



Review of the Continuation of Boggabri Coal Mine Economic Assessment

Prepared by
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Executive Summary

Economists at Large have undertaken a review of *Appendix Q - Economic assessment of the environmental impact statement into the continuation of the Boggabri Coal Mine*, located in north-central New South Wales.

We have found several issues that call into question aspects of the analysis presented by the Economic Assessment. These issues are:

- No economic analysis of scenarios have been undertaken other than cessation of mining in 2011 and a 21 year, open cut extension despite seven alternative scenarios being mentioned in the Environmental Assessment report.
- Mixing of private financial values and public economic values within the cost-benefit analysis.
- Miscalculation and/or omission of external costs and benefits.

The result of these issues is that the assessment - the cost-benefit analysis and then carried on into the economic impact assessment - present values that inflate public benefits and under estimate public costs. The assessment seems to avoid discussion of distribution of benefits between stakeholders and fail to assess all alternative methods of expanding this mine.

In summary, the overstatement of benefits and understatement of costs of the project mean that the modelling results for the Economic Impact Assessment are heavily compromised and should not be used for decision making purposes.

Introduction

Economists at Large have undertaken a review of *Appendix Q - Economic assessment of the environmental impact statement into the continuation of the Boggabri Coal Mine* (the Economic Assessment). The Economic Assessment was prepared for Hansen Bailey Pty Ltd by Gillespie Economics (the Consultant). This review was made at the request of the Maules Creek Community Council (MCCC).

Lack of alternative scenarios

One of the most important parts of Environmental Impact Assessment (EIA) and economic evaluation of projects is to examine alternative options and select the scenario which optimises the welfare of the community. This is made clear in all guides to EIA and cost benefit analysis, including one co-written by the consultants of this report:

“The main aims of an economic efficiency analysis are to...provide a framework for the evaluation of feasible alternatives” (Gillespie & James 2002).

See also the World Bank Handbook on Economic Analysis:

“One of the most important steps in project evaluation is the consideration of alternatives throughout the project cycle, from identification through appraisal.” (Belli et al. 1997)

Despite this, the Economic Assessment and the EIA that that this assessment forms an appendix of, focus on only two alternatives – complete cessation of mining this year or a 21 year extension using open cut methods. The Economic Assessment claims:

Boggabri Coal’s alternatives for the mining of coal are essentially limited to different scales, designs, technologies, processes, modes of transport, timing, impact mitigation measures, etc. However these alternatives could be considered to be variants of the preferred proposal rather than distinct alternatives. (p6)

But on pages 42 to 45 of the Continuation of Boggabri Coal Mine Environmental Assessment by Hansen and Bailey, seven alternatives are mentioned, including an underground mining option (option 6). As noted by the MCCC, these options have never been subjected to proper benefit-cost analysis, allowing them to be compared to each other and to the presented option. The alternatives have been dismissed as technically and economically feasible, but not desirable – from the perspective of the project proponent.

While the consultant’s brief for the Economic Assessment was, no doubt, only to compare the two options, proper economic analysis would have compared several options using cost-benefit analysis from the perspective of broad net social impact. As the consultant’s co-authored guidelines to economic analysis also state:

The main aim of an economic evaluation is to provide information that will assist decision makers make efficient use of available resources to maximise the well-being or welfare of the community. (Gillespie & James 2002)

It is feasible that other options may produce a smaller return for the operators but a larger overall return to the community due to a better mix of values.

Mixing of private, financial values and public, economic values within the cost-benefit analysis.

Private, financial assessment

Many items included in the benefit-cost analysis mix financial analysis with economic analysis. Financial analysis should focus on dollar values and the profitability of a project to those operating it, while economic analysis should look at the costs and benefits to the society the project will impact upon, in this case primarily the state of NSW and local communities.

The following items from the Economic Assessment should be included in the financial analysis of the project:

- Opportunity cost of capital
- Capital expenditure
- Operating expenditure
- Decommissioning costs
- Avoided decommissioning costs
- Revenue (sale value of coal)

These values, less the royalties owed to the state of NSW and tax paid represent the economic rents – profit – that the proponent is expecting to gain. The table on the following page shows this calculation based on figures provided in the Economic Assessment.

Table 1. Summary of the financial costs & benefits
 (From Economic Assessment and Economists at Large analysis)

Costs		
Opportunity cost of mine land	\$5,000,000	
Opportunity cost of capital	\$7,000,000	
Capital costs	\$778,000,000	
Operating costs	\$3,328,000,000	
Decommissioning costs	\$11,000,000	
Royalties	\$625,566,633	
Total costs		\$4,754,566,633
Benefits		
Avoided decommissioning costs	\$46,000,000	
Revenue	\$5,343,000,000	
Residual value of capital	\$8,000,000	
Total benefits		\$5,397,000,000
Net private benefits to operators		\$642,433,367

We see in Table 1 that the expected profit to the operators of this project will be around \$642M discounted at 7% over the life of the project. Note that the royalty figures here are based on the DPI NSW website figures of 8.2% royalties for open cut coal, at the proponent's suggested price of \$94/tonne. The royalty figures here are also discounted at 7% over the life of the project – why they were not discounted in the Economic Assessment (p8) is not clear, and another example of public benefits being overstated while public costs are minimised.

Other issues – capacity

The modelling may overstate the case of the mine as it is based on “peak production levels...and peak employment levels” (p.21). As reported on page 6, the current operations are up to 5 Mtpa, however the Idemitsu Australia website reports that only 1.55 Mt were exported in 2009¹, indicating that the mine doesn’t currently operate at full capacity - assuming that the majority of the coal is exported². It is beyond the scope of this analysis to fully investigate the factors impacting on whether or not a mine operates at full capacity, however use of full capacity figures serves to inflate any estimates provided by the analysis. This is an important omission from the sensitivity analysis conducted as part of the economic analysis. Production levels were not included in the sensitivity analysis but are as important as the price of coal or capital and operating costs.

Other issues - Discount rate

The discount rate of 7% used through the main part of the Economic Assessment could be considered low. If looking at private investment, the appropriate discount rate to apply to calculate a net present value (NPV) is typically based on the opportunity cost of capital, typically the weighted average cost of capital (WACC) used in the industry concerned. We assume (because the proponent has not made it clear) that the rate of 7% used in the main appendix is a real discount rate (adjusted for inflation) and in addition is a pre-tax discount rate since tax is not included as a cost in the analysis provided. Given this, the discount rate seems low. The discount rate of 10% used in sensitivity analysis may have been more suitable, though conservative, for an Australian commercial rate of return.

If a higher discount rate of 10% were applied to the analysis provided, the net benefits would decrease by approximately one fifth.

¹ http://www.idemitsu.com.au/Operations/Boggabri_Coal/Overview_-_Ownership.aspx

² Note that the description of operations at Boggabri from the Idemitsu website states “Coal from the pit is loaded into rear dump trucks and transported to the ROM crusher pad. Coal is then crushed and loaded into B-double trucks for transport to the rail loadout facility via a private 17 km haul road. The coal is then railed to the Port of Newcastle for export.”

A framework for economic assessment of projects

The net present value of the project to the community is difficult to assess using the Economic Assessment, as many of the costs are not listed or understated, while the benefits are likely overstated.

Economic assessment of a resource should consider what economists call its Total Economic Value (TEV). TEV consists of three components – direct use values, indirect use values and non-use values. Direct use values of the area of the proposed Boggabri mine extension include agriculture, recreation and transport.

Indirect uses refer to how a natural resource produces environmental goods such as air quality, water quality, soil fertility, etc that are enjoyed by people, towns and businesses, even if they are not paid for or consciously used and produced.

Non-use values refer to the value that people gain simply from knowing that a natural or cultural resource – be it a beautiful area, unique country town or threatened species exists.

Although the Economic Assessment discusses direct and indirect use values as well as non-use values, we see that there are several weaknesses in the estimates arrived at.

Direct Use Values

While the direct use values of mining are discussed in the Assessment, there is little discussion of the potential costs to direct uses such as recreation within the state park, or agriculture in the surrounding area.

The calculations of the opportunity cost of use of the state forest land the Economic Assessment only include the value of timber that would be harvested from this land in the future and make no effort to calculate the total economic value of the park, which would also include recreational use values, indirect use values and existence values (see p7-8 of the Economic Assessment).

The park is used by shooters, trail bike riders, naturalists and hikers according to the MCCC. We assume that these users will lose access to a large part of the state park for the duration of the project, and the nature of open-cut mining means that some of the recreational values associated with the site may never be regained. Little information is available on numbers of recreational users, and estimating the economic value of recreation in the area is beyond the scope of this review. However, it is important to note that these values exist, can be significant and have not been included in the economic assessment. A report investigating recreational values of park areas in Victoria, which the same consultants were involved in, estimated consumer surplus values of \$30 per visitor (Hassal & Associates & Gillespie Economics 2004). Why similar values were not estimated and included in this report is unclear.

The impact on agriculture in the project area is also hardly considered in the economic assessment. The acquisition of surrounding properties and impacts on properties not to be acquired is discussed, but the implication of these acquisitions on the agricultural production of the area is not considered. Other parts of the MCCC submission address these points in detail, specifically:

- Decline in Rural Property Values
- Competing Land Use

- Farm Productivity
- Shire Rate Increases
- Housing Affordability

These points should have been addressed and quantified in the Economic Assessment.

The project area is also used for road transport that may be compromised. This is also addressed in the MCCC submission and seems to have been inadequately factored into the Economic Assessment.

Indirect use values

Several externalities relating to the mine proposal are mentioned without considering indirect use values of the project site that may be lost – air quality, noise and vibration, water impacts and visual impacts. These impacts of the proposed mine may be mitigated by the acquisition of surrounding properties, though this debated by other submissions, but no attention is paid to the loss of air quality, the qualities of peace and quiet and visual amenity that are provided by existing woodland and the state park.

While the water impacts of the mine may be contained – again something that is debated by experts – the loss of watershed and aquifer recharge is not considered in the Economic Assessment. The discipline of environmental economics provides many tools for measuring these costs and why some effort to quantify them was not included in the Assessment is not clear. Other parts of the MCCC submission address water, air quality issues, though without economic quantification.

Another indirect use of land is as a greenhouse gas (GHG) sink. While the GHG emissions of the mine operations themselves are discussed in the Assessment, there is no mention of the value of the state forest as a carbon sink which will be lost.

The GHG emissions of burning the coal produced by the Boggabri mine is the elephant in the room of the GHG discussion. This is addressed in more detail in part of the MCCC's submission by Prof Ian Lowe. Professor Lowe's estimate that the burning of 7Mta of coal produces 20-25million tonnes of CO₂, would result in costs of \$0.6 billion to \$0.75 billion per year at the Economic Assessment's chosen carbon price of \$30 per tonne. This is considerably more than the annual revenue of the mine.

The cost of burning this coal is distributed across the globe through climate change, and how much of it should be relevant to the discussion of NSW and the mine area is debateable. At the very least the BCA should state the cost per tonne of CO₂e, at which the NPV is reduced to zero. This would at least put this externality into perspective alongside the alleged benefits.

Given the global cost of carbon emissions the BCA should state the costs unequivocally. It may indeed be true that on a global basis this project is a net negative whilst it is a benefit to NSW. Good public policy and sound BCA requires sound, transparent analysis that allows the truth to stand where it may. If the public of NSW decided to profit at the expense of the

global community then they should be aware of the choice they are making and not have it covered up as this analysis appears to do. In addition, however, it is logically and internally inconsistent of the Economic Assessment that it includes discussion of benefits that will be exported internationally to Idemitsu owners, without discussing the export of the costs.

Non Use values

Social value of employment

The Economic Assessment discusses and places a value on the existence values that the NSW public places on rural jobs and communities, but with little discussion of similar values that might be placed on endangered habitat types or aboriginal heritage.

While discussion of the social and economic value of employment is valuable, it is critical in any such discussion of wider economic impacts to include a full explanation of both the benefits and the costs associated with a project. This consideration and valuation of employment clearly focuses purely on the benefits, with little regard for the many costs.

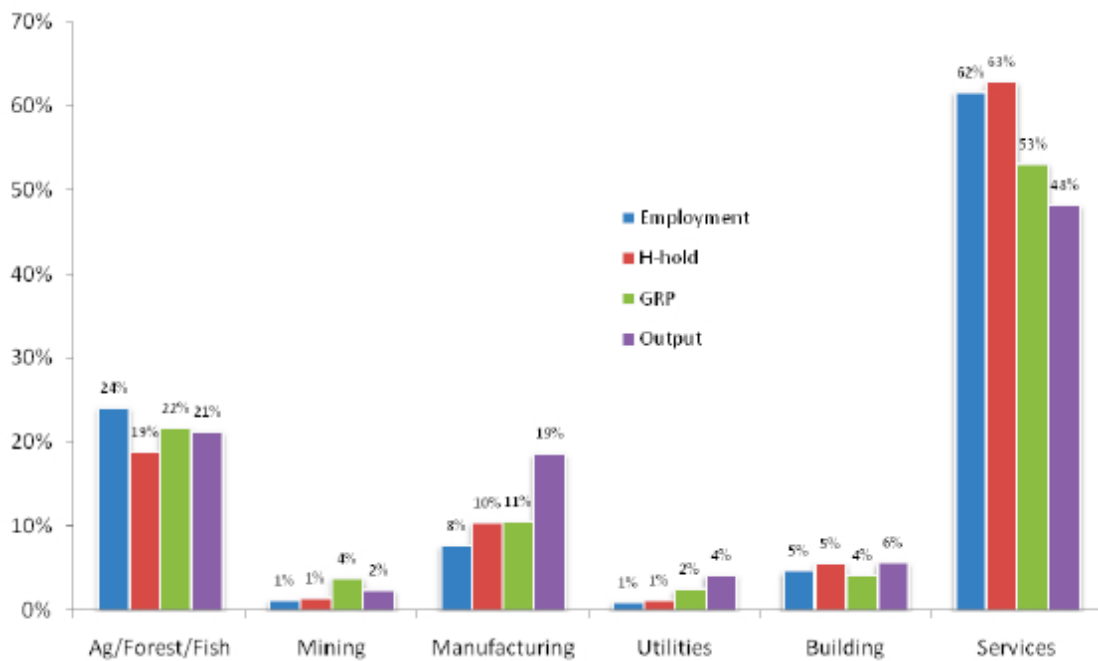
The economic logic of applying existence values to employment is theoretically correct. It may be possible that the Australian public is willing to pay to preserve the jobs in the Boggabri coal mine. Whilst possible this is a highly unlikely probability that the Australian community would pay to support these jobs in a mining boom or at any other time, given the extensive labour shortages in this industry and country and the high wages already being earned at alternative mining locations. Is it logical that the Australian community would pay workers to continue at Boggabri when other mines, possible even nearby, are looking for such workers? Any claim of this magnitude must be backed by some form evidence by appropriate peer reviewed willingness to pay studies subjected to the same thorough standard as WTP studies conducted for environmental existence values.

It is also important to realise that the values mentioned in the Economic Assessment regarding employment are derived not from a study relating to the Boggabri mine, but to a mine in the Illawarra, Bulli Seam Operations (see (Gillespie Economics 2009)). This is important, as the two mines differ in two significant ways.

Firstly, the Illawarra Bulli Seam operation is an underground, longwall mine, while Boggabri is open cut. The choice modelling survey presented to respondents was based on environmental issues such as land subsistence and impacts on local streams – hardly comparable to open cut mining of a state park with listed threatened ecosystems. If Option 6 of the Boggabri mine extension proposal was being considered, perhaps this would be a relevant study, but it seems unlikely respondents would give similar answers to the open cut option.

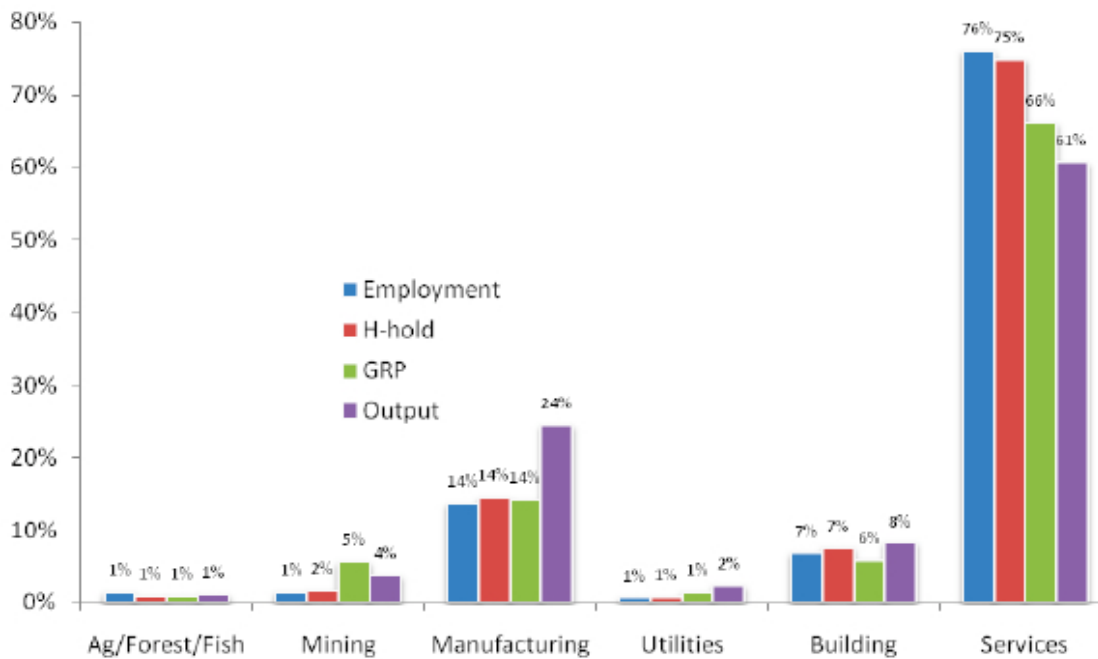
Secondly, the Bulli Seam operation is in an area where coal mining plays quite a different role in the local economy. Note in the graphs below, taken from the Bulli Seam report and the Boggabri Mine extension Economic Assessment, that coal mining is a larger part of the Illawarra economy than agriculture, while in the Boggabri area agriculture is dominant.

Chart 1: Economic structure in the region around Boggabri



Source: Figure 3.1, p.16 from Economic Assessment.

Chart 2: Economic structure in region around Bulli Seam



Source: Figure 3.1, p.31 from Bulli Mining Operations Socio-Economic Assessment

In the above graphs the bars represent employment, household income, gross regional product and regional output as a proportion of the respective regional economies. It seems unlikely that respondents would place the same value on 238 mining jobs in an agricultural area, in an open cut mine that may threaten agriculture, as they would on 1,170 mining jobs in an underground mine in a traditional mining area. We suggest that the \$238M figure for social value of employment generated by the Boggabri mine is misleading and should be revised before being incorporated into decision making.

Existence values of habitat

The Boggabri Mine Extension proposal results in the destruction of federally listed “box-gum” woodlands and grasslands. In the Economic Assessment this loss is given a zero economic value as it will be “offset”. Whether or not this habitat can be replaced by offset plantings is beyond our field of expertise, however, it is contrary to environmental economic practice, where natural habitat is assigned an existence value, much like the social value of employment discussed above. Even if people have no plans to visit this habitat, they will still place a value on knowing that it exists in its natural state. The assignment of a zero value to this cost is inappropriate.

There are many studies that discuss the existence values of Australian ecosystems, see for example (Gillespie Economics et al. 2007) which found the Victorian public placed a value of up to \$3.29 per household per 1,000ha on river red gum forest conservation. It is unclear why a value has not been estimated for the values the NSW public places on the 1,500ha of woodland that will be cleared for this project.

Aboriginal Heritage

Aboriginal heritage is not assigned a value in the Economic Assessment as their “monetisation ...is problematic” (p10). This is disappointing as the consultants have estimated aboriginal heritage values in other studies, such as (Gillespie Economics 2009, see p10 and p28 of the associated CM survey appendix). Why the social value of employment was transferred from this Illawarra study to the Boggabri study, but not values of Aboriginal heritage is unclear.

Cost Benefit assessment of economic values

In light of the above analysis, it is instructive to review the analysis presented in the Economic Assessment.

Costs	<u>EA valuation</u>	<u>Economists at Large opinion</u>
Opportunity cost of state forest land	\$2,000,000	Understated. Recreational use and indirect use values not included. Based only on timber values. Also does not consider loss of agricultural productivity through the purchasing of existing rural properties.
Air quality	Zero value, offset by acquisition of some properties	Understated as does not consider impact on agriculture and the impact of the acquisition program
Greenhouse gasses	\$138,000,000	Heavily understated, with no consideration of carbon sinks or of end use of coal.
Noise and vibration	Zero value, offset by acquisition of some properties	Understated as no consideration made of impact of the acquisition program
Ecology	Zero value due to environmental offset program	Understated as does not consider existence value of natural habitat, or take into account the near impossibility of replacing it to the same quality.
Groundwater	Zero value	Understated, as does not consider the loss of forested areas for groundwater recharge.
Traffic transport	Zero value	Unknown
Aboriginal Heritage	Zero value "negligible impacts"	Understated, aboriginal heritage values are calculated in other studies and should be included as a cost of this project.
Visual impacts	Zero value	Understated as does not consider the loss of local visual amenity
Surface water	Negligible impacts	Understated as does not consider the loss of runoff area into watersheds.
Total costs	\$140,000,000	Heavily understated due to the above issues.
Benefits	<u>EA valuation</u>	<u>Economists at Large opinion</u>
Royalties	\$642,433,367	Overstated due to assumption that mine always operates at full capacity.
Social and economic values of employment	\$234,000,000	Heavily overstated, as this value has been transferred from an underground mine in the Illawarra, an area with different socio-economic background.
Total benefits	\$876,433,367	Overstated due to the above issues
NPV	\$736,433,367	Heavily overstated due to the above issues. Unclear if this is a positive value and therefore if the project should proceed. It seems unlikely that the open cut option for the project is the optimal scenario for the local community or the state of NSW.

The overstatement of benefits and understatement of costs of the project mean that the modelling results for the Economic Impact Assessment are heavily compromised and should

not be used for decision making purposes. It should also be noted that aggregate output or expenditure figures do not represent real economic value, only the size of a particular activity. A more accurate measure of economic value would be based on the value added to the Australian economy as a result of the gross figures above.

Conclusion

Economists at Large believe the Economic Assessment of the Boggabri Coal Mine Extension Project should be revised before a decision is made on the project. The Assessment confuses analysis of private financial decision making with economic assessment, which, combined with the lack of alternative scenarios, makes assessing the value of the project to the public difficult.

The understatement of costs and overstatement of benefits of the project, by omission or methodology, further reduce the usefulness of the Assessment. We hope that this review clarifies some of the Assessment and we would be happy to further explain any points.

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