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## **Economics Impact Assessment Peer Review**

# **‘Continuation of Bengalla Mine Economic Impact Assessment’**

## **An expert review of the Gillespie Economics study**

**Jeff Bennett<sup>1</sup>**

In this review, I begin by establishing my credentials as an expert reviewer. An assessment of the overall approach taken by Gillespie Economics to the analysis of the Bengalla Mine proposal is then provided followed by a sequence of detailed points which constitute the most contentious components of the study. Finally, a conclusion as to the merits of the analysis is provided.

### **Credentials**

I am Professor of Environmental Management at the Australian National University with around 40 years of experience as a researcher, teacher and consultant in the field of environmental and resource economics. I am a Fellow of the Academy of Social Sciences in Australia and a Distinguished Fellow of the Australian Agricultural and Resource Economics Society. My specific areas of expertise are incorporating environmental impacts into economic assessments and the role of the private sector in environmental conservation. I have published over 100 papers in refereed journals and am the author or editor of over a dozen books. I have acted as an advisor to numerous state and federal government departments and authorities (currently for Food Standards Australia and New Zealand and the NSW Marine Estate Authority), was a pro-bono member of the board of Wetland Care Australia and was Director of the Environmental Economics Research Hub, funded by the Federal Department of the Environment. I was a part-time member of the Planning Assessment Commission for the Metropolitan Mine and the Bulli Seam Operations approvals process and I appeared before the Land and Environment Court as an expert witness in the Warkworth case.

My role in providing this expert review is to set out a professional and independent analysis of the Gillespie Economic Impact Assessment completed for the Continuation of Bengalla Mine Environmental Impact Statement.

### **Assessment Overview**

The Gillespie Economics (GE) Assessment follows the NSW Government guidelines (NSW Government 2012 and James and Gillespie 2002) by presenting a benefit cost analysis (BCA) and an input-output analysis (IOA) of the Bengalla proposal. Both analyses follow conventional practice in their application and have been performed competently. They provide a sound basis for decision-makers to consider the economic consequences of the project.

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The BCA is structured around the estimation of net production benefits where benefits and costs are readily estimated with reference to value data from market transactions. The so-estimated net production benefits are then framed in a 'threshold value analysis' whereby the net production benefits are set as the threshold value that the non-marketed environmental, social and cultural costs of the project must exceed in order for the Bengalla mine to be rejected on economic efficiency grounds. The GE assessment takes the analysis one stage further by advancing some estimates of the non-market costs in order to provide decision-makers with a degree of value relativity. This approach makes an advance on traditional BCA in which non-market values are largely ignored, at least in a quantitative sense, but falls short of undertaking primary non-market valuation studies. It is, however, an approach that is taken (and is acceptable) when the time and/or money available for conducting project assessments are limited. The caveat on such an approach is that in the absence of primary valuation studies the policy maker must be aware of the increased judgement required in the decision making process.

The BCA performed by GE thus follows accepted principles of economic analysis and provides decision-makers with guidance as to the economic efficiency of the proposed mine. The finding that the project will yield a significant net present value indicates that the well-being of the people of Australia and specifically residents of NSW will be improved by the project's implementation i.e. the benefits of the project outweigh the costs.

This finding does come with some caveats. First, the omission of primary estimates of some elements of benefit and costs because of the difficulties associated with their estimation must be noted. Second, in accordance with standard BCA practice, the distribution of the benefits and costs of the project is not explicitly integrated into the net present value calculation. Rather equity concerns are addressed through a documentation of the various groups within society that gain and lose. This provides decision-makers with relevant information to their task of assessing the trade-offs involved with any project.

These caveats are particularly pertinent to a correct appreciation of the role of BCA in decision making. It is not intended to be a decision generator i.e. to take the place of decision-makers. Rather, it is a vehicle designed to provide information about the relative strengths of the benefits and the costs to society that are created by a proposal. It quantifies the trade-offs that a decision-maker needs to consider and it does so with regard to the preferences of the individual members of society for the various benefits and costs that are involved. It thus allows decision-makers to be aware of the values held by the people who comprise the society that is being impacted. As such it is an important tool of democratic decision making.

The IOA estimates the impacts on economic activity caused by the Bengalla mine at the regional and state-wide levels. The analysis is based on input-output tables that quantify the observed interrelationships between sectors in the economy. It takes the point of comparison against which the project's impacts are judged as the current setting and also assumes that the interrelationships in the economy that are currently in place will continue through the project's life span. This constitutes a limitation to the IOA method, as does the method's assumption that there is supply

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capacity available in and outside the project region to satisfy the increased demands placed on resources that come with the project.

However, within these methodological limitations, the GE analysis has been conducted appropriately and is in accord with NSW Government guidelines for project appraisal. Gillespie Economics correctly points out that the IOA is not intended to perform the same function as the BCA. While the BCA provides decision-makers with information relevant to the impact on the well-being of society as a result of the project, the IOA is designed to provide an indication of changes to the structure and scale of the economy caused by the project. The IOA<sup>2</sup> does not provide any assessment of the economic efficiency merits of the project: the technique can deliver the same result in terms of its impact on overall economic activity for a project that involved the filling and emptying of sand bags (a project that generates no improvement in society’s well-being) as it could be to the building of a hospital. It is also important to note that the assumption of unlimited supply that underpins IOA also means that the estimates of structural impact are at the top-end of the potential distribution of impacts – as correctly pointed out in the Section 3.1 of Gillespie Economics assessment. Where there are supply constraints - potentially because prevailing macro-economic conditions mean that there is restricted excess capacity (e.g. an unemployment rate only slightly above the ‘natural’ rate) or constraints to the in-migration of resources – some of the proposed project’s demands for resources could result in partial off-setting reductions in economic activity in other sectors.

These caveats relating to BCA and IOA are generic to the methods. The GE assessment has employed these methods as stipulated by the NSW Government guidelines and hence limitations of the methods are not specific to the GE analysis. However, they do require a thorough understanding of the techniques to be developed by decision-makers and their advisers. It is relevant to note that neither the current PAC members nor those presiding in the Land and Environment Court have backgrounds in economics and so this understanding has not been evident in recent decisions.

### **Defining the project**

The GE assessment correctly defines the Bengalla project as the mining and transportation of coal to port. The point of comparison for the project (the ‘counterfactual’) is defined as the absence of the project. While this structure is appropriate and consistent with BCA principles it needs to be highlighted that the counterfactual involves an existing mine ceasing to operate. This has implications for a number of elements of the analysis. For example, the point of comparison in terms of traffic congestion and noise is not the current levels of traffic congestion and noise but rather is the level of noise and congestion without the existing mine’s operations. The GE analysis has correctly used the latter base.

The definition of the counterfactual is also relevant to the IOA. Most IOAs involve new demands for resources being added to the counterfactual. In the Bengalla case, the counterfactual involves resources primarily being released as the mine closes with some additional demands due to relative production growth. Hence, the proposal is not only adding demands to those currently existing but

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<sup>2</sup> The same can also be said for computable general equilibrium (CGE) modelling.

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rather is generating new demands relative to the mine closed scenario. Concerns about IOA failing to account for demand hitting supply constraints are thus somewhat relieved.

It is also important to note that the GE analysis does not include the GHG costs of burning the coal in foreign power stations because of the project being defined as the mining and transportation of Bengalla coal to port. This is the correct approach because if those costs were included then the benefits of burning the coal (the surpluses generated for the consumers of the electricity generated) would also have to be included along with all the costs associated with the construction of power stations and the electricity distribution network. Clearly such an exercise is beyond the mandate of the NSW government.

#### Scope of analysis

The NSW government requirement is for project assessments to consider the impacts of a proposal on the well-being of NSW citizens. The GE assessment recognises the difficulties of achieving this requirement. Specifically, the geographic source of costs cannot be tracked down so that only NSW originated costs are included (it is impossible for instance, to know *a priori* if a worker employed at the mine will come from NSW or Queensland or if a mine machinery maintenance task is to be performed in Newcastle or Brisbane). Similarly, benefits are complex in their geographic distribution (company taxes paid by the operator to the federal government will be dispersed to benefit citizens from all states and not just NSW residents and the locations of individual shareholders are also costly to discover). Furthermore, some costs and benefits of the project will be experienced overseas.

To address these complexities and to address the NSW government's requirement, the GE assessment takes what I regard to be a practical yet conceptually sound approach. It starts by taking an international perspective that includes all benefits and costs of the defined project. This then is paired back to a national (Australian) scope by omitting benefits enjoyed by foreign shareholders of the operating corporate entity. The more difficult step is to approximate the NSW shares of the national costs and benefits. The approach taken by GE is to consider only the component of benefits that is assured to be NSW based (the royalty payments) and use that as the basis for the threshold value analysis. Because the estimated non-market costs, apart from greenhouse costs, are all born by people from NSW, the royalty payments can be compared against those costs to allow a state based analysis.

There are however, two questions that must be addressed to be satisfied by this approach to the consideration of the NSW impacts. First, the non-market costs may not be born only by residents of NSW. For instance, if the aboriginal heritage assets impacted by the proposed mine are of such significance that their loss would cause costs to people resident beyond the NSW state boundary, then the estimate of their value included in the BCA would be an underestimate. However, for the state based comparison, this is an irrelevance as the appropriate point of comparison is NSW residents' values as have been included in the GE analysis. The omission of any non-NSW residents' costs is only relevant to the national level BCA.

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The second question involves the treatment of greenhouse gas (GHG) costs. In this respect it is noted that the costs of GHG emissions are potentially international. The federal government has levied a tax on GHG emissions in an attempt to 'internalise' these external costs. Gillespie Economics uses that tax rate (AUD23 per tonne of CO<sub>2</sub>) as an estimate of the international costs of GHG emissions. The GE analysis does reduce that cost estimate to reflect the portion of the GHG costs borne by the citizens of Australia but does not for NSW residents. As such, the analysis at the NSW level overstates the costs of GHG emissions.

The approach taken by GE to consider the costs and benefits for NSW residents is practical and remains conceptually well-founded. Any attempt to delineate further the distribution of costs and benefits from the Australian scope to the NSW scope would be perilous, impractical and very costly to perform. I strongly advise against such attempts. Furthermore, what has been carried out by GE in the state-based assessment produces an output that is relevant and adequate to the task faced by NSW decision-makers.

#### **The price of coal**

A key driver of the BCA is the price of coal. That parameter is key to establishing the extent of the benefits to be generated by the proposed mine. Of course, the price of any resource is subject to uncertainty into the future, both in terms of the commodity itself and the currency in which it is traded. The approach taken by GE is to use the price expected by the proponent for the specific grades of coal that are predicted to be mined, at the predicted exchange rate and subject it to sensitivity testing i.e. whether a variation in the price assumed makes a difference to the overall sign of the net present value of the proposal. This is consistent with sound practice given that some verification of price magnitudes and trends is conducted using independent market analysis.

#### **Environmental, social and cultural costs**

The predominant approach taken by GE to the inclusion of non-marketed costs is to approximate them using the mitigation cost approach. This involves use of the market costs of actions taken to avoid losses and then compensating for any losses that remain as approximations of the environmental social and cultural costs incurred. The assumption is that in incurring these costs of action, the non-market costs are eliminated. Hence, where noise or dust impacts are so severe that properties will be compulsorily acquired, those acquisition costs are taken to completely compensate owners for their losses and so are approximately equal to the environmental social and cultural costs. Likewise, the costs of creating biodiversity offsets are taken to be approximations of the costs of vegetation cleared for the mine. This approach is largely in accord with government policies that require offsets, mitigation and compensation in so far as such policies are designed to ensure affected parties are not made worse off by the project's consequences.

This approach is frequently used in BCA assessments where primary data collection exercises such as those involved in choice modelling or contingent valuation non-market valuation applications are not possible (because of time or money constraints). It is a practical and relatively inexpensive approach but has weaknesses. For instance, the market price of a property may not reflect the true surplus value enjoyed by its owner. Hence the reluctance of some owners to accept 'market price' as adequate compensation for resumed property. Similarly the biodiversity offset purchased for a

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project may not be a perfect substitute for the lost site. Strong reliance is made on the assumption that government policy settings regarding mitigation, offsets and compensation are conforming to the 'no net loss' principle.

Furthermore, Gillespie Economics assumes that mitigation expenses completely remedy nuisances caused to those people outside the compulsory acquisition zone.

The result of the approach taken is that the operational costs included in the net production benefit calculation may not completely reflect the extent of these non-market costs. Gillespie Economics has recognised this issue and has attempted to include costs to the extent that they are in excess of basic mitigation costs e.g. the full cost of property acquisition when only partial property value impacts will occur. The moot point is whether any residual impacts after offsetting, compensation and mitigation are of sufficient magnitude to cause the fundamental result of the BCA to be incorrect. Such is the magnitude of the net production benefits that I am confident they are not.

The preferred approach would have been to commission a case specific non-market valuation exercise so as to increase the confidence decision-makers could hold for the value estimates. Gillespie Economics has carried out such work previously. Those previous studies are used as the basis for the estimation of the value of Aboriginal heritage using the 'benefit transfer' approach. Again, while this is a practical and inexpensive option to inform a BCA, and the preferred approach would have been to undertake primary non-market valuation studies. Project proponents should be encouraged to commission more of these non-market valuation exercises so as to provide better information to decision-makers on a case by case basis. Such further applications would also enable decision-makers to become more familiar with the mechanism of non-market valuation techniques, so as to avoid problems associated with misinterpretation of process and results as seen in some recent PAC and Land and Environment Court decisions.

In summary, the GE analysis attempts to include the non-marketed environmental, social and cultural costs of the project using offset, compensation and mitigation costs as well as benefit transfer but the approach is inferior to the estimation of these costs through case specific primary valuation studies. . The approach however is widely used in BCA where environmental impacts occur and is practical and inexpensive to implement. A more complete analysis would involve specifically commissioned choice modelling, contingent valuation or hedonic pricing studies.

### **Employment**

Project impacts on employment are taken into account in the BCA in two ways. First, the resource costs of labour employed in the mine are included as market based costs of wages. These costs indicate that people working in the mine have alternative employment opportunities and so involve a cost of foregone production elsewhere in the economy. They are included in the GE analysis as operation costs and are negatives in the calculation of net production benefits. The second impact is the benefit that people who do not work in the mine enjoy from knowing that the people who do work in the mine have job security. This is a non-market benefit arising from the mine's operation. In the Bengalla case, it relates to people currently employed at the mine having continued employment there.

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While the inclusion of the first 'cost' element of employment is largely uncontroversial – except perhaps where there is a high rate of unemployment and workers employed at the mine do not have any other employment opportunities and so have no opportunity cost – the inclusion of the 'social benefit' of employment aspect is more vexed. Gillespie Economics points to the literature that substantiates the inclusion of this benefit and indeed the observation that governments around the globe pay subsidies to maintain employment opportunities provides some empirical justification for their inclusion. Numerous non-market valuation studies – some of which I have co-authored - have also found evidence of social values relating to employment. Nevertheless, there are some arguments that dispute their inclusion. In conditions of full employment, the prospects of workers displaced by a decision not to allow the mine's continuance being unable to find alternative work are low. The need for outsiders to pay to maintain workplace continuity is thus much reduced. On the other hand, there is ample evidence especially in the mining sector of 'boom and bust' cycles in which periods of full employment are relatively short lived. Members of the public may be well aware of this and want to support continuity of employment but this is speculative without further empirical investigation.

While this debate is unresolved for lack of further empirical evidence, Gillespie Economics has adopted the sensible strategy of presenting the BCA both with and without the non-market employment benefit component. Again, the exclusion of the estimate does not affect the sign of the net present value of the project.

### **Conclusions**

The economic assessment of major projects such as the Bengalla Mine continuation faces numerous complexities and the economics profession has sought to set up a series of bench-mark methods and application approaches to aid practitioners in the presentation of consistent and rigorous studies. Governments in Australia and internationally have sought to capitalise on those professional advances by stipulating approaches and codes of practice in application for major project assessments.

The NSW government is no exception and in the study by Gillespie Economics reviewed here has followed those accepted approaches and practices. The study has been conducted in a professional manner and is of a high standard.

Importantly, the assessments carried out by GE do not and cannot represent full and complete information. Assessment studies are carried out within budgetary and time constraints. Hence, there are areas where the GE analysis could have been improved if there had been more time and resources devoted to the task. For instance, the breakdown of benefits enjoyed from the project on a state by state basis would have provided greater depth of understanding regarding the NSW only BCA. It would have also been preferable to have primary valuation studies commissioned to explore in greater depth the extent of the non-market social, cultural and environmental costs.

However, the question must be asked 'Would the collection of more information have made a difference to the broad outcome of the economic efficiency assessment?' My view is that such are the relative magnitudes of the benefits and costs involved, that an investment in collecting more

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data including the breakdown of state-by-state data would have been futile. The same broad answer would have emerged i.e. the net well-being of the community (NSW and Australian) is improved by allowing the project to progress.

The GE assessment is carried out in sufficient detail within the conceptual bounds imposed by the methods used to allow decision makers to proceed in the knowledge that allowing the project to go ahead would be economically efficient. It also allows them to understand the converse: that preventing the mine's continuation will cause the people of NSW to be worse off.

A handwritten signature in black ink, appearing to read 'JVD' followed by a stylized flourish and a period.

Jeff Bennett

13 March 2014