



Vulcan South Project GHG Emissions Report

Date: 11 October 2023



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Executive Summary

EnergyLink Services were engaged by Vitrinite to forecast the Scope 1,2 and 3 greenhouse gas (GHG) emissions associated with Vulcan South (the Project). The Project is located north of Dysart and approximately 45 km south of Moranbah in Queensland’s Bowen Basin. The Project will target hard coking coal which has been identified through previous exploration activities.

The Project is a small-scale mining operation which includes open cut areas and a smaller highwall mining trial area. The Project is proposed to be operational for 8 years from 2024 and extract approximately 13.5 million tonnes (Mt) of run of mine (ROM) coal consisting predominately of hard coking coal destined for steel manufacturing, not for electricity generation at a rate of up to 1.95 million tonnes per annum (Mtpa).

The GHG emissions estimation for Scope 1 and Scope 2 followed the National Greenhouse and Energy Reporting Scheme (NGERS) and the Scope 3 framework was based on the Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (the Value Chain Standard). Under both the NGERS and the Value Chain Standard, emission estimates need to be compiled in accordance with several common principles, relating to relevance, completeness, consistency, transparency, and accuracy of data. The ‘relevance’ principle only applies to Scope 3 emissions which are ‘relevant’ to the facility which the emissions inventory is being compiled for. Further information in section 2.1.

Over the Life of Mine (LOM), the Project is estimated to contribute to 960,000 tCO₂e of Scope 1 and Scope 2, these are the emissions under operational control of the Project. It is also expected to contribute to 25 MtCO₂e in consideration of Scope 3. A summary of the GHG emissions results is provided in Table ES 1.

It is noted that over 93% of the 25 MtCO₂e are associated with the use of the high quality metallurgical coal as an essential element for the production of steel (Scope 3).

Table ES 1: GHG Emissions Breakdown over the Life of Mine

Scope	Description	Report Section	Total GHG Emissions	%
<i>Direct emissions</i>				
Scope 1	(Emission related to activities occurring within the boundary of a facility, which are under the operational control of the entity)	4.1	856 ktCO ₂ e	3.42%
<i>Indirect emissions</i>				
Scope 2	(Emissions related to secondary energy imported to a facility, e.g. electricity, under the operational control of another entity)	4.2	104 ktCO ₂ e	0.42%
Total Scope 1 and 2			960 ktCO₂e	3.82%
<i>Indirect emissions</i>				
Scope 3	(Emissions related to upstream and downstream activities caused/required by the activities of the entity, but at sources controlled by other entities)	4.3	24,059 ktCO ₂ e	96.16%
Total Scope 1, 2 and 3			25,019 ktCO₂e	100%

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Acronyms and Abbreviations

Table 1: Acronyms and Abbreviations

Acronyms and Abbreviations	
Australian Carbon Credit Unit	ACCU
Carbon Dioxide Equivalent	CO ₂ e
Coal Handling and Preparation Plant	CHPP
EnergyLink Services	ELS
Financial Year	FY
Gigajoule	GJ
Global Warming Potential	GWP
Greenhouse gas	GHG
Kilo tonnes	kt
Kilo tonne of carbon dioxide equivalent	ktCO ₂ e
Kilo tonnes per annum	ktpa
Life of Mine	LOM
Million tonnes	Mt
Million tonnes per annum	Mtpa
Mine Infrastructure Area	MIA
National Greenhouse Accounts Factors	NGA Factors 2023
National Greenhouse and Energy Reporting (Measurement) Determination	NGER Measurement Determination or 'the Determination'
<i>National Greenhouse and Energy Reporting Act 2007</i>	the NGER Act
National Greenhouse and Energy Reporting Scheme	NGERS
Run of mine	ROM
Safeguard Mechanism Credits	SMC
The Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard	'the Value Chain Standard'
Tonne	t
Tonne of carbon dioxide equivalent	tCO ₂ e
Tonnes per hour	tph
Train load-out	TLO
Transmission and Distribution	T&D
World Business Council for Sustainable Development	WBCSD
World Resources Institute	WRI

1 Project Overview & Report Structure

1.1 Engagement Scope

EnergyLink Services were engaged by Queensland Coking Coal Pty Ltd and Qld Coal Aust No.1 Pty Ltd (Vitrinite Pty Ltd) (the proponent) to forecast the Scope 1,2 and 3 greenhouse gas (GHG) emissions associated with Vulcan South (the Project).

1.2 Vitrinite's Vulcan South Project

The Project is located north of Dysart and approximately 45 km south of Moranbah in Queensland's Bowen Basin, neighbouring several established mining operations, including BHP's Peak Downs and Saraji mines. The Project will target hard coking coal which has been identified through previous exploration activities.

The Project is a small-scale mining operation which includes open cut mining areas and a smaller highwall mining trial area. The Project is expected to operate for eight years and extract approximately 13.5 Mt of run of mine (ROM) coal consisting predominately of hard coking coal (with an incidental thermal secondary product¹) at a rate of up to 1.95 million tonnes per annum (Mtpa).

The Project will target the Alex and multiple Dysart Lower coal seams. Truck and shovel mining operations will be employed to mine the pits.

A mine infrastructure area (MIA) will be established along with a modular coal handling and preparation plant (CHPP), rail loop and train load-out facility (TLO) at a location between the northern and central pits. The CHPP will include tailings dewatering technologies to maximise water recycling and to produce a dry tailings waste product for permanent storage within active waste rock dumps. No wet tailings are proposed and therefore no tailings dams are required.

The highwall mining activities will only be undertaken in the year 1 of operations. The CHPP will not be operational until the year 3 of operations. Coal excavated in the period up until the CHPP is operational will be directed to nearby CHPP facilities.

More information on Vulcan South can be found on Vitrinite's website [7].

1.3 Report Overview

This report follows the following structure:

- Section 1: Project Overview & Report Structure – provides an overview of the project and the structure of the report;
- Section 2: GHG Emissions Inventory Framework – provides a summary of the framework used for the development of the GHG emissions inventory;

¹ It is noted all the coal production will be destined for steel manufacturing, not for electricity generation.

- Section 3: Project Activities and Relevance to the Inventory – provides an overview of the Project activities and the relevant GHG emissions sources attributable to these activities;
- Section 4: GHG Emissions Summary – provides the results of the GHG emissions inventory, provides details of each GHG emissions Scope and provides information on each category considered for Scope 3;
- Section 5: Comparison to National and State Emission Inventories – provides an overview of the emissions associated with the Project and compares it across the National, State and against other coal mine sites that operate in the vicinity of the Project;
- Section 6: Mitigation and Abatement Opportunities – provides a list of the mitigation and abatement opportunities that Vitrinite will consider for implementation where financially viable and applicable; and
- Section 7: Metering, Monitoring, Reporting and Verification – outlines the reporting and record keeping requirements related to energy and GHG emissions.

2 GHG Emissions Inventory Framework

The primary purpose of this report is to convey the greenhouse gas (GHG) emissions that are relevant to the Project, which is proposed to be operational for eight years from 2024. The GHG emissions are categorised as Scope 1, 2 and 3 emissions:

- Scope 1 – Direct emissions (emission related to activities occurring within the boundary of a facility, which are under the operational control of the entity).
- Scope 2 – Indirect emissions (emissions related to secondary energy imported to a facility, such as electricity, which are under the operational control of another entity).
- Scope 3 – Indirect emissions (related to upstream and downstream activities caused/required by the activities of the entity, but at sources controlled by other entities).

This GHG inventory encompasses Scope 1, 2, and 3, with no duplication of emissions between these Scopes. Therefore, a company’s Scope 3 inventory excludes emissions already accounted for as Scope 1 or Scope 2 by the same company. Scope 3 emissions, stemming from entities in the value chain, are distinct to prevent duplication within Scope 1 and Scope 2, ensuring accurate emissions accounting. More information on GHG emissions and the different Scopes is provided in Appendix A.

The GHG emissions estimation framework was based on the Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (the Value Chain Standard) [1], which presents the three Scopes pictorially as shown in Figure 1.

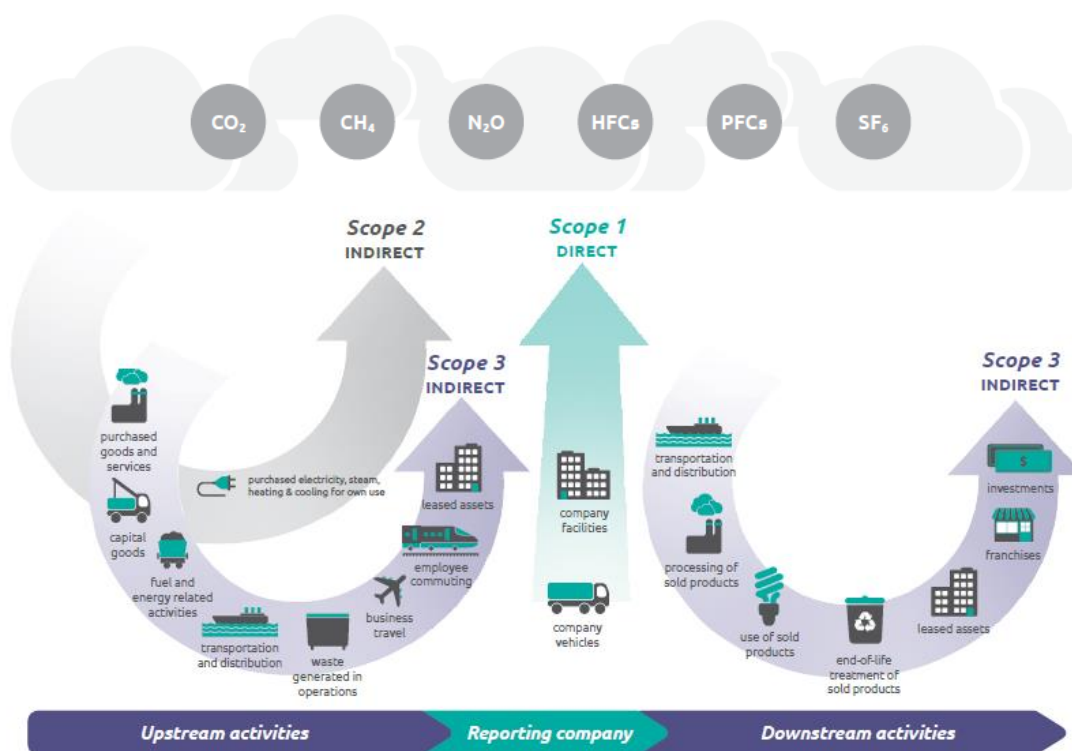


Figure 1: Overview of GHG Protocol Scopes and emissions across the value chain

The GHG emissions Scope 3 accounting and reporting framework is outlined in Figure 2. As the GHG emissions estimation is a forecast (refer to Appendix C for more information on forecasting GHG emissions), the last two steps in Figure 2 have not been considered as part of this engagement and Vitrinite is required to track emissions over time and report these emissions will be required. It is noted that Vitrinite is a liable entity under the *National Greenhouse and Energy Reporting Act 2007* (the NGER Act) which requires to report Scope 1 and Scope 2 GHG emissions, energy production and energy consumption.



Figure 2: GHG Protocol Corporate Value Chain Reporting Framework

2.1 Reporting principles

Under both the NGER legislation and the Value Chain Standard emission estimates need to be compiled in accordance with several common principles, relating to relevance, completeness, consistency, transparency, and accuracy of data.

The ‘relevance’ principle only applies to Scope 3 emissions which are ‘relevant’ to the facility which the emissions inventory is being compiled for. The other four principles apply to all emissions estimates (Scope 1, 2 and 3). A discussion of how these principles have been addressed for the Project inventory is presented below.

2.1.1 Relevance

The determination of whether to include or exclude activities from the GHG emissions boundary depends on whether the activities, both internal and external to the organisation and the Project, pertain to the operations and business activities of the organisation and the Project. The extent of the project boundary and the availability and quality of data that could faithfully represent the GHG emissions inventory were considered in the compilation of the GHG emissions report.

2.1.2 Completeness

All material and most of the immaterial GHG emission sources within the reporting boundary have been accounted for. Where GHG emissions sources were not able to be estimated at a sufficient level of accuracy (e.g. combustion of liquid fuels other than diesel), their exclusion has been documented and justified (refer to Appendix B). These excluded emissions are immaterial to the total inventory.

2.1.3 Consistency

Methods applied are consistent with the NGER legislation, the guidance in the Value Chain Standard and the methods applied for emissions inventories for similar facilities. Any modifications to the inventory, including alterations in accounting methods, boundaries, or calculation approaches, were documented, and transparently justified to enable a comparison of GHG emissions performance over time and identify trends and performance over time.

2.1.4 Transparency

Emission estimates have been prepared with explicit identification of reference data, justification of exclusions, disclosure of assumptions, and references to methodologies and data sources to enhance transparency in the GHG inventory. Estimates and the preparation methodology have been peer reviewed and are presented in a format to enable the continuation of reporting once the Project commences.

2.1.5 Accuracy

The GHG emissions report is a forecast estimate, as such, the accuracy is unable to be calculated. The assumptions made in the course of the forecasted Activity Data have been documented and reviewed by the Project proponent. Efforts were made to enhance the accuracy of the Activity Data forecasts, where applicable, Activity Data was derived from historical actual energy consumption (i.e. diesel) for equivalent current operations at Jupiter mine. This ensures the GHG emissions report can be relied upon for confident decision making, while having regard for the availability of data for the Project.

2.2 Emissions Factors Sources

The following were used to source the emissions factors (refer to section 8 References for more details):

- Scope 1, 2 and 3 GHG emissions were calculated, where possible, based on the methodologies and emission factors contained in the National Greenhouse Accounts (NGA) Factors 2023 [2];
- Scope 1 open cut fugitive emissions were calculated using the emissions factors prescribed in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 [3];
- Scope 3 GHG emissions associated with transport were calculated based on emission factors contained in NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4]; and
- Other Scope 3 emissions were calculated using:
 - Stainless Steel and CO₂: International Stainless Steel Forum (ISSF) 2023 [5]; and
 - AC3 Public Disclosure Statement AC3 Service Certification 2023 [6].

3 Project Activities and Relevance to the Inventory

This section provides a high-level overview of the process of establishing and operating the Project facility and the transportation of the Project output (metallurgical coal) to its point of end use.

3.1 Project Set Up

The Project will predominantly use existing assets (i.e. excavation equipment, trucks and ancillary equipment) and personnel from the operating Jupiter pit, which will cease operations when the Project commences. The operation of existing and new equipment (both Project and contractor owned) and the activities of staff (direct employees and contractors) will be in accordance with existing operational procedures deployed by Vitrinite.

The use of assets, and the activities of staff and contractors are accounted for in the assessment of all Scopes of emissions related to the Project.

3.2 Mining Method

An out-of-pit waste rock dump will be established prior to commencing in-pit dumping activities that will continue for the life of the operation. Ancillary infrastructure, including a ROM pad, offices, roads and surface water management infrastructure will be established to support the operation.

3.2.1 Truck & Shovel

Waste rock extracted during the early stages of each open pit will be placed in out-of-pit dumps to the west of the open pits. Following this initial out-of-pit placement and once sufficient pit space has been established, in-pit placement of waste rock will commence. This will continue for the life of each pit as it is developed. The in-pit dumps will extend up to approximately 60m above the surrounding ground level, with batters shaped up to a maximum slope of 15%. A central plateau will drain to the west to minimise the requirement for significant drainage infrastructure along the eastern toe of the dump.

An assessment of waste rock geochemistry has concluded that the waste rock does not propose a significant risk of generating saline or metalliferous drainage. Therefore, no selective handling and treatment measures are proposed. Furthermore, low permeability capping over the dump surface is not considered to be required.

In-pit dumping will fill most of the pit volumes during operations with the remaining final voids to be backfilled upon cessation of mining, resulting in the establishment of low waste rock dump landforms over the former pit areas. Following backfill of the final voids, the remaining material stored in the initial out-of-pit waste rock dumps will be rehabilitated in-situ.

The initial out-of-pit waste rock dump will be progressively rehabilitated following the placement of the waste rock in the dump zone. As a part of Progressive Rehabilitation requirements, different areas will be rehabilitated once the area becomes available over the life of the mine.

3.2.2 Highwall Mining

The Project includes a small-scale highwall mining trial program in the north of the MLA. The trial will involve the establishment of four highwall mining benches across a series of hillsides to facilitate extraction of coal utilising a CAT HW300 highwall miner (or similar). The highwall mining trial will target up to 750 kt of coal within the first year of mining operations. Mined coal will be loaded by front-end-loader and transported by truck to the third party CHPPs.

Minimal infrastructure will be required to support the highwall mining trial. This will include mobile diesel fuel tanks, workshop containers and portable bathroom amenities. Earthmoving equipment will be required for the development of benches for the highwall miner to operate on as well as road construction and maintenance equipment to build and maintain the haul road to the CHPP/ ROM stockpile area. For the trial, the benches will form part of the haul road and will be connected by sections of linking haul road.

ROM coal will be loaded from the discharge conveyor of the highwall miner onto a stacker belt for stockpiling on the active bench. Loaders will manage the stockpile for haulage to the CHPP. Waste rock from the benches will be temporarily stockpiled during highwall mining activities, prior to being backfilled into the bench areas during progressive rehabilitation. Mining activities are accounted for in the Scope 1 assessment related to the Project. Site establishment is accounted for in the Scope 3 inventory.

3.3 Coal processing activities

After the coal is extracted, it will be crushed and screened and hauled as part of the CHPP raw coal handling circuit. The Project will include a modular CHPP to process ROM coal into saleable products. The CHPP will include:

- A raw coal handling circuit to size ROM coal for further processing and remove incidental wastes;
- A raw coal bypass conveyor to provide the option to direct raw coal to product stockpile;
- Three CHPP circuits (coarse, secondary coarse and mid-sized) for coal beneficiation, producing a single product stream;
- A tailings thickener to thicken ultrafine reject material; and
- Tailings dewatering technology to dewater tailings to a solid cake for disposal in active waste rock dumps.

The CHPP will produce dual products at any one time with different products produced in campaigns via control of different ROM feed materials. All processing wastes, including reject material and dry process tailings, will be stored within active waste rock dumps, removing the requirement for a tailings' storage facility at the site. Priority will be given to disposal of processing wastes within in-pit dumps at depth; however scheduling constraints may necessitate storage of some material in out-of-pit waste rock dumps. Wastewater will be recycled within the CHPP circuit to minimise raw water demand and storage and disposal requirements.

Coal processing activities are accounted for in the Scope 1 and 2 assessments related to the Project. Wastes and wastewater are accounted for as Scope 3 emissions (where an emission source may be considered either Scope 1 or Scope 3, its classification is made in line with NGER reporting requirements).

3.4 Transport of Product

3.4.1 Transport: Overland Pit to Port

A single CHPP product conveyor is expected to deliver saleable product (i.e. metallurgical coal) to a radial product stacker. The system is expected to deliver different products to two different stockpiles. The train load out facility will link the product stockpiles with the proposed rail loop and will utilise a two-coal valve reclaim system to load at a rate of 3,500 tph. The train load out facility will be managed via a fully automated system, including overload protection and load veneering. The facility will be positioned over the rail line and will incorporate a suitable under rail spillage pit. Product coal is expected to be railed from the Project rail loop onto the existing Goonyella Rail network to the Dalrymple Bay Coal Terminal.

3.4.2 Transport: Shipping Port to Port

The product coal is expected to be transported by sea to several countries. At the time of the writing of this report, the destinations were unknown. However for the purposes of estimation of GHG emissions, the Wood Mackenzie's forecasted country imports² for high quality metallurgical coal were considered. The countries' demand over the next ten years was considered for the destination of the Project's coal.

3.4.3 Transport: Overland Port to Use Facility

The specific end use facility locations are not known, however the main steel manufacturing facilities of the different countries where the coal is expected to be exported, were considered. The transportation from port to the end use facilities is expected to be done by rail. The GHG emissions associated with the transportation from port to the end use facility have been considered as part of the engagement.

Transport may be accounted for as either Scope 1 or Scope 3 depending on how contracts are arranged and whether the transport activities fall under the operational control of the Project. The classification of emissions as Scope 1 or Scope 3 is made in line with NGER reporting requirements.

3.5 Consumption of coal in steel manufacturing

The Project product (high-quality coking coal) is consumed in the steel manufacturing process, to which there is currently no substitute. The emissions associated with the consumption of coal in the steel manufacturing process are (the largest) Scope 3 emissions for the Project. None of the coal from the Project is intended for electricity generation.

3.6 Identification of relevant Scope 3 activities

The relevance of the emission sources within each of the Scope 3 emissions inventory categories was established at the commencement of the assessment and revisited at the conclusion of the inventory development. This determination was made based on the relevancy, materiality, availability of data and information. The Scope 3 categories that are covered in the emissions inventory are presented in green in Appendix C, and categories shaded red are not relevant for the Project Inventory.

² Information provided by the Project proponent.

4 GHG Emissions Summary

As shown in Figure 3, the most material emission source for the Project is the downstream Scope 3 Activity, consumption of coal in steel manufacturing. This is the most material emission source for any metallurgical coal mining facility.

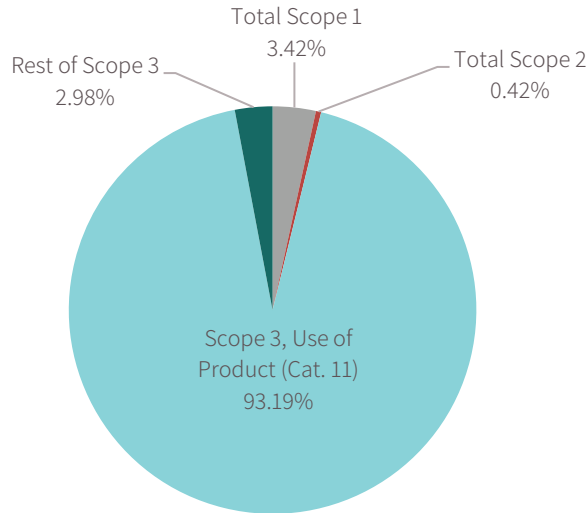


Figure 3: GHG emissions breakdown by Scope, Total Project

The GHG emissions breakdown across the Project are outlined in Figure 4 and further detailed in Table 2.

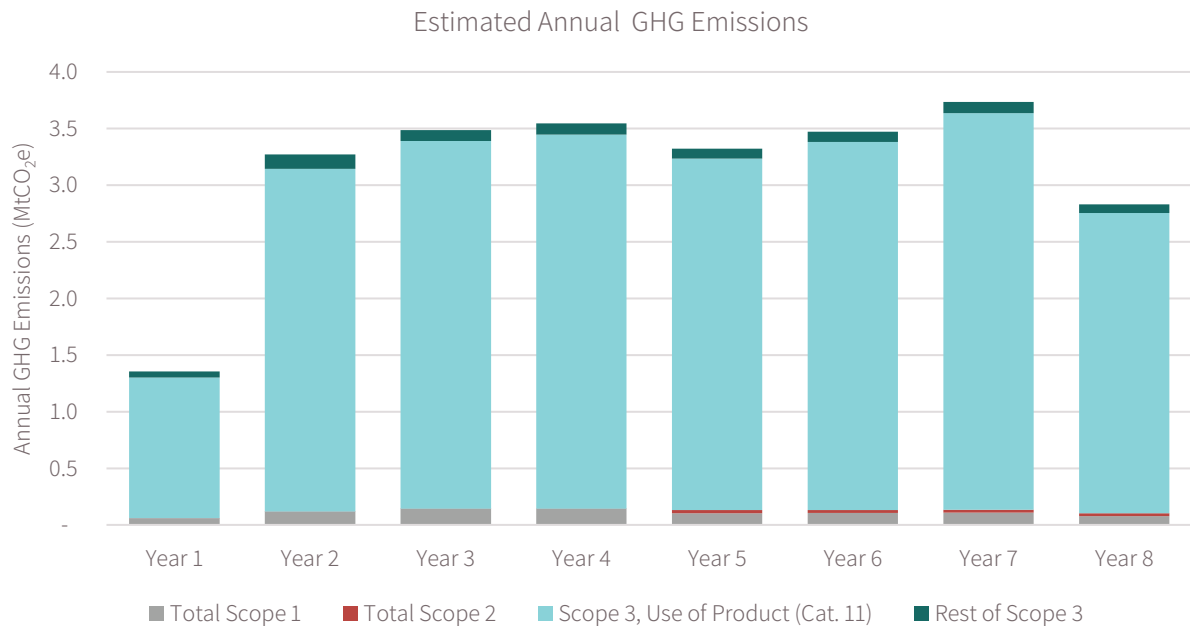


Figure 4: GHG emissions breakdown by Scope and Project Year

A breakdown of each of the GHG emissions categories is provided in Table 2. The quantities are provided in kilo tonnes of carbon dioxide equivalent (ktCO₂e) (i.e. 1,000 tCO₂e). A summary and an overview of each of the categories outlined in Table 2 are provided in the below sections.

Table 2: GHG Emissions Breakdown, ktCO₂e

Description	Report Section	Total	%	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
Total Scope 1	4.1	856	3.42%	58	117	142	143	102	105	110	79
Total Scope 2	4.2	104	0.42%	0.1	0.1	0.1	0.1	29	27	25	23
<i>Upstream emissions</i>	<i>4.3.1</i>										
Cat 1 Purchased Goods & Services	4.3.1.1	59	0.23%	4.5	16	6.2	6.1	6.2	6.1	7.3	6.2
Cat 2 Capital Goods	4.3.1.2	-	-	-	-	-	-	-	-	-	-
Cat 3 Fuel and energy-related activities	4.3.1.3	129	0.52%	8.1	14	21	21	18	18	17	13
Cat 4 Upstream transportation & distribution	4.3.1.4	-	-	-	-	-	-	-	-	-	-
Cat 5 Waste generated at operations	4.3.1.5	8.8	0.04%	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Cat 6 Business travel	4.3.1.6	0.7	0.003%	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cat 7 Employee commuting	4.3.1.7	12	0.05%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cat 8 Upstream leased assets	4.3.1.8	2.8	0.01%	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
<i>Downstream emissions</i>	<i>4.3.2</i>										
Cat 9 Downstream transportation and distribution	4.3.2.1	473	1.89%	25	62	66	68	63	65	70	53
Cat 10 Processing of sold products	4.3.2.2	45	0.18%	14	31	-	-	-	-	-	-
Cat 11 Use of sold products	4.3.2.3	23,328	93.24%	1,243	3,027	3,247	3,304	3,103	3,249	3,502	2,653
Cat 12 End of life treatment of sold products	4.3.2.4	-	-	-	-	-	-	-	-	-	-
Cat 13 Downstream leased assets	4.3.2.5	-	-	-	-	-	-	-	-	-	-
Cat 14 Franchises	4.3.2.6	-	-	-	-	-	-	-	-	-	-
Cat 15 Investments	4.3.2.7	-	-	-	-	-	-	-	-	-	-
Total Scope 3	4.3	24,059	96.16%	1,298	3,153	3,343	3,402	3,193	3,341	3,600	2,728
Total Scope 1, 2 and 3		25,019	100%	1,356	3,271	3,486	3,545	3,324	3,473	3,735	2,830

4.1 Scope 1 GHG Emissions Results

The main Scope 1 GHG emissions (direct emissions) sources for the Project are:

- The combustion of liquid fuels for mining activities and the construction of the CHPP and rail loop; and
- Fugitive emissions (methane) released to the atmosphere as the coal seam is exposed.

Description	GHG emissions from operations that are owned or controlled by the reporting company.
Total Emissions	856 ktCO ₂ e over the LOM, representing 3.42% of the total GHG emissions.
Activity Data Source	Planned annual diesel consumption in L for project (provided by the proponent), for: <ul style="list-style-type: none"> - open cut mining fleet operations - drill and blast operations - ancillary fleet (inc. power generation) - ROM operations - offsite haulage - onsite haulage Quantity and hours of various units used in highwall mining operations (supplied by the proponent). Fuel consumption L/hr for % load factors (supplied by the proponent). Planned annual ROM production (provided by the proponent). Number of Local, FIFO and DIDO workers (provided by the proponent).
Emissions Factors Data Source	NGA Factors 2023 [2]. NGER (Measurement Determination) FY24 [3].
Other	Scope 1 emissions relating to the construction of the CHPP and rail loop, and the operations of the CHPP have been incorporated as provided by the Contractor designing the CHPP.

4.2 Scope 2 GHG Emissions Results

The only Scope 2 GHG emissions source is electricity from the grid. The electricity procurement from the grid for the Project at the mine site is expected to commence at the start of Year 5, and electricity procurement from the grid for offsite company rented houses expected to occur across the life of the project.

Description	GHG emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company.
Total Emissions	104 ktCO ₂ e over the LOM, representing 0.42% of the total GHG emissions.
Activity Data Source	CHPP, TLO and admin demand power and annual operating hours (supplied by the proponent). Historical electricity consumption in rental housing (provided by the proponent).
Emissions Factors Data Source	NGA Factors 2023 [2].

4.3 Scope 3 GHG Emissions Results

All indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

Scope 3 emissions are estimated using guidance from the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (the Value Chain Standard). The Value Chain Standard provides an internationally accepted approach to account GHG emissions in an organisation’s corporate chain GHG emissions.

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

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

In the case of goods purchased or sold by the reporting company, upstream emissions occur up to the point of receipt by the reporting company (i.e. the gate), while downstream emissions occur subsequent to their sale by the reporting company and transfer of control from the reporting company to another entity (i.e. the rail).

The GHG protocol provides 15 different categories to assist reporting corporations to quantify their Scope 3 GHG emissions (eight of which are upstream and seven are downstream). The following sections provide an overview of all the upstream and downstream GHG emissions divided by each of the categories proposed by the GHG protocol. The Upstream and Downstream Scope 3 Categories are listed in Table 3.

Table 3: Scope 3 Categories

Category	Report Section
Upstream Scope 3 emissions	
1. Purchased goods and services	4.3.1.1
2. Capital goods	4.3.1.2
3. Fuel- and energy-related activities (not included in Scope 1 or Scope 2)	4.3.1.3
4. Upstream transportation and distribution	4.3.1.4
5. Waste generated in operations	4.3.1.5
6. Business Travel	4.3.1.6
7. Employee commuting	4.3.1.7
8. Upstream leased assets	4.3.1.8
Downstream Scope 3 emissions	
9. Downstream transportation and distribution	4.3.2.1
10. Processing of sold products	4.3.2.2
11. Use of sold products	4.3.2.3
12. End-of-life treatment of sold products	4.3.2.4
13. Downstream leased assets	4.3.2.5
14. Franchises	4.3.2.6
15. Investment	4.3.2.7

4.3.1 Upstream GHG emissions

4.3.1.1 Category 1. Purchased Goods and Services

Scope 3 Category Description	Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 – 8.
Total Emissions	59 ktCO ₂ e over the LOM, representing 0.23% of the total GHG emissions.
Activity Data Source	Annual water consumption volumes and source (provided by the proponent). Details of new assets for project (provided by the proponent). Annual expenditure on miscellaneous services (provided by the proponent).
Emissions Factors Data Source	NGA Factors 2023 [2]. ISSF 2023 [5]. Climate Active PDS 2023 [6].
Other	Scope 3 emissions relating to the construction of the CHPP, and rail loop have been incorporated as provided by the Contractor designing the CHPP.

4.3.1.2 Category 2. Capital Goods

Category Description	Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year.
Total Emissions	N/A
Exclusion Justification	All GHG emissions related to this category have been included in Category 1.

4.3.1.3 Category 3. Fuel- & energy-related activities: Extraction, production, & transportation

Category Description	Extraction, production, and transportation of fuels and energy purchased / acquired by the reporting company in the reporting year, not already accounted for in Scope 1 or Scope 2. Includes emissions related to purchased fuel, electricity, T&D losses & produced electricity.
Total Emissions	129 ktCO ₂ e over the LOM, representing 0.52% of the total GHG emissions.
Activity Data Source	Fuel and energy quantities as outlined for Scope 1 and Scope 2 (refer to sections 4.1 and 4.2).
Emissions Factors Data Source	NGA Factors 2023 [2].
Other	Scope 3 emissions relating to the operations of the CHPP have been incorporated as provided by the Contractor designing the CHPP.

4.3.1.4 Category 4. Upstream transportation & distribution

Category Description	Transportation & distribution (T&D) of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company). T&D services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company).
Total Emissions	N/A
Exclusion Justification	There are no feedstock material/products purchased which are imported to a coal mining project.

4.3.1.5 Category 5. Waste generated in operations

Category Description	Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company).
Total Emissions	8.8 ktCO ₂ e over the LOM, representing 0.04% of the total GHG emissions.
Activity Data Source	Service provider monthly invoice (provided by the proponent). Closest waste centre distance (provided by the proponent). Number of rental properties (provided by the proponent).
Emissions Factors Data Source	NGA Factors 2023 [2]. NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4].

4.3.1.6 Category 6. Business travel

Category Description	Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company).
Total Emissions	0.7 ktCO ₂ e over the LOM, representing 0.003% of the total GHG emissions.
Activity Data Source	Corporate travel service provider activity data (provided by the proponent).
Emissions Factors Data Source	NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4].

4.3.1.7 Category 7. Employee Commuting

Category Description	Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).
Total Emissions	12 ktCO ₂ e over the LOM, representing 0.05% of the total GHG emissions.
Activity Data Source	Local, FIFO and DIDO staff numbers, commute routes and frequencies (provided by the proponent).
Emissions Factors Data Source	NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4].

4.3.1.8 Category 8. Upstream Leased Assets

Category Description	Operation of assets leased by the reporting company (lessee) in the reporting year and not included in Scope 1 and Scope 2 – reported by lessee.
Total Emissions	2.8 ktCO ₂ e over the LOM, representing 0.01% of the total GHG emissions.
Activity Data Source	Number of beds leased in hotel (provided by the proponent).
Emissions Factors Data Source	NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4].

4.3.2 Downstream GHG emissions

4.3.2.1 Category 9. Downstream transportation and distribution

Category Description	Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company).
Total Emissions	473 ktCO ₂ e over the LOM, representing 1.89% of the total GHG emissions.
Activity Data Source	Planned annual ROM production (provided by the proponent). Yearly CHPP expected yield (provided by the proponent). Annual projected coal imports by country (provided by the proponent).
Emissions Factors Data Source	NZ Ministry for the Environment, Measuring Emissions Guidance 2023 [4].

4.3.2.2 Category 10. Processing of sold products

Category Description	Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers).
Total Emissions	45 ktCO ₂ e over the LOM, representing 0.18% of the total GHG emissions.
Activity Data Source	CHPP and TLO demand power and annual operating hours (supplied by the proponent). CHPP operations diesel in kL (supplied by Contractor designing CHPP).
Emissions Factors Data Source	NGA Factors 2023 [2].

4.3.2.3 Category 11. Use of Sold Products

Category Description	End use of goods and services sold by the reporting company in the reporting year.
Total Emissions	23,328 ktCO ₂ e over the LOM, representing 93.24% of the total GHG emissions.
Activity Data Source	Tonnes saleable coal over project life (provided by the proponent).
Emissions Factors Data Source	NGA Factors 2023 [2].

4.3.2.4 Category 12. End-of-life treatment of sold products

Category Description	Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.
Total Emissions	N/A
Exclusion Justification	Steel manufacturing yields slag (i.e. remanent material) as a byproduct smelting (pyrometallurgical) ores and recycled metals. Slag is a mixture of metal oxides and silicon dioxide. The slag is either processed into a raw contraction material by the steel manufacturing or sold to a third party. As such, any emissions associated with the process of slag or its sale is not considered in Vitrinite’s reporting boundary.

4.3.2.5 Category 13. Downstream leased assets

Category Description	Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in Scope 1 and Scope 2 – reported by lessor.
Total Emissions	N/A
Exclusion Justification	Vitrinite does not own any downstream leased assets.

4.3.2.6 Category 14. Franchises

Category Description	Operation of franchises in the reporting year, not included in Scope 1 and Scope 2 – reported by franchisor.
Total Emissions	N/A
Exclusion Justification	Vitrinite does not own any franchises.

4.3.2.7 Category 15. Investments

Category Description	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in Scope 1 or Scope 2.
Total Emissions	N/A
Exclusion Justification	Vitrinite does not own any downstream investments.

5 Comparison to National and State Emission Inventories

Australia’s annual net GHG emissions averaged 530 MtCO₂e over the last decade (2011 to 2021) [8]. Over the same period, Queensland’s annual GHG emissions averaged 163 MtCO₂e, representing 31% of Australia’s GHG emissions. In comparison the Project’s Scope 1 & 2 GHG emissions are projected to be, on average,

0.13 MtCO₂e annually. The Project’s GHG emissions are a relatively small proportion of both the Australian and Queensland’s total GHG emissions, accounting for 0.02% of Australia’s total GHG emissions and 0.08% of Queensland’s GHG emissions. Furthermore, the Project will transition all operating staff and assets from the Jupiter mine, which will cease operations at the time the Project commences. A breakdown of this comparison is provided in Figure 5.

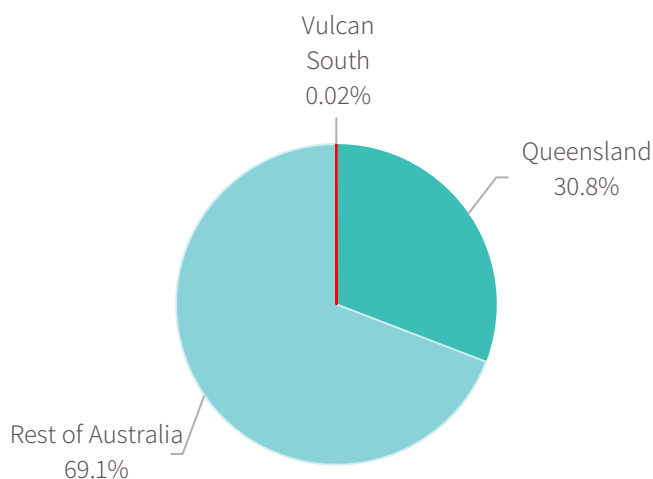


Figure 5: Vulcan South Project Scope 1 & 2 GHG emissions comparison to State and National levels

Only the direct Scope 1 emissions and the indirect Scope 2 emissions have been considered for Figure 5 as they are under the operational control of Vitrinite’s Vulcan South.

5.1 Meeting Australia’s and Queensland’s Emissions Reduction Targets

Australia has the emissions reduction target of 43% below 2005 levels by 2030 [10], and Queensland 30% emissions reduction below 2005 levels by 2030 [11]. Based on data from Australia’s National Greenhouse Accounts (NGA) [8], the following targets were considered:

- Australia’s 2005 GHG emissions totalled 616 MtCO₂e, a reduction of 43% equates to a total of 351 MtCO₂e in 2030; and
- Queensland’s 2005 GHG emissions totalled 196 MtCO₂e, a reduction of 30% equates to a total of 137 MtCO₂e in 2030.

The latest NGA numbers are for 2021, and a linear regression between 2021 and 2030 was performed and graphed in Figure 6. In the graph, the immaterial contribution of the Project’s Scope 1 and Scope 2 GHG emissions were also plotted.

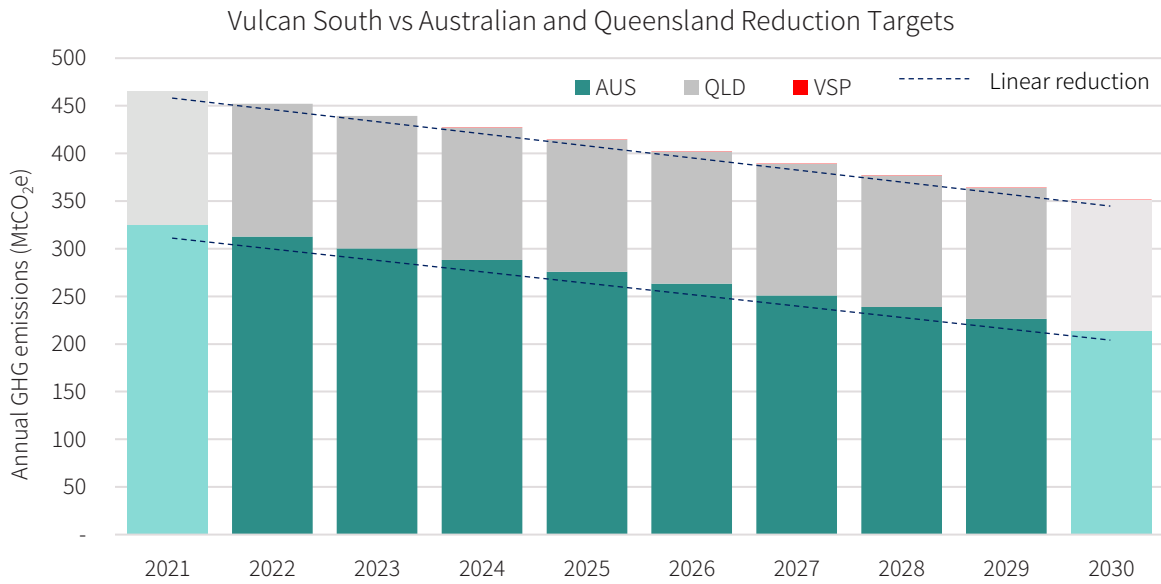


Figure 6: Scope 1 & 2 GHG emissions comparison to State and National levels to 2030

5.2 Comparison with other coal mines near the Project

A high-level comparison of the publicly available annual GHG emissions (Scope 1) and annual production between the Project and other operating coal mines located within 60 km from the Project. A graphical representation of the comparison is provided in Figure 7. The graph compares the GHG emissions (Scope 1) with production. The projected annual GHG emissions and production for the Project are highlighted with a different colour and shows that the emissions intensity is projected to be lower than other mines located within 60 km of the proposed mine site. The Project is expected to be significantly smaller in emissions and production than other mines in the area.

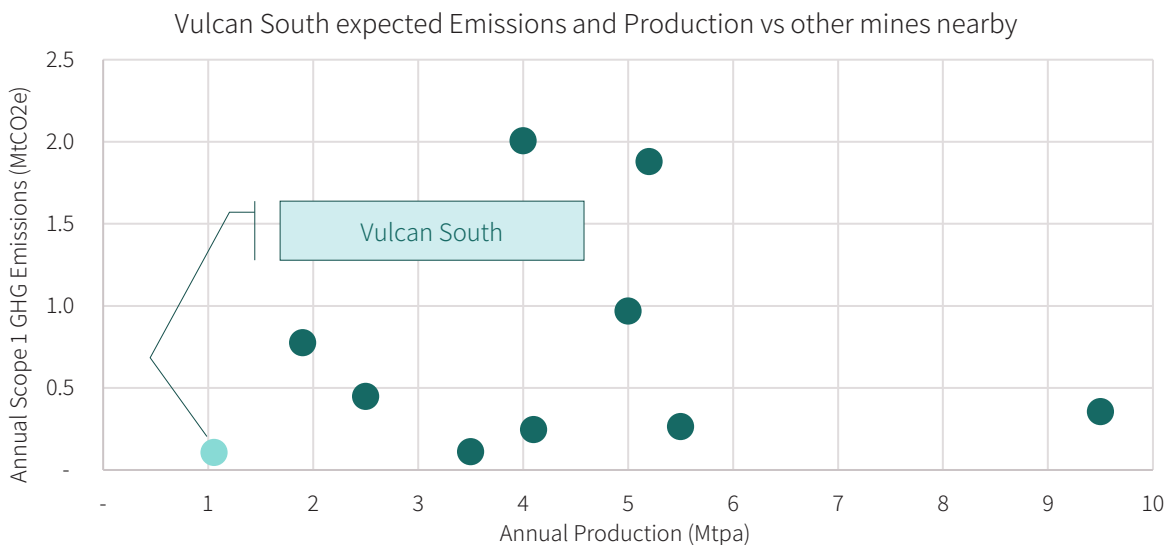


Figure 7: Production and Scope 1 emissions comparison with other mines near the Project

6 Mitigation and Abatement Opportunities

As part of business improvement, Vitrinite will continue to identify energy consumption reduction and GHG emissions abatement options to be considered in the design phase of the Project. In this section, a series of preliminary opportunities to improve energy efficiency and abate GHG emissions are detailed. Table 4 provides an overview of the opportunities considered, a brief description and the emissions abatement potential the opportunity may have if the opportunity is implemented.

As the project planning process matures, it is expected further opportunities will be identified, evaluated and analysed to test the sensibility, and financial and commercial viability of each option.

Table 4: Mitigation and Abatement Opportunities

No	Opportunity	Description	Potential
1	Method 2 open cut fugitive GHG emissions determination	Vitrinite will evaluate the use of Method 2 to estimate the fugitive emissions from open cut as described in the NGER Act to determine the site specific GHG emissions associated to the open cut mining activities for Project. It is expected that the total GHG emissions will be decreased as a result of this study.	Very High
2	CHPP optimisation from design	Vitrinite has used nine CHPP plants to wash their coal from current operations. Vitrinite is designing and constructing their own CHPP and will employ an optimised circuitry that works best for their coal (e.g. size fraction distribution and designing plant flow to suit). Other optimisation activities to be performed are the CHPP operating settings and the use of additives to optimise yield and efficiency. This will result in a high-quality export product.	Very High
3	Enhanced excavator utilisation and rate	Improvements related to shift changeovers and work through crib times will increase the utilisation of the excavators. Improving the utilisation of equipment is expected to result in secondary energy and GHG emissions benefits, as the mine becomes more productive (i.e. more tonnes of product by the same energy consumed) and idle time is minimised. Vitrinite will consider setting up objectives to improve excavator utilisation and rates.	Medium
4	Install VSD in motors and pumps (CHPP)	Vitrinite is considering the implementation of Variable Speed Drives (VSD) in motors and pumps throughout the CHPP as part of its design and construction. Correct motor and pump sizing throughout the site will enable efficient energy usage.	Medium
5	Road Optimisation	Vitrinite will consider the use of enhanced road maintenance and the use of additives to decrease the rolling resistance of roads, decrease water usage, and positively impact the energy consumption from haulage activities. Less tyre damage due to improved intersection, loading faces, roads and spillage. It is expected this will result in reduced OPEX, improvements in fuel efficiency and productivity benefits (e.g. availability of equipment).	Medium
6	Energy Optimisation	Use of energy efficient equipment / implement energy efficiency or saving activities in auxiliary services, lighting, compressed air, etc. as the replacement becomes needed.	Low

7 Metering, Monitoring, Reporting and Verification

Vitrinite must adhere to internal and external energy and GHG emissions reporting requirements stipulated under the NGER Act and the Safeguard Mechanism (it is noted that it is likely that the Project will trigger the Safeguard Mechanism reporting threshold of 100ktCO_{2e}).

7.1 Energy and GHG Emissions Reporting

The NGER Act is bound by the reporting principles of transparency, accuracy, completeness, and comparability. Vitrinite is required to comply with the NGER Act requirements.

To prepare for any internal and external audits (e.g. under the NGER Act), Vitrinite will need to perform periodic reviews of energy and GHG emissions activities and record keeping. A proactive approach will enable the Project to report energy and GHG emissions in a compliant, accurate, consistent and complete manner.

7.2 Record Keeping

All relevant information and data supporting energy and GHG emissions management must be stored and maintained for at least five (5) years³, in line with the NGER Act legislative requirements, and must include records and information relating to the assessments undertaken, supporting evidence, reporting and any other relevant documentation.

³ Section 22 (3) of the NGER Act – “The corporation or person must retain the records for 5 years from the end of the year in which the activities take place”.

8 References

- 1 World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) (2011) Corporate Value Chain (Scope 3) Accounting and Reporting Standard, retrieved from: https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf
- 2 Australian Government Department of Climate Change, Energy, the Environment and Water (2023), Australian National Greenhouse Accounts Factors For individuals and organisations estimating greenhouse gas emissions, retrieved from: <https://www.dcceew.gov.au/sites/default/files/documents/national-greenhouse-account-factors-2023.pdf>
- 3 Australian Government (2023), National Greenhouse and Energy Reporting (Measurement) Determination 2008, incorporating amendments up to National Greenhouse and Energy Reporting (Measurement) Amendment (2023 Update) Determination 2023, retrieved from: <https://www.legislation.gov.au/Details/F2023C00815>
- 4 New Zealand Government Ministry for the Environment (2023), Measuring emissions: A guide for organisations, 2023 summary of emission factors, retrieved from: <https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2023-emission-factors-summary/>
- 5 International Stainless Steel Forum (ISSF) (2023), Stainless steel CO2 emissions report, retrieved from: https://www.worldstainless.org/files/issf/non-image-files/PDF/worldstainless_CO2_Emissions_Report.pdf
- 6 Climate Active (2023), AC3 Public Disclosure Statement AC3 Service Certification FY2022-23 (Projected), retrieved from: <https://www.climateactive.org.au/sites/default/files/2023-08/AC3%20-%20Public%20Disclosure%20Statement%20-%20Services%5B37%5D.pdf>
- 7 MetServe (2022) Supporting Information for Site-specific Environmental Authority Application, retrieved from: https://vitrinite.com.au/wp-content/uploads/2022/06/Vulcan-South_EA-Application-Supporting-Information-Documents-MET00285309-017.pdf
- 8 Department of Climate Change, Energy, the Environment and Water (n.d.) Australia's National Greenhouse Accounts, online tool available at: <https://ageis.climatechange.gov.au/>
- 9 Queensland Government (2023), Newsroom: 70% renewables target by 2032 announced in landmark energy plan, [webpage] retrieved from: <https://www.qld.gov.au/about/newsroom/queensland-energy-and-jobs-plan>
- 10 Australian Government (2022) Australia submits new emissions target to UNFCCC, Department of Climate Change, Energy, the Environment and Water [News webpage] retrieved from: <https://www.dcceew.gov.au/about/news/australia-submits-new-emissions-target-to-unfccc>
- 11 Queensland Government (2023) Queensland Climate Action [webpage] retrieved from: <https://www.des.qld.gov.au/climateaction>

Appendix A: GHG Emissions Background

The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol (the Kyoto Protocol) identified six anthropogenic greenhouse gas (GHG) emissions (UN, 1998). These include:

- Carbon Dioxide (CO₂);
- Nitrous Oxide (N₂O);
- Methane (CH₄);
- Perfluorocarbons (PFCs);
- Hydrofluorocarbons (HFCs); and
- Sulphur Hexafluoride (SF₆).

For the purposes of this greenhouse gas (GHG) assessment, the GHG emissions considered only CO₂, N₂O and CH₄ emissions. All GHG emission quantities are provided in tonnes of carbon dioxide equivalent (tCO₂e).

The CO₂e of a particular GHG emission is calculated based on its Global Warming Potential (GWP). The GWP reflects the relative global warming impact that one metric tonne of a particular GHG emission source has relative to one metric tonne of carbon dioxide (tCO₂). The GWPs for gases relevant to this study have been taken from the National Greenhouse and Energy Reporting Regulations (the NGER Regulations) and are provided in Table 5.

Table 5: Global Warming Potentials

GHG	Chemical Formula	GWP
Carbon Dioxide	CO ₂	1
Methane	CH ₄	28
Nitrous Oxide	N ₂ O	265

Operational Boundary (GHG Emissions Scopes)

Defining an operational boundary assists with the determination of GHG Emissions associated with a facility. Identifying the operational boundary also assists with determining and categorising GHG emissions sources as *direct* and *indirect* GHG emissions through the identification of three Scope level of GHG emissions (Scope 1, Scope 2 and Scope 3) (ISO, 2006). These Scope levels are defined in Table 6.

Table 6: Carbon Emissions Scope Details

Scope	Details
Scope 1	Direct GHG emissions which occur from sources that are owned or controlled by an organisation. Examples of Scope 1 emissions include the emissions from on-site fuel combustion for electricity generation purposes, or emissions associated with diesel combustion from transport activities.
Scope 2	Indirect GHG emissions are emitted from the generation of purchased electricity, heat or steam consumed by an organisation (i.e. the emissions do not physically occur within the boundary of the facility).
Scope 3	Indirect GHG emissions are generated in the wider economy as a result of an organisation's activities, however these emissions physically occur elsewhere. For example, the emissions from waste disposed at a third party's operated landfill facility.

Appendix B: GHG Emissions Report Assumptions

The GHG emissions associated with the Project were estimated based on forecasted Activity Data and emission factors, which are based on the best available, accurate and relevant information available to date.

As such, all the emissions estimations are based on forecasted activity data. Whilst the GHG emissions report is based on the GHG emissions reporting principles (refer to section 2.1), the actual GHG emissions for the Project will vary. This variance will be highly impacted by differences between projected Activity Data and actual Activity Data, however, will also be impacted by any annual emission factor and conversion factor variations.

The electricity-based emission factors have been projected to decrease annually throughout project, in-line with the methodology applied by the Contractor designing the CHPP. This methodology assumes a straight line reduction from the NGA Factors 2023 values to 0.25 kgCO₂e/kWh in 2037. This accounts for the greening of Queensland's electricity grid resulting from the Queensland Energy and Jobs Plan, 70% renewables target by 2032 [9], with a 5-year delay on reaching this target.

All non-electricity based emissions factors have been forecast to be consistent for every year across the LOM.

Exclusions

The GHG emissions projections exclude estimations for the following **immaterial** sources:

- Scope 1:
 - Venting or other fugitive release before extraction of coal, as no drilling / pre-drainage is expected to be undertaken;
 - Combustion of gaseous and liquid fuels other than diesel;
 - Combustion of lubricants and greases;
 - Use of synthetic GHGs, such as sulphur hexafluoride (SF₆) in switchgear; and
 - Fugitive emissions for onsite wastewater handling.
- Scope 3:
 - Upstream transport and asset embodied associated with gensets for the CHPP; and
 - Supply and transportation of onsite potable water for drinking (supply of operational water is accounted for).

It is acknowledged that there may be other immaterial Scope 3 emissions sources excluded from the inventory and not outlined in the list above.

Appendix C: Reporting Boundary



Vitrinite - Vulcan South Emission Boundary



The Scope 3 emissions boundary extends upstream to cover the emissions associated with the production of new plant and equipment purchased for use in the facility during the operations period and downstream to the combustion of coal in the steel making process.

Upstream Scope 3			Scope 1 & 2		Downstream Scope 3		
	Category Description	Minimum Boundary				Category Description	Minimum Boundary
1. Purchased Goods and Services	Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8	All upstream (cradle-to-gate) emissions of purchased goods and services	Scope 1		9. Downstream transportation and distribution	Transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company)	The scope 1 and scope 2 emissions of transportation providers, distributors, and retailers that occur during use of vehicles and facilities (e.g., from energy use). Optional: The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure
2. Capital Goods	Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year	All upstream (cradle-to-gate) emissions of purchased capital goods	Diesel Fuel (Haulage)	Diesel Fuel (Stationary)	10. Processing of sold products	Processing of intermediate products sold in the reporting year by downstream companies (e.g. manufacturers)	The scope 1 and scope 2 emissions of downstream companies that occur during processing (e.g., from energy use)
3. Fuel- & energy-related activities: Extraction, production, & transportation	Extraction, production, and transportation of fuels and energy purchased / acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2. Includes emissions related to purchased fuel, electricity, T&D losses & produced electricity *	All upstream (cradle-to-gate) emissions of purchased / acquired fuels and energy (from raw material extraction up to the point of, but excluding combustion) *	Fugitive emissions from the extraction of coal		11. Use of Sold Products	End use of goods and services sold by the reporting company in the reporting year	The direct use-phase emissions of sold products over their expected lifetime (i.e., the scope 1 and scope 2 emissions of end users that occur from the use of: products that directly consume energy (fuels or electricity) during use; fuels and feedstocks; and GHGs and products that contain or form GHGs that are emitted during use). Optional: The indirect use-phase emissions of sold products over their expected lifetime (i.e., emissions from the use of products that indirectly consume energy)
4. Upstream transportation & distribution	Transportation & distribution (T&D) of products purchased by the reporting company in the reporting year: between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company) T&D services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company)	The scope 1 and scope 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities (e.g., from energy use) Optional: The life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure			12. End-of-life treatment of sold products	Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life	The scope 1 and scope 2 emissions of waste management companies that occur during disposal or treatment of sold products

Upstream Scope 3			Scope 1 & 2		Downstream Scope 3			
	Category Description	Minimum Boundary				Category Description	Minimum Boundary	
Upstream Scope 3	5. Waste generated in operations	Disposal and treatment of waste generated in the reporting company's operations in the reporting year (in facilities not owned or controlled by the reporting company)	The scope 1 and scope 2 emissions of waste management suppliers that occur during disposal or treatment Optional: Emissions from transportation of waste		Downstream Scope 3	13. Downstream leased assets	Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 - reported by lessor	The scope 1 and scope 2 emissions of lessees that occur during operation of leased assets (e.g., from energy use). Optional: The life cycle emissions associated with manufacturing or constructing leased assets
	6. Business travel	Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)	The scope 1 and scope 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use) Optional: The life cycle emissions associated with manufacturing vehicles or infrastructure			14. Franchises	Operation of franchises in the reporting year, not included in scope 1 and scope 2 - reported by franchisor	The scope 1 and scope 2 emissions of franchisees that occur during operation of franchises (e.g., from energy use) Optional: The life cycle emissions associated with manufacturing or constructing franchises
	7. Employee Commuting	Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)	The scope 1 and scope 2 emissions of employees and transportation providers that occur during use of vehicles (e.g., from energy use) Optional: Emissions from employee teleworking		15. Investments	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2	See the description of category 15 (Investments) in section 5.5 of the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard for the required and optional boundaries	
	8. Upstream Leased Assets	Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 - reported by lessee	The scope 1 and scope 2 emissions of lessors that occur during the reporting company's operation of leased assets (e.g., from energy use) Optional: The life cycle emissions associated with manufacturing or constructing leased assets					
			Electricity purchased from grid (Vitrinite staff houses)	Electricity purchased from grid (CHPP & other mining uses)				