

Appendix 15

Greenhouse Gas Assessment





ULAN WEST CONTINUED OPERATIONS MODIFICATION

Greenhouse Gas Assessment

Final | Revision 2

29 July 2025

Project: 23035



Ulan West Continued Operations Modification

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Acronyms and definitions

Abbreviation	Definition
CER	Clean Energy Regulator
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
GHG	Greenhouse gas
MIA	Mine Infrastructure Area
Mtpa	Million tonnes per annum
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007</i>
NGERS	National Greenhouse and Energy Reporting Scheme
ROM	Run-of-mine
UCC	Ulan Coal Complex
UCMPL	Ulan Coal Mines Pty Limited
UWCO	Ulan West Continued Operations

Executive Summary

Ulan Coal Mines Pty Limited (UCMPL) is seeking approval for a modification to operations at the Ulan Coal Complex (UCC). Specifically, UCMPL is seeking approval to maximise resource recovery from within existing mining lease and exploration licence areas by extending longwall panels to the west of the currently underground mining areas. The project is referred to as the Ulan West Continued Operations (UWCO) Modification. Approval is sought via an application to be made under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This report provides an assessment of the greenhouse gas (GHG) emissions of the UWCO Modification.

Emissions were estimated in accordance with the principles of the Greenhouse Gas Protocol, using methods prescribed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and guidance from the NSW Environment Protection Authority (EPA).

The main outcomes of the assessment were as follows:

- The UWCO Modification meets the EPA's definition of a "large" emitter, and the "Guide for Large Emitters" (EPA, 2025) is therefore applicable.
- The UCC is an NGER facility with low fugitive emission intensity (due to being a non-gassy mine with negligible methane) and predominant use of electricity-powered underground equipment (rather than diesel-powered equipment). These characteristics represent the existing use of the avoidance, reduction, and substitution aspects of the mitigation hierarchy in the "Guide for Large Emitters" (EPA, 2025).
- The material emission sources at the UCC are fugitive emissions (carbon dioxide dominant), electricity and diesel consumption.
- Annual average emissions (2028 to 2039) from the UWCO Modification are calculated to be:
 - o Scope 1 = 0.017 Mt CO₂-e
 - o Scope 2 = 0.005 Mt CO₂-e
 - o Scope 3 = 8.752 Mt CO₂-e.
- Total emissions (2028 to 2039) from the UWCO Modification are calculated to be:
 - o Scope 1 = 0.203 Mt CO₂-e
 - o Scope 2 = 0.060 Mt CO₂-e
 - o Scope 3 = 105.027 Mt CO₂-e.
- The Scope 1 emission intensity of the UWCO Modification has been calculated to be 0.0043 t CO₂-e / t ROM. This intensity is well below the industry average emissions intensity (0.0653 t CO₂-e / t ROM) and, and significantly below emissions intensities from other similar operations (for example, the recently approved Mod 3 Tahmoor South has a Scope 1 emission intensity of 0.406 t CO₂-e / t ROM).
- The average annual Scope 1 emissions from the UWCO Modification represent ~0.015% of NSW emissions in 2022, and the expected overall declining trajectory in emissions from the UCC with the UWCO Modification aligns with the NSW net zero emissions trajectory.
- The UCC (including the UWCO Modification) is not a Safeguard facility as it emits less than 100,000 tonnes of CO₂-e of Scope 1 emissions (direct emissions produced on-site) in a year.
- Emissions from the UCC are considered in Glencore's emissions reduction targets for total Scope 1, 2, and 3 emissions. Consistent with the commitment to responsibly manage the decline of its thermal coal portfolio, Glencore has established total Scope 1, 2 and 3 industrial CO₂-e emissions reduction targets (against a 2019 baseline) of: 15% reduction by the end of 2026; 25% reduction by the end of 2030; 50% reduction by the end of 2035; A longer-term ambition of achieving net zero industrial CO₂-e emissions by the end of 2050, subject to a supportive policy environment.
- Glencore recognises that thermal coal for electricity generation remains a necessary source of energy in many countries – providing grid stability, supporting energy access and security, and contributing to socioeconomic development in many markets. Glencore supports regulatory efforts to transition towards cleaner power generation and to reduce underlying demand for fossil fuels. To support anticipated global energy needs, Glencore plans to continue to progress select brownfield coal investments at existing mines but will continue to align with the Group emissions reduction targets and commitment to a managed decline of the coal portfolio overall.

- As Scope 1 and 2 emissions from UCC with the UWCO Modification represent a very small proportion of NSW emissions, and decline in a similar emissions trajectory as for NSW, UCMPL is not proposing specific quantitative emissions reduction goals for the UWCO Modification. Instead UCMPL proposes the following qualitative GHG management practices:
 - UCC will maintain its low emission intensity operations by continuing with current operational and business planning practices to minimise electricity and diesel consumption.
 - On a 3 yearly basis, UCMPL will monitor and evaluate existing and emerging technologies to reduce GHG emissions from the UWCO Modification and will consider the mitigation hierarchy in the “Guide for Large Emitters” (EPA, 2025) in its evaluation of options for emissions reduction for the UWCO Modification.

1 Introduction

1.1 Background

Ulan Coal Mines Pty Limited (UCMPL) is seeking approval for a modification to operations at the Ulan Coal Complex (UCC). Specifically, UCMPL is seeking approval to maximise resource recovery from within existing mining lease and exploration licence areas by extending longwall panels to the west of the currently underground mining areas. Approval is sought via an application to be made under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report provides an assessment of the greenhouse gas (GHG) emissions of the UWCO Modification. The GHG assessment requirements are outlined in the "NSW Guide for Large Emitters" (EPA, 2025) (the Guide) and the triggers for whether the UWCO Modification is classified as a large emitter are detailed in Section 3. The sector and subsector of the project emissions, based on the Intergovernmental Panel on Climate Change (IPCC) categories, is fugitive emissions (sector) and underground coal mines (subsector).

1.2 Approved Operation

The UCC is located approximately 38 km north-east of Mudgee and 19 km north-east of Gulgong in New South Wales (NSW). The UCC is owned by Glencore Coal Pty Limited (Glencore) and operated by UCMPL, a subsidiary of Glencore.

Coal mining has been undertaken in the Ulan area since the 1920s. The UCC currently operates pursuant to Project Approval (PA) 08_0184 which was granted under Part 3A of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) on 15 November 2010 for the Ulan Coal – Continued Operations Project (UCCO Project). The UCC is also subject to two approvals (2009/5252 and 2015/7511) issued under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In addition, controlled action 2022/09292, which is associated with Modification 6, is currently under assessment.

Approved mining operations within the UCC consist of underground mining in the Ulan Underground and Ulan West Underground areas as well as open cut mining, and coal handling, processing and transport through to 30 August 2035. The open cut operations are currently in care and maintenance.

1.3 Modification Description

UCMPL is proposing a modification to PA 08_0184 (Modification 8 or the Ulan West Continued Operations (UWCO) Modification) to maximise resource recovery from within existing mining lease and exploration licence areas. UCMPL has identified additional mineable resources within Exploration Licence (EL) 8687 and EL 9363 located to the west of the currently approved Ulan West underground mining area and is seeking to modify PA 08_0184 under Section 4.55(2) of the EP&A Act to enable access to this coal resource by extending the longwall panels in these areas.

The UWCO Modification, if approved, will maintain the currently approved coal extraction rate of up to 20 million tonnes per annum (Mtpa) of product coal and will enable extraction of approximately 43 million tonnes (Mt) of additional product coal. The UWCO Modification comprises the following mining activities within the UWCO Modification Area:

- widening of the approved Ulan West Underground LW12 by approximately 180 m (from approximately 220 m to 400 m)
- an additional four longwall panels (three of which are separated by a step around that considers surface features) consisting of LW13A and LW13B, LW14A and LW14B, LW15A and LW15B and LW16.

The UWCO Modification is also proposing the following new surface infrastructure items to support underground mining activities:

- upcast ventilation shafts and fans
- dewatering infrastructure
- service boreholes
- electrical infrastructure including powerlines, switch rooms and substation(s)
- access tracks
- tailings storage facility within the existing surface infrastructure area
- communication and monitoring services and other associated infrastructure required to service the approved and proposed mining operations.

The final location of infrastructure is subject to ongoing consultation with landholders. The UCC will also continue to utilise the existing approved mine infrastructure, including the Coal Handling and Preparation Plant (CHPP) and train loading facilities. The UWCO Modification will extend the life of the approved UCC operation by approximately six years to 31 December 2041.

Figure 1 shows the location of the UCC, surrounding features and nearest properties.

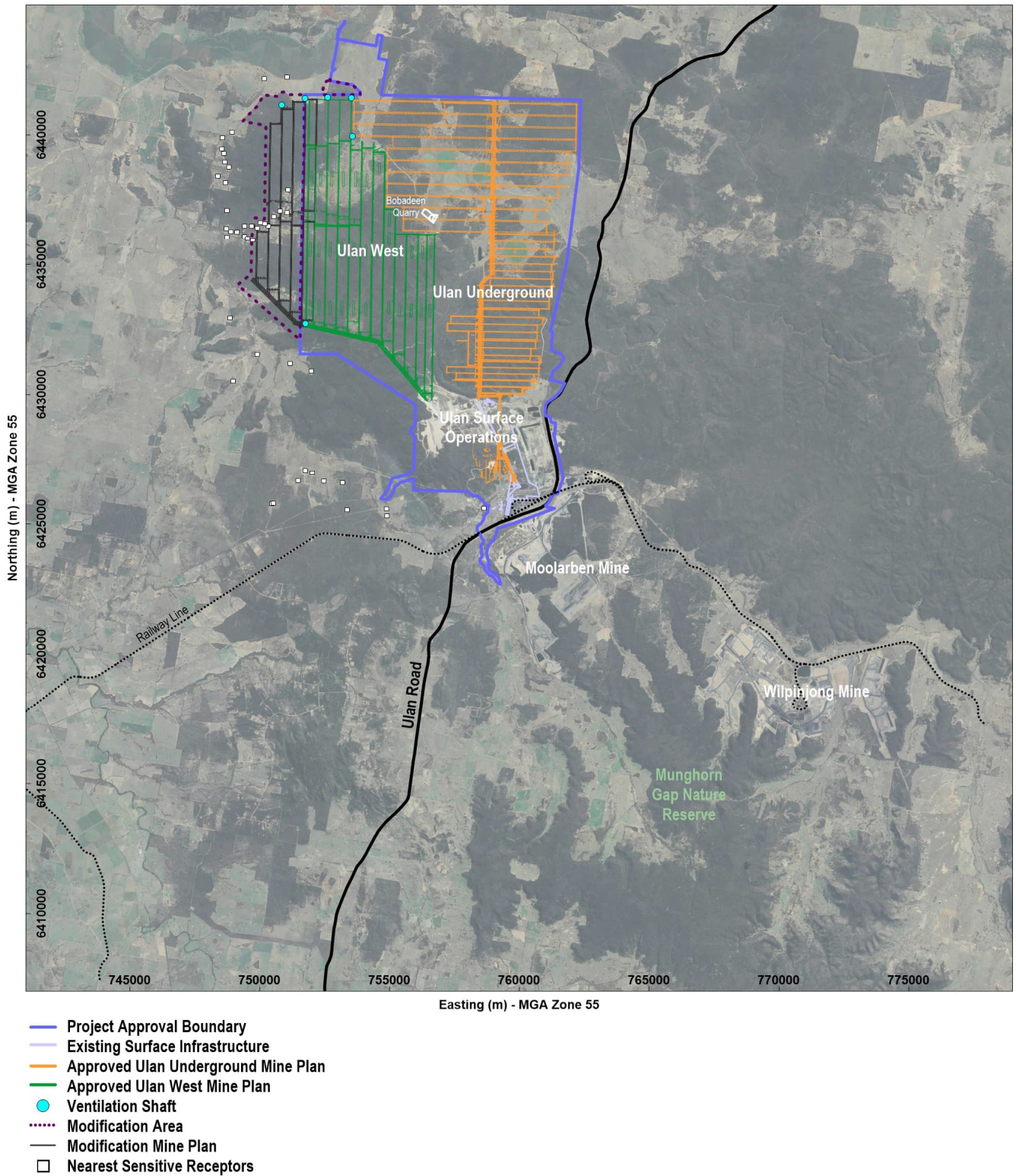


Figure 1 Location of the UCC and surrounds

1.4 Report Structure

The report is structured as follows:

- Section 1 provides the background to the UCC and UWCO Modification.
- Section 2 outlines the key legislative and policy assessment requirements.
- Section 3 provides an assessment of the greenhouse gas emissions.
- Section 4 provides the conclusions of the assessment.

2 Policy Setting

2.1 Overview

GHG is a collective term for a range of gases that are known to trap radiation in the upper atmosphere, where they have the potential to contribute to the greenhouse effect (global warming). GHGs include:

- Carbon dioxide (CO₂); by far the most abundant GHG, primarily released during fuel combustion.
- Methane (CH₄); generated from the anaerobic decomposition of carbon-based material (including enteric fermentation and waste disposal in landfills).
- Nitrous oxide (N₂O); generated from industrial activity, fertiliser use and production.
- Hydrofluorocarbons (HFCs); commonly used as refrigerant gases in cooling systems.
- Perfluorocarbons (PFCs); used in a range of applications including solvents, medical treatments and insulators.
- Sulphur hexafluoride (SF₆); used as a cover gas in magnesium smelting and as an insulator in heavy duty switch gear.

It is common practice to aggregate the emissions of these gases to the equivalent emission of carbon dioxide. This provides a simple figure for comparison of emissions against targets. Aggregation is based on the potential of each gas to contribute to global warming relative to carbon dioxide and is known as the global warming potential (GWP). The resulting number is expressed as carbon dioxide equivalents (or CO₂-e).

GHG emissions that form an inventory can be split into three categories known as “Scopes”. Scopes 1, 2 and 3 are defined by the Greenhouse Gas Protocol (WRI, 2004) and can be summarised as follows:

- Scope 1 – Direct emissions from sources that are owned or operated by the organisation (examples include combustion of diesel in company owned vehicles or used in on-site generators).
- Scope 2 – Indirect emissions associated with the import of energy from another source (examples include importation of electricity or heat).
- Scope 3 – Other indirect emissions (other than Scope 2 energy imports) which are a direct result of the operations of the organisation but from sources not owned or operated by them (examples include business travel, by air or rail, and product usage).

The purpose of differentiating between the scopes of emissions is to avoid the potential for double counting, where two or more organisations assume responsibility for the same emissions.

2.2 Federal Policy

2.2.1 Conference of Parties

The 21st yearly session of the Conference of Parties (COP), held in Paris in 2015, was pivotal for developing an international treaty on climate change. It resulted in “The Paris Agreement”, an agreement “to achieve a balance between anthropogenic (human induced) emissions by sources and removals by sinks of greenhouse in the second half of this century”. Subsequent COPs have sought to develop policy architecture to deliver on the commitments of COP21. In particular, following COP21, international agreements were made to:

- Keep global warming well below 2.0 degrees Celsius, with an aspirational goal of 1.5 degrees Celsius (based on temperature pre-industrial levels).
- From 2018, countries are to submit revised emission reduction targets every five years, with the first being effective from 2020, and goals set to 2050.
- Define a pathway to improve transparency and disclosure of emissions.
- Make provisions for financing the commitments.

The *Climate Change Act 2022* operates as umbrella legislation to implement Australia’s net-zero commitments. It codifies Australia’s net 2030 and 2050 GHG emissions reductions targets under the Paris Agreement including targets to cut emissions by 43% by 2030 from 2005 levels and achieve net zero emissions by 2050.

2.2.2 National Greenhouse and Energy Reporting Act 2007

The Federal Government uses the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) legislation for the measurement, reporting and verification of GHG emissions in Australia. This legislation is used for a range of purposes, including international GHG reporting. Under the NGER Act, constitutional corporations in Australia which exceed thresholds for GHG emissions or energy production or consumption are required to measure and report data to the Clean Energy Regulator (CER) on an annual basis. The UCC reports GHG emissions and energy production and consumption data to the CER in accordance with NGER Act requirements.

The NGER Act defines facility and corporate group emission thresholds. The facility thresholds are:

- 25,000 t or more CO₂-e (scope 1 and scope 2 emissions);
- production of 100 terajoules (TJ) or more of energy; or
- consumption of 100 TJ or more of energy.

The *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Measurement Determination) identifies several methodologies to account for GHGs from specific sources relevant to the UWCO Modification. This includes emissions of GHGs from the extraction of coal, direct fuel combustion (fuels for transport energy purposes), emissions associated with consumption of power from direct combustion of fuel (e.g. diesel generators), and from consumption of electricity from the grid.

The Measurement Determination provides methods, criteria, and measurement standards for calculating and reporting greenhouse gas emissions and energy data under the NGER Act. It covers Scope 1 and Scope 2 emissions and energy production and consumption. The calculation methodologies have been based primarily on the National Greenhouse Accounts (NGA) Factors as these are used for the purposes of project assessment in NSW. The NGA Factors provide methods for the estimation of GHG emissions. Whilst drawing on the Measurement Determination, the NGA factors can be applied to a broader range of emissions estimates.

2.2.3 Safeguard Mechanism

The Safeguard Mechanism has been in place since 1 July 2016 and is a legislated framework that applies to all facilities that emit more than 100,000 tonnes of CO₂-e of Scope 1 emissions (emissions produced on-site) in a year. The Safeguard Mechanism places a limit on the amount of greenhouse gases Australia's largest industrial facilities can emit by assigning each facility covered by the Mechanism a 'baseline'. Each year, every large facility within the Safeguard Mechanism reports their emissions to the CER. Any facility that emits more greenhouse gases than allowed by their baseline has to take actions to reduce their emissions, for example, through purchasing Australian Carbon Credit Units.

Reforms to the Safeguard Mechanism took effect from 1 July 2023. Under these reforms, new baseline emissions numbers ('baselines') for designated large facilities are set on a declining trajectory aligned with achieving Australia's emissions reduction targets set out in the *Climate Change Act 2022* and its Nationally Determined Contribution (NDC) under the Paris Agreement. The decline rate for Safeguard baselines is currently 4.9% per year to 2030, followed by 3.285% per year thereafter. The UCC (including with the UWCO Modification) is not a Safeguard facility as it emits less than 100,000 tonnes of CO₂-e of Scope 1 emissions (direct emissions produced on-site) in a year.

2.3 State Policy

Table 1 summarises the relevant NSW Government legislation and policy documents that are relevant to the UWCO Modification, including policy documents from the EPA, the primary environmental regulator for NSW.

Table 1 Relevant NSW Government legislation and policy

Title	Description
NSW Guide for Large Emitters	The Guide outlines the EPA's assessment requirements for new projects likely to have large emissions and proposed modifications of existing facilities likely to significantly increase their emissions
Strategic Statement on Coal Exploration and Mining in NSW	Sets out the NSW Government approach to the global transition to a low-carbon future, consistent with Australia's ambition under the Paris Agreement, and how it is managing the impacts for coal-reliant communities. The Statement recognises that "Ending or reducing NSW thermal coal exports while there is still strong global demand would likely have little or no impact on global carbon emissions", and acknowledges the "currently limited practical substitutes" for coking coal.
<i>Climate Change (Net Zero Future) Act 2023</i>	Legislates NSW target reductions in GHG emissions of 50% of 2005 levels by 30 June 2030, 70% of 2005 levels by 30 June 2035, and net zero emissions by 2050. The Act does not impose any direct obligations on companies or facilities.

Title	Description
NSW Climate Change Policy Framework	Sets out the NSW Government's long-term goals of achieving net-zero emissions by 2050, and making NSW more resilient and better adapted to a changing climate.
Net Zero Plan Stage1: 2020-2030	Foundation for NSW's action on climate change. It outlines the NSW Government's plan to grow the economy, create jobs and reduce emissions during the 2020s.
Net Zero Plan Stage 1: 2020-2030 Implementation Update Net Zero Plan Implementation Update 2022	These provide updates on the key achievements of NSW Government under the Net Zero Plan and commit NSW to reducing emissions by 50% below 2005 levels by 2030, and 70% below 2005 levels by 2035.
NSW Climate Change Adaptation Strategy	Sets out the NSW Government's strategic approach for managing the impacts of climate change on the State.
NSW Waste and Sustainable Materials Strategy 2041	Sets out how NSW will transition to a circular economy over the next 20 years, including key reforms for reducing GHG emissions from materials (embedded carbon) and the waste sector.
<i>Protection of the Environment Administration Act 1991</i>	Outlines the EPA's statutory objectives and duty to address climate change. Section 6 of the Act outlines the EPA's statutory objectives to protect the environment and human health. The key elements are: - to protect, restore and enhance the quality of the environment in NSW, having regard to the need to maintain ecologically sustainable development - to reduce the risks to human health and prevent the degradation of the environment, including by taking action in relation to climate change. Section 9 of the Act imposes a statutory duty on the EPA to develop environmental quality objectives, guidelines and policies to ensure environment protection. This includes protection of the environment from climate change.
<i>Protection of the Environment Operations Act 1997</i>	Sets out EPA's statutory powers and regulatory tools, including environment protection licensing. Schedule 1 of the Act sets out the types of activities that need a licence. The EPA is required to consider its statutory objectives (above) when exercising its licensing functions.
Climate Change Policy	Supports and builds upon NSW Government's climate change policies and initiatives. The main purpose is to address: - the EPA's statutory objectives to protect, restore and enhance the quality of the environment in NSW, and to reduce the risks to human health and prevent the degradation of the environment - the EPA's statutory duty to develop environmental quality objectives, guidelines and policies to ensure environment protection from climate change.
Climate Change Action Plan 2023-26	Designed to deliver the Climate Change Policy. The Action Plan sets out: - the specific actions the EPA will take over the three years that it covers - the regulatory action the EPA will consider over the medium to longer term, where an increased regulatory response may be required to support the NSW Government's climate change commitments and policies, including achieving net-zero emissions in NSW by 2050.
Strategic Plan 2024–29	Describes how the EPA will deliver stewardship for the environment to protect, restore and enhance the environment and human health. It sets out commitments to effective regulation and a focus on high quality environmental outcomes across all of EPA's work. The plan details objectives and outcomes for three key areas: - caring for country - driving action on climate change - enabling a safe circular economy.
Waste Delivery Plan	Outlines the actions the EPA take to reduce the harmful impact of waste and drive behaviours that create a circular economy. The Waste Delivery Plan includes actions to reduce carbon emissions and building the resilience of the waste sector to climate change.

In January 2025, the EPA finalised their GHG assessment requirements in the “NSW Guide for Large Emitters” (EPA, 2025) (the Guide). The Guide outlines the assessment requirements for new projects likely to have large emissions and proposed modifications of existing facilities likely to significantly increase their emissions. There are two main tests to determine the applicability of the Guide. These consider whether the project is a large emitter, and if these emissions will be “significant” based on the development type. The potential applicability and requirements of the Guide has been discussed (see Section 3).

3 Greenhouse Gas Assessment

3.1 Overview

The level of assessment of the UWCO Modification has been informed by the “NSW Guide for Large Emitters” (EPA, 2025). The assessment requirements of the Guide are applicable to a project if it meets the following three criteria:

- The project proposal requires development assessment and approval, or a change to an approval, under the Environmental Planning and Assessment Act 1979.
- The project involves one or more scheduled activities under Schedule 1 of the *Protection of the Environment Operations Act* (POEO Act) and / or will be carried out at an existing licensed premises.
- The project is likely to emit 25,000 tonnes or more of scope 1 and 2 emissions CO₂-e in any financial year during the operational life of the project (based on planned operational throughput and as designed).

The UWCO Modification is likely to result in more than 25,000 tonnes of CO₂-e of scope 1 and 2 emissions in any financial year during the operational life of the project (incremental to the emissions from the existing approved UCC mine) and meets the additional criteria above, so the “NSW Guide for Large Emitters” is applicable. The assessment is outlined below.

3.2 Assessment Boundary and Scenarios

The assessment boundary was developed to include all significant Scope 1, 2 and 3 emissions. The completeness principle states that all relevant emission sources within the chosen inventory boundary need to be accounted for so that a comprehensive and meaningful inventory is compiled (WRI, 2004).

Emission sources include the dominant sources at coal mining operations. Table 2 lists the sources that have been included and excluded from the assessment. The source exclusions represent activity data that are not readily available and/or where activity data for these sources will not material materially change emissions; that is, expected to be less than 1% of the overall emissions inventory.

Table 2 GHG source inclusions and exclusions

Activity	Description	Scope
Included sources		
Diesel usage	Combustion of diesel fuel from on-site mobile and stationary plant and equipment	1
Fugitive	Fugitive emissions from the extraction of coal	1
Electricity	Electricity usage	2
Transport (rail)	Transport of product coal by rail to port	3
Transport (shipping)	Transport of product coal by ship to market	3
Energy production	Combustion of thermal coal in power generators by end users	3
Excluded sources		
Combustion of fuel for energy	Combustion of diesel fuel from on-site mobile and stationary plant and equipment for power generation	1
Construction diesel use	Combustion of diesel fuel from on-site equipment during the construction phase	1
Industrial processes	Sulphur hexafluoride (high voltage switch gear) Hydrofluorocarbon (commercial and industrial refrigeration)	1
Wastewater handling (industrial)	Methane emissions from wastewater management	1
Solid waste	Solid waste to landfill	3
Business travel	Employees travelling for business purposes	3
Employee travel	Employees travelling between their place of residence and UCC	3

Emissions have been considered for the operational life of the UWCO Modification.

The emission scenarios were as follows:

- The UCC without the UWCO Modification*, referred to as “Business as usual”.

- The UCC with the UWCO Modification, referred to as “Modified business”.
- The UWCO Modification, referred to as “Project Only”

The UWCO Modification seeks to extend the current approved operations. The emissions data used in the technical assessment are based on the UCC’s business plans. Current approved operations and the associated production are governed by PA 08_0184.

3.3 Source Prioritisation

This section identifies the most significant sources of GHG emissions and prioritises those sources when considering mitigation. Section 3.5 provides the GHG emission inventories. Figure 2 shows the distribution of the total life-of-mine Scope 1, 2 and 3 emissions (as CO₂-e) from the UWCO Modification by source type. This inventory identifies fugitive, electricity usage and stationary diesel usage as the most significant Scope 1 and 2 sources. Product coal combustion for energy generation would be responsible for the majority of Scope 1, 2 and 3 emissions.

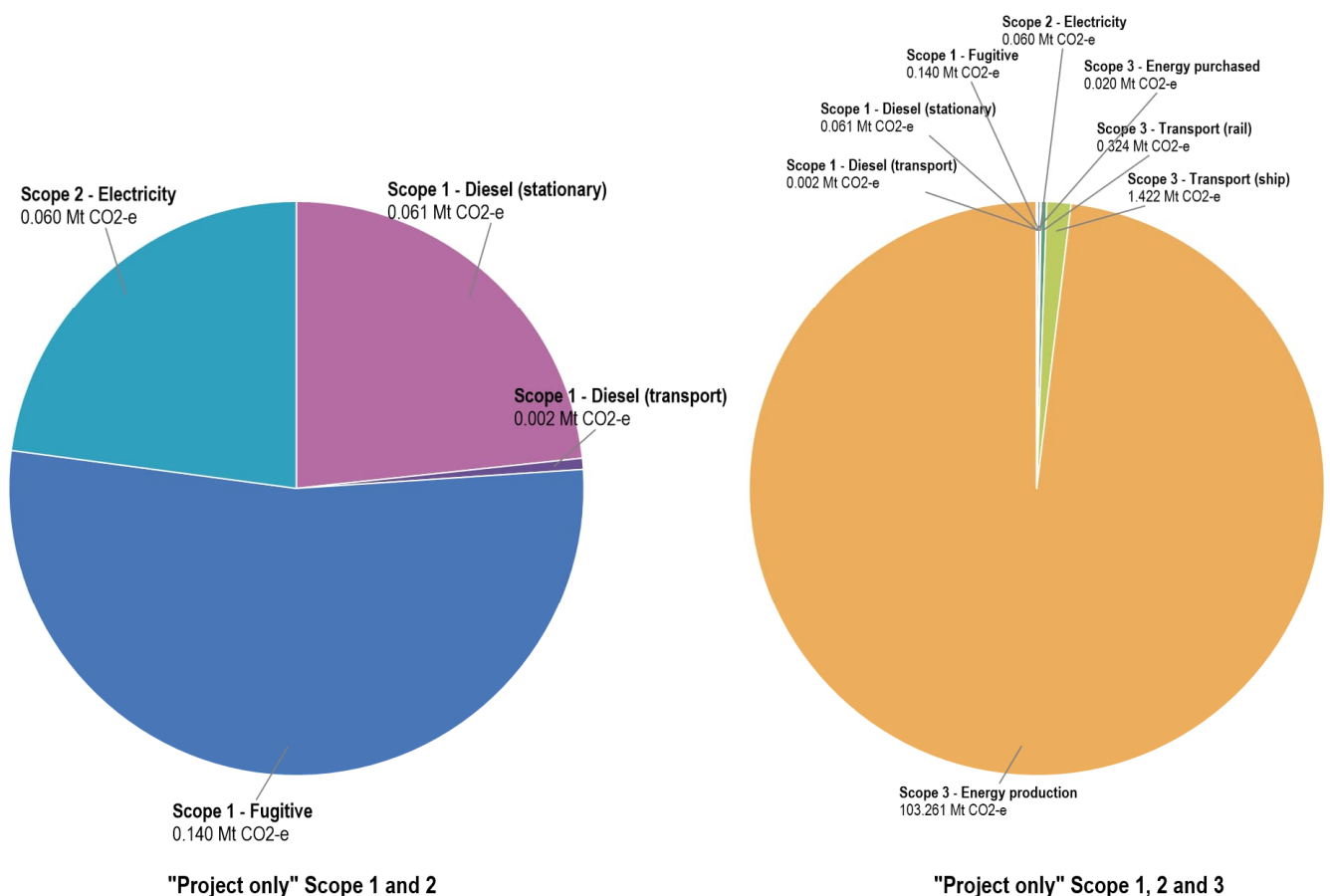
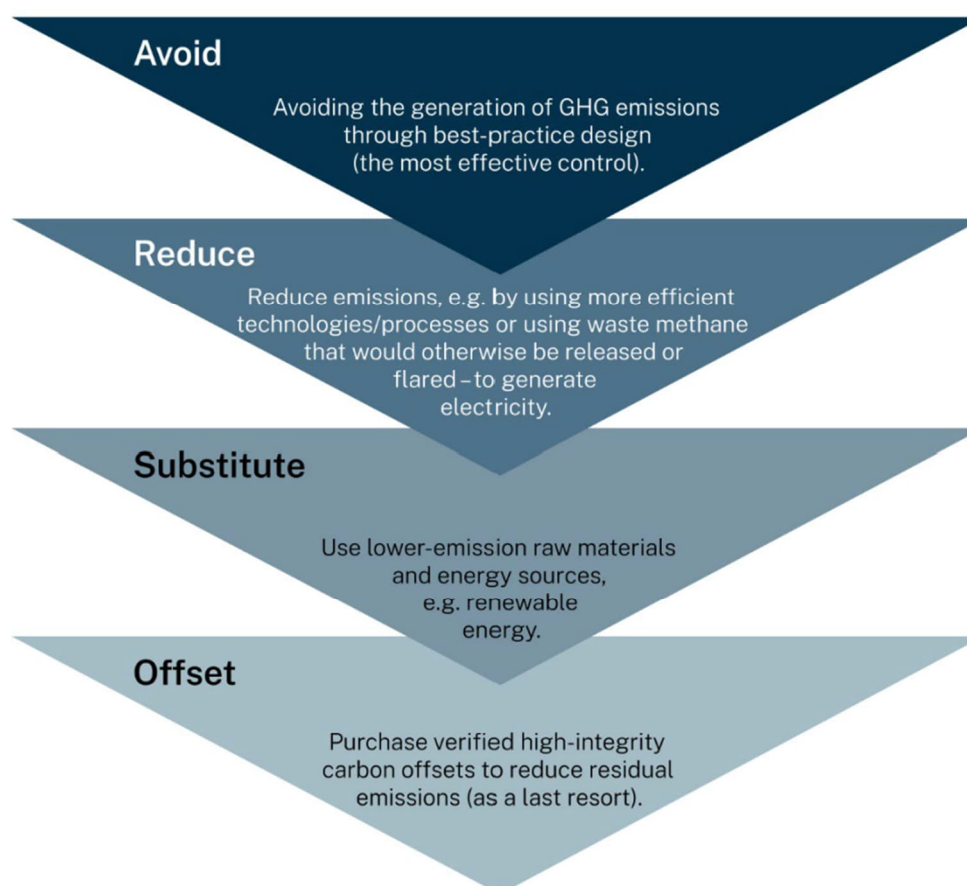


Figure 2 Distribution of GHG emission sources from the UCC

The mining areas of the UCC have negligible methane content and consequently the UCC is classed as a “non-gassy” mine (i.e. negligible methane in ventilation air). Based on the distribution above, UCML has focused on diesel usage and electricity consumption when considering emission reduction measures for the UWCO Modification.

3.4 Mitigation Measures

Evaluation of mitigation measures is embedded in the business planning processes of the mine. Annual business planning processes forecast GHG emissions and assess the feasibility of mitigation measures. UCML has considered the mitigation hierarchy in the “Guide for Large Emitters” (EPA, 2025) in its evaluation of options for emissions reduction for the UWCO Modification. Figure 3 shows the mitigation hierarchy.



Source: EPA, 2025

Figure 3 GHG emissions mitigation hierarchy

The UWCO Modification's emissions estimates reflect current operational practices at UCC to maximise energy efficiency and minimise diesel and electricity consumption. They also reflect the avoidance of significant fugitive emissions due to UCC's low gas environment; UCC's fugitive emissions consist of negligible methane concentrations in ventilation air, for which there is no feasible mitigation measure. As such, the UWCO Modification has primarily considered measures to reduce electricity and diesel-related emissions.

The following management practices are currently utilised at the UCC to minimise emissions and are proposed to be maintained during the life of the UWCO Modification:

- **Procurement policy:**
 - UCC's procurement policy typically includes the consideration of energy efficiency as a criterion in equipment selection, thereby reducing energy consumption and emissions.
- **Mine design, planning, and equipment section:**

UCC conducts annual Life-of-Mine (LOM) and Budget planning processes, incorporating the following practices to minimise energy consumption:

- Optimised Mine Layout: Designing the mine layout to enhance operational efficiency and selecting appropriate equipment for mining and haulage activities.
 - Equipment selection: UCC's coal mining activities are mostly conducted using electrified production equipment and haulage is conducted via electrified conveyors. Ancillary equipment is typically diesel-fuelled.
- **Equipment Operation & Maintenance:**
 - The mining equipment, mobile equipment, and fixed plant are maintained in accordance with supplier specifications. Ad-hoc maintenance is conducted when equipment monitoring systems identify anomalies, ensuring optimal performance and energy efficiency.

- o Equipment operation is carried out by competent personnel trained in the use of relevant equipment, including adherence to standard operating procedures. Training emphasises practices that maximise productivity and energy efficiency.
- Performance Monitoring and Feedback:
 - o UCC conducts regular reporting of historical and actual performance as part of operational processes. This includes evaluations at intervals ranging from shiftly, weekly, and monthly to annual and multi-year assessments.
 - o UCC's performance is benchmarked against other Glencore operating sites to assess equipment performance and identify opportunities for improvement.
- Evaluation of Existing and Emerging Emissions Reduction Technologies:
 - o As part of broader Glencore business planning processes, existing ("off-the-shelf") emissions reduction technologies are evaluated for potential future implementation at UCC, such as renewable energy.
 - o As part of broader Glencore business planning processes, emerging/developing emissions reduction technologies are monitored for potential future implementation at UCC, such as alternative drive trains.

At present, none of the assessed initiatives are considered practicable or feasible for implementation. However, Glencore will continue to review and update these assessments as part of its ongoing business planning processes.

These measures represent the full range of leading practice design, technology and management measures that can be implemented for Scope 1 and 2 emissions.

Emissions from customer use of product coal comprise the major source of Scope 3 emissions for the UWCO Modification. Based on historical data, saleable coal from the UCC has been predominantly sold to customers in export markets in Asia, with China being the largest export destination over the past three years. The primary countries that UCC coal has been exported to all have Nationally Determined Contributions (NDCs) under the Paris Agreement (or have followed international standards recognised by the UNFCCC and published their own NDCs document in support of the Paris Agreement). It is anticipated that future export destinations for UCC coal will continue to follow similar patterns. However, as coal sales are market driven, export destinations may change in the future.

3.5 Estimated Emissions

The GHG inventory in this document has been calculated in accordance with the principles of the GHG Protocol and the "Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia" (DEE, 2017). The initial actions for a GHG inventory are to determine the sources of GHG emissions, assess their likely significance and set a boundary for the assessment. Creating an inventory of the likely GHG emissions has the benefit of determining the scale of the emissions and providing a baseline from which to assess options that may be reasonable and feasible for GHG reduction. The results of this assessment are presented in terms of the previously mentioned 'Scopes' to help understand the direct and indirect impacts of the UWCO Modification.

The GHG Protocol (and similar reporting schemes) dictates that reporting Scope 1 and 2 sources is mandatory, whilst reporting Scope 3 sources is optional. Reporting significant Scope 3 sources is recommended. Scope 3 emissions are a consequence of the activities of the company, although occur from sources not owned or controlled by the company. Some examples of Scope 3 activities include the extraction and production of purchased materials, transportation of purchased fuels, and use of sold products (i.e. burning of coal) and services. The inventory for this assessment includes all significant sources of GHGs (Scopes 1, 2 and 3) associated as per Table 2.

GHG emissions associated with operation of the UCC are well understood, given that the mine is currently operating. Future projections of production, fuel usage and electricity usage (from UCMPL) were used to determine the GHG emissions from the UCC with and without the UWCO Modification. Table 3 shows the emission estimation methodologies for the key emission sources.

Table 3 GHG emission estimation methodologies

Activity	Description	Scope(s)	Emission estimation methodology
Diesel usage	Combustion of diesel fuel from on-site mobile and stationary plant and equipment	1, 3	Emission factors from NGA Factors (DCCEEW, 2024a). Consumption based on average of last 3 reported financial years, ROM pro-rata.
Fugitive	Fugitive emissions from the extraction of coal	1	Measurement Determination Chapter 3, Part 3.2. Division 3.2.2, Subdivision 3.2.2.2, Method 4. Average of last 3 reported financial years, ROM pro-rata.

Activity	Description	Scope(s)	Emission estimation methodology
Electricity	Electricity usage	2, 3	Emission factor projections from DCCEEW (2024b). Consumption based on average of last 3 reported financial years, ROM pro-rata.
Transport (rail)	Transport of product coal by rail to port	3	Emission factors from the Department for Environment, Food and Rural Affairs (DEFRA) (2024) for "Freighting goods / freight train".
Transport (shipping)	Transport of product coal by ship to market	3	Emission factors from DEFRA (2024), based on "Freighting goods / cargo ship, bulk carrier".
Energy production	Combustion of thermal coal in power generators by end users	3	Emission factors from NGA Factors (DCCEEW, 2024a).

Table 4 shows the estimated emissions due to all identified GHG generating activities associated with the UCC. The direct (scope 1) annual GHG emissions from the UWCO Modification are estimated to be 0.017 Mt CO₂-e/y on average, and a total of 0.203 Mt CO₂-e.

Table 4 Estimated GHG emissions

Year	Annual emission (Mt CO ₂ -e)								
	UCC without the UWCO Modification "Business as usual"			UCC with the UWCO Modification "Modified business"			Change due to the UWCO Modification "Project only"		
	Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3
2028	0.051	0.066	26.320	0.051	0.066	26.409	0.000	0.000	0.090
2029	0.055	0.043	28.303	0.055	0.044	28.544	0.001	0.001	0.241
2030	0.051	0.029	26.539	0.052	0.029	26.911	0.001	0.000	0.372
2031	0.051	0.029	26.096	0.059	0.033	29.823	0.008	0.005	3.728
2032	0.042	0.021	21.433	0.052	0.025	26.520	0.009	0.004	5.087
2033	0.007	0.003	3.897	0.041	0.014	21.525	0.034	0.011	17.628
2034	-	-	-	0.024	0.008	12.967	0.024	0.008	12.967
2035	-	-	-	0.035	0.009	18.019	0.035	0.009	18.019
2036	-	-	-	0.024	0.005	12.792	0.024	0.005	12.792
2037	-	-	-	0.025	0.006	12.097	0.025	0.006	12.097
2038	-	-	-	0.023	0.005	12.398	0.023	0.005	12.398
2039	-	-	-	0.019	0.004	9.608	0.019	0.004	9.608
Average	0.043	0.032	22.098	0.038	0.021	19.801	0.017	0.005	8.752
Total	0.257	0.190	132.587	0.460	0.251	237.614	0.203	0.060	105.027

Figure 4 shows the estimated Scope 1 and 2 GHG emissions from the UCC. The projected annual emissions of the UCC with the UWCO Modification are expected to exceed the NGER facility emission threshold, so UCMPL will continue to have an obligation to report emissions from this facility under the NGER Act. Full details of the calculations by source and year are provided in Appendix A.

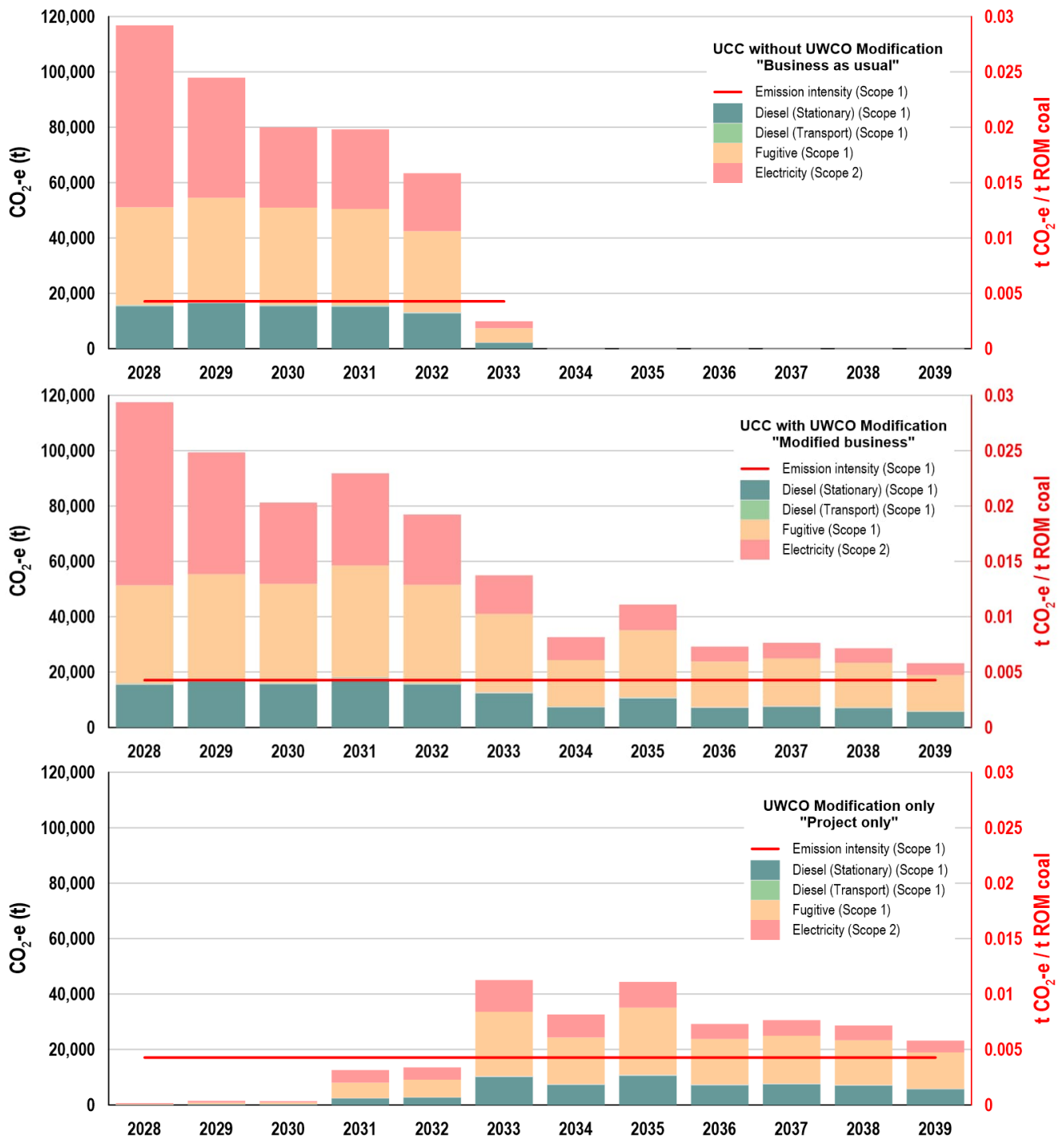


Figure 4 Estimated GHG emissions from the UCC

3.6 Independent Expert Review Outcome

As the UWCO Modification's Scope 1 and 2 emissions do not exceed 100,000 tonnes CO₂-e per year at any time over the operational life of the project, an independent expert review is not required.

3.7 Benchmarking and Goal Setting

The GHG emissions associated with the UWCO Modification have been quantified by source (see Table 4 and Figure 4). Benchmarking of these emissions, and goal setting, is provided below.

3.7.1 Commonwealth Emissions Reduction Targets and Safeguard Mechanism

Table 6 shows the calculated GHG emissions in the National context. Direct (scope 1) annual GHG emissions from the UWCO Modification are estimated to be 0.017 Mt CO₂-e/y, on average, representing approximately 0.004% of Australia's estimated emissions (that is 432.62 Mt CO₂-e for 2022, the latest year of estimates available).

Table 5 Comparison of emissions in the National context

Statistic	Value
Emissions in the Australian context	
Total reported Australia GHG emissions in 2022 (https://ageis.climatechange.gov.au/)	432.621 Mt CO ₂ -e
UWCO Modification annual average Scope 1 emissions	0.017 Mt CO ₂ -e
UWCO Modification as a proportion of Australia's annual emissions	0.004 %

The 'Safeguard Mechanism document' (DCCEEW, 2024c) includes default (industry average) Scope 1 emissions intensities of production for various industries. The industry average emissions intensity for coal mining is an average of 0.0653 tonnes of CO₂-e per tonne of ROM coal. As per Figure 4 the estimated Scope 1 emissions intensity of the UWCO Modification is 0.0043 tonnes of CO₂-e per tonne of ROM coal, which is ~7% of the industry average emissions intensity.

The UCC is not a Safeguard facility as it emits less than 100,000 tonnes of CO₂-e of Scope 1 emissions (direct emissions produced on-site) in a year. The main drivers for this outcome are both UCC's low fugitive emission intensity (due to being a non-gassy mine) as well as its main contributing source of extraction energy from electricity powered underground equipment rather than diesel powered equipment.

3.7.2 NSW State Emissions Reduction Targets as per Net Zero Future Act

Table 6 shows the calculated greenhouse gas emissions in the State context. Direct annual GHG emissions from the UWCO Modification are estimated to be 0.017 Mt CO₂-e/y, on average, representing approximately 0.015% of NSW's estimated emissions (that is 110.997 Mt CO₂-e for 2022, the latest year of estimates available).

Table 6 Comparison of emissions in the State context

Statistic	Value
Emissions in the State context	
Total reported NSW GHG emissions in 2022 (https://ageis.climatechange.gov.au/)	110.997 Mt CO ₂ -e
UWCO Modification annual average Scope 1 emissions	0.017 Mt CO ₂ -e
UWCO Modification as a proportion of NSW's annual emissions	0.015 %

The Scope 1 emissions intensity of the UWCO Modification is well below emissions intensities from other similar operations, including for example the Scope 1 emissions intensity of the recently approved Tahmoor Modification 3 (0.406 t CO₂-e / t ROM) (EMM, 2024).

Comparisons have also been made with emission projections for NSW. The Net Zero Emissions Dashboard ('the Dashboard') presents past and projected future GHG emissions for NSW. The Dashboard presents emission trends and the progress being made towards the state's emission-reduction objectives and includes three cases:

- An historical actual emissions scenario up to 2022, based on the NSW Greenhouse Gas Inventory and the National Greenhouse Accounts compiled by the Australian Government.
- A future business as usual (BAU) projection. The BAU scenario accounts for major factors impacting NSW emissions including past state policies but excludes the impact of actions under the Net Zero Plan and related Government policies.
- Current policy emissions projections up to 2050. This takes the BAU scenario and adjusts the emissions trajectory based on the designed abatement and timelines in existing NSW and Commonwealth policies and programs.

Table 7 shows projections of Scope 1 emissions from the Modified Business in comparison to NSW emissions. Table 8 shows the same comparison but for Scope 1 and 2 emissions from the Modified Business. The UWCO Modification results in incremental production increases over time. During 2028 to 2032, there are smaller magnitudes of incremental production from the widening of LW12 plus roadway development in the UWCO Project area. In contrast the 2033 to 2039 period comprises a more representative scale of planned longwall production.

The calculated changes in emissions have been made with reference to the first year of the UWCO Modification, that is, 2028. The total Scope 1 and 2 emissions are expected to decrease to 20% of 2028 emissions by 2039 (Table 8). This result represents a more significant decrease in emissions than the NSW emissions, which are expected to decrease to 46% of 2028 emissions over the same period. Scope 1 and 2 emissions for the Modified Business are projected to reduce at a greater rate (7.3% per year on average) than those for the state (4.9% per year on average). The data from Table 7 and Table 8 show that the expected declining emissions of the "Modified business" are consistent with the NSW net zero emissions trajectory.

Table 7 Projections of the trajectories of Modified Business (Scope 1) and NSW emissions

Year	"Modified Business" Scope 1 annual emissions (Mt CO ₂ -e)	Change in emissions of the "Modified Business" from 2028	"NSW current policy" annual emission (Mt CO ₂ -e)	Change in emissions of "NSW current policy" from 2028 (%)	"Modified Business" Scope 1 annual emissions as percentage of NSW current policy (%)
2028	0.051	100%	100.75	100%	0.051%
2029	0.055	108%	97.54	97%	0.057%
2030	0.052	101%	82.97	82%	0.062%
2031	0.059	114%	84.13	84%	0.070%
2032	0.052	100%	81.19	81%	0.063%
2033	0.041	80%	76.75	76%	0.053%
2034	0.024	47%	61.55	61%	0.040%
2035	0.035	68%	57.44	57%	0.061%
2036	0.024	46%	53.47	53%	0.045%
2037	0.025	49%	50.68	50%	0.049%
2038	0.023	45%	47.79	47%	0.049%
2039	0.019	37%	46.00	46%	0.041%
Average decline rate (2028-2039):		-5.7% per year	--	-4.9% per year	-
Total decline (2028-2039):		-63%	--	-54%	-

Table 8 Projections of the trajectories of Modified Business (Scope 1 and 2) and NSW emissions

Year	"Modified Business" Scope 1 and 2 annual emissions (Mt CO ₂ -e)	Change in emissions of the "Modified Business" from 2028 (%)	"NSW current policy" annual emission (Mt CO ₂ -e)	Change in emissions of "NSW current policy" from 2028 (%)	"Modified Business" Scope 1 and 2 annual emissions as percentage of NSW current policy (%)
2028	0.118	100%	100.75	100%	0.117%
2029	0.099	85%	97.54	97%	0.102%
2030	0.081	69%	82.97	82%	0.098%
2031	0.092	78%	84.13	84%	0.109%
2032	0.077	65%	81.19	81%	0.095%
2033	0.055	47%	76.75	76%	0.072%
2034	0.033	28%	61.55	61%	0.053%
2035	0.044	38%	57.44	57%	0.077%
2036	0.029	25%	53.47	53%	0.055%
2037	0.031	26%	50.68	50%	0.060%
2038	0.029	24%	47.79	47%	0.060%
2039	0.023	20%	46.00	46%	0.050%
Average decline rate (2028-2039):		-7.3% per year	--	-4.9% per year	
Total decline (2028-2039):		-80%	--	-54%	

3.7.3 Glencore Emissions Reduction Targets

Glencore's Climate Action Transition Plan (Glencore, 2024) describes Glencore's commitment to responsibly manage the decline of its global thermal coal portfolio. As the world moves towards a low-carbon economy, Glencore is focused on supporting the energy needs of today whilst investing in its transition metals portfolio. The metals Glencore produces, sources and markets will support the global ambition to decarbonise.

Consistent with the commitment to responsibly manage the decline of its thermal coal portfolio, Glencore has established total Scope 1, 2 and 3 industrial CO₂-e emissions reduction targets (against a 2019 baseline) of:

- 15% reduction by the end of 2026;
- 25% reduction by the end of 2030;
- 50% reduction by the end of 2035;
- A longer-term ambition of achieving net zero industrial CO₂-e emissions by the end of 2050, subject to a supportive policy environment.

Emissions from UCC are considered in Glencore's emissions reduction targets.

Glencore's 2024-2026 Climate Action Transition Plan outlines its position on climate and energy transition and the strategies it currently proposes to use to manage its transition, including:

- Recognising that thermal coal for electricity generation remains a necessary source of energy in many countries – providing grid stability, supporting energy access and security, and contributing to socioeconomic development in many markets. Glencore supports regulatory efforts to transition towards cleaner power generation and to reduce underlying demand for fossil fuels.
- To support anticipated global energy needs, Glencore plans to continue to progress select brownfield coal investments at existing mines but will continue to align with the Group emissions reduction targets and commitment to a managed decline of the coal portfolio overall.
- To continue driving improved operational performance in its industrial activities through a strong focus on identifying and delivering cost-effective emissions reduction opportunities.
- To continue to evolve technical and economic assessments to identify emissions reduction opportunities across the portfolio. This enables Glencore to identify and implement investments in abatement opportunities that are practically and commercially viable. Where opportunities are deemed not sufficiently ready, Glencore will continue to collaborate with industry and OEM partners to study and invest in research and development to drive technology maturation and scale requirements to improve commerciality.
- To identify and invest in value-enhancing growth opportunities in Glencore's metals portfolio that meet market requirements, including a focus on commodities fundamental for the transition to a low-carbon economy, such as copper, nickel, zinc, aluminium and cobalt

3.7.4 UCC Emission Goals

As Scope 1 and 2 emissions from UCC with the UWCO Modification represent a very small proportion of NSW emissions, and decline in a similar emissions trajectory as for NSW, UCMPL is not proposing specific quantitative emissions reduction goals for the UWCO Modification. Instead UCMPL proposes the following qualitative GHG management practices:

- UCC intends will maintain its low emission intensity operations by continuing with current operational and business planning practices to minimise electricity and diesel consumption.
- On a 3 yearly basis, UCMPL will also monitor and evaluate existing and emerging technologies to reduce GHG emissions from the UWCO Modification and will consider the mitigation hierarchy in the "Guide for Large Emitters" (EPA, 2025) in its evaluation of options for emissions reduction for the UWCO Modification.

3.8 Offset Strategy

UCMPL has applied the mitigation hierarchy described in the "Guide for Large Emitters" (EPA, 2025) with the UWCO Modification primarily utilising avoidance, reduction, and substitution in order to reduce fugitive emissions, electricity and diesel related emissions. There is currently no requirement for UCC to implement an offset strategy for either compliance purposes under Safeguard, or for voluntary purposes to achieve Glencore's emissions reduction targets.

4 Conclusions

This report provides a GHG assessment of the UWCO Modification. Emissions were estimated in accordance with the principles of the Greenhouse Gas Protocol, using methods prescribed by the DCCEEW and by applying the guidance from the EPA's "NSW Guide for Large Emitters".

The main outcomes of the assessment were as follows:

- The UWCO Modification meets the EPA's definition of a "large" emitter, and the "NSW Guide for Large Emitters" is therefore applicable.
- The UCC is an NGER facility with low fugitive emission intensity (due to being a non-gassy mine with negligible methane) and predominant use of electricity-powered underground equipment (rather than diesel-powered equipment). These characteristics represent the existing use of the avoidance, reduction, and substitution aspects of the mitigation hierarchy in the "Guide for Large Emitters" (EPA, 2025).
- The material emission sources at the UCC are fugitive emissions (carbon dioxide dominant), electricity and diesel consumption.
- Annual average emissions (2028 to 2039) from the UWCO Modification are calculated to be:
 - o Scope 1 = 0.017 Mt CO₂-e
 - o Scope 2 = 0.005 Mt CO₂-e
 - o Scope 3 = 8.752 Mt CO₂-e.
- Total emissions (2028 to 2039) from the UWCO Modification are calculated to be:
 - o Scope 1 = 0.203 Mt CO₂-e
 - o Scope 2 = 0.060 Mt CO₂-e
 - o Scope 3 = 105.027 Mt CO₂-e.
- The Scope 1 emission intensity of the UWCO Modification has been calculated to be 0.0043 t CO₂-e / t ROM. This intensity is well below the industry average emissions intensity (0.0653 t CO₂-e / t ROM) and, and significantly below emissions intensities from other similar operations (for example, the recently approved Mod 3 Tahmoor South has a Scope 1 emission intensity of 0.406 t CO₂-e / t ROM).
- The average annual Scope 1 emissions from the UWCO Modification represent ~0.015% of NSW emissions in 2022, and the expected overall declining trajectory in emissions from the UCC with the UWCO Modification aligns with the NSW net zero emissions trajectory.
- The UCC (including the UWCO Modification) is not a Safeguard facility as it emits less than 100,000 tonnes of CO₂-e of Scope 1 emissions (direct emissions produced on-site) in a year..
- Emissions from the UCC are considered in Glencore's emissions reduction targets for total Scope 1, 2, and 3 emissions.
 Consistent with the commitment to responsibly manage the decline of its thermal coal portfolio, Glencore has established total Scope 1, 2 and 3 industrial CO₂-e emissions reduction targets (against a 2019 baseline) of: 15% reduction by the end of 2026; 25% reduction by the end of 2030; 50% reduction by the end of 2035; A longer-term ambition of achieving net zero industrial CO₂-e emissions by the end of 2050, subject to a supportive policy environment.
 Glencore recognises that thermal coal for electricity generation remains a necessary source of energy in many countries – providing grid stability, supporting energy access and security, and contributing to socioeconomic development in many markets. Glencore supports regulatory efforts to transition towards cleaner power generation and to reduce underlying demand for fossil fuels. To support anticipated global energy needs, Glencore plans to continue to progress select brownfield coal investments at existing mines but will continue to align with the Group emissions reduction targets and commitment to a managed decline of the coal portfolio overall.
- As Scope 1 and 2 emissions from UCC with the UWCO Modification represent a very small proportion of NSW emissions, and decline in a similar emissions trajectory as for NSW, UCMPL is not proposing specific quantitative emissions reduction goals for the UWCO Modification. Instead UCMPL proposes the following qualitative GHG management practices:
 - o UCC will maintain its low emission intensity operations by continuing with current operational and business planning practices to minimise electricity and diesel consumption.

- o On a 3 yearly basis, UCMPL will monitor and evaluate existing and emerging technologies to reduce GHG emissions from the UWCO Modification and will consider the mitigation hierarchy in the “Guide for Large Emitters” (EPA, 2025) in its evaluation of options for emissions reduction for the UWCO Modification.

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Appendix A. Greenhouse gas emissions

UCC with UWCO Modification
Diesel (stationary)

Diesel (stationary)							GWP	Distribution corrected for GWP		
							CO2	1	99.6%	
							CH4	28	0.01%	
							N2O	265	0.001%	
Year	ROM coal (t)	Usage (kL)	Scope 1	Emission factor (kg CO2-e/kL)			Emissions (t CO2-e/year)			
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	12,024,585	5,734	2709.72		0	667.78	15,538	-	3,829	19,368
2029	12,958,125	6,180	2709.72		0	667.78	16,745	-	4,127	20,871
2030	12,131,723	5,785	2709.72		0	667.78	15,677	-	3,863	19,540
2031	13,700,937	6,534	2709.72		0	667.78	17,705	-	4,363	22,068
2032	12,063,525	5,753	2709.72		0	667.78	15,589	-	3,842	19,430
2033	9,596,833	4,577	2709.72		0	667.78	12,401	-	3,056	15,457
2034	5,696,115	2,716	2709.72		0	667.78	7,361	-	1,814	9,175
2035	8,214,246	3,917	2709.72		0	667.78	10,615	-	2,616	13,231
2036	5,570,793	2,657	2709.72		0	667.78	7,199	-	1,774	8,973
2037	5,832,409	2,781	2709.72		0	667.78	7,537	-	1,857	9,394
2038	5,462,772	2,605	2709.72		0	667.78	7,059	-	1,740	8,799
2039	4,427,185	2,111	2709.72		0	667.78	5,721	-	1,410	7,131
Total		51,351					139,146	-	34,291	173,437

UCC with UWCO Modification
Diesel (transport)

Diesel (transport)							GWP	Distribution corrected for GWP		
							CO2	1	99.6%	
							CH4	28	0.01%	
							N2O	265	0.001%	
Year	ROM coal (t)	Usage (kL)	Scope 1	Emission factor (kg CO2-e/kL)			Emissions (t CO2-e/year)			
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2024	12,024,585	153		2717.44	0	667.78	415	-	102	516
2025	12,958,125	164		2717.44	0	667.78	447	-	110	557
2026	12,131,723	154		2717.44	0	667.78	418	-	103	521
2027	13,700,937	174		2717.44	0	667.78	472	-	116	588
2028	12,063,525	153		2717.44	0	667.78	416	-	102	518
2029	9,596,833	122		2717.44	0	667.78	331	-	81	412
2030	5,696,115	72		2717.44	0	667.78	196	-	48	245
2031	8,214,246	104		2717.44	0	667.78	283	-	70	353
2032	5,570,793	71		2717.44	0	667.78	192	-	47	239
2033	5,832,409	74		2717.44	0	667.78	201	-	49	251
2034	5,462,772	69		2717.44	0	667.78	188	-	46	235
2035	4,427,185	56		2717.44	0	667.78	153	-	38	190
Total		1,366					3,713	-	912	4,625

UCC with UWCO Modification
Fugitive

Fugitive						GWP		Distribution corrected for GWP		
						CO2	1	97.5%		
						CH4	28	2.5%		
						N2O	265			
Year	ROM coal (t)	ROM coal (t)	Scope 1	Emission factor (kg CO2-e/t)		Emissions (t CO2-e/year)				
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	12,024,585	12,024,585		2.945	0	0	35,415	-	-	35,415
2029	12,958,125	12,958,125		2.945	0	0	38,165	-	-	38,165
2030	12,131,723	12,131,723		2.945	0	0	35,731	-	-	35,731
2031	13,700,937	13,700,937		2.945	0	0	40,353	-	-	40,353
2032	12,063,525	12,063,525		2.945	0	0	35,530	-	-	35,530
2033	9,596,833	9,596,833		2.945	0	0	28,265	-	-	28,265
2034	5,696,115	5,696,115		2.945	0	0	16,777	-	-	16,777
2035	8,214,246	8,214,246		2.945	0	0	24,193	-	-	24,193
2036	5,570,793	5,570,793		2.945	0	0	16,407	-	-	16,407
2037	5,832,409	5,832,409		2.945	0	0	17,178	-	-	17,178
2038	5,462,772	5,462,772		2.945	0	0	16,089	-	-	16,089
2039	4,427,185	4,427,185		2.945	0	0	13,039	-	-	13,039
Total		107,679,247					317,143	-	-	317,143

UCC with UWCO Modification

Electricity usage

							GWP		Distribution corrected for GWP	
							CO2	1	99.7%	
							CH4	28	0.002%	
							N2O	265	0.001%	
Year	ROM coal (t)	Usage (kWh)	Scope 1	Emission factor (kg CO2-e/kWh)		Scope 1	Emissions (t CO2-e/year)			
				Scope 2	Scope 3		Scope 2	Scope 3	Total	
2028	12,024,585	194,598,442		0	0.34	0.02	-	66,163	3,892	70,055
2029	12,958,125	209,706,291		0	0.21	0.02	-	44,038	4,194	48,232
2030	12,131,723	196,332,300		0	0.15	0.01	-	29,450	1,963	31,413
2031	13,700,937	221,727,498		0	0.15	0.01	-	33,259	2,217	35,476
2032	12,063,525	195,228,637		0	0.13	0.01	-	25,380	1,952	27,332
2033	9,596,833	155,309,206		0	0.09	0.00	-	13,978	-	13,978
2034	5,696,115	92,182,398		0	0.09	0.00	-	8,296	-	8,296
2035	8,214,246	132,934,277		0	0.07	0.02	-	9,305	2,659	11,964
2036	5,570,793	90,154,275		0	0.06	0.01	-	5,409	902	6,311
2037	5,832,409	94,388,103		0	0.06	0.00	-	5,663	-	5,663
2038	5,462,772	88,406,121		0	0.06	0.00	-	5,304	-	5,304
2039	4,427,185	71,646,826		0	0.06	0.00	-	4,299	-	4,299
Total		1,742,614,373					-	250,546	17,779	268,325

UCC with UWCO Modification

Transport (Rail)

Transport (Rail)						GWP		Distribution corrected for GWP		
Factor	kg CO2-e/t.km	0.02779 DEFRA 2024 - Freightng goods - Freight train				CO2	1	99.6%		
Distance	km	275 Assumed distance to port				CH4	28	0.01%		
						N2O	265	0.001%		
Year	ROM coal (t)	Product coal (t)	Scope 1	Emission factor (kg CO2-e/t)		Emissions (t CO2-e/year)				
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	12,024,585	10,655,711		0	0	7.64	-	-	81,434	81,434
2029	12,958,125	11,517,060		0	0	7.64	-	-	88,016	88,016
2030	12,131,723	10,859,066		0	0	7.64	-	-	82,988	82,988
2031	13,700,937	12,034,108		0	0	7.64	-	-	91,968	91,968
2032	12,063,525	10,701,169		0	0	7.64	-	-	81,781	81,781
2033	9,596,833	8,686,222		0	0	7.64	-	-	66,382	66,382
2034	5,696,115	5,232,764		0	0	7.64	-	-	39,990	39,990
2035	8,214,246	7,270,385		0	0	7.64	-	-	55,562	55,562
2036	5,570,793	5,161,954		0	0	7.64	-	-	39,449	39,449
2037	5,832,409	4,881,654		0	0	7.64	-	-	37,307	37,307
2038	5,462,772	5,003,003		0	0	7.64	-	-	38,234	38,234
2039	4,427,185	3,877,244		0	0	7.64	-	-	29,631	29,631
Total		95,880,339					-	-	732,742	732,742

UCC with UWCO Modification

Transport (Shipping)

Factor	kg CO2-e/t.km	0.00353	DEFRA 2024 - Freightng goods - Cargo ship, bulk carrier				CH4	28	0.01%	
Distance	km	9507	Assumed distance to market				N2O	265	0.003%	

UCC with UWCO Modification
Energy Production

Energy Production							GWP	Distribution corrected for GWP		
							CO2	1	99.7%	
							CH4	28	0.002%	
							N2O	265	0.001%	
Year	ROM coal (t)	Product coal (t)	Scope 1	Emission factor (kg CO2-e/t)			Emissions (t CO2-e/year)			
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	12,024,585	10,655,711		0	0	2436.48	-	-	25,962,428	25,962,428
2029	12,958,125	11,517,060		0	0	2436.48	-	-	28,061,085	28,061,085
2030	12,131,723	10,859,066		0	0	2436.48	-	-	26,457,897	26,457,897
2031	13,700,937	12,034,108		0	0	2436.48	-	-	29,320,863	29,320,863
2032	12,063,525	10,701,169		0	0	2436.48	-	-	26,073,183	26,073,183
2033	9,596,833	8,686,222		0	0	2436.48	-	-	21,163,805	21,163,805
2034	5,696,115	5,232,764		0	0	2436.48	-	-	12,749,526	12,749,526
2035	8,214,246	7,270,385		0	0	2436.48	-	-	17,714,147	17,714,147
2036	5,570,793	5,161,954		0	0	2436.48	-	-	12,576,998	12,576,998
2037	5,832,409	4,881,654		0	0	2436.48	-	-	11,894,053	11,894,053
2038	5,462,772	5,003,003		0	0	2436.48	-	-	12,189,716	12,189,716
2039	4,427,185	3,877,244		0	0	2436.48	-	-	9,446,828	9,446,828
Total		95,880,339					-	-	233,610,529	233,610,529

UWCO Modification only

Diesel (stationary)

							GWP		Distribution corrected for GWP	
							CO2	1	99.6%	
							CH4	28	0.01%	
							N2O	265	0.001%	
Year	ROM coal (t)	Usage (kL)	Emission factor (kg CO2-e/kL)			Emissions (t CO2-e/year)				
			Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	71,549	34	2709.72	0	667.78	92	-	23	115	
2029	193,602	92	2709.72	0	667.78	250	-	62	312	
2030	199,254	95	2709.72	0	667.78	257	-	63	321	
2031	1,877,182	895	2709.72	0	667.78	2,426	-	598	3,024	
2032	2,125,053	1,013	2709.72	0	667.78	2,746	-	677	3,423	
2033	7,863,806	3,750	2709.72	0	667.78	10,162	-	2,504	12,666	
2034	5,696,115	2,716	2709.72	0	667.78	7,361	-	1,814	9,175	
2035	8,214,246	3,917	2709.72	0	667.78	10,615	-	2,616	13,231	
2036	5,570,793	2,657	2709.72	0	667.78	7,199	-	1,774	8,973	
2037	5,832,409	2,781	2709.72	0	667.78	7,537	-	1,857	9,394	
2038	5,462,772	2,605	2709.72	0	667.78	7,059	-	1,740	8,799	
2039	4,427,185	2,111	2709.72	0	667.78	5,721	-	1,410	7,131	
Total		22,668				61,425	-	15,137	76,562	

UWCO Modification only

Diesel (transport)

Diesel (transport)						GWP		Distribution corrected for GWP		
						CO2	1	99.6%		
						CH4	28	0.01%		
						N2O	265	0.001%		
Year	ROM coal (t)	Usage (kL)	Emission factor (kg CO2-e/kL)			Emissions (t CO2-e/year)				
			Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2024	71,549	1	2717.44		0	667.78	2	-	1	3
2025	193,602	2	2717.44		0	667.78	7	-	2	8
2026	199,254	3	2717.44		0	667.78	7	-	2	9
2027	1,877,182	24	2717.44		0	667.78	65	-	16	81
2028	2,125,053	27	2717.44		0	667.78	73	-	18	91
2029	7,863,806	100	2717.44		0	667.78	271	-	67	338
2030	5,696,115	72	2717.44		0	667.78	196	-	48	245
2031	8,214,246	104	2717.44		0	667.78	283	-	70	353
2032	5,570,793	71	2717.44		0	667.78	192	-	47	239
2033	5,832,409	74	2717.44		0	667.78	201	-	49	251
2034	5,462,772	69	2717.44		0	667.78	188	-	46	235
2035	4,427,185	56	2717.44		0	667.78	153	-	38	190
Total		603					1,639	-	403	2,042

UWCO Modification only

Fugitive

Fugitive						GWP		Distribution corrected for GWP		
						CO2	1	97.5%		
						CH4	28	2.5%		
						N2O	265			
Year	ROM coal (t)	ROM coal (t)	Scope 1	Emission factor (kg CO2-e/t)		Emissions (t CO2-e/year)				
				Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total	
2028	71,549	71,549		2.945	0	0	211	-	-	211
2029	193,602	193,602		2.945	0	0	570	-	-	570
2030	199,254	199,254		2.945	0	0	587	-	-	587
2031	1,877,182	1,877,182		2.945	0	0	5,529	-	-	5,529
2032	2,125,053	2,125,053		2.945	0	0	6,259	-	-	6,259
2033	7,863,806	7,863,806		2.945	0	0	23,161	-	-	23,161
2034	5,696,115	5,696,115		2.945	0	0	16,777	-	-	16,777
2035	8,214,246	8,214,246		2.945	0	0	24,193	-	-	24,193
2036	5,570,793	5,570,793		2.945	0	0	16,407	-	-	16,407
2037	5,832,409	5,832,409		2.945	0	0	17,178	-	-	17,178
2038	5,462,772	5,462,772		2.945	0	0	16,089	-	-	16,089
2039	4,427,185	4,427,185		2.945	0	0	13,039	-	-	13,039
Total		47,533,965					140,000	-	-	140,000

UWCO Modification only

Electricity usage

	GWP	Distribution corrected for GWP
CO2	1	99.7%
CH4	28	0.002%
N2O	265	0.001%

Year	ROM coal (t)	Usage (kWh)	Emission factor (kg CO2-e/kWh)			Emissions (t CO2-e/year)			
			Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total
2028	71,549	1,157,904	0	0.34	0.02	-	394	23	417
2029	193,602	3,133,136	0	0.21	0.02	-	658	63	721
2030	199,254	3,224,605	0	0.15	0.01	-	484	32	516
2031	1,877,182	30,379,146	0	0.15	0.01	-	4,557	304	4,861
2032	2,125,053	34,390,539	0	0.13	0.01	-	4,471	344	4,815
2033	7,863,806	127,262,969	0	0.09	0.00	-	11,454	-	11,454
2034	5,696,115	92,182,398	0	0.09	0.00	-	8,296	-	8,296
2035	8,214,246	132,934,277	0	0.07	0.02	-	9,305	2,659	11,964
2036	5,570,793	90,154,275	0	0.06	0.01	-	5,409	902	6,311
2037	5,832,409	94,388,103	0	0.06	0.00	-	5,663	-	5,663
2038	5,462,772	88,406,121	0	0.06	0.00	-	5,304	-	5,304
2039	4,427,185	71,646,826	0	0.06	0.00	-	4,299	-	4,299
Total		769,260,297				-	60,294	4,326	64,620

UWCO Modification only

Transport (Rail)

						GWP		Distribution corrected for GWP	
Factor	kg CO2-e/t.km	0.02779	DEFRA 2024 - Freightng goods - Freight train			CO2	1	99.6%	
Distance	km	275	Assumed distance to port			CH4	28	0.01%	
						N2O	265	0.001%	
Year	ROM coal (t)	Product coal (t)	Emission factor (kg CO2-e/t)			Emissions (t CO2-e/year)			
			Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3	Total
2028	71,549	36,201	0	0	0	7.64	-	-	277
2029	193,602	97,287	0	0	0	7.64	-	-	743
2030	199,254	150,075	0	0	0	7.64	-	-	1,147
2031	1,877,182	1,504,073	0	0	0	7.64	-	-	11,495
2032	2,125,053	2,052,827	0	0	0	7.64	-	-	15,688
2033	7,863,806	7,113,580	0	0	0	7.64	-	-	54,364
2034	5,696,115	5,232,764	0	0	0	7.64	-	-	39,990
2035	8,214,246	7,270,385	0	0	0	7.64	-	-	55,562
2036	5,570,793	5,161,954	0	0	0	7.64	-	-	39,449
2037	5,832,409	4,881,654	0	0	0	7.64	-	-	37,307
2038	5,462,772	5,003,003	0	0	0	7.64	-	-	38,234
2039	4,427,185	3,877,244	0	0	0	7.64	-	-	29,631
Total		42,381,047					-	-	323,887

UWCO Modification only

Transport (Shipping)

Factor	kg CO2-e/t.km	0.00353	DEFRA 2024 - Freightng goods - Cargo ship, bulk carrier				CO2	1	99.1%	
Distance	km	9507	Assumed distance to market				CH4	28	0.01%	
							N2O	265	0.003%	
Year	ROM coal (t)	Product coal (t)	Emission factor (kg CO2-e/t)			Emissions (t CO2-e/year)			Total	
			Scope 1	Scope 2	Scope 3	Scope 1	Scope 2	Scope 3		
2028	71,549	36,201		0	0	33.56	-	-	1,215	1,215
2029	193,602	97,287		0	0	33.56	-	-	3,265	3,265
2030	199,254	150,075		0	0	33.56	-	-	5,036	5,036
2031	1,877,182	1,504,073		0	0	33.56	-	-	50,476	50,476
2032	2,125,053	2,052,827		0	0	33.56	-	-	68,892	68,892
2033	7,863,806	7,113,580		0	0	33.56	-	-	238,730	238,730
2034	5,696,115	5,232,764		0	0	33.56	-	-	175,610	175,610
2035	8,214,246	7,270,385		0	0	33.56	-	-	243,992	243,992
2036	5,570,793	5,161,954		0	0	33.56	-	-	173,234	173,234
2037	5,832,409	4,881,654		0	0	33.56	-	-	163,827	163,827
2038	5,462,772	5,003,003		0	0	33.56	-	-	167,899	167,899
2039	4,427,185	3,877,244		0	0	33.56	-	-	130,119	130,119
Total		42,381,047					-	-	1,422,296	1,422,296

UWCO Modification only

Energy Production

							GWP		Distribution corrected for GWP	
							CO2	1	99.7%	
							CH4	28	0.002%	
							N2O	265	0.001%	
Year	ROM coal (t)	Product coal (t)	Scope 1	Emission factor (kg CO2-e/t)		Scope 1	Emissions (t CO2-e/year)			
				Scope 2	Scope 3		Scope 2	Scope 3	Total	
2028	71,549	36,201		0	0	2436.48	-	-	88,202	88,202
2029	193,602	97,287		0	0	2436.48	-	-	237,038	237,038
2030	199,254	150,075		0	0	2436.48	-	-	365,655	365,655
2031	1,877,182	1,504,073		0	0	2436.48	-	-	3,664,644	3,664,644
2032	2,125,053	2,052,827		0	0	2436.48	-	-	5,001,672	5,001,672
2033	7,863,806	7,113,580		0	0	2436.48	-	-	17,332,095	17,332,095
2034	5,696,115	5,232,764		0	0	2436.48	-	-	12,749,526	12,749,526
2035	8,214,246	7,270,385		0	0	2436.48	-	-	17,714,147	17,714,147
2036	5,570,793	5,161,954		0	0	2436.48	-	-	12,576,998	12,576,998
2037	5,832,409	4,881,654		0	0	2436.48	-	-	11,894,053	11,894,053
2038	5,462,772	5,003,003		0	0	2436.48	-	-	12,189,716	12,189,716
2039	4,427,185	3,877,244		0	0	2436.48	-	-	9,446,828	9,446,828
Total		42,381,047					-	-	103,260,574	103,260,574