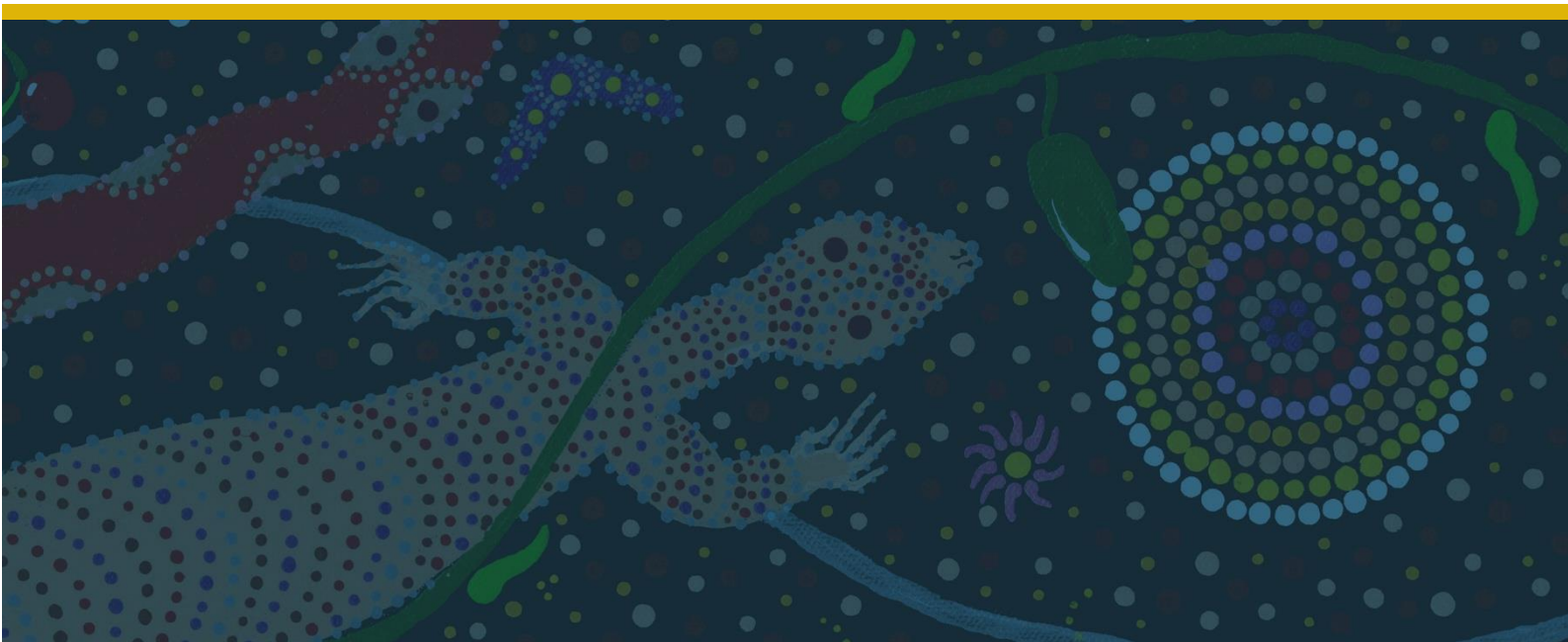
NORTHERN STAR
RESOURCES LIMITED

GREENHOUSE GAS MANAGEMENT PLAN

FIMISTON GOLD MINE OPERATIONS EXTENSION (STAGE 3) AND MINE CLOSURE PLANNING: REVISED PROPOSAL

FIMISTON SOUTH PROJECT



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1. SUMMARY

Kalgoorlie Consolidated Gold Mines (KCGM) Operations is a world class asset located adjacent to the City of Kalgoorlie-Boulder approximately 600 kilometres east of Perth, Western Australia. KCGM's mining operations are centred in the Kalgoorlie Goldfield located on the Golden Mile, one of the richest gold deposits in the world. In 2019 KCGM celebrated its 30th anniversary and poured its 50,000th bar of gold, bringing the total produced from the Golden Mile to over 60 million ounces in the 120 years since the first leases were pegged. On 12 February 2021, the KCGM Operations became controlled by a single entity, Northern Star Resources Limited (Northern Star).

The KCGM Operations include the Fimiston Operations, Mt Charlotte Underground Mine and the Fimiston and Gidji Processing Plants. The Fimiston Operations consists of the Fimiston Open Pit (Open Pit), Fimiston processing plant, three tailings storage facilities, waste rock dumps (WRDs), run of mine pad, and supporting infrastructure.

KCGM is planning to mine a cutback to the south of the Open Pit, referred to as the Fimiston South Project (the Project). The Project will allow for both widening and deepening of the Open Pit and extend the life of mine to 2034. The Project will require additional areas for infrastructure, waste rock dumps and tailings.

The Project will sustain hundreds of local jobs in Kalgoorlie-Boulder over the next decade, which has been consistently welcomed by local stakeholders throughout KCGM's engagement undertaken for the Project. KCGM Operations' legacy as a predominately residential mine site is viewed by stakeholders as critical to KCGM's social license to operate, providing a positive flow on effect for the local community and economy.

To develop the Project KCGM is seeking approval from the Western Australian Environment Protection Authority (EPA) under the *Environmental Protection Act 1986 (Part IV-Section 38)* via a Revised Proposal of the *Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning* Public Environmental Review, which was approved on 29 January 2009 by the Minister for Environment; Youth (Ministerial Statement No. 782).

KCGM has identified emissions reduction Initiatives that have been (or are to be) incorporated into the design of the Project or have the potential to be implemented in the operational phase of the Project. These emissions reduction Initiatives are summarised in Appendix 3.

This Greenhouse Gas Management Plan (GHGMP), which details the forecast emissions and measures that are required to manage greenhouse gas emissions as a result of developing the Project, is submitted to support the Revised Proposal. The GHGMP was prepared in accordance with the 'Instructions on how to prepare *Environmental Protection Act 1986* - Part IV Environmental Management Plans' published by the EPA (EPA, March 2020).

Table 1 provides a summary of the GHGMP.

Table 1: Management Plan Summary

TITLE OF PROPOSAL	Revised Proposal: Fimiston South Project
PROPONENT	Kalgoorlie Consolidated Gold Mines Pty Ltd
MINISTERIAL STATEMENT NUMBER	Ministerial Statement Number yet to be issued for the Revised Proposal
PURPOSE OF THE GHGMP	To meet the requirements of the EPA for a Greenhouse Gas Emissions Management Plan to be prepared for projects that will result in significant greenhouse gas emissions i.e. more than 100,000 $tCO_{2\text{-}e}$ per year.
KEY ENVIRONMENTAL FACTOR/S AND OBJECTIVE/S	Key Environmental Factor: Greenhouse gas emissions EPA Objective: To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change
CONDITION CLAUSES:	NA
PROPOSED CONSTRUCTION DATE:	Continuation of existing operations
EMP REQUIRED PRE-CONSTRUCTION?	No, continuation of existing operations

2. CONTEXT, SCOPE AND RATIONALE

2.1. Proposal

KCGM is planning to mine a cutback to the south of the Open Pit, referred to as the Fimiston South Project. The Project will allow for both widening and deepening of the Open Pit and extend the life of mine to 2034. The Project will require additional areas for infrastructure, waste rock dumps and tailings.

The Project requires approximately 2,246 ha of clearing to accommodate the footprint of the Open Pit extension, waste rock dump (WRD) extension, additional tailings storage facilities (TSFs) (Fimiston III Tailings Storage Facility and an additional third cell on Fimiston IIE TSF) and associated supporting infrastructure, some of which overlays existing infrastructure within the existing approved Mine Development Envelope (MDE).The MDE will increase from 5,914 ha to 7,794 ha to accommodate the Open Pit, TSFs, WRD and supporting infrastructure.

Additionally, developing the Project will result in a change to KCGM's greenhouse gas emissions profile. This GHGMP details those changes and the mitigation and management measures that are required to manage greenhouse gas emissions that are expected to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change.

This GHGMP will be implemented following receipt of the approved Revised Proposal under the EP Act. In the interim, the KCGM Operations will continue to operate under current Ministerial Conditions (Part IV), Prescribed Premises Licences (Part V), other applicable environmental legislation, and in accordance with existing environmental management plans and practices.

2.2. Key Environmental Factor

This GHGMP specifically addresses the 'Greenhouse Gas Emissions' environmental factor, as defined within the EPA's *Statement of Environmental Principles, Factors and Objectives* (EPA, April 2020).

The environmental objective of the Greenhouse Gas Emissions factor, as defined within the EPA's *Environmental Factor Guideline: Greenhouse Gas Emissions* (the Guideline) (EPA, April 2020), is:

To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change.

2.2.1. Activities affecting Key Environmental Factor – Greenhouse Gas Emissions

The main activities affecting greenhouse gas emissions at Fimiston are from:

- Direct combustion of diesel fuel, primarily used for mining (i.e. haul trucks, excavators, drill rigs, graders, loaders, dozers and in explosives);
- Direct combustion of liquefied petroleum gas (LPG), primarily used in processing for carbon regeneration and gold production;
- Direct consumption of oils and greases, transport fuels and losses of sulphur hexafluoride from electrical equipment;
- Consumption of purchased electricity, used for processing (i.e. crushing and grinding);
- Emissions associated with vegetation clearing associated with loss in capacity to sequester carbon;
- Emissions associated with disposal of waste.

An assessment of greenhouse gas emissions is provided in section 2.5 and summarised in Table 3: Inventory of Scope 1 and Scope 2 greenhouse gas emissions.

2.3. Condition Requirements

This GHGMP has been developed to meet the requirements of the EPA's Environmental Factor Guideline for Greenhouse Gas Emissions (EPA, April 2020) for the Project.

KCGM provided an estimation of greenhouse gas emissions for life of mine (2006-2017) in the Public Environmental Review documentation for the *Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning* (Environ, September 2006). The maximum quantity of greenhouse gas emissions for the life of mine in any one year was estimated to be 440,779 tonnes carbon dioxide equivalent (tCO_{2-e}).

When Ministerial Statement 782 (M:782) was issued in January 2009, Table 1 of M:782 "Summary of the Key Proposal Characteristics" listed Greenhouse Gas Emissions as "Approximately 440,800 tonnes of carbon dioxide equivalent". No ministerial conditions were applied to greenhouse gas emissions in M:782.

The following legislative requirements are also considered by this GHGMP:

- *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*
- *National Greenhouse and Energy Reporting Regulations 2008*
- *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 (Safeguard Mechanism Rule)*

2.4. Rationale and Approach

The objectives of this GHGMP are to:

- Assess the potential greenhouse gas emissions resulting from the Revised Proposal;
- Report on Scope 1 and Scope 2 greenhouse gas emissions for the Fimiston facility in accordance with the NGER Act;
- Report on Scope 1 greenhouse gas emissions in relation to the emissions baseline set under the Safeguard Mechanism Rule;
- Report on Scope 1, Scope 2 and Scope 3 greenhouse gas emissions as requested by other relevant authorities; and
- Identify Emissions Reduction Initiatives to reduce greenhouse gas emissions for the Fimiston facility.

2.4.1. National Greenhouse and Energy Reporting Act 2007

As the controlling corporation, Northern Star reports Scope 1 and Scope 2 emissions and energy production and consumption data to the Clean Energy Regulator (CER) under section 19 of the NGER Act for its subsidiary companies. This data is reported on a financial year basis, with a deadline of 31 October of each year.

KCGM's Fimiston facility triggers the facility threshold for mandatory reporting of greenhouse gas emissions, energy consumption and energy production data to the Australian Government. KCGM is also required to report emissions and energy use for the Gidji operation as a separate facility, but this reporting is not covered in the scope of the Project.

KCGM follows the technical guidance for reporters (including measurement techniques and conversions) provided in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Measurement Determination); and retains records to support compliance.

2.4.2. Safeguard Mechanism Rule

The Safeguard Mechanism Rule commenced on 1 July 2016, imposing maximum emission limits for facilities with more than 100,000 tCO2-e Scope 1 emissions per annum (emissions baseline).

In August 2016, the CER published a Reported emissions baseline of 238,934 tCO_{2-e} for the Fimiston facility, commencing on 1 July 2016. The reported emissions baseline for the Fimiston facility was set using Scope 1 emissions from FY2010/11, which was the highest level of Scope 1 emissions reported during the period FY2009/10 through FY2013/14.

The Section 19 NGER report is used by the CER to assess whether KCGM has exceeded its reported emissions baseline. If an emissions baseline is exceeded, the facility is required to "make good" on the excess emissions by procuring a quantity of Australian Carbon Credit Units (ACCUs) equal to the excess emissions.

As a result of amendments to the Safeguard Mechanism Rule that came into force in March 2019, reported emissions baselines were to expire on 1 July 2020, with facilities being required to transition to calculated emissions baselines in FY2019 and FY2020. In response to the COVID-19 pandemic, the safeguard Rule was

further amended in May 2020, to allow facilities to remain on reported emissions baselines for both FY20 and FY21.

Options available to KCGM were:

1. Do nothing. Under this scenario the default emissions baseline of 100,000 tCO_{2-e} will be applied after 1 July 2021;
2. Apply directly for a production-adjusted emissions baseline. Under this scenario, the new emissions baseline will be calculated by multiplying the defined production variable (ROM Metal Ore throughput) by the published default emissions intensity value; or
3. Apply for a transitional calculated emissions baseline, and then a production-adjusted emissions baseline. Under this scenario, a new three-year fixed emissions baseline will be set using forecast emissions data (the transitional calculated baseline period) followed by a production adjusted baseline that will be calculated by multiplying the defined production variable (ROM Metal Ore throughput) by the site-specific emissions intensity that is set during the transitional calculated baseline period.

KCGM chose Option 3 and applied to the CER in October 2021 for a transitional calculated emissions baseline. The application utilises a prescribed Schedule 2 production variable (ROM metal ore) and a site-specific emissions intensity of 0.018141962 t CO2-e/tonne ROM metal ore that is based on forecast production and emissions data in FY2022/23 (Table 2: FY2022/23 – Year of highest forecast primary production).

Table 2: FY2022/23 – Year of highest forecast primary production

DESCRIPTION	FORECAST QUANTITY	FORECAST EMISSIONS	FORECAST EMISSIONS INTENSITY
ROM metal ore (primary production variable)	13,375,588 tonnes	242,659 t CO2-e	0.018141962 t CO2-e/t ROM metal ore

Source: *Clean Energy Regulator*

The Clean Energy Regulator published updates to its safeguard baselines on the 4 July 2022 to reflect new and updated baseline determinations made under the Safeguard Mechanism. This published data included KCGM's updated transitional baseline of 242,659 t CO2-e.

KCGM will be required to "make good" on emissions if they are in excess of the emissions baseline set under the Safeguard Mechanism Rule.

2.4.3. Emissions Reduction Initiatives

For projects with significant greenhouse gas emissions (i.e. more than 100,000 tCO2-e per year), the Guidelines require the project proponent to consider mitigation activities including:

- Avoiding emissions through best practice design. This may involve comparing emissions and energy intensity performance metrics with comparable facilities and ensuring emissions and energy intensity are minimised at the design stage and/or a particular level of emissions intensity performance is attained through adoption of renewable/low emissions technologies;
- Continuous improvement to reduce emissions over the project life through consideration of measures to improve performance or setting targets for emissions intensity improvement over time; and
- Offsetting emissions (carbon offsets) through the implementation of a greenhouse gas emissions offset package to offset some or all residual emissions.

KCGM has identified emissions reduction Initiatives that have been (or are to be) incorporated into the design of the Project or have the potential to be implemented in the operational phase of the Proposal. These Emissions Reduction Initiatives are summarised in Appendix 3.

Northern Star is pursuing the planned strategic pathway shown below to reduce Scope 1 and Scope 2 Emissions by 35% by 2030. This would achieve a reduction in greenhouse gas emissions from our baseline (1 July 2020) of 930ktCO2-e down to approximately 590 kt CO2-e (Figure 1).

Northern Star's planned pathways to achieve 35% Emissions Reduction by 2030

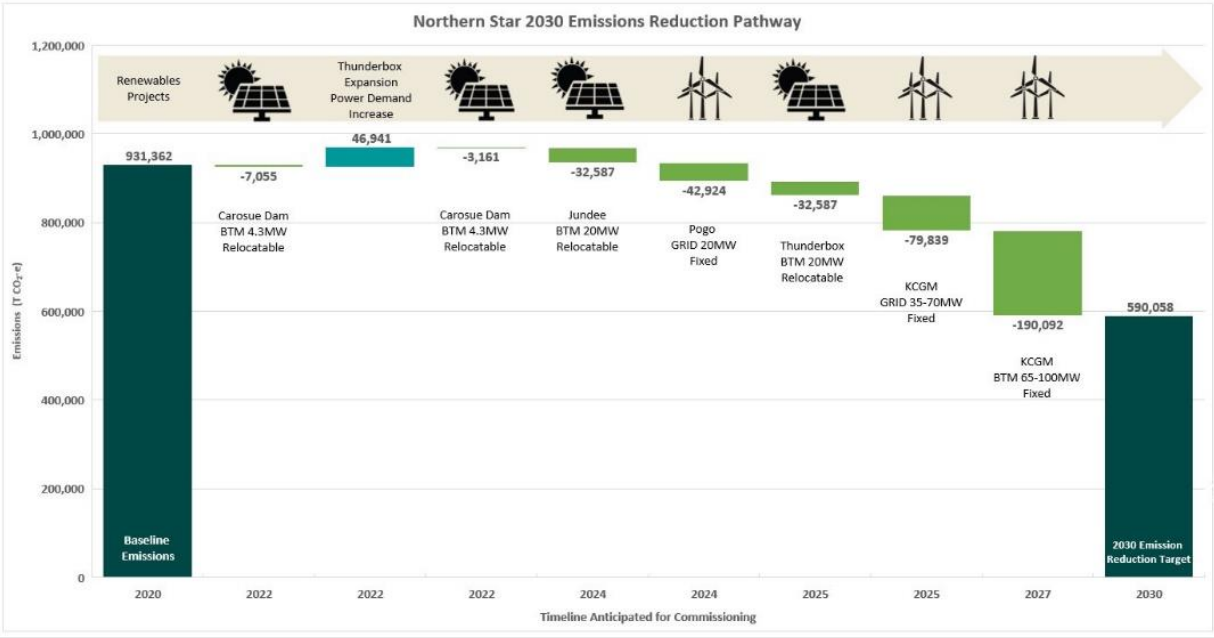

Figure 1:Northern Star 2030 Emissions Reduction Pathway

The largest consumer of electricity within Northern Star's operations is KCGM, currently making up 50% of Northern Star's electricity emissions. The viability of expanding KCGM's Fimiston Processing Facility is currently progressing through a Feasibility Study.

The ASX release of 28 June 2022 explains the three options for optimisation of processing at KCGM in addition to steady state. If this expansion is approved there will be significant further electricity requirements including renewable energy. Source of electricity supply to KCGM is therefore a priority in our future focus and thus the most advanced (Figure 2).

In a renewable energy market where long tenure is critical to financial approval and cost-effective outcomes, KCGM's life of mine is a competitive advantage.

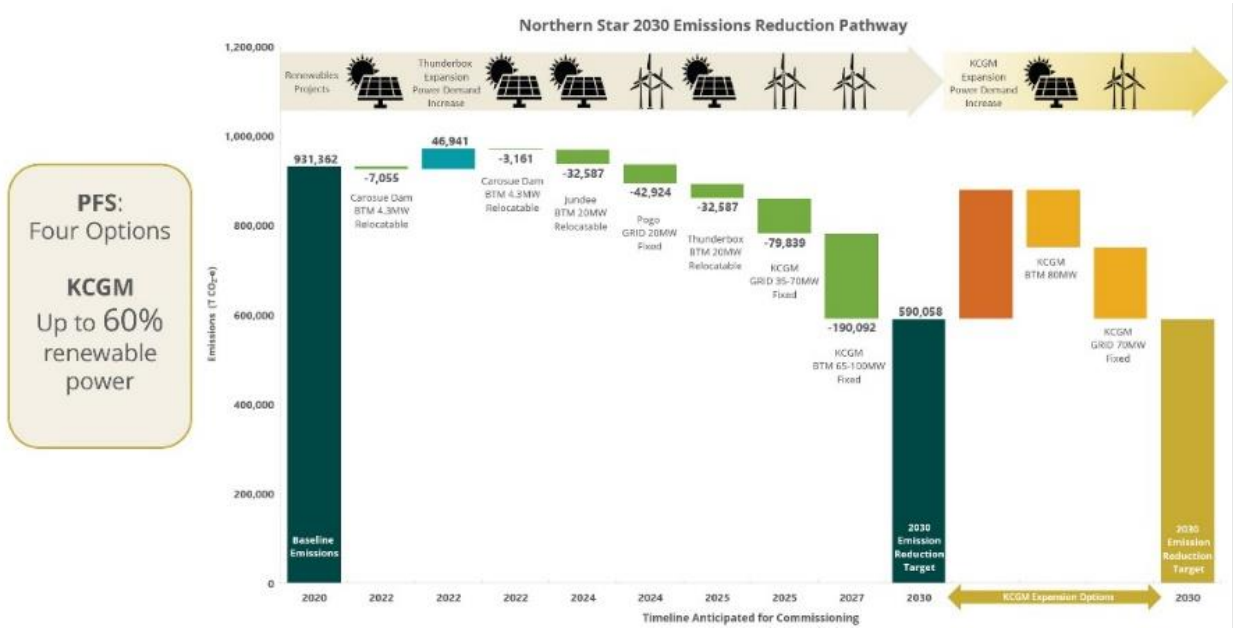

Figure 2: 2030 Pathway to Reduce Emissions by 35%- Leveraging Strategic Option Value from Acquisition of Goldfields Power

2.4.4. Quality Offsets

Northern Star's intent is to strive towards net zero emissions and improve efficiencies wherever practicable, however there will likely remain a requirement to utilise offsets to achieve Net Zero operational emissions by 2050.

Where offsets are required, Northern Star's preferred approach will be to generate the offsets such as carbon sequestration projects from within local communities and with stakeholder involvement, to benefit our stakeholders. To this end Northern Star has earmarked three pastoral leases in the Goldfields with potential for such projects.

Studies to confirm the eligibility of these pastoral leases for Human Induced Regeneration (HIR) Carbon Projects have been completed with two of the pastoral leases identified as being immediately suitable for registering as Emissions Reduction Fund projects with the Australian Government.

The third pastoral lease will be eligible for registration pending the proposed amendments to WA's Land Administration Act 1997.

Northern Star is progressing the requirements for registering HIR projects to partially meet the Company's future offset needs.

2.5. Assessment of emissions

This GHGMP is supported by a detailed analysis of the greenhouse gas emissions resulting from KCGM's Fimiston facility (inclusive of the Fimiston Gold Mine Operations and the Mt Charlotte Underground Operations). Assessment reports were carried using CER endorsed methodologies provided by external and independent third parties.

Greenhouse gases include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6) and specified kinds of hydrofluorocarbons and perfluorocarbons.

Greenhouse gas emissions are measured as tonnes of carbon dioxide equivalence (tCO2-e). This means that the amount of a greenhouse gas that is emitted is measured as an equivalent amount of carbon dioxide which has a global warming potential of one.

2.5.1. Scope 1 and 2 emissions

Scope 1 emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. Scope 2 emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity (e.g. from the use of electricity produced by another facility).

Since 2009, KCGM has been required to identify and annually report on all Scope 1 and 2 emissions for the Fimiston facility; in order to comply with the NGER Act. This has resulted in a detailed understanding of the sources and quantities of emissions associated with the Fimiston facility.

Table 3: Inventory of Scope 1 and Scope 2 greenhouse gas emissions shows the current understanding of the emissions inventory, based on 4 years of historical data (2015-2018).

In addition to this historical understanding, KCGM has carried out an Assessment of Emissions ('Assessment') over the life of the Project, as set out in the Guidelines.

This Assessment included:

- Credible estimates of Scope 1, Scope 2 and Scope 3 greenhouse gas emissions (annual and total) over the life of the Project.
- A breakdown of greenhouse gas emissions by source inclusive of, but not limited to, stationary energy, fugitives, transport, and any emissions associated with changes to land use.
- Projected emissions intensity (emissions per unit of production) for the proposal and benchmarking against other comparable projects.

The Assessment was based on the following inputs:

- Historical performance from NGER data.

- Forecast quantities of major inputs (diesel, LPG and electricity)
- Forecast quantities of material mined and processed ore, and gold production; electricity consumption (processed ore) and LPG consumption (gold production).
- Energy content factors and emissions factors from the Commonwealth National Greenhouse Accounts ('NGA') and other available sources.
- The measurement criteria used in the Assessment, are tabled in Appendix 1.
- The profile of Scope 1 and 2 emissions over the lifecycle of the Project is shown in Appendix 2.

2.5.2. Scope 3 emissions

In addition to Scope 1 and 2 emissions, there are Scope 3 emissions that are attributable to the Fimiston facility. These are indirect emissions that occur outside of KCGM's operational control, as a result of manufacturing and transportation of raw materials that are used in gold mining, processing and certain business activities as well as from the transportation and use of gold that is produced from the project.

Northern Star have estimated KCGM's Scope 3 GHG emissions that have been material or relevant to the overall expected footprint. The categories chosen account of approximately 90% of Scope 3 emissions from the Project, they are:

- Purchased goods and services
- Fuel and energy related activities
- Upstream transport and distribution

Scope 3 emissions deemed immaterial and not included in this assessment are:

- Downstream transportation and distribution
- Processing of sold products
- Employee commuting related emissions
- Business travel

Total predicted Scope 3 emissions for the above categories for the life of mine is 935,795 tCO2-e. The average annual scope 3 emissions are 71,984 tCO2-e, with the maximum emissions (73,118 tCO2-e) occurring in 2034 and the minimum (70,934 tCO2-e) occurring in 2030.

The profile of Scope 3 emissions over the lifecycle of the Project is shown in Table 6 and Appendix 2.

Table 3: Inventory of Scope 1 and Scope 2 greenhouse gas emissions

Emissions source	Where used	Annual Quantity[1]	Annual Tonnes CO_{2-e}	% Of total Scope 1
Scope 1				
Diesel	Mining Operations: haul trucks, excavators, explosives, drill rigs, and ancillary earthmoving equipment	70,000 kL	190,000	97
LPG	Processing: carbon regeneration kilns and gold room furnace	2,900 kL	4,500	2
Oils and greases	Mining Operations: haul trucks, excavators, drill rigs and ancillary earthmoving equipment	665 kL	310	< 1
Gasoline	Other: transport energy use	20 kL	50	< 1
SF6	Other: electrical insulators, transformers, circuit breakers, and high voltage switchgear	-	32	< 1
Scope 2				
Electricity	Processing: crushing and grinding	350,000,000 kWh	265,000	NA

Table 4: Total of Scope 1 and Scope 2 greenhouse gas emissions[2]

Greenhouse Gases (Tonnes CO2-e)	2024-2026 (Annual average)	2027-2034 (Annual average)	Total Project 2024-2034 (Annual average)	% of Total
Scope 1	237,277	234,417	235,197	92
Scope 2	177,325	-39,380	19,721	8
TOTAL	**414,602**	**195,037**	**254,918**	**100**

[1] For diesel and LPG, the average of data for 2015 to 2018 (reported for NGERs) was used. For other sources, 2019 data was used
[2] Average of the lifetime of the project 2024-2034, offset by renewables.

Table 5: Assessment of Scope 1 and 2 Emissions – Average Annual and Total Project

Emissions source	**Average annual quantity (tCO_{2-e})[3]**	**Total for the Project (tCO_{2-e})**
Stationery Energy Purposes (diesel)	230,083	2,530,916
LPG	4,079	44,869
Transport Energy (diesel and gasoline)	691	7,601
Oils and Greases	312	3,432
Other (SF6)	32	352
TOTAL OF SCOPE 1 EMISSIONS	235,197	2,351,970
Electricity (Scope 2) post-renewable implementation	19,721	197,210
TOTAL OF SCOPE 1 AND 2 EMISSIONS (Post-renewable implementation)	254,918	2,549,180

Table 6: Assessment of Scope 3 Emissions – Average Annual and Total Project

Scope 3 Category	**Average annual quantity (tCO_{2-e})[4]**	**Total for the Project (tCO_{2-e})**
Category 1 Purchased goods and services	55,157	717,042
Category 3 Fuel and energy related activities	15,803	205,441
Category 4 Upstream transport and distribution	1,024	13,312
TOTAL OF SCOPE 3 EMISSIONS	71,984	935,794

[3] Annual emissions have been averaged for the operational phase of the project (2021 to 2034. Emissions quantities decline sharply after 2034 due to reduced mining activity as the project approaches end-of-life).

[4] Annual emissions have been averaged for the operational phase of the project (2021 to 2034. Emissions quantities decline sharply after 2034 due to reduced mining activity as the project approaches end-of-life).

2.5.3. Land Use Change

Northern Star utilised the Department of Climate Change, Energy, the Environment and Water Full Carbon Accounting Model (FullCAM) to estimate additional tCO2-e entering the atmosphere through loss of sequestration due to clearing (DCCEEW, 2020). Using the FullCAM tool, based on latitude of -30.46 South and Longitude 121.30 East, carbon mass of trees per hectare and forest debris per hectare were valued at 21.61 and 11.15 t carbon/ Ha respectively. Using these values and the proposed total hectares (2,246Ha) to be cleared for the project, it is estimated that for the life of the project the capacity for the natural environment to sequester approximately 269,663 tCO2-e will be lost.

3. INTERNAL AND REGULATORY FRAMEWORK

3.1. Northern Stars Approach to Climate Change

Northern remains committed to the Paris Agreement1 and the journey towards a net-zero carbon future by limiting global warming to well below 2°C, preferably 1.5°C above pre-industrial levels by 2050.

Northern Star acknowledges the invitation made to the private sector by the United Nations at the Framework Convention on Climate Change when adopting the Paris Agreement, to scale up efforts and support actions to reduce emissions and/or to build resilience and decrease vulnerability to the adverse effects of climate change

Northern Star has set a Net Zero ambition for Scope 1-3 greenhouse gas emissions by 2050.

3.2. Climate Change Governance

Northern Star's Board has oversight of the physical and transitional risks posed by climate change assisted by the ESS Committee's review of environmental and social performance risks, and climate change related risks and the Audit & Risk Committee's review of the Company wide risk register.

Climate change related matters are considered quarterly by the Board through its ESS Committee meetings. Northern Star's Chief Legal Officer & Company Secretary has climate-related reporting and disclosure responsibilities within the officer's portfolio.

In FY22 Northern Star's Board adopted a Climate Change Policy confirming our alignment to the Paris Agreement through our Net Zero by 2050 Ambition

3.3. Taskforce on Climate- Related Financial Disclosures

Northern Star is committed to understanding how both the physical impacts of climate change and the transition to low carbon operations might affect our business. We have provided details in our Sustainability Reports on our identified climate-related risks and opportunities and detailed our scenario analysis work and our approach to operational resilience in light of potential climate change impacts.

We understand the importance of continuing our alignment with the TCFD recommendations, and the need for Northern Star to progress its commitment to a low-carbon economy in advancing our Emissions Reduction projects.

4. EMP PROVISIONS

Table 7: Outcome-based GHGMP

EPA Factor: Greenhouse Gas Emissions

EPA Objective: To reduce net greenhouse gas emissions to minimise the risk of environmental harm associated with climate change.

Outcome: The operation of the proposal shall (i) comply with the requirement to report Scope 1 emissions under the NGER Act; and (ii) to operate below the emissions intensity set by the Commonwealth under the NGER (Safeguard Mechanism) Rule for the facility.

Key environmental values: Climate change

Key impacts and risks: Compliance with Regulations. Cost of having to "make-good" on excess emissions

PERFORMANCE INDICATORS	RESPONSE ACTIONS	MONITORING	TIMING/FREQUENCY	REPORTING
Trigger criteria 1: Average diesel usage over a 3-month period (quarter) is more than 5% above the estimated usage based on the business plan.	Investigate cause for variance.	Diesel usage will be monitored using the monthly diesel delivery invoices.	Diesel usage will be monitored quarterly.	The Annual Compliance Report will provide information on diesel usage and any significant variations to the business plan.
Trigger criteria 2: Estimation of Scope 1 emissions for the facility are higher than the Baseline set under the Safeguard Mechanism Rule based on the business plan.	Investigate cause for variance. Identify and implement opportunities to reduce greenhouse gas emissions to mitigate an exceedance.	Scope 1 emissions will be estimated based on forecast diesel usage from the open pit mine plan.	Scope 1 emissions will be monitored quarterly. Note that diesel usage for open pit mining accounts for approximately 94% of scope 1 emissions at the Fimiston facility.	In the event of an exceedance of the trigger criteria, the exceedance will be reported in the annual Compliance Assessment Report.
Threshold criteria 1: The Scope 1 emissions reported for the Fimiston facility are higher than the Baseline set under the Safeguard Mechanism Rule.	Investigate cause for exceedance. Identify and implement opportunities to reduce greenhouse gas emissions "Make good" on the excess emissions by procuring a quantity ACCUs equal to the excess emissions.	Scope 1 emissions will be calculated in accordance with the NGER Determination (refer to Appendix 1 for details).	Scope 1 emissions are calculated annually.	Scope 1 emissions are reported annually (by 31 October) to the CER under section 19 of the NGER Act.

5. ADAPTIVE MANAGEMENT AND REVIEW OF THE GHGMP

In line with the concept of adaptive management, the outcomes presented in this GHGMP shall be monitored, reviewed, evaluated and updated as required, considering:

- Outcomes of any technical review of and evaluation of any routine emissions monitoring new and relevant data/information gained as a result of implementing this GHGMP, or from external sources.
- Effectiveness of internal processes and procedures to reduce and manage greenhouse gas emissions.
- Changes in State or Commonwealth legislation or policy. With relevant updates included in a revised GHGMP.

In addition, this GHGMP may be reviewed:

- based on EPA and decision-making authorities (DMAs) comments during the Environmental Review Document (ERD) approval process.
- if a new process or activity is proposed to be introduced that has the potential to alter the emissions from the Revised Proposal (and that is not in accordance with this GHGMP).

If any significant changes are required to be made to the monitoring program or any other aspect of this GHGMP as a result of any review; a revised GHGMP will be provided to the EPA for approval. If a significant change to either the facility, activity, or risk is identified, a revised GHGMP will be submitted to the EPA.

When approved, the revised plan will be made publicly available.

A GHGMP Report will be implemented to ensure that the GHGMP is meeting its objectives and will be submitted for review at a frequency that meets regulatory requirements.

5.1. Emissions Reduction Initiatives

Emissions Reduction Initiatives are reviewed on an annual basis to assess the status of existing initiatives are being implemented, to be implemented, or under review. The initiatives are also reviewed as part of ongoing business improvement initiatives at Northern Star.

Where new initiatives have been identified through business improvement opportunities, these will be added to the register of Emissions Reduction Initiatives.

A summary of the Emissions Reduction Initiatives is summarised for the Annual GHGMP Report, including the cumulative emission reduction of initiatives that have been implemented. Table 8: Template for recording emissions reduction initiatives is provided as template for recording Emissions Reduction Initiatives.

Table 8: Template for recording emissions reduction initiatives

OPPORTUNITY NAME	DESCRIPTION	STATUS	EMISSIONS REDUCTION POTENTIAL
Climate change policy evolution	▪ Regenco project for carbon farming to generate offsets. ▪ Renewable energy installations in accordance with decarbonisation strategy to reduce emissions profiles. Power Purchase Agreements (PPAs) with grid power suppliers for GHG emissions reduction. ▪ Long term modelling and investigation into alternate power systems for mobile plant (e.g. trolley assist).	Planned or underway	To Be Assessed
Removing fossil fuel subsidies and rebates	▪ Utilise equipment efficiency monitoring for fleet and fixed asset optimisation ▪ Task-Force on Climate-Related Financial Disclosures (TCFD) financial impacts quantification modelling ▪ Model cost increase into Life of Mine (LOM) planning. ▪ Reduce reliance on carbon intensive technologies/energy production. ▪ Investigate reduction in combustion engine equipment as part of decarbonisation strategy	Planned or underway	To Be Assessed
Government mandated carbon charges	▪ Introduce a shadow carbon price into financial business decisions. ▪ Reduce reliance on carbon intensive technologies/energy production. ▪ Develop offset strategies.	Planned or underway	To Be Assessed

6. STAKEHOLDER CONSULTATION

The relevant stakeholders for this GMGMP are:

- Australian Clean Energy Regulator: Reporting under Section 19 of the NGER Act, and for the Safeguard Mechanism Rule.
- Department of Industry, Science, Energy and Resources: Development of prescribed production variables and associated default emissions intensity values within Schedule 2 of the Safeguard Mechanism Rule.
- Western Australian Environmental Protection Agency (EPA): Assessment of the proposal under Part IV of the EP Act and development of this GHGMP. All comments received during the assessment period from the EPA, other decision-making authorities and the public that relate to this GHGMP will be considered and changes made to this GHGMP will be made where required.
- Community: When approved, the revised plan will be made publicly available.

7. CHANGES TO THE GHGMP

VERSION	AUTHORISATION	POSITION	SIGNATURE	DATE	SUMMARY OF CHANGE	REASON FOR CHANGE	DATE SUBMITTED TO EPA
Final for Initial Approval	Nickolas Strong	Site Senior Executive		October 2022	New Document. Greenhouse Gas Management Plan (GHGMP) developed to meet the requirements of the Western Australian Environmental Protection Agency, for projects that will result in significant greenhouse gas emissions.	This GHGMP was specifically developed to support assessment of the Fimiston South Project by the EPA under Part IV of the EP Act.	October 2022

8. GLOSSARY

ACCU	Australian Carbon Credit Units
ASX	Australian Securities Exchange Ltd
CER	Clean Energy Regulator
$CO_{2\text{-}e}$	Carbon dioxide equivalent
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DWER	Department of Water and Environmental Regulation
EMP	Environmental Management Plan
EPA	Environmental Protection Authority (Western Australian)
EP Act	*Environmental Protection Act 1986* (Western Australian)
The Project	Fimiston South Project
GHG	Greenhouse Gas
GHGMP	Greenhouse Gas Management Plan (this document)
KCGM	Kalgoorlie Consolidated Gold Mines Pty Ltd
kL	Kilolitre (1,000 litres)
Km	Kilometre
kWh	Kilowatt hours
LOM	Life of Mine
LPG	Liquefied petroleum gas
Mt	Million tonnes
NGA	National Greenhouse Accounts
NGER Act	*National Greenhouse and Energy Reporting Act 2008*
NGER Determination	*National Greenhouse and Energy (Measurement) Determination 2009*
PPA	Power Purchase Agreements
SF6	Sulphur Hexaflouride
Safeguard Mechanism Rule	*National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*
TBA	To Be Announced
TCFD	Task Force on Climate-Related Financial Disclosures
$tCO_{2\text{-}e}$	Tonnes of carbon dioxide equivalent

9. REFERENCES

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10. APPENDIXES

10.1. Appendix 1: Measurement of greenhouse gas emissions

Monitoring and management of greenhouse gas emissions is primarily based on invoiced quantities of fuels, electricity and materials, and is consistent with the NGER Determination.

Emissions quantities are calculated by applying the relevant conversion Method from the NGER Determination. KCGM uses the default method (Method 1) in all cases.

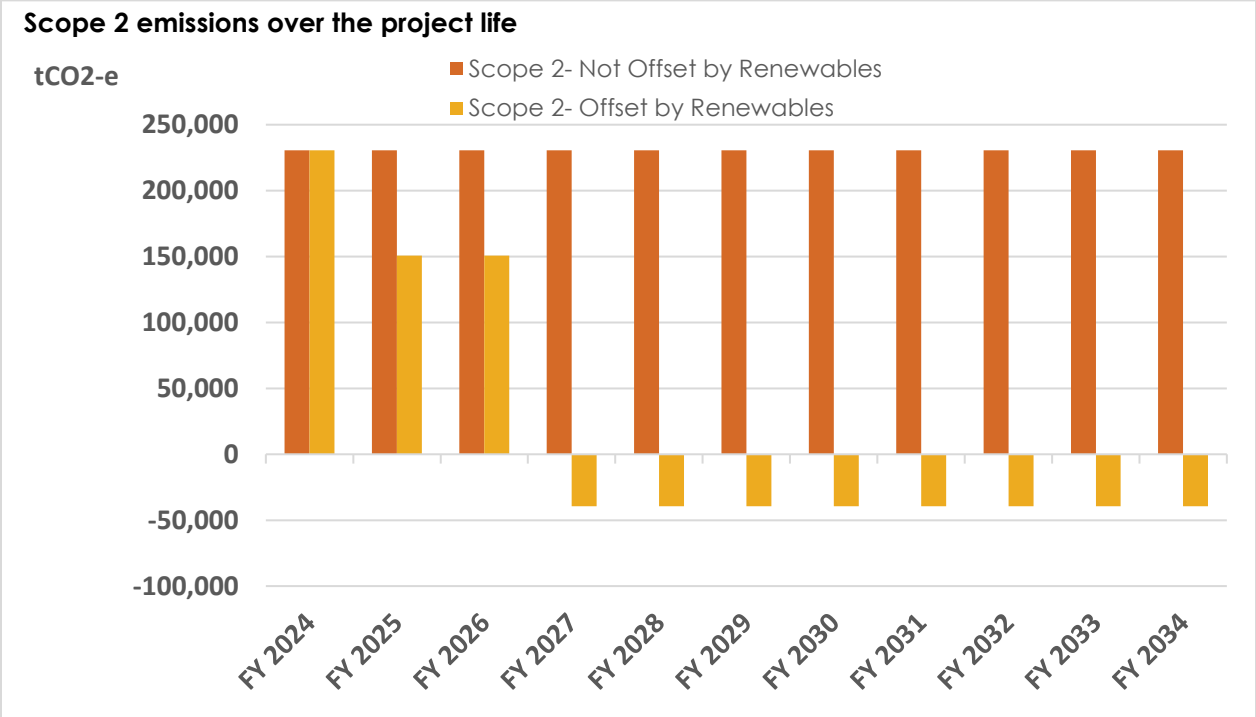
Table 9: Measurement of greenhouse gas emissions at Fimiston outlines the techniques used for emissions measurement at KCGM, and the relevant measurement criteria and methodology in the NGER Determination.

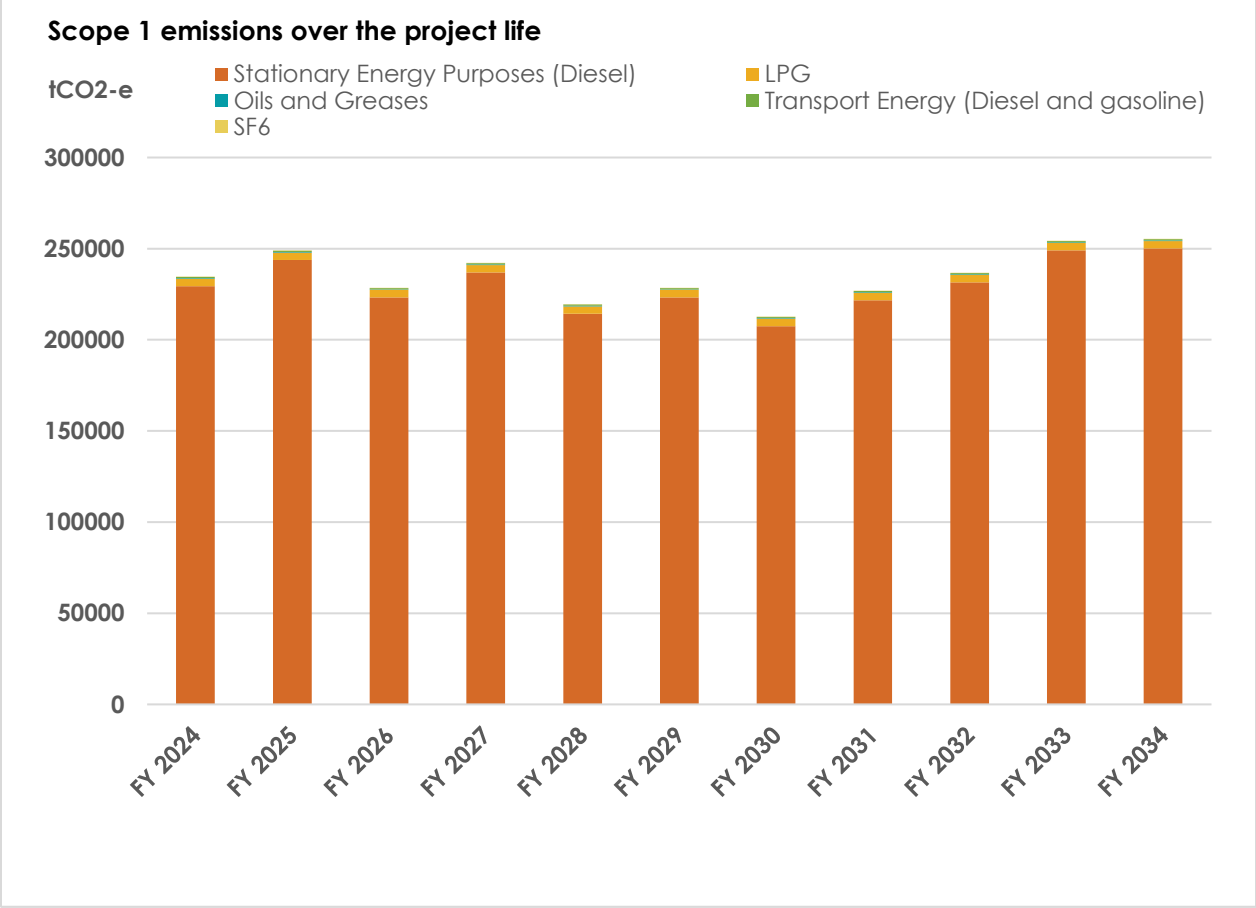
Table 9: Measurement of greenhouse gas emissions at Fimiston

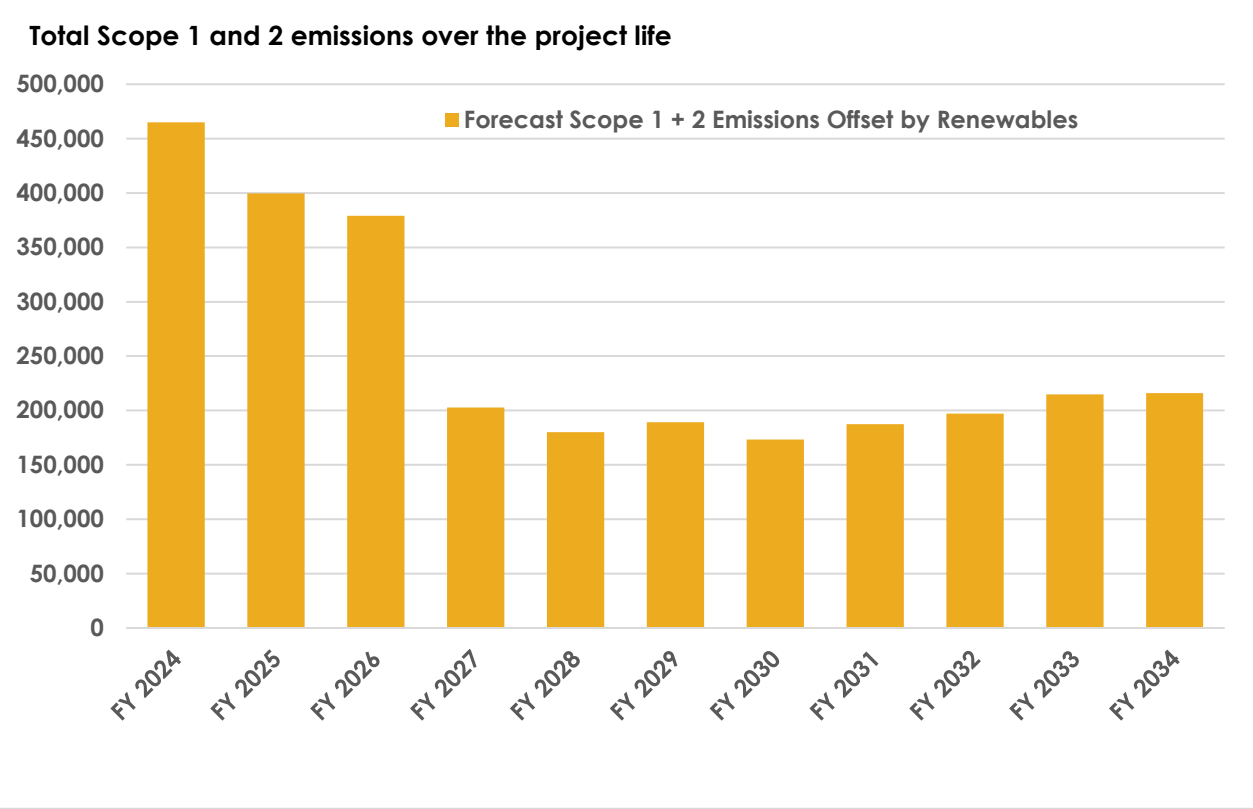
EMISSIONS SOURCE	MEASUREMENT CRITERIA	EMISSIONS METHODOLOGY	MEASUREMENT CRITERIA
Diesel	Invoices	Method 1	A[5]
LPG	Invoices	Method 1	A
Gasoline	Invoices	Method 1	A
Oils and greases	Invoices	Method 1	A
Electricity	Invoices	NA	NA

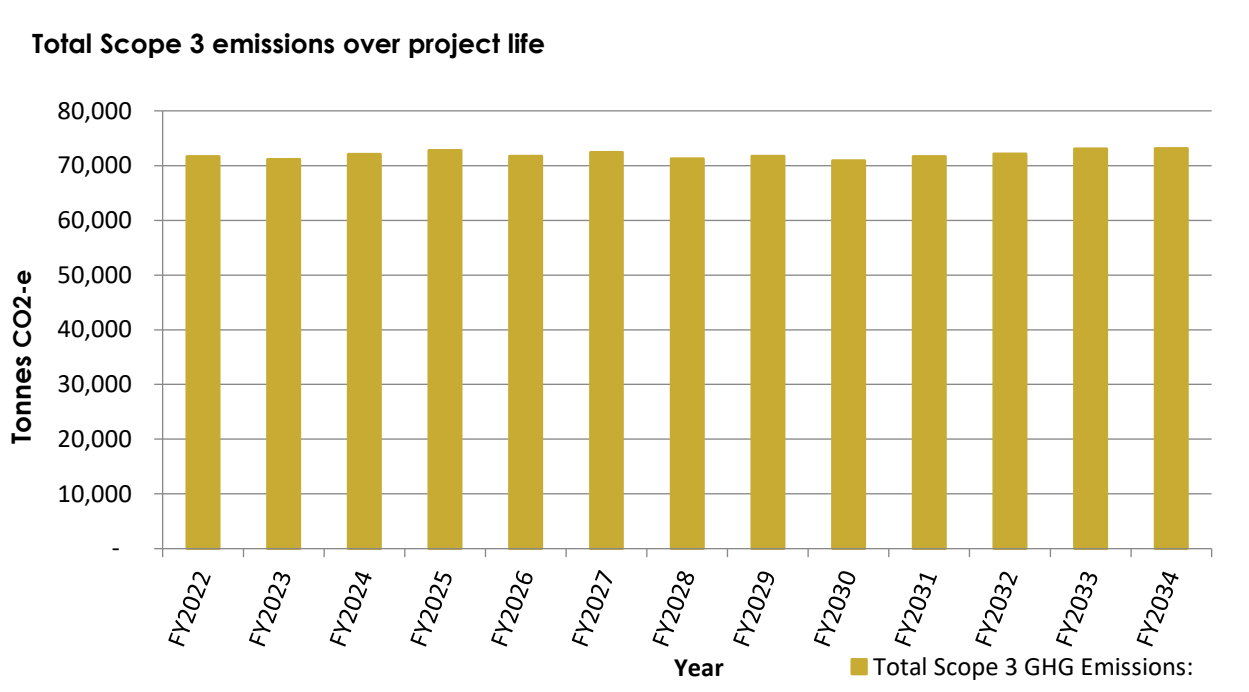
[5] Minor quantities of diesel are measured according to criteria BBB

10.2. Appendix 2: Assessment of Emissions (life of Project)






Total Scope 1 and 2 emissions over the project life
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Forecast Scope 1 + 2 Emissions Offset by Renewables
FY 2024
FY 2025
FY 2026
FY 2027
FY 2028
FY 2029
FY 2030
FY 2031
FY 2032
FY 2033
FY 2034


Total Scope 3 emissions over project life
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Tonnes CO2-e
FY2022
FY2023
FY2024
FY2025
FY2026
FY2027
FY2028
FY2029
FY2030
FY2031
FY2032
FY2033
FY2034
Year
Total Scope 3 GHG Emissions:

10.3. Appendix 3: Register of Emissions Reduction Initiatives

ITEM #	HEADING	DESCRIPTION	BENEFITS
1	KCGM GRID 35-70MW Fixed - Wind	KCGM consumes significant quantities of electricity from the South West Interconnected System (SWIS) and Northern Star intends to contract green power from a wind farm developer/s through the Wholesale Electricity Market (WEM) to reduce its Scope 2 emissions.	Northern Star is targeting just under 80,000 t.CO2-e per annum reductions (as a minimum) in its Scope 2 emissions through this initiative.
2	KCGM BTM 65-100MW Fixed – Wind	Northern Star further intends to contract green power from a wind farm development/s in the Eastern Goldfields Region that would supply electricity directly to KCGM behind the meter (BTM)	Northern Star is targeting just over 190,000 t.CO2-e per annum reductions (as a minimum) in its Scope 2 emissions through this initiative.
3	Haul Truck Replacement	KCGM has upgraded its fleet of 40 mechanical drive haul trucks from the 793C to the 793F model. This will result in an increase in fuel efficiency and reduction is associated emissions per tonne. In addition, 6 underground vehicles with Tier 1 diesel engines will be replaced with vehicles with more efficient Tier 4 engines. This will improve the fuel efficiency of the underground fleet.	The updated BSFC (Brake Specific Fuel Consumption fuel map) for the proposed new fleet indicates a reduction in fuel burn by 1-4% when compared with the existing vehicles (i.e. an average 2% savings). The engine fluid and filter change intervals for the new engines has doubled when compared to the existing 793F fleet. This results in reduced waste of oils and consumables.
4	Lighting Plant Replacement	KCGM currently have 47 aging diesel mobile lighting towers. Parts for these earlier models are becoming increasingly difficult and expensive to procure resulting in increased fuel consumption, maintenance costs and downtime. KCGM are replacing the existing lighting plants with LED plants.	The new generation of LED lighting plants offer a fuel saving of over 80% compared to the current models used on site. This is expected to reduce diesel consumption in the lighting plants from the current 10-11 litres/hr to 1.1 litres/hr, resulting in savings of $1.2M per year.