
Appendix I

Supplementary economic analysis and issues
response

Hunter Valley Operations Response to Submissions

EMM Consulting Pty Limited

06 November 2023

Release notice

Ernst & Young ("EY") was engaged on the instructions of the EMM Consulting Pty Limited ("Client") to perform an economic impact assessment in relation to the proposed Hunter Valley Operations Continuation Project ("Project"), in accordance with the engagement agreement dated March 2020, including the General Terms and Conditions ("the Engagement Agreement").

The results of Ernst & Young's work, including the assumptions and qualifications made in preparing the report, are set out in Ernst & Young's report dated 15 December 2022 ("Report"). The Report should be read in its entirety including the release notice, the applicable scope of the work and any limitations. This document specifically seeks to clarify the basis of analysis undertaken in the Report in response to written submissions received. A reference to the Report includes any part of the Report. No further work has been undertaken by Ernst & Young since the date of the Report to update it.

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06 November 2023

Response to written submissions on the Economic Impact Assessment of the Hunter Valley Operations Continuation Project

Dear Thomas Frankham,

EY was engaged to undertake an independent economic impact assessment of the proposed Hunter Valley Operations Continuation Project (“the Report”). The Report was developed in accordance with the Project Secretary’s Environmental Assessment Requirements (SEARs), which state that an Environmental Impact Assessment requires an economic assessment of the Project that abides by the Guidelines for the economic assessment of mining and coal seam gas proposals, as published by the NSW government in December 2015 (“the Guidelines”) and the Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (“the Technical Notes”) published in April 2018. This document specifically seeks to clarify the basis of analysis undertaken in the Report in response to written submissions received. A reference to the Report includes any part of the Report. No further work has been undertaken by Ernst & Young since the date of the Report to update it.

The Report was completed on 15 December 2022 with annexures detailing the methodology behind estimating worker and supplier benefits. The Report was included as Appendix W of the Hunter Valley Operations Continuation Project Environmental Impact Statement (EIS) (EMM 2022).

The Australian Institute (TAI) and several other parties provided written submissions on the proposed Hunter Valley Operations Continuation Project (“the Project”) which were received during the public exhibition of the EIS for Project on 27 February 2023.

This document (“the Document”), with the agreement dated for the 21 April 2023, outlines the response to address comments made in the written submissions, summarising and supporting key aspects of the cost benefit analysis methodology used in the Report whilst directly addressing the uncertainty issue raised by TAI. This is consistent with our role in this process of providing an independent assessment of the costs and benefits of the Project consistent with the Guidelines based on data and assumptions outlined in our Report.¹ The issues covered in this document relate to the treatment of:

- ▶ Worker benefits
- ▶ Supplier benefits
- ▶ Greenhouse gas emissions

¹ The Report and accompanying annexures can be accessed here:
<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-11826621%2120221219T113431.191%20GMT>

- ▶ Taxation and broader financial benefits
- ▶ Public responses to the broader methodology applied for the analysis

1.1 Preliminary comments

Before addressing the issues noted above in detail, there are some broad comments for the Department of Planning and Environment (DPE) as the evaluating authority, to consider in relation to the analysis we have produced.

First, we believe it is important to recognise the relatively unique role that the economic cost benefit analysis (CBA) plays in the assessment and determination process of new mining projects. It is common for government to undertake CBA when considering public expenditures such as large infrastructure developments or programs. Embedded in that process is a level of conservatism to addresses the uncertainties inherent and potential biases in CBA, particularly where the proponent is not putting their own capital at risk. However, in this case, the conservatism that is often inherent in government CBA is applied to the use of private funding, and as such, the primary bearer of the risk of the Project is the proponent rather than government. Given this unique relationship, this has resulted in the development of the Guidelines, which are used to evaluate proposals that require the expenditure of private funds.

Second, and related to the nature of the analysis discussed above, the Guidelines have been developed explicitly to account for the kinds of benefits that are more appropriate for decision makers to consider when accounting for private investment. In this context, the CBA outlined in the Guidelines is aimed at assessing the economic welfare benefits to New South Wales, including areas that might not be standard when assessing government expenditure programs such as worker and supplier benefits. In our view, including such welfare benefits ensures that the potentially significant downstream impacts of a private sector investment in a region receives due consideration, preventing the potential policy failures that may arise from the government refusing a project that would deliver positive benefits due to its CBA adopting conservative assumptions.

Third, by recognising a range of potential beneficiaries from the Project (at the State and local levels), the Guidelines are effectively identifying key stakeholders in the Project. What we observe in much of the commentary around the Report is calls for the exclusion of elements, such as the benefits to workers, of our analysis based on obscure economic arguments that have little basis in common sense. For example, to claim that the approximately 1,118 average direct employees employed over the period of the Project, who will earn a significant wage premium compared with those earning the reservation wage (approx. 1.75x more, based on income analysis in the State by occupation and industry) in New South Wales, should be excluded from the assessment of benefits to the State can only be justified under the most restrictive of circumstances.

Fourth, given the inherent conservatism of the CBA process and potential policy failure mentioned above, we would urge the evaluating authority to consider the appropriate burden of proof in relation to this application. Our assumptions and arguments are clearly laid out and sensitivity analysis has been undertaken to address key uncertainties and criticisms, as is required by the Guidelines. Much of the criticisms made of our analysis are simply not presented to the same standard.

1.2 Worker benefits

TAI writes:

Indirect benefit to workers are overstated, estimated by EY at over \$1 billion. This calculation relies on an assumption that workers on the project would otherwise work outside of the mining industry in lower-paying jobs. This is contrary to the usual economic assumption that inputs such as labour are priced at their opportunity cost. This is why NSW guidelines suggest a starting assumption of zero worker benefits.

Firstly, TAI claims that the Guidelines suggest a starting assumption of zero worker benefits. However, this has been selectively quoted without providing any additional context behind the statement. Task 6.2 of the Guidelines also states that that:

Although a zero-wage premium is a useful starting assumption, the appropriateness of this assumption must be assessed on a case-by-case basis. **This is because benefits to workers can be one of the major economic benefits from a project.**

Evidently, the Guidelines are explicit in their allowance for the use of worker benefits as part of the CBA, given that the reasons for their inclusion are adequately explained and evidence is presented to support the valuation that we adopted in the Report. Our arguments for the appropriate inclusion of worker benefits are stated in detail in the Report in Section 2.6.2 and Appendix C.2, where we have explicitly addressed several key criticisms that are often made against their inclusion.

Secondly, TAI specifically claims that relying on the assumption that workers on the Project would otherwise work outside of the mining industry in lower-paying jobs is contrary to the usual economic assumption that inputs such as labour costs are priced at their opportunity cost. Task 6.2 (and specifically Chart 3.8) of the Guidelines suggests that the basis for estimating the benefits that accrue to workers in a mine is based on the following principles:

- ▶ Wages earned in the mine.
- ▶ Minus the wage difference due to skills and the disutility of working in the mining industry.
- ▶ Minus the opportunity cost of working in the non-mining sector.

In Appendix C, we specifically address the argument that differences in the minimum wage required in non-mining sectors and mining sectors are attributed to skills and disutility to work in the mining industry. A major criticism against worker benefit estimations is that miners possess specialised skills that mean that, should approval for a project not be granted, workers would end up employed elsewhere in the mining industry. Alternatively, if the Project was approved, workers would be derived from the mining sector, with workers in both scenarios earning the average mining wage. This would result in labour's opportunity cost being zero and there consequently being no worker benefits. While this argument may be supported in circumstances where employment in the NSW coal mining sector is projected to grow over the life of the Project, as discussed in Appendix C.2.1 of the Report, the NSW Government's own projections are for employment in the coal mining sector to remain flat and then decline over the life of the Project, meaning displaced workers would be required to find work elsewhere in other industries in NSW or outside of NSW.

Chapter 26 of the Environmental Impact Statement (EIS) 9EMM 2022) for the Project provides an overview of the approved coal production in the Hunter Valley over the life of the Project, which also demonstrates this decline. As a result, it is expected that employees may not be able to find a similar job at the same wage rate. As such, the average mining wage cannot be used as a reservation wage unless there is evidence of additional demand for mining employment in NSW that would enable displaced workers to be employed in the mining sector.

Additionally, Appendix C.2.3 indicates an observed movement of workers between the mining industry and other professions which have a lower average wage, but similar skill requirements. Appendix C.2.4 and Appendix C.2.5 also respectively indicate that there are very minimal differences in the level of experience and education between those employed in the mining sector, and those employed in comparable industries. All this evidence holistically suggests that skill requirements do not drive the wage premium in the mining sector.

Another major criticism assigns part of the wage premium paid to mine workers to compensate for an unpleasant job or disutility of working in a mine. In Section 2.6.2 of the Report, we discount these arguments, rather focussing on the evidence to suggest that the wage premium paid to miners is more a function of the application of capital to generate higher returns. Furthermore, no credible evidence has been proffered to establish that working in a modern open cut coal mine in the Hunter Valley is considerably more unpleasant than working in any other professions which receive an average wage (which is the appropriate benchmark in this case). In addition, the employment assumptions used in the Report are based on workers in NSW transferring from non-mining employment to employment in the mine. As such, it is not the absolute level of

unpleasantness associated with working in the mine, rather the relative unpleasantness of a mining job to other forms of work. As outlined in Appendix C.2.6, no evidence has been presented that establishes that working in a coal mine in NSW is any more or less unpleasant than other forms of employment.

Given that we argue that there are no wage differences attributed to skills or disutility, these become null and void in the calculation of worker benefits.

In determining opportunity cost of working in the non-mining sector, Section 2.6.2 of the Report indicates that we have used the weighted average of the wages paid to occupations not in the mining sector in NSW. We additionally adjust this upwards to account for the differential in hours worked between those in the coal mining sector and those employed in other industries. This remains consistent with the previously aforementioned notion that should the Project not go ahead, those workers who would have been employed by the Project would instead find alternative work at the average wage afforded to their occupation in NSW.

Overall, our analysis serves to show that, when comparing jobs on a like for like basis (i.e., taking hours worked, education, age and occupation into account), people employed in the mining sector earn more. Additionally, the Centre for International Economics (CIE) in its assessment of the impact of the benefits of the expansion of the mining sector in Australia, indicate increased income and real wages, while reducing the unemployment rate (against a counterfactual that has no/limited mining expansion).²

As outlined in the Report, the Project is expected to employ a significant number of workers, continuing to provide an annual average of 1,118 full time equivalent (FTE) incremental positions over the lifetime of the Project. The net present value of total wages paid is around \$2,378.6 million over the life of the Project (i.e., to 2050). Therefore, net worker benefits in accordance with the Guidelines, are calculated by subtracting the weighted average of the wages paid to occupations not in the mining sector in NSW, for all of these employees. This results in worker benefits of approximately \$1,023.8 million (around 43% of total wages paid). In doing so, we have appropriately priced the cost of labour at its opportunity cost, rendering TAI's claim as invalid. Furthermore, TAI in seeking to have these benefits excluded from the analysis, have failed to match the same burden of proof in their claims and have not provided sufficient evidence or reasoning to do so. TAI has also neglected to comment on our arguments for their inclusion as explored in Appendix C.2.

An alternative way for governments to assess the impacts of large projects is by using Computable General Equilibrium (CGE) modelling. A CGE model is based on a more detailed representation of the economy, including the complex interactions between different sectors, such as labour market displacement associated with the increased demand associated with the Project, and takes into account international ownership (which results in the expropriation of profits). The quantification of these benefits is supported by both the LEA and the CGE modelling contained in the Report and is consistent with the CIE assessment regarding the benefits and associated impacts of Australia's mining sector expansion.³

To the extent that there are uncertainties associated with employee benefits, these uncertainties are considered in the sensitivity analysis required by the Guidelines. The systematic sensitivity analysis on worker benefits reduces the total benefits to workers by between 25 and up to 75% to test the impacts of a substantial change in benefits related to the Project. In all instances, analysis indicates significant positive indirect benefits associated with the additional direct employment associated with the Project.

² CIE, (2021), Estimating the economic benefits of mining expansion and further productivity reforms

³ CIE, (2021), Estimating the economic benefits of mining expansion and further productivity reforms,

1.3 Supplier benefits

TAI writes that:

Indirect benefit to suppliers are overstated, estimated by EY at \$1.7 billion. This calculation relies on the assumption that in the absence of the Project, businesses in the mining supply chain would be unable to achieve the same sales at the same prices. Given the largely imported nature of mining equipment and fossil fuel inputs, combined with the likely major expansions of other parts of the mining industry in the coming decades, this assumption is unconservative and contrary to usual economic practice.

Broadly speaking, there are three major issues with the assertion from TAI. Firstly, TAI neglect to provide relevant evidence when commenting on the nature of the mining industry. TAI mentions the “largely imported nature of mining equipment and fossil fuel inputs”, however, this is a generalised statement with no further context provided, and can be further considered an inaccurate representation of HVO’s operations given that 75% of the Complex’s inputs are supplied from NSW-based businesses, with no indication that this would change with the Project.

Furthermore, there is also no evidence to suggest that there are likely to be any major mining expansions in the Hunter Valley region. Secondly, if we take the conservative assumption that the supply of inputs are held constant between the base case and project case, the continuation of the Project and the net positive influence of demand will still increase the prices of businesses in the mining supply chain regardless. Therefore, it is expected that suppliers should be able to achieve an increased surplus relative to the situation that the Project does not proceed.

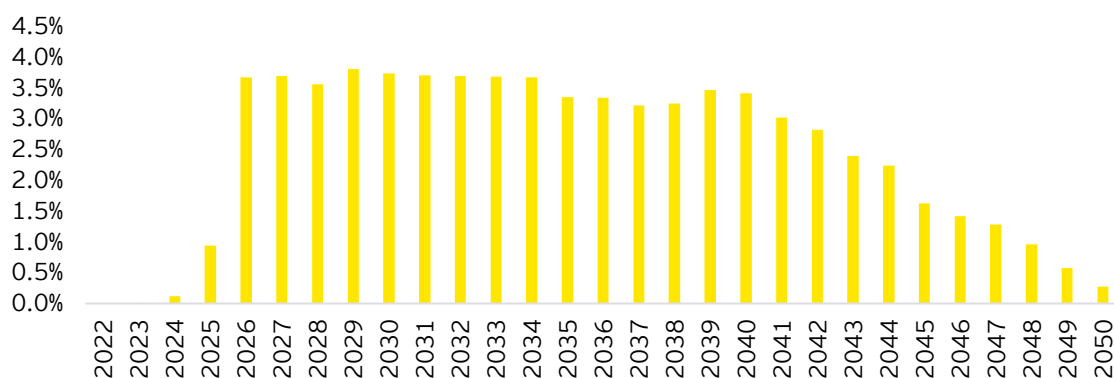
Third, a key benefit of private sector investment is through the establishment and continuation of supply chain networks that act to disperse the economic benefits of projects to a myriad of businesses, with these businesses in turn supporting increased local economic activity. The CIE report prepared for the Minerals Council of Australia demonstrates the positive impact of the expansion of the mining sector to Australian gross value added (GVA), which is partially driven by spending on suppliers supporting the ongoing development and operations of the mining sector.⁴

Simply, our analysis takes the amount of spending on goods and services that is aimed at NSW suppliers under the Project, equivalent to \$8,502.5 million in net present value terms as highlighted in the report, and applies a simple metric of gross operating surplus from our in-house regional input output model (around 20%) to this figure to derive the increase in producer surplus. This yields a benefit of around \$1,715.8 million in net present value terms.⁵ Also, as shown in Figure 1, total spending on suppliers is expected to make up a significant portion of expected Gross Regional Product (GRP) for the Lower Hunter, under base case assumptions derived from EY’s in-house CGE model. These results are also corroborated with the CGE analysis as discussed below.

⁴ CIE, (May 2021), *Estimating the economic benefits of mining expansion and further productivity reforms*

⁵ Noting that Oxford Economics, in their Peer Review for the Economic Impact Assessment for the Tahmoor South Coal Project concludes that such an approach is considered reasonable, given data limitations.

Figure 1: Total Spending on suppliers (net of labour costs) as a portion of GRP under base case CGE assumptions from 2022 to 2050 (%)



Source: EY analysis of HVO Data

This approach is consistent with a common-sense proposition that businesses selling more goods and services (relative to the Project not occurring) will make more profits associated with those sales. This basic proposition should be preferred over the very restrictive interpretation of supplier benefits applied by TAI’s criticisms.

The Guidelines are explicit in their allowance for the use of supplier benefits as part of the CBA. The Report includes additional analysis and justification for the calculated supplier benefits to the NSW economy. To the extent that there are uncertainties associated with supplier benefits, these uncertainties are both considered in the sensitivity analysis required by the Guidelines and further tested where supplier benefits are reduced by between 25 and 75%. In all instances, the results indicate significant positive indirect benefits associated with the additional sales of goods and services required for the operation of the Project.

The CGE analysis in the Report corroborates the results of the CBA and LEA components of the economic impact assessment required by the Guidelines, but also demonstrates the conservative nature of the assessment under the framework of the Guidelines. In the Lower Hunter region, the Project is expected to increase GRP by \$11,981 million in Net Present Value terms and provide significant net benefits to NSW and Australia. Over the course of the Project, this represents an average 7% increase in GRP to Lower Hunter, above the base case.

1.4 Greenhouse Gas Emissions

There are two broad criticisms provided by TAI with respect to the greenhouse gas emission externality. Firstly, TAI writes that:

The cost of greenhouse gas emissions is understated, estimated by EY at just \$1.3 million. EY use a low estimate of the social cost of carbon, with a mid-estimate of \$75/t, apparently based partly on estimates by the USA EPA. EY neglect to mention that the USA EPA has more recently proposed a central value of US\$190/t, approximately AUD\$278/t.

TAI has claimed that we have neglected to use the US Environmental Protection Agency’s (US EPA) revised values for the social cost of carbon, hence understating the cost of greenhouse gas emissions attributed to the Project. The US EPA proposed revised values in September 2022⁶ however at the time of writing, these figures have not been formally adopted and are potentially subject to revision.

⁶ EPA, (September 2022), *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*

Table 1 recreates the price trajectory using the revised carbon price figures from the US EPA in real AUD and compares the figures to the base case cost of carbon prices (i.e., previous US EPA mid-price trajectory estimates) used in the analysis in the Report.

Emission Year	Low	Mid	High	Base Case Price (As reported in the EIA)
2020	\$163.9	\$283.0	\$491.6	\$76.0
2025	\$163.4	\$274.5	\$470.6	\$73.2
2030	\$186.7	\$306.7	\$520.0	\$82.7
2035	\$206.7	\$340.0	\$553.3	\$89.3
2040	\$226.7	\$373.3	\$586.7	\$97.3
2045	\$253.3	\$406.7	\$626.7	\$105.3
2050	\$280.0	\$440.0	\$666.7	\$113.3

Source: US EPA, EY Analysis

With respect to TAI's comments, further sensitivities using the EPA's revised figures have been conducted. Table 2 shows that net benefits of the Project relative to the base case are robust and remain positive under each price trajectory.

	Low Price Trajectory	Mid Price Trajectory	High Price Trajectory	Base Case (As reported in the EIS)
Benefits				
Direct Benefits	\$2,122.5	\$2,122.5	\$2,122.5	\$2,122.5
Indirect Benefits	\$2,739.6	\$2,739.6	\$2,739.6	\$2,739.6
Total Benefits	4,862.1	4,862.1	4,862.1	4,862.1
Indirect Incremental Costs				
Total Greenhouse Gas Costs (Global cost)	\$2,728.5	\$4,486.0	\$7,342.9	\$1,186.1
Apportionment to NSW	0.11%	0.11%	0.11%	0.11%
Total Greenhouse Gas Emissions (NSW)	\$3.0	\$4.9	\$8.1	\$1.3
Other Indirect Incremental Costs	\$12.4	\$12.4	\$12.4	\$12.4
Total Indirect Incremental Costs	\$15.3	\$17.2	\$20.4	\$13.6
Net Benefit	\$4,846.8	\$4,844.9	\$4,841.7	\$4,848.5

Source: EY analysis of HVO Inputs

It should also be noted that the Technical note to NSW Government Guide to Cost-Benefit Analysis TPG23-08 Table 1 provides carbon emission values in 2022 dollars that are far below the US EPA's revised figures above, indicating that we have used far more conservative estimates in this

⁷ EPA, (September 2022), *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*

⁸ EPA, (September 2022), *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*

response.⁹ Evidently, the results are similar regardless of the price trajectory chosen. This is due to the percentage of greenhouse gas costs being apportioned to NSW being 0.11% and remaining consistent between the three presented price trajectories. The reasoning underpinning the decision to use this percentage is explained further below in this response.

TAI writes a series of further criticisms with regards to greenhouse gas emissions and the apportionment method. Each of TAI's points are addressed below.

EY understate the climate impacts of the project is by multiplying its (already low) estimate of climate damage costs by the NSW share of world population.

It is inconsistent with the carbon budgeting approach that guides global efforts to avoid climate change and which underpins relevant policies such as NSW's net zero emissions goal and the Paris Agreement.

The NSW Government's Climate Change Policy Framework includes a goal to achieve an emission reductions of 50% by 2030 and net zero by 2050, with NSW being in the process of legislating these targets. Whilst there is a stated emissions goal that will be legislated, the Framework doesn't provide a carbon budgeting approach that reflects their view on the potential social damage costs to NSW. Therefore, to say that our approach remains inconsistent with the approach that underpins relevant policies such as the NSW's net zero emissions goal is invalid. Furthermore, it is EY's position that in the development of a CBA, the methodology shall be underpinned by the Guidelines and not the approach or framework that may drive other efforts globally, and we provide reasoning as to how we have ensured this is the case further below.

Furthermore, under the new Commonwealth Safeguard Mechanism (SGM) requirements, as legislated under the *Climate Change Act 2022*, HVO will have a declining baseline which will result in significant reductions in net emissions to 2050. To deliver the SGM budget consistent with Australia's emissions reduction targets, the Commonwealth Government has set a decline rate for Safeguard facilities' baselines that reflects the following considerations:

- ▶ This decline rate reflects the final policy design of the SGM reforms and projected emissions in the absence of the reforms, based on Australia's Emissions Projections 2022, which includes expected emissions from existing and new Safeguard facilities. A reserve has also been built into baseline decline rate calculations to ensure the 2030 target is met. The reserve accounts for any higher-than-expected production growth at new and existing facilities and any higher-than-expected use of the trade exposed baseline adjustments.

Cumulative gross Scope 1 and 2 emissions for the Project total approximately 29.6 MtCO₂-e. However, due to the Safeguard Mechanism and the declining baseline, cumulative net emissions from the Project will be significantly lower at approximately 17.9 MtCO₂-e. The difference of 11.7 MtCO₂-e due to the Safeguard Mechanism reforms reflects either Australian Carbon Credit Units (ACCUs) or Safeguard Mechanism Credit Units (SMCs) that HVO will need to purchase and surrender, or abatement activities that HVO will implement, whichever is cost effective and practical at the time.

The development of the Project incorporates measures to mitigate and reduce the GHG emissions produced by HVO. These measures will be undertaken every 3 years¹⁰ and include:

- ▶ Reviewing the availability and feasibility of fuel alternatives such as hydrogen and biofuel to replace diesel;
- ▶ Considering the transition of the Project's operations to utilise an electric powered fleet should the technology sufficiently advance and further information becomes available, and; and/or

⁹ NSW Treasury, (February 2023), *Technical note to NSW Government Guide to Cost-Benefit Analysis TPG23-08 Carbon Value in cost-benefit analysis*

¹⁰ HVO, (2023), *HVO Submissions Report - Climate and Atmospheric Science*

- ▶ Conducting a trial of gas pre-drainage in identified areas where pre-drainage may be effective

In effect, the Project's expected adherence to the Safeguard Mechanism is consistent with global efforts to reduce greenhouse gas emissions and results in an explicit accounting of the emissions related to the Project in the NSW governments efforts to achieve its Net Zero emissions target. Moreover, the impacts of the Safeguard Mechanism on the overall Project economics have been included as an additional piece analysis within the EIS.

1. Climate impacts are complex and not likely to be distributed in line with population.

The methodology used to apportion greenhouse emissions costs to the Project are consistent with the Guidelines. The Guidelines state that the analysis of the costs and benefits of a project "should be focused on the collective public interest of households in NSW". Given that GHG emissions are a global externality, the value of these externalities should be apportioned by the share of the NSW collective households relative to the rest of the world, ensuring that the analysis captures the relevant impact as per the Guidelines. For this reason, 0.11% apportionment rate is used in the analysis above. As such, the potential distribution of global impacts to other populations, than those outside of NSW is out of the scope of the Guidelines.

Furthermore, any other approach to apportioning costs to the Project would result in inconsistency with the way that the benefits have been apportioned. Profits from these projects are apportioned to capital owners (many foreign) and corporate taxes are allocated to NSW from an Australia-wide pool. Should the full costs of the externalities be assigned to the Project, even simply under the assumption that the totality of these costs should be borne by Australians, then the benefits of a project should also be treated the same way. For example, benefits such a company income tax would no longer be attributed to the proportion of NSW residents to Australia. In light of this, the decision to apportion costs arising from the Project based on the ratio between the population of NSW and the world is consistent with the way benefits have been apportioned.

Internationally, the treatment of GHG externalities has also become a matter for the attention of academics.¹¹ Gayer and Viscusi argue that in apportioning the social costs (or benefits) of GHG increases (reductions) to those outside of the jurisdiction of a project would be inconsistent with the preferences of the local jurisdiction, who would be bearing the cost of such Projects. In effect, global GHG impacts have no special claim in welfare economics and CBA and when undertaking a CBA from a NSW or Australian perspective, these costs should therefore be apportioned in a consistent way with all other costs and benefits.

- 2. It serves to obscure that other jurisdictions bear a large cost of the project and that if these costs are included in the assessment, the costs of the project are likely to outweigh its benefits. This approach sees NSW essentially free ride on a cost borne by the rest of the world. This point should be made clear to decision makers and other readers.*

Output 2 of the Greenhouse Gas section of the Technical Notes states that the value of greenhouse gas externalities, in particular Scope 1 and 2 emissions, must be limited to the impact on NSW only to be consistent with the Guidelines and how all other costs/benefits are measured in the CBA. As such, the approach to apportioning costs utilised in the Report is consistent with the Guidelines and broader cost-benefit analysis methodologies. However, section 2.7.1.6 in the Report outlines the estimated Scope 1 and 2 emissions costs, and in doing so, explicitly reports the total global impacts of greenhouse gas emissions in NPV terms, should DPE or a reader wish to ascertain this.

Output 2 of the Greenhouse Gas section of the Technical Notes also states that a sensitivity analysis on anticipated project GHG emissions output (Scope 1 and 2) must be undertaken at carbon prices below and above the central estimate price. This has been carried out in Table 21 of the Report, using alternative methods of apportionment where Australia bears the full cost of the

¹¹ Gayer, T. and Viscusi, W.K. (2014) Determining the Proper Scope of Climate Change Benefits, Working Paper of The George Washington University Regulatory Studies Centre, The George Washington University, Washington DC

greenhouse gas externality. Given that this sensitivity analysis makes the GHG emissions an Australian externality, the value of the externality is apportioned by the share of the NSW collective households relative to Australia. For this reason, a 32.7% apportionment rate is used in the analysis.

This analysis is replicated in Table 3 below, using the updated US EPA Social Cost of Carbon figures as outlined in Table 1, in particular, the 'Mid Price' trajectory. In this case, the total net benefits to NSW remain positive.

	Mid Price Trajectory
Benefits	
Direct Benefits	\$2,122.5
Indirect Benefits	\$2,739.6
Total Benefits	4,862.1
Indirect Incremental Costs	
Total Greenhouse Gas Costs (Costs to Australia)	\$4,486.0
Apportionment to NSW	32.70%
Greenhouse Gas Emissions (NSW)	\$1,466.9
Other Indirect Incremental Costs	\$12.4
Total Indirect Incremental Costs	1,479.2
Net Benefit	\$3,382.9

Source: EY analysis of HVO Inputs, US EPA

This illustrates that our methodology is consistent with the Guidelines, and regardless of the apportionment method utilised, the total net benefits to NSW remain positive.

1.5 Yancoal Taxation and financial benefits

TAI writes:

Company tax payments are out of all proportion with Australian Tax Office (ATO) data. Proponent Yancoal has never paid company tax in Australia, according to the eight years of data published by the ATO.

The premise of the CBA is based on a consideration of only the direct project costs relative to the case where the Project is not approved. The argument made by TAI in critiquing the likelihood of actual taxes paid through the Project, however, is methodologically inconsistent with the Guidelines, and is questionable. The fundamental basis of the CBA compares a project case to a base case where the Project does not exist. Assessing broader company tax liabilities is inconsistent with this approach.

In extending this argument, while liabilities or tax payments may be offset by other assessed losses in larger firms, these are irrelevant for the assessment of the merits of the Project. Whether taxes are paid or used to offset other losses is immaterial, as the actual operation of the Project relative to the base case (where no project exists) means that these tax liabilities will be created and should be recognised as part of the benefits of the Project.

¹² EPA, (September 2022), *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*

Lastly, as part of the conclusion, TAI writes that:

The uncertain future of the coal market means that the financial benefits of the Project are likely overstated by EY.

This comment by TAI fails to mention that any Net Producer Surplus is not assumed to flow towards NSW, despite both Glencore and Yancoal being publicly traded companies. It is not inconceivable that there is some proportion of the population that owns shares in each of these operations and resides within NSW. This is an inherently conservative assumption, given that Yancoal - part owner of the Project - is listed on the Australian Stock Exchange. This may also be the case for Glencore, which is listed on the London Stock Exchange and remains an option for investment either directly or indirectly through diversified ETFs.

Therefore, it is quite likely that there would be some proportion of net producer surplus that could be attributed to NSW, however given the uncertainties around ascertaining this level of ownership, it is conservatively assumed that 0% of the net producer surplus is attributed to NSW. This is an inherently conservative assumption and can potentially have significant effects on the overall financial benefits of the Project.

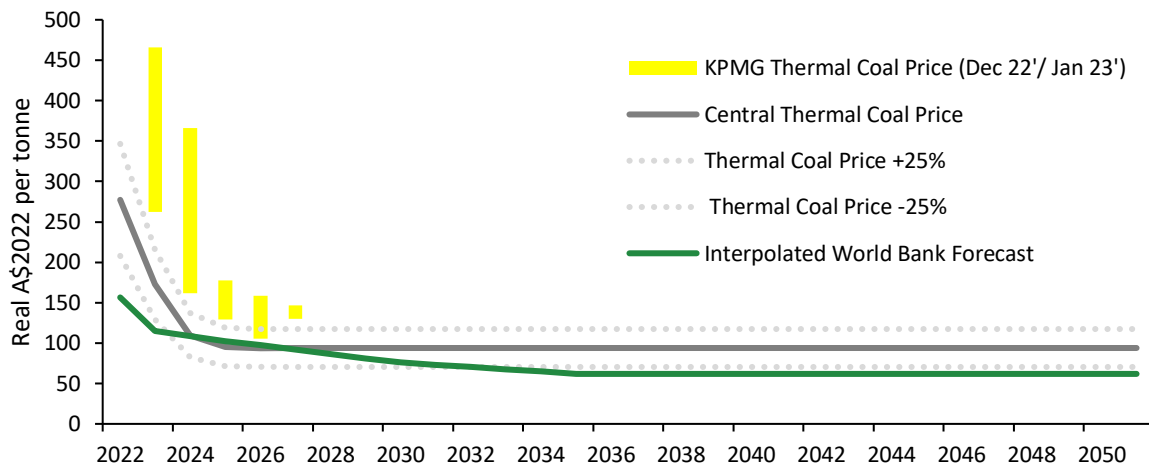
Secondly, in relation to coal market demand, the EIS prepared for the Project (EMM 2022) provides a detailed discussion on the justification of the Project including the long-term demand for coal (refer to Section 2.1.3 of the EIS).

In the case of coal prices, what has been observed in the market is sustained strength in the market, despite the negative outlooks on the strength of coal prices. The Project is expected to produce around 497.3 Mt of product coal, comprised of approximately 59 Mt of high-quality metallurgical coal and 438 Mt of thermal coal. The subsequent analysis for the coal price outlook, in response to the potential overstatement of benefits focuses on thermal coal outlooks, as these represent 88% the expected production profile of the Project. However, forecasts also suggest a stable growth profile over the next five years for metallurgical coal exports, suggesting demand for metallurgical coal may continue to show signs of strength.¹³

Figure 2 shows the expected price profile for thermal coal in real Australian dollars, which are compared with updated consensus forecasts from KPMG, from the December 2022/January 2023 report. The most recent consensus forecasts suggest that the current prices used within the CBA modelling may be inherently conservative, however the prices remain broadly in line with long term forecasts, such as those generated by the World Bank. It is noted however, that the World Bank forecasts only until 2035.

¹³ DISER, (March 2023), Resources and Energy Quarterly

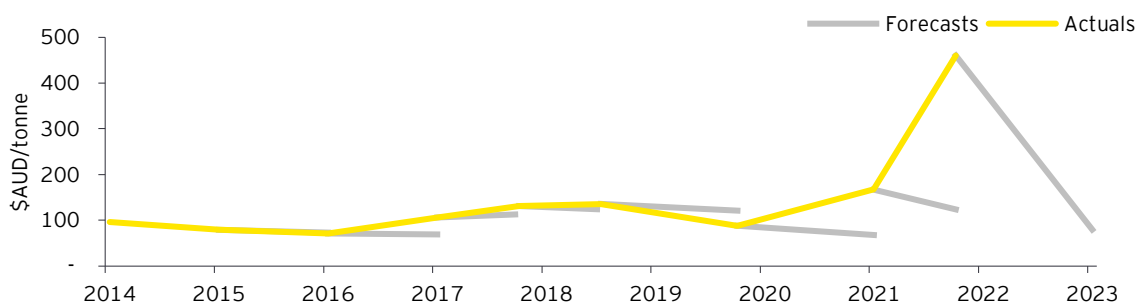
Figure 2: Thermal Coal Price Forecasts from 2022 to 2051 (Real \$A2022/tonne)¹⁴



Source: World Bank, KPMG, EY Analysis

Providing further justification for the use of EY’s price forecasts, is the fact that Commonwealth forecasts have historically overestimated the extent and speed at which coal prices revert to their long-term mean. As evident in Figure 3, since 2020, thermal coal prices have consistently surprised to the upside. Whilst recent coal price spikes can largely be explained by global supply and demand imbalances amid sanctions imposed on Russian coal exports and Europe’s fuel switching to coal¹⁵, the historically sustained elevation in thermal coal prices over long-term averages, combined with the broad range in prices tested and independent sources of forecasts used, suggests that the financial benefits of the Project is not overstated.

Figure 3: Commonwealth Budget Thermal Coal Forecast vs Actuals from 2014 to 2023



Source: Commonwealth Budgets, Hamburg institute for international economics

1.6 Public responses to the broader methodology applied for the analysis

Criticisms, such as those from TAI, also point towards the Rocky Hill decision, as part of a rationalisation for the removal of certain benefits. However, the decision itself, as noted by other economists, was one that is not without flaws and criticisms.¹⁶ Indeed, for the sake of providing a balanced criticism of the CBA, such references should also note that the decision itself is not one without broader criticisms regarding the court’s rationale and interpretation of the Guidelines and

¹⁴ Noting that the price sensitivities are the recreated from the sensitivity analysis undertaken in the Report

¹⁵ IEA (December 2022), *Coal 2022 analysis and forecasts to 2025*

¹⁶ Henry Ergas, (2022), *Absurd Rocky Hill decision tarnishes rule of law.*

economic evidence. Additionally, the Rocky Hill decision also does not explicitly account for the evolved methodology, which includes the further provision of justification for the inclusion of the benefits to workers, and further extends the analysis for the estimation of the reservation wage implemented for the estimation of the indirect benefits.

To provide a balanced discussion around the methodology, there are many instances of independent analyses on the CBA methodology utilised which have been shown in favour of the methodology applied. For example, in Emeritus Professor Jeff Bennett's review of the Mangoola Coal Continued Operations Project, it was found that "the completed EIA was of a high quality and was prepared in accordance with relevant professional standards".¹⁷ In addition, Oxford Economics stipulated that the analysis undertaken for the EIA of the amended Tahmoor South Coal Project is broadly well-researched with a reasonable basis.¹⁸ These cases highlight a general acceptance of the methodology used in the CBA analysis which have also since their publication, been innovated upon as discussed in the previous paragraph.

1.7 A final comment

The analysis presented in the economic impact assessment of the Hunter Valley Operations Continuation Project follows a logical framework in accordance with the Guidelines as required by the Project SEARs, and further confirms this through the CGE modelling assessment.

As noted above and in previous submissions for alternative projects, it is inconceivable that the Project will not result in significant economic benefits due to the additional employment and sales of goods and services required by the Project (relative to the base case of the Project not proceeding).

The calls for key components of the analysis to be excluded, in our view, should be viewed with caution. Taken to the extreme, given its foreign ownership, if the indirect benefits in the form of worker benefits and supplier benefits are not taken into consideration, the net remaining impact of the Project is measured in taxes (corporate income taxes and royalties). By default, this renders government the primary stakeholder receiving a benefit from the Project, whilst applying a much broader set of stakeholders when considering the costs of the Project. In our view, this is contrary to the framework developed in the Guidelines which aims to consider the extent of the net increase in economic activity as a result from an investment, and through this, weigh up the economy-wide costs and benefits of the investment. In this manner, the estimates of the impacts of the Project should serve to support all stakeholders in assessing the relative merits of the Project.

¹⁷Glencore, (2019), Mangoola Coal Continued Operations Project Environmental Impact Statement, accessed at: <https://www.glencore.com.au/.rest/api/v1/documents/27db5135b7e50682e9990fa9f94b8fa5/Mangoola%20Coal%20Continued%20Operations%20Project%20EIS.pdf>

¹⁸ BIS Oxford Economics, (2020), Peer review of Economic Impact Assessment - Tahmoor South Coal Project, accessed at: <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-8445%2120201218T044925.096%20GMT>

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