Narrabri Underground Mine Stage 3 Extension Project (SSD 10269)
Independent Planning Commission Public Hearing

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Preamble

This report has been prepared in response to an expert brief from the Environmental Defenders Office (EDO) on behalf of Lock the Gate.

I have read and agree to be bound by Part 31 Division 2 and the Expert Witness Code of Conduct as described in Schedule 7 of the *Uniform Civil Procedure Rules 2005* (UCPR).

Executive summary

- The approval of the Narrabri Underground Mine Stage 3 Extension Project (Project) requires that the social benefits outweigh the social costs under the NSW Government's (2015) "Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals" (NSW Guidelines).
- I make three points about the cost benefit analysis performed for the Project in relation to the carbon emission costs, the treatment of environmental offsets, and the valuation or lack thereof of other environmental, social and cultural costs.
- With regard to the carbon emission costs, the cost benefit analysis in the Economic Assessment has not included the entire amount of scope 1 and scope 2 emissions in the analysis. In the economic assessment, the total cost of carbon ($279 million) is multiplied by the New South Wales (NSW) percent of global gross domestic product to reduce the costs to $860,000 in present value terms. In my opinion, the entire global costs of scope 1 and 2 emissions should be included because under the NSW Guidelines they are all attributable to the project. This total cost increases to $546 million using a high price scenario. However, the high price scenario is well below the International Energy Agency's estimate of carbon emission prices in 2040 under plausible scenarios.
- The way that environmental offsets have been considered in the cost benefit analysis does not align with the theory of cost benefit analysis. In the economic assessment, the cost of offsets are included as a cost of the Project and because offsets are assumed to lead to no net loss in biodiversity, no indirect environmental costs are included for biodiversity, or the use of water. However, NSW citizens value the biodiversity and other environmental attributes in their current condition and location. While offsets may be good, they do not compensate citizens for the value of the biodiversity and other environmental attributes being lost. Thus, the willingness to pay to avoid the biodiversity and other environmental losses even when compensation occurs through offsets must be included as an indirect cost of the Project.
- The economic assessment has not included other environmental, social and cultural costs of the Project that may arise from society's increasing understanding that NSW and Australia have a responsibility to the world to curb greenhouse gas emissions. Citizens may have a willingness to pay to avoid the mine extension because they perceive they have a responsibility to future generations. Of course, other members of society may desire mining due to, for example, the employment it creates. However, the cost benefit analysis cannot purport to represent a conclusion on the economic efficiency of the Project without investigating this issue.
- The full accounting of greenhouse gas emissions in and of itself renders the Project economically inefficient under plausible scenarios regarding the future cost of carbon dioxide (CO_2) emissions. Additionally, as biodiversity and other environmental costs have not been calculated sufficiently, and the social and cultural costs of more mining have not been calculated at all, the Project has not been justified as economically efficient.

1. Economics and the evaluation of a mine expansion

Economics is concerned with the efficient allocation of resources. Economic resources such as land, labour and capital must be allocated in an economic system to particular industries and for particular products or services. Due to unlimited wants for goods and services, economic logic suggests that the land, labour and capital should be allocated to the goods and services most valued by society.

In the case of the Project, land around the pit top site and land subject to subsidence above the mine is being allocated by society to the project, along with the labour and financial capital needed to purchase and develop the technology and machinery and operate the mine. Other resources are also allocated to the mine such as surface and underground water resources, the atmosphere and biodiversity.

To determine whether this allocation of resources is right or efficient, economic theory suggests that the costs and benefits of any project should be assessed and that a project is efficient when the benefits outweigh the costs. This is a fundamental principle of welfare economics. The practical tool of cost benefit analysis has developed around this theory and is used throughout the world to assess government and private-sector projects, regulations and policies.

It is important to note, however, that economics is not concerned with profits, the financials of the firm, or individual returns. Economists are concerned with the social costs and benefits and analyse whether society's resources are being allocated correctly. Thus, rather than the private costs and benefits of the project to a company, the social costs and benefits must be considered.

This is important for mining projects because mining typically leads to what economists refer to as external costs or externalities. These are costs which spill over onto third parties – that is, other members of society that are not party to the selling or buying of the product or service being produced (Baumol and Oates 1988, p. 17). For example, when looking at a new or extended mine, the benefits chiefly accrue to the owners, suppliers and workers. Costs such as water, air and noise pollution are incurred by residents near the mine, and those individuals concerned with the impacts on other species or natural ecosystems. Economists stress that the private and social benefits and costs must all be considered for a project to be evaluated correctly and that the social benefits of a project must outweigh the social costs if it is to lead to an improvement in welfare.

It is on the basis of my knowledge in cost-benefit analysis that I have evaluated the Narrabri Underground Mine Project's environmental impact assessment and particularly Appendix L, the economic assessment (AnalytEcon 2020), as requested by EDO acting on behalf of Lock the Gate. I also reviewed the NSW Department of Planning and Environment's (2022) Assessment Report and Whitehaven Coal's (n.d.) Submission Report, as well as various elements of the Environmental Impact Statement.

I would like to address three points about the cost benefit analysis performed for the Project in relation to the carbon emission costs, the treatment of environmental offsets, and the valuation or lack thereof of other environmental, social and cultural costs. In my opinion, these three points are enough to conclude that the Project has not been shown to be economically efficient and should be rejected.

2. Carbon emission costs are incorrect

In the Economic Assessment, AnalytEcon (2020: 38) apportions the cost of carbon emissions to NSW on the basis of NSW's contribution to global gross domestic product. There is no justification for this approach and, in my opinion, it goes against the guidelines and recent standard practice. The NSW Government's (2015) guidelines and technical notes (Department of Planning and Environment 2018) are very clear in stating that the total environmental impact of greenhouse gas emissions that are attributable to NSW should be included. By "attributable", I take this to mean the total amount caused by NSW. The Department of Planning and Environment's (2022: xii) Assessment Report highlights this and states that the full allocation of scope 1 and 2 greenhouse gas emissions to NSW has been the norm and that allocation of all scope 1 and 2 emissions would "significantly reduce net benefits". In fact, under plausible scenarios, allocating the cost of all scope 1 and 2 emissions to NSW is enough to render the project economically inefficient for NSW. For example, the cost of greenhouse gases is $546 million under the high CO_2 price scenario but this high price is a mere A$124.84 per tonne of CO_2-e in 2044 (AnalytEcon 2020: 38-9). The International Energy Agency publishes CO_2 prices in plausible scenarios where countries meet emission reduction targets at USD 140 to USD 205 in 2040 (International Energy Agency 2021: 16-17). The coal price also falls dramatically. Under these scenarios and prices, the Project is economically inefficient.

Such a plausible scenario should be included in a sensitivity analysis. A sensitivity analysis is fundamentally about dealing with uncertainty. One of the main uncertainties is the price of coal and carbon emissions under future scenarios where the world acts to address climate change. The NSW Guidelines provide examples of sensitivity analysis but the issue is really about dealing with uncertainty. As an economist recommending a proposal to government, I would want to be very clear that if the world acts on climate change, coal prices fall, and CO_2 prices increase, the proposal would have very little benefit in terms of royalties, producer surplus or taxes in the future. It is clear too that there is evidence that renewable energy is taking over from coal as coal-fired power stations shut down earlier than expected in Australia. While the output from the Project is to be exported, we can expect changes around the world and the International Energy Agency rightly models these scenarios. It is incumbent upon the economic analyst to include these scenarios as legitimate in sensitivity analysis.

To conclude this section, I note that the price of CO_2 emissions in markets and the prediction of such prices by the International Energy Agency are not the actual social cost of carbon. In a perfectly functioning carbon emission reduction market, the price of carbon emission reductions would be equal to the marginal social cost of carbon emissions, or the marginal damages of carbon emissions, and the marginal abatement cost. Unfortunately, every carbon market in the world is compromised and the number of permits, or the cap on emissions, has little relationship to the efficient amount of carbon emissions. Instead, the cap and subsequent price of carbon is driven by pragmatic considerations such as the competitiveness of a country's export industry. Thus, the price does not equal the marginal social cost of emissions. This is acknowledged by economists. For example, see Gillespie and Bennett (2015: 348) who state that they assume the carbon price is equal to the social cost, indicating that it may or may not be. This suggests that the social costs of the Project could far exceed or indeed be less than the $546 million or any other estimate provided.

3. The treatment of offsets does not align with economic theory

The way that environmental offsets have been used in the cost benefit analysis is not in alignment with the theory of cost benefit analysis. I would like the Commission to be aware of the fact that environmental offsets are a relatively new phenomenon and to my knowledge there has not been a formal, peer-reviewed treatment of them in the theory of cost-benefit analysis. How they are treated in cost-benefit analysis is an open book and the Commission can determine how offsets are treated in regards to this mining proposal.

Cost benefit analysis is about the willingness to pay for, say, a new national park or a new bridge or road and the opportunity cost of providing that park, bridge or road. The opportunity cost is the value of the resources, such as land, labour and capital in their alternative uses. In the cost benefit analysis, biodiversity offsets are stated as being included in the costs of the Project (which reduces the producer surplus) (AnalytEcon 2020: 32) and the environmental impacts themselves are not therefore considered in the indirect costs of the Project. However, even when a mining company pays for an offset, there is still a willingness to pay to avoid the original loss of biodiversity or the potential water impacts. As such, this willingness to pay needs to be investigated and included in the indirect costs of the Project and they are likely to be substantial. They will be substantial because even though offsets may be good, they are nothing like the original. NSW citizens value the biodiversity in its original state and are willing to pay for them to be maintained even when the offset occurs.

The problem here derives from the no net loss assumption that underpins NSW's biodiversity offset policy (NSW *Biodiversity Conservation Act 2016*, Part 6, Division 2, Section 6.7). Because of the no net loss assumption, the proponent can argue that since they have offset in accordance with that policy, there is no biodiversity lost. They can also argue that they have taken the cost of offsets into account in the costs of the project and have internalised the environmental externality. However, the no net loss assumption is only ever correct in terms of biodiversity attributes and not the values or willingness to pay with regard to biodiversity. That is, even if the offset includes all the attributes of the original biodiversity, NSW citizens still value the biodiversity in its original condition and are willing to pay to avoid that loss. In addition, in reality, the no net loss assumption is debatable because the policy allows for offsets to occur by securing existing biodiversity. No, or very little, new biodiversity attributes need to be created in this situation. Thus, the willingness to pay to avoid the biodiversity and other environmental losses even when compensation occurs through offsets must be included as an indirect cost of the Project.

While offsets have not been theorised in cost benefit analysis, support for my view on this issue comes from the peer reviewed journal article by Gillespie and Bennett (2015: 348) which reports on cost benefit analysis work in the early days of its application to mining proposals in NSW. The choice modelling that was performed in three mining extension proposals included an assessment of whether offsets "were sufficient from an economic welfare perspective". That is, whether there was an additional willingness to pay to avoid the destruction and offset. Unfortunately, this can only be determined on a case-by-case basis requiring contingent choice or other methods of non-market valuation. However, in and of itself, this issue is enough to conclude that the economic assessment does not calculate all the costs of the project and therefore we cannot know whether it passes the benefit-cost test.

4. The indirect social and cultural cost has not been calculated

The cost benefit analysis in the Economic Assessment is biased in favour of the benefits of the Project because it does not calculate additional indirect costs of the Project. As mentioned above, the standard practice for treating environmental impacts has been to include mitigation and offset expenses as negatives in the calculation of producer surplus. Otherwise the willingness to pay to avoid these impacts has been ignored.

The fact that additional indirect costs are ignored is perhaps a function of the early days of cost benefit analysis and its application to mining proposals in NSW as documented in a peer-reviewed journal article by Gillespie and Bennett (2015). Gillespie Economics attempted to bring in the issue of the NSW population's willingness to pay for the boost in employment provided by mining, as well as the impact on the "social fabric" of communities due to dust and noise, which would also apply to the maintenance of agricultural industries in areas such as Narrabri. The Land and Environment Court rejected the use of the non-market valuation approach "choice modelling" as a tool for determining these willingness to pay values (Gillespie and Bennett 2015: 363-4). Choice modelling is one of a range of non-market valuation approaches that economists have developed which also includes contingent valuation methods. Simply, choice modelling allows an analyst to assess the willingness to pay for environmental and social attributes that have no market, such as pollution reduction or the survival of endangered species. While sophisticated, the methods are not without criticism and they are especially problematic when respondents to the choice modelling survey are asked to value something they are not familiar with. The analyst can provide information but it is still debatable whether respondents can really understand how the issue affects their utility function, as they would understand the impact of well-known purchases such as consumable durables or services (see Carson (2000) for a discussion of the issues, both positive and negative, surrounding contingent valuation). Perhaps due to these early rulings, economists who are employed by mining companies to carry out economic assessments have ceased trying to value the intangibles.

The NSW population's values and knowledge regarding climate change have shifted markedly since the early years of cost benefit analysis for mining projects. While some people undoubtedly still value the existence of mining and the jobs it supports, it is undeniable that many people have a very strong desire – that is, they are willing to pay – for the cessation of mining in the state and country. However, whether the population values more mining or less mining is not the issue. The point is that the economic assessment has not attempted to uncover this information. As mentioned, there may be good reason for this. The planning authorities or Courts may be sceptical of the method of choice modelling. However, the cost benefit analysis cannot purport to represent the outcome of the Project for economic efficiency without this information. For example, if residents of the 3 million dwellings in NSW are willing to pay on average just $200 in present value terms (that is, around $20 per year for the next 22 years) to stop this Project in the name of ceasing mining, the Project is not economically efficient, even given the original assumptions in the economic assessment.

It should be noted that the willingness to pay being discussed in this section is additional to the social cost of carbon or biodiversity in the previous sections. These are related but it is not double counting to determine the additional social and cultural values and willingness to pay for a cessation of mining. The social and cultural values relate to the desire of the population to act responsibly in a rapidly heating world. Again, there are certainly some people who are not willing to pay to cease mining and some who favour mining and disregard our responsibility for reducing global emissions. However, the economic assessment cannot purport to represent an argument about economic efficiency until it can determine the willingness to pay (or otherwise) for ceasing mining in the state.

5. The economic assessment has not demonstrated that the Project passes the benefit-cost test

Giving consideration to the points made in this submission, the Project cannot be argued to pass the benefit-cost test. The cost of carbon emissions has been underestimated due to the decision to apportion the costs on the basis of NSW's share of global gross domestic product. The indirect environmental costs have not been included in the cost-benefit analysis due to the application of environmental offsets, which does not align with economic theory. There has been no attempt to assess the social and cultural values surrounding the cessation of mining.

The full accounting of greenhouse gas emissions in and of itself renders the Project economically inefficient under plausible scenarios regarding the future cost of CO_2 emissions. Additionally, as biodiversity and other environmental costs have not been calculated sufficiently, and the social and cultural costs of more mining has not been calculated at all, the Project has not been justified as economically efficient.

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24 February, 2022

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Appendix A – Neil Perry's Qualifications and Experience

I am an Associate Professor of Corporate Social Responsibility and Sustainability in the School of Business at Western Sydney University where I have been employed since 2011, and a member of the Institute for Culture and Society at the University. Previously, I held an Associate Professor position at Lebanon Valley College in Pennsylvania, USA (2004-2010), a Lecturer position at La Trobe University (1997-2002), and a tutoring position at the University of Melbourne. I attained my PhD in Economics from La Trobe University in 2006 and I have also graduated with a Master of Commerce (with Honours) (University of Melbourne), a Graduate Diploma in Advanced Economics (La Trobe University), and a Bachelor of Business (University of Technology, Sydney).

My speciality is Environmental and Natural Resource Economics and I have published extensively in the field in international journals such as *Ecological Economics*, the *Journal of Economic Perspectives*, and *Wildlife Research* as well as in edited volumes published by respected publishers such as the Oxford University Press. I have 25 years of experience analysing environmental policy and the utilisation of natural resources in Australia, the USA and globally. I have led cost-benefit analysis projects for government agencies and non-profit organisations, I have qualifications in cost-benefit analysis from the Institute of Public Administration Australia, and I designed and teach the cost-benefit analysis undergraduate unit at Western Sydney University.

Staff profile:

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