

LIDDELL COAL OPERATIONS

APPENDIX **F**

Economists at Large Submission and Gillespie Economics' Response

APPENDICES



Review of Liddell Coal Project Environmental Impact Statement: Appendix T

Economic Assessment

Prepared by

Economists at Large Pty Ltd

October 2013

Report prepared by:

Economists at Large Pty Ltd
Melbourne, Australia
www.ecolarge.com
info@ecolarge.com

Phone: +61 3 9005 0154 | Fax: +61 3 8080 1604
65 Bevan St, Albert Park VIC 3206, Melbourne, Australia

Citation:

Economists at Large, 2013, *Review of Liddell Coal Project Environmental Impact Statement: Appendix T Economic Assessment*, prepared by Economists at Large, Melbourne, Australia.

Authors:

Rod Campbell
Andrew Scarlett

Disclaimer:

The views expressed in this report are those of the author and may not in any circumstances be regarded as stating an official position of the organisations involved.

This report is distributed with the understanding that the authors are not responsible for the results of any actions undertaken on the basis of the information that is contained within, nor for any omission from, or error in, this publication.

Contents

Introduction/Summary.....	4
Lack of transparency.....	5
Scope	5
Non market values	6
Greenhouse gas emissions.....	8
Input-output model results.....	9
Conclusion.....	12
References	13

Introduction/Summary

Economists at Large welcome the opportunity to make a submission on the Environmental Impact Statement (EIS) of the Liddell extension project, particularly relating to Appendix T: Economic Assessment (Gillespie Economics 2013). The economic impact assessment contains a number of shortcomings that make it unsuitable for decision making purposes. The key shortcomings are:

- **Lack of transparency.** The economic assessment fails to discuss assumptions about the most important economic aspects of the project – coal price, production schedule, coal quality and marketing, royalty rates and deductions, tax rates and deductions. Without disclosure of these assumptions it is impossible to have confidence in the results of the assessment.
- **Scope of assessment.** The cost benefit analysis fails to present the costs and benefits to the state of NSW, despite this being one of the Director General's Requirements for assessment of the project and the recommended approach of the NSW Treasury.
- **Understated external costs.**
 - The economic assessment assumes that all mitigation and offset measures will perfectly compensate for environmental impacts. This approach has been rejected by the NSW Planning and Assessment Commission.
 - Some non-market values are based on studies which have been rejected by the NSW Land and Environment Court.
 - Greenhouse gas emissions associated with the project have been underestimated.
- **Use of input-output modelling.** These models create inflated estimates of impacts such as employment. The claim of 1,128 jobs being created is contradicted by more realistic modelling commissioned by other Hunter coal mines. Based on other coal mine models, we suggests this figure would be closer to 320, 1 percent of the local workforce. 80 percent of these jobs would be filled by people commuting from outside the region, according to the EIS.

As a result of these shortcomings, decision makers are unable to get a clear picture of the economic effects of the project. This is of concern due to the increased scrutiny that economic assessment of projects have been facing in planning and court decisions and the increased weight that project economics is to be given under new state government regulations. Increasing the quality of economic assessment is important for public confidence in the planning system. We recommend the rejection of this project until suitable economic assessment has been conducted.

Lack of transparency

Gillespie Economics neglect to discuss their assumptions around the most important assumptions for economic analysis of a coal project:

- Thermal coal price
- Semi soft coking coal price
- Production schedule
- Yield of product coal from run of mine coal
- Marketing expectations – portion to be sold as thermal or metallurgical coal
- Royalty rates and deductions
- Tax rates and deductions
- Exchange rates

As the most important economic benefit for NSW decision makers is the potential royalty earnings, the lack of data around estimates should be of great concern. It is impossible to replicate or verify any of Gillespie Economics calculations. The non-disclosure of price assumptions should be of particular concern due to the uncertainty facing the coal market at present.

It is worth noting that NSW Treasury have also been critical of the non-transparency of Gillespie Economics' work on other projects:

The characteristics of a good quality CBA include transparency and repeatability, with assumptions and methodology clearly identified, and rigorous sensitivity testing. Unfortunately in the paper available to us, the Gillespie Economics analysis does not clearly detail the inputs and assumptions used in its calculations, making the testing of assertions more difficult.¹

Scope

An important step in any BCA is setting the scope of the assessment and ensuring that scope is used consistently²:

Let us now turn to ... issues that challenge and bedevil practitioners of social benefit-cost analysis. The first challenge is deciding "whose benefits and costs count" It sometimes is called the issue of standing--that is, who has standing in the analysis of benefits and costs? This is an issue of scope. Should the analysis include only those costs and benefits affecting residents of the local community? The state or province? The nation? The world? Whether the net benefits of a project are positive or negative often depends on how narrow or broad the scope of the study is.

¹ (NSW Treasury 2013)p6

² Eggert (2001) (p27)

As this project relates to the extraction of resources which belong to the State of NSW, it is appropriate that the Director General's Requirements (DGRs) and guidelines from Planning and Treasury specify:

*A detailed assessment of the costs and benefits of the development as a whole and whether it would result in a net benefit for the NSW community;*³

*[Project] benefits and costs should be estimated where possible as those that accrue for New South Wales. In the first instance, it will generally be most practical to assess all major costs and benefits to whoever they accrue and then adjust to estimate the proportion of these attributable to residents of the State.*⁴

However, The BCA of the Liddell project is conducted from a global perspective and then narrowed down to a national level, as explained by Gillespie Economics:

BCAs of mining projects are therefore often undertaken from a global perspective i.e. including all the costs and benefits of a project, no matter who they accrue to, and then truncated to assess whether there are net benefits to Australia. A consideration of the distribution of costs and benefits can then be undertaken to identify the benefits and costs that accrue to NSW and other regions. (p7)

Gillespie Economics do not undertake this consideration of costs and benefits that accrue to NSW, claiming:

BCA at a sub-national perspective is not recommended as it results in a range of costs and benefits from a project being excluded, making BCA a less valuable tool for decision-makers.(p7)

While we agree that there can be added difficulties to conducting sub national BCA, and that relying on rigidly state-based analysis may be misleading, these difficulties are not sufficient reason to contravene the DGRs and Treasury guidelines. In fact, the principal of Gillespie Economics was able to produce exactly this kind of state-level analysis when before the Land and Environment Court in the Warkworth case⁵.

Non market values

Gillespie economics include no value in the BCA for impacts on noise, air quality, visual amenity, ecology and biodiversity beyond those incurred in mitigation measures and offsets. This assumes that these mitigation measures and offsets will perfectly compensate local communities loss of amenity and the impacts on the local environment. We do not believe this is likely to be the case and as such this approach serves to understate the costs of the project to the NSW community and overstate its final value.

³ (DGRs reported in Appendix T p5)

⁴ (NSW Treasury 2012)p5

⁵ See (Bennett & Gillespie 2012)

The same approach was taken by Gillespie Economics in their assessment of the Coalpac Consolidation Project. The NSW Planning and Assessment Commission for that project found⁶:

[The] assertion in the economic analysis that the biodiversity impacts of the project are fully accounted for in the rehabilitation and offset proposals is clearly wrong. Not only does it not stand up to any level of scrutiny from a biodiversity protection perspective, but there have also been substantial changes to these proposals in response to criticism of the EA. The RTS simply adds \$1m to the project costs and reasserts the Proponent's original position. The problem is that the Commission does not consider that there is any credible evidence available that the rehabilitation will work in the longer term and there is no conclusive evidence that even the revised Biodiversity Offset Package is adequate.

It is also arguable whether property offsets can be seriously asserted to 'offset the biodiversity values that will be lost from the Project' and that there 'would be no additional ecological costs for inclusion in the BCA'⁷. This may be a convenient economic fiction, but the fact is that destroying biodiversity in one area cannot be compensated for by 'protecting' it in other areas where it was not under threat.

We agree with the PAC that this approach serves to understate the costs of the project to the community of NSW and therefore overstates its value. The Department of Planning and Infrastructure recently agreed with the PAC, finding⁸:

While the Department accepts that the project would undoubtedly result in a range of substantial economic benefits, overall the Department is satisfied that these benefits do not overcome the significant and irreversible impacts on the biodiversity, scenic and geological values of internationally significant pagoda landform complex, and hence the project is ultimately not in the public interest.

One non-market values – non-market value of employment – has been estimated through “choice modelling” studies conducted by Gillespie Economics for other coal mines. Choice modelling uses the results of a multiple choice survey to estimate environmental and social values. All choice modelling studies by Gillespie Economics use similar methodology. One of these studies was conducted for the Warkworth coal project. Preston CJ found⁹:

I agree with the [project opponents] that the Choice Modelling study and the BCA undertaken for the Project have a number of deficiencies which lessen their usefulness. (p163)

These deficiencies include identified by Preston CJ include:

- Distribution of Choice Modelling survey too limited (quoted above in discussion of scope)
- Deficiencies in information provided to survey respondents:
The information provided to survey respondents was not, in my view, sufficiently accurate to enable them to make informed and meaningful choices. (p163)
- Values in Choice Modelling survey inadequate:

⁶ (PAC 2012)

⁷ Note the similar quote in Appendix S on p17.

⁸ (DPI 2013)

⁹ (Preston 2013)

I agree with Mr Campbell that modelling a situation based on a willingness to pay of survey respondents presented with a range of levels that, as Professor Bennett described and Mr Gillespie accepted has nothing to do with the costs, is of limited assistance in the situation confronting a decision-maker. (p167)

- All relevant matters, at level of particularity required, not considered
I have identified above matters relevant to biodiversity and ecological integrity, including the EEGs, noise and dust, and social impacts, which were not included in the Choice Modelling survey or BCA. (p167)
- Other non-market impacts and values not considered:
I agree with Mr Campbell that there are non-market values that have either not been, or have inadequately been, taken into consideration in the BCA, including impacts of noise and dust, impacts on amenity values, and ecosystem services (aff, second dot point). The omission of these non-market values is a deficiency of this BCA. (p168)

In light of Preston CJ's emphatic agreement with Economists at Large's evidence on the choice modelling surveys, we suggest that decision makers place little weight on the estimate in this project which derives from these same surveys. They are likely to overstate the external value of employment. The very existence of this latter value in relation to coal projects has been doubted for several years by a range of economists, including coal industry consultant and ANU economist Jeff Bennett¹⁰.

Greenhouse gas emissions

The project will cause a small increase in the amount of coal used in the world. Coal industry proponents often adopt the "drug dealer's defence" – that if we did not sell the coal/drug to the users, someone else would, and our actions therefore make no difference. This is true to a large extent - most coal that would be consumed in the world would be substituted from other mines, but not all of it. The expansion of the coal supply that the project represents will exert some downward pressure on prices which will result in an increase in the amount demanded.

In the absence of the project, not all of the coal exported would be offset by production in other mines. To argue otherwise is to suggest that coal supply is perfectly elastic and therefore that coal price should not vary. This is clearly not the case. Some estimate of this effect can be made from published sources and consideration of the price elasticities of supply and demand for coal. The standard analysis gives the equilibrium effect on aggregate quantity by the project as $\Delta(-\epsilon/(-\epsilon+\eta))$ where:

Δ is the initial change in supply

ϵ is the elasticity of demand

η is the elasticity of supply

¹⁰ (Bennett 2011)

The elasticity of demand for coal is estimated at -0.3¹¹. Estimates of the elasticity of supply vary widely and are also frustratingly out of date. International authors cite a range of estimates from 0.3 to 2.0 and conclude that the best estimate is around 0.5¹².

Using the Light, Kolstad and Peterson estimate, if the project did not proceed, a reduction in supply would ensue of approximately 8 million tonnes per year¹³. The equilibrium market outcome would be a reduction in total output and consumption of $8 * (0.3 / (0.3 + 0.5)) = 3.0$ million tonnes, with associated emissions of around 8 million tonnes of CO₂. At a price of \$23/tonne, the implied social cost is over \$184 million per year, the present value of which substantially exceeds the estimated benefits of the project.

The greenhouse gas impacts of the project estimated in the economic assessment relate only to the direct emissions of the project. To understand the full impacts of the project Gillespie Economics need to incorporate the impact of the increase in coal consumed in the world. This impact is not equivalent to greenhouse from combustion of all of the product coal, as is sometimes contested by anti-coal groups. In the absence of the project, most of this consumption would have been sourced from other coal mines. The economic assessment should, however, include the emission from the additional coal burned as a result of the project.

Interestingly, in Washington State, USA, state government agencies are now beginning to include downstream emission as a part of project assessment processes. The Washington Department of Ecology is using its state environmental policy act to broaden the scope of its assessment beyond state and national boundaries. See:

- <http://www.eisgatewaypacificwa.gov/>
- <http://www.ecy.wa.gov/news/2013/238.html>

Input-output model results

Appendix T claims the project will result in the following impacts in the Singleton, Musswelbrook and Upper Hunter LGAs:

- \$458M in annual direct and indirect regional output or business turnover;
- \$283M in annual direct and indirect regional value added;
- \$37M in annual direct and indirect household income; and
- 469 direct and indirect jobs.

At a state level it claims:

- \$657M in annual direct and indirect regional output or business turnover;
- \$374M in annual direct and indirect regional value added;
- \$113M in annual direct and indirect household income; and
- 1,128 direct and indirect jobs.

¹¹ There seem to be no more recent estimates from ABARE/BREE than (Ball & Loncar 1991)

¹² (Light et al. 1999)

¹³ Note this refers to run of mine coal, as no estimate of product coal is provided. These figures are likely somewhat of an overestimate.

To derive these results, Gillespie Economics use a modelling approach called input-output (IO) modelling. IO models estimate the “flow on” or “downstream” economic impacts of a project or policy on other industries - ie that when one industry spends more money or employs more people, it buys things from other industries which increases their output, in turn increasing activity in yet more industries and so on. These effects are estimated through “multipliers” which are higher or lower depending on the degree to which the analyst believes industries are integrated.

While IO modelling has been common in Australia, this does not reflect on its reliability and accuracy. Economists and public institutions have criticised its use for many years. The ABS stopped publishing IO multipliers in 1998-99 as the data was mostly used to support “bids for industry assistance”. The ABS details the shortcomings of this “biased estimator of the benefits or costs of a project”¹⁴:

Lack of supply-side constraints: *The most significant limitation of economic impact analysis using multipliers is the implicit assumption that the economy has no supply-side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.*

Fixed prices: *Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured.*

For an example of the ABS’s first point, IO analysis assumes there is no “constraint” to the amount of construction labour available in the Hunter Valley. They assume that there is a large “ghost workforce” of skilled construction and mining workers ready to work on the project who will not be taken away from some other project either in the Hunter Valley or in NSW more broadly.

The ABS’s point about fixed prices refers to the assumption that the new demand for inputs such as construction workers can be satisfied without increasing the price of their wages. This is clearly unrealistic, as mining wages have increased considerably during the mining boom as is regularly emphasised by the mining industry.

Wariness about the application of IO modelling to project applications is not limited to the ABS. A recent Productivity Commission research papers describes the Commission’s concern about “well recognised abuses” over several decades¹⁵:

The lack of accounting for the opportunity costs in input-output multiplier analysis has resulted in persistent expressions of concern over many years regarding the applicability of multiplier analysis in a public policy context. As noted, a common focus of the concern is on the use of multipliers to make the case for government intervention (either to preserve

¹⁴ (ABS 2011)

¹⁵ (Gretton 2013)p10

prevailing output or employment under threat or to support the set up or expansion of a designated activity).

The economic assessment of the Warkworth expansion project also relied on IO modelling, which was criticised by Preston CJ¹⁶:

The IO analysis is a limited form of economic analysis, assessing the incremental difference in economic impacts between approving or disapproving the extension of the Warkworth mine. The deficiencies in the data and assumptions used affect the reliability of the conclusions as to the net economic benefits of approval. More fundamentally, however, the IO analysis does not assist in weighting the economic factors relative to the various environmental and social factors, or in balancing the economic, social and environmental factors. (p155)

The IO analysis assumes that there are unemployed resources available within the Hunter region to meet any increase in workforce demand, and that the workforce will not be drawn away from any other activity. I accept [The Australia Institute's] evidence that the assumption of the IO model that there is a ghost pool of highly skilled yet unemployed people in the Hunter region, from which labour for the extension of the existing mine would be drawn, is unrealistic. I accept [the Institute's] evidence that, to a considerable extent, employment generated from the extension of the Warkworth mine would involve currently employed skilled workers transferring from other industries, but the vacancy thereby created in the other industries may not necessarily be filled, partly because of a shortage of skilled workers and partly because the remuneration is inferior to that offered in the mining industry. (p159)

Preston CJ is not alone in his criticisms. Following his decision, coal industry major Yancoal reassessed the IO modelling of their Ashton South East Open Cut project, also facing an appeal before the Land and Environment Court. Yancoal commissioned ACIL Allen to review the IO modelling and to re-evaluate the project's impacts using another model¹⁷:

[In] the Warkworth case IO modelling was criticised by the chief judge and ... for good reason. [This] modelling is fine for some purposes but it's not the best technique ... for this kind of purpose [evaluating a coal mine]. The reason is that IO modelling takes no account of the fact that there are limited productive resources [in the economy] principally people to be employed. So it always makes the amount of output, income, jobs, bigger than would likely be the case, unless you're in the Great Depression, or a very deep recession.

Instead of IO modelling, ACIL Allen used more sophisticated computable general equilibrium (CGE) modelling to assess the project. They estimated that while the Ashton project would employ 162 people, local employment would increase by only 78. This means that 84 jobs in other projects and industries are "destroyed" at a local level. At a state level, downstream jobs estimated by Yancoal were only 2 jobs greater than the direct employment number of 162. (See court transcripts)

Because of the flaws inherent in IO modelling counsel for the Minister for Planning has dropped the earlier IO modelling of that project from their case and rely on Yancoal's CGE modelling.

¹⁶ (Preston 2013)

¹⁷ (see court transcripts, p546)

While detailed modelling of the impacts of the Liddell project is beyond the scope of this submission, applying the Yancoal modelling to the Liddell project can give some estimate of the likely impacts on local employment, including the reductions in other industries. Rather than an increase of over 1128, we estimate a net increase in employment of 173:

	Ashton	Liddell	Notes and sources
Direct employment	162	360	See Ashton court transcripts and (Gillespie Economics 2009)
IO model estimate of state direct and indirect employment	682	1,128	(HVRF 2009)
CGE model estimate of net change in local employment	78	173	Ashton court transcripts and EAL calculation.

To put this in context, at the 2011 census there were 28,671 people in the labour force working in Singleton, Muswellbrook and Upper Hunter Local Government Areas¹⁸. The project would increase employment in the area by less than 1 percent. This will not affect unemployment, however, with only 647 people looking for full time work in these areas at the census. Instead, they will likely come from outside the area.

In summary, decision makers should be sceptical of the economic impacts emphasised in the EIS due to the flaws in IO modelling. While the project proposes to employ on average 360 people, the project's impacts on the local markets for labour, land, capital and inputs will crowd other industries out, meaning the net increase in employment considerably lower, likely around 170, based on Yancoal modelling. The increase in employment will be sourced 80 percent from outside the local area according to the EIS, meaning there will be minimal impact on local unemployment and a negligible increase in employment at a wider level.

Conclusion

The economic impact assessment of the Liddell project contains a number of flaws relating to:

- Input output modelling
- Cost benefit analysis
 - Scope
 - Non transparency
 - Understatement of environmental costs

It is not clear from this assessment that the project represents a net increase in the welfare of the NSW community. This is concerning as economic assessment of major projects has been under close scrutiny, a pattern set to increase under new state regulation. We recommend extensive revision of this assessment before any decision can be made on the future of the project.

¹⁸ Sourced through ABS Tablebuilder, Census 2011

References

- ABS, 2011. Australian National Accounts: Input-Output Tables - Electronic Publication, Final release 2006-07 tables. Available at:
[http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5209.0.55.001MainFeatures4Final release 2006-07 tables?opendocument&tabname=Summary&prodno=5209.0.55.001&issue=Final release 2006-07 tables&num=&view=.](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5209.0.55.001MainFeatures4Final%20release%202006-07tables?opendocument&tabname=Summary&prodno=5209.0.55.001&issue=Final%20release%202006-07tables&num=&view=)
- Ball, K. & Loncar, T., 1991. *Factors influencing the demand for Australian coal*, Project 4247.102 Australian Bureau of Agricultural and Resource Economics (ABARE).
- Bennett, J., 2011. Maules Creek Coal Project Economic Impact Assessment: A review. *Research Evaluation*. Available at:
[https://majorprojects.affinitylive.com/public/d70ab9717ed8449eafa6b1e7d8e4cea5/Appendix G Bennet Peer Review_lowres.pdf](https://majorprojects.affinitylive.com/public/d70ab9717ed8449eafa6b1e7d8e4cea5/Appendix%20G%20Bennet%20Peer%20Review_lowres.pdf) .
- Bennett, J. & Gillespie, R., 2012. Affidavit of Professor Jeffrey William Bennet relating to the Proposed Warkworth Coal Mine extension. , 40(version 2).
- DPI, 2013. *MAJOR PROJECT ASSESSMENT Coalpac Consolidation Project*, NSW Department of Planning and Infrastructure. Available at:
[https://majorprojects.affinitylive.com/public/3b0f7beff4ab9832c7b75a65f4d4e928/4. Coalpac Consolidation Project_Director-General's Report_Main Body.pdf](https://majorprojects.affinitylive.com/public/3b0f7beff4ab9832c7b75a65f4d4e928/4.Coalpac%20Consolidation%20Project_Director-General's%20Report_Main%20Body.pdf).
- Eggert, R.G., 2001. *Mining and Economic Sustainability: National Economies and Local Communities*, Report commissioned by the Mining, Minerals and Sustainable Development project of the International Institute for Environment and Development, England and the World Business Council for Sustainable Development.
- Gillespie Economics, 2009. *Ashton Coal Project Extension Benefit Cost analysis*, Analysis of the South East Open Cut Project and Ashton Coal Project Modification, Appendix 18 of Environmental Assessment.
- Gillespie Economics, 2013. *Liddell coal operations: appendix T economic assessment*, Prepared for Liddell Coal Operations Pty Ltd, C/O GSS Environmental Pty Limited.
- Gretton, P., 2013. *On input-output tables: uses and abuses*, Staff Research Note, Productivity Commission, Canberra. Available at:
http://www.pc.gov.au/__data/assets/pdf_file/0008/128294/input-output-tables.pdf.
- HVRF, 2009. *Ashton coal EIS Appendix 17: Social and Economic Environment*, Prepared for Wells Environmental Services on behalf of Ashton Coal Operations.
- Light, M.K., Kolstad, C.D. & Rutherford, T.F., 1999. *Coal Markets and the Kyoto Protocol*, Discussion Papers in Economics, Working Paper no. 99-23, Centre for Economic Analysis, University of Colorado at Boulder.
- NSW Treasury, 2012. *Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals*, Available at:

<http://www.planning.nsw.gov.au/LinkClick.aspx?fileticket=1IW95ZTjemY%3D&tabid=205&mid=1081&language=en-AU>.

NSW Treasury, 2013. *PAC Review of the Coalpac Proposal - Assessment of the Economic Evaluation*, Available at:

[https://majorprojects.affinitylive.com/public/f689ec370f5f2a151c3ef885370fbb8/Coalpac Consolidation Project_ Director-General's Report_ Appendix M.pdf](https://majorprojects.affinitylive.com/public/f689ec370f5f2a151c3ef885370fbb8/Coalpac%20Consolidation%20Project_Director-General's%20Report_Appendix%20M.pdf).

PAC, 2012. *Commission Coalpac Consolidation Project Review: Main Report*, NSW Planning and Assessment Commission.

Preston, B., 2013. *Judgement on Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited*, Judgement in the Land and Environment Court, New South Wales. Available at:

http://www.edo.org.au/edonsw/site/pdf/casesum/Warkworth_judgment.pdf.

Liddell Coal Operations

Proposed Modification

Response to Submission from Economists at Large

Prepared for

Liddell Coal Operations Pty Ltd

C/- SLR Consulting Australia Pty Ltd

By



Gillespie Economics

Email: gillecon@bigpond.net.au

February 2014

EXECUTIVE SUMMARY

GILLESPIE ECONOMICS BCA

- Gillespie Economics (2013) found that the Modification would have net social benefits to Australia of between \$314M and \$361M.
- The Modification would also have net social benefits to NSW of at least \$134M.

GILLESPIE ECONOMICS REGIONAL IMPACT ASSESSMENT

- The Modification would provide continued economic activity to the regional and NSW economy for a period of up to seven years.

RESPONSE TO ISSUES RAISED BY ECONOMISTS AT LARGE

Lack of Transparency in the BCA

- The economic assessment clearly identifies and documents the methodology utilised for the BCA and the major assumptions embodied in it.

The BCA Failed to Address DGRs to Assess Net Benefits to NSW

- This is incorrect. The BCA examined the total net benefit, the net benefit to Australia and the net benefit to NSW.

Impacts on Noise, Air Quality, Visual Amenity and Ecology Not Included in the BCA

- This is incorrect. All material, scientifically determined, impacts of the Modification were valued and included in the Gillespie Economics BCA.

The Nonmarket Value of Employment Should Not Be Included in the BCA

- This is inconsistent with economic theory, the results of empirical studies and the views of leading economists.

Greenhouse Gas from the Burning of Coal Should Be Included in the BCA

- This is incorrect. Only greenhouse gas emissions from the Modification, excluding scope 3 emissions from the burning of coal, are relevant for inclusion in the BCA.
- Greenhouse gas emissions from the burning of coal are relevant to a BCA of electricity generation projects.

Input-Output Analysis Is an Inappropriate Method

- Input-output model (IO) analysis is an appropriate method for estimating regional economic activity from a project and is consistent with the NSW DP&I guidelines.
- The criticism of IO referred to by EAL relate to the correct use and interpretation of the results rather than the method itself. Additionally, the comments made by Preston CJ in *Warkworth* need to be read in context, being his Honour's discussion of the role the input-output analysis should play in the consent authority's ultimate determination of the project, that is *'the input-output*

analysis is not a substitute for the decision-making process that the approval authority must undertake in determining the project application.¹

CGE Modelling is a Preferable Approach to Modelling Regional Economic Impacts

- IO and Computable General Equilibrium model (CGE) are two alternative methods of estimation regional economic impacts that are underpinned by different assumptions.
- Each method has its advantages and disadvantages.

IO is Flawed Because it Assumes a Ghost Pool of Available Unemployed Labour in the Region

- This is incorrect. The input-output method assumes that relative to the level of increased demand for labour in the region from a project, there is substantial available employed or unemployed labour in the region and **outside** the region that can be accessed.

Alternative Regional Impact Assessment by EAL

- EAL provide no alternative modelling of the Modification but instead “borrow” some ratios from the ACIL CGE modelling of a different project and apply them to the direct employment estimates of the Modification.
- This is simply not credible and shows no understanding of the ACIL CGE modelling which is driven by project specific costs, sales and employment structures, which will vary from project to project.

The Modification is a Continuation of an Existing Mine

- EAL misrepresent the Modification as a new mine stating that that increased employment for the Modification will not affect unemployment in the region and will likely come from outside the region. However, the Modification is a continuation of an existing mine which will provide continued employment for 361 employees and 105 contractors.
- Without approval of the Modification existing employees and contractors will lose their jobs. This will reduce the economic activity in the region and have flow-on effects to a wide range of sectors of the economy.

TABLE OF CONTENTS

1.0 INTRODUCTION	4
2.0 LACK OF TRANSPARENCY	5
2.1 Introduction	5
2.2 Production Schedule	5
2.2 Yield and Product Coal	5
2.3 Royalty Rate.....	5
2.4 Company Tax.....	5
2.5 Coal Price.....	5
3.0 SCOPE	6
4.0 NONMARKET VALUES	7
4.1 Noise, Air Quality, Visual Amenity, Ecology.....	7
4.2 Employment	7
4.3 Greenhouse Gas.....	8
5.0 INPUT OUTPUT ANALYSIS	9
5.1 Introduction	9
5.2 Correct Interpretation of IO Analysis	9
5.3 IO Analysis Versus CGE Modelling	10
5.4 Ghost Pool of Available Unemployed Labour	10
5.5 Alternative Regional Impact Assessment	11
5.6 Modification is a Continuation of an Existing Mine	11
5.7 Crowding out	11
6.0 REFERENCES	13

1.0 INTRODUCTION

Economists at Large (EAL) have made a submission to the Environmental Assessment (EA) for Liddell Coal Operations' proposed Modification. The submission makes comment on the Economic Assessment contained in the EA and concludes that it contains a number of shortcomings that make it unsuitable for decision-making purposes. This report responds to these comments.

2.0 LACK OF TRANSPARENCY

2.1 Introduction

EAL raise concerns about the lack of transparency in the Economic Assessment (EA) particularly regarding coal prices, the production schedule, yield of product coal from ROM coal, portion to be sold as thermal or metallurgical coal, royalty rates, tax rates and exchange rates.

The EA very clearly identifies and documents the methodology utilised for the Benefit Cost Analysis (BCA) and the major assumptions embodied in it. The BCA draws on all the information provided in the EA, including the indicative production profile and the potential environmental, social and cultural impacts of the Modification. The main assumptions on which the Economic Assessment is based are repeated below.

2.2 Production Schedule

As identified in Section 2.2 of the Economic Assessment, under the base case LCO would continue its current operation in accordance with development consent DA 305-11-01, producing up to 8 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 2019. Under the Modification, mining would continue at up to 8 Mtpa until 2025. A detailed production schedule is provided in the Air Quality and Greenhouse Gas Assessment.

2.2 Yield and Product Coal

Product coal is estimated at 66% of the run-of-mine (ROM) coal volume with approximately 89% sold as thermal coal and the remainder as semi-soft coking coal.

2.3 Royalty Rate

The Modification is an open cut mine and so in accordance with the *Mining Regulation 2010*, a royalty rate of 8.2% of revenue value was used in calculating royalties.

2.4 Company Tax

In accordance with the tax law in Australia a corporate tax rate of 30% of net profits was used in calculating company tax from the Modification.

2.5 Coal Price

While different institutions report and predict benchmark prices for coal, it is a heterogeneous commodity and can have different ash, moisture and other specifications. Producers also have relationships with different purchasers and different contractual commitments. These factors combine to result in coal price differentiation from project to project. Gillespie Economics therefore relies on the price predictions of proponents for its economic analyses. LCO provided information on the expected revenue stream rather than predicted coal price as it considered this information to be commercial-in-confidence. Sensitivity analysis on this assumed revenue stream was undertaken in Section 2.6 of the Economic Assessment.

3.0 SCOPE

EAL state that that the BCA does not present the costs and benefits of the Modification to the State despite this being one of the Director General Requirements (DGRs) for assessment of the Modification and the recommended approach of the NSW Treasury.

This is incorrect. The DGRs require *“a detailed assessment of the costs and benefits of the project as a whole, and whether it would result in a net benefit for the NSW community;”*

As identified in the BCA, “As a tool of investment appraisal for the public sector, BCA can potentially be applied across different definitions of society such as a local area, state, nation or the world. However, most applications of BCA are performed at the national level. This national focus extends the analysis beyond that which is strictly relevant to a NSW government planning authority. However, the interconnected nature of the Australian economy and society creates significant spillovers between States. These include transfers between States associated with the tax system and the movement of resources over state boundaries.

Nevertheless, “where major impacts spill over national borders, then BCA should be undertaken from the global as well as the national perspective” (Boardman et al 2001). For mining projects, impacts that spill over national borders include greenhouse gas costs and benefits to foreign owners.

BCA at a sub-national perspective is not recommended as it results in a range of costs and benefits from a project being excluded, making BCA a less valuable tool for decision-makers (Boardman et al 2001).

BCAs of mining projects are therefore often undertaken from a global perspective i.e. including all the costs and benefits of a project, no matter who they accrue to, and then truncated to assess whether there are net benefits to Australia. A consideration of the distribution of costs and benefits can then be undertaken to identify the benefits and costs that accrue to NSW and other regions. However, a project is considered to improve the well-being of society if it results in net benefits to the nation, even if it results in net costs to the local area.”

The BCA of the Modification initially considers all the costs and benefits of the Modification (as a whole) and then identifies the costs and benefits that accrue to Australia. Section 2.5.2 of the Economic Assessment identifies the distribution of costs and benefits including those that accrue to NSW. This section concludes that *“as well as resulting in net social benefits to Australia the Modification would result in net social benefits to NSW”*.

4.0 NONMARKET VALUES

4.1 Noise, Air Quality, Visual Amenity, Ecology

EAL state that the BCA does not include a value for impacts on noise, air quality, visual amenity and ecology, beyond those incurred in mitigation measures and offsets. EAL considers that this will understate the costs of the Modification to the NSW community and overstate its final value.

EAL misrepresents the Economic Analysis of the Modification and provide no technical analysis to support its claim.

As identified by NSW Government (2012), *“in estimating .. benefits and costs, there is the practical principle of materiality – costs and benefits that will not have a material bearing on the decision do not need to be included in a CBA.”* The consideration of non-market impacts in BCA relies on the assessment of other appropriate technical experts reporting on the biophysical impacts of the Modification. Where the environmental assessments undertaken by technical experts identify that biophysical impacts will be negligible, it is considered that there would not be any material economic impacts. For the Modification, technical assessments identified negligible noise, blasting, air quality and amenity impacts. Consequently, there are no material impacts for inclusion in the BCA.

Where impacts are identified but are proposed to be mitigated or offset to the point where residual impacts become immaterial, the residual impact is no longer relevant for inclusion in BCA. For the Modification this was the case for the ecological impacts where a Biodiversity Offset Package (BOP) is proposed. Land opportunity costs and operational expenditure associated with the biodiversity offset areas were included in the BCA. Provided the values held by the community for the offsets are equal or greater than values that would be lost then no additional economic costs warrant inclusion in the BCA. In this respect, it is noted that the BOP is required to improve or at least maintain biodiversity values.

All material potential impacts as identified in the EA have been included in the Gillespie Economics BCA.

4.2 Employment

EAL consider that the value for employment included in the BCA should be ignored and makes reference to excerpts from the Warkworth Judgment and the purported views of Professor Jeff Bennett from the Australian National University.

As identified in Section 2.4.2 of the Economic Assessment, the value for employment included in the BCA of the Modification was sourced from a CM study undertaken for the Bulli Seam Operations NOT the Warkworth Extension Project. As a form of sensitivity testing, the results of the BCA are reported with and without the inclusion of this value. That is, the Modification is estimated to have net social benefits to Australia of between \$314M and \$361M. Even without the inclusion of the employment value there are considerable net social benefits of the Modification.

The view of EAL questioning the existence of nonmarket values for employment is inconsistent with economic theory and the results of empirical studies. Professor Bennett, who is referred to by EAL, is one of Australia’s most senior academic economists. In particular, his field of expertise is non-market valuation. Professor Bennett has included the social value of employment in a number of his research studies including the following peer reviewed and published studies:

- Morrison, M., Bennett, J. and Blamey, R. (1999) *Valuing improved wetland quality using choice modelling*, *Water Resources Research* (Vol. 35, No. 9, pp. 2805-2814);

- Bennett, J., Van Bueren, M. and Whitten, S. (2004) *Estimating society's willingness to pay to maintain viable rural communities*, Australian Journal of Agricultural and Resource Economics ([Volume 48, Issue 3](#), pages 487–512);
- R.K. Blamey, J.W. Bennett, J.J. Louviere, M.D. Morrison and J.C. Rolfe (2002) *Attribute Causality in Environmental Choice Modelling*, Environmental and Resource Economics (23: 167–186, 2002);
- Blamey, R., Rolfe, J., Bennett, J., and Morrison, M., (2000) *Valuing remnant vegetation in Central Queensland using choice modelling*, The Australian Journal of Agricultural and Resource Economics(44(3): 439-56); and
- Gillespie, R. and Bennett, J. (2012) *Valuing the Environmental, Cultural and Social Impacts of Open Cut Coal Mining in the Hunter Valley of NSW, Australia*, Journal of Environmental Economics and Planning.

4.3 Greenhouse Gas

EAL undertake a calculation of greenhouse gas (GHG) emissions associated with the burning of coal from the Modification and state that the present value of the costs of these emissions exceeds the benefits of the Modification.

To compare the GHG costs of the burning of coal to the benefits of coal mining is totally spurious and methodologically incorrect. The burning of coal has no relevance to a BCA of the Modification. As identified in Section 2.1 of the Economic Assessment, the scope of the BCA is of the mining of coal and delivery of coal to port. Coal is an intermediate good i.e. it is an input to other production processes such as production of electricity and steel making. Scope 3 carbon emissions associated with the burning of coal are indirect carbon emissions which are not directly attributable to the Modification and so are not included in the BCA. However, these downstream uses of the coal constitute a different project, that itself can be subject to BCA. For example, BCA of an electricity generation project would include the cost of coal, labour, land and capital inputs, electricity distribution and environmental impacts (such as GHG emissions from the burning of coal). The BCA of electricity generation would also include benefits such as the community's willingness to pay for electricity. There may also be externality benefits for economic development, education, and medical care. All of these costs and benefits are relevant considerations in the BCA at this next stage of the production process but not of a BCA of a coal mining project.

5.0 INPUT OUTPUT ANALYSIS

5.1 Introduction

The main issues raised by EAL are addressed below.

5.2 Correct Interpretation of IO Analysis

The main concern that economists have with the use of all methods which examine the economic activity of projects (e.g. input-output analysis, CGE, Keynesian multipliers etc.) is their correct interpretation.

As clearly identified in the Economic Assessment of the Modification:

“It is important not to confuse the results of the economic impact assessment, which focuses on indicators of economic activity i.e. direct and indirect output (expenditure/ revenue), value-added, income and employment, in a specific region, with the results of BCA which is concerned with the net benefits from the Modification.” (pg 6)

On page 24 of the Economic Assessment it is further identified that:

“The BCA in Section 2 is concerned with whether the incremental benefits of the Modification exceed the incremental costs and therefore whether the community would, in aggregate, be better off ‘with’ the Project compared to ‘without’ it. In contrast, the focus of the regional economic impact assessment is the effect (impact) of the Project on the economy in terms of a number of specific indicators of economic activity, such as gross regional output, value-added, income and employment”.

IO analysis is a suitable methodology for predicting changes in the structure of regional economies and is consistent with the NSW DP&I *Draft Guidelines on Economic Effects and Evaluation in EIA* (James and Gillespie 2002) which relevantly states:

“If a proposal is predicted to have significant economic impacts at the regional or State scale, it is appropriate to assess these economy-wide effects.....These impacts can be assessed by means of a multi-sectoral or input-output model which identify regional impacts in terms of changes in the value of output for separate sectors of the regional economy, as well as changes in value-added, income and employment.” (pg 18)

The assumptions underlying IO analysis are well documented, including in the Economic Assessment for the Modification (Attachment 3).

The issues with IO analysis referred to in the EAL submission relate to its inappropriate use. The concerns of the Productivity Commission referred to in the EAL submission relate to using IO analysis to “*make the case for government intervention.*” It is agreed that this would be an inappropriate use of IO but this is not how IO analysis has been used in the Economic Assessment for the Modification, and the comment is therefore not relevant to the assessment of the Modification.

The reference EAL make to ABS concerns with IO analysis relate to it “*providing biased estimates of the benefits or costs of a project.*” It is agreed that IO analysis is not a good indicator of costs and benefits but this is not how IO analysis has been used in this Economic Assessment. A separate BCA has been undertaken to examine costs and benefits.

EAL also make reference to the Warkworth Judgement which criticised IO analysis for not “*assisting in weighing the economic factors relative to the various environmental and social factors, or in balancing economic, social and environmental factors.*” However, this is an inappropriate criticism of

the IO method, since it is not intended to do this. IO analysis is solely concerned with estimating the level of economic activity associated with a project and this was how it was used in the Economic Assessment for the Modification. It provides one piece of information for the consideration of the decision-maker, alongside all the other pieces of information provided via the environmental impact assessment process. Further, this statement made by his Honour Preston CJ in *Warkworth* needs to be understood in the context in which it was made, that is his Honour's comment that the input-output analysis cannot displace the role of the consent authority in weighing and balancing all relevant matters in determining whether or not a project should be approved.

Additionally, the *Warkworth* judgment was delivered prior to the introduction of clause 12AA of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* which provides that in determining whether to grant consent to the proposed development, the significance of the resource is to be the consent authority's principal consideration under this Part. Therefore in undertaking the balancing exercise referred to by Preston CJ above a consent authority therefore now needs to undertake such an exercise in consideration of cl12AA.

5.3 IO Analysis Versus CGE Modelling

IO analysis and CGE modelling are two alternative modelling methods for estimating the economic activity associated with a project. IO analysis has historically been applied at the regional level while CGE modelling has historically been applied at the State and National level for major policies and developments. CGE modelling has recently been adapted for use at the regional level.

IO analysis identifies the direct and indirect **additional (positive) regional economic activity** associated with a project in terms of a number of indicators of economic activity – output, income, value-added and employment. The impacts from IO analysis are based on a number of simplifying assumptions – most notable is that the regional economy has access to sufficient labour and capital resources (from both inside and outside the region) so that an individual project does not result in any regional price changes e.g. wages in other industries or house rentals. Consequently there are no reductions in economic activity (“crowding out”) in other sectors in the region. The results of IO modelling can be seen as representing an upper bound for the net economic activity associated with a project. IO analysis is a static analysis that looks at impacts in a particular year.

CGE modelling estimates the additional **net (positive and negative) regional economic activity** associated with a project in terms of a number of economic indicators – including value-added and employment – but also real income, government tax revenue and components of value-added. CGE modelling is underpinned by an IO database as well as a system of interdependent behaviour and accounting equation which are based on economic theory (but mostly without econometric backing at the regional level). These equations **ensure** that any change in demand in a region, no matter how small, translates into some change in prices and hence there is some ‘crowding out’ of other economic activity in the region. Results can be sensitive to changes in these behavioural assumptions. The CGE modelling can be dynamic or comparative static.

Which modelling approach best represents the true situation depends on whether price changes occur at a regional level as a result of **individual** projects. This is an empirical issue and would depend on the migration of labour into the region and timely management of land releases by Councils. Few studies exist that examine this issue.

5.4 Ghost Pool of Available Unemployed Labour

EAL make reference to a finding from the *Warkworth* Judgement criticising IO analysis because it assumes “*that there is a ghost pool of highly skilled yet unemployed people in the Hunter region, from which labour for the existing mine would be drawn...*”.

This is incorrect. The input-output method does not assume that there is a pool of highly skilled yet unemployed people in the region to work on the Modification. It assumes that relative to the level of increased demand for labour in the region, there is substantial available employed or unemployed labour in the world that can be accessed. This simplified assumption negates the need to attempt to model the extremely difficult and contentious matter of price rises and 'crowding out' of other economic activity in the region.

Crowding out would be most prevalent if the regional economy was at full employment and it was a closed economy with no potential to use labour and other resources that currently reside outside the region. In this situation a mining project requiring labour and other resources would compete for them with existing activities. However, the Hunter regional economy is not at full employment and is not a closed economy. Projects in the Hunter have potential access to employed and unemployed labour and capital resources from across the country and internationally. **Importantly, for the Modification, no new labour is required. The Modification proposes continuation of the existing level of employees,** and subsequently, as there is no proposed change in the number of employees, the criticism from EAL of the IO analysis is not relevant to the Modification.

Even where a mining project utilises labour resources from inside the region, there is a natural filter effect where these jobs are filled by other employed or unemployed labour resources inside and outside the region (i.e. including the continual addition to the labour force from school leavers, TAFE and University graduates and potentially those not currently seeking employment). This in turn creates vacancies that are then filled by other employed or unemployed labour resource, with these employed and unemployed labour resources coming from both inside or outside the region.

The potential labour force to meet demand in a region is considerably greater than just the labour force in the region and hence from a regional perspective is virtually unlimited. Consequently, for small open economies, 'crowding out' of other economic activity is likely to be small.

5.5 Alternative Regional Impact Assessment

EAL provide no alternative modelling of the Modification but instead "borrow" some ratios from the ACIL CGE modelling of a different project and applying them to the direct employment estimates of the Modification.

This is simply not a credible approach. The ACIL CGE modelling is driven by project specific costs, sales and employment structures, which will vary from project to project, and is therefore not applicable to the Modification. .

5.6 Modification is a Continuation of an Existing Mine

EAL identify that the increase in employment associated with the Modification will not affect unemployment in the region and that with only 647 people looking for full-time work in these areas at the census, instead they will likely come from outside the area.

EAL fail to understand that the Modification is for the continuation of an existing mine, that currently employs 361 and 105 contractors. Most of these workers reside in the region. Without approval of the Modification these people will lose their jobs. This will reduce the economic activity in the region and have flow-on effects to a wide range of sectors of the economy.

5.7 Crowding out

EAL refer generally to 'crowding out' as indicating the level of jobs that are 'destroyed' in a region as result of a mining project and imply a reduction in employment in other industries as a result of the Modification.

However, this is an incorrect interpretation of the results of CGE models and misunderstands the nature of the Modification. As identified above, the Modification proposes the continuation of the current levels of employment. Consequently, it will not result in any 'crowding out' of other economic activity in the region. Secondly, any 'crowding out' of other economic activities estimated via CGE modelling does not reflect losses of jobs but the shifting of labour resources to higher valued economic activities. This reflects the operation of the market system where scarce resources are reallocated to where they are most highly valued and where society will benefit the most from them. This reallocation of resources is therefore considered a positive outcome for the economy not a negative.

6.0 REFERENCES

Deloitte Access Economics (2011). Economic and social impacts of the Warkworth Extension Project, prepared for Singleton Council.

Gillespie Economics (2013) *Liddell Coal Operations Proposed Modification*, prepared for Liddell Coal Operations.

James, D. and Gillespie, R. (2002). *Guideline for Economic Effects and Evaluation in EIA*. Prepared for NSW Department of Urban Affairs and Planning.

NSW Government (2012). *Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals*.