Joint Expert Report for the Land Court of Queensland:

Economics

MRA050-21; EPA 051-20

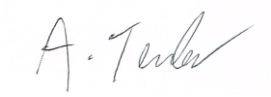
By Mr Rod Campbell and Mr Andrew Tessler

Date: 11 April 2022

Expert Agreement

We confirm:

(a) the factual matters stated in the statement are, as far as we are aware, true;
(b) we have made all enquiries that we consider are appropriate;
(c) the opinions stated in the statement are genuinely held by the experts;
(d) the statement contains references to all matters we consider significant;
(e) we understand our duty to the court and we have complied with that duty;
(f) we have read and understand the rules contained in Part 5 of the Land Court Rules 2000 (Qld), as far as they apply to the expert; and
(g) we have not received or accepted instructions to adopt or reject a particular opinion in relation to an issue in dispute in the proceeding



Mr Andrew Tessler

Mr Rod Campbell

11 April 2022

Executive Summary

Areas of agreement and disagreement on the questions posed to us are outlined below.

1. **Opine on whether the economic benefits of the proposed mine outweigh the costs and if not, why not.**

Areas of agreement:

While disagreeing on the ultimate answer to the question, we agree on the general approach to it:

- Cost benefit analysis (CBA) is the most appropriate tool to assess costs and benefits of a project, despite its limitations, some of which are discussed later in the report:
    - Focus on efficiency rather than equity.
    - Partial equilibrium – it provides little information about how the project might impact on other relevant parts of the economy, such as the markets for coal, labour or other supplies.
- Aside from key points of disagreement, we agree that our analyses (Mr Tessler's CBA and Mr Campbell's calculations in response to parts of the CBA) are technically sound and based on reasonable/appropriate data.
- CBA is an economic assessment that considers costs and benefits to the community, rather than a financial assessment that considers viability to the proponent. Financial analysis includes a range of calculations that are ultimately transfers between members of the community, which may not be included in a CBA depending on scope.
    - Because of this difference, some scenarios tested in the CBA may result in a positive NPV to the community overall, but may result in low or negative net benefits to the proponent. Such scenarios may produce a low or negative net benefit result under financial analysis.
- While the project before the court is the mine itself, from an economic perspective it is useful to consider costs and benefits of the related rail and port facilities.

Key areas of disagreement:

Probably the most important area of disagreement is on valuing greenhouse gas emissions and how this value should be incorporated into cost benefit analysis (CBA):

- Mr Tessler's CBA uses a carbon price based on offset prices that begins at $74/t. He applies that price to scope 1 and 2 emissions to calculate a greenhouse gas cost of $1.8 billion in present value terms. The scope of Mr Tessler's CBA is the Queensland community, which makes up 0.07% of world population and thus a climate cost of $1.2 million is incorporated into the CBA.
- Mr Campbell responds that offset prices do not reflect the social cost of carbon. He estimates that at a global level the economic benefits of the project would be outweighed by its relevant emissions at costs of between $72/t and $145/t, which is within estimated ranges and some government guidelines. In his view, reducing climate cost estimates based on population is inappropriate because it is contrary to the carbon budgeting approach that underlies key climate policies and results in the non-counting of large climate impacts.

Materiality

The areas of disagreement are material to our conclusions

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler
If the court found that the costs of the mine outweighed the benefits then the Project would not record a positive economic result. In principle, there may however be other reasons for proceeding (e.g. employment or skills development).
Mr Campbell
If the court accepts Mr Tessler's approach and conclusion of net benefits from the project, it is likely that a large climate cost is still incurred, but is transferred onto the rest of Australia and the world. Queensland essentially free rides on the climate change the rest of the world endures.

2. Opine on whether the economic benefits of the proposed mine would outweigh the impacts on present and future generations and if not, why not.

Areas of agreement and disagreement
We agree that the proposed mine would have both benefits and impacts (costs) on present and future generations and that cost-benefit analysis (CBA) is a useful framework for addressing these effects.
However, as discussed in our responses to Question 1, we disagree on whether the benefits of the mine would outweigh the impacts (costs) on present and future generations.
The disagreement on this point relates to a variety of factors including the scope and costings used in the project assessment. In particular, these include the way in which the costs of climate change are assessed, the populations and ecosystems to which these costs are applied and the way in which existing guidance is interpreted.

Materiality
The areas of disagreement are material to our conclusions

How conclusions would differ if the court resolved the matter against our conclusions
Mr Tessler
As in Question 1, if the court found that the costs of the mine outweighed the benefits to future generations then the Project would not record a positive economic result. In principle, there may however be other reasons for proceeding (e.g. employment or skills development).
Mr Campbell
As in Question 1, a finding of net benefit is likely due to selective interpretation of assessment scope and accounting for greenhouse gas emissions. These costs are likely to be incurred predominantly by future generations.

3. Opine on whether economic benefits of the proposed mine described in the EIS and SEIS are overstated and if they are so overstated, the extent of any overstatement.

Areas of agreement
No substantive agreement

Materiality
Any areas of disagreement on this issue may not directly impact on the current CBA or CGE analysis.. However the court may be interested in this issue given the history of the Project.
How conclusions would differ if the court resolved the matter against our conclusions
Mr Tessler

If the court holds that the EIS/SEIS overstated benefits of past economic analysis I do not believe that the current assessments would be materially affected.

Mr Campbell
An understanding of why the project has not advanced in the last ten years is important to assessing its future. If the court resolves that the EIS/SEIS was not overstated, the risks a financially marginal project (delay, periods of closure, risk of abandonment) will remain, but be less well understood and less well planned for.

4. **In your opinion, has the economic assessment for the proposed mine accurately considered all related costs and benefits. In providing your answer, please consider:**

(1) Any state or federal subsidies;

Areas of agreement
As a part of the preparation of the CBA, Mr Tessler asked the project proponent whether there were any subsidies relating to the project. They indicated that there were not. (See the Second Information Response, CBA Appendix 2).
Based on this advice we agree that there are no direct State and Federal subsidies to the Project such as cash payments or project-specific royalty holidays.
In broad economic terms taxes and subsidies are treated as a transfer between parties and so are often excluded from cost and benefit calculations.
However, we note that as part of his response Mr Campbell has pointed to policy settings which provide a financial benefit to the Project. These are detailed in Mr Campbell's response.

(2) Any state or federal taxes or royalties;

Areas of agreement
No significant agreement

Materiality
The areas of disagreement may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis
How conclusions would differ if the court resolved the matter against our conclusions
Mr Tessler
This would depend on how these items were treated though as indicated below taxes and royalties are transfers or a sub-set of benefits .
Mr Campbell
If the court resolves that tax and royalty estimates in the economic assessment are accurately considered, there remains a risk that these payments will not materialise and that government budget planning is poorly informed.

(3) The coal price, its variability and the viability of extracting the coal;

Areas of agreement

We agree that the coal price used by Mr Tessler, averaging AUD$95/t is a reasonable starting point and that sensitivity analysis of +/- 10%, 20% and 30% around this starting price is a good range. We agree that the coal price is highly influenced by both short term events, such as Russia's invasion of Ukraine, and long term changes such as competition from other energy sources. We agree that future climate policies could have a significant impact on the coal price and that the thermal coal market faces long term uncertainty to a greater degree than most commodity markets. We note that the project has not made significant progress in the last 10 years, which may reflect this uncertainty. We agree that the coal price and its variability affect the economic and financial viability of the project. We note Mr King's estimates appear to suggest that a decline in price of below approximately 13% from his central estimate could be sufficient to reduce the project to below a financial break-even point (based on the Net Present Value of Equity Cash Flows After Tax in Year 1). However, Mr Tessler's assessment of economic viability is that the project would still be economically viable at this price.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

If the coal price is deemed to be lower then forecast this could affect the economic results of the Project (along with financial ones) though as noted the economic results are robust to a wide variety of sensitivity tests.

Mr Campbell

Various sensitivity tests, along with the ten year delay in starting the project, show that the project viability is dubious. If the court resolves that the project's viability is in fact robust, there is a risk that further delays are not planned for or anticipated by relevant bodies.

(4) Any relevant managing company or joint venture partnership structures;

Areas of agreement

While noting that the detailed implications of corporate structures are outside our area of expertise, we agree that based on public information and the information provided to Mr Tessler by the proponent, that the project is owned and managed by interests based in Queensland. We agree that Mr Tessler's CBA treats this appropriately, perhaps conservatively as producer surplus is also assumed to accrue to other parts of Australia.

We note Mr Harris's affidavit and statement that the project is looking to overseas state-owned enterprises and banks to support the project. If this were to come about, some adjustment may need to be made to estimates of producer surplus accruing to Queensland and Australia, depending on the scope of assessment and interpretation of this fact.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis

How conclusions would differ if the court resolved the matter against our conclusions

If corporate structure is treated differently to the approach in the CBA then there may be a need to adjust the results of the CBA.

(5) Ongoing management costs, including costs associated with the proposed final void;

Areas of agreement

We note that Mr Tessler's CBA, based on data in Mr King's report includes values for final rehabilitation costs.

(6) Non-market values, including any values relating to the Bimblebox Nature Refuge and any ecosystem services it provides;

Areas of agreement

As discussed in Question 5 below, we agree that the protection of the BNR has a non-zero benefit (as compared to its partial loss). We acknowledge that quantification of ecosystem values is difficult and that any methodology (including established methods such as stated and revealed preference) will have shortcomings.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis.

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

A Higher valuation of the BNR would mean that the results of the CBA would need to be adjusted. However it is unclear to me at this stage how material this adjustment would be.

Mr Campbell

Mr Tessler's estimates are based on a study that is not reliable. Accepting this estimate without adequate wider consideration of impacts on Bimblebox would risk higher than anticipated impacts.

(7) Any costs to future generations that are likely to arise from the Project, including any costs arising from climate change. To the extent that it is within your expertise, please comment on the distributive equity of any future costs;

Areas of agreement and disagreement

As discussed in our response to Question 2, we agree that the proposed mine would have both benefits and impacts (costs) on present and future generations and that cost-benefit analysis (CBA) is a useful framework for addressing these effects, although it is aimed primarily at assessing efficiency rather than equity.

We disagree on whether the benefits of the mine would outweigh the impacts (costs) on present and future generations. The disagreement on this point relates to a variety of factors including the scope and costings used in the project assessment. In particular, the way in which the costs of climate change are assessed, the populations and ecosystems to which these costs are applied and the way in which existing guidance is interpreted.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis.

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

A higher valuation of the costs of climate change on future generations would mean that the results of the CBA would need to be adjusted. These effects could be material but it is not clear how material as this would depend on which elements of the frameworks and data the court accepted and which it dd not.

Mr Campbell

In my view, the project imposes significant costs on future generations, who are unlikely to be compensated by the beneficiaries of the current generation. Resolving against this conclusion risks compromising climate policy and other planning issues.

(8) When considering predicted impacts arising from climate change on the Queensland environment, whether the Project is likely to contribute to future increases in insurance premiums for landowners, particularly landowners in coastal communities;

Areas of agreement and disagreement

We agree that, when considering the predicted impacts arising from climate change on Queensland, the Project is likely to contribute to future increases, at the margin, in insurance premiums for landowners, including on coastal communities.

However, we also agree that insurance premiums themselves are a transfer of risk rather than a cost or benefit in CBA terms and that the real issue is the costs of climate change itself on Queensland communities, including coastal communities.

As discussed in earlier answers, we disagree on the materiality of such climate change costs (and any insurance premium effects) to Queensland communities, arising from the Project.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis.

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

As above a higher valuation of the costs of climate change on future generations would mean that the results of the CBA would need to be adjusted. However given the treatment of insurance premiums as a transfer of risk this should not affect the results of the CBA.

5. Identify the economic benefits of protecting the Bimblebox Nature Refuge in perpetuity and compare that to the economic benefits of the proposed mine.

Areas of agreement

We agree that the CBA specifies an approach to determining the cost (i.e., the economic benefits forgone) of the loss of the BNR in perpetuity as compared to the economic benefits of the proposed mine. We also agree that the protection of the BNR has a non-zero benefit (as compared to its partial loss). We acknowledge that quantification of ecosystem values is difficult and that any methodology (including established methods such as stated and revealed preference) will have shortcomings.

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis.

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

As above a higher valuation of the benefits or retaining the BNR could affect the estimation of the CBA. However much would depend on whether this occurred within the context of the old or new mining plans given the latter does not propose open cut mining in the BNR .

Mr Campbell

Mr Tessler's estimates of the value of Bimblebox are based on a study that is not reliable. Accepting this estimate without adequate wider consideration of impacts on Bimblebox would risk higher than anticipated impacts.

6. Opine whether the economic benefits of the proposal are vulnerable to any adverse impacts from the emission of greenhouse gases. If they are so vulnerable, please explain the reasons for your view.

Areas of agreement:

The likely effects of climate change on the region of the mine is outside our expertise. However, like most economic activity, the project is potentially vulnerable to impacts such as reduced water availability, periodic flooding, increased ambient temperatures, etc. We note that the Co-Ordinator General has previously considered the impacts of climate change on the project and Waratah's commitment to implement various measures.

7. Having regard to the joint expert report to be given by the energy market experts, opine on whether the replacement of existing customers' coal in the market with that to be sold by the Applicant is consistent with sound economic theory.

No significant agreement

Materiality

Any areas of disagreement on this issue may be material to our conclusions depending on the treatment of these items in a cost-benefit analysis.

How conclusions would differ if the court resolved the matter against our conclusions

Mr Tessler

I note that I am not a global energy markets expert, and so refer to the energy markets report on this matter (COM 0069.0001). As noted on p.5 (2.l) , p.23 and in Paragraph 61 of that report, the energy experts agree that the coal from the project has the potential to displace higher cost/lower margin supply that sits higher on the supply cost curve. Given that the project's coal provides a qualitative improvement over some other seaborne coal, the Project's coal could replace coal from sources such as Indonesia in particular. This may be especially so given that some Indonesian coal, while being of lower quality, also sits higher on the seaborne thermal coal total cash cost curve, as indicated in Figure 3, p.25 of COM 0069.0001. However, If the coal supplied is deemed additional to the overall global market for coal then this could increase the overall supply of coal in that market.

Mr Campbell

Under basic economic theory, the project represents an expansion of coal supply that would reduce price, increase coal consumption and related greenhouse emissions, and reduce output from higher

cost suppliers. Resolving against this conclusion risks increasing emissions without adequate planning or policy response.

Main body of joint expert report

1. Opine on whether the economic benefits of the proposed mine outweigh the costs and if not, why not.

Areas of agreement:

While disagreeing on the ultimate answer to the question, we agree on the general approach to it:

- Cost benefit analysis (CBA) is the most appropriate tool to assess costs and benefits of a project, despite its limitations, some of which are discussed later in the report:
    - Focus on efficiency rather than equity.
    - Partial equilibrium – it provides little information about how the project might impact on other relevant parts of the economy, such as the markets for coal, labour or other supplies.
- Aside from key points of disagreement, we agree that our analyses (Mr Tessler's CBA and Mr Campbell's calculations in response to parts of the CBA) are technically sound and based on reasonable/appropriate data.
- CBA is an economic assessment that considers costs and benefits to the community, rather than a financial assessment that considers viability to the proponent. Financial analysis includes a range of calculations that are ultimately transfers between members of the community, which may not be included in a CBA depending on scope.
    - Because of this difference, some scenarios tested in the CBA may result in a positive NPV to the community overall, but may result in low or negative net benefits to the proponent. Such scenarios may produce a low or negative net benefit result under financial analysis.
- While the project before the court is the mine itself, from an economic perspective it is useful to consider costs and benefits of the related rail and port facilities.

Key areas of disagreement:

- Reliability of revenue, capital and operating cost data provided by the proponent.
- Approach to valuing environmental impacts, particularly greenhouse gas emissions and incorporating into CBA.

Tessler opinion in detail

A cost-benefit analysis (CBA) is normally prepared for just such a purpose.

BIS Oxford Economics (BISOE) has undertaken such work for the Galilee Coal project ("the project"). This constitutes WAR 0531.0001 ("the CBA"). This document also includes a Computable General Equilibrium (CGE) analysis detailing impacts on items such as employment and Gross Regional and State Product.

The CBA finds that net benefits (i.e., benefits less costs) to Queensland from the project amounted to $4,089 million over the period 2021 to 2054. This figure represents the net present value (NPV) of the Project discounted at 7% real discount rate. As indicated in Fig 13 and Fig 19 of the CBA, Project

benefits are substantially in excess of Project costs. A large number of sensitivity tests are also examined in Chapter 6 of the CBA. These indicate a positive project economic result in all but one case (the Net Zero Emissions (NZE) price and volume sensitivity test). [1]

The CBA noted that its focus is on the mine itself and this question likewise refers to the mine. On this basis, as indicated, the Project benefits clearly outweigh project costs. There is also some uncertainty over transport arrangements (noted below). This is in contrast to the more clearly established issue that there will (or will not) be a defined mine at the proposed site.

I agree with Mr Campbell that an alternative view is that transport costs should be included in the costings from a broader economic perspective "beyond the mine gate". However, as indicated there is some uncertainty over the final transport arrangements for the coal. In any event, the CBA did allow for a parallel set of results including transport costs and construction of a fixed rail link to the coast at Abbot Point Coal Terminal. If such an allowance is made for the construction of a fixed rail link and associated transport costs then the Project's net benefits to Queensland stand at $2,517 million in NPV terms over 2021-2054. I note that such an assessment still produces benefits considerably in excess of costs.

I would further note however, that Paragraph 45 of Nui Bruce Harris's First Affidavit (WAR 0291.001) indicates that the preference is now to supply coal via the existing rail network connecting the nearby town of Alpha to Gladstone rather than through the construction of a fixed rail link. Paragraphs 255-256 of the same document indicate that there would be considerable cost savings in doing so particularly with respect to capital costs.

While full information to allow for a detailed costing of such an alternative approach to transport is not currently available to me, I likewise note that if coal is to be transported by the existing rail network, then the capital costs associated with the construction of a new dedicated link of approximately 468 km in length (Environmental Impact Statement Vol 3, Chap 1, p.10; (WAR0046.001 to WAR0129.0001) would no longer be incurred, More specially, these amount to some $1.400 million undiscounted or $1,145 million in Present Value (PV) terms using a 7% discount rate, although some rail construction costs would be involved to connect with existing links at Alpha, some 30 km distant.

In other words, it seems reasonable to expect that while project net economic benefits are recorded as $2,517 million with construction of a new fixed rail link, such net benefits could be higher than this, if use was made of the existing rail network.

I also note the statement in that affidavit (Paragraph 257) that the use of underground mining in the BNR would produce higher margins then the previously proposed use of open cut mining in that area.

I note these points in the context of the issues Mr. Campbell has raised around uncertainty and project viability. To this end, a variety of scenarios examining sensitivity tests and various future climate change initiatives are also explored in the CBA. These indicate that the project returns net positive benefits in all but one case. The exception is a scenario modelled on an interpretation of the impacts of the International Energy Agency (IEA) Net Zero Emissions (NZE) Scenario. However, note

[1] As indicated in the CBA (pp100-102), the NZE sensitivity represents a high end interpretation of International Energy Agency (IEA) projections rather than an official IEA modelled position. In practice there may be some amelioration of these projections due to stronger residual Asian demand for Australian coal then is true for coal demand at a global level.

that this scenario represents our interpretation based on IEA data rather than an official IEA modelled figure and is a relatively "high end" interpretation of NZE impacts (see CBA pp.100-102).

I also note Paul Manley and Rachel Wilson's Joint Expert Report (COM0069.0001) and Mr. Paul Manley's forecasts that while Waratah's proposed purchasers have made NDCs' they will continue to demand thermal coal into the future (pp.70-75) including under a variety of more stringent commitment scenarios.

I note however that project economic viability is a distinct concept to project financial viability. Accordingly, I cannot comment directly on project financial viability. James King's *Analysis of the Galilee Coal Project* ("the King Report") (WAR 0360.0001) investigates the project from a financial standpoint, including sensitivity tests around project viability.

On the specific issue of climate change impacts on Queensland, and the instruction to consider such issues in a response to Questions 1 and 2, I note the report of the actuary Peter Coleman (YLV0279.0001). However, such costings:

- Do not appear to specify the impacts of the mine itself as opposed to the broader impacts of climate change from all global human activity on Queensland. As per COM 0067.005 (pp.50-51) total project emissions (if the project is deemed to include Scope 3 emissions) are estimated to account for some 0.17% of global CO2-e emissions per annum. Scope 1 emissions account for 0.0027% of annual global emissions, Scope 2 , 0.0015% of total global emissions. Scope 3 emissions – whose inclusion is the subject of some debate - account for 0.16% of total annual emissions. In short the Project itself would contribute only a minor amount to such climate change impacts.
- Do not appear to subject the derived estimates to discounting (which would have substantial effects over time).
- Do not appear to allow for any adaption to mitigate the referenced costs (though I note that adaptation would have costs in and of itself).
- Specify a variety of scenarios including an upper end "Fossil Fuel Future" scenario (RCP 8.5). Such scenarios would need to consistently be applied within the context of a CBA. For example, under a Fossil Fuels Scenario, coal demand would presumably be strong implying that demand (and potentially prices) for the Project's coal would likewise be strong.

We also note that we have undertaken an analysis of climate change costs associated with the project based on international research. This is detailed in WAR 0531.0001 and incorporated into our CBA. Such costs alone do not exceed the benefits of the project in our base case scenario (with or without the inclusion of transport links).

I also note that CBA (and the accompanying assessment of costs and benefits) requires the clear definition of project scope (also known as "the population of standing").

While CBA itself may be seen as a partial equilibrium approach, it has been pointed out in the past that in one sense this is a matter of degree rather than type and the same could be said for a wide range of economic modelling.[2] In addition, a CGE analysis examining broader economic impacts on the local and Queensland economies has also been conducted by Victoria University's Centre of Policy Studies (CoPs). This is included in WAR 0531.0001.

[2] Bureau of Transport Economics (1999) Facts and Furphies in cost benefit analysis, p. 107

As these issues are intermingled with the impacts on future generations and climate change impacts, I have provided a more detailed discussion of scope and climate change related issues and the impacts on project economics in my response to Question 4-7 below.

Campbell opinion in detail

In my view it is very unlikely that the economic benefits of the proposed mine will be greater than its costs, either overall or for the vast majority of the Queensland community. The economic benefits of the mine (revenue from coal sales) are unlikely to outweigh the costs, such as the costs of constructing and operating the mine and the costs of environmental impacts, particularly additional greenhouse gas emissions.

Looking at the project from a global perspective, based on the King report and initial data from the proponent, Mr Tessler calculates the key benefits in present value terms as:

Tax	$	1,216m
Royalties	$	2,010m
Surplus	$	8,667m
Total	$	11,893m

This estimate does not take into account the rail and port costs necessary to market the coal. Mr Tessler requested and was provided with further data to incorporate these costs. I agree with Mr Tessler's approach. While the court is not being asked to approve the rail and port requirements of the project, from an economic perspective these parts are essential. It is of no use to assess the project only to the 'mine gate'. Mr Tessler's estimates of the project benefits incorporating rail and port costs are as follows:

Tax	$1,019m
Royalties	$2,010m
Surplus	$1,046m
Total	$4,076m

At $4 billion, the benefits of the project would be outweighed by the value of climate impacts with a social cost of carbon (SCC) of $145/tCO2e. This is well within the range of SCC estimates in academic studies and government guidance.

Notes on this calculation:

- Scope 1 and 2 emissions of the construction, mine operations, rail and port as reported in GHG assessment (WAR.0381.0032) and climate JER.
- Averaged across relevant years of each phase.
- Discounted at 7%

In other words, even taking the financial and emissions estimates of the proponent at face value, NPV is reduced to zero using a plausible SCC.

In my view, however, these estimates should not be taken at face value. They are likely to overstate the benefits of the project and understate costs. This is not unique to this project. There is a considerable economic literature on major project assessment that shows a tendency for strategic

misinterpretation, optimism bias and other flaws that result in forecasts of benefits that are overstated and costs understated. One of the leading authors in this field describes the '"iron law of megaprojects": Over budget, over time, over and over again.'[3] Several factors suggest that this applies to the Galilee Coal Project:

- The project has seemingly made minimal progress in the decade since it first entered the planning system. Rather than addressing the question of why the project has stalled, the 2021 King report (WAR.0360.0003) is simply an "update" of Mr King's 2011 report. In my view, the stalling of the project suggests that its costs and benefits have not been well estimated and it is financially marginal. I do not think the lack of progress is due to administrative difficulties or public opposition, based on the following points:
    - None of the other Galilee Basin projects or greenfield Surat Basin projects have made progress, despite claiming similar economic impacts in initial assessment documents.
        - The exception is Adani's Carmichael mine. That project is proceeding despite considerable public opposition and only at a fraction of its original size. Adani has received strong political and at times financial support from Australian and Indian governments. The viability of the project appears to depend on vertical integration with power stations that have favourable offtake agreements, which are alleged to have been politically influenced.
    - Projects with strong financial cases have proceeded despite regulatory hurdles and public opposition, Whitehaven's Maules Creek mine in NSW being one example.

The implication of the marginal nature of the project is that profit/surplus and company tax estimates are likely to be heavily overstated. Further suggesting that this is the case:

- Mr Tessler's estimate, based on the proponent's data and Mr King's report, is for present value company tax payments of $869.2 million (inc rail and port costs), or an average annual payment of $72.5 million over the 27 year life of the project. Prominent Australian thermal coal producers have paid far less in the years for which ATO data is available:
    - New Hope - $232 million over 7 years, or $33m per year.
    - Whitehaven - $16 million over 7 years, or $2.3m per year.
    - Yancoal – zero over 7 years.
    - Banpu (owners of Centennial Coal) – zero over seven years.
- It is not clear that the estimated $150m payroll tax benefit is additional. Under usual cost benefit analysis assumptions, this revenue would have been generated regardless of the project.

Because of these points, in my view, a more useful comparison of costs and benefits for the court is of royalty revenue with external costs, particularly climate impacts. This excludes the tax and profit/surplus estimates above which are likely to be overstated and, in the case of profit/surplus, accrue to a very small number of Queenslanders.[4] A SCC of $72/t (lower than Mr Tessler's starting

[3] Flyvbjerg (2014) *What you should know about megaprojects and why: An Overview,* p11, emphasis added, https://www.researchgate.net/publication/261411676_What_You_Should_Know_About_Megaprojects_and_Why_An_Overview/link/59fbaad60f7e9b9968bb03ff/download

[4] If overseas credit agencies and other investors take a significant stake in the project, as suggested in Mr Nui Harris's affidavit, Mr Tessler's Queensland-focused analysis would need to be revised down

price) applied to the emissions from construction, mine operations, rail and port results in climate costs exceeding royalty revenue. Even this is likely to be optimistic:

- It assumes the uninterrupted operation of the project at the assumed coal prices. Given the uncertainty around the future of thermal coal markets, this is optimistic. The past ten years suggests the project could experience delays and/or periods of reduced or suspended operations that would reduce royalty revenue, as well as reducing many costs. Most NSW thermal coal mines are currently operating substantially below capacity.[5]
- It assumes that the project's coal production does not crowd out other mines. In reality, a large new supply in the Galilee Basin is likely to reduce output, and therefore royalty revenue, from other mines, including those in Queensland and NSW:
    - Mr Manley points out in the energy market expert JER points out that "should Waratah not be developed there are ample projects both within Australia and elsewhere that could satisfy projected seaborne thermal coal demand. (par 204)" The flip side of this is that if the project is developed, some of these projects are likely to produce less coal and less royalty revenue.
- It assumes that no emissions from coal combustion (scope 3 emissions) are additional from the project. In my view, the addition of a large new supply into the coal market will, other things being equal, reduce the price of coal and see an increase in consumption.
- It ignores recent research that finds that coal mines and other major emitters routinely emit more than was forecast in planning documents.[6]
- It ignores or downplays other potential external costs such as biodiversity impacts.

Clearly, the cost of greenhouse gas emissions is a key factor in answering this question. What this price should be is difficult to determine in dollar figures.

The appropriate cost to include in a cost benefit analysis of a coal mine is the cost of the damage to the climate from the additional emissions that the mine creates. In other words, the additional emissions multiplied by the social cost of carbon. The social cost of carbon should be used in this case, rather than a price derived from offset prices because:

- This is the cost that will be incurred by the community, not the price of emissions offsets, particularly as:
    - There is no proposal or obligation to offset the relevant emissions in this case.
    - There are major integrity issues with most, if not all, offset schemes. This has been prominent news in Australia recently,[7] and has long been a question in Europe.[8]

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profits accruing overseas. I note Mr Harris' affidavit seems to contradict Waratah's response to Mr Tessler's request for information on ownership.

[5] Campbell and Carter (2021) *Mind the gaps: Unused capacity and unfunded rehabilitation in Upper Hunter coal mines*, https://australiainstitute.org.au/report/mind-the-gaps/

[6] ACF (2022) Emissions exposé: Australia's biggest polluters are emitting more than approved and getting away with it, https://www.acf.org.au/emissions_expose

[7] Long and McDonald (2022) *Insider blows whistle on Australia's greenhouse gas reduction schemes*, https://www.abc.net.au/news/2022-03-24/insider-blows-whistle-on-greenhouse-gas-reduction-schemes/100933186

[8] Can probably find a better ref, but here's a news piece: Nasralla and Twidale (2021) Factbox: Carbon offset credits and their pros and cons, https://www.reuters.com/article/us-climate-change-carbon-offsets-idUSKBN2AP1FZ

- Offset prices vary based on supply and regulations, factors with little relevance to the actual costs incurred by the community.

Regarding what might be an appropriate social cost of carbon in the current circumstances, I note the following:

- Academic estimates of social cost of carbon range from $AUD235 - $AUD1,069/t.[9] This is not an exhaustive survey and is now four years old.
- UK government guidance on social cost of carbon ranges from $AUD216 - $AUD652.[10]
- Mr Tessler refers to the the Biden Administration's social cost of carbon estimate that centres on US$51 (AUD$68)/t. He does not provide any context or explanation of this value and its current status. This estimate is the reinstatement of the Obama Administration's recommended value of social cost of carbon updated for inflation. Its reinstatement was ordered by President Biden on his first day in office in response to the Trump administration's moves to exclude international climate costs from public cost benefit analysis in the USA and include only climate costs that are borne by the USA – an approach similar to that taken by Mr Tessler. The Biden executive order states that its range is an interim estimate, that will be updated in 2022.[11] It is widely expected that its estimates will increase,[12] particularly given input from some of the world's most prominent economists. These include Nicholas Stern and Joseph Stiglitz who argue that the Biden Administration's social cost of carbon estimate is well below what is required to achieve abatement in line with climate commitments.[13] Legal contests between US states and the Federal Government around social cost of carbon have delayed this process, with the Federal Government recently winning an important legal appeal.[14]

Mr Tessler's estimates of the value of greenhouse gas emissions from the project are, in my view, too low because:

- He uses a price based on offset prices with no consideration of the integrity issues associated with these offsets and with little discussion of the factors that influence their price.
- He refers to the US Government's interim social cost of carbon without consideration of its likely increase or wider estimates.

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[9] Ricke et al (2018) *Country-level social cost of carbon*, https://www.nature.com/articles/s41558-018-0282-y
[10] UK Government (2021) *Valuation of greenhouse gas emissions: for policy appraisal and evaluation*, https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation
[11] US Government (2021) Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf
[12] Chemnick (2021) *Cost of Carbon Pollution Pegged at $51 a Ton*, https://www.scientificamerican.com/article/cost-of-carbon-pollution-pegged-at-51-a-ton/
[13] Stern et al (2022) A social cost of carbon consistent with a net-zero climate goal, https://rooseveltinstitute.org/wp-content/uploads/2022/01/RI_Social-Cost-of-Carbon_202201-1.pdf; Rennert et al (2021) *The Social Cost of Carbon: Advances in Long-Term Probabilistic Projections of Population, GDP, Emissions, and Discount Rates*, https://www.brookings.edu/wp-content/uploads/2021/09/Social-Cost-of-Carbon_Conf-Draft.pdf
[14] Phillips (2022) *Appellate court rules Biden can consider climate damage in policymaking*, https://www.washingtonpost.com/climate-environment/2022/03/16/social-cost-of-carbon-ruling/

- He does not include emissions from rail and port activities that are clearly essential for the project and incremental increases in emissions directly due to the project.
- He does not consider whether the project could result in a marginal increase in combustion emissions, which is likely in my view.
- His cost benefit analysis includes only a fraction of his estimated greenhouse gas cost, which is further reduced by multiplying it by the ratio of Queensland's population to world population, 0.07%. Mr Tessler's reasoning is that he has chosen as the scope of his analysis the costs and benefits of the project to the Queensland community and, as climate impacts are felt globally, only a fraction of the impact should be included in his calculations. While it is important for a cost benefit analysis to have a consistent scope, I disagree with Mr Tessler's approach because:

    - It is inconsistent with the carbon budgeting approach discussed in the climate JER that guides global efforts to avoid climate change and which underpins relevant policies such as Queensland's net zero emissions goal and the Paris Agreement. Under this approach and these policies, each jurisdiction is responsible for direct emissions such as those from the construction and operation of the mine and the initial transport of coal. Aside from the relevant emissions accounting framework, under a net zero emissions policy, any project that would increase emissions will come at the expense of emitting activities elsewhere in the economy. It therefore imposes an opportunity cost on Queensland that needs to be fully included in a state-focused cost benefit analysis.
    - Climate impacts are complex and this approach seems out of line with the Earth-systems approach in the climate JER. For example, part of the cost of a tonne of carbon emitted in NSW might be "borne" by Siberia through melting permafrost, which in turn could increase emissions and costs borne by NSW. While arithmetically appealing, the approach taken by Mr Tessler is not suitable for assessment of costs relating to the inter-linked nature of climate systems.
    - It serves to obscure that other jurisdictions bear a large cost of the project and that if these costs are included the costs of the project are likely to outweigh its benefits, as discussed above. This approach sees Queensland 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. Mr Tessler provides an estimate of total present value scope 1&2 emissions of $1.84 billion on page 83 of his report, but this not discussed anywhere else in his report. He does not use it in sensitivity testing even though his approach to this issue has a far greater impact on NPV than most of the parameters tested at length.
    - This approach is not widely used or accepted in NSW, nor is it required under NSW guidelines, which ask only for costs to the NSW community. No mention is made of using ratios of state to world population to estimate this cost, suggesting in my view that the authors of the guidelines did not intend for it to be interpreted in the way Mr Tessler has done. The guidelines were developed through an extensive consultation process and this approach was never prominently mentioned.

To demonstrate the implications of Mr Tessler's approach to scope 1 and 2 emissions it is worth considering what would happen if it were more widely adopted. The coal-fired power station that burns the project's coal could also adopt the same logic. The Waratah project's scope 3 emissions (at

least the vast majority relating to combustion) would be this power station's scope 1 emissions and would be included in its cost benefit analysis.

Mr Tessler (under)estimates the value of the these emissions at $59.0 billion in present value terms. The power station's cost benefit analysis would include $59 billion multiplied by the ratio of the relevant sub-national population to world population. If it were located, for example, in Japan's Fukushima Prefecture, population 1.8 million, this represents 0.02% of the world's 7.4 billion people. Under Mr Tessler's approach, the value of the power station's impact on climate, burning 40 million tonnes of coal per year for decades, would be assessed by Fukushima's decision makers at just $13 million. Fukushima's decision makers would presumably ignore the cost that their project imposed on Queensland ($41 million) and the billions imposed on the rest of the world.

Clearly, this way lies disaster. The world cannot adopt this approach to project assessment if climate disaster is to be avoided and it would be irresponsible for Queensland to do so.

In understanding whether costs of a project are likely to outweigh its benefits sensitivity testing is important. I disagree that Mr Tessler's sensitivity testing demonstrates that the project is financially or economically robust and likely to have benefits greater than costs:

- As just mentioned, there is no testing of different approaches to greenhouse gas emissions valuation and attribution, despite this having large implications for the NPV of the project. Mr Tessler's approach is largely to increase or decrease his estimate of externality costs, which is artificially low due to the scope 1&2 emissions costs being divided by Queensland's share of world population.
- Many of the scenarios tested see producer surplus decline below zero. Under normal economic assumptions, a project that loses money for its owner would be suspended or cancelled, particularly in the medium to long term.
    - Mr King's report shows that the project is unprofitable for the proponents with a reduction in sale price of 13%, an increase in exchange rate of 15% or an increase in operating costs of 17%. Mr King's analysis is slightly different in nature, but suggests that the project would be financially unprofitable even under scenarios where Mr Tessler's analysis suggests it has positive producer surplus.

2. Opine on whether the economic benefits of the proposed mine would outweigh the impacts on present and future generations and if not, why not.

Areas of agreement

We agree that the proposed mine would have both benefits and impacts (costs) on present and future generations and that cost-benefit analysis (CBA) is a useful framework for addressing these effects.

However, as discussed in our responses to Question 1, we disagree on whether the benefits of the mine would outweigh the impacts (costs) on present and future generations.

The disagreement on this point relates to a variety of factors including the scope and costings used in the project assessment. In particular, these include the way in which the costs of climate change are assessed, the populations and ecosystems to which these costs are applied and the way in which existing guidance is interpreted.

Tessler opinion in detail

I refer again to my answer to Question1 which indicated that the economic benefits of the Project outweigh the costs. This is true on a "mine only" basis or when transport links are included (though I again note the uncertainty over transport costings and the fact that the use of existing infrastructure would increase the Project net benefits compared to construction of a fixed link, as modelled).

The CBA referred to above allowed for this work as it allows for the impacts of the project over the period 2021-2054 (as opposed to a single year or years in the very near future for example).

It should be recognized that costs and benefits in a CBA represent a discounted stream of values over time. In other words, while future generations are considered, the costs and benefits accruing to such generations are discounted (reduced) relative to the present[15]. This is in accord with standard practice. The discount rate used is consistent with the stipulations in *Queensland Government: Cost Benefit Analysis Guide: Assessment Framework* (2021).

As is the case with any CBA the future impacts (costs and benefits) have been consistently defined within a given time period of project life. This is standard practice. There may be some additional impacts on future generations beyond the specified project period. In practical terms, however, the impact of discounting would substantially reduce any such impacts beyond the existing Project life. I also note that costs such as estimates of the social costs of carbon (SCC) attempt to capture long term damage effects and so should implicitly incorporate costs to future generations from current activity.

The points on climate change costs to Queensland also apply here. While I again note the report of Mr. Coleman, the key question is what difference the existence of the mine would or would not have on benefits and costs to future generations. As indicated, to make such an assessment requires allowing for the marginal costs and benefits of the mine itself, appropriately discounted. The CBA has already incorporated analysis of climate change costs into the analysis based on international research, allowing for mine contribution and discounting.

Another relevant issue is the scope of analysis over which the question is intended to cover, and which future generations are being referenced: Queenslanders, Australians or international populations ? In short, as indicated above, as these issues are intermingled with the impacts on future generations and climate change impacts, I have provided a more detailed discussion of scope and climate change related issues and the impacts on project economics in my response to Question 4-7 below.

Campbell opinion in detail

[15] Note, in the case of the Bimblebox Nature Refuge (BNR) there is no discounting as total impacts are assumed to be occur at the commencement of mine construction.

As estimated in my answer to Question 1, at a global level, in present value terms, the costs of the project outweigh its benefits if the social cost of carbon is between $72/t and $145/t, or potentially lower due to reasons listed above. Given that most estimates of social cost of carbon are at or above these levels, the costs are likely to outweigh benefits overall and consideration of the distribution of cost and benefits is important for decision makers assessing the project.

Beneficiaries of the project are likely to be:

- Queensland Governments that receive royalties during the project's productive period. The wider Queensland community also benefits via government services.
- The proponent and their investors that receive profits/surplus, at least under some scenarios.

While parties that will incur costs of the project are likely to be:

- Future generations of the Queensland and global community through climate impacts.
- Current and future generations of Queenslanders, and probably to a smaller extent the world, due to impacts on the Bimblebox Nature Reserve.

This is consistent with Mr Tessler's findings - some parties within present generations of Queenslanders may enjoy a net benefit from the project, but if the project proceeds net costs will be borne by future generations in Queensland and globally. Mr Tessler's avoids stating this plainly by restricting the scope of his analysis to Queensland, downplaying financial viability and transferring climate costs to the rest of the world.

If revenues are invested in projects that brough substantial and unambiguous benefit to future generations this generational inequity could be reduced, but in my view this theoretical possibility is not a likely real world outcome. Neither entities associated with the proponent, nor the Queensland Government show a strong propensity for such investments.

It is also important to consider that the CBA uses a discount rate of 7% and most social cost of carbon estimates also use discounting to express future costs of climate change in present value terms. The US Government estimates referenced above, and by Mr Tessler, centre around a 3% discount rate. Stern, Stiglitz and others are explicit that discount rates of 3 to 7 percent are "excessively high" for social cost of carbon calculations if abatement in line with the Paris Agreement is to be achieved.

Discounting is fundamentally about two things – accounting for uncertainty and people's natural preference for benefits sooner and costs later. This skews assessment towards the current generation at the expense of future generations. If lower discount rates were applied, some analysts argue for zero discount rates in assessment of climate impacts, the estimated costs of the project would be even greater on future generations.[16]

To summarise, the benefits of this project are uncertain and accrue to current generations of Queenslanders, whereas, if the project proceeds, the external costs are relatively certain and will be borne by future generations in Queensland and globally.

[16] For example see Tarsney (2017) *Does a discount rate measure the costs of climate change*?, https://www.cambridge.org/core/journals/economics-and-philosophy/article/does-a-discount-rate-measure-the-costs-of-climate-change/62E21F7AF09080AC880768023374755A

3. Opine on whether economic benefits of the proposed mine described in the EIS and SEIS are overstated and if they are so overstated, the extent of any overstatement.

Areas of agreement

No substantive agreement

Tessler opinion in detail

The EIS (Chapter 17) provided a variety of employment, Gross State Product (GSP) and Gross Regional Product (GRP) estimates in its estimation of economic impacts, along with royalty and tax impacts. This was based on CGE work and associated modelling undertaken by AEC Group in 2010.

I note that the SEIS (pp. 525-526) in response to a similar question at the time stated that a coal price of $A 115/tonne had been assumed for future Project royalty revenues based on prices for coal sold through Newcastle over the period 2010-2012.

However, BISOE analysis based on data provided by Wood McKenzie suggest that the nominal price of FOB Newcastle @ 6,000 kcal/kg NAR, market coal averaged $A 106.36 over the period 2013-2021 at annual market exchange rates.

Although the SEIS is not specific in stating that 6,000kcal/kg coal is being cited at the forecast price of $A 115/tonne, this analysis suggests that the coal price for the Project, adopted by the SEIS were 7.5% too high on average. As this would reduce Project revenues and royalties are linked to project revenues, it is reasonable to assume that this would mean that royalty payments would have been lower than forecast.

Nonetheless, the SEIS (p.526) also stated that should the price fall below $115/tonne this would result in reduced royalty payments but would not be expected to result in a significant change to the modelled outcomes of the economic impacts.

I also note that the economic analysis in Chapter 17 of the EIS also pointed to broader effects such as employment and GRP impacts, and highlighted issues such as skills development and the development of local infrastructure. As the mine has not been constructed in the intervening years, it is not possible to reach a blanket conclusion that all of the cited impacts in the EIS or SEIS were overstated (or indeed understated).

I also note that no CBA was produced for the EIS or the SEIS, However, while this is the case, a CBA has now been produced by BISOE based on currently available data including the King Report.

This leads on to a broader point that given the passage of time since the production of the EIS and the SEIS and the production of new market and financial and economic data and reports, a more relevant question is consideration of the economic case for the Project (or otherwise) based on current data and projections.

These data include the King Report as well as the recent CBA and CGE analyses (WAR 0531.0001). The CoPS CGE details the economic impacts of the Project in terms of indicators such as GDP and

employment. As indicated the CBA produces a substantial net positive economic benefit for the Project.

In that context also I note that since new estimations were prepared for these documents on the basis of the new Mine Plan (NMP) it is difficult to conclude more broadly that the economic impact estimates of over a decade ago, used in the EIS or SEIS were overstated (or otherwise) based on such documents. The project profile has changed and so the new documentation is based on a different mine footprint basis and uses a different set of assumptions and projections. Accordingly, more recent documentation cannot simply be compared to that of a decade ago to reach conclusions on overstatement (or understatement).

On a more general principle, I do not agree that one can conclude *a priori* that project benefits *must* be overstated. However, I do agree with Mr. Campbell that more broadly major projects are subject to issues such as optimism bias. This can raise the *risk* that benefits are be overestimated (and/or costs underestimated). Some literature in this field has been cited by Mr. Campbell. There is likewise a *risk* of optimism bias in the case of the Project, as there is for many major projects.

Nonetheless, there are a number of caveats to this which need to be considered both in broad terms and with respect to the Project, going forward.

- First any significant project could likewise face the same risk, regardless of its nature (e.g., solar or wind farms, public transport).

- Second, BIOSE's CBA also includes a variety of sensitivity tests as stipulated by the most detailed guidance available for assessment of coal mining projects – i.e., the detailed guidance provided in the NSW Government (2015) *NSW Guidelines for the economic assessment of mining and coal seam gas proposals* (YVL 0287.0001 or "the NSW Guidelines") and indeed have gone beyond this to allow for interactive effects (which do not appear to be required by that document) as well as a variety of future market scenarios based on an interpretation of IEA scenarios. These recognize the potential for benefit overestimates/cost overruns, including sensitivity testing of coal prices of +/-30%. As indicated these suggest a positive project economic outcome in all but one case, though as noted elsewhere economic assessments differ from financial ones.

- Third many project proponents (particularly in areas such as public transport and/or urban revitalization) have argued for many years that major project benefits are systematically *understated*. This has found expression in the Wider Economic Benefits (WEBS) literature which has been developed in Australia, the UK and New Zealand in recent years. WEBS have been considered by governments in Australia and globally, in this context.[17] A common practice in some Australian jurisdictions is to report a CBA with and without WEBS.

I also note that, as indicated in WAR 0531.0001 there are some differences between the New Mine Plan (NMP) and the Old Mine Plan (OMP). The latter was examined in the EIS and SEIS. Data limits preclude a full comparative quantification between the two. *A priori* benefits and costs of the NMP might be lower than those of the OMP due to a reduced scale of production. However, as indicated the removal of the need for new rail construction and higher margins for underground coal extraction, referred to above, could result in more favorable net economic and financial results

[17] See OECD (2007), "The Wider Economic Benefits of Transportation" https://www.oecd-ilibrary.org/transport/the-wider-economic-benefits-of-transportation_234804032336 ; Australian Transport Assessment and Planning, "Wider Economic Benefits" https://www.atap.gov.au/tools-techniques/wider-economic-benefits

under the NMP. On the costs side I also note that the BNR will no longer be the subject of open cut mining activity which will also lower environmental costs.

In addition, Mr Paul Manley has suggested that the coal prices used in the King Report (and adopted in the CBA) may be conservative (COM00069.0001, Paragraph 57). In short there are also factors which might increase net benefits above those allowed for in the current CBA assessment.

As a final technical point, it should be noted that a CBA differs from other methods such as input-output analysis (I-O) which focus on economic activity as opposed to benefits.

In a CBA benefits are matched against opportunity costs – essentially the costs of undertaking the work. These may include land, labor and capital inputs. They may also include environmental costs. These are netted off against benefits. In other words, benefits are assessed on a net and not a gross basis.

Campbell opinion in detail

It is clear that the benefits of the proposed mine were overstated in the EIS and SEIS. The EIS estimated average annual increases to government revenue of over $1 billion per year from 2010-11 to 2036-37,[18] yet almost half way through this period the total paid is zero.

Even if the project had gone into production, the coal price these benefit estimates were based on was AUD$115/t, considerably higher than the average price realised for Australian thermal coal exports since 2012, which was $97.[19]

As discussed in my answer to Question 1, the project is not unique in this sense. Most major project assessment includes some degree of strategic misrepresentation and optimism bias. Other examples include almost every other mine proposal for the Galilee Basin. The analysts' optimism may also have been a product of the time at which they were writing. The Galilee Basin projects entered the planning system during the unprecedented coal boom of the early 20th century. Coal demand had been rising strongly and prices were reaching record levels when the Waratah, then China First, EIS was written in 2010. While some optimism might have been unavoidable, the analysis behind the economic parts of the EIS/SEIS was shallow. For example, on coal prices the SEIS says:

> *The royalty revenues are based off an assumed coal price of AUD $115 per tonne. Coal will be sold on a contractual basis. The average coal spot price through Newcastle between May 2010 and May 2012 averaged approximately US$115 to US$120 per tonne[1], while the exchange rate averaged around parity over this period. Predicting future exchange rates and coal prices over the next 20–30 years is not possible, but basing the average revenue on approximately the average price for the last two years is a reasonable assumption.*[20]

In my view it was never "a reasonable assumption" to assess a project that would operate for decades based on just two years of price data, particularly when prices in those two years were unprecedented.

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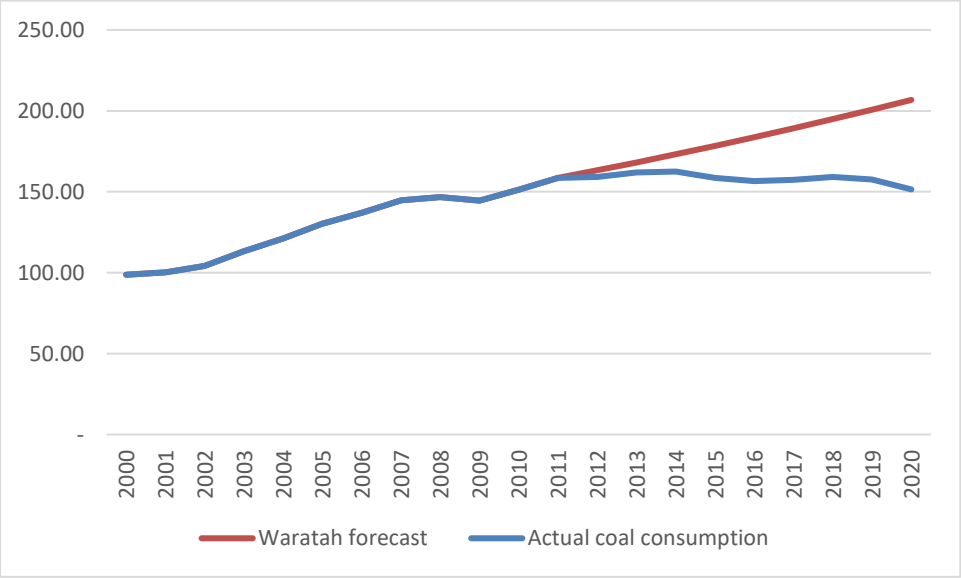
[18] See AEC Group (2010) *Economic impact assessment for the China First EIS*, p52.
[19] Office of Chief Economist (2022) *Resource and Energy Quarterly, March 2022, Historic data*, https://publications.industry.gov.au/publications/resourcesandenergyquarterlymarch2022/index.html
[20] SEIS Part C submissions response: 14 Economy, p525

Similarly, analysis of coal demand in the EIS/SEIS was weak. Chapter 3 of the EIS includes a section headed "Increased demand for coal", which with hindsight looks optimistic, but even at the time is brief and simplistic. It is quoted in its entirety below:

> ***Increased demand for coal***
> *Thermal coal is used to generate almost 40% of the world's electricity. Global demand for thermal coal is expected to grow by at least 3% per annum over the next 10 to 15 years. Future world demand is driven by developing Asian and Indian markets and the international market sees Australian coal as a secure energy supply that is produced in a stable economic and political environment.*[21]

With hindsight, we can see that this forecast growth did not materialise. Global coal consumption peaked in 2014 according to BP's annual energy statistics. Figure 3 below compares Waratah Coal's forecast of 3% ongoing growth from 2011 to BP's calculations of actual coal consumption:

Figure 1: Waratah world coal demand forecast vs actual coal consumption



Sources: Project EIS Ch 03-sustainability; BP Statistical Review of World Energy July 2021

Figure 1 shows that Waratah's assumption of ongoing 3% annual coal demand growth has proven very optimistic. By 2020 actual consumption of coal is 27% lower than Waratah's forecast.

In terms of coal supply, the EIS makes little mention of how other miners and other companies might have behaved to either its forecast demand levels or the demand that subsequently materialised. However, there is no shortage of coal in world markets. Other Galilee Basin projects were obvious examples at the time, while more recent analysis by the Australia Institute shows that Hunter Valley coal mines in NSW are producing around 100

[21] Project EIS Ch 03-Sustainability, p40

million tonnes per year less than their approved capacity.[22] This suggests that existing coal mines are able to supply current and forecast demand comfortably.

In summary, there is no need for the Project in the world coal market and never was. The SEIS made this point succinctly:

> *Is the Project Needed?:*
> *This project is not being proposed or developed out of need. It is being driven by market forces indicating demand for the coal resources will generate an economic return. The project will deliver as a result considerable economic benefits to Queensland and Australia. This is the scenario faced by almost all commercial projects, across all industries and businesses.*[23]

As it turns out, market forces have not indicated demand for the Project's coal and it has not generated either economic return or benefit for the Queensland and Australian communities. It imposes a net cost on these communities. Costs are borne by affected landholders and surrounding industries through ongoing uncertainty around the development. Management expenses impose costs on the proponent, costs which may be transferred to the public if used to reduce tax payments for profitable parts of the proponent's enterprises. The existence of the current challenge shows that substantial parts of the community are affected by the project and the message it sends about Queensland and Australia's approach to energy and climate.

The overstatement of benefits in the EIS/SEIS is still relevant today. Without an understanding of how and why this overstatement occurred and what lessons have been learned from it, decision makers can have no confidence in the more recent assessment documents. In my view, the analysis provided by Mr King, Mr Tessler and others does not provide the frank and transparent explanation of what went wrong in the EIS/SEIS and why decision makers should be confident the project will provide net benefits in the future.

4. In your opinion, has the economic assessment for the proposed mine accurately considered all related costs and benefits. In providing your answer, please consider:

(1) Any state or federal subsidies;

Areas of agreement

As a part of the preparation of the CBA, Mr Tessler asked the project proponent whether there were any subsidies relating to the project. They indicated that there were not. (See the Second Information Response, CBA Appendix 2).

[22] Campbell and Carter (2021) *Mind the gaps: Unused capacity and unfunded rehabilitation in Upper Hunter coal mines*, https://australiainstitute.org.au/report/mind-the-gaps/
[23] Project SEIS – Part C Economy, p528

Based on this advice we agree that there are no direct State and Federal subsidies to the Project such as cash payments or project-specific royalty holidays.

In broad economic terms taxes and subsidies are treated as a transfer between parties and so are often excluded from cost and benefit calculations.

However, we note that as part of his response Mr Campbell has pointed to policy settings which provide a financial benefit to the Project. These are detailed in Mr Campbell's response.

Campbell response

Various policy settings will likely provide a financial benefit to the project, such as the Federal Fuel Tax Credit Scheme, which affects the cost of fuel inputs, or concessional access to port facilities owned by the State. Such policies are labelled as a subsidy by organisations such as The Australia Institute and the OECD, while others such as the Productivity Commission do not use the word subsidy. The International Monetary Fund considers unpriced carbon and air pollution to be a subsidy. Much of this is a matter of definition.

Given the project is financially and economically marginal, the proponent will have every incentive to petition governments for subsidies or other forms of policy support that impose costs on the community such as:

- A royalty holiday similar to the arrangement between Bravus/Adani and the Queensland Government.[24]
- Eased environmental and work safety standards.
- Provision of infrastructure. Queensland Governments have often built infrastructure for the benefit of the mining industry. Queensland Treasury has long complained of the cost of providing infrastructure to the mining industry:

> *There is a real opportunity cost for governments in undertaking the initial capital expenditure. Governments face budget constraints and spending on mining related infrastructure means less infrastructure spending in other areas, including social infrastructure such as hospitals and schools.*[25]

In summary, there are a range of subsidies or policy settings that currently do, or potentially could, assist the project and impose further costs on the community.

Tessler opinion in detail

As a part of the preparation of the CBA, BISOE asked the project proponent whether there were any subsidies relating to the project such as royalty holidays and/or tac concessions. They indicated that there were not. This response is provided in the Second Information Response, CBA, Appendix 2.

Accordingly, this issue is accurately treated in the CBA.

[24] Zillman and Horn (2020) Queensland Government signs deal to allow Adani to defer royalty payments for unspecified period, https://www.abc.net.au/news/2020-10-01/adani-carmichael-coal-mine-royalties-deferred-qld-election/12716272

[25] Queensland Treasury. (2013). Queensland Treasury Response to Commonwealth Grants Commission: Response to Terms of Reference for Commonwealth Grants Commission 2015 Methodology Review

I note however that in any event, in broad economic terms taxes and subsidies are generally treated as a transfer between parties. As such they are not generally referred to as costs or benefits. However, I also refer to my discussion of jurisdictional scope in my response to Question 4-2 below.

(2) Any state or federal taxes or royalties;

Areas of agreement

No significant agreement

Tessler opinion in detail

I again note that in first principles terms, from an economic perspective, taxes are a transfer between parties, rather than a cost or benefit in and of themselves.

That said, they are, in fact, a sub-set of gross revenues. In this context, gross revenues *are* a benefit. Some of these gross revenues are then apportioned by government through taxes and the residual retained by the private sector. However, taxes in themselves may be relevant if the scope of benefits relates to the Queensland community, as some taxes (like Federal Company Tax) may flow to the Commonwealth.

The CBA undertakes an estimation of project taxes and royalties based on the James King's *Analysis of the Galilee Coal Project* ("the King Report") (WAR 0360.0001)

As indicated, royalties are simply a subset of gross revenues which now falls to the State. The CBA allows for royalties in our calculations.

Federal Company Tax is also allowed for in the CBA, as well as some tax deductions due to depreciation effects. These calculations are based on those provided in the King Report. The CBA adds back a component of these (approximately 20% based on Queensland's national population share) to proxy ultimate benefits to the Queensland community as some Federal Company Taxes will be returned to the Queensland community. This is consistent with the approach outlined in the NSW Guidelines, (Table 3.5, p.15).

In addition, the CBA allows for Queensland Payroll Tax effects. Note that again this is a re-allocation of gross revenues within the Queensland community (from the private sector to the State) rather than an ultimate cost or benefit per se.

Accordingly, these items are accurately treated in the CBA.

Campbell opinion in detail

As I explained in previous answers, the EIS/SEIS heavily overstated tax and royalty payments. Mr King and Mr Tessler's analyses are likely to overstate tax payments as history has shown that the project is marginal, supported by Mr King's analysis showing that small changes to coal price and operating costs reduce profits (and therefore tax payments) to zero. More broadly, none of the thermal coal producers operating in Australia have paid the levels of tax estimated by Mr Tessler and Mr King in the years for which ATO data is available.

As mentioned above, it is not clear that Mr Tessler's payroll tax estimate is additional and valid for inclusion in the cost benefit analysis. Under usual cost benefit analysis assumptions, employment in the project is not considered to be additional, so the equivalent payroll tax payments would have been generated in the absence of the project.

Royalty estimates may be more robust, given the nature of the Queensland royalty system. The main source of uncertainty around royalty estimates by Mr Tessler is whether the project will operate consistently, or whether it will experience periods of care and maintenance and other delays, which would reduce royalty payments. This history of the project and the various sensitivity tests that show low or negative profit/producer surplus suggest that this is likely.

(3) The coal price, its variability and the viability of extracting the coal;

Areas of agreement

We agree that the coal price used by Mr Tessler, averaging AUD$95/t is a reasonable starting point and that sensitivity analysis of +/- 10%, 20% and 30% around this starting price is a good range. We agree that the coal price is highly influenced by both short term events, such as Russia's invasion of Ukraine, and long term changes such as competition from other energy sources. We agree that future climate policies could have a significant impact on the coal price and that the thermal coal market faces long term uncertainty to a greater degree than most commodity markets. We note that the project has not made significant progress in the last 10 years, which may reflect this uncertainty.

We agree that the coal price and its variability affect the economic and financial viability of the project. We note Mr King's estimates appear to suggest that a decline in price of below approximately 13% from his central estimate could be sufficient to reduce the project to below a financial break-even point (based on the Net Present Value of Equity Cash Flows After Tax in Year 1). However, Mr Tessler's assessment of economic viability is that the project would still be economically viable at this price.

Tessler opinion in detail

We have adopted estimates of the coal price based on the King Report. This estimate equates to an average of $A 95.34 /tonne in real terms over the lifetime of the project. As indicated, the Project records a clearly positive economic result at that price

In addition, as indicated by Mr Paul Manley, in the *Joint Statement of Evidence - Coal and Energy Markets* (COM 0069.0001) , Paragraph 57, these price estimates may in fact be conservative ones.

I note the potential for price variability. Chapter 6 of the CBA subjects this price examines a large variety of sensitivity tests involving not only "static" price (and thereby revenue) changes of +/- 30% but the interactive effects of price changes on other elements of the model including tax, royalties and net producer surplus. The economic case for the Project remains positive across all price sensitivity tests. It also remains positive across a variety of other sensitivity tests including tests based on our interpretation of price and volume effects based on IEA projections (as noted the sole exception is a relatively high end NZE price and volume scenario).

I note that the King Report (p.5) records a positive NPV of Equity Cash Flows After Tax in Year 1 of $2,010 million, using a 7% discount rate and also records the results of a variety of other sensitivity tests. As indicated these would appear to indicate that the Project would fall below a financial break even point with a price decrease of approximately 13% (King Report, p.6) . However, we also note Mr Manley's observations above that price estimates for the Project's coal may be conservative to begin with.

In addition, I note that there is a distinction between an economic CBA and issues of financial viability. Financial viability represents a separate test to an economic CBA.

Campbell opinion in detail

In my view, it is misleading to suggest that the project could produce positive economic values while losing money for the proponent either overall, or for significant periods. Most economic analysis rests on basic assumptions such as the rationality of all parties and that businesses seek to maximise profits and minimise losses. Yet many of the scenarios in Mr Tessler's sensitivity analysis suggest the project would operate indefinitely while losing money. Without further explanation and detail, this analysis does not help decision makers understand the economic and financial aspects of the project.

(4) Any relevant managing company or joint venture partnership structures;

Areas of agreement

While noting that the detailed implications of corporate structures are outside our area of expertise, we agree that based on public information and the information provided to Mr Tessler by the proponent, that the project is owned and managed by interests based in Queensland. We agree that Mr Tessler's CBA treats this appropriately, perhaps conservatively as producer surplus is also assumed to accrue to other parts of Australia.

We note Mr Harris's affidavit and statement that the project is looking to overseas state-owned enterprises and banks to support the project. If this were to come about, some adjustment may need to be made to estimates of producer surplus accruing to Queensland and Australia, depending on the scope of assessment and interpretation of this fact.

Tessler opinion in detail

Waratah Coal provided answers on the management structure in their Response to the Second Information Request indicating that project ownership is located in Queensland and that all project revenue flows would be retained in Queensland other than revenue flows to contractors and their employees (the majority of which would be retained in Queensland). This is provided at Appendix 2 of the CBA and again noted on p.30 of thew CBA.

I note Mr Campbell's observation about potential foreign financing of the Project, referencing Mr Harris first affidavit (WAR0291.0001), though I also note that this document also refers to Minerology itself potentially providing financing of required (Paragraph 127). As indicated detailed implications of financial structures are outside our expertise and I have no further information on

such financing or corporate structure beyond what has been provided in WAR0291.0001 and in the Second Information Response.

I also note that the NSW Guidelines (p.12) refer to Net Producer Surplus as the economic rent attributable to NSW owners of capital and suggests applying NSW's share of the Australian population as the default proportion of ownership. A similar approach was applied to Queensland in the BISOE CBA.

As indicated above, our estimation of Net Producer Surplus refers to project ownership structure noting the proponent's response that project owners were based in Queensland. Nonetheless, following the stipulations of the NSW Guidelines only 20% of NPS is assumed to accrue to Queensland, based on its national population share, with the rest accruing to the remainder of Australia. Given Waratah Coal's response regarding Project ownership, this approach may be conservative and underestimate benefits to the Queensland community.

(5) Ongoing management costs, including costs associated with the proposed final void;

Areas of agreement

We note that Mr Tessler's CBA, based on data in Mr King's report includes values for final rehabilitation costs.

Tessler opinion in detail

BISOE allowed for ongoing management and other costs as derived from the King Report and incorporated these into the CBA's costings .

In terms of the final void many of the concerns appear to relate to groundwater issues. The CBA (p.53) noted the proponent's commitment to void management as a part of its rehabilitation plan and the Coordinator General has previously stipulated conditions for the proponents' s void management plan (WAR0040.0001, p.47).

I note that the King Report allows for rehabilitation costs. Given this, our incorporation of the King Report's estimates into the CBA and the past findings of the Coordinator General, we have assumed this would cover the relevant costs.

Further discussion of rehabilitation costs and issues is provided in Chapters 3 and 4 of the CBA.

Campbell opinion in detail

The figures suggested for site rehabilitation and final void management seem optimistic and little detail is provided. This is concerning as the cost of final site rehabilitation for large open cut mines can run into the billions of dollars. As the financial case for the project is weak, decision makers should be concerned that much of this cost could be borne by the community, either through a degraded environment, or through public funding of mine site rehabilitation. Indeed, Queensland has a publicly funded abandoned mines rehabilitation program.

It is worth considering that no major open cut mine in Australia has ever been fully rehabilitated and the site relinquished to the state or a third party.[26] In my view, there is a high likelihood that future generations could incur considerable cost in relation to site rehabilitation, ongoing water impacts and void management from this project and many other mines currently proposed and operating. This is inadequately explored in the economic assessment of this project.

(6) Non-market values, including any values relating to the Bimblebox Nature Refuge and any ecosystem services it provides;

Areas of agreement

As discussed in Question 5 below, we agree that the protection of the BNR has a non-zero benefit (as compared to its partial loss). We acknowledge that quantification of ecosystem values is difficult and that any methodology (including established methods such as stated and revealed preference) will have shortcomings.

Tessler opinion in detail

BIS Oxford Economics has undertaken an estimation of ecosystem values (also known as externalities) as discussed in Chapter 4 of the CBA.

As detailed in the CBA, these estimates include an estimation of the ecosystem value of the BNR based on a published "willingness to pay" study of the Desert Uplands biogeographic region.[27] While any assessment of ecosystem values is inherently difficult, that study specifically explores the valuation of the Desert Uplands and uses choice modelling approach. Choice modelling has been used in environmental valuations for several decades and represents a more sophisticated approach then others in the field such as contingent valuation.

I also note that the NMP differs from the OMP in that the BNR will no longer be subject to open cut mining. Accordingly, the loss of half of the BNR to the project will no longer take place under the NMP and such costs will not be incurred.

Some disturbance of remanent vegetation however *will* still take place, along with some potential subsidence. The cost of this disturbance has been quantified (using values derived from the study cited above) as $0.8 million in PV terms (though it is assumed this disturbance takes place immediately upon project commencement). These costs are incorporated into the CBA.

Nonetheless BIS Oxford Economics has also allowed for sensitivity tests in the CBA relating to the impact of more extensive subsidence along with species loss (including effective allowance for the loss of the Black Throated Finch). Scenario One in the CBA refers to extensive subsidence causing the loss of vegetation over the area of the BNR originally specified for open cut mining in any event (plus the loss of one threatened species and 1% of two non-threatened species). These losses amount to

[26] Campbell et al (2017) *Dark side of the boom: What we do and don't know about mines, closures and rehabilitation*, https://australiainstitute.org.au/report/dark-side-of-the-boom/

[27] Blamey et al. (2000) "Valuing remnant vegetation in Central Queensland using choice modelling", *Australian Journal of Agricultural and Resource Economics*, 44-3

$56.3 million in PV terms. Scenario Two estimates even more extensive subsidence losses and finds that costs could total up to $65.9 million.

BIS Oxford Economics also considered a variety of other non-market costs in the CBA (e.g., noise, air pollution, historic heritage, ground and surface water, waste, impacts on government fixed capital costs). These were detailed in Chapter 4 of the CBA and are incorporated into costs, where relevant. BIS Oxford Economics also notes that some of these non-market costs would also be incorporated (i.e., internalized) into the proponents costings for the project.

Campbell opinion in detail

See response to Question 5 below.

(7) Any costs to future generations that are likely to arise from the Project, including any costs arising from climate change. To the extent that it is within your expertise, please comment on the distributive equity of any future costs;

Areas of agreement

As discussed in our response to Question 2, we agree that the proposed mine would have both benefits and impacts (costs) on present and future generations and that cost-benefit analysis (CBA) is a useful framework for addressing these effects, although it is aimed primarily at assessing efficiency rather than equity.

We disagree on whether the benefits of the mine would outweigh the impacts (costs) on present and future generations. The disagreement on this point relates to a variety of factors including the scope and costings used in the project assessment. In particular, the way in which the costs of climate change are assessed, the populations and ecosystems to which these costs are applied and the way in which existing guidance is interpreted.

Tessler opinion in detail

Much of the costs to future generations may arise from climate change impacts (although some others have been noted below). I note that equity *per se* was not my specific focus or area of expertise but have offered some comments below.

The response therefore involves considering:

- Whether Scope 3 (as well as Scope 1 and 2 emissions) should be considered in such an assessment.
- Which future generations are to be considered (i.e., the "population of standing")
- Given that Scope 3 emissions largely consist of the combustion of coal for electricity generation for overseas consumers, to what extent these could be considered as a part of "the Project". Likewise given that the benefits from power generation and costs of such emissions mainly fall upon the rest of the world ("the global commons") what implications this would have for the focus of the Project assessment ?

The costs of Scope 1 and 2 emissions have been estimated based on reported emissions data and an estimate of the social cost of carbon and attributed back to the Queensland community. As indicated there is a need to define a timeframe in undertaking CBA and the timeframe for the analysis has been defined 2021-2054 consistent with project life. This is common practice for CBA.

Mr Campbell has questioned the approach to assessing carbon prices in the CBA. I note that some of the key carbon prices considered in the CBA (Australian Carbon Credit Units (ACCUs) issued under the Emissions Reduction Fund (ERF), the European Union's Emissions Trading Scheme (EU ETS) and the US government's estimation of the Social Cost of $C0^2$) are well recognized as assisting in climate policy implementation.

ACCUs are voluntary (but nonetheless have take-up including by the private and public sector to meet policy commitments) while the EU ETS has been used as a means to bring home the price of carbon to polluters and society and affect policy change on this basis[28]. If societies are adopting these measures to guide action on climate change (and presumably reflecting social preferences in doing so) it seems reasonable to consider them as a guide to carbon pricing. The potential for some distortions in carbon markets (in either direction) due to current events or other factors was recognized in the CBA (p.82). For that reason, we also considered the US government's Social Cost of Carbon (SCC) measure (CBA pp.81-83). The SCC is likewise a well-recognized measure, established via an intergovernmental working group, using detailed modelling. This takes a different approach to the measuring of climate change costs, based on future damage costs. As indicated in the CBA averaging the ACCUs and EU ETS carbon cost estimates produces a similar value to the US government's SCC carbon price. The CBA also allows for the growth in the carbon price over time, following the price path outlined in by the US government estimations, as indicated in the CBA (pp.81-83).

This approach produces a cost of Scope 1 and 2 emissions associated with the Project. These costs are incorporated as a part of total project costs in the CBA.

It is possible that some impacts may continue past this timeframe. However, the effect of discounting on the materiality of such impacts should not be ignored. For example, the value of $1 a century from now is equivalent to 0.1 cents today at a 7% real discount rate using by the Queensland government.

Mr Campbell has questioned the exclusion of rail and port costs from the assessment. This is tied in with the broader questions of whether transport costs are to be included or excluded from the analysis, the uncertainties over what transport arrangements are to be used for the project and the potential for double counting given a third party entity will be used to haul the coal (See CBA pp.86-87). As transport costs form part of Scope 3 emissions, this is also connected with the question of whether Scope 3 emissions should be incorporated into the analysis. On a more practical note, the information provided to BISOE by ERM at the time the CBA was estimated, only extended to Scope 1 and 2 emissions and likewise excluded transport emissions[29]. The CBA does allow for transport

[28] Demand for ACCUs is discussed at the Australian Energy Regulator, Australian Carbon Credit Unit Demand http://www.cleanenergyregulator.gov.au/Infohub/Markets/buying-accus/australian-carbon-credit-unit-demand . The European Commission defines the EU ETS as the cornerstone of the EU's policy to fight climate change, noting that it is the worlds largest and oldest climate market. See European Commission "Climate Action", https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en

[29] ERM, Galilee Coal project, Greenhouse Gas Assessment, 25 August 2021.

emissions along with Scope 3 emissions in general however in a sensitivity test based on the findings of the *Joint Statement of Evidence – Greenhouse Gas Emissions and Climate Change* – by Prof John Church, Prof Will Steffen and Dr Bethany Warren (COM0067.0001) - see CBA pp.87-88 .

We note that this document also indicates that transport emissions account for only 2.1% of Scope 3 emissions (COM0067.0001 p. 48).Accordingly, I also note that most Scope 3 emissions would take place outside the Queensland community (and outside of Australia) and will arise from the combustion of coal .

As indicated in the CBA, the inclusion of Scope 3 emissions is a matter of some debate given the national accounting uncertainties, the potential for double counting and questions about jurisdictional scope. The CBA noted that a House of Representatives recently rejected the inclusion of Scope 3 emissions in Australian Greenhouse Gas Emissions reporting obligations, noting this was consistent with international practice.

We have noted the discussion on this in the CBA (pp.83-86). Given that Scope 3 emissions are heavily dominated by coal combustion for electricity generation, which takes place offshore a related question is to what extent this constitutes part of "the Project".

I also note that the Queensland Coordinator-General's *Evaluation report on the environmental impact statement* (2013) (WAR 0040.0001) has previously indicated that Scope 3 emissions should be excluded from Project assessment, noting that:

> *Based on the accounting methodology provided for by the NGER Act and the project* [Terms of Reference] *TOR, I do not consider that Scope 3 emissions should be included in the proponent's assessment of GHG emissions* (p.102)

Nonetheless, we have also undertaken estimates of Scope 3 emissions as a sensitivity test and included alternative estimates of such costs based on the findings of COM 0067.0001 as reported in Chapter 4 of the CBA.

A second (and connected question) is the issue of *which future generations* are being referred to ? Queenslanders, Australians or the global population? While climate change is a global issue, the formal scope of the CBA relates to impacts on Queensland. We have therefore focused on costs and benefits to Queensland in making such an assessment, just as the focus has been on costs and benefits to Queensland in other categories.

We have noted in the CBA that this approach is consistent with the most detailed guide to the assessment of coal mining projects specifically, as published by the NSW Government (YVL 0287.0001) . That document (p.9) defines the specified community of interest as the NSW community, requiring that an assessment of benefits and costs be estimated where possible as those accruing to the NSW community. The NSW Government's (2018) *Technical notes supporting the Guidelines for the Economic Assessment of Mining and Cal Seam Gas Proposals* (2018) (WAR 0288.0001) are also consistent with this definition. These also specifically state that only the expected emissions profile of Scope 1 and 2 emissions are to be considered and that the economic impact of greenhouse gas emissions outputs are to be measured with reference to NSW <u>only</u> (p.48, underlined in original).

Mr Campbell has questioned the use of the Queensland population as an allocator for climate change costs. I note however, that these documents use population as a guide to the attribution of costs and benefits. For example, Table 3.9 (p.15) of the NSW Guidelines provides a clear example of

the attribution of costs and benefits on a population basis. BISOE has used this approach as a guide to the allocation of costs and benefits for other elements of the analysis.

For example, as roughly 80% of Australia's population resides outside Queensland, roughly 80% of the CBA's producer surplus was assumed to benefit populations elsewhere in Australia (i.e., *outside* Queensland) and so was *excluded* from the assessment of benefits to the Queensland community. In other words, the net producer surplus ultimately attributed to the Queensland community formed only 20% of the Project's total "raw" producer surplus. As indicated in the CBA this may be considered a conservative stance (p.30). In fact, following this approach, net producer surplus (NPS) excluding transport costs is reduced from an Australian community value of $8,667 million in NPV terms to $1,753 million (for the Queensland community). Inclusive of transport costs, Australian NPS falls from $1,047 million in NPV terms to $212 million for Queensland only.

Likewise, the CBA uses the Queensland population as an allocator for Scope 1 and 2 costs (and our Scope 3 costs sensitivities). This is consistent with the approach above.

These documents were used as an instructive guide to the development of the CBA and applied to a Queensland context. The scope of the CBA was accordingly restricted to the Queensland community.

This approach is also consistent with the scope indicated in the Queensland Government's Cost *Benefit Analysis Guide: Business Case Development Framework* (2021) which refers to CBA being at the "whole of system, whole of state level with the entire liability to the state" (p.5). It is also consistent with the *Queensland Coordinator General Economic Impact Assessment Guidelines* (YVL 0286.0001) which notes that should conditions be required to address "local, regional or state economic impacts" Economic Impact Assessments (EIAs) should be undertaken to help form the basis for the development of such conditions (p.2).

A third (and likewise connected) issue is that Scope 3 emissions largely consist of the combustion of coal for electricity generation for overseas consumers. Consideration of the costs of such emissions suggests that activity outside the actual mining of coal could be taken into account and that the costs to such consumers and the broader global community from Scope 3 emissions could likewise be taken into account. Correspondingly, the benefits of coal fired power generation to overseas consumers would need to be accounted for. However, if the benefits from coal fired power generation and corresponding costs of carbon emissions mainly fall upon the rest of the world ("the global commons") this extends the boundaries of the future generations under consideration to global populations. Given the large costs and benefits associated with overseas power generation, it would also seem to substantively change the focus and the definition of "the Project" from the mining of coal to the combustion of that coal overseas.

This is an important point, since if power generation associated with coal combustion (i.e., the large part of Scope 3) for ***and*** the international community are both brought within scope of the analysis (i.e., counted as part of the "population of standing") then the bulk of the assessed Project costs and benefits will fall outside Queensland. However, this seems at odds with the community and scope definitions discussed above.

My view is that the intent behind current guidelines relates to the Queensland community and accordingly that costs and benefits of the Project relating to future generations should be assessed with refence to that community.

To the extent that Queensland is affected by the impacts of climate change from Scope 1 and 2 emissions, as indicated, only a small part of the global climate change impacts of Scope 1 and 2

emissions would impact on future generations within Queensland itself. This is accounted for in the CBA. Likewise, even if Scope 3 emissions were to be included it is the future impacts on the Queensland community which would be of relevance to the CBA.

I note that distributional issues are separate to the focus of a CBA which is *a priori* concerned with efficiency (i.e., is society as a whole better or worse off). To some extent climate change related issues are also a climatological and geographical issue. One might say that the impacts of future climate change would affect poorer countries with a leaser ability to deal with it more than richer ones, along with low lying or island nations. However, these are issues of international equity and outside the costs and benefits to Queensland.

Within Queensland it might be speculated that poorer strata of society might be more affected. I note the findings of Anthony Coleman's evidence(YVL0279.0001), outlining the effects of natural disasters due to climate change could be relevant in this context. In addition, the evidence of Professor Hilary Bambrick (YVL0280.0001) also points to climate change impacts on Queensland. These include impacts on chronic disease from extreme heat which may have particular impacts on First Nations populations and the elderly.

I note that the provision of public goods (e.g., flood defenses) and redistributive payments might also help alleviate such impacts. It is reasonable to expect that some of this will occur, although the extent to which this will mitigate equity impacts is a much broader issue, outside the scope of this analysis.

I would again caveat these findings however noting that the Project itself would have only a very small impact on climate change costs and by extension on equity outcomes. This is even more the case if Scope 3 costs are excluded (as recommended by the Coordinator General).

In terms of non-climate equity impacts this is likewise outside my specialty. However, I note the proponent has considered issues of social equity in its Social Impact Management Plan (SIMP) and revised SIMP. Issues considered included potential for drug abuse, social dislocation and family stress. The insertion of a large workforce population into accommodation located near the town of Alpha could potentially contribute to these. In addition, there is some potential for a housing market/rental squeeze and rising costs of living for local residents (noted by the CGE analysis undertaken by Victoria University's Centre of Policy Studies (CoPS)). However, as the CoPS modelling noted, these effects would be modified by the construction of additional accommodation. Such construction would take place under the proponent's plans. (As input data treated accommodation as an operating cost input rather than as a capital input during an investment phase, the CoPS modelling treated the accommodation costs as a part of the mine operating costs rather than as an addition to the capital (i.e., housing) stock per se.)

Lars Holms' expert report (WAR 0441.001) also noted the potential for adverse equity impacts due to the reasons noted above, but balanced these by positive outcomes such as reversal of population decline, higher patronage of local clubs and institutions and meeting local community aspirations. He submitted that on balance social impacts would be positive. Nui Harris' first affidavit also noted the commitments required by the Coordinator General including the maximization of local employment opportunities for indigenous and disadvantaged groups (WAR 0291.001, Paragraph p.48).

Campbell opinion in detail

As explained in my answers to Questions 1 and 2, the benefits of this project are uncertain and accrue to current generations of Queenslanders, whereas, if the project proceeds, the external costs are relatively certain and will be borne by future generations in Queensland and globally.

(8) When considering predicted impacts arising from climate change on the Queensland environment, whether the Project is likely to contribute to future increases in insurance premiums for landowners, particularly landowners in coastal communities;

Areas of agreement and disagreement

We agree that, when considering the predicted impacts arising from climate change on Queensland, the Project is likely to contribute to future increases, at the margin, in insurance premiums for landowners, including on coastal communities.

However, we also agree that insurance premiums themselves are a transfer of risk rather than a cost or benefit in CBA terms and that the real issue is the costs of climate change itself on Queensland communities, including coastal communities.

As discussed in earlier answers, we disagree on the materiality of such climate change costs (and any insurance premium effects) to Queensland communities, arising from the Project.

Tessler opinion in detail

I note that I am not an insurance industry employee nor an expert on the insurance industry itself

I agree that there could be potential for future increases in insurance premiums in Queensland as a result of climate change impacts.

However as indicated in the Project itself will contribute only a small amount to global climate change impacts. Total Project emissions amount to 0.17% of annual global annual emissions if Scope 3 emissions are included (with Scope 1 accounting for 0.0027%, Scope 2, 0.0015% and Scope 3 0.16%). I note these are total global impacts - not impacts simply confined to Queensland. Impacts on Queensland itself would be a fraction of these effects.

The extent of any such increase due to the Project itself is therefore likely to be small.

A further issue is the relevance of insurance premiums *per se* (irrespective of whether they are incurred in coastal communities or elsewhere). Insurance premiums in terms of the welfare economics framework used in CBA are a transfer of risk. As risks, rise the transfer may be altered. But they are not a cost or a benefit to society in themselves.

What is more relevant is the actual damage costs rather than premiums *per se*. To the extent that there are costs specific to such communities they would be incorporated into the costing of GHG emissions from the project.

BISOE has estimated the costs to Queensland arising from the Project in the CBA as indicated, based on international evidence on the social cost of carbon. Global costs attributed to the Project are

discounted and apportioned to the Queensland community as a whole. These costs would therefore include climate change costs faced by Queensland due to the Project. As indicated, this estimation was undertaken using a Scope 1 and 2 definition, however, as indicated we also indicated costs based on an illustrative Scope 3 basis.

I also note the alternative costings of Mr. Coleman which also contain climate change cost estimates for Queensland. However, these are a broad estimate of such costs without specific reference to the *impact of the Project itself* on Queensland. As indicated, such costings would also need to be discounted and apportioned to the impact of the mine itself (relative to global emissions contributing to in order to estimate the marginal impact of the Project). In addition, as indicated it is not clear if any allowance has been made for adaptation costs in these estimates. While adaptation would incur "up front" costs to the extent that it mitigates damage this might also have a (downward) impact on future damage costs (and insurance premiums).

5. Identify the economic benefits of protecting the Bimblebox Nature Refuge in perpetuity and compare that to the economic benefits of the proposed mine.

Areas of agreement

We agree that the CBA specifies an approach to determining the cost (i.e., the economic benefits forgone) of the loss of the BNR in perpetuity as compared to the economic benefits of the proposed mine. We also agree that the protection of the BNR has a non-zero benefit (as compared to its partial loss). We acknowledge that quantification of ecosystem values is difficult and that any methodology (including established methods such as stated and revealed preference) will have shortcomings.

Tessler opinion in detail

I note the question, but I suggest that it needs to be respecified. The real question is perhaps more appropriately phrased as what change there would be should the Project go ahead (including the benefits of the mine and the costs to the BNR) relative to a Base Case where the BNR was left undisturbed (with no mining benefits and no costs to the BNR).

As indicated, under the OMP approximately half the BNR was to be cleared for open cut operations.

However, under the NMP. the loss of half of the BNR not occur since mining operations will be underground. Based on this, there is no direct trade-off comparing the economic benefits of the mine and the preservation of the BNR since both can occur simultaneously.

I also note that 24,237 ha of environmental offsets will still be purchased by the proponent for purposes of environmental preservation (CBA, p. 48, WAR 0362.0001). Although I further note that the *Joint Expert Report for the Land Court of Queensland: Offsets* by Professor Martine Maron and Dr Jarred Cousin (COM0183.0001) indicated that there is inadequate information to determine if the offsets would provide an adequate offset for the loss of the BNR. This document also indicates that estimates of offset benefit are overestimated, with the size of the offsets being inconsistent with

requirements of offsets for Nature Refuges and considerable uncertainty over whether offset sites would achieve a quality score at least as high as the BNR (COM0183.0001, Paragraph ES4-ES12).

I also note that the possibility remains that there will be some impacts on the BNR itself. The CBA estimates the potential for losses due to issues such as some vegetation loss and assesses these costs as $0.8 million. As indicated, it also outlines willingness to pay (WTP) valuations in the CBA which investigate the loss of Desert Uplands territory and species due to the project under various scenarios. As indicated these WTP valuations were based on choice modelling approaches using the Desert Uplands valuations developed by Blamey et al (2000) . While all approaches have shortcomings, choice modelling is a relatively sophisticated and well established methodology which has been employed in environmental assessments over several decades.

As indicated, even after allowing for the costs associated with disturbance of the BNR under the NMP, the economic case for the mine remains positive, with $4,089 million in NPV terms (considering the scope as the mine itself) or $2,517 million (if the fixed rail link option is incorporated).

I note that even the current CBA assessment does *not* assume that offsets negate the cost of the loss of portions of the BNR or other local ecosystems. Rather it treats the cost of offset purchases as an *additional cost* along with any other assessed losses to flora and fauna due to clearing. However, should additional offset purchases be necessary given the conclusions of COM0183.0001) these would need to be added to the assessed costs of the CBA.

Campbell opinion in detail

The economic benefits of nature conservation are often approached through the concept of total economic value. Total economic value tends to be divided into:

- **Direct use values**, such as sustainable grazing, tourism or education (these and following examples come from COM.0042.0010, Bimblebox's Objection to the Waratah mining lease).
- **Indirect use values,** such as improving air and water quality, carbon sequestration and assisting with preservation of useful flora and fauna.
- **Non-use values**, such as the satisfaction people gain by knowing a place like Bimblebox exists, even if they never intend to go there, or of maintaining the option of future use and natural existence, including bequest values.

It is important to note that these values are human-centric, based on satisfying human needs or human consideration of nature's existence. Economics has little to say about the rights of other species to exist outside of human consideration, or the morality of basing decisions about nature conservation on human values.

The elements of total economic value are difficult to quantify. Some direct use values may be marketed, such as sale of livestock, but most indirect and non-use values are not marketed. Attempts to quantify non-marketed values are inherently subjective and often controversial.
Mr Tessler's cost benefit analysis estimates non-use values by transferring values from a 1999 study 'Valuing Remnant Vegetation Using Choice Modelling: An Application to the Desert Uplands of

Central Queensland.'[30] There are various problems with this approach that invalidate Mr Tessler's estimates.

Choice modelling studies were originally used as part of marketing and product development research. Rather than manufacturing many different versions of goods with many combinations of different attributes, and seeing which ones customers valued in the market, researchers asked consumers about different attributes, the trade offs between them and their impact on price. For example, a choice modelling study on cars might consider how much legroom passengers prefer, how much boot space the car has and different prices. The car study would present participants with multiple choice decisions between different combinations of legroom, boot space and price asking which they would choose. Using sophisticated mathematical models, the relationships between the attributes and price are estimated in order to optimise the car for the consumer.

The application of choice modelling to environmental decision making is more problematic. While consumers have a good understanding of their budgets and preferences for legroom and boot space, government budgets, ecology and other aspects of natural resource management are more complicated. The uncertainty of conservation outcomes and the complicated trade offs between conservation and resource use do not lend themselves to easily understandable multiple choice questions. For example, the study used by Mr Tessler forces respondents to choose between the following three options:

Figure 2: Example choice set from Blamey et al

Implications	Option A Current Guidelines	Option B	Option C
Levy on your income tax	none	$60	$20
Income lost to the region ($ million)	none	5	10
Jobs lost in region	none	15	40
Number of endangered species lost to region	18	8	4
Reduction in population size of non-threatened species	80%	75%	45%
Loss in area of unique ecosystems	40%	15%	28%

In my view, even a well-informed participant would find it difficult to make a meaningful choice between percentage change in unique ecosystem coverage, population of non-threatened species and changes to the gross regional product of the Desert Uplands region. Respondents have no opportunity to say, for example, that they do not want to see any endangered species lost in the region at all. The choices are set by the researchers and, as far as I can tell, it is never explained that the claimed costs of conservation activity could just as well be funded by a reduction in fossil fuel subsidies, an increase in government debt or a levy on coal production, rather than increasing income tax.

[30] Blamey et al (2019) *Valuing Remnant Vegetation Using Choice Modelling: An Application to the Desert Uplands of Central Queensland*, https://ageconsearch.umn.edu/record/117846/?ln=en

I say 'as far as I can tell' in the paragraph above because while the Blamey et al study refers to "background information" they provided to participants, there is no copy of this attached to the versions of this paper that I have been able to find.

Choice modelling for environmental decision making was, as far as I am aware, largely led by Australians, particularly the authors of the Blamey et al study. It is not commonly used internationally. This approach was pursued in the 1990s and 2000s with funding from various Australian government departments.[31] The idea that reasonable estimates of environmental values could be incorporated into cost benefit analysis and other policy development tools is clearly appealing. While some studies are still occasionally produced,[32] the peak of environmental choice modelling seemed to come in the late 2000s when three NSW coal mines (Bulli, Metropolitan and Warkworth) funded studies by as part of their EIS documents.

If this was the peak of environmental choice modelling in Australia, it was also the beginning of its decline. The approval of the Warkworth mine extension was successfully challenged in the NSW Land and Environment Court.[33] Preston CJ made the following points about the choice modelling study:

- Distribution of choice modelling survey was too limited.
- Deficiencies in information provided to survey respondents, including that it was "inaccurate, indiscriminate and uninformative".
- Values in the choice modelling survey were inadequate, including that "that modelling a situation based on a willingness to pay of survey respondents presented with a range of levels that…has nothing to do with the costs, is of limited assistance in the situation confronting a decision-maker."
- All relevant matters were not considered at a level of particularity required.
- Other non-market impacts and values not considered.
- Polycentricity of issues not considered.
- Different weighting and balancing to that required.
- Issues of equity or distributive justice not considered.

Preston CJ concluded on the Warkworth choice modelling study and its use in cost benefit analysis that:

> *I am of the view that the results of those analyses are of limited value in deciding whether I can reach a state of satisfaction as to the nature and extent of impacts in considering each and all of the relevant matters, the weight I should assign to each matter, and the balancing of the matters, to determine whether the Project should be approved or disapproved. (par 496)*

[31] ANU (2022) Choice Modelling Research Reports, https://crawford.anu.edu.au/people/academic/jeff-bennett/choice-modelling-research-reports

[32] For example Gunawardena et al (2020) *Valuing multiple threatened species and ecological communities in Australia*, https://www.nespthreatenedspecies.edu.au/media/dutjtrsk/6-1-valuing-multiple-threatened-species-and-ecological-communities-in-australia-report_v6.pdf

[33] B*ulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited*, [2013] NSWLEC 48, https://elaw.org/system/files/attachments/publicresource/Bulga-Milbrodale-Progress-Association-Inc-v-Minister-for-Planning-and-Infrastructure-and-another-2013-NSWLEC-48.pdf

This judgement was appealed to the NSW Court Of Appeal, including on a ground that Preston CJ had inappropriately rejected the evidence of Warkworth's choice modelling.[34] This appeal was dismissed, including detailed consideration of the choice modelling evidence, concluding that "his Honour did not reject that evidence, but rather considered that their evidence was of limited value." Following the Warkworth judgment and appeal, choice modelling has rarely been used in planning processes in my observation.

This history is relevant to Mr Tessler's analysis as the methodology behind the study he uses as the basis for valuing the Bimblebox Nature Reserve is largely the same as the Warkworth study. Both were co-authored by Professor Jeff Bennett. The other author of the Warkworth study was Professor Bennett's then-PhD student Rob Gillespie, whom Mr Tessler cites elsewhere.

To summarise, the economic assessment documents relating to the Waratah project have not made a thorough assessment of the economic values of the Bimblebox Nature Reserve and are likely to have understated the value of potential impacts on it. In cases where such impacts cannot be reliably quantified, it is incumbent on analysts to highlight to decision makers that the impact needs to be considered qualitatively.

6. Opine whether the economic benefits of the proposal are vulnerable to any adverse impacts from the emission of greenhouse gases. If they are so vulnerable, please explain the reasons for your view.

Areas of agreement:

The likely effects of climate change on the region of the mine is outside our expertise. However, like most economic activity, the project is potentially vulnerable to impacts such as reduced water availability, periodic flooding, increased ambient temperatures, etc. We note that the Co-Ordinator General has previously considered the impacts of climate change on the project and Waratah's commitment to implement various measures.

Tessler opinion in detail

I take it that this question relates to the whether climate change would impact on the viability of the Project operations themselves. Accordingly, along with noting the likely effects of climate change on the project is outside my direct expertise, I would qualify my views in that the answer to this question relates to the measures taken by the proponent to deal with climate change and the associated costs.

I note that the proponent has previously outlined its assessments of the impact of climate change in the EIS (Vol. 2), Chapter 10 (Mine) and SEIS vol. 2, Appendix 37 (WAR0046.0001 to WAR0129.0001 and WAR 0130.001 to WAR0197.0001).

In considering the proponents measures with respect to climate change resilience, the Co-Ordinator General has previously indicated that:

[34] Warkworth Mining Limited v Bulga Milbrodale Progress Association Inc [2014] NSWCA 105, https://www.elaw.org/au.warkworth.14

> *I am further satisfied that impacts from climate change can be adequately managed through infrastructure design and implementation of a sound workplace health and safety system which Waratah has committed to implement. (WAR 0040.0001, p.101)*

To the extent that such relevant costs are built into the operating costs outlined in the King Report they are also incorporated into the CBA and so form part of the assessed costs of the Project.

I also note that the economic case for the Project as a whole (i.e., the CBA) indicates that benefits are substantially higher than costs.

Accordingly, my view is that, to the extent that the economic benefits of the Project are vulnerable to climate change impacts, such costings would already be incorporated into those estimated for the project. Even if there were additional costings these would have to be very material (i.e., over $4,089 million in NPV terms or $2,577 million if transport links are included) to negate the economic case for the mine.

7. Having regard to the joint expert report to be given by the energy market experts, opine on whether the replacement of existing customers' coal in the market with that to be sold by the Applicant is consistent with sound economic theory.

No significant agreement

Tessler opinion in detail

I note that I must caveat these response with the fact that I am not an energy markets expert and so refer to the Paul Manley and Rachel Wilson's Joint Expert Report (*Joint Statement of Evidence – Coal and Energy Markets*, COM 0069.0001).

As noted on p.5 (2.l) , p.23 and in Paragraph 61 of that report, the energy experts agree that the coal from the project has the potential to displace higher cost/lower margin supply that sits higher on the supply cost curve.

There is also agreement in that report that while the project's coal is of similar quality to that produced in Australia and other seaborne providers it is of higher quality than that produced in Indonesia (p.5,2.n)

Given that the project's coal provides a qualitative improvement over some other seaborne coal, the Project's coal could then replace coal from sources such as Indonesia in particular. This may be especially so given that some Indonesian coal, while being of lower quality, also sits higher on the seaborne thermal coal total cash cost curve, as indicated in Figure 3, p.25 of COM 0069.0001.

Campbell opinion in detail

Under general economic theory, demand, supply and price interact to determine market outcomes. When the supply of coal is expanded, such as with the approval and construction of a large new coal mine, three things happen:

- More coal on the market pushes prices down.
- The lower prices cause:
    - Consumers to use more coal, creating more greenhouse gas emissions.
    - Higher cost producers to produce less.

The theory holds in reverse:

- Less coal on the market makes prices higher.
- The higher price causes:
    - Consumers to use less coal, creating less greenhouse gas emissions.
    - Higher cost producers are able to remain in the market.

Thus, approving and developing the Waratah project will increase greenhouse gas emissions and reduce production, royalties and jobs in other mines.

The energy market joint expert report refers to this basic theory, with agreement that "when supply is greater than demand, coal prices will fall" (par 70) and "should the Applicant's coal enter the market, it has the potential to displace higher cost/ lower margin supply that sits higher on the supply cost curve" (Heading above par 56.).

Despite seeming to accept this basic economic theory, Mr Manley then contradicts it by claiming that there would be 100% substitution for the project's coal should it not be developed. He writes:

> *Should Waratah not be developed there are ample projects both within Australia and elsewhere that could satisfy projected seaborne thermal coal demand. (par 204)*

Here Mr Manley ignores the interaction of demand with price. The question is not whether other mines *could* produce the same volume of coal, but what impact *will* the development of Waratah have on the coal price, and by extension on the amount of coal consumed, greenhouse gasses emitted.

Mines make their production decisions based on price forecasts, not the approval status of some potential competitor somewhere else in the world. Every economic assessment of a coal project that I have ever read includes discussion of coal prices. I have never read an economic assessment of a coal project that includes discussion of project viability with reference to some particular mine in Kalimantan, the Hunter Valley or Shanxi. Yet that is what the 100% substitution argument is based on.

Other things being equal, economic theory says that with more supply, prices will be lower. The effect on prices will be more significant if coal demand is declining and if the additional new supply is a significant quantity. On these points, the energy market experts agree that thermal coal demand is forecast to decline over time (par 2.a.). The EIS emphasised the global significance of the project:

> *3.5.3.3 Global Dimension*

While the project is situated in one state of Australia, its size and breadth is significant on a global scale. Some impact areas that have been considered on a global scale include…

…trade and economic flows between suppliers, the project and customers.[35]

Indeed, Chapter 17 of the EIS boasts that the project "will represent an increase in Australian thermal coal export revenues of approximately 25.7%".[36] Based on the ABARE figures quoted in the EIS introduction, project's proposed 40 million tonnes per year represents almost 10% of Asian coal demand.[37] With the likely decline in coal demand, this would be even greater.

Furthermore, one of the "beneficial implications" of the project is considered to be its role in developing the wider Galilee Basin:

17.4.6 Implications of the project for future development

17.4.6.1 Beneficial implications

The project will involve the following key elements that could provide significant future benefits for the regional state and national economies:

- *The development of rail and port infrastructure that is critical to access and commercialise coal and other resource deposits with export potential in the Mine Catchment and the Galilee Basin*

…

Rail, port and other support infrastructure developed for the project will be accessible by third parties, which will open the abundant high quality resources available in the Galilee Basin for future development including coal and coal seam gas, by providing base support infrastructure and reducing hurdle rates for future resource development.[38]

The development of a mine of this size in a declining market would have a discernible impact on coal markets, coal price and the consumption of coal by consumers. This is particularly so given the Project's potential to lead to further development in the Galilee Basin. Basic economic theory suggests that this will lead to increased consumption of coal and reduced coal produced by other mines, including in Australia. I note that this logic is supported by economic modelling conducted by Wood Mackenzie, commissioned by the owners of the Port of Newcastle, which focused on how reduced coal prices from Galilee Basin development would impact mines in NSW.[39] While not the focus of that report, the downward pressure on prices that Galilee Basin development would cause, would logically lead to increased consumption of coal by consumers, resulting in increased greenhouse gas emissions.

In my view, the increase in climate impact and reduction in benefits produced by other mines is inadequately emphasised in the assessment documents for this project.

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[35] Project EIS Chapter 3 – Sustainability, p44
[36] Project EIS Chapter 17 – Economic Impact Assessment, p427
[37] Project EIS Chapter 01 – Introduction, p10.
[38] Project EIS Chapter 17 – Economic Impact Assessment, p427
[39] Long (2017) *Galilee Basin mines will slash coal output, jobs elsewhere, Wood Mackenzie says*, https://www.abc.net.au/news/2017-07-06/galilee-basin-mining-project-will-reduce-coal-output:-research/8682164

CVs/Detail of Experience

Andrew Tessler

Head of Applied Economics , BIS Oxford Economics

Bachelor of Economics and Government, University of Sydney

B.Com (Econometrics and Marketing), University of NSW

GDip Transport Management (Economics), University of Sydney

GDip Finance, FINSIA

Andrew heads up BIS Oxford Economics' Australian applied economics consulting practice. He has 20 years' experience as an economist and is a dual Australian/UK national specialising in transport economics, with international experience in the field. Andrew has worked at the NSW Treasury, Booz & Co (now PwC Strategy&) and Oxford Economics in the UK.

Andrew's work has covered a diverse range of sectors including energy, the arts, law enforcement, transport, infrastructure, and the environment and has included economic appraisals, valuations, rate of return studies, market analysis and program reviews.

PROJECT EXPERIENCE:

Energy and transport economics

- Review of the business case for the Hume Coal Project for NSW Department of Planning Industry and Environment (DPIE)
- Review of the business case for the Tahmoor Coal Project for DPIE
- Review of the business case for the McPhillamys gold mine for DPIE
- Analysis of the impact of Smart Meters on electricity consumption in the UK
- Updated review of remaining mine life of Hunter Valley Coal mines, incorporating statistical, operational and industry issues for IPART asset valuation
- WACC analysis of the cost of renewable power generation
- Cost-benefit analysis of three Sydney road projects for RMS
- Valuation of the benefits of Australia's road network
- Review of business case for Melbourne's North East Link (NEL)
- Economic benefits of the Internet of Things on the US truck network.
- Review of the UK Airports Commission's findings on the optimal location for airport expansion.

- Review of the economic costs of HS2 in Buckinghamshire
- Economic impact of a new London Airport for TfL
- Economic impact of Heathrow Night Flights
- Economic appraisal of Mid East Air Traffic Control improvements
- Cost-benefit and financial analysis of the Singapore Eastern Region Line and Airport Express Line extension
- Valuation of electronic border checking system for the Organisation of American States
- Appraisal of Melbourne's rolling stock procurement program
- Review of strategic options for Sydney's North-West rail link
- CBA of nationwide ATMS signalling system for ARTC
- Cost-benefit and financial analysis of Central Coast Rail Upgrade
- Review and development of elasticities for domestic shipping markets

Regulatory Economics

- Review of Third Party Access Pricing for freight movements through Sydney
- Assessment of the financing costs and final DORC for the Tarcoola to Darwin rail link
- Examination of regulatory and competition policy issues surrounding the Eastern Gas Pipeline, Moomba Gas Pipeline, Tasmanian Gas Pipeline and the Queensland Gas Code
- Analysis of Hunter Valley mine, rail and port infrastructure and projections of the future Hunter Valley coal haulage task in support of IPART's valuation of Rail Access Corporation assets
- Analysis of Public Private Partnership (PPP) arrangements in South-East Asia
- Advice on treatment of valuation and the rate of return for New Zealand Road and Rail Infrastructure
- Assessment of appropriate charges for bulk freight access to rail track owned by Asia Pacific Transport and subsequent support for (successful) legal action in National Competition Council
- Examination of regulatory, issues connected with implementation of Victorian Rail Access Regime for the Victorian Essential Services Commission and provision of dispute resolution advice
- Review of proposals to alter the Queensland Competition Authority's current approach towards assessing the regulated cost of capital
- Updated review of remaining mine life of Hunter Valley Coal mines, incorporating statistical, operational and industry issues for IPART asset valuation

Selected other work

- Total Economic Valuation of the Great Barrier Reef and the impacts of climate change induced bleaching
- Total Economic Valuation of the British Library
- Total Economic Valuation of the Royal Botanic Gardens, Kew
- Cost-Benefit Analysis for proposed expansion of Carriageworks multi-arts centre
- Economic Assessment of Sydney's Sculpture by the Sea
- Economic Impact Assessment for La Trobe University
- Economic impact of post-Olympics "ICity" development
- Framework for a cost-benefit analysis of tourism in the UK
- Financial and economic impact of the Internet of Things
- Financial and economic impacts of Big Data in the US and Europe
- Economic and financial effects of cybercrime

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Employment

Research Director (Nov 2014 - ongoing) **August 2013 -**
Economist (Aug 2013 – Nov 2014) **Present**
The Australia Institute
Australia's most influential progressive think-tank, based in Canberra

The Australia Institute researches a wide range of political and economic issues, including public finance and fiscal policy, equity and the environment. I was appointed Research Director in November 2014 and am responsible for coordinating the Institute's team of researchers in addition to my own research, which focuses on economic assessment and its role in planning systems and policy making, particularly around the mining industry. Selected highlights:

- Co-editing book Nordic Edge: Policy lessons for Australia, to be published by Melbourne University Publishing July 2021
- Overseeing growth of research team from six to twelve.
- Australia Institute listed in AFR Power Index as one of Australia's most politically influential organisations.
- Civil Society representative on Australia's Extractive Industries Transparency Initiative multi-stakeholder group.
- Expert witness appearances:
    - Mt Thorley-Warkworth expansion – NSW Land and Environment Court
    - Ashton SE Open Cut expansion – NSW Land and Environment Court
    - Adani Carmichael Mine – Queensland Land Court
    - Kevin's Corner Mine – Queensland Land Court
    - Acland Stage 3 expansion – Queensland Land Court
    - Fingerboards Mineral Sand project – Victorian Assessment Panel
- Journal articles in Australian Environment Review, Biological Conservation and Australian and New Zealand Journal of Public Health (in press).

Director and Economist **2008 – 2016**
Economists at Large (www.ecolarge.com all reports available on website)
Melbourne-based network of "economists without borders" providing consulting services to NGOs, development agencies and community-based organisations. Current projects and past achievements include

Assessment of Victorian brown coal export potential. I was the main author of an assessment of the financial and economic viability of proposals to export brown coal from the Latrobe Valley, which required

- Understanding of markets for different ranks of coal, gas and related commodities
- Understanding of carbon pricing

Economics of hunting in Africa. I have authored several influential reports on hunting tourism and the species conservation in Africa:

- *Horn of Contention* – economics of trade in rhino horns and the potential

conservation implications of trade liberalisation.
- *The $200 million question* – assessment of the value of trophy hunting to African economies and communities.
- *Mane assumptions* – critique of hunting industry sponsored research on the value of lion safaris to east African conservation and economies.

Evaluation of livestock-focussed disaster recovery packages. Ongoing project for World Society for Protection of Animals and their Livestock in Disasters project, requiring

- Experience in bioeconomic modelling
- Understanding of the economic role of livestock in developing countries
- Knowledge of economic literature relating to disaster recovery

Freelance development consultant **2007 - 2008**

Including projects with WWF, European Commission, ACIAR

- Model of environmental service values in the Mekong Basin. Required a thorough understanding of environmental service valuation and benefit transfer protocols
- Financial modelling and project evaluation of EC-funded Sustainable Rattan Harvest Project in Laos, Cambodia and Vietnam. Included fieldwork in project areas and financial data analysis

Education

University of Melbourne **1996-2002**

B.Commerce (Economics) & B.Arts (Honours Economic Geography)

My honours thesis addressed payment for environmental service schemes in China, specifically the "Grain for Green" soil erosion control policy. Data collected during a field trip to Shaanxi Province.

Kyoto University

Economics exchange **2001**

I took three subjects for local students, environmental economics, Japanese economy and organisational behaviour, all taught in Japanese.

Other information and interests

Languages: Chinese, Japanese, Portuguese, basic French and Spanish.

Licences: Driving (car), boat (recreational), first aid level 2

Other interests: Kiteboarding, crosswords and music.