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# Warkworth Continuation Project

Submission
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As we begin the 21st century, new dilemmas confront our society and our planet. Unprecedented levels of consumption co-exist with extreme poverty. Through new technology we are more connected than we have ever been, yet civic engagement is declining. Environmental neglect continues despite heightened ecological awareness. A better balance is urgently needed.

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# Summary

Rio Tinto's Warkworth coal project has now been assessed by no fewer than seven economists. The latest assessment by BAEconomics presents results which contrast not only with those of the project's opponents, but also with those of Rio Tinto's earlier reports. Compared with Warkworth's economists' evidence to the Land and Environment Court in 2012, revenue has increased by nearly $3 billion, as have operating costs, royalties have doubled, while profits to NSW shareholders are now ninety per cent lower.

These differences suggest readers should treat BAEconomics' assessment with caution.

## Financial issues

BAEconomics base their assessment of the project on assumptions of:

- A coal price of AUD$100/tonne, 20 per cent above current levels and Rio Tinto's own estimates of long term price.
- Operating costs of $70.50 per tonne, substantially below Australian averages of $80-$85 and the figure used in recent assessment of the neighbouring Bulga mine of $84 per tonne.

By assuming a high coal price and low operating costs, BAEconomics give the impression of a financially strong project with 'gross operating surplus' of $2.2 billion.

However, the financial viability of the project is highly sensitive to changes in these assumptions. At current coal prices and with less optimistic operating costs the project is actually likely to lose money. Media statements by Rio Tinto confirm that the project is under great financial pressure.

BAEconomics ignore this financial pressure in their assessment, by focusing not on the overall finances of the project, but on benefits to NSW – mainly royalties and employment. Under their optimistic price and cost assumptions benefits to NSW are estimated at nearly $1.5 billion.

BAEconomics' analysis suggests that these benefits to NSW are largely unaffected by changes in coal price and other assumptions. Even under their worst-case coal price and exchange rate assumptions, similar to actual market conditions today, they claim that benefits to NSW would remain above $1.2 billion.

What BAEconomics omit to tell readers is that under these price assumptions, the project would lose money in every year of its 21 year life. They ignore the fact that no project would continue paying hundreds of millions in royalties and wages each year while indefinitely losing money for its largely foreign shareholders.

## Employment issues

After royalties, the largest benefit of the project in the economic assessment is related to employment and wages. There are several problems with BAEconomics assumptions and theoretical approach.

Firstly, the assessment appears to assume project workers will be paid $170,000 per year, far higher than the industry average of $133,000 according to the Australian Bureau of Statistics (ABS).

Secondly, assumptions around labour markets are highly pessimistic. BAEconomics assume that if the project does not proceed, workers would face the following labour market conditions:

- Only 30 per cent are re-employed within one year
- 40 per cent are unemployed for more than one year
- 30 per cent leave the labour force permanently

By assuming such difficult labour market conditions, BAEconomics conclude that the benefits of the project relating to employment are very high – worth $612 million in their assessment.

However, these assumptions are not supported by ABS data, which shows that despite some recent volatility, NSW mining employment and overall coal sector employment are at, or close to, record levels. Mining has the lowest level of underemployment of all industries, estimated by the ABS at just 0.8 per cent, compared with 19 per cent in the hospitality sector.

Instead of basing their assessment on official data, BAEconomics appear to base key assumptions on lobby group claims reported in *The Australian* newspaper.

BAEconomics' approach of including wages as a benefit in cost benefit analysis is unorthodox and not supported by NSW Treasury or the Productivity Commission. The conventional assumption is that workers can be re-employed at a similar wage level in the absence of the project – i.e. that labour is priced at its 'opportunity cost'.

Under standard Treasury assumptions, the benefit of Warkworth employment would be zero. Clearly this value is not zero and The Australia Institute supports efforts to include these values in economic assessment. However, with ABS data shows that under-employment in mining is the lowest of all industries at just 0.8 per cent, the Warkworth coal project is unlikely to produce employment results that warrant departure from standard assumptions.

Part of the reason authorities like NSW Treasury and the Productivity Commission recommend against this approach is that it requires so many assumptions that are difficult to justify and that can produce strange results within the assessment. An example is BAEconomics' counterintuitive result that the less people from NSW work on the project, the greater the benefits will be to NSW. Their results are reproduced in the table below:

| Percentage of additional hires originating from NSW | Net employment benefit to NSW (NPV A$2014 m) |
|---|---|
| **50 per cent** | **$622** |
| **70 per cent** | **$612** |
| **100 per cent** | **$596** |

Source: extract from BAEconomics (2014) Table 3-8, p35

Whatever the assumptions behind this result, it is difficult to explain to unemployed people in NSW why the state would be better off if they remained unemployed and allowed outside workers to fill these jobs.

## Impacts on community

While the benefits of the project to NSW have been overstated, the costs it imposes on the local community have been understated. Many residents will be surprised to discover that the

assessment concludes that there will be no change to their property values or general wellbeing if they are required to live next to a coal mine for an extra 15 years.

BAEconomics make the mistake of assuming that money spent in order to meet government criteria for noise, vibration and dust standards is exactly equal to the costs of these impacts. This ignores noise and dust levels that occur despite compliance with guidelines, or the fact that the project has a long history of non-compliance with such standards.

## Environmental Impacts

The project would destroy large areas of an endangered ecosystem, the Warkworth Sands Woodland. Rather than attempting the task of environmental valuation, or of making it clear that this impact is difficult to value and should be considered separately by decision makers, BAEconomics have assumed that the offset package proposed will perfectly compensate for this destruction. They value this destruction at no more than the cost of planting the new woodland offset. No consideration is made of the uncertainties surrounding the ability to recreate a unique ecosystem, the willingness to maintain it into the future, or of the long period it will take for it to mature. These assumptions are contrary to the published opinions of expert ecologists in this field.

## Regional Economic Impact Assessment

BAEconomics have used an input-output model to estimate wider economic impacts of the project, particularly 'indirect jobs'. Input-output models overstate the positive impacts of projects due to their assumptions of no resource constraints and fixed prices.

BAEconomics' choice of an input-output model is surprising as one of the key criticisms of the earlier Warkworth assessments by the Land and Environment Court was that input-output models were 'deficient' for this purpose. The Court's decision is supported by the reports from the ABS, the Productivity Commission and most recently by neighbouring coal company, Yancoal.

Yancoal discarded their input-output assessment when faced with the scrutiny of the Land and Environment Court, instead commissioning ACIL Allen to do a more comprehensive modelling exercise. ACIL Allen's economist told the court:

> *In the Warkworth case input/output modelling was criticised by the chief judge and ... for good reason. Input/output modelling is fine for some purposes but it's not the best technique … for this kind of purpose [evaluating a coal mine].*

BAEconomics' decision to use an input-output model is also against recent decisions of the Planning and Assessment Commission.

## Conclusion

Ultimately the economic question around the Warkworth project is - are the uncertain benefits of royalties and employment greater than the certain impacts on local residents and the destruction of an endangered ecological community? The Australia Institute has argued for several years that these benefits do not outweigh the costs of this mine. The latest economic assessment provided by the proponent has major flaws and does nothing to change this conclusion. The project should be rejected on this basis.

# Introduction

Over the past three years seven different economists have made and reviewed assessments of the Warkworth mine proposals. There is a general consensus between us that, if the project proceeds, it would pay royalties and extend employment in the mine, but would have negative impacts on endangered ecological communities and the residents of Bulga. This is the basic cost-benefit assessment which decision makers face.

Beyond this broad consensus there is little agreement, even between the economists employed by Rio Tinto. From 2009 to 2012 the company used coal industry economists, Gillespie Economics to assess the project. After losing project approval in the NSW Land and Environment court in 2013, the company has changed economists, now employing BAEconomics, a consultancy headed by prominent economist Brian Fisher, the former head of the Australian Bureau of Agricultural and Resource Economics (ABARE).

In assessments by both Gillespie Economics and BAEconomics, the amount of coal produced by the project is the same, coal prices are at similar levels and the geographical area is identical, but the economists' estimates of key costs and benefits are very different, as shown in Table 1 below:

**Table 1: Warkworth mine assessments – Gillespie Economics and BAEconomics**

| | Gillespie Economics 2012 | BAEconomics 2014 |
|---|---|---|
| | (AUD$m) | (AUD$m) |
| **Value of coal** | $4,857 | $7,527 |
| **Operating costs** | $2,622 | $5,306 |
| **Capital costs** | $301 | $714 |
| **Net production benefits** | $1,934 | $1,507 |
| **Royalties** | $254 | $617 |
| **Company tax share to NSW** | $121 | $116 |
| **Share of profit to NSW** | $144 | $12 |

It is surprising that two assessments of the same mine commissioned by the company would differ by nearly $3 billion in estimates of revenue and operating costs without explanation. Capital costs appear to have doubled and the net financial benefits of the project have reduced by $400 million. Of direct interest to NSW is that royalty estimates have more than doubled, revenue from federal company tax has remained the same, while the share of profit retained by NSW residents is now estimated at less than 10 percent of what was presented to the Land and Environment Court.

No explanation is provided for these large differences, suggesting that the proponents either acknowledge serious errors in the earlier work of Gillespie Economics or accept that there

are major uncertainties around the work of BAEconomics. The former seems unlikely, as the current Environmental Impact Statement (EIS) still references Gillespie Economics' reports.[1]

Our submission supports the second option - there are major uncertainties around costs and benefits in the BAEconomics assessment. In particular, benefits are overstated while costs are downplayed:

- Coal prices and exchange rates are optimistic
- Cost estimates are low compared to Australia averages and a neighbouring project
- They have not questioned the ability of a marginal project to pay royalties and provide employment
- They have adopted an unorthodox approach to assessment of employment benefits based on high wage assumptions and pessimistic assumptions about labour markets not supported by ABS data.

More certainty surrounds the negative environmental and social impacts of the project. If the Warkworth mine proceeds it would subject the Bulga community to an extra 15 years of living next to an open cut coal mine. It would also result in the destruction of a large area of woodland, of a type which is found nowhere else in the world.

The position of The Australia Institute is, and has always been, that it is not in the interests of NSW to harm a vibrant rural community and destroy an endangered ecosystem for a project which largely benefits a foreign corporation. The impacts on Bulga and rare woodlands are up-front and certain, while payments to NSW are spread over many years and dependent on market conditions. Even if the project proceeds as the proponents hope, royalties paid in any year amount to less than one tenth of one per cent of the NSW Government's annual revenue. Similarly, employment on the project amounts to a tiny fraction of the Hunter's workforce.

## Financial aspects of the Warkworth project

BAEconomics focus their assessment on the "gross operating surplus" of the Warkworth project. Their Table 3-2 calculates gross operating surplus by subtracting operating costs from the revenue from the sale of coal, giving an estimate of $2.1 billion.

With this apparently strong result, BAEconomics then turn their attention to other issues, such as estimating impacts of the proposal on gross state product, royalty revenue and employment. The financial viability of the project is not discussed again in the 118 pages of the assessment.

This is surprising, as the Warkworth project, along with many Hunter coal projects, is under considerable financial pressure. This is no secret; these issues are widely discussed in the press.[2] Rio Tinto has even mentioned options to either heavily downsize the project, or merge with neighbors due to the finances of the project.[3]

[1] See EIS main volume, Section 23.3 p415-416

[2] See for example: http://www.theaustralian.com.au/business/mining-energy/mine-ruling-a-test-of-political-mettle-says-rio/story-e6frg9df-1226759355400?nk=e2266bfc9fb92c022c436d5099993bca and http://www.miningaustralia.com.au/features/thin-margins-job-losses-coal-sector-troubles

[3] http://www.theaustralian.com.au/business/mining-energy/mine-ruling-a-test-of-political-mettle-says-rio/story-e6frg9df-1226759355400 and http://www.theherald.com.au/story/2134182/rio-glencore-talks-may-see-super-pit/

In the following sections we consider key assumptions and derive other unstated assumptions important for understanding the financial aspects of the project. Although it is not explicitly discussed by BAEconomics, some of their own results highlight that the project is highly sensitive to assumptions around coal prices, exchange rates and operating costs.

## Price of coal

The BAEconomics assessment is based on assumptions of a $USD Newcastle benchmark coal price of $85/tonne and a USD:AUD exchange rate of 0.85, giving an Australian dollar price of $100 per tonne. While this is in line with some analysts' forecasts, it is considerably above the current AUD price of $82/tonne, derived from a US$77/tonne price and an exchange rate of 0.93.[4] BAEconomics provide no sources or references for their estimates of coal price or exchange rate.[5]

It is interesting that Rio Tinto itself uses a far lower coal price in its own work. In research for another Hunter Valley mine owned by Rio Tinto, the company used a:

> *Long-term consensus view of the thermal coal price of US$72.58 per tonne*.[6]

It is not clear why BAEconomics use unsourced estimates considerably above their client's own long term forecasts.

Importantly, BAEconomics do not discuss the impact of lower coal prices on the overall finances of the project. Their estimate of gross operating surplus is not subject to sensitivity testing on this or any other assumption. To test the sensitivity of the project to changes in assumptions over time, it is important to understand the volume and timing of production.

## Volume and timing of production

In addition to prices, consideration of the volume and timing of production is important to the financial analysis of any project. Unfortunately, the EIS for the Warkworth project provides no production schedule outlining the volumes of coal the project hopes to produce through its lifetime. [7]

We can estimate the production schedule assumed by working backwards from BAEconomics' estimate of present value of production. Their estimate of $7,527 million, implies a production rate of 11Mtpa is maintained through most of the project's life, a total of 156 million tonnes of extra production.[8] Our estimate of production under the extension proposal and production under the current Warkworth consent is shown in Figure 1 below:

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[4] http://www.indexmundi.com/commodities/?commodity=coal-australian&months=60, www.xe.com accessed 5 August 2014.

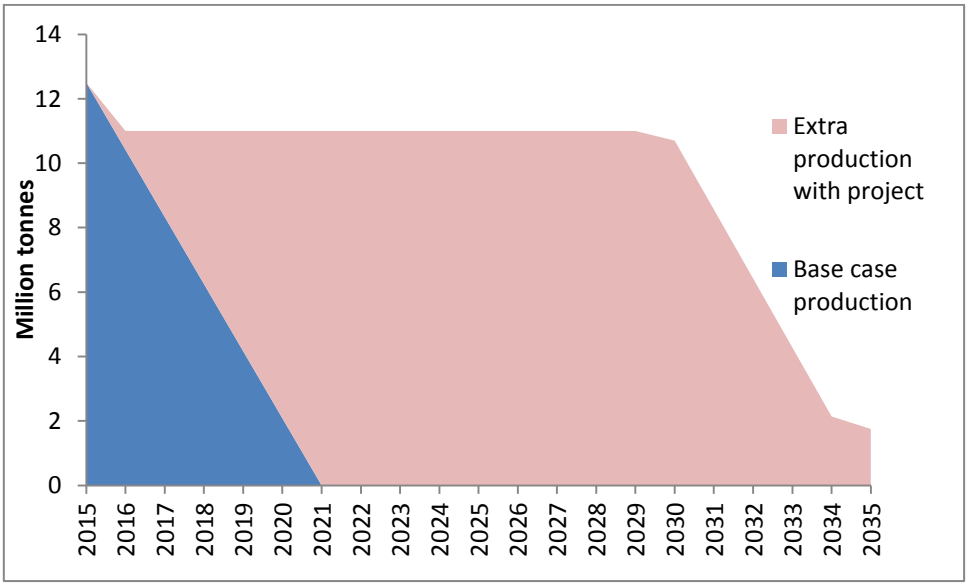
[5] In contrast with the thorough and transparent approach taken recently by (DAE, 2013) p24-25

[6] (Rio Tinto, 2013) p9

[7] In contrast, note the detailed production schedule provided in the economic assessment of the Bulga Optimisation project. (DAE, 2013) p57

[8] Confusingly, in the text of the EIS BAEconomics state that production would be 18 million tonnes per annum (Mtpa) of run-of-mine coal (ROM), equivalent to 12.5 Mtpa of processed, saleable coal. However, this production level maintained through the project results in a volume of coal 183 million tonnes above the base-case, which would have a value of $8.9 billion at the assumed prices - a far higher value than that included in the BAEconomics assessment, even allowing for a ramp down of production from 2030 as outlined in (EMM, 2014) EIS main volume p27.

**Figure 1: Project production schedule derived from EIS**




Sources: The Australia Institute calculations based on BAEconomics production values and EMM production information

The production schedule in Figure 1 results in BAEconomics estimated present value of production of $7,527 million under their assumptions of US$85 per tonne, USD:AUD 0.85 and a seven per cent discount rate.

## Project revenue

Based on this derived production schedule, we can assess the value of production at current prices and exchange rates. At the current price of $77/tonne and an exchange rate of 0.93, the present value of the project's product coal relative to the base case is $6,232 million, $1,295 million lower than in the economic assessment.[9]

A similar result can be derived from Table 3-5 of the BAEconomics assessment, which has sensitivity analysis of royalty, payroll tax and rates revenues. At a coal price of US$75/t and exchange rate of 0.95 the estimated royalty, tax and rate revenue is estimated at $549 million. This implies an estimate of total revenue of $5,890 million, slightly below our estimate above.[10]

## Operating costs

Another cause for concern in the BAEconomics analysis is their estimate of operating costs. Their Table 3-2 shows present value operating expenditure, $3,812 million, and wages & salaries, $1,494 million, a total of $5,306 million (including royalties). No source is provided for these figures and no estimate of the mines operating costs per tonne is provided – a key statistic for any mine analysis.

[9] All working available on request.

[10] To arrive at this estimate, we assumed that payroll tax and council rates estimates of $66 million, would be unaffected by price and exchange rate fluctuation. Subtracting this $66 million from the $549 figure in Table 3-5 gives royalty revenue of $483 million. The royalty rate for the project used by BAEconomics is 8.2% in line with NSW government guidelines before deductions. Dividing the $483 million royalty estimate by the royalty rate gives estimated revenue of $5,890. Note that BAEconomics do not consider royalty deductions as outlined in (NSW DII, 2008), which serves to overstate the value of royalties.

From the present value figures provided and production estimates above, BAEconomics' Table 3-2 implies operating costs (including wages and royalties) of $70.50 per tonne of saleable coal.

This is considerably below the average cost per tonne of Australian coal mines, which is currently around $80-85 per tonne.[11] Note that the recent assessment of the Bulga Optimisation project used an estimate of $78 per tonne, *excluding royalties*, based on referenced econometric modelling studies of Australian open cut coal mines.[12] Including royalties this would be approximately $84/tonne.

Furthermore, mines tend to extract the cheapest part of a resource first, leaving the more expensive to access areas until later in the mine's life. We would expect over the next 21 years that operating costs per tonne would increase at the Mount Thorley-Warkworth complex. This likely cost increase is not discussed by BAEconomics and its implications for the viability of the project and benefits to NSW are not considered.

## Capital costs

BAEconomics' estimate of gross operating surplus does not consider the capital costs of the project. Gross operating surplus includes only operating costs and wages. Capital costs are only included in BAEconomics' Table 1.1, where they are included as "incremental benefits" of the project.[13]

As there is no direct estimate of capital costs provided in the BAEconomics analysis and no discussion around them, it is difficult to assess possible changes and their implications for the project and various stakeholders. It is worth noting recent industry reports saying:

> *The average capital expenditure (capex) overrun in the mining industry over the last two years is 56 percent. It is not uncommon for capex overruns to be in excess of 100 percent when markets were running and input factor inflation was strong.*
>
> *These capex overruns occur after the successful completion of bankable feasibility studies that typically state a 10 percent margin of error.*[14]

As shown in Table 1 above, the estimate of capital costs in the BAEconomics assessment is more than double the estimate used by Gillespie Economics. Given these changes, sensitivity analysis around these costs should be provided.

## Assessing project viability

With some understanding of how estimates of the project revenue and costs are derived by BAEconomics, we can make alternative estimates of the finances of the project. In Table 2 below, we compare BAEconomics estimates with revenues under current market conditions and operating costs similar to neighbouring Bulga mine:

[11] (Morgan Stanley, 2013)
[12] (DAE, 2013) See page 27
[13] The inclusion of a cost to the proponents as an "incremental benefit" under the State Environmental Planning Policy heading is misguided. It assumes that any investments and purchases of capital equipment are made in NSW, whereas much is likely to be imported. Furthermore, it assumes that the opportunity cost of providing these goods and services is zero – but any providers clearly incur costs in providing goods and services. This approach appears not to have been included in the cost benefit analysis, but the discussion of expenditure as a "benefit" is erroneous from an economic perspective.
[14] (Koth, 2013)

**Table 2: Project net production benefits BAEconomics assumptions and current prices**

| | | BAEconomics 2014 | Current levels |
|---|---|---|---|
| **Coal Price** | USD/t | $85 | $77 |
| **Exchange rate** | USD:AUD | 0.85 | 0.93 |
| **AUD coal price** | AUD/t | $100 | $83 |
| **Additional production** | Million tonnes | 156 | 156 |
| **Discount rate** | % | 7% | 7% |
| **Present value of additional production** | AUD (m) | $7,527 | $6,232 |
| **Present value operating costs** | AUD (m) | $5,306 | $6,323 |
| **Present value capital costs** | AUD (m) | $714 | $714 |
| **Net value of production** | AUD (m) | $1,507 | -$805 |

We see that at current prices and exchange rates the project has a net value of negative $805 million – it is not financially viable. Similarly, under BAEconomics' lower price scenarios in Table 3-5, the revenue requried to derive the royalty figures in that table would be lower than their estimated total cost of $6,020 million in Table 1-1.

This will not come as a surprise to observers of the Australian coal industry, with many mines operating at a loss for prolonged periods.[15] Because of financial considerations, options for further change to the Warkworth mine are

A marginal project will not operate consistently and under the conditions assumed in the EIS. It will be forced to change its operations, perhaps downsizing its operations or alternatively expanding them to try to capture economies of scale.

The key message from this analysis is that at current prices and exchange rates, the project is under extreme financial pressure. This situation concerns not only the project's foreign owners, but is also relevant to NSW decision makers as the payment of royalties and maintenance of employment – the key benefits of the project – depend on its financial viability. If the project is marginal, it will likely be delayed and have strong incentive to seek further modification and relaxation of planning conditions.

## Sensitivity analysis

The sensitivity analysis provided by BAEconomics explores how changes in some assumptions affect the benefits of the project for NSW. For example, BAEconomics Table 3-

[15] http://www.miningaustralia.com.au/features/thin-margins-job-losses-coal-sector-troubles http://www.afr.com/p/more_pain_to_come_for_coal_OUFz8MpuegNTBu1gs4J7XO

5 shows how royalty, tax and rates revenue would be affected by changes in the coal price and the exchange rate. The findings suggest the benefits are robust against price and exchange rate changes, varying between $549 million and $852 million.

Similarly, BAEconomics Table 3-6 estimates changes in overall benefits to NSW, including employment benefits in relation to coal price and exchange rates. Again, the results seem robust, with a low of $1,235 million and a high of $1,839 million.

What is missing from this sensitivity testing, however, is any consideration of the financial aspects of the project. As discussed above, at the lower price and exchange rate assumptions, the project will lose money. The unstated assumption of both tables of sensitivity testing is that the project would continue to produce to schedule regardless of financial losses. However, it is unlikely that a project that is losing money for two decades will pay a steady stream of royalties and provide secure employment.

As the sensitivity testing on benefits relevant to NSW ignores the financial aspects of the project, it provides little guidance as to what NSW can expect out of the project. As the benefits to NSW are largely royalties and employment, both of these are highly dependent on the financial viability of the mine and are certainly overstated at the lower end of sensitivity estimates, under conditions like those currently prevailing in coal and foreign exchange markets.

## Employment in economic assessment

Benefits of the project relating to employment are estimated at $612 million dollars, almost half of the estimated net economic benefits of the project. BAEconomics make two key assumptions relating to employment in their analysis:

- That the project "would provide, on average, 1,307 full time equivalent positions between 2015 and 2035." (p13)
- That if the project is not approved many employees will experience extended unemployment.

We question both of these assumptions and the way they are incorporated into the cost benefit analysis in the following sections.

### Proponent's statements on employment

It is difficult to reconcile the assumptions regarding employment in the EIS with statements Rio Tinto has made to investors. To government and the media Rio Tinto emphasise the jobs they are trying to save, while to investors they emphasise the jobs they are trying to cut.

Rio Tinto's chief of Australian coal, Chris Salisbury, said to the Planning and Assessment Commission and wrote in The Australian newspaper last year that a key objective was to:

> *protect the the jobs of more than 1300 employees and contractors. Granting this approval will, in effect, provide a lifeline for our workforce and the many hundreds of other businesses that rely on us.*[16]

Yet at the same time, Rio Tinto's CEO, Sam Walsh, told investors:

[16] http://www.theaustralian.com.au/business/opinion/why-failure-to-reform-planning-could-cost-the-country-millions/story-e6frg9if-1226759379206#

> *To be frank, we had lost focus on what really matters - delivering superior value.*
>
> *My goal is to transform Rio Tinto from where we were, to where we must be - the highest performer in our sector, delivering greater value to our shareholders.*[17]

If you look at how shareholder value is to be delivered you find a heavy focus on:

> *Reducing costs around the business…*[18]

Including from the Energy Division, which includes this project:

> *Reducing staff levels…*[19]

The company has outlined some of its plans to reduce staff levels through use of technology such as driver-less trucks:

> *Remote mining involves controlling operations without physical presence at a location. Drivers and other operators of machinery are able to control equipment from an operations centre located away from the mine site itself, reducing the need for staff to be located in the rural areas where mines are typically located. …*
>
> *… Rio Tinto will consider opening remote mining centres in the Hunter and Gladstone. At present the bandwidth and speeds available in the remote locations in the upper Hunter where mining operations are based are a constraint to widespread adoption of remote services, however as fixed and wireless technologies improve through the NBN, and as automation technologies improve, remote operations may become more viable. … Highwall remote mining techniques have also been proposed for the Hunter's open-cut coal excavations.*[20]

It is the responsibility of Rio Tinto management to work in the interests of their shareholders, even if this means reducing staff levels. It is normal for a company to invest in technology to enhance the productivity of its workers and enable operations to run more efficiently. This is entirely appropriate for a major corporation in a very competitive market.

It is confusing, however, to claim at the same time that maintaining jobs is also a key objective of the project. The economic assessment is wrong to assume, contrary to the statements of their clients, that staffing levels would be maintained throughout the life of the project and that no effort will be made to increase the productivity of the workforce.

## Employment in cost benefit analysis

BAEconomics assume that in the absence of the Warkworth Continuation Project that significant numbers of workers will experience long and costly periods of unemployment. The benefits of avoiding this unemployment are included as a major benefit to NSW in the cost benefit analysis.

Cost benefit analysis typically assumes that in the absence of the project in question, workers are employed elsewhere in the economy at similar wage rates. In formal economics

[17] http://www.riotinto.com/documents/Presentation_script-slides-QA__Sydney_3_Dec_2013.pdf
[18] http://www.riotinto.com/investors/reducing-costs-around-the-business-9032.aspx
[19] http://www.riotinto.com/investors/optimising-maintenance-to-increase-productivity-energy-9047.aspx
[20] Deloitte Access Economics. (2013). *Prospects and challenges for the Hunter region: A strategic economic study*. Report for Regional Development Australia Hunter, p27

terms, the assumption is that labour is priced at its “opportunity cost”. As workers have other opportunities, there is no particular benefit from that project over the other opportunities. This is the position of the *NSW Government Guidelines for Economic Appraisal*:

> *It can be argued that in times of unemployment the opportunity cost of labour employed on a project is less than the wage costs, and project costs and benefits should be adjusted accordingly. However, in practice such adjustments are not generally made and are not recommended.*
>
> *Uncertainty exists as to what represents the "full employment" level of output and employment in the economy. The degree of full employment would need to be assessed by occupation and region and forecast over the project period. An adjustment for unemployed resources assumes that the resources employed are not at the expense of the employment of other resources. Where macroeconomic parameters act to constrain the overall level of activity in the economy and/or the funds available for capital works such an assumption is not appropriate.*[21]

BAEconomics’ decision to depart from government guidelines and conventional assumptions around redeployment of workers is a brave one, and one that in many circumstances The Australia Institute would support.

For example, the Australia Institute’s Executive Director, Richard Denniss, argued that unemployment that would be experienced by textile, clothing and footware (TCF) workers represented a serious cost to the policy of tariff reductions in this area, which had not been adequately considered by policy makers and government agencies.[22] His views were opposed by the Productivity Commission, who strongly objected to modelling assumptions that 30 per cent of TCF workers would not find further employment and likely leave the labour force – a similar percentage as assumed by BAEconomics in this assessment.[23]

TCF workers are generally low-skilled, low-earning workers, with limited ability to move to different industries or geographical areas to find other work. Employment in TCF jobs has been declining steadily over many years. The opposite is true of workers in the mining industry. They are highly skilled, high-earning and the most mobile workers geographically and between industries in Australia. Mining employment has increased in recent years and is close to record levels, as discussed below.

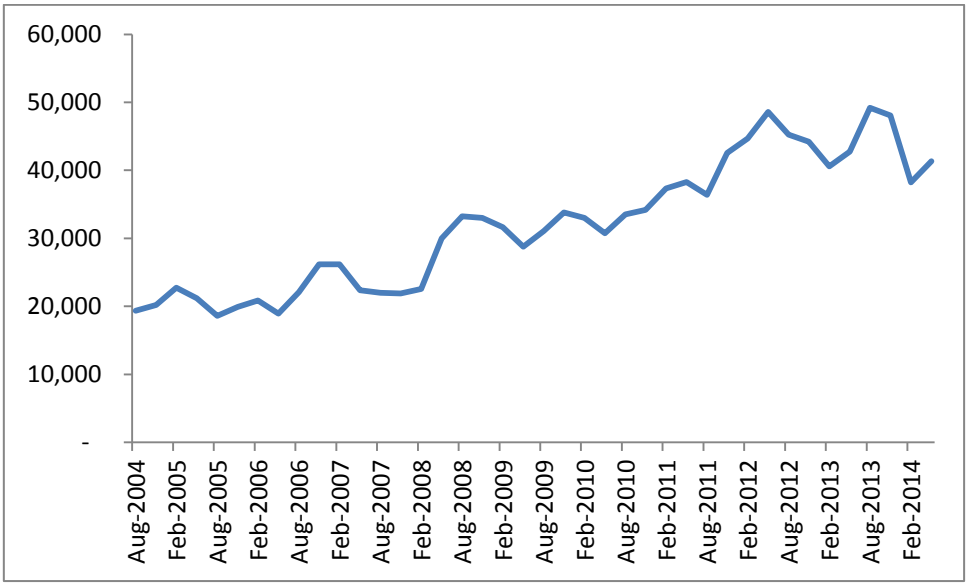
While we applaud the consideration of employment effects outside of orthodox economic assumptions, it is hard to understand why this approach is being taken in relation to the mining industry. To justify their approach, BAEconomics attempt to show that workers from the Warkworth project are unlikely to find other jobs either in the coal industry or elsewhere in the Hunter economy. Official statistics show that this is not the case.

## Employment in the coal industry

Employment in the NSW mining industry, the bulk of which is in Hunter coal mining, has doubled over the last decade. While numbers have been volatile over the last two years, there are more people employed in the NSW mining industry now than in February 2013 and any time prior to 2011, as shown in Figure 2 below:

[21] (NSW Treasury, 2007) p48
[22] (Denniss, 2008)
[23] (Productivity Commission, 2008)

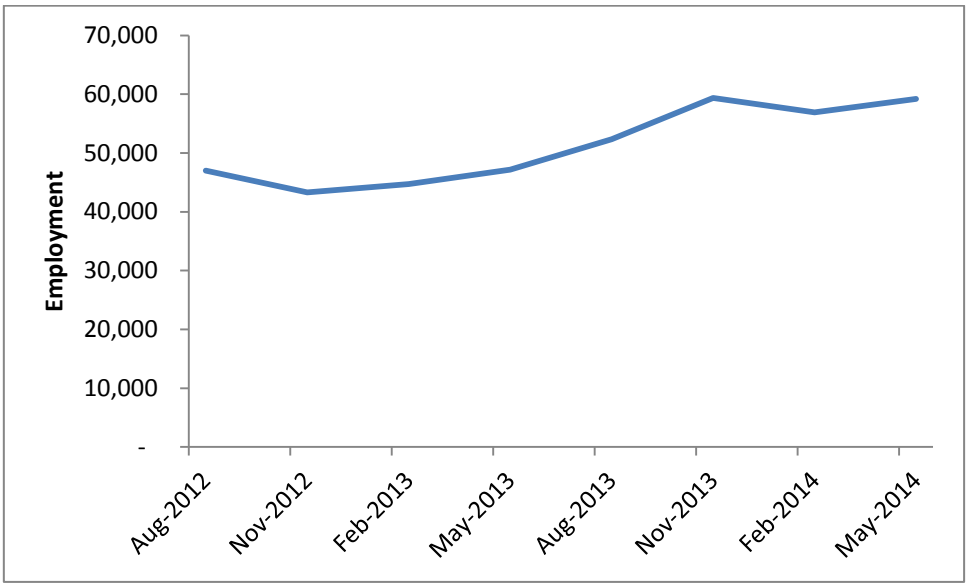
**Figure 2: NSW mining employment 2004-2014**




Source: ABS 2014 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly

NSW statistics do not show the coal sector specifically. Australia-wide statistics show that the coal sector has followed similar trends over the long term and has actually increased employment by 10,000 people in the last two years, as shown in Figure 3 below:

**Figure 3: Australia coal mining employment**




Source: ABS 2014 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly

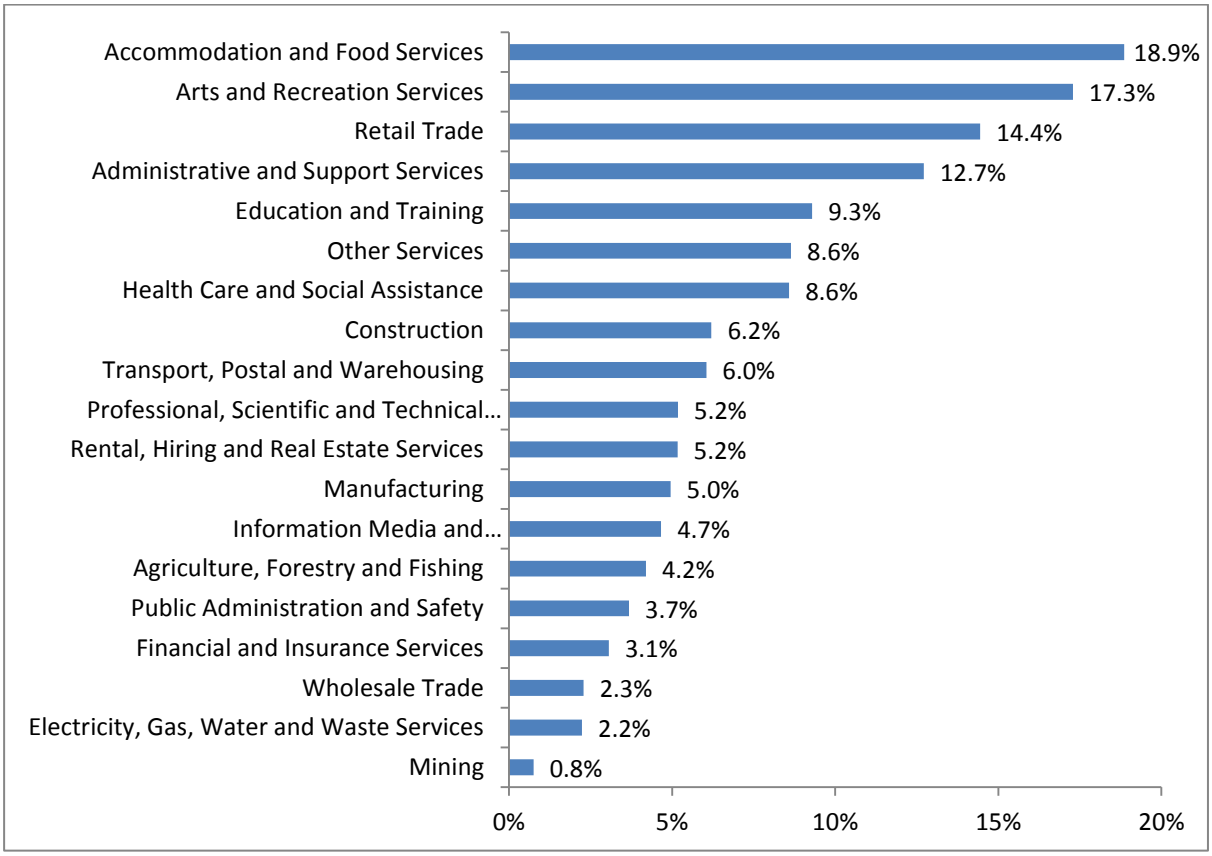
Note that BAEconomics' source for data on coal employment is an article in *The Australian* newspaper, which claims the precise opposite – that up to 12,000 jobs have been lost in the coal sector over the last two years.[24] While the source of the statistics is not mentioned in *The Australian's* article, contemporary reports on the ABC indicate that they are from mining

[24] (Tasker, 2014)

lobby group, the Minerals Council of Australia.[25] It is inappropriate to base assessment on statistics from an industry lobby group, rather than official sources.

Furthermore, while there has been volatility in parts of mining employment over recent years, the amount of under-employment reported in the mining industry is the lowest of any ABS industry category, as shown in Figure 4 below:

**Figure 4: Underemployment in Australian industries May 2014**




Source: ABS 2014 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly

With underemployment in the mining industry at 0.8 per cent, it is very pessimistic of BAEconomics to try to argue that skilled, experienced mine workers will have difficulty finding work.

Recent layoffs in particular coal projects have captured headlines and the difficulties that this places on the individuals and families affected are serious. However, economic analysis should be based on data rather than annectdote, no matter how powerful. It is clear that while some areas of the mining and coal industries have been reducing employment, others have been increasing it. The employment situation in the mining indusutry does not justify BAEconomics departure from NSW government guidelines for economic appraisal.

Similarly, outside of the mining industry there is no employment crisis in the Hunter or NSW economies. BAEconomics in Table 2-1 use 2011 data suggest an unemployment rate of 5.0 per cent in the Upper Hunter and 5.6 per cent in the much larger Hunter economy which includes Newcastle and Lake Macquarie, areas with minimal mining employment. These levels are well within long term averages for the Hunter (ex-Newcatle), of 5.8 per cent and

[25] http://www.abc.net.au/news/2014-05-16/coal-outlook/5462226

the Newcastle and Lake Macquarie area of 6.8 per cent.[26] NSW has averaged 6.9 per cent in the long term, 5.2 per cent in the last decade and 5.4 per cent in the last five years.[27]

## Labour market assumptions in BAEconomics cost benefit analysis

BAEconomics calculations of employment benefits require many assumptions about the labour force. Key assumptions include:

- Rates of workers being re-employed elsewhere, remaining unemployed and leaving the labour force.
- Wages earned by re-employed workers.

## Re-employment, unemployment and labour force

BAEconomics' central estimates are based around the assumption that if the project in not approved:

- 30 per cent of workers will be re-employed that year.[28]
- 40 per cent are re-employed the following year after one year's unemployment.
- 30 per cent leave the NSW labour force.

These estimates appear to be based on a Reserve Bank of Australia (RBA) study, which showed that across all industries, of people experiencing invouluntary reduncancy, 35 per cent are re-employed that year, 43 per cent are unemployed for at least a year and 23 per cent leave the labour force.[29] There are many reasons why BAEconomics modification and use of the RBA's results are inappropriate.

Firstly, BAEconomics apply the average rates from all industries to the mining industry. This is surprising as the RBA publication that is their main source goes into considerable detail on the nature of mining employment in recent data. For example, it includes a graph which shows that mining has the second highest rate of worker turnover of all industries, second only to accomodation and food services (hospitality), as shown in Figure 5 below:

[26] ABS 2014 6291.0.55.001 Labour Force, Australia, Detailed - Electronic Delivery Table 16. Labour force status by Region (SA4) and Sex

[27] ABS 2014 6202.0 Labour Force, Australia, Table 04. Labour force status by Sex - New South Wales

[28] It is not clear if these workers are assumed to be re-employed immediately, or after a 38 week period of unemployment, as suggested in section A.2.2 Duration of unemployment.

[29] (D'Arcy et al., 2012)

**Figure 5: Worker turnover - selected industries**


Source: (D'Arcy, Gustafsson, Lewis, & Wiltshire, 2012) p6

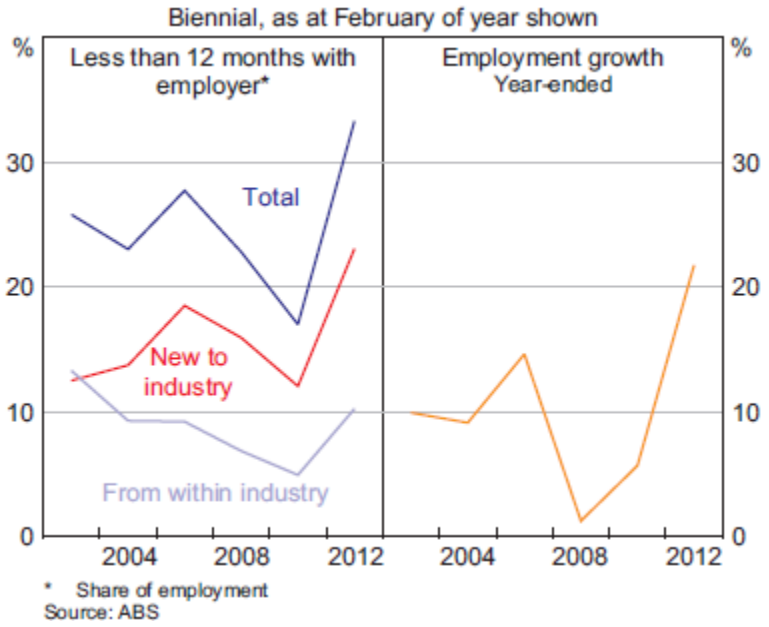
Turnover in industries like hospitality and retail is high due to the low skill levels required, the young age of many workers, low wages and lack of other benefits like long service leave and organised industrial relations, according to the RBA. In contrast, mining worker turnover is high due to:

> *[The] rapid growth in employment, which has seen more new workers enter, but also more existing workers changing jobs as competition for labour in the industry encouraged more intra-industry job moves.* [30]

So not only has mining employment growth been strong, as shown in the ABS data above, but more than any other industry, mining has recruited skilled workers from other sectors. This suggests that workers in the Warkworth project will be able to find employment either within the mining industry or other industries they have come from, to a degree that workers in few other industries can. It is hard to understand how BAEconomics overlooked this conclusion, as the RBA researchers emphasised it again in two more graphs on the next page of the same report, as shown in Figure 6 below:

[30] (D'Arcy et al., 2012)p6

**Figure 6: Changes in mining employment**




Source: (D'Arcy et al., 2012) p7

We see in Figure 6, that while mining employment growth and turnover fell to very low, but still positive, levels after the financial crisis, it has rebounded since then, with new employees overwhelmingly coming from other industries. In short, BAEconomics' main source document for its labour market assumptions, does not support their decision to abandon standard economic assumptions.

Secondly, the figures used by BAEconomics are based on the RBA's "involuntary separations" data, which includes retrenchment, employers going out of business, the ending of temporary or seasonal jobs. No time frame is mentioned for how much notice employees are given, but presumably many of these employees would include firings and redundancies with relatively little notice.

In contrast, the Warkworth mine is scheduled to operate until 2021, although Rio Tinto claim it may close sooner. The planning process and legal appeals around the mine have been running for at least five years. As discussed above, Rio publically state they are trying to reduce employment levels and automate their operations.

It is hard to imagine a situation where workers could have greater and clearer notice that they need to look for other work. While the uncertainty around an actual closing date is no doubt frustrating for many parties, if a closing date of 2021 was set, it is likely that minimal costs of unemployment would be experienced by workers due to the nature of industry worker turnover, robust mining employment and a generally strong Hunter and NSW economy.

## Wage assumptions

BAEconomics do not say what they assume the average wage is for Warkworth project workers. This is an important assumption as it is the basis for one of the largest benefits in the CBA - $612 million in workers' salaries.

Based on information in BAEconomics Figure 2-4, Figure 2-1 and Table 3-7, it appears they have assumed a wage of nearly $170,000 per year. This is far higher than the national

industry average of $133,000[31] or the $109,000 to $142,000 per year wage offers rumoured to have been made by the proponents in recent wage negotiations.[32]

The calculations and sources for our estimate of $170,000 per year salaries are outlined in Table 3 below:

**Table 3: Project worker wage estimates**

| Data | Value | Source |
|---|---|---|
| **Number of workers on project** | 1300 | p3 |
| **Percentage from Singleton** | 35% | Figure 2-1, p 10 |
| **Number of workers living in Singleton** | 455 | Calculation |
| **Disposable income increase in Singleton** | $50,000,000 | Figure 2-4, p 14 |
| **Increase in disposable income per Singleton worker** | $109,890 | Calculation |
| **Average Hunter wage** | $58,653 | Table 3-7, p34 |
| **Implied salary of Warkworth worker** | $168,543 | Calculation |

We see that BAEconomics have either assumed a very high wage of nearly $170,000 per worker, or in their estimation of disposable income in Singleton in Figure 2-4, they assume that no Singleton workers find any other employment. These assumptions, and any corrections, must be made transparent if readers to have any confidence in the work of BAEconomics.

In the event that the project does not proceed, BAEconomics assume that once workers are re-employed, they earn a wage of $58,853 per year, their estimate of the average Upper Hunter wage. Workers then go on earning this average wage for the rest of the assessment period.

This is a highly questionable assumption. Warkworth workers are skilled, experienced mine workers, many with backgrounds in other industries that are likely to earn above average wages, like skilled construction. It is very unlikely that they will permanently transfer to average paying jobs. Alternatively, the assumption is that the Warkworth workforce is transferred to all industries at the same rate as the general population, with only five per cent going to Hunter mining jobs and most going to low paid work in the major employing sectors of health care and retail.[33] The RBA graphs above show that this is not the case – most will find work in the mining or other skilled industries.

[31] ABS (2014) 6302.0 - Average Weekly Earnings, Australia, May 2014, TABLE 10H. Average Weekly Earnings, Industry, Australia (Dollars) - Original - Persons, Full Time Adult Total Earnings

[32] The Australia Institute has been shown wage offer documents by local contacts; however we have no way of verifying their authenticity and they are not publically available.

[33] For a full discussion on Hunter employment by industry and mining's 5 per cent share, see (Campbell, 2014)

## Sensitivity analysis of labour assumptions

The sensitivity analysis provided in BAEconomics' Tables 3-7 and 3-8 examines how changing assumptions around employment affects calculations of benefits to NSW. Some assumptions around re-employment and workers origins are adjusted, but the fundamental issues discussed above – that mining employment is strong and that workers are unlikely to go back to average paid work – are never considered.

For example, BAEconomics' best-case scenario in Table 3-7 suggests that even if all employees are employed elsewhere, that there is a $504 million dollar benefit to NSW of approving the project. This assumes that all employees will be redeployed to 'average' jobs, or that only around 65 out of 1300 experienced mine workers get jobs in the mining industry, while the bulk are redeployed in the Hunter's main industries of employment, health care and retail.

BAEconomics' worst-case scenario in Table 3-7's assumes that none of these skilled, experienced mine workers would find any paid employment within a year, despite living in one of Australia's largest mining areas with mining employment close to all-time highs.

Most surprisingly, BAEconomics Table 3-8 comes to the counter-intuitive conclusion that the less workers from NSW work on the project, the better the result for NSW. If 50 per cent of workers are from NSW, benefits are estimated at $622 million, but if 100 per cent come from NSW, benefits drop to $596 million, as summarised in our Table 4 below:

### Table 4: employment benefits and NSW participation

| Percentage of additional hires originating from NSW | Net employment benefit (disposable income) (NPV A$2014 m) |
|---|---|
| **50 per cent** | **$622** |
| **70 per cent** | **$612** |
| **100 per cent** | **$596** |

Source: extract from BAEconomics (2014) Table 3-8, p35

The reasoning in Table 4 seems to be that if an interstate worker came, all of their wage would be a benefit to NSW. By contrast, NSW workers would mostly be leaving other jobs in NSW, so only the difference between their new earnings and their other earnings is considered a benefit. In other words, the labour of NSW workers has an 'opportunity cost' to NSW.

Yet, it was the assumption that labour is not priced at its opportunity cost that led BAEconomics to adopt its unorthadox approach to employment benefits in the first place. It would be difficult to explain to unemployed members of the Hunter Valley workforce, such as those recently laid off from other coal mines, that NSW would benefit more if they stayed underemployed or unemployed and allowed interstate workers to work at Warkworth.

Proper sensitivity analysis around employment benefits would begin with a zero value – one implied by the orthodox approach to economic assessment endorsed by NSW Treasury and the Productivity Commission. If labour is priced at its opportunity cost, employment benefits from the project are zero in an orthodox cost benefit analysis.

BAEconomics attempt to put a value of hundreds of millions of dollars on these impacts are unconvincing. They ignore the nature of mining employment and the current state of the labour market, being based on lobby group claims and selective parts of an RBA report.

A potential comparison is the Cobbora Transition Fund. The community of Dunedoo, near Dubbo, has been affected by the Cobbora coal project buying out agricultural families, many of whom have left the area. Thousands of jobs were promised, but the project has faced planning hurdles and is financially unviable. To compensate the community for the damage to their economy, a fund of $20 million has been established.[34]

Clearly, the value of maintaining employment is not zero. Involuntarily losing your job is a setback, even if you are highly employable. For this reason, decisions which affect employment are the most sensitive type of decision employers and policy makers can make. Decision makers instinctively incorporate employment impacts into decisions, usually without detailed empirical estimates. It is for this reason that we have unemployment benefits and a welfare system, to balance out the effects of a relatively free labour market.

It is very pleasing that other prominent economists are keen to incorporate the impacts of unemployment into economic assessment. The Australia Institute looks forward to working with BAEconomics to advance this issue in the future. However, the estimates of these values in the assessment of the Warkworth Continuation project are heavily overstated and are not reliable. A figure of between zero and around $20 million dollars is more in line with conventional economic assessment and recent policy practice.

## External costs

BAEconomics assessment of most external costs understates the impacts of the project. A range of errors have been made in the assessment of these impacts.

### Noise, vibration, air quality and visual amenity

BAEconomics claim to have measured these impacts through “financial instruments (market-based valuation)” based on:

> *observed behaviour of households or individuals of incurring financial outlays to insulate themselves against a non market ‘bad’, for instance, by moving house or by installing double glazing in noise affected homes.* [35]

This is wrong. BAEconomics have made no observations of people’s behaviour and have used no market to assess these values. Instead they have used Rio Tinto’s estimates of expenditure required to mitigate noise, vibration, etc. to comply with government guidelines.

BAEconomics’ mistake is to assume that compliance with guidelines ensures no economic cost. If this were so, then houses next to airport runways would be worth the same amount as similar houses further away with no noise. This is not the case with airports and it is difficult to accept that a house in Bulga near a mine operating until 2021 would be worth the same amount as the same house next to a mine operating until 2035. We have visited the Bulga area several times during times when the mine was compliant with all guidelines and the noise level and visual impacts are still considerable. It is highly probable that even when

[34] http://www.infrastructure.nsw.gov.au/projects/cobbora-transition-fund.aspx
[35] p23

compliant these levels would reduce willingness to pay for property and other activities in the area.

Having paid such close attention to the difficulties people face in having to change jobs, BAEconomics are unconcerned with the ordeal of having to move house:

> *Households predicted to be significantly affected (that is, above government-prescribed criteria) by air and noise outcomes will be offered acquisition of their properties, generally at prices that are above market values. In these cases it could be argued that the valuation of the corresponding external effects on that basis overestimates the impacts, although the affected landowners may have a (subjective) perspective of these impacts that may be lower or higher.*[36]

No data is presented to justify claims of over-market payment. In fact, the market rates discussed are likely to be heavily influenced by the proximity of a coal mine and the negative influence that has on house value. This was highlighted recently by the NSW Valuer General:

> *Property professionals working in the Gloucester area report that the number of potential purchasers has decreased in the south east Gloucester area where properties are in close proximity to the CSG area and the proposed mine. Agents report that potential purchasers have an aversion to the CSG and mine areas of Gloucester but the main concern is the mine.*[37]

Importantly, BAEconomics assume that the project will comply with all criteria. The Bulga Milbrodale Progress Association has documented many instances of non-compliance, suggesting this is an optimistic assumption. If the mine is under financial pressure, as discussed above, there will be strong incentive to minimise expenditure on mitigation measures, imposing further costs on the local community.

## Ecology

BAEconomics claim to have used “market-based” valuation to value ecological impacts and their offsets. As far as we are aware, the project will not be making purchases on a well-traded ecological offset market. Instead, offsets will be built to comply with government guidelines.

Furthermore, BAEconomics appear to misunderstand some basic concepts of environmental valuation:

> *The cost of establishing direct offsets and related initiatives is pertinent to the valuation of ecological impacts.*[38]

This is wrong. The value of the ecological impacts of the project relate to what value the community places on the environment around Warkworth and the environmental services that the environmental assets provide. Economists call this ‘total economic value’, the values relating to direct and indirect use of the environment and the value the community places on the existence of parts of the environment such as the Warkworth Sands Woodland. BAEconomics have not attempted to measure any of these values, nor to approximate them through transfer of values from other studies.

[36] P24-25
[37] (NSW Valuer General, 2014)p36
[38] p25

Valuing environmental impacts is difficult, subjective and often outside the scope of an EIS or a cost benefit analysis. The 2009 Warkworth economic assessment by Gillespie Economics was unusual in that it attempted a primary non-market valuation exercise based on an extensive survey. The Gillespie Economics study was flawed and rejected by the Land and Environment Court, but the proponents should be applauded for commissioning the study which, if conducted properly, could have contributed significantly to understanding of environmental values in NSW.

The cost of establishing offsets which meet government requirements is a separate issue. This cost depends not on the value of the environment, but on the government regulations. The ecological science literature highlights several reasons why current offset regulations are failing to provide offsets which actually compensate for environmental values:

- Offsetting destruction with protection of existing assets does not avoid biodiversity loss.
- Constructed offsets face considerable uncertainty around whether they will ever mature into real offsets, relating to physical uncertainty around recreating the offset and future policy uncertainty and commitment to maintaining them into the future – an obvious example being the Warkworth mine's earlier offsets in Non Disturbance Area 1 including Saddle Ridge, which the current proposal would destroy.
- Offsets could take hundreds of years to mature to a state that actually offsets what is destroyed. Unless destruction takes place after offsets have matured considerable ecological loss is likely. [39]

These issues are particularly pertinent in relation to offsetting the Warkworth sands woodland, which BAEconomics describe as:

> *Impacts on Warkworth Sands Woodland (WSW) resulting from the proposals will be offset by the protection of areas of WSW in the Northern Biodiversity Area (NBA) and Southern Biodiversity Area (SBA), as well as the re-establishment of large areas of this community in designated offset areas. Additional offsets for WSW include provisions for the preparation of an Integrated Restoration Implementation Plan and contributions to research.*

Clearly protecting other areas of Warkworth Sands Woodland does not avoid the destruction of the proposal and exposes the offset to the uncertainty of future commitment to protection. Furthermore, it is contested that Warkworth Sands Woodland can be re-established, as it forms on top of ancient sand dunes from earlier geological periods.[40]

In summary, BAEconomics approach heavily understates the economic costs of potential ecological impacts of the project. Given the uncertainties surrounding environmental valuation and the ability of offsets to compensate for environmental impacts, a more useful approach would be to inform decision makers that uncertainty around these costs is great and this uncertainty should be incorporated into decision making against any benefits of the project.

## Regional Economic Impact Assessment

BAEconomics conducted a regional economic impact assessment (REIA) based on input-output multipliers. The key result is net change in employment for NSW, estimated at 227 full

[39] See (Bekessy et al., 2010; Gibbons & Lindenmayer, 2007; Walker, Brower, Stephens, & Lee, 2009) for extended discussion on these issues.
[40] See Bulga Milbrodale Progress Association submission to this EIS process, ecology section.

time equivalent positions in Table 4-3. This is a far more conservative estimate than the 45,000 jobs claimed in the 2009 analysis of the Warkworth Extension Project.[41]

This estimate is still likely to be overstated due to the assumptions used in input-output models, which are outlined by BAEconomics:

- Lack of resource constraints
- Fixed prices
- Fixed production patterns

Clearly resources are constrained in the Hunter – there are limits on how much skilled labour, inputs, land, water, clean air and other resources are available. It is surprising that BAEconomics consider that fixed price assumptions do not have a serious impact on their analysis:

> *[This] is only a problem in input output analysis for projects of a sufficient scale to materially shift the demand for inputs into production and the total supply of industry output*[42]

Seeing as the project's capacity to increase the price of labour is one of the key assumptions in the cost benefit analysis, it is surprising that the same impact is ignored in the REIA.

General equilibrium (GE) models overcome some of these shortcomings through more sophisticated modelling. BAEconomics claim:

> *Given the relatively small size of the proposals under consideration here, material price impacts would not be expected and the difference between the results of a GE and an input output analysis should also be small.*[43]

BAEconomics' support for input-output model assessment of this project is surprising given the Land and Environment Court dismissed an earlier assessment commissioned by Rio Tinto as "inadequate".[44]

The Land and Environment Court's criticism was taken on board by another coal company, Yancoal. They had submitted an input-output study by the same authors as the earlier Warkworth assessment for initial planning approval.[45] Faced with more serious scrutiny in the Land and Environment Court, Yancoal discarded their input-output model and commissioned a GE modelling exercise from well-known consultants ACIL Allen.

ACIL Allen's analysis found that the Ashton project would result in a change in employment of just two jobs more than direct employment in the project. Director of ACIL Allen, Jerome Fahrer, said to the Land and Environment Court:

> *[In] the Warkworth case input/output modelling was criticised by the chief judge and ... for good reason. Input/output 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 input/output 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.*

[41] (HVRF, 2009a)
[42] P43
[43] P39
[44] (Preston, 2013)
[45] (HVRF, 2009b)

> *[GE] is a superior technique when you've got a big enough project that it affects the whole economy, which is what we have here. Now, it's not to say that input/output modelling is, is disreputable. It's not. The economist who invented it won the Nobel Prize for inventing it. It's just not the right technique for this kind of job and GE modelling is.*[46]

While BAEconomics are entitled to their opinion, we note that they are contradicted not only by their consulting peers at ACIL Allen and by the bench of the Land and Environment Court, but also by recent Planning and Assessment Commission decisions, the ABS, the Productivity Commission and many other economists.[47]

## Conclusion

The fundamental question around the Warkworth mining proposal is do its costs outweigh its benefits? Are the royalties earned and the employment effects enough to justify the impacts on a rural community and the destruction of unique woodlands? BAEconomics' economic assessment provides little new material to assist in answering this question.

Their analysis avoids the difficult issue of the project's viability under current and reasonably expected coal prices. By ignoring the likely financial difficulties the project faces, they are able to present analysis which suggests benefits to NSW will be robust, regardless of market fluctuations. This analysis should be ignored unless coal markets lift to levels close to the BAEconomics central assumptions.

BAEconomics' analysis departs from conventional economic assumptions in relation to employment, as used by NSW Treasury and the Productivity Commission. While we applaud consideration of the costs of unemployment in economic assessment, the circumstances around the Warkworth mine do not support BAEconomics' unorthodox approach and assumptions. While BAEconomics assume employment levels will be maintained, the proponent is telling investors they will be reduced. Where BAEconomics assume employment in the mining industry is weak, ABS data shows it is robust. They have applied RBA research relating to all industries to the mining industry, despite the RBA providing mining-specific results which contradict their position. BAEconomics confusion around employment values in cost benefit analysis is best summed up by their result that the fewer NSW people work on the project, the greater the benefits to NSW.

Similarly counterintuitive is the result that no external costs would be imposed on the community as a result of living next to an open cut coal mine for an extra 15 years. BAEconomics confuse the expenditure required to generally comply with government regulations, with the overall costs to the community of these impacts. No effort has been made to measure these impacts, nor to inform decision makers that such impacts exist.

Finally, the evaluation of ecological impacts as being equal to the costs of planting offsets shows a misunderstanding of environmental valuation and no consultation with independent specialists in this field. Ecology literature suggests that there is great uncertainty around the ability of offsets to adequately compensate for environmental impacts. This is likely to be the case here with offsets aiming to recreate unique woodland ecosystems which are dependent on ancient geological formations.

Despite the conclusions of BAEconomics, we remain convinced that the costs of the project are greater and more certain than its benefits. The project should be rejected on this basis.

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[46] See court transcripts of Hunter Environment Lobby Inc v Minister for Planning and Infrastructure in the Land and Environment Court of NSW, page 546.

[47] (ABS, 2011; Denniss, 2012; Gretton, 2013; Layman, 2002; PAC NSW, 2014a, 2014b)

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