

HUNTER VALLEY
OPERATIONS

GREENHOUSE GAS MITIGATION PLAN

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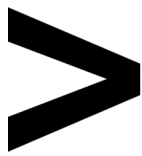
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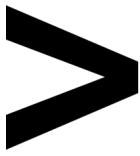
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1 | CONTEXT & PURPOSE

The Hunter Valley Operations (HVO) mining complex is a joint venture between Yancoal (51%) and Glencore (49%) and is independently managed on behalf of the JV partners.

The Plan has been prepared to meet the requirements of condition 6A of development consent DA 450-10-2003 Modification 8 (Mod 8) (approved April 2025) for HVO North as per the excerpt in Figure 1 below.

6A. Within six months of the determination of Modification 8, unless otherwise agreed by the Secretary, the Applicant must prepare a Greenhouse Gas Mitigation Plan in consultation with the EPA.

Notes:

- With the introduction of the EPA's Climate Change Policy and Climate Change Action Plan, the Applicant will be required to prepare and implement a Climate Change Mitigation and Adaptation Plan (or similar) in accordance with requirements provided by the EPA under the POEO Act.
- In accordance with its Climate Change Action Plan 2023-26, the NSW EPA is preparing guidance for the preparation and implementation of various climate change related guidelines.
- Once the Greenhouse Gas Mitigation Plan in Condition 6A of Schedule 3 has been prepared the greenhouse gas management components of the Air Quality & Greenhouse Gas Management Plan in Condition 6 of Schedule 3 can be satisfied through that plan and the EPA's regulatory framework.

Figure 1 Excerpt from DA 450-10-2003 Modification 8 Consolidated Consent – Hunter Valley Operations

At the time of writing, the NSW EPA has released draft guidance for preparing Climate Change Mitigation and Adaptation Plans. Therefore, this plan draws on the EPA's draft publication (NSW EPA, 2025).

This plan outlines the ongoing emission mitigation and management strategies to be considered – and, where practicable and feasible, implemented for HVO North, to reduce Scope 1 and Scope 2 GHG emissions.

Production from the HVO North area is integrated into the broader HVO mining operation. The Scope 1 emission intensity for Mod 8 is relatively low compared to other coal mines, due to the low gas content of the areas being mined.

HVO is a facility regulated under the Commonwealth Safeguard Mechanism. The objective of the plan is to describe how emissions from Mod 8 will be measured and managed in line with the National Greenhouse and Energy Reporting Scheme and the performance expectations of the Commonwealth Safeguard Mechanism.

2 | SCOPE

Whilst the activities and processes described within this plan are typically undertaken as part of broader operational practices at HVO, the scope of commitments outlined in this document are primarily related to HVO North.

References to HVO throughout this document are provided for contextual and operational alignment purposes only and do not imply an extension of the commitments beyond HVO North. In meeting the commitments specific to HVO North Mod 8, HVO may rely upon, and reference assessments, data, and operational procedures developed for the broader mining complex, provided they are applicable to HVO North.

The Hunter Valley Operations South Project (HVO South) development approval PA 06_0261 Schedule 3 Condition 53 also requires the implementation of all reasonable and feasible measures to minimise GHG emissions. To maintain alignment between both approvals, it is intended that the broad site wide measures to minimise and offset emissions outlined in this document also addresses this requirement.



3 | CONSULTATION

Condition 6A of DA 450-10-2003 requires the Applicant to prepare a Greenhouse Gas Mitigation Plan (GHGMP) in consultation with the EPA, within six months of the determination of Modification 8 (24 April 2025), unless otherwise agreed by the Secretary.

On 26 September 2025, correspondence was forwarded to the EPA inviting comments on the proposed draft GHGMP. Feedback from the EPA was received on 7 November 2025. A copy of this correspondence is included within Appendix F. In summary, the EPA recommended alignment with the *Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines (consultation draft)* and associated *Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements (consultation draft)* with respect to the HVO Continuation Project EIS and GHG Assessment (which is under assessment).

HVO understands that the scope of this GHGMP is relevant to the current approved operations. As such HVO has prepared this GHGMP by considering the requirements contained within the consultation drafts as they apply to the current approved operations (as per Appendix C). When the consultation drafts are finalised and published, the GHGMP can be revised and updated in accordance with the review mechanisms provided by Schedule 5 Conditions 3 and 4 of DA450-10-2003. Similarly, any new or modified development approval will require the same.

In addition to the direct consultation undertaken above, where relevant or required, internal and external subject matter experts are engaged to assist with:

- GHG emissions estimates
- Identification and assessment of GHG emission reduction measures
- Review of advancing technologies and opportunities
- Monitoring, reporting, auditing and publishing of HVO performance.

4 | GHG EMISSIONS ESTIMATE

4.1 | GHG EMISSIONS

The Scope 1 emission intensity for HVO North is relatively low compared to other coal mines:

- Due to the low gas content of the areas being mines, HVO North is a low fugitive emission intensity mining area
- Fugitive emissions represent ~4% of HVO North Scope 1 emissions (2025-26).
- Fossil fuel emissions form the considerable portion of Scope 1 emissions.

Regarding Scope 2 emissions, HVO is connected to the electricity grid. As the grid transitions to more renewable energy sources, the emissions associated with HVO's electricity consumption are expected to decrease. Consequently, HVO's electricity costs will also reflect this shift towards a greener grid.

The emissions inventory for HVO North is as per the HVO Mod 8 Projected Greenhouse Gas Assessment (HVO, 2024).

The emissions inventory forms the reference point for potential future (additional) emissions reductions to be assessed against.



4.2 | GHG EMISSIONS INTENSITY

The Scope 1 emissions intensity from HVO North, as calculated for Modification 8 are expected to be within the range of historically reported emissions intensities.

5 | SAFEGUARD MECHANISM OBLIGATIONS

Please refer to Section 7.1 | for a description of Safeguard Mechanism obligations.

6 | MEASURES TO AVOID AND REDUCE GHG EMISSIONS

HVO considers the GHG abatement hierarchy in its evaluation of options for emissions reduction, as depicted in the figure below.

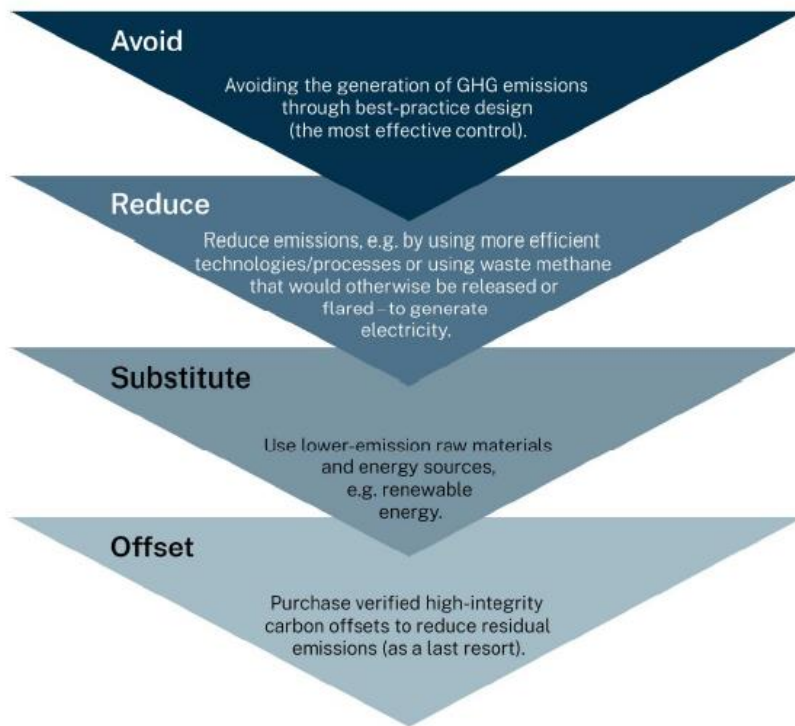


Figure 2 GHG Abatement Hierarchy (excerpt from NSW EPA Large Emitters Guide (NSW EPA, 2025))

Mod 8’s emissions estimates reflect current operational practices at HVO to maximise energy efficiency and minimise diesel consumption. They also reflect the avoidance of significant fugitive emissions due to Mod 8’s low gas environment.

Given the 18-month period of the Modification, there are limited opportunities to implement material and feasible long-term GHG mitigation measures at HVO North, that are additional to the practices described below.

HVO will continue to investigate means of reducing the emission intensity of operations by assessing existing and emerging technologies for emissions reduction, as described below.



6.1.1 | MANAGEMENT OF FUGITIVE EMISSIONS

HVO North is mining areas of low fugitive emission content which are currently not feasible to mitigate.

6.1.2 | MANAGEMENT OF FOSSIL FUEL EMISSIONS

Fossil fuel emissions constitute a significant portion of HVO's Scope 1 emissions, and fossil fuel is also a significant cost driver. To address this, HVO implements a series of embedded operational practices aimed at reducing fossil fuel consumption and minimising associated emissions. These practices align with the mitigation hierarchy - avoiding, reducing, and substituting emissions.



1. Procurement Processes

- HVO's procurement processes typically includes the consideration of fuel efficiency as a criterion in equipment selection, thereby reducing fuel consumption and emissions.

2. Mine Design, Planning, and Equipment Selection

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

- **Optimised Mine Layout:** Designing the mine layout to enhance operational efficiency and selecting appropriate equipment for mining and haulage activities. This includes considering the use of electric equipment where feasible to optimise overburden removal.
- **Early Rehabilitation Scheduling:** Planning for rehabilitation activities early in the mining process to minimise the need for future rehandle and/or hauling material over long distances and elevations beyond the pit workings.
- **Haulage Destination Planning:** Planning the delivery of hauled material to minimise material handling, haul distance and elevation changes, thereby decreasing fuel consumption.
- **Haul Route Optimisation:** Iteratively optimising haul routes to reduce equipment operating hours and, consequently, fuel consumption.
- **Loading Efficiency:** Operational monitoring through fleet dispatch systems, progressively examining and matching the interaction between loading units and trucks to minimise wastage, improve haul cycle times, and optimise the amount of material moved per equipment operating hour.
- **Payload Optimisation:** Planning and monitoring haulage performance to ensure that loading equipment capacity aligns with the haulage capacity of the fleet, maximising efficiency and reducing fuel usage.

3. Equipment Maintenance

- The mobile equipment fleet 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 fuel efficiency.
- 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 fuel efficiency.

4. Haul Road Maintenance

- Haul roads are designed to optimise energy efficiency, considering factors such as gradient and surface material.
- Regular maintenance is performed to ensure that haul road gradients and rolling resistance are minimised. Remedial actions are undertaken based on operational monitoring to maintain optimal conditions.

5. Performance Monitoring and Feedback

- HVO conducts regular reporting of historical and actual performance as part of operational processes. This includes evaluations at intervals ranging from shiftily, weekly, and monthly to annual and multi-year assessments.
- HVO's performance is benchmarked against other operating sites to assess equipment performance and identify opportunities for improvement.



6.1.3 | EVALUATION OF EXISTING EMISSIONS REDUCTION TECHNOLOGIES

As part of broader business planning processes, existing (“off-the-shelf”) emissions reduction technologies are evaluated for potential future implementation at HVO, such as alternative fuels, and renewable energy. An example of evaluation of existing emissions reduction technologies for potential future implementation at HVO is described in Appendix A.

6.1.4 | MONITORING OF EMERGING EMISSIONS REDUCTION TECHNOLOGIES

As part of broader business planning processes, emerging/developing emissions reduction technologies are evaluated for potential future implementation at HVO, such as alternative drive trains. An example of evaluation of emerging emissions reduction technologies for potential use at HVO is described in Appendix B.

As described in Section 6.1.3 | and 6.1.4 | and Appendices A and B, HVO will continue to investigate options for reducing its low emission intensity operations by evaluating existing and emerging technologies for emissions reduction.

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

7 | GHG EMISSION GOALS

HVO is subject to GHG emissions reduction targets as part of both regulatory and corporate (voluntary) frameworks, as described below. The Commonwealth Safeguard Mechanism provides the regulated quantitative performance standard that HVO (inclusive of Mod 8) needs to comply with.

7.1 | COMMONWEALTH SAFEGUARD MECHANISM EMISSIONS REDUCTION TARGETS

HVO is a Safeguard facility under the Commonwealth Safeguard Mechanism. The Safeguard Mechanism commenced on 1st July 2016 and applies to facilities that emit more than 100,000 tonnes of carbon dioxide equivalent (t CO₂-e) gas per financial year. This extends to businesses across a broad range of industry sectors, including mining. The Safeguard Mechanism is administered by the Australian Government’s Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Together with the reporting obligations under the National Greenhouse and Energy Reporting Act 2007 (NGER Act), the Safeguard Mechanism provides a framework for Australia’s largest emitters to measure, report, and manage their emissions. The Safeguard Mechanism sets legislated limits, known as baselines, on the GHG emissions from qualifying facilities. The Safeguard Mechanism was reformed in 2023 with the aim of ensuring applicable facilities such as HVO contribute a proportionate share to Australia meeting its GHG emission reduction commitments. Australia’s current legislated emissions reduction commitment is to reduce GHG emissions to 43% below 2005 levels by 2030, and net zero by 2050.

7.1.1 | EMISSIONS BASELINE

Under the Safeguard Mechanism, facilities such as HVO are given a baseline against which their Scope 1 emissions levels will be assessed. A Safeguard facility must keep its net emissions levels at or below its baseline or face civil penalties.

7.1.2 | EMISSIONS REDUCTION & BASELINE DECLINE RATE

Under the Safeguard reforms, there is a requirement for net emissions across the Safeguard Mechanism to reduce by 4.9% annually from FY24 to FY30, then by ~3.3% from FY31 to reach net zero by 2050. These



rates have been calculated to ensure that Australia remains on track with its legislated GHG emission reduction targets. The Federal Government has also scheduled a review during FY27 to evaluate performance against the reformed Scheme and to determine if baseline decline rates need to be revised.

Additionally, total absolute emissions from Safeguard facilities are also required to decrease over time, measured over a 5- year rolling average. From 1st July 2025, the rolling average of Safeguard covered emissions over the previous 5-year period are required to be lower than the 5- year rolling average from 3 years earlier. From 1st July 2027, the 5-year rolling average of Safeguard covered emissions is required to be lower than the 5-year rolling average from 2 years earlier.

7.1.3 | MANAGING EXCESS EMISSIONS

Safeguard obligations rest with the person with operational control of the Safeguard facility. This person is referred to as the 'responsible emitter' and may be an individual, a body corporate, a trust, a corporation sole, a body politic or a local governing body. The responsible emitter is required to keep the Safeguard facility's net emissions at or below its emissions baseline.

Responsible emitters with a Safeguard facility that has, or is likely to, exceed its baseline have several options to manage the excess emissions situation:

- Pursue activities that would reduce the relevant emissions of the facility.
- Surrender prescribed carbon units to reduce the net-emissions of the facility - Australian Carbon Credit Units (ACCUs) and Safeguard Mechanism Credits (SMC) are currently the only prescribed units.
- Apply for a multi-year monitoring period that provides flexibility in how emissions are managed over a longer period.
- Apply for an exemption where excess emissions are due to exceptional circumstances such as a natural disaster or criminal activity.

7.1.4 | EMISSIONS REDUCTION PATHWAYS FOR HVO UNDER THE SAFEGUARD MECHANISM

The Safeguard Mechanism provides HVO with both regulatory frameworks and financial incentives to reduce its emissions. HVO's efforts to reduce emissions, as outlined in Section 3.2, will result in either of the following outcomes:

1. **Reduction in the Need for Australian Carbon Credit Units (ACCUs) or Safeguard Mechanism Credits (SMCs):** If HVO's emissions are below its baseline, it may reduce its reliance on purchasing ACCUs or SMCs to offset excess emissions.
2. **Generation of Safeguard Mechanism Credits (SMCs):** Emissions below the baseline result in the creation of SMCs, each representing one tonne of CO₂-e emissions avoided. These credits can be traded or banked for future use.

These outcomes may offset some of the costs associated with implementing emissions reduction technologies, thereby enhancing their economic feasibility. Consequently, the Safeguard Mechanism incentivises HVO to continuously monitor and evaluate existing and emerging technologies to assess their applicability and potential for emissions reduction.

The current estimates of emissions intensity from HVO North during the Modification period are below Safeguard Mechanism emissions intensity levels set for this facility, due to low fugitive emissions for the mining area targeted during the Modification period.



8 | REVIEW OF ADVANCING TECHNOLOGIES AND OPPORTUNITIES

As part of business planning processes, HVO will continue to assess existing and emerging technologies for emissions reduction and energy efficiency.

This work will be conducted on a three-yearly basis (unless material changes are identified earlier).

These three-yearly reviews form a qualitative performance measure for regularly monitoring and evaluating opportunities to further reduce emissions and improve energy efficiency.

9 | MONITORING, REPORTING, AUDITING & PUBLISHING

The National Greenhouse Gas and Energy Reporting (NGER) Scheme, established by the NGER Act, provides a national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information specified under NGER legislation.

There are two thresholds that determine whether a company has a requirement to report under the NGER Act, facility, and corporate thresholds. HVO as a facility exceeds the 25kt CO₂-e threshold and is therefore required to submit annual NGER reports to the Clean Energy Regulator (CER). HVO undertakes monitoring, reporting and auditing requirements in accordance with its NGER obligations.

As HVO is also a Commonwealth Safeguard facility and Scope 1 emissions data from HVO will be published by the CER on their website on an annual basis.

In April each year, the CER publishes information relating to the Safeguard Mechanism for the previous financial year¹. This includes information about each Safeguard facility:

- Safeguard outcomes, including progress towards the Commonwealth’s emissions reductions commitments
- Baselines and emissions
- Multi-year monitoring periods
- Trade-exposed baseline-adjusted facilities
- Emissions-intensity determinations
- NGER method data.

The above requirements of the NGER Scheme and Commonwealth Safeguard Mechanism form the monitoring, reporting, auditing, and publishing performance measures for HVO.

10 | REVIEW AND IMPROVEMENT

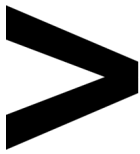
Every three years this plan will be reviewed for effectiveness in achieving the requirements of condition 6A of the consent. The plan will be updated to address any matters identified during the review process.

10.1 | 3 YEARLY STATUS REPORT

The updated plan must include a status report on the goals and planned implementation measures from their previous plan (on track, not on track). When CCMAPs are updated, any changes to goals need to be explained with reference to the previous and the updated figures.

¹ Data from the Clean Energy Regulator is available at <https://cer.gov.au/markets/reports-and-data/safeguard-data>





11 | DOCUMENT INFORMATION

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information in this section provides the linkage and source to develop and maintain site compliance information.

11.1 | REFERENCE INFORMATION

Reference information, listed in Table below, is information that is directly referred to for the development of this document

[Climate Change Licensee Requirements | NSW Environment Protection Authority](#)

TITLE

NSW EPA – NSW Government, 2024, NSW EPA Guide for Large Emitters - Draft for Consultation, available at <https://yoursay.epa.nsw.gov.au/draft-climate-change-assessment-requirements-and-guide>

NSW EPA – NSW Government, 2025, Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements CONSULTATION DRAFT- Draft for Consultation, available at <https://yoursay.epa.nsw.gov.au/climate-change-licensee-requirements>

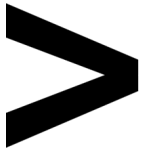
Various, 2024 - 2025, Hunter Valley Operations Mod 8 - Extension of time: Project Assessment on NSW Government Planning Portal, available at <https://www.planningportal.nsw.gov.au/major-projects/projects/mod-8-extension-time>



11.2 | CHANGE INFORMATION

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in table below. Example detail shown below.

VERSION	DATE	CHANGE DETAILS
1.0	19/11/25	Sent for EPA review 26/09/2025. EPA review correspondence received 7/11/2025. Plan updated and Major Projects Portal submission finalised 19/11/2025.



12 | APPENDIX A - EXISTING TECHNOLOGIES FOR EMISSIONS REDUCTION

As part of its business planning framework, HVO evaluates existing emissions reduction technologies to assess the relative feasibility and effectiveness of various initiatives.

These assessments are typically conducted during the annual business planning process. Abatement initiatives are examined by considering a range of criteria including estimated costs, emissions reduction potential, and practicability of deployment.

- Scope 1 abatement initiatives assessed for potential application at HVO focus on reducing diesel-related emissions and include options such as the use of biofuels and fuel additives.
- Scope 2 initiatives relate to electricity consumption and include options such as renewable power purchase agreements and the development of onsite renewable energy infrastructure (e.g., solar and/or wind installations, with and without battery storage).

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



13 | APPENDIX B - EMERGING TECHNOLOGIES FOR EMISSIONS REDUCTION

As part of its business planning processes, HVO evaluates emerging technologies with the potential to reduce emissions. By definition, such technologies are in varying stages of development and must progress through established Technology Readiness Levels (TRL) and Commercial Readiness Indexes (CRI) before they can be deployed at scale.

Due to their early-stage nature, emerging technologies are associated with a higher degree of uncertainty—particularly regarding the quantification of potential benefits and the timing of their implementation. Accordingly, HVO assesses these technologies based on their current TRL and CRI status, as well as indicative timeframes for commercial deployment.

Given the inherent uncertainty in both technical and economic outcomes, it is not considered appropriate to provide quantified emissions reduction estimates or economic forecasts for emerging technologies at this stage.

The areas discussed below summarise the evaluation of emerging technologies for potential implementation at HVO.

Opportunities to reduce diesel emissions

Given the off-road mining fleet is the largest user of diesel, further information is provided on the status of available technology and opportunities at HVO for reducing diesel emissions.

A joint industry program facilitated by the International Council on Mining and Metals (ICMM), the Initiative for Cleaner, Safer Vehicles (ICSV), exists to leverage the broader industry learnings for solving constraints to the development of emissions reduction technologies in mining equipment.

Based on existing relationships and governance requirements, the ICMM and Charging Interface Initiative e.V. (CharIN), with involvement of the original equipment manufacturers (OEM), are the industry bodies with the most influence to help achieve the emission reduction objectives. CharIN is a not-for-profit global organisation in the field of charging systems for electric vehicles of all types around the world. It provides a community of technological collaborators, with over 300 members and eight years of work and learnings that can be built on.

Glencore is a founding and active member of the ICSV program, and therefore HVO is able to stay abreast of technological developments and implementation progress through association with these bodies, which it does so on a regular basis. Using this available information and Glencore’s industry knowledge, Glencore undertook an assessment of the readiness of alternative technologies to diesel powered equipment for the mining sector and engaged Hatch Pty Ltd (ICSV Technical and Facilitation Support) to peer review this work. A summary of the findings is provided below.

The frameworks and methodology used by the Australian Renewable Energy Agency (ARENA) were used to assess readiness of technology for use in the mining sector by considering both the Technology Readiness Level (TRL), and Commercial Readiness Index (CRI) of the technology. These concepts are illustrated in Figure 3.

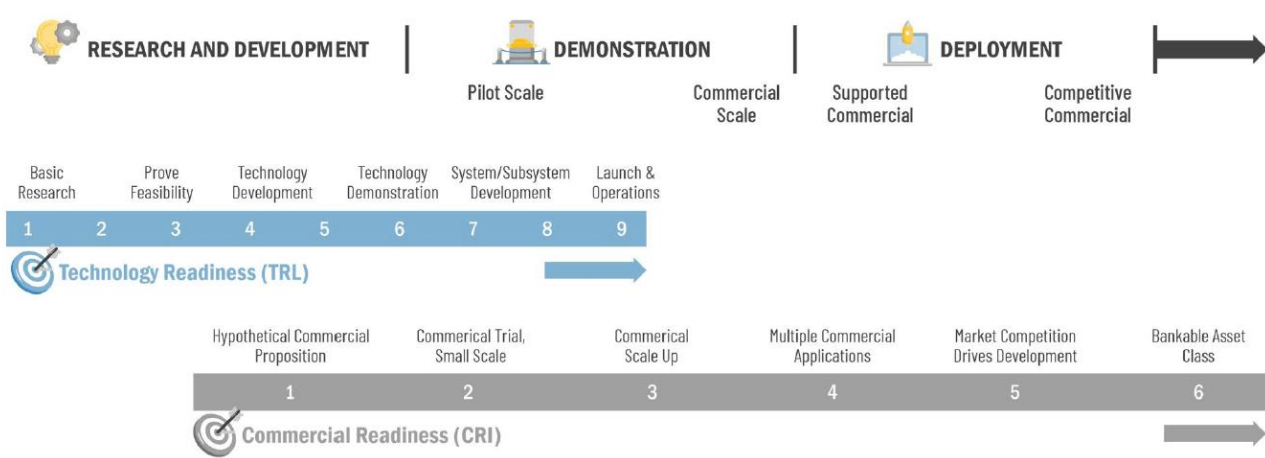


Figure 3 Technology Readiness Level and Commercial Readiness Index concepts

The review considered electrically powered equipment, as well as equipment powered by alternative fuels such as hydrogen, biofuels, ammonia and synthetic diesel. The findings are summarised below.

An overview of the potential technologies for powering surface mining equipment, currently typically powered by diesel, is shown below in Figure 4. It shows the current TRL status of a range of technologies that might be suitable. Diesel as a fuel supply is, as a technology, refined and adopted. 20% biodiesel blends and catenary supplied electric power are also at TRL9. The second phase of assessment towards commercial adoption is the CRI and, when considering commercial readiness, diesel is again a fully adopted and commercially competitive fuel for mining equipment. As will be discussed below, 100% biodiesel and catenary power while technologically ready, are not as advanced on a CRI basis and not as readily adopted.

Figure 4 also shows that while technologies such as hybrid, fuel cell or battery power solutions are developing and being adopted in smaller scale sectors such as for automotive, they are not yet adequately developed for use with mining equipment. Glencore will continue reviewing technologies on a regular ongoing basis to assess their development status and suitability for adoption at HVO.

PHASES	TRL	DESCRIPTION	RECIPROCATING ENGINES >30 L					GRID SUPPLIED		HYBRID STORAGE/ ENGINE			HYBRID STORAGE/ FUEL CELL			HYBRID STORAGE					
			Diesel	Hydrogen	Ammonia	Bio-Diesel - 20%	Synthetic Diesel - 100%	Catenary	Trailing cable	Storage / Engine / Regen	Storage / Engine / Static Charge / Regen	Storage / Engine / Catenary / Regen	Storage / Engine / Catenary / Static Charge / Regen	Storage / Fuel Cell / Regen	Storage / Fuel Cell / Static Charge / Regen	Storage / Fuel Cell / Catenary / Regen	Storage / Fuel Cell / Catenary / Static Charge / Regen	Storage / Regen	Storage / Engine / Static Charge / Regen	Storage / Catenary / Regen	Storage / Catenary / Static Charge / Regen
Basic research	1	Basic principles and research																			
	2	Application formulated																			
	3	Proof of concept																			
Applied research	4	Components validated in laboratory environment																			
	5	Integrated components demonstrated in a laboratory environment																			
Development	6	Prototype demonstrated in relevant environment																			
	7	Prototype demonstrated in operational environment																			
	8	Technology proven in operational environment																			
Implementation	9	Technology refined and adopted																			

Figure 4 Potential technologies for powering surface mining equipment with current TRL



Electric powered equipment

Several technologies exist for electrically powered equipment, including tethered cable electric machines, and high capacity overhead catenary systems. As demonstrated in Figure 5, catenary system technology is well developed for trucks with an overhead mounted system, and electric tethered cable system for hydraulic face shovel configured excavators in hard rock mining applications. However, there are a number of complexities and constraints to their implementation in a coal mining geological environment as discussed below.

High capacity overhead catenary systems can be used to support diesel-electric truck fleets and potentially hybrid or battery powered fleets. Overhead catenary support for diesel-electric trucks is used in some limited non-coal instances globally; however, there is little opportunity to use this sort of system in the coal sector and HVO in particular. This is mainly due to the progressive nature of mine advancement during coal extraction and the subsequent continual changing of the location of suitable haul ramps, which would necessitate continually moving the significant support infrastructure involved.

In relation to cabled electric machines, draglines, shovels and large capacity drills are available as shown in Figure 5. HVO currently uses electric shovels, however the nature of the cabled connection renders them useful for specific, usually high volume, tasks only. As a multi-seam open cut where equipment requires frequent relocation, several smaller hydraulic diesel-fuelled equipment is required for efficient mining. These are available as electric cable supplied machines however are too restrictive for the flexibility required at HVO. Similarly smaller drills that require flexibility of movement within the mine are more appropriate as diesel machines.

In summary, some equipment is utilised as electric cable supplied machines at HVO however the further use of electric equipment for all excavators and drills is constrained by practicality and efficiency. As excavators and drills are replaced, forecasts of their respective uses will be assessed including whether cable supply might be appropriate.

Sustainable Fuel Options and Hydrogen

There are a range of sustainable fuel options which are commercially available as well as under development. Such fuels can be used in conventional internal combustion engines (ICE) across sectors including mining, road transport, rail, maritime, aviation, and as chemical feedstocks.

Sustainable fuels can be blended with fossil fuels to a blend limit (fatty acid methyl ester - FAME and ethanol) or to any ratio up to 100% (hydrogenated vegetable oil - HVO, synthetic), without requiring any technical adjustments to the vehicle. The use of 100% renewable diesel, such as HVO, in ICE vehicles could achieve a 100% reduction in Scope 1 emissions.

The use of sustainable fuels is expected to grow significantly over the next 20 years, decreasing fossil fuel consumption in hard-to-abate sectors, driven by regulatory mandates, particularly in the road transport and aviation sectors.

Currently, there are significant barriers to the use of sustainable fuels including cost and limited availability. Sustainable fuels also face issues of ethical provenance as their feedstocks may have the potential to displace food-growing activities and have land use impacts e.g. deforestation. Sustainable fuels also differ in their extent of application or the ability to “drop-in” or substitute fossil fuel diesel use.

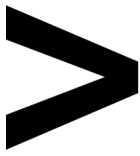
As shown below, the use of hydrogen as a fuel in mining equipment does not currently meet TRL requirements for implementation and is therefore not yet an option for the industry. Further research and development is needed before this technology could be considered for use at an operation like HVO.

HVO will continue to monitor and assess the potential use of sustainable and alternative fuel options for application over the mine life.



PHASES	TRL	DESCRIPTION	GRID SUPPLIED ELECTRICAL POWER										RECIPROCATING ENGINES (> 30L OPTIONS)												
			DIESEL ELECTRIC WITH CATENARY					ELECTRIC TETHERED CABLE					HYDROGEN					BIODIESEL (20%)							
			Trucks overhead mounted	Trucks parallel side mounted	Excavators	Loaders and dozers	Ancillary	Trucks	Excavators / Shovel	Excavators / Backhoe	Loaders and dozers	Ancillary	Drills	Trucks	Excavators	Loaders	Dozers	Ancillary	Trucks	Excavators	Loaders	Dozers	Ancillary		
Basic research	1	Basic principles and research																							
	2	Application formulated																							
	3	Proof of concept																							
Applied research	4	Components validated in laboratory environment																							
	5	Integrated components demonstrated in a laboratory environment																							
Development	6	Prototype demonstrated in relevant environment																							
	7	Prototype demonstrated in operational environment																							
	8	Technology proven in operational environment																							
Implementation	9	Technology refined and adopted																							

Figure 5 Mining equipment optionality with current_TRL – grid supplied electrical power and alternate fuels



14 | APPENDIX C – MAPPING OF THIS MANAGEMENT PLAN TO NSW EPA’S JULY 20205 CONSULTATION DRAFT REQUIREMENTS FOR CLIMATE CHANGE MITIGATION AND ADAPATION PLANS (CCMAP): PROPOSED MITIGATION REQUIREMENTS

The table below summarises how the components of this management plan address the requirements of the draft CCMAP requirements as consulted on by the EPA during August 2025.

Table 1 Mapping this Management Plan to EPA’s Draft Consultation CCMAP Requirements

Requirement	Details	Section in this Document
Licensees must prepare a CCMAP	1. The holder of an environment protection licence must prepare a written climate change mitigation and adaptation plan in accordance with the requirements in this document.	This document is considered the equivalent of a CCMAP
Greenhouse-gas mitigation information to be included in a CCMAP	2. The following greenhouse gas mitigation information must be included in a CCMAP: a) Sources and quantities of current scope 1 and 2 (and optionally scope 3) greenhouse gas emissions in tonnes carbon dioxide equivalent (t CO ₂ -e) for the most recently concluded financial year, and estimated future emissions for each of the next 10 financial years starting with the current financial year (see 3.1). For each year’s emissions data: i. include greenhouse gas emissions broken down by: a. gas type in t CO ₂ -e b. activity type, and c. activity stage (operational, decommissioning, closure, and post-closure); ii. take into account any current and intended mitigation measures and offsets, iii. include a description of how the future emissions have been estimated, including the assumptions, data and methods used, and	NGER reporting obligations are described in Section 9 Monitoring, Reporting, Auditing & Publishing The emissions forecast for HVO North Mod 8 is as per the GHG Assessment prepared for the project, and summarised in Section 4 GHG Emissions Estimate
	b) Current and future mitigation measures (see section 3.2): i. The CCMAP must include a description of the measures that are currently implemented at the premises to avoid and mitigate current scope 1 and 2 greenhouse-gas emissions, and those that will be implemented over the next ten years to avoid and mitigate future scope 1 and 2 emissions, including time frames for implementation. Information about current and future scope 3 mitigation measures may be optionally included.	Mitigation measures are addressed in Section 6 Measures to Avoid and Reduce GHG Emissions



	<p>ii. For each measure, provide a description of the following:</p> <ul style="list-style-type: none"> a. how the measure is expected to avoid or mitigate greenhouse-gas emissions from the premises over time, b. how the licensee will ensure the level of claimed performance, and how contingency actions can be adopted or retrofitted to ensure the level of claimed performance, c. how the mitigation measure aligns with, or is more effective than, any measures referred to in their development consent, d. how the mitigation measure will not compromise other pollution controls or the premise's overall environmental performance. e. how the mitigation measures align with the mitigation hierarchy, f. how the mitigation measures meet any specified actions set out in EPA regulations or in the licence, and g. how the mitigation measures compare to any best-practice mitigation measures relevant to the licensee, as identified by the EPA in guidance. 	
	<p>c) A description of scope 1 and 2 greenhouse-gas emissions goals for the premises for 2050 and years where there is a legislated NSW emission reduction target, currently 2030 and 2035, and how those goals will be achieved. Scope 3 goal may be included.</p>	<p>Scope 1 goals for the HVO North form part of the HVO Complex facility's Safeguard Mechanism Obligations as described in Section 7 GHG Emission Goals</p> <p>It is anticipated that Scope 2 emissions will reduce over time due to the impacts of grid greening. Scope 2 goals are not proposed as the HVO Complex is grid-connected and HVO is not in direct control of the</p>



		grid's emission intensity.
Submit emissions estimates to the EPA	3. The holder of an environment protection licence must submit their 10-years future emissions estimates to the EPA every three years (see 3.1.3).	Forward-looking updates of this nature are considered commercially sensitive and HVO is unable to provide this
Publishing a CCMAP	4. A CCMAP must be made publicly available on the licensee's website and made available to an EPA authorised officer upon request.	This document will be made available on the HVO website
Review and update the CCMAP every three years	5. CCMAP must be reviewed and updated every three years to ensure the information included is accurate, up to date and capable of being implemented in a workable and effective way. Licensees must include in their updated plan a status report on the goals and planned implementation measures from their previous plan (on track, not on track). When CCMAPs are updated, any changes to current emissions, emissions projections or goals need to be explained with reference to the previous and the updated figures.	The review and status report requirements are described in Section 10 Review and Improvement



15 | APPENDIX D – MAPPING OF THIS MANAGEMENT PLAN TO HVO NORTH DA 450-10-2003, GHG-RELATED CONDITIONS

The table below summarises how the components of this management plan address the requirements of GHG-related conditions contained within the HVO North DA 450-10-2003.

Table 2 Mapping this Management Plan to GHG-related conditions within HVO North DA 450-10-2003

Condition	Requirement	Section in this Document
Sch 3, Con 4	The Applicant must implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Secretary.	Mitigation measures are addressed in Section 6 Measures to Avoid and Reduce GHG Emissions
Sch 3, Con 6	<p>The Applicant must prepare a detailed Air Quality & Greenhouse Gas Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with the EPA, and submitted to the Secretary for approval by the end of June 2013;</p> <p>(b) describe the measures that would be implemented to ensure: • best management practice is being employed; • the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; and • compliance with the relevant conditions of this consent. (c) describe the proposed air quality management system;</p> <p>(d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities;</p> <p>(e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring;</p> <p>(f) include an air quality monitoring program that: • uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development; • adequately supports the proactive and reactive air quality management system; • includes PM2.5 monitoring; • includes monitoring of occupied development-related residences and residences on air quality-affected land listed in Table 1, subject to the agreement of the tenant; • evaluates and reports on the effectiveness of the air quality management system; and • includes a protocol for determining any exceedances of the relevant conditions in this approval; and</p> <p>(g) include a protocol that has been prepared in consultation with the owners of nearby mines (Mt Thorley Warkworth, Wambo, Ravensworth and HVO South mines) to minimise</p>	<p>This Plan is equivalent to the GHG-related aspects of the AQ & GHG Management Plan.</p> <p>Consultation with the EPA was conducted as follows, during the Plan’s development:</p> <ul style="list-style-type: none"> - HVO Submission for EPA review on 26/9/2025 - EPA review comments and recommendations received on 7/11/2025



	<p>the cumulative air quality impacts of these mines and the development. The Applicant must implement the approved management plan as approved from time to time by the Secretary</p> <p>The Applicant must implement the approved management plan as approved from time to time by the Secretary.</p>	
Sch 3, Con 6a	<p>Within six months of the determination of Modification 8, unless otherwise agreed by the Secretary, the Applicant must prepare a Greenhouse Gas Mitigation Plan in consultation with the EPA.</p> <p>Notes:</p> <ul style="list-style-type: none"> • With the introduction of the EPA’s Climate Change Policy and Climate Change Action Plan, the Applicant will be required to prepare and implement a Climate Change Mitigation and Adaptation Plan (or similar) in accordance with requirements provided by the EPA under the POEO Act. • In accordance with its Climate Change Action Plan 2023-26, the NSW EPA is preparing guidance for the preparation and implementation of various climate change related guidelines. • Once the Greenhouse Gas Mitigation Plan in Condition 6A of Schedule 3 has been prepared the greenhouse gas management components of the Air Quality & Greenhouse Gas Management Plan in Condition 6 of Schedule 3 can be satisfied through that plan and the EPA’s regulatory framework. 	<p>This plan was submitted within the required timeframe, subject to consultation with the EPA as described in Section Consultation</p> <p>Note only</p>
Sch 5, Con 2	<p>The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data;</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> • the relevant statutory requirements (including any relevant approval, licence or lease • conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; <p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p>	<p>Note only</p>



	<p>(d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> • impacts and environmental performance of the development; and • effectiveness of any management measures (see (c) above); <p>(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the development over time;</p> <p>(g) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; <p>(h) a protocol for periodic review of the plan; and</p> <p>(i) a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of people who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary’s approval.</p> <p>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</p>	
<p>Sch 5, Con 2a</p>	<p>With the agreement of the Secretary, the Applicant may combine any strategy, plan, program or Annual Review required by this consent with any similar strategy, plan, program or Annual Review required for HVO South and Mt Thorley Warkworth mines or any other adjoining operation in common ownership or management.</p>	<p>To be confirmed following submission and acceptance by Secretary for HVO South.</p>



**16 | APPENDIX E – MAPPING OF THIS MANAGEMENT PLAN TO HVO SOUTH
PA 06_0261, GHG RELATED CONDITIONS**

The table below summarises how the components of this management plan address the requirements of GHG-related conditions contained within the HVO South PA 06_0261 (as modified).

Table 3 Mapping this Management Plan to GHG-related conditions within HVO North PA 06_0261

Condition	Requirement	Section in this Document
Sch 3, Con 53	The Applicant must implement all reasonable and feasible measures to minimise greenhouse gas emissions from the development to the satisfaction of the Planning Secretary.	Mitigation measures are addressed in Section 6 Measures to Avoid and Reduce GHG Emissions



17 | APPENDIX F REGULATOR CORRESPONDENCE



Our ref: DOC25/836235-2

7 November 2025

Ben de Somer
Manager Environment & Community
Hunter Valley Operations

Via: Major Projects Portal

**EPA Comment on draft Greenhouse Gas Mitigation Plan
Hunter Valley Operations – (DA450-10-2003-PA-108)**

Dear Ben

I am writing in response to your request for the NSW Environment Protection Authority (EPA) to provide comments on the draft Greenhouse Gas Mitigation Plan (Plan) for the Hunter Valley Operations (HVO) North.

The EPA has reviewed the following draft Plan which was prepared to address the requirement under condition 6A of development consent DA450-10-2003:

- *Hunter Valley Operations Greenhouse Gas Mitigation Plan* – Document Number HVOOC-748212775-24

The EPA notes that the draft Plan listed the EPA's draft [Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements \(consultation draft\)](#) under Section 11.1 – Reference Information. We highlight that the EPA has also released the [Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines \(consultation draft\)](#), which you can consider as an additional reference when finalising the GHG Mitigation Plan for HVO North.

Recommendations:

The EPA recommends that the mitigation measures in the [Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines \(consultation draft\)](#) be considered when finalising the GHG Mitigation Plan for HVO North. This is to ensure the mitigation plan is reflective of the best GHG mitigation practices in coal industry. Other recommendations are listed below for your consideration.

1. Include clarification on the context and purpose of this Plan

This Plan can be clearer by including its purpose and context in relation to:

- o MOD 8 (HVO North – West Pit Extension of Time)
- o The broader HVO South and HVO North Open Cut Coal Continuation Projects (the 'proposed HVO Continuation Project')

NSW Environment Protection Authority

As the environmental steward and regulator of our State we are committed to a sustainable future. Join us on our mission to protect tomorrow together.

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2. Consider consistency with the commitments made in the proposed HVO Continuation Project

The EPA understands that HVO is operated as a single integrated complex and it is intended to have one consolidated GHG mitigation plan for the entire complex. It is then recommended that the final GHG Mitigation Plan for HVO North is aligned with the commitments made in the EIS and GHG Assessment prepared for the proposed HVO Continuation Project.

3. Consider the relevant greenhouse gas mitigation measures included in the EPA's Climate Change Mitigation and Adaptation Plans: Proposed Mitigation Requirements (consultation draft)

The EPA recommends including the following content since the draft Plan referred to the EPA's draft Climate Change Mitigation and Adaptation Plan guidance material:

- Greenhouse gas emissions inventory: including sources, quantities and projections of Scope 1 and 2 emissions (and optionally Scope 3) over a 10-year horizon
- Mitigation measures: expanding on current and future mitigation strategies, in line with the GHG assessment prepared for the proposed HVO Continuation Project. Further, the EPA's Proposed Greenhouse Gas Mitigation Guide for NSW Coal Mines can also be considered as a reference when finalising this Plan.
- GHG emissions goals: clarifying how the Plan's goals align with both regulatory targets (e.g., Safeguard Mechanism) and the more ambitious targets outlined in the GHG assessment prepared for the HVO Continuation Project.
- Forward-looking emissions estimates: noting that EPA is likely to expect licensees to submit 10-year emissions forecast every three years.

4. Check the conditions listed in Chapter 16 (Appendix E – Mapping to HVO South Conditions)

EPA notes that Table 3 within Chapter 16 (Appendix E – Mapping to HVO South Conditions) currently references Condition 53 of Development Consent PA 06_0261. However, EPA recommends that the consent holder checks if HVO South Condition 54, which relates to the Greenhouse and Energy Efficiency Plan for the project, should also be included in this table.

Whilst the draft Plan broadly follows the structure outlined in the EPA's draft CCMAP guidance, the Plan would benefit if additional details above are to be included. We recommend that the Plan be revised to ensure alignment with the regulatory requirements and the proposed HVO Continuation Project's commitments.

If you have any questions about this request, please contact Nick Vlasoff via email at environmentprotection.planning@epa.nsw.gov.au.

Yours sincerely

07/11/2025

VICTORIA LEE
Unit Head – Environment Protection Planning
Environment Protection Authority



HVO North - West Pit Consent 2003 - Greenhouse Gas Mitigation Plan



no-reply@majorprojects.planning.nsw.

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To **#AU - Hunter Valley Operations - Environment and Community**
 Cc Jack.Turner@planning.nsw.gov.au;
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The Department has no comments on the document at this time.

If you have any enquiries, please contact Jack Turner on 02 9995 5387 /at Jack.Turner@planning.nsw.gov.au.

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