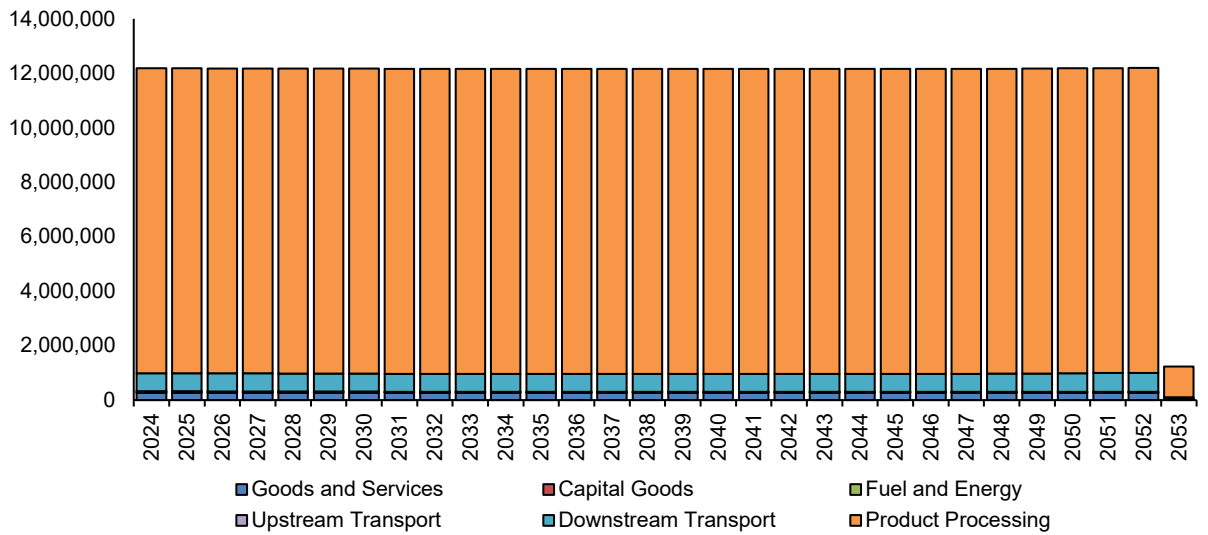


Figure 6 Scope 3 GHG Emissions Trajectory (t CO₂-e)

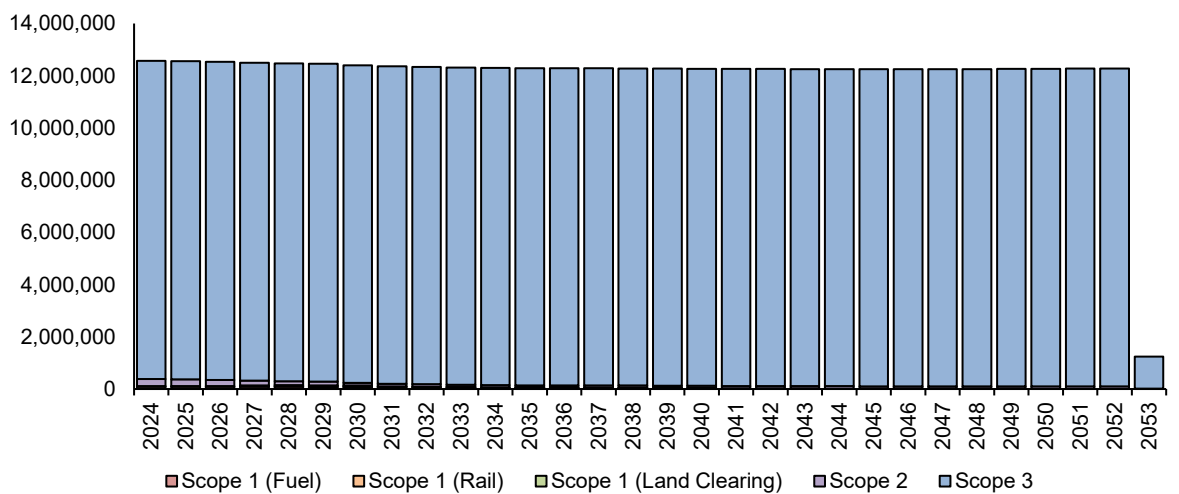


Figure 7 Scope 1, 2, and 3 GHG Emissions Trajectory (t CO₂-e)

The following figure presents estimated the trajectories of scope 1 and 2 emissions over the life of mine, compared to the trajectories without mitigation measures.

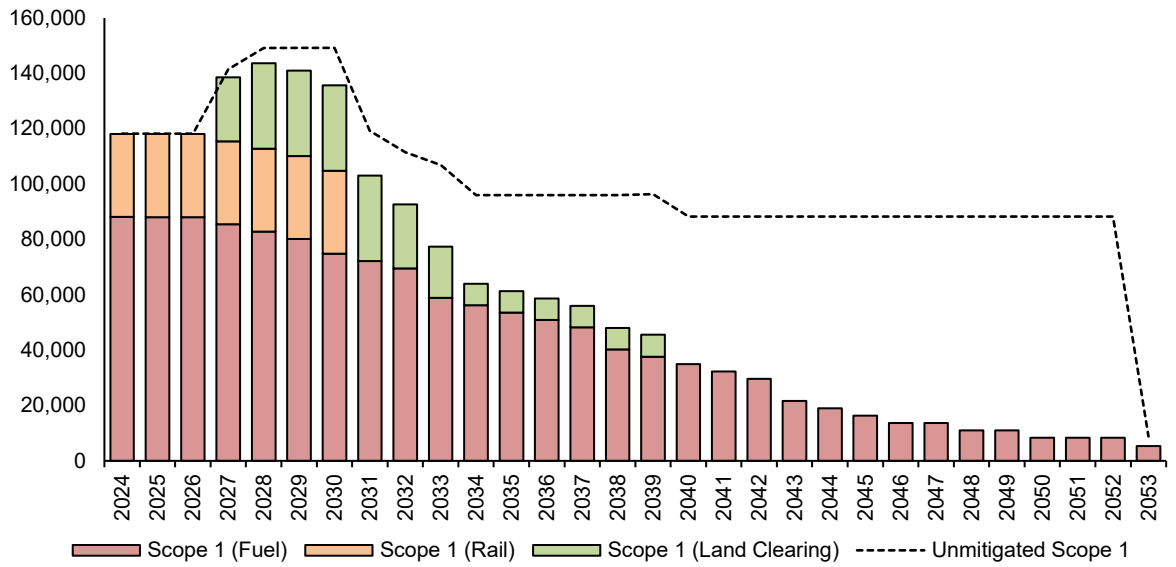


Figure 8 Scope 1 GHG Emissions Trajectory Compared to Unmitigated Emissions (t CO₂-e)

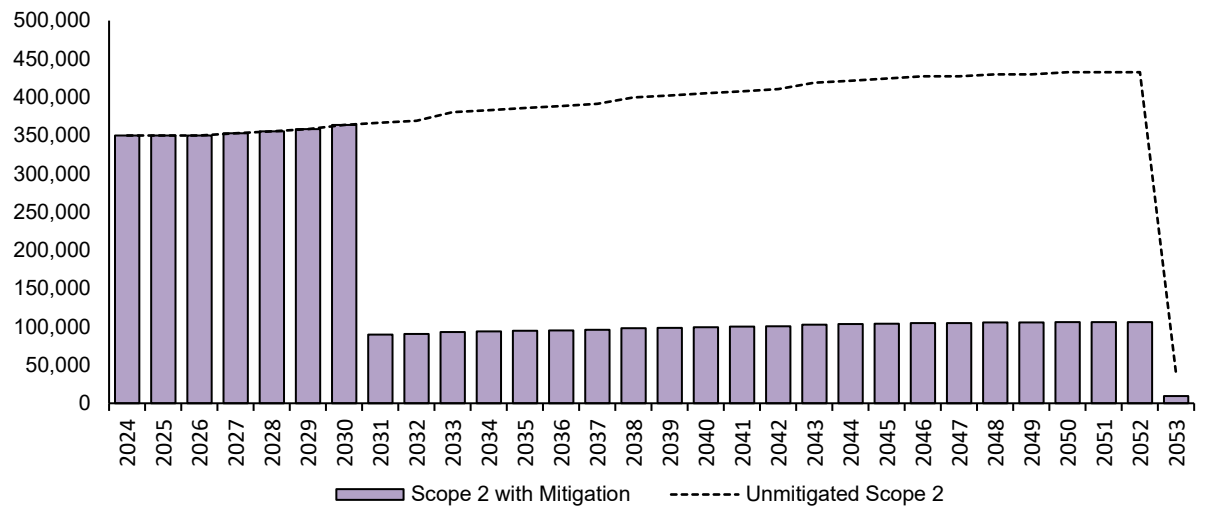


Figure 9 Market-based Scope 2 GHG Emissions Trajectory Compared to Unmitigated Emissions (t CO₂-e)

The following figures present estimated trajectories of scope 1 emissions over the life of mine compared to statutory and non-statutory emissions targets.

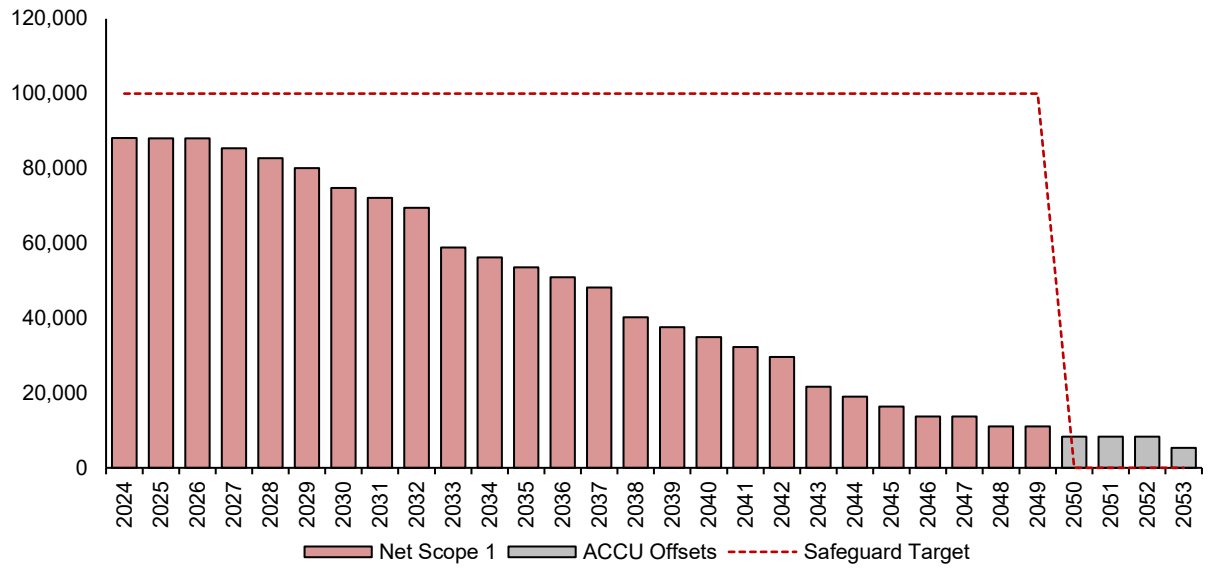


Figure 10 Scope 1 GHG Emissions Trajectory Compared to Statutory Target (t CO₂-e)

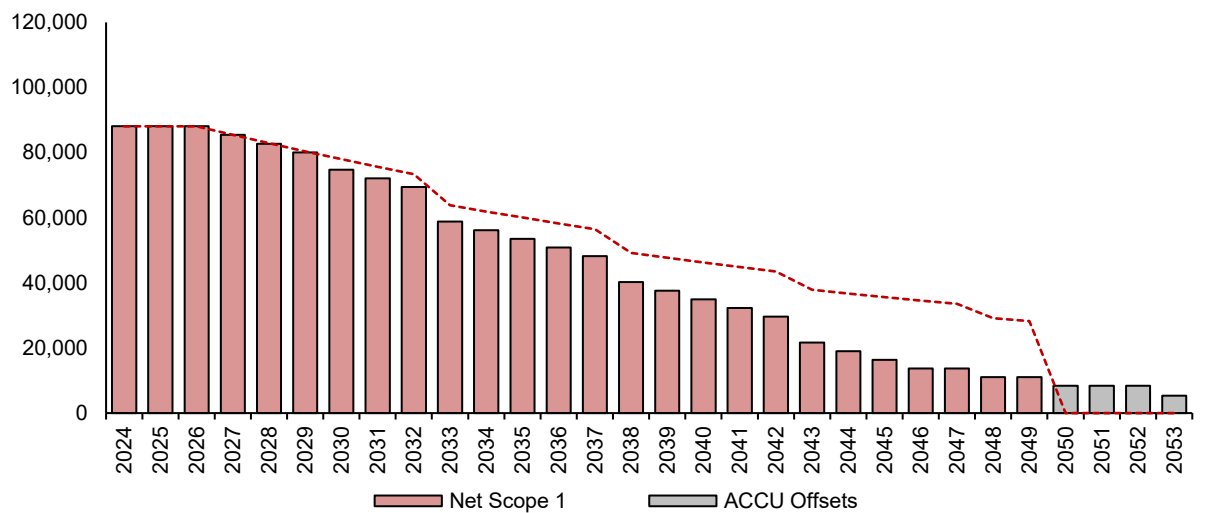


Figure 11 Scope 1 GHG Emissions Trajectory Compared to Non-statutory Target (t CO₂-e)

5 GHG Mitigation Measures

Scope 1, 2, and 3 emissions from the Proposal will be mitigated through best practice design and operational measures, as well as through offsets.

Mitigation measures have been developed through internal consultation with various KML departments and initial consultation with potential renewable energy providers. The selection criteria for those measures were based on a review of the current best industry practices for emission reductions of similar iron ore projects in WA, and an assessment of their feasibility for the Proposal. The best practice review can be found in Appendix C.

In addition, the selection criteria have been consulted with and informed by key contractors and service providers in line with their own targets and mitigation measures through ongoing development of new clean technologies (e.g., decarbonisation program) in their industry sector (e.g., future zero emission vehicles operated by the rail contractor).

5.1 Scope 1 GHG Mitigation Measures

Scope 1 emissions from the Proposal will be mitigated through best practice technologies and operational measures. Technologies and operational measures have been assessed and ranked by effectiveness in Table 28. Emissions that cannot be mitigated through technologies or operational measures will be offset through surrendered carbon credit units. In addition, progressive rehabilitation of native vegetation will be undertaken to offset scope 1 emissions from land clearing.

Mining Activities

The main source of scope 1 emissions from the Proposal is diesel consumption for mining activities, comprising approximately 85% of emissions without mitigation, and 72% of emissions with mitigation, over the life of the mine.

KML is planning to reduce diesel consumption through a staged electrification of its light vehicle fleet and contracted mining fleet. While fleet electrification will increase electricity consumption from the grid, and therefore increase scope 2 emissions, this increase in scope 2 emissions will not completely offset the scope 1 emissions mitigated from decreased diesel consumption. This is because electric vehicles are more energy efficient (around 90% efficient) compared to diesel vehicles (around 30% efficient).

Fleet electrification will be dependent on the availability of technology; the electric mining vehicle market is still in its early stages and it is uncertain when they will become widely commercially available. Fleet electrification will also be dependent on the electrical infrastructure at the facility, such as charging stations and transmission lines. According to the Climate Change Authority's (CCA) Sector Pathways (2024), widespread deployment of fleet electrification is not expected to begin until 2030-2035, with larger mining companies and underground mining operations likely becoming the first adopters.

- KML is proposing to electrify its light vehicle fleet from 2027 onwards.
- KML is also proposing that its main mining contractor will electrify the mining fleet in five-year increments from 2032 onwards (10% every five years). If these targets are achieved, this will mean KML is in line with the sector timeline proposed by the CCA.
- Based on current electrification targets, fleet electrification is expected to reduce 1,254,746 t CO₂-e of scope 1 emissions.

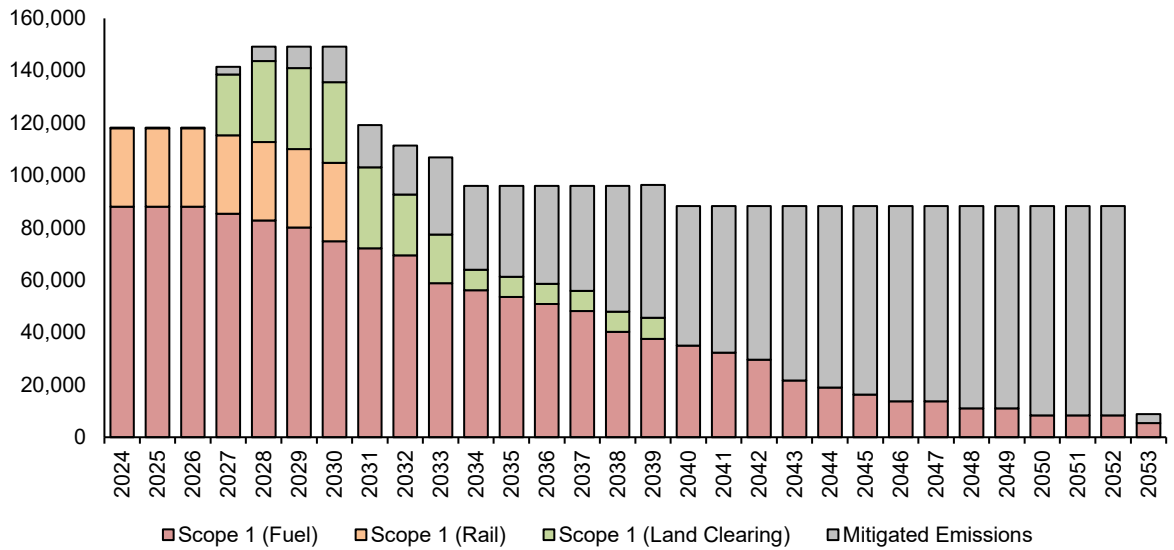


Figure 12 Scope 1 GHG Emissions Mitigated (t CO₂-e)

KML is also planning to reduce emissions from mining activities through other operational measures. Some of these measures have already been implemented.

- KML has switched to high-efficiency diesel in 2023, with the aim of reducing diesel consumption. High-efficiency diesel is assumed to reduce diesel consumption by approximately 0.23% and reduce scope 1 emissions by approximately 200 t CO₂-e/year. It should be noted that these emissions reductions are calculated using the energy content and emission factors from the NGER Determination, rather than with fuel-specific emission factors.
- KML is investigating ways to minimise the use of diesel-fired generators during power outages, such as switching to renewable energy generators. This will reduce scope 1 emissions from diesel-fired generators.
- KML is investigating ways to ways to replace diesel-powered ancillary equipment, such as lighting plants, with renewable energy assets. This will reduce scope 1 emissions from ancillary equipment.

Rail Haulage Activities

Emissions from haulage of iron ore are expected to reach zero emissions in 2030, because the rail haulage contractor is planning to switch from diesel-powered trains to zero emissions trains by application of Battery Electric Locomotives and Battery Electric Tender. The rail haulage contractor also has an overall net zero target for its operational emissions in 2050.

Carbon Offsets

While KML’s goal is to mitigate scope 1 emissions using best available technologies and best practice operational measures, there will likely be emissions that cannot be mitigated due to limitations in technology availability. Emissions that cannot be otherwise mitigated to fulfill statutory and non-statutory emissions targets are proposed to be offset using surrendered carbon credit units. Further information on offsets can be found in Section 5.6.

Rehabilitation

The proposed disturbance areas associated with the Proposal will be progressively revegetated. It is assumed revegetation will occur after the end of life of mine, and therefore emissions offset from revegetation have not been quantified in this GHG management plan.

5.1.1 Benchmarking against the Safeguard Mechanism

To benchmark against the Safeguard Mechanism, the scope 1 emissions intensity is estimated based on forecast production of run-of-mine (ROM) iron ore. Run-of-mine iron ore follows the definition in Safeguard Mechanism: Prescribed Production Variation and Default Emissions Intensities (DCCEEW, 2024), as tonnes of saleable iron ore that is suitable for or has undergone primary crushing, prior to processing (e.g., beneficiation or concentrating).

$$emission\ intensity = \frac{scope\ 1\ GHG\ emissions}{ROM\ iron\ ore}$$

The average scope 1 emissions intensity for the Proposal is estimated as 0.00226 t CO₂-e/t iron ore (excluding emissions from rail haulage and land clearing).

Figure 13 outlines the scope 1 emission intensity of the Proposal over the life of mine, based on the expected operational throughput.

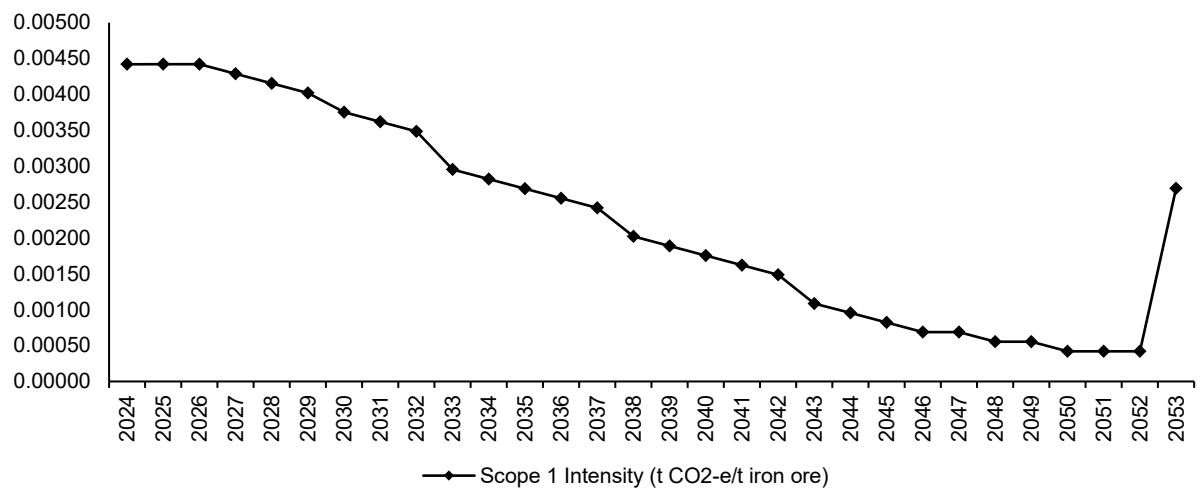


Figure 13 Scope 1 GHG Emissions Intensity Trajectory (t CO₂-e/t iron ore)

Table 21 compares the estimated annual emissions intensity of the Proposal with default and best practice emissions intensities specified in the Safeguard Mechanism Rule, in Schedule 1, Part 14, Section 20.

The scope 1 emissions intensity of the Proposal is expected to be lower than the default emissions intensity and higher than the best practice emissions intensity. It should be noted that emissions intensities from the Safeguard Mechanism are based on both hematite and magnetite iron ore mines, and hematite mines have lower emissions compared to magnetite mines; hematite iron ore tends to be lower in grade and requires less processing, whereas magnetite iron ore tends to be higher in grade and require an additional stage of processing to produce a concentrate. Though magnetite mines have higher emissions, the higher-grade magnetite iron ore is associated with lower downstream emissions in steelmaking plants.

Table 21 Safeguard Scope 1 GHG Emissions Intensities Benchmark

PROJECT	IRON ORE PRODUCTION (t/year)	EMISSIONS INTENSITY (t CO ₂ -e/t ore)
Proposal		
Expected operations	19,931,272	0.00226
Highest intensity year ¹	19,931,272	0.00442
Maximum nameplate	20,000,000	0.00487
Safeguard Mechanism		
Default	N/A	0.00476
Best practice	N/A	0.00188

¹Highest intensity year is 2024.

5.1.2 Benchmarking against Industry Peers

To benchmark against peers, the scope 1 emissions intensity for is estimated based on forecast sales of iron ore concentrate.

$$\text{emission intensity} = \frac{\text{scope 1 GHG emissions}}{\text{iron ore concentrate}}$$

The average scope 1 emissions intensity for the Proposal is estimated as 0.00562 t CO₂-e/t iron ore (excluding emissions from rail haulage and land clearing).

Table 22 compares the estimated emissions intensity of the Proposal with other magnetite iron ore mines in Western Australia. For comparability purposes, the table does not consider emissions mitigations from offsets.

The scope 1 emissions intensity from the Proposal is expected to be similar to the proposed Ridley Magnetite Project, and lower than other proposed (North Star Magnetite Project, Southdown Magnetite Project, and Yogi Magnetite Project) and existing (Cape Preston) magnetite mines in Western Australia. Scope 1 emissions mitigation measures adopted by the proposed magnetite mines are similar to the Proposal.

- North Star Magnetite Project and Yogi Magnetite Project have published their scope 1 emissions reduction targets: North Star Magnetite Project will have an annual reduction target of 2% each year and Yogi Magnetite Project will have a five-year reduction target of 25% every five years. Ridley Magnetite Project and Southdown Magnetite Project have not published their scope 1 emissions reduction targets, but state they will publish them in future GHG management plans.
- Ridley Magnetite Project, North Star Magnetite Project, and Southdown Magnetite Project will purchase electricity from the grid, which will avoid scope 1 emissions from electricity generation but increase scope 2 emissions. Yogi Magnetite Project will generate electricity from an onsite power station, and reduce scope 1 emissions through the inclusion of solar photovoltaic, wind, and Battery Energy Storage System (BESS) in their power station design.

- North Star Magnetite Project, Southdown Magnetite, and Yogi Magnetite Project will reduce their diesel consumption by transitioning their mining fleet, or a portion of their mining fleet, from diesel vehicles to electric vehicles.
- North Star Magnetite Project, Southdown Magnetite, and Yogi Magnetite Project will surrender carbon credits if they are unable to reach their emissions reduction targets through other measures.

Table 22 Peer Scope 1 GHG Emissions Intensities Benchmark

PROJECT	LOCATION	CONCENTRATE PRODUCTION (t/year)	SCOPE 1 EMISSIONS INTENSITY (t CO ₂ -e/t ore)
Proposal			
Expected operations	WA	8,000,000	0.00562
Highest intensity year ¹	WA	8,000,000	0.01101
Maximum nameplate	WA	8,200,000	0.01188
Peers			
Ridley Magnetite Project ²	WA	16,500,000	0.00564
North Star Magnetite Project ³	WA	15,000,000	0.01060
Southdown Magnetite Project ⁴	WA	7,000,000	0.01758
Yogi Magnetite Project ⁵	WA	5,000,000	0.04400
Sino Iron Project - Cape Preston ⁶	WA	21,000,000	0.05910

¹Highest intensity year is 2024.

²Calculated from *Ridley Magnetite Project Referral Document*, based on Stage 2 of operations.

³Obtained from *North Star Magnetite Project Extension GHG MP*.

⁴Calculated from *Southdown Magnetite Project Revised Proposal Referral Supporting Document*.

⁵Obtained from *Yogi Magnetite Project GHG MP*. Includes emissions from onsite electricity generation.

⁶Calculated from *Citic Pacific Financial Review 2023* and *NGER Safeguard Facilities Data 2022-23*. Includes emissions from onsite electricity generation.

5.1.3 GHG Emissions from the Project

Total estimated emissions for Australia from the Department of Climate Change, Energy, the Environment and Water in FY2022-23 was 465 million t CO₂-e (DCCEEW, 2023a).

Corporations in FY2022-23 reported a total of 310 million t CO₂-e scope 1 emissions and 84 million t CO₂-e scope 2 emissions (CER, 2023a). Western Australia contributed 22.2% of Australia's scope 1 emissions. Around 30.3% of Australia's scope 1 emissions were derived from the mining industry (CER, 2024a).

To provide a perspective on the Proposal's likely impact, scope 1 emissions estimates, including emissions from land clearing, have been compared against state and national emissions estimates and displayed in Table 23.

Table 23 Estimated Impact of Annual Scope 1 GHG Emissions

LOCATION	FY2023 SCOPE 1 GHG EMISSIONS (million t CO ₂ -e)	% ANNUAL CONTRIBUTION FROM THE PROPOSAL
Western Australia ¹	69	0.09%
Australia ²	465	0.01%

¹Sourced from Clean Energy Regulator (CER, 2024a). Only corporations that exceed NGER reporting thresholds are required to report to the NGER Scheme.

²Sourced from Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2023 (DCCEEW, 2023a).

Scope 1 emissions estimates up to 2030 have also been compared to Australia's emissions budget (based on a 43% reduction by 2030) and displayed in Table 24.

Table 24 Estimated Impact of Scope 1 GHG Emissions from 2021 to 2030

LOCATION	GHG EMISSIONS BUDGET TO 2030 (million t CO ₂ -e)	% CONTRIBUTION FROM THE PROPOSAL
Australia	4,381	0.02%

5.2 Scope 2 GHG Mitigation Measures

Scope 2 emissions from the Proposal will be mitigated through best practice technologies and operational measures. Technologies and operational measures are assessed and ranked by effectiveness in Appendix C.

Scope 2 emissions will be reduced through Power Purchase Agreements (PPAs) with renewable energy generators, by surrendering the generated large-scale energy certificates (LGCs) to the Renewable Energy Certificate (REC) registry. KML will voluntarily surrender LGCs to the REC registry in the year that they are generated. This will be in addition to KML's mandatory obligations under the Renewable Energy Target (RET).

- KML is undergoing discussions with a renewable energy generator in the Mid-West to supply around 80% of electricity each year through the existing grid infrastructure. This is expected to commence in 2031 and extend until the end of the Proposal. 100% of electricity supplied by the renewable energy generator is considered renewable and will generate equivalent LGCs.
- While the surrender of LGCs will have no effect on location-based scope 2 emissions, there will be an average reduction of 233,315 t CO₂-e/year in market-based scope 2 emissions, or 6,795,235 t CO₂-e over the life of mine.

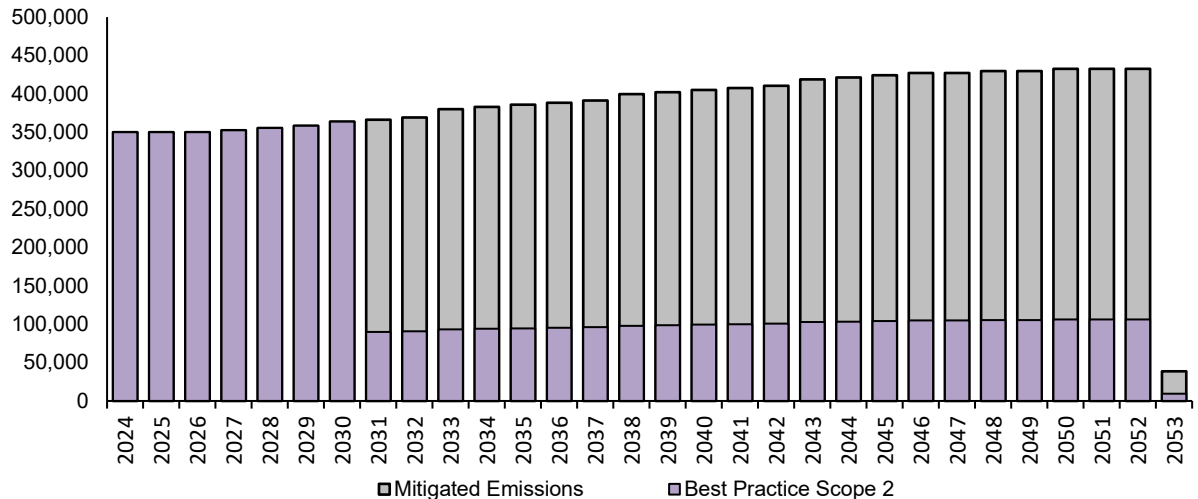


Figure 14 Market-based Scope 2 GHG Emissions Mitigated (t CO₂-e)

KML has also investigated the effectiveness of following other measures to mitigate scope 2 emissions.

- KML has assessed the potential for an onsite wind farm located at the Proposal or alongside the Karara Transmission Line. It would be owned and operated by an independent power supplier. The independent energy supplier provided a pre-feasibility desktop study based on wind resource, distance to transmission network, and other constraints (environmental, pastoral and mining leases, dwellings, native title etc.). KML has evaluated the findings of the pre-feasibility study and determined that it would not be feasible to acquire electricity requirements from the wind farm.
- KML has assessed the potential for an onsite hybrid renewable power station located at the Proposal site. However, it was considered less effective than a PPA with an offsite power station, because it would require construction of additional infrastructure and clearing of additional land. The additional clearing and construction activities may increase scope 1 and 3 emissions for the Proposal, as fuel combustion would be used for a proportion of the electricity generation.
- If zero mitigation measures are undertaken by KML, scope 2 emissions would still decrease over the life of mine due to increasing integration of renewable energy into the South West Interconnected (SWIS) grid; this is reflected in the projected location-based emissions intensities in the DCCEEW's *Australia's Emissions Projections 2023*. However, this would not be reflected in calculated market-based emissions, and would not align with KML's net zero targets.

5.3 Scope 3 GHG Mitigation Measures

The largest sources of scope 3 emissions are upstream emissions from purchased goods and services, fuel and energy-related activities, downstream transportation and distribution, and processing of sold product.

Emissions from purchased goods and services are estimated based on expenditure, which makes it difficult to determine where emissions can be reduced. KML has committed to acquiring goods and services from suppliers and contractors in the local community where possible. Local suppliers and contractors are subject to Western Australia's emissions

reduction regulations, and any reductions in their scope 1 or 2 emissions will flow on to reductions in KML's purchased goods and services emissions.

KML will reduce scope 3 emissions from fuel and energy-related activities by reducing fuel consumption, which will reduce the emissions associated refining and transporting that fuel. Emissions from fuel and energy-related activities are expected to be emitted both domestically and internationally. Emissions from energy-related activities are emitted within Western Australia, and, according to *Australia's Emissions Projections 2023*, likely decrease over the life of mine due to increased integration of renewable energy, while emissions from diesel-related activities are likely emitted overseas, as over 70% of Australia's diesel is refined in other countries.

Emissions from downstream transportation and distribution will be emitted from mixing and storage of iron ore at Geraldton Port and shipment of iron ore to Chinese processing plants.

- Emissions from mixing and storage of iron ore at Geraldton Port are not material and are under the operational control of KML. KML can mitigate emissions at Geraldton Port by switching to high-efficiency diesel and optimising operations to reduce diesel and electricity consumption.
- Emissions from shipment of iron ore are emitted internationally, and therefore difficult for KML to mitigate.

Emissions from the processing of iron ore in Chinese processing plants are expected to be the largest source of scope 3 emissions. Chinese processing facilities will be subject to China's 'dual carbon' goal of peak carbon emissions before 2030 and net zero carbon emissions by 2060.

While emissions from employee commute are less material compared to other scope 3 emissions categories, KML is dedicated to reducing emissions from employee commute by encouraging employees to commute by bus or carpool instead of personal vehicles. KML also proposes to optimise bus commute between the mine site and Geraldton to reduce emissions from employee commute.

5.4 Statutory GHG Emissions Reduction Targets

5.4.1 Safeguard Mechanism

Starting on 1 July 2016, the Australian Government introduced a Safeguard Mechanism under section 22XS of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). Facilities that emit 100,000 t CO₂-e or more of scope 1 emissions will be liable to meet Safeguard requirements, including applying for a set baseline and keeping scope 1 emissions at or below the baseline. If scope 1 emissions exceed the baseline, the facility will be required to surrender Australian Carbon Credit Units (ACCUs) or Safeguard Mechanism Credits (SMCs) to 'make good' the excess emissions or be liable to a substantial penalty.

Reforms to the Safeguard Mechanism apply a decline rate to facilities' baselines so that they are reduced on a trajectory consistent with achieving Australia's emissions reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. The decline rate will be set at 4.9% each year to 2030. The decline rates post-2030 will be set in predictable five-year blocks after updates to Australia's commitments under the Paris Agreement.

The safeguard baseline for the Proposal has been estimated in Figure 15, using the calculation method in Section 11 of the Safeguard Mechanism Rule. In any year that the

Proposal exceeds the baseline, KML will be required to ‘make good’ the excess emissions by purchasing and surrendering ACCUs or SMCs. The Proposal is expected to exceed the baseline in the years between 2050 and 2053, and KML is expected to surrender a combined 30,483 ACCUs over those years.

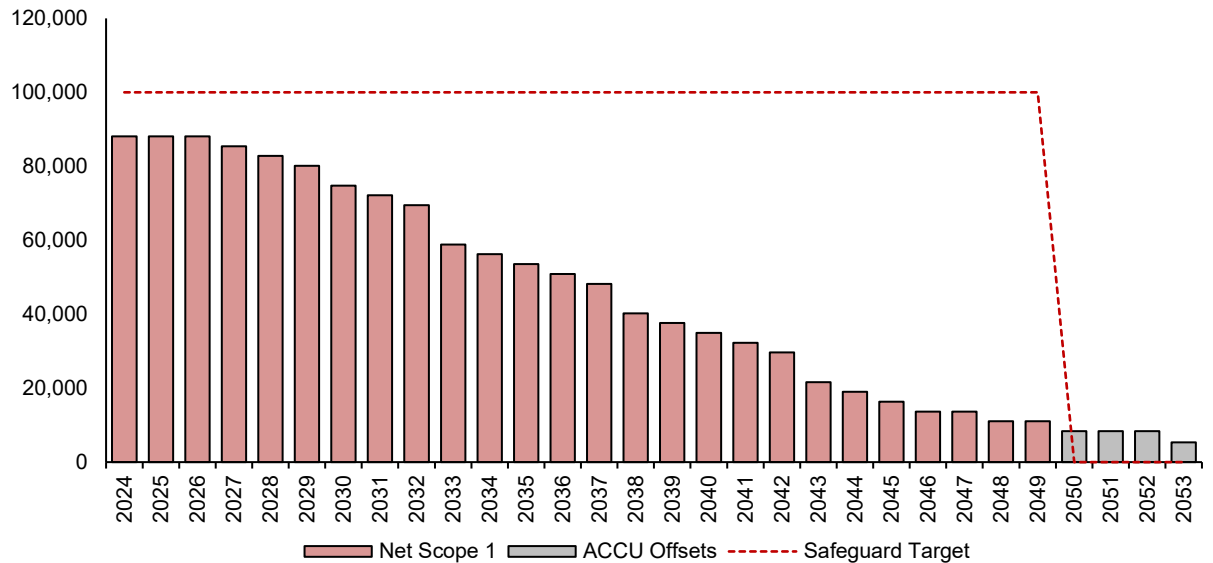


Figure 15 Safeguard Baseline Projection (t CO₂-e)

5.5 Non-statutory GHG Emissions Reduction Targets

Australia has a net zero target in 2050, and an interim target of 43% below 2005 levels by 2030 (Australian Government, 2022). Based on the interim target, Australia’s emissions budget from 2021 to 2030 is 4,381 Mt CO₂-e. Australia is a party to the Paris Agreement and will be required to submit an updated interim target every five years. Western Australia has a net zero target in 2050 (WA Government, 2020). Western Australia is currently the only state that has not set an emissions reduction target for 2030.

Under section 15 of the EP Act, the WA EPA has the objective to protect the environment and to prevent, control, and abate environmental harm. The EPA’s view is that there should be a deep, substantial, and sustained reductions in WA’s emissions in the current decade, reaching net zero emissions no later than 2050 through a straight-line trajectory from 2030. The EPA emphasises that reductions beyond these should also be made as far as practicable, and that WA emissions should reach net zero well before 2050.

In alignment with the state and federal net zero target, KML has a target to achieve net zero scope 1 emissions by 2050 or earlier. In order to reach the target, KML proposes an emissions reduction of 3% for the Proposal every year. In addition, from 2032 onwards, KML proposes an emissions reduction of 10% every five years. The five-year emissions reduction targets are aligned with the five-year contract with the mining contractor for the Proposal.

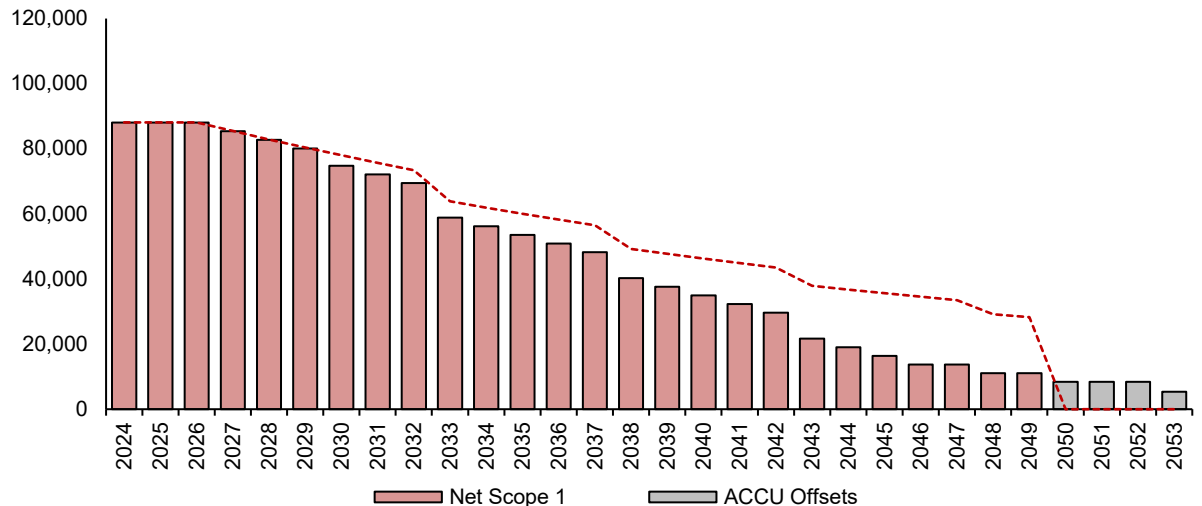


Figure 16 KML's Scope 1 GHG Emissions Reduction Targets (t CO₂-e)

5.6 Offsets

KML will use carbon offsets to mitigate scope 1 emissions from the Proposal where it is not possible to meet statutory and non-statutory targets through other mitigation measures. Australian Carbon Credit Units (ACCUs) will be purchased and surrendered to fulfill regulatory requirements for the Safeguard Mechanism, and also to fulfil KML's internal emissions reduction targets.

5.6.1 Australian Carbon Credit Units (ACCUs)

ACCUs are generated by emissions abatement projects registered and certified under the Australian Government's Emissions Reduction Fund (ERF). Each ACCU represents 1 t CO₂-e emissions abated in Australia. Projects registered under the ERF include carbon capture and storage, carbon sequestration, waste management, and reforestation.

ACCUs are managed by the Clean Energy Regulator (CER), which closely monitors the supply and demand of ACCUs to ensure that ACCUs will be available to buyers for compliance obligations or voluntary commitments. The number of ACCUs surrendered each year, either voluntarily or to fulfill Safeguard obligations, are published on the CER website. The offsets integrity standards for ACCUs are set out in Section 133 of the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

SMCs can also be used to fulfil Safeguard obligations. However, SMCs are not considered offsets as they exist only within the Safeguard Mechanism's regulated emissions limit.

5.7 Projects Operating Beyond 2050

KML has a net zero emissions target in 2050 in accordance with the federal and state targets. The Proposal is expected to cease operations in 2053, and, if it is not possible for the Proposal to operate at zero emissions after 2050, KML will use carbon offsets to mitigate the excess emissions. Australian Carbon Credit Units (ACCUs) will be purchased and surrendered to reach net zero emissions.

6 Management Plan Review and Adaptive Management

In line with the concept of adaptive management, the management and mitigation measures will be reviewed and updated (where appropriate) in response to triggers such as:

- Introduction of a new process or activity that could potentially alter existing emissions,
- Changes to relevant State or Commonwealth legislation, policy, or guidelines,
- Introduction of new emissions reduction technologies,
- Technical review of implemented emissions monitoring,
- Relevant audit findings, or
- EPA and decision-making authorities' comments during the environmental approval process.

6.1 GHG Monitoring and Reporting

6.1.1 Climate and Sustainability Reporting

KML will publish a climate action statement on its website, that outlines emissions reduction targets and mitigation measures, including timelines and budgets. The climate action statement will be reviewed every five years and updated in alignment with the five-year milestones set out in the Paris Agreement. The annual progress of the emissions reduction targets and mitigations measures will be tracked in KML's annual NGER submissions.

6.1.2 National Greenhouse and Energy Reporting (NGER)

The NGER scheme is a Commonwealth initiative introduced in 2007 to provide data and accounting in relation to GHG emissions and energy consumption and production. Under the NGER scheme, corporations that exceed the corporate or facility thresholds need to report annually to the CER (Table 25).

Table 25 NGER Thresholds

LEVEL	GHG EMISSIONS	ENERGY CONSUMED / PRODUCED
Facility	25,000 t CO ₂ -e	100,000 GJ
Corporate	50,000 t CO ₂ -e	200,000 GJ

The controlling corporation (as defined in the NGER Act) responsible for reporting for the Proposal is Karara Mining Limited (KML).

KML is registered under Section 12 of the NGER Act and is responsible for reporting emissions and energy data from the current KIOP and the Proposal. Each year, scope 1 and 2 emissions from the Proposal will be published on the CER website.

6.1.3 Safeguard Mechanism

If the Proposal exceeds the 100,000 t CO₂-e Safeguard threshold in any year, the following information will be published to the CER website:

- Baseline applicable to the Proposal (100,000 t CO₂-e),
- Scope 1 emissions,
- Scope 1 emissions that exceed the baseline emissions, and
- Number of ACCUs surrendered, either voluntarily or to 'make good' on excess emissions.

If the number of ACCUs surrendered is greater than 30% of baseline emissions, KML will be expected to provide a written statement explaining why more carbon abatement was not undertaken during the reporting period. This statement will be published along with the published emissions.

The Proposal is not expected to exceed 100,000 t CO₂-e baseline in any year. The Proposal is only expected the zero emissions baseline in 2050. It is not known which reporting requirements will be applied to corporations that exceed the

6.2 Stakeholder Consultation

KML has been engaging with relevant internal and external stakeholders on the GHGs emission reductions associated with the Proposal.

The consultation to date has focused on the discussions around the potential mitigation measures to be taken to reduce scope 1, 2, and 3 emissions from the Proposal to meet both short-term internal target at approximately 3% per annum and the industry's target of net zero emissions by 2050. The details of the stakeholder consultation are recorded in the Stakeholder Engagement register, which forms part of the KML Environmental Management System (EMS) and is updated on an ongoing basis. A summary of ongoing stakeholder engagements for the GHGs emissions management undertaken for the Proposal to date are provided in in Appendix D.

KML proposes to continue stakeholder engagement and consultation during the life of the GHG management plan. Ongoing internal consultation will be undertaken through a designated 'Clean Development Committee' involving representatives from each department through regular communications, including, but not limited to emails, teleconferences, meetings, and workshops.

Ongoing consultations with external parties, particularly the renewable energy suppliers and the key mine contractors, are proposed for potential cooperation on the renewables projects in the mid-west region and electrification of mining fleet etc. so as to reduce most of the scope 1 and 2 emissions throughout the life of mine.

Appendix A Glossary

TERMS	DEFINITIONS
ACCU	Australian Carbon Credit Unit
CCA	Climate Change Authority
CER	Clean Energy Regulator
CO ₂ -e	Carbon dioxide equivalence, the amount of the gas multiplied by a value specified in the regulations in relation to that kind of greenhouse gas.
Determination	<i>NGER Determination 2008</i>
Downstream emissions	Indirect GHG emissions related to sold goods and services
EPA	Western Australian Environmental Protection Authority
EP Act	Environmental Protection Act 1986
ERF	Emissions Reduction Fund
Facility	Is a single enterprise that undertakes an activity, or a series of activities that involve greenhouse gas emissions, the production of energy or the consumption of energy.
GHG	All greenhouse gases mentioned in the Environmental Factor Guideline for Greenhouse Gas Emissions
GWP	Global Warming Potential
LGC	Large-scale generation certificate
LPG	Liquefied petroleum gas
NGER	National Greenhouse and Energy Reporting
NGER Act	<i>NGER Act 2007</i>
Non-transport	Includes purposes for which fuel is combusted that do not involve transport energy purposes, see Sections 2.20, and 2.42 of the Determination.
PER	Public Environmental Review
PPA	Power Purchase Agreement
REC	Renewable Energy Certificate
RET	Renewable Energy Target
Safeguard Rule	<i>NGER (Safeguard Mechanism) Rule 2015</i>
Scope 1	Emission of greenhouse gas, in relation to a facility, means the release of greenhouse gas into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility.
Scope 2	Emission of greenhouse gas, in relation to a facility, means the release of greenhouse gas into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.
Scope 3	Indirect emissions of greenhouse gas, that are not included in scope 2, that occur in the value chain of the reporting company.
SMC	Safeguard Mechanism Credit
SWIS	South West Interconnected System
Transport	Includes purposes for which fuel is combusted for transport by vehicles registered for road use, rail transport, marine navigation, and air transport, see Sections 2.20, and 2.42 of the Determination
UNFCCC	United Nations Framework Convention on Climate Change
Upstream emissions	Indirect GHG emissions related to purchased or acquired goods and services

Appendix B Scope 3 Categories

Table 26 shows descriptions and examples for each scope 3 category defined by the GHG Protocol.

Table 26 Scope 3 Category Definitions (GHG Protocol, 2011)

CATEGORY	DESCRIPTION
1. Purchased goods and services	All emissions from the production of products and services purchased or acquired by the reporting company in the reporting period. <i>Example: The emissions associated with the extraction, production and transportation (between suppliers) of copper that is purchased by the reporting company to create bronze.</i>
2. Capital goods	All upstream emissions from the production of capital goods purchased by the company in the reporting period. <i>Example: Emissions associated with the production of excavators used by the reporting company.</i>
3. Fuel- and energy-related activities (Not included in scope 1 or scope 2)	All emissions related to the production (extraction, processing, transport etc.) of fuel and energy purchased by the reporting company, that are not included in the company's scope 1 and scope 2 emissions. <i>Example: The emissions from extracting crude oil, processing it to form diesel and transporting it to a site run by the reporting company.</i>
4. Upstream transportation and distribution	All emissions resulting from the transportation and distribution of purchased products, between a company's tier 1 suppliers and its own operations, in vehicles not owned by the reporting company, as well as any third-party transportation and distribution services purchased by the reporting company between a company's own facilities. <i>Example: Emissions from transportation of purchased copper between the supplier and the reporting company's bronze manufacturing facility.</i>
5. Waste generated in operations	All emissions from third-party treatment and disposal of waste that is generated by the company in the reporting period. <i>Example: Waste sent from the reporting company's site facilities for recycling, disposal at landfills, incineration, composting, etc.</i>
6. Business travel	All emissions from the transportation of employees for business-related activities in vehicles owned or operated by third-parties. <i>Example: Flights to business conferences and meeting suppliers.</i>
7. Employee commuting	All emissions from the transportation of employees between their homes and worksites. <i>Examples: FIFO and DIDO to site.</i>
8. Upstream leased assets	All emissions from the operation of leased assets that are not included in the company's scope 1 and 2 emissions inventory. <i>Example: Emissions from leased cars, offices and buildings.</i>
9. Downstream transportation and distribution	All emissions from third-party transport and distribution of the company's sold products in the reporting period. <i>Example: Emissions from third-party marine transportation of iron ore sold by the reporting company to be processed by another company.</i>
10. Processing of sold products	All emissions from processing of sold intermediate products by third-parties, subsequent to the sale of the product by the reporting company. <i>Example: Emissions from processing of iron ore sold by the reporting company to create steel.</i>

CATEGORY	DESCRIPTION
11. Use of sold products	All emissions from the use of goods and services sold by the reporting company in the reporting period. <i>Example: Emissions from the combustion of diesel, produced by the reporting company, as fuel for cars.</i>
12. End-of-life treatment of sold products	All emissions from the waste disposal or treatment of products sold by the company in the reporting period, at the end of their life. <i>Example: Emissions from recycling of metal cans sold by the reporting company.</i>
13. Downstream leased assets	All emissions from the operation of assets owned by the company and leased to third-parties in the reporting period, if they are not included in the company's scope 1 and scope 2 emissions. <i>Example: Emissions from electricity used in offices/buildings leased by the reporting company to other operations.</i>
14. Franchises	All emissions from the operation of franchises, by franchisees, not included in the franchisor's scope 1 and scope 2 emissions. <i>Example: Emissions from operations associated with a company's trademark.</i>
15. Investments	All emissions associated with operating the reporting company's investments in the reporting period. <i>Example: Emissions associated with a mine a company has a financial investment in but not operational control.</i>

Source: GHG Protocol (2011)

The GHG Protocol recommends that companies identify which scope 3 activities are expected to have the highest emissions, offer the most significant reduction opportunities, and are most relevant to the company's goals. Table 27 provides guidance on how to identify relevant scope 3 activities.

Table 27 Criteria for Identifying Relevant Scope 3 Activities (GHG Protocol, 2011)

CRITERIA	DESCRIPTION
Size	They contribute significantly to the company's total anticipated scope 3 emissions.
Influence	There are potential emissions reductions that could be undertaken or influenced by the company.
Risk	They contribute to the company's risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks).
Stakeholders	They are deemed critical by key stakeholders (e.g., customers, suppliers, investors).
Outsourcing	They are outsourced activities previously performed in-house or activities outsourced by the reporting company that are typically performed in-house by other companies in the reporting company's sector.
Sector guidance	They have been identified as significant by sector-specific guidance.
Other	They meet any additional criteria for determining relevance developed by the company or industry sector.

Source: GHG Protocol (2011)

Appendix C Best Practice Review

Design and operational best practice measures to mitigate emissions at the Proposal are assessed, categorised by activity type, and ranked by effectiveness within each activity type in Table 28. The measures were developed through internal consultation with various KML's departments, as well as external consultation with potential renewable energy providers. The measures were initially selected based on a review of the current best industrial practices for emission reductions of similar iron ore projects in WA, and then assessed for feasibility. Measures that are currently not considered feasible may be reassessed in the future, as lower emissions technology becomes increasingly available.

The comparison of design and operational best practice measures with industry peers can be found in Section 5.1.1.

Table 28 Best Practice Review

DESIGN / OPERATIONAL MEASURE	MITIGATION HIERARCHY	DESCRIPTION	EMISSIONS MITIGATED OVER LOM	STATUS
Electricity				
Onsite wind farm	Avoid	An onsite wind farm, owned and operated by an independent electricity supplier, will generate renewable electricity and avoid scope 2 emissions from electricity purchased from the grid.	Not calculated	Assessed and considered not feasible. The scale and size of the wind farm needed to supply the electricity requirements may not be feasible to construct at the location of the Proposal site.
Onsite hybrid renewable power station	Avoid	An onsite hybrid renewable, owned and operated by an independent electricity supplier, will have a renewable portion of the electricity it generates that avoids scope 2 emissions from electricity purchased from the grid.	Not calculated	Assessed and considered less feasible compared to PPA. In addition, it will generate scope 1 emissions from the non-renewable portion of the electricity it generates, and potentially increase scope 1 emissions from the Proposal.
Small-scale renewable energy assets	Avoid	Small-scale renewable energy assets used as backup during power outages can avoid scope 1 emissions from backup diesel generators.	Not calculated	Assessing for feasibility. Planning to adopt if feasible.

DESIGN / OPERATIONAL MEASURE	MITIGATION HIERARCHY	DESCRIPTION	EMISSIONS MITIGATED OVER LOM	STATUS
PPA with renewable energy generators and surrender of LGCs	Reduce	Power Purchase Agreement (PPA) with a renewable energy generator will reduce scope 2 emissions; electricity will be supplied through the existing grid infrastructure with equivalent large-scale energy certificates (LGCs), which can be surrendered to the Renewable Energy Certificate (REC) registry. Emissions reductions from LGCs can be quantified as market-based scope 2 emissions.	6,795,235 t CO ₂ -e/ market-based emissions (233,315 t CO ₂ -e/year)	Planning to adopt 2031. KML will arrange a PPA with a renewable energy generator in the mid-west to supply 80% of electricity requirements. The PPA will commence in 2031, after the existing electricity supply contract ceases, and extend until the end of the project.
Mining activities				
Electrification of KML and mining contractor fleet	Reduce	Fleet electrification can reduce scope 1 emissions from fuel combustion. Electric vehicles are more energy efficient (around 90% efficiency) compared to diesel vehicles (around 30% efficiency), so reduction in emissions will not be offset by increase in scope 2 emissions. According to the CCA Sector Pathways (2024), mining fleet electrification is still in the research and development stage, and widespread electrification is not expected to begin until 2030-2035.	1,254,746 t CO ₂ -e	For KML, planning to adopt from 2027 onwards. KML will carry out a staged replacement of its diesel fleet and equipment. For mining contractors, planning to adopt from 2032 onwards, in line with the predicted timeline from the CCA Sector Pathways. Mining contractors will be expected to electrify a portion of their fleet each time they renew their contract. Contracts are renewed every five years.
Small-scale renewable energy assets	Reduce	Small-scale renewable energy assets powering individual pieces of equipment, such as lighting plants, may reduce scope 1 emissions from powering the equipment with diesel.	Not calculated	Assessing for feasibility. Planning to adopt if feasible.
High-efficiency diesel	Reduce	The use of high-efficiency premium diesel fuel can reduce fuel consumption.	~200 t CO ₂ -e/year	Adopted 2023.
Maintenance of haul roads	Reduce	Regular maintenance of haul roads can ensure efficiency of vehicle movement and fuel consumption.	Not calculated	Adopted.
Optimisation of waste rock landform design	Reduce	Optimising the design of waste rock landforms will reduce fuel consumption from moving waste rock.	Not calculated	Adopted.

DESIGN / OPERATIONAL MEASURE	MITIGATION HIERARCHY	DESCRIPTION	EMISSIONS MITIGATED OVER LOM	STATUS
Other activities				
Electrification of rail haulage	Reduce	Electrification of trains transporting iron ore to Geraldton Port will reduce downstream scope 3 emissions.	662,098 t CO ₂ -e	KML's rail contractor proposes to replace their diesel-powered trains with zero emissions trains in 2031.
Carbon credits	Offset	Scope 1 emissions will be offset by purchasing and surrendering carbon credits.	1 t CO ₂ -e/ ACCU	Will adopt to meet regulatory obligations. ACCUs will be purchased and surrendered to meet the Safeguard baseline. ACCUs are generated by projects in Australia and certified by the CER.
Progressive rehabilitation	Offset	Progressive rehabilitation during the LOM, as well as rehabilitation after the LOM, will offset scope 1 emissions released from land clearing.	Not calculated	Adopted. However, because the emissions abatement from rehabilitation occurs after the LOM and are associated with a considerable amount of uncertainty, mitigated emissions have not been calculated.

Appendix D Stakeholder Consultation

KML has been engaging with relevant internal and external stakeholders on the GHGs emission reductions associated with the Proposal. The outcomes of stakeholder consultation to date are shown in Table 29.

Table 29 Stakeholder Consultation Register

STAKEHOLDER	DATE	TOPIC / PURPOSE	STAKEHOLDER FEEDBACK	RESPONSE/ACTION
Main Energy Supplier	18/09/2023	Potential partnership with the Main Energy Supplier to develop a wind farm to power the Proposal on a Behind the Meter (BtM) arrangement	<p>The Main Energy Supplier is interested in developing a wind farm close to the existing Karara 330 kV transmission line to provide the Proposal with power and add extra capacity into the SWIS grid.</p> <p>The Main Energy Supplier is tasked with undertaking a desktop analysis to identify four potential sites for wind farm development; potential sites are to be determined based on wind resource, distance to transmission network, and constraints (environmental, pastoral and mining leases, dwellings, native title etc.).</p>	<p>KML was provided with a desktop study that gave an overview of the wind power generation around the Proposal.</p> <p>KML has been evaluating the findings of the desktop analysis and conducting some internal consultation on potential wind farm development.</p>
Yamatji Southern Regional Corporation (YSRC)	26/09/2023	The Proposal and KML's green energy initiatives (e.g., solar or wind-generated power) associated with the Proposal	<p>YSRC indicated that KML was the first mining company to approach them upon their commencement and appreciated KML's briefing on the Proposal.</p> <p>YSRC had no issue with the Proposal and supports KML's green energy initiatives to reduce GHGs emissions from the Proposal.</p>	<p>KML maintains regular communications with YSRC to inform them on proposed activities on the Karara Rangeland Park, which is co-managed by the Department of Biodiversity, Conservation and Attractions (DBCA) and YSRC in accordance with the Yamatji Proponent Standard Heritage Agreement. KML will update YSRC on the status of Proposal and development of the green energy initiatives potentially through corporation with renewable energy suppliers for the Proposal on an ongoing basis.</p>

STAKEHOLDER	DATE	TOPIC / PURPOSE	STAKEHOLDER FEEDBACK	RESPONSE/ACTION
Various KML's departments (internal consultation)	Jan/Feb 2024 Ongoing	Internal consultation with various KML's departments regarding KML's GHGs emissions reductions	<p>KML's departments agreed on the short-term provisional target of GHGs emissions reduction at 3% (from 2027 onwards).</p> <p>Mining and Assets Management departments will work with main mine contractors for a plan to reduce scope 1 emission reductions potentially through electrification of vehicles/plants/machineries owned by KML and contractors. KML has started using high-efficiency diesel for KIOP operations etc.</p> <p>Environment/Commercial/Assets Management departments to engage with local renewable energy supplier as soon as possible to discuss renewable energy options to reduce scope 1 and 2 emissions from the Proposal.</p> <p>Commercial department indicates the rail contractor is looking into options for electrification of trains for KML potentially by 2031.</p> <p>Flights and Accommodation team proposes to optimise bus commuting style on an ongoing basis to reduce Scope 3 emissions.</p>	<p>As per the internal stakeholder feedback, each department engages and works with contractors/services providers/energy suppliers to confirm and implement the mitigation measures to reduce GHGs emissions from the Proposal so as to achieve industry's net zero emissions by 2050.</p> <p>Environment department will be leading the overall management of the GHG emissions for the Proposal.</p>
Potential Renewable Energy Supplier (Supplier)	15/05/2024	Brief on the progress of the renewable energy project (Project). Potential cooperation of the Project with KML and supply of renewable energy to KML mine site for the Proposal.	<p>The Supplier proposes to start producing renewable energy in 2030/31 and is currently undertaking some feasibility studies, including baseline wind/solar monitoring at potential sites in Mid-West region. The Supplier plans to submit an application for regulatory approval for the Project in 2025.</p> <p>The Supplier is happy to work with KML to assist with reduction of scope 1 and 2 emissions for the Proposal.</p>	<p>KML has been undertaking internal consultation and studies to achieve the industry's commitment of zero net emissions by 2050.</p> <p>KML is happy to work with the Supplier for the Project and also willing to invest in 'green' processing technology for the Proposal.</p> <p>The Supplier may use KML owned land/infrastructure to construct facilities and supply the renewable energy to the mine site via a signed Agreement. KML is happy to proceed to sign a Confidentiality Agreement with the Supplier.</p>

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