



BIS OXFORD
ECONOMICS

REVIEW OF ECONOMIC IMPACT ASSESSMENT

HUME COAL AND BERRIMA RAIL PROJECT

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EXECUTIVE SUMMARY

Hume Coal Pty Limited has lodged development applications for the Hume Coal Project (the HCP), and the associated Berrima Rail Project (BRP) which are planned to be undertaken in the NSW Southern Highlands. Collectively, these may be referred to as “the project”.¹

An Environmental Impact Statement for the project was released in March 2017. As a part of this, an Economic Impact Assessment Report (the EIA) has been prepared by BAEconomics.² The EIA was finalised on 20 February 2017. It contains a Cost Benefit Analysis (CBA) of the project using a NSW State-wide level of analysis as well as a Local Effects Analysis (LEA) using the Southern Highlands as the basis of the analysis.

The NSW Department of Planning & Environment (“the Department”) has requested that BIS Oxford Economics undertake an independent assessment of the EIA and its component parts (the CBA and LEA).

This review finds that the CBA is well-researched and (with some exceptions) well presented. The work is obviously the product of considerable effort and much of the approach is reasonable. Close attention has been paid to the stipulations laid down in the NSW Government (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals* (“the Guidelines”) in many (though not all) instances.

That said, there remain several areas of concern with the CBA. These include the following:

- *Employment benefits* - The inclusion (or, at least, the claimed magnitude) of employment benefits relies on questionable assumptions relating both to currently employed and unemployed/footloose labour.
- *Tax benefits* - The associated personal income tax, Medicare payments and payroll tax payments associated with the hiring of unemployed/footloose labour is, by extension, also questionable. In addition, the issue of a shadow price for unemployed labour is not addressed.
- *Transparency* - The description of project costs and revenues, and their role in the composition of Net Producer Surplus, does not appear to be as transparent as the approach suggested by the Guidelines.
- *Inclusion of flow on effects* – The inclusion of State-wide flow on (“multiplier”) effects in the EIA Summary is at odds with NSW Treasury stipulations for CBA.

¹ Most of the activity in the project relates to the HCP. The BRP will essentially consist of a rail spur to service the HCP and would not occur in the absence of the HCP.

² BAEconomics (2017), *Economic impact assessment of the Hume Coal project, Appendix Q in Hume Coal Project – Environmental Impact Statement – Volume 9*.

As a result of this review, it is recommended that:

- Employment benefits (and associated tax benefits) either be removed from the CBA or a better justification should be made for the existence (and claimed size) of such benefits. In addition, there should be an acknowledgement of the existence of shadow price of unemployed labour even if such costs cannot be quantified.
- Project costs and revenues and the composition of the Net Producer Surplus be more transparently indicated, along the lines suggested in the Guidelines (Table 3.5, p.11).
- The flow on effects at the State-wide level be removed from the EIA Summary, to be consistent with the stipulations of the CBA guidelines issued by NSW Treasury (2017).³

Separate to this, there may also be room for an ongoing discussion between the Department, Hume Coal Pty Ltd and other parties about the size of the externalities quantified in the EIA. Both the EIA and work by the Australia Institute measure these externalities using differing methodologies and assumptions. So there remains considerable ambiguity about the true size of the externalities. However, it is noted that BAEconomics has been very helpful in clarifying the size and nature of project externalities.

There may be an *a priori* case for revisiting the question of how groundwater prices themselves may change with the impact of the scheme and the nature of inflows. However, the resolution of these issues might be assisted by both parties transparently sharing their assumptions and accompanying spreadsheets.

It is noted that the CBA currently assesses the discounted net economic benefits as \$295 million over the project lifetime. If the recommendations above are carried out (assuming no employment benefits and that revenues, costs and externalities are as given) then the project will still record positive net lifetime economic benefits of \$127 million.

The LEA is likewise well-presented and researched, with considerable attention being paid to detail in areas such as the local housing market, tourism, agriculture, externalities and assessment of flow-on effects. The discussion here is well thought out and reasonable.

However, some elements of the LEA also appear open to question, namely:

- *Employment benefits* - These would again appear to be overestimated for many of the same reasons as in the CBA. A re-estimate by BIS

³ NSW Treasury (2017), *NSW Government Guide to Cost-Benefit Analysis*, Policy and Guidelines Paper TPP 17-03.

Oxford Economics, adhering more closely to the stipulations in the Guidelines, suggests the overestimation is in the order of 13 percent.

- *Non-labour project expenditure* - Against this, non-labour expenditures are not quantified, which means that one potentially important area of benefits is actually omitted. Though the reasons for this are discussed in the LEA, there may be scope to re-examine the issue.

It is recommended that these issues be reviewed with an aim of adjusting the LEA findings, if feasible.

1. INTRODUCTION

Hume Coal Pty Limited has lodged development applications for the Hume Coal Project (the HCP), and the associated Berrima Rail Project (BRP). These projects are planned to be undertaken in the NSW Southern Highlands. Collectively these may be referred to as “the project”.⁴

An Environmental Impact Statement for the project was released in March 2017. As a part of this, an Economic Impact Assessment Report (the EIA) has been prepared by BAEconomics. The EIA was finalised on 20 February 2017. It contains a Cost Benefit Analysis (CBA) of the project using a NSW Statewide level of analysis as well as a Local Effects Analysis (LEA) using the Southern Highlands as the basis of the analysis.

The NSW Department of Planning & Environment (“the Department”) has requested that BIS Oxford Economics undertake an independent assessment of the EIA and its component parts (the CBA and LEA).

The Scope of Work issued by Department indicates that issues to be considered include:

- Whether assumptions presented are reasonable, appropriate and suitably justified;
- whether the Cost Benefit Analysis aligns with current best practice;
- the adequacy of the methodology, analysis and assessment presented in evaluating the economic costs and benefits of the proposed development (for the Applicant, local area, region and State);
- the identification of any areas of deficiency (including inconsistencies, overlaps or “double counting”) and recommendations to improve or resolve these issues in the assessment;
- consistency of the assessment with any relevant Government guidelines (e.g. NSW Treasury (2017) *NSW Government guide to cost-benefit analysis* and/or the NSW Government (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals*).

BIS Oxford Economics undertook a preliminary review of the CBA and LEA in August/September 2017. Close attention was paid in this review to NSW Government (2015), *Guidelines for the economic assessment of mining and coal seam gas proposals* (“the Guidelines”) and to NSW Treasury (2017), *NSW Government Guide to Cost-Benefit Analysis*, Policy and Guidelines Paper TPP 17-03 (“the Treasury Guidelines”).

BIS Oxford Economics submitted a series of questions to BAEconomics (through the Department) as a result of this process (Appendix 1). BAEconomics submitted a response to these questions (“the Response”) in October 2017 (Appendix 2).

The results of the review are detailed in the following chapters. Chapter 2 considers the CBA while Chapter 3 reviews the LEA.

⁴ Most of the activity in the project relates to the HCP. The BRP will essentially consist of a rail spur to service the HCP and would not occur in the absence of the HCP.

2. REVIEW OF COST BENEFIT ANALYSIS

2.1 BACKGROUND

This Chapter is concerned with a review of the project's approach to CBA, as specified at the State-wide (NSW) level and contained within BAEconomics' overall EIA.

Relevant points on the issues identified in the Scope of Work are presented below. BAEconomics' Response has also been taken into account in this analysis.

On the whole, the CBA is well-researched and presented and attempts to adhere to the Guidelines. There remain several areas for concern, however, and these have been detailed below.

2.2 ADHERENCE TO GUIDELINES

The EIA (p. 1) states that:

The approach to preparing the assessment is consistent with the various guidelines published by the NSW Government including the 'Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals' published in 2015 (the 2015 Guidelines).

In this context, it is worth noting that NSW Treasury (2017) also issues its own Guidelines informing the approach to be taken to CBA by public sector agencies (the "Treasury Guidelines").⁵ While the Treasury Guidelines refer to government initiatives and indicate that these initiatives are not intended to replace agency-specific advice, they also note that they are intended to encourage a common analytical approach to CBA across NSW Government (p. 6). In this context, the Treasury Guidelines (p. 6) also refer to the NSW Government (2015), *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* as publically available sector specific guidelines.

As indicated, the Scope of Work for this review also refers to the need to ensure consistency with NSW Government guidelines, including the Treasury Guidelines.

Given the stipulations of the Scope of Work and the reference in the EIA to "the various Guidelines published by the NSW Government" it might be expected that some of the approach and principles noted by the Treasury Guidelines would be noted or adhered to in the analysis. This should be taken into account in the discussions below.

⁵ NSW Treasury (2017), *NSW Government Guide to Cost-Benefit Analysis*, Policy and Guidelines Paper TPP 17-03.

2.3 INCLUSION OF ROYALTIES, COMPANY INCOME AND OTHER TAXES

The Guidelines (p. 15) call for inclusion of the NSW royalties and company income tax in the assessment of benefits. The CBA does this and the approach is described in the EIA (pp. 22-24) with estimates provided in Tables 3-6 of the EIA (p.40).

The CBA also includes shire rates, land taxes and levies. The Guidelines appear to be silent on such inclusions and it should be recalled that technically, in cost-benefit terms, taxes are a transfer. However, the approach taken in the CBA appears reasonable. Such taxes are incorporated within a gross producer surplus. The gross producer surplus is pre-tax and approximates the value of profits, some of which is then appropriated by government. It therefore seems reasonable to incorporate these as a benefit which will flow through to the NSW community.

2.4 EMPLOYMENT BENEFITS

A major issue with the assessed benefits in the EIA relates to the inclusion of employment benefits as a project benefit.

There are several grounds for concern with the approach taken towards such claimed benefits in the CBA and further clarified in the Response. These are indicated below. Before addressing these however, it is worth noting that, on first principles grounds, a standard CBA considers labour to be an (opportunity) cost, not a benefit. The Treasury Guidelines (Appendix 7, p. 56) make this clear. The reason for this is that it is assumed that labour is fully employed and must be drawn away from elsewhere in order to develop and run projects such as the HCP and the BRP. This constitutes an opportunity cost.⁶

There may be some instances where this is relaxed – such as cases where there is a high rate of industry or general unemployment. However, in such cases (as discussed below) strong evidence is generally required about why it is assumed some workers are likely to be drawn from the ranks of the unemployed and to support assertions about the potential magnitude of this effect.

This is particularly so, since employers are likely to prefer skilled and experienced labour in a given project, particularly technically complex ones such as the HCP and BRP.

Both the EIA (pp. 20-21) the Response (Points 1-8, pp. 1-3) discuss the issue of the calculation of the employment benefits. In effect, the employment benefits calculation would appear to be based on the following approach:

- 80 percent of Hume and BRP's labour is assumed to be drawn away (displaced) from other (non-mining) industries or alternatively would be working in such industries if the project did not proceed. This is proxied by assuming that such displaced labour receives the median wage for NSW labour.

⁶ These points were also made in Australia Institute (2017), *For Hume the bell tolls: Local economic impacts of the Hume Coal project*.

- Such labour will receive more for working in the mining sector than the median wage. Therefore, the difference in wages between the non-mining and mining sectors is a benefit (an incremental income benefit). This constitutes a considerable part of the labour benefit.
- 20 percent of labour would either be unemployed, move interstate (“footloose labour”) or retire in the absence of the project. There is no opportunity cost in hiring these employees. Therefore, the full effects of the wages of these employees are allowed for in assessing project benefits along with income tax, Medicare payments and payroll taxes attributable to such employees. Further, there is no disutility in swapping a state of unemployment for employment – i.e. the shadow price of labour is zero - so the full value of the wages now gained counts as a benefit.

The validity of this approach is discussed below.

2.4.1 Displaced labour

The first set of issues relates to the 80 percent of labour assumed to be drawn away from other industries (displaced labour).

The Response (Point 4., p. 2) states the following in response to BIS Oxford Economics request for clarification of the calculation of incremental income benefits.

The reasoning behind the calculation of disposable income benefits is described in Section 3.2.1: it cannot simply be assumed that all workers that are newly employed by Hume were previously unemployed; applying such an assumption would overstate the value of the additional employment generated by Hume. As noted above, this is a more conservative assumption than is required in the Guidelines.

In the counterfactual (no Hume project), it has therefore been assumed that workers employed elsewhere would receive the relevant median income (for NSW, or for the Southern Highlands Region, respectively). Given that wages in mining are, on average, higher than in other industries, an incremental (disposable) income benefit therefore arises.

The first cited paragraph above seems to turn the conventional approach - that labour is *a priori* an opportunity cost - on its head. It is not clear why one would start with an assumption that all labour was previously unemployed. Indeed, as indicated, the standard starting assumption for a CBA is precisely the opposite – all labour is assumed to be fully employed. Nor is it clear why the assumptions are “more conservative than the Guidelines”. The *Economic benefit to workers* described in the Guidelines (pp. 13-14) details issues relating to wage premiums and assessment of worker benefits, but does not refer to an assumption that project employees are all drawn from the ranks of the unemployed.

In addition, the Response makes clear that the basis for much of the assessed employment benefits is derived by way of assuming mining wages are higher than a counterfactual non-mining alternative. This is in effect, a wage premium

arising from the difference between mining sector and non-mining sector wages.

However, the Guidelines (pp. 13-14 and Chart 3.8, p. 14) are very clear that the starting assumption is that wage premium is zero - whether workers are drawn from the mining sector or from other sectors. It is worth citing the text on p.13 of the Guidelines at some length on this:

An appropriate starting assumption should be that workers do not receive a wage premium, even if they will earn more working in the mining sector.

- *If workers are already working in the mining sector, it is not generally the case that one mine will pay significantly more than other mines for workers doing a similar job in similar conditions.*
- *If a mine will employ workers that are currently working locally, but not in the mining sector, a mine may need to offer higher wages to compensate for more physically demanding work, tougher conditions etc. In this case, the benefit to the worker from higher pay will be offset by the costs associated with greater hardship etc.*
- *If a mine needs to attract workers from other parts of NSW, it may need to pay them more than they are earning in their existing or previous jobs so that they will relocate. For example, a mine that employs truck drivers in a remote area may need to offer a higher wage than is paid to drivers of similar trucks in the city or large towns. If so, the difference between the minimum wage necessary to get a truck driver to relocate and the standard wage in the city or town is not a valid wage premium.*

The second and third dot points here are particularly important. If it is assumed that the project's labour is drawn from non-mining sectors then any higher wages would be offset by the extra costs of the more demanding work. So the net wage premium is zero. Likewise if labour is travelling from other areas of the State then the higher wages are offset by relocation costs and there is no wage premium.

The same issue is clearly illustrated in Chart 3.8 on p. 14 of the Guidelines, where economic benefit to workers is identified as net of simple wage differentials. Thus there appears to be no strong basis for claiming employment benefits due to the wage differentials associated with the project.

On a practical level it is also difficult to justify the apparent assumption behind these calculations - that (excluding unemployed labour) the entire project workforce is actually drawn from sectors outside of the mining (or the rail) sector or that, absent the project, such labour would work in non-mining sectors. It would be expected that the project workers would chiefly be drawn from the mining and rail sectors rather than from a workforce unfamiliar with such sectors. The converse is also true – in the absence of the project it seems unlikely that 80 percent of the project workforce would be employed in the non-mining/non-rail sector given the specialist nature of their skills and experience.

As any jobseeker can attest, employers tend to prefer skilled and experienced staff members to fill roles. This would be no less true of the HCP and BRP, which will require large inputs of labour with skills and experience in the mining

and rail sectors. However, if the project's workforce is indeed drawn from the mining or rail sectors – or would work in those sectors if the project did not occur - then dot point one (Guidelines p.13), cited above, applies and there is likewise no wage premium for such employees.

That said, there may still be a case for economic benefits to workers arising from the project. The Guidelines (p.13) go on to indicate that:

If a proponent considers that a project will generate positive benefits for workers, the economic assessment should clearly explain the reasons for this conclusion and present evidence in support of the valuation that has been adopted.

The Guidelines (p.14) also suggest that net benefits may exist in the case of populations with “persistently high unemployment” or social and economic disadvantage. They may also exist if workers develop new skills on the project or if there is a need to pay more than necessary to attract necessary skills and workers.

Consistent with the Guidelines, reductions in unemployment can be considered to relax the assumption that labour is necessarily an opportunity cost. Likewise, labour that learns new skills, boosting employability and/or which attracts a premium wage would be reflective of a gain to the productive efficiency of the economy. To the incremental extent that this is true (relative to base case skills /wages) it could be considered within a CBA.

Unemployment is discussed further below. However, the issue of unemployed labour does not apply to the 80 percent of the workforce which is assumed to be drawn away from other industries. Further, the other (skills/productivity) reasons cited above are not advanced in either the EIA or the Response. If such reasons could be advanced then a much more credible case for worker benefits could be made.

2.4.2 Unemployed, mobile and retiring labour

A second tranche of issues concerns the assumption that 20 percent of the project workforce would be drawn from the ranks of the unemployed or would move interstate (“footloose” labour) or retire in the absence of the project. There would therefore be no opportunity costs with employing such labour.

In support of this, the Response (Point 1, p. 1) cites ABS Job Search evidence referred to in the EIA (p. 64) that 33 percent of employed persons indicated that they had been out of work prior to starting a job. It also points out that geographical labour mobility very high for mining sector employees

It is not clear where the precise figure of 20 percent originated from. In any event, the 20 percent “no opportunity costs” claim is a strong one which, equally, needs to be backed up by strong evidence to ensure its credibility.

Another issue, discussed further below is where these workers come from – whether they are assumed to be unemployed (or mobile) *mining sector* workers or whether they are drawn from *non-mining* sectors of the economy. As noted above, one inference is that the 80 percent of workers who are drawn from the currently employed workforce are drawn from *non-mining* industries. It is unclear whether it is assumed that the remaining 20 percent of workers are

drawn from (potential or former) non-mining or mining sector workers. This is relevant to the treatment of such workers as discussed below.

Consider first the issue of unemployment. As indicated, there may be cases where a high degree of unemployment means that opportunity costs associated with labour inputs are reduced because some employees are drawn from the ranks of the unemployed. However, as noted above even in times of high unemployment, employers prefer skilled and experienced labour. Indeed the bargaining power of employers is further enhanced at such times meaning that unemployed labour may be *even less likely* to obtain work than during periods of higher employment – this can contribute to the “vicious circle” of unemployment and the process of “labour scarring”.

The Response (p. 1) cites ABS Job Search evidence referred to in the EIA (p. 64) that 33 percent of employed persons indicated that they had been out of work prior to starting a job. However, it is unclear how this broad finding would relate to the specific projects in question or the current employment context in NSW, the Southern Highlands or the mining industry. As indicated, the Guidelines (p. 14), require that evidence of “persistently high unemployment” before unemployment-related issues are taken into account in assessing worker-related benefits.

In this context, it should be noted that the NSW unemployment rate was 5 percent in July 2017, while the rate in the Southern Highlands and Shoalhaven was 6.6 percent in that month.⁷ An unemployment rate of 5 percent is consistent with current definitions of full employment. From a State-wide perspective – which is the relevant basis for the State-level CBA - therefore there appears to be little case for an argument that the project would recruit large amounts of unemployed labour. Even if the Southern Highlands and Shoalhaven unemployment figure is used as a basis for analysis there appears little to support an argument that unemployment there is persistently high.

These figures are particularly relevant if it is assumed unemployed workers were simply members of the broader unemployed and not drawn from the mining industry specifically.

Further, analysis of the ABS data indicates that in August 2017, some 1,500 unemployed persons in NSW listed their last occupation as in the mining sector, while the employed mining sector workforce was reported as 41,700. This implies a crude unemployment rate of 3.5 percent. Nationally, the equivalent figures were 8,300 listing mining as their last employment and a labour force of 222,000, suggesting a crude rate of 3.6%.⁸

A different set of figures is reported by the Australasian Institute of Mining and Metallurgy. This organisation’s recent survey of mining professionals (the *2017 AusIMM Professional Employment Survey*) suggests an unemployment rate for professionals working in the mining and resources sector of 5.9% in NSW and

⁷ Australian Government, “Unemployment Rate by Labour Force Region”, at Department of Employment website, accessed 24 October 2017,

http://lmip.gov.au/default.aspx?LMIP/LFR_SAF0UR/NSW_LFR_LM_byLFR_UnemploymentRate

⁸ ABS (2017), *Labour Force, Australia, Detailed, Quarterly, Aug 2017, Cat. No. 6291.0.55.003*

the ACT. The nationwide rate is 7.4%, pushed up by higher rates in the major mining states of Western Australia (9.0 percent) and Queensland (6.8 percent).

The national unemployment rate in the coal mining industry is reported as 3.9 percent⁹.

These figures suggest that while some unemployment may exist in the mining sector it is not clear that it is “persistently high” at present and indeed there is evidence that unemployment in the most relevant mining sector - coal mining - is quite low.

It is worth considering the implications of the above. If unemployed workers are assumed to be drawn from previous *non-mining* industry employees who are now unemployed or might move interstate, the skills and experience preference issues noted previously raise questions about how this would come about. Even if it did, overall State and regional unemployment does not seem particularly high, which would limit the size of this effect.

Moreover, while the Response makes the argument that *mining sector* employees are geographically mobile, it is not clear how this would be relevant if the labour is drawn from the *non-mining* sector.

Conversely, if such workers were drawn from the *mining* sector then unemployment in this sector does not seem especially high at present, particularly in areas such as coal mining. Moreover, the incentive to leave NSW when unemployment is not particularly high (but is relatively higher in traditional mining-focussed states such as Western Australia) does not appear to be great.

2.4.3 Tax-related benefits

Another issue concerns the inclusion of personal income tax, Medicare payments and payroll tax benefits. This relates to both displaced and unemployed/mobile labour.

The Response (Point 5, p. 2) states that the approach to the construction and operational income benefits is “more conservative” than that required in the Guidelines as it includes disposable income rather than unadjusted pre-tax income. It is noted that the EIA (pp. 22-23) details the treatment of personal income tax and Medicare payments and states that only disposable income has been included for those who would be employed in the absence of the project.

However, since the existence of labour income benefits themselves is questionable, given the discussion on displacement above, it is not clear how exclusion of such taxes is in itself conservative.

Further, such taxes *are* included as benefits in Tables 3-6. Based on the discussion in the EIA (pp. 22-23), this would appear to relate to the taxes now paid by the 20 percent of the workforce who are assumed to be unemployed, mobile or leave the state in the absence of the project. Yet since the magnitude of this estimate is also questionable there must equally be doubts about the assessed income tax, Medicare benefits and payroll tax in Tables 3-6.

⁹ Australasian Institute of Mining and Metallurgy (2017), *The AusIMM Professional Employment Survey 2017*

It is noted that the Guidelines (p. 10) states the following in respect of personal income tax and payroll tax.

Note that a new mine will also pay other taxes, such as payroll tax and personal income tax. The majority of these taxes will have been generated without the project, as people would have been employed elsewhere. Hence these should be included in costs. To the extent that a proponent can demonstrate that other taxes are genuinely additional, and will not be offset by lower tax payments elsewhere in the economy, they may be recognised, provided that the impact of these taxes on the overall NPV of the project is reported.

In other words, such taxes, like labour costs in general, should be included on the costs side, unless it can be shown that they are a genuine additional benefit. Indeed, this is recognised in the discussion in the EIA (p. 23).

The case for inclusion of the personal income tax, Medicare payment and payroll tax benefits in Tables 3-6 therefore depend on acceptance of the assumption that 20 percent of the project workforce would be unemployed, move interstate or retire in the absence of the project. However, as already indicated, it is not clear that a genuine case has been made that this would be true for such a substantial proportion of the project workforce.

2.4.4 Shadow price of labour

In addition, the Response (Point 3, p. 1) indicates that the shadow price of labour is not material. This appears somewhat dismissive. The Guidelines (pp.13-14) themselves hint at the disutility of labour discussing the issue of a reservation wage. While difficult to quantify, the issue of shadow labour prices is pointed to in a variety of standard economic texts (Campbell and Brown, (2003), pp. 96-98; BTE (1999); p.53, Boardman et al. (2005), pp. 450-455)¹⁰.

If there were a case for inclusion of labour benefits, then a better approach would be seek to quantify the shadow price of labour based on the difference between wages and shadow prices. If such quantification is not possible, at least some acknowledgement could be made that a “zero opportunity cost” approach to unemployed labour is likely to be an upper limit estimate.

As is the case with the issue of displaced labour discussed above, there may actually be a case that *some* labour employed by Hume Coal would be unemployed or go interstate in the absence of the project. However, there is no strong evidence that the magnitude of such effects is in the vicinity of 20% of the project’s entire workforce.

It is also noted that if the rest of the analysis presented in Tables 3-6 of the EIA is correct then the project will still produce a positive net economic benefit, irrespective of the exclusion (or reduction) of employment benefits.

¹⁰ Campbell, H. and Brown, R. (2003), *Benefit-Cost Analysis* ; Bureau of Transport Economics (BTE) (1999), *Facts and Furfphies in Benefit-Cost Analysis: Transport* ; Boardman et al. (2005), *Cost-Benefit Analysis: Concepts and Practice*

2.5 EXTERNALITIES

The EIA (pp. 24-37) referred to a variety of externalities. Considerable care and effort is taken in the EIA to estimate issues such as the loss of agricultural land and greenhouse gas emissions.

The size of several other externalities is not explicitly quantified in the EIA. However, the Response provided more details on externalities (such as groundwater usage), some of which are argued to have been internalised into project costings. This effort is noted and appreciated.

The allowance for groundwater costs appears to be a particularly contentious issue. The measurement of externalities in this particular case is not straightforward. While BAEconomics has set out an approach for the measurement and internalization of such externalities, an alternative set of calculations has been developed by the Australia Institute (2017). Since the methodologies used by BAEconomics and the Australia Institute are fundamentally different, it is difficult to compare their estimates. Academic literature on the subject (which might be expected to provide a “neutral” perspective) advocates a case-specific examination of water usage and economic value in the region, which both reports have provided.

More specifically, BAEconomics has incorporated the cost of groundwater usage into their producer surplus calculations. The Response indicates that these allow for “make-good” provisions in respect of private bore groundwater to the value of \$4.4 million. An additional \$4.8 million is also allowed for to account for the purchase of water licenses. In effect, this internalizes this externality (from their point of view) by adding it to the cost side of the ledger. The sum of these equates to approximately \$9.2 million. The producer surplus is then calculated by netting off these and other project costs.

However, it is not completely clear whether this addresses all relevant externalities in this context. In addition, based on the EIS and the Response, the basis of the groundwater calculations is still not completely transparent. The degree of ambiguity makes it difficult to comment on the accuracy of the approach. Increased clarity around the calculations and the externalities involved may help address some of these issues. Full clarity may only ultimately be achieved by release of the relevant spreadsheet calculations and supporting assumptions.

The Australia Institute mentions a number of externalities and, while not quantifying all of these, suggests a groundwater impact of \$130.6 million in present value terms would be the most appropriate measure of externalities in this context.¹¹ This (notionally) compares to the \$9.2 million groundwater

¹¹ Australia Institute (2017), *For Hume the bell tolls: Local economic impacts of the Hume Coal project*. Table 6 (p.26) provides a number of groundwater cost estimates under varying pricing and inflow scenarios in future years. The preferred estimate from these is the cited \$130.6m in present value terms. This represents a licensing price of \$4,000/ML and groundwater inflow of 9.7GL. These estimates, in turn, are partly based on estimates from Southern Highlands Coal Action Group (SHCAG).

externalities present value suggested by the Response and noted above, though, as indicated, the approaches differ substantially.¹²

We note that a “gross” additional \$130.6 million in externality costs would appear to produce a *negative* project NPV of approximately (\$3.6 million) after removal of the employment (and accompanying) tax benefits, discussed above.¹³ However, acknowledging difficulties in comparability, the estimate of \$130.6m may already implicitly incorporate some of the externalities estimated by BAEconomics. So it is more likely that the project NPV would remain (marginally) positive even if the Australia Institute’s preferred valuation of externalities were to be adopted.

The Australian Institute’s report provides a strong qualitative discussion of the environmental impacts of the project. However the Australia Institute’s approach to the calculation of externalities differs markedly from that adopted by BAEconomics and therefore it is difficult to directly compare the two. A major reason for the difference between the two externality calculations appears to be that the Australia Institute approach assumes that:

- groundwater resources are fully allocated at 16 Gigalitres (GL);
- the increasing scarcity of water licenses will force up prices; and
- the current price on groundwater licenses in the region is set at \$2,000 per megaliter (ML) by the Australia Institute based on interviews with landowners and past research. The Australia Institute approach then multiplies this by two to three times to form middle and upper case scenarios indicating prices of \$2,000, \$4,000 and \$6,000 per GL respectively¹⁴. Separate inflow levels (of 3.2GL, 9.7GL and 16GL) are then estimated for each of these scenarios. The stated groundwater impacts of \$130.6 million are effectively the mid-range inflow level (9.7 GL) for a mid-range scenario (price of \$4,000 per ML).

This cost scenarios approach reflects the Australia Institute’s opinion of the likely increase in price of groundwater due to such a large increase in demand as the groundwater licence cap of 16 GL is approached.

There may be some intuitive validity to the Australia Institute’s argument that such a large purchase of groundwater within a defined area may force up prices. However, the Australia Institute’s scenario licensing cost estimates do not appear to be estimated in a robust manner, with the average licensing cost per ML simply doubled and tripled for the mid and upper scenarios, respectively.

Given the differing approaches and the lack of transparency behind the BAEconomics and Australia Institute groundwater calculation methods and the lack of a “neutral” literature estimate, it is difficult to reach a definitive

¹² An additional issue may be differing assumptions on project life and consequently NPV calculations. The Australia Institute assumes a three year construction period, 19 years of operations and two years of rehabilitation. BAEconomics refers to a two year construction period but the same number of operational and rehabilitation years.

¹³ As discussed below, after removal of these values, the project NPV is estimated at \$127 million. \$127 million - \$130.6 million = (\$3.6 million).

¹⁴ The EIA and the Response refer to an average price of \$2,650 per ML.

conclusion on the “true” value of externalities in respect of the project. However, there may be an *a priori* case for revisiting the question of how groundwater prices themselves may change with the impact of the scheme and the nature of inflows. Ultimately, the resolution of these issues would be assisted by both parties transparently sharing their assumptions and accompanying spreadsheets.

2.5.1 TREATMENT OF COSTS

The Guidelines (Table 3.5, p. 11) refer to the calculation of a Net Producer Surplus through inclusion of items. On the benefits side the Guidelines state these include:

- Gross mining revenue
- Residual value of land at the end of the evaluation period
- Residual value of capital at end of the evaluation period

On the costs side, the Guidelines state these include:

- Operating costs
- Capital costs
- Decommissioning costs
- Environmental mitigation costs
- Transport management costs
- Purchase costs for land
- Local contributions
- All taxes (Federal, State and local)

The inclusion of these items, and particularly construction phase costs - which would be expected to be substantial - is not made transparent in the CBA. In the Response, BAEconomics indicated that construction phase costs have been allowed for during the years 2019 – 2022, along with some capital outlays during the project life. Reference is also made to labour costs, operating and rehabilitation costs. It is assumed that these costs are incorporated into the project’s net producer surplus, though none of these costs are specifically quantified in the Response.

On the benefits side, it is also not clear how residual values are incorporated into the analysis.

While the clarification provided in the Response is appreciated, a better approach from the outset would have been to indicate these costs transparently in the analysis. As it is, readers must effectively “take it on faith” that the costs have been accurately set against revenues to produce the NPV over the project lifespan.

2.6 TRANSPARENCY

As a broad comment, it would have assisted the analysis if both costs (e.g. construction costs, operational and maintenance costs, decommissioning costs, rehabilitation costs, environmental externalities) and benefits (e.g. revenue) could have been laid out separately and in a transparent fashion in the CBA. Standard approach to CBA in related areas such as transport projects is to do precisely this through presentation of a worksheet detailing the

discounted cashflow (DCF) analysis (and it is noted that the analysis is in fact inclusive of a transport element – the Berrima Rail Project). A good example of a transparent DCF used for project evaluation purposes can be found in Transport for NSW (2016), *Principles and Guidelines for Economic Appraisal of Transport Initiatives*, pp. 237-238.

Such an approach would be more helpful than the summary provided in Tables 3-6 of the EIA.

2.7 INCLUSION OF STATEWIDE ECONOMIC MULTIPLIERS

As discussed below, the LEA includes flow on benefits for the Southern Highlands after a well thought out and careful discussion of multipliers

However, flow on benefits are also calculated for NSW and presented in the Summary to the EIA (p. 2). NSW is not the local area and the Guidelines do not appear to allow for such benefits at the State level. As the Treasury Guidelines (Appendix 8 pp. 65-66) make clear, Input-Output analysis is not a CBA and should not be used in its place. (The LEA is there to provide local supplementary information to the State-level CBA.).

In the Response (Point 17, p. 8) it is stated that:

The analysis of flow-on effect [sic] at the state level are intended to complement the local analysis, provide additional information, and put the local figures in context.

Although the determination of State-wide flow-on effects is not required in the Guidelines (but was in earlier versions of the Guidelines), the Guidelines also do not preclude such benefits from being calculated. It is up to policy makers to decide what weight to assign to these figures, if any.

This does not appear to address the issues raised above. Flow-on effects are not part of a CBA. Inclusion of such effects is clearly at odds with Treasury Guidelines. Further, their inclusion at a State-wide level can serve to distort (i.e. exaggerate) the results of a CBA for those who are not well versed in the technical details of the process.

2.8 CONFLATION OF GSP AND ECONOMIC WELFARE

On a technical note, the statement in the EIA (p. 19) that Gross State Product (GSP) is an appropriate measure on which to base a CBA, seems incorrect.

On a first principles basis, a CBA should reflect the change in Consumer and Producer Surplus and externalities associated with an initiative, consistent with the principles of welfare economics. GSP measures do not commonly form the basis of a CBA (BTE (1999); Boardman et. al. (2005)). Neither the Guidelines nor the Treasury Guidelines suggest the use of GSP as a CBA measure. GSP simply measures economic activity and does not form a net benefits measure. The compatibility of externalities (welfare-based) with GSP is questionable.

More specifically, the Guidelines refer to Producer Surplus as forming a key benefits measure for the CBA, while the Treasury Guidelines refer to Consumer, Producer and Labour Surplus as benefits to be assessed in a CBA (though last of these would only arise rarely).

The Response (Point 12, p. 6) notes the following:

If the aim is to measure the net benefit accruing to a state or country, a suitable metric for estimating the improvement in ‘welfare’ to a jurisdiction is value added, and therefore GDP or GSP.

GDP or GSP is not a direct measure of economic and social ‘welfare’, but a measure of the production of goods and services. However, production is an important dimension of welfare because it enables greater consumption, and because strong GDP growth goes hand in hand with declining unemployment. Dimensions of welfare that are not reflected in GDP or GSP include social inequality, security of goods and persons, and the quality of the environment.

However, while interesting, this response is somewhat vague and technically inconsistent. Indeed, the second of the cited paragraphs could be taken to reinforce the difference between GSP and economic welfare. As indicated, simply put, GDP or GSP is not economic welfare. It is economic welfare which is the concern of a CBA.

More technically, GDP (and by extension) GSP is a market driven measure. Using the “income approach” GDP can be defined as the sum of Gross Operating Surplus (GOS) and Compensation of Employees plus mixed income, taxes on production and imports less subsidies on production.¹⁵ As indicated, economic welfare typically includes Producer Surplus, Consumer Surplus and potentially externalities.¹⁶

In practical terms, as there is some crossover between GOS and Producer Surplus, the CBA can derive a rough measure of producer surplus through its reference to GOS. This appears to be the approach taken by the CBA. Nonetheless, the conflation of these concepts in the EIA is a matter of concern.

2.9 CONCLUSION

Notwithstanding the points made above, on the whole, the CBA is well researched and presented. Care has been taken to adhere to the Guidelines in many instances (other than those raised above) including:

- Delineation of the geographical scope (State and local area)
- Definition of a base case
- Assessment of Producer Surplus, royalties and company tax attributable to NSW
- Discussion of externalities including forgone agricultural production

¹⁵ See ABS (2016), <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/5206.0Explanatory%20Notes1Mar%202016?OpenDocument>

¹⁶ As indicated there may be some allowance for “labour surplus” in certain cases but these are highly specific. These are detailed in the Treasury Guidelines (p. 13). They are similar to the issues discussed above of – e.g. cases where unemployed labour is employed (zero opportunity costs) or where a wage increase reflects a productivity/skills improvement.

- Issues relating to changes in the surplus of other NSW industries, benefits to other landowners
- Sensitivity tests

BAEconomics also provided a useful response to BIS Oxford Economics' initial questions on the CBA.

In the main, the approach and many assumptions therefore appear reasonable and a genuine attempt appears to have been made in many instances to assess costs and benefits in adherence to the Guidelines.

That said, there remain technical questions around the size of the assessed benefits – in particular employment benefits and associated taxes – as well as the transparency of certain results, particularly on the costs side. However, assuming assessed costs are reasonable, even if all of the claimed employment (and accompanying tax) benefits are excluded, initial calculations indicate that the project NPV remains positive at \$127 million.¹⁷ However, as noted above, this result may be further affected if some additional environmental externalities are included.

The fact that the project records a positive NPV even after excluding claimed employment benefits is an important one. Further, it may well be that a positive case for employment benefits could be made along the skills/productivity lines suggested above. Likewise there may be a more convincing (albeit more modest) case for the employment of unemployed/mobile/potential retired labour on the project and one which at least acknowledges the existence of shadow labour prices.

As indicated, if more transparency could be provided around the inclusion of project costs (e.g. through a DCF table) this would further improve confidence in this results.

In summary, it is recommended that:

- Employee benefits (and associated tax benefits) either be removed from the CBA or a better justification should be made for the existence (and claimed size) of such benefits. In addition, there should be an acknowledgement of the existence of shadow price of unemployed labour even if such costs cannot be quantified.
- Project costs and revenues and the composition of the Net Producer Surplus be more transparently indicated, along the lines suggested in the Guidelines (Table 3.5, p. 11).
- Flow-on effects at the State-wide level be removed from the EIA Summary, consistent with the stipulations of the Treasury Guidelines.

Separate to this, there may also be room for an ongoing discussion between the Department, Hume Coal Pty Ltd and other parties about the size of the

¹⁷ That is claimed net benefits of \$295 million less disposable income, personal income tax, Medicare payments and payroll tax benefits (\$168 million).

externalities quantified in the EIA. Both the EIA and work by the Australia Institute measure these externalities using differing methodologies and assumptions. So there remains considerable ambiguity about the true size of the externalities. However, it is noted that BAEconomics has been very helpful in clarifying the size and nature of project externalities.

There may be an *a priori* case for revisiting the question of how groundwater prices themselves may change with the impact of the scheme and the nature of inflows. However, the resolution of these issues might be assisted by both parties transparently sharing their assumptions and accompanying spreadsheets.

3. REVIEW OF LOCAL EFFECTS ANALYSIS

3.1 BACKGROUND

The Guidelines note that there are three major effects relevant to the calculation of LEA:

- Effects relating to local employment
- Effects related to non-labour project expenditure; and
- Environmental and social impacts on the local community

As is the case with the CBA, much of the LEA is well researched and much appears to conform to the Guidelines. As is the case with the CBA, however, there are some issues which require further clarification, chiefly concerning the calculation of employment benefits. These are detailed below.

3.2 CALCULATION OF LOCAL EMPLOYMENT BENEFITS

The Guidelines (pp.21-22) requires that the net increase in local workers incomes is measured as well as the flow on effects that such earnings generate.

In order to estimate incremental income benefits the LEA makes estimates indicating how many workers would be drawn from the local area and how many would migrate to the region for both the construction and operational phases.

In terms of the operational phase a number of calculations are presented by the LEA and it is claimed that incremental disposable income benefits to the Southern Highlands economy are \$85 million (Table 4-2 p.52). The derivation of this figure is somewhat unclear in the LEA. The Response (Point 13, pp. 6-7) provides further details indicating that the figure was derived by applying the same approach as used to derive the employment benefits in the CBA. That is, assuming 80 percent of workers are drawn from the existing workforce at median wages with 20 percent being drawn from the ranks of the unemployed, the footloose or potential retirees.

However, the Guidelines (p.22, Table 4.2) provide a somewhat different, and more straightforward approach to the issue of local employment effects. This acknowledges that some of the project employees may come from outside the labour force while some may be working within the mining industry. In order to estimate the net increase in local incomes, the Guidelines therefore recommend taking the difference between mining industry incomes and average local average multiplied by the number of project employees. Note that there is no discussion of unemployed or footloose labour in this recommended approach.

The Response (Table 3, p. 7) suggests a total annual disposable income benefit of \$11.1 million (as measured for FY 2016). While there is still some ambiguity about data such as precise project employment numbers, the

following calculations may be considered as an alternative which may be more closely aligned to the approach presented in Table 4.2 of the Guidelines.

- The total local project workforce would appear to be 165. This is based on the results presented in the EIA (Table Es1, p. 2) which indicate that net employment gain is 33. Since this would constitute 20 percent of the project workforce that would otherwise be unemployed or move interstate, that implies a workforce of 165 ($33/0.2$).
- Table 3 in the response indicates that total disposable income of the Hume workforce is \$17.3 million. Assuming 165 workers, this implies a mining sector income of roughly \$104,800 per employee
- The EIA (p. 48) reports that the median income in the Southern Highlands is \$46,296 in 2016 dollars¹⁸. This implies a difference of \$58,552 per employee.
- Therefore, using the approach outlined in Table 4.2 of the Guidelines, the incremental net disposable income is $\$58,552 \times 165 \sim \9.7 million.

The figure of \$9.7 million is about 13 percent less than the \$11.1 million in annual claimed disposable income benefits suggested in Table 3 of the Response. This likewise implies that the present value figure of \$85 million in direct disposable income benefits may be too high.

3.3 NON-LABOUR PROJECT EXPENDITURE

The LEA does not include non-labour project expenditures, indicating that there is a lack of data on purchases and that while purchases could be matched to local postcodes, the actual location of owners is uncertain.

If anything, this approach is too conservative. An estimate of non-labour project expenditure could be made based on the pattern of typical spending in the mining sector, adjusting for labour costs. While it is true that postcodes are an imperfect guide and some businesses may not be locally owned, this issue is common in local area analysis. A degree of reasoned inference about likely ownership on an industry by industry basis could have been adopted to allow for some estimate of non-labour project expenditures.

At the very least, the lack of non-labour project expenditures means that project benefits are understated in this area (they would clearly be greater than zero) to acts as something of a conservative “counterweight” to the apparent overestimation of local employment benefits.

¹⁸ Note that a median income will vary from an average income. If incomes in the Highlands are skewed right than the median income will be lower than the average income.

3.4 EFFECTS ON OTHER SECTORS

The LEA contains a well-researched discussion on social and other effects on the local community including impacts on housing, tourism and agriculture. The discussion here well thought out and reasonable.

3.5 LOCAL FLOW ON EFFECTS

The discussion in this section is also detailed and well researched, with a good description being offered for the approach. The results here seem reasonable.

3.6 CONCLUSION

Much of the LEA is well researched and documented and appears conform to the Guidelines. However, some elements of the LEA also appear open to question, namely:

- *Employment benefits* - These would again appear to be overestimated for many of the same reasons as the CBA. A re-estimate by BIS Oxford Economics, adhering more closely to the stipulations in the Guidelines, suggests the overestimation is in the order of 13 percent.
- *Non-labour project expenditure* - Against this, non-labour expenditures are not quantified, which means that one potentially important area of benefits is actually omitted. Though the reasons for this are discussed in the LEA, there may be scope to re-examine the issue.

It is recommended that these issues be reviewed with an aim of adjusting the LEA findings, if feasible.

4. APPENDIX 1: QUESTIONS TO BAECONOMICS

Hume Coal and Berrima Rail Projects – Questions concerning the Economic Impact Assessment Report (EIA) by BAEconomics

Cost-benefit analysis

Disposable income benefits

- Please provide the basis for the assumption that 20% of labour would either be either unemployed, retire or go interstate in the absence of the project .
- Why would labour go interstate in the absence of the project (under a zero wage premium assumption), separate to concerns about unemployment? Please provide the basis for this assumption.
- If labour is otherwise unemployed or retired has any allowance been made for shadow value of leisure?
- Following on from the above, please provide the reasoning behind the calculation of disposable income benefits. If a wage premium has *not* been allowed for, why is there a reference to differences in median wages being calculated by reference to the project workforce incomes relative to median incomes of NSW (for the CBA) or the Southern Highlands (for the LEA) ? Does this refer to the mining sector specifically? If there is no assumption of a wage premium, why is one then apparently calculated to derive disposable income benefits ?
- Are the disposable income benefits applied to the construction and operational workforces (given references to both in the relevant section of the EIA) ? Please clarify.
- Do disposable income benefits apply only to the 20% of workers who are deemed to be additional to the workforce ? Please clarify.
- The Guidelines state that any benefits to workers should be based on strong evidence that workers are drawn from a population with persistently high unemployment or that they learn new skills, adding to their employability. Employers willing to pay more to attract skills are also counted as a benefit. Please clarify if this reasoning was employed on the estimation of disposable income benefits.
- Connected to the above, the derivation of the \$134 million in disposable income benefits in Table 3-6 is unclear. Please set out the precise calculations and matching assumptions to produce this figure.

Externalities

- Please provide more quantitative detail about how the externalities (apart from GHG emissions) are internalised. There is a discussion about various externalities (noise, aboriginal heritage, water) but please provide more transparency on the costing approach adopted, indicating the total amount allocated to each and the calculations involved .

Presumably the incorporation of externalities means producer surplus (profit) is lower than would otherwise be the case.

Allowance for construction phase costs

- How are the labour and construction/capital costs during the construction phase of the project allowed for ? Please provide details of how these have been taken into account in the assessment.

Omission of potential consumer surplus benefits

- Why are the benefits arising from consumer surplus gains omitted from the benefits calculations? (Although the Guidelines themselves don't mention consumer surplus, the issue is taken up by the Treasury Guidelines (2017).) Conceivably, there may be benefits to NSW consumers arising from the mine such as lower energy costs arising from the mine or improved freight transport arising from the Berrima rail project.

GSP as a base measure

- Why is GSP used as a measure for the benefits of the project? (GSP measures production not economic welfare and does not commonly form the basis of a CBA (BTE 1999, Boardman et. al. 2005). Neither the *Guidelines for the economic assessment of mining and coal seam and gas proposals* (2015) ("the Guidelines") nor Treasury (2017) guidance suggest the use of GSP in a CBA. That said, it is acknowledged the EIA does derive a measure of producer surplus via its assessment of Gross Operating Surplus.)

Local effects analysis

Disposable income benefits

- Please clarify the derivation of the \$85 million in production related (i.e. operational phase) disposable income benefits and provide precise calculations of how this figure was arrived at. (While a number of calculations are presented the derivation of the remains unclear. It might have been simpler to refer to the example in the Guidelines and cite the actual numbers involved and the wage premium applied – if that is what is being claimed.)

Treatment of in-migrants

- Please clarify if in-migrants for the operational phase are now considered "locals" ? (While there may be a reasonable case for doing so for a long-lived project, it should be noted that in discussing the State level CBA, the Guidelines state that the economic benefit to workers migrating to NSW for the project should *not* be included in the CBA for NSW.)

Omission of non-labour employment effects

- Is it possible to have another look at non-labour employment effects ? (Omitting them understates project benefits.)

Environmental externalities

- Why is there no discussion of environmental externalities in this section ?

GSP flow on benefits at the State level

- Please clarify why GSP flow on benefits are also calculated for NSW and presented in the Executive Summary. (NSW is not the local area and the Guidelines do not appear to allow for such benefits at the State level. As the Treasury (2017) makes clear, input-output analysis is not a CBA and should not be used in its place. The LEA is there to provide local supplementary information to the (State level) CBA.)

References

Boardman et al. (2005) *Cost-Benefit Analysis: Concepts and Practice*

Bureau of Transport Economics (BTE) (1999) *Facts and Furfies in Benefit-Cost Analysis: Transport*

Department of Planning and Environment (2015) *Guidelines for the economic assessment of mining and coal seam and gas proposals*

NSW Treasury (2017) *NSW Government Guide to Cost-Benefit Analysis*

5. APPENDIX 2: BAECONOMICS RESPONSE TO QUESTIONS

Hume Coal - Economic assessment Cost-benefit analysis

Disposable income benefits

1) Alternative employment

The assumption that was made in the analysis is that, in the absence of the Hume Project, 80 per cent of Hume's prospective workforce would find alternative employment in NSW and that 20 per cent may remain unemployed or leave the NSW workforce, for instance, by retiring, or by moving interstate. As noted in Appendix 1, an Australian Bureau of Statistics (ABS) survey of newly employed persons indicated that, for 14 per cent, this was the first job ever held, while 33 per cent indicated that they had been out of work prior to starting a job.

We note that the assumption that the majority of the Hume workers would be redeployed from elsewhere (rather than being newly employed) significantly reduces the disposable income benefits that can be attributed to the Hume Project, and is conservative. Such an assumption is not required in the *Guidelines for the economic assessment of mining and coal seam gas proposals* (2015, 'the Guidelines').

2) Labour movements

In the absence of the Hume project going ahead, suitably qualified personnel may opt instead to take up similar, well-paid employment in other mining-related industries, for instance in Queensland or Western Australia. In Australia, geographical labour mobility of employees is by far the highest for mining sector employees.¹⁹ Further, there are many local people already travelling interstate for work in the mining industry on fly-in-fly-out rosters who have expressed interest in working for Hume Coal. Many of these people have gained relevant trade qualifications at local mining equipment manufacturers or experience in local mines, some of which have now closed.

3) Shadow value of leisure

The Guidelines require *material* costs and benefits to be quantified (p.2), i.e. costs or benefits that could reasonably be expected to change the results of the analysis in a significant way. Therefore, no allowance has been made for the shadow value of leisure. Similarly, other project benefits have also not been quantified, such as improved health, education and other benefits arising from employment.

¹⁹Productivity Commission 2013, Geographic Labour Mobility, Draft Research Report.



4) Reasoning behind calculation of disposable income benefits

The reasoning behind the calculation of disposable income benefits is described in Section 3.2.1: it cannot simply be assumed that all workers that are newly employed by Hume were previously unemployed; applying such an assumption would overstate the value of the additional employment generated by Hume. As noted above, this is a more conservative assumption than is required in the Guidelines.

In the counterfactual (no Hume project), it has therefore been assumed that workers employed elsewhere would receive the relevant median income (for NSW, or for the Southern Highlands Region, respectively). Given that wages in mining are, on average, higher than in other industries, an incremental (disposable) income benefit therefore arises.

5) Construction and operational workforce

As noted in section 3.2.1.1, disposable income benefits were calculated for both the construction and the operational workforce.

We note that the derivation of disposable (as opposed to unadjusted, pre-tax) income is a more conservative approach than is required in the Guidelines. The focus on disposable income further reduces the income benefits attributable to the Hume Project.

6) Calculation of disposable income

The net disposable income calculation is described in Section 3.2.1. An example calculation for one year (FY 2026) in real 2016 dollars is shown for Question 8. The net disposable income benefits calculated for the Hume workforce, including operational and construction workers, was calculated by:

- determining gross income by type of worker and subtracting superannuation, tax and Medicare imposts to derive disposable income for Hume workers;
- summing disposable income across workers to derive the aggregate disposable income of the Hume workforce (A);
- for the 80 per cent of the Hume workforce that would have been re-employed from elsewhere where they would have been paid an alternative wage (median income), determining gross income and subtracting superannuation, tax and Medicare imposts to derive disposable income at the alternative wage;
- summing disposable income across the relevant share of the workforce assumed to be reemployed to derive aggregate disposable income (B); and
- subtracting (B) from (A) to arrive at the estimated incremental disposable income as a result of the Hume project.

7) Benefits to workers

Reference is made to the discussion around a wage premium in the Guidelines, which is defined at (p.13): ... the economic benefit to workers is the difference between the wage paid in the mining project and the minimum (reservation) wage that the workers would accept for working elsewhere in the mining sector (emphasis added).

As noted at 4), the analysis did not assume that the Hume workforce would be paid a premium relative to working elsewhere in the mining sector. We further note that both the approach that was adopted for determining the share of the workforce that would be 'additional' to the NSW workforce, and the application of disposable income, rather than gross income benefits is significantly more conservative than is required by the Guidelines.

8) Derivation of \$134 million

See the table below. The calculation follows the structure described at 6). To obtain the net present value, two further steps are required: the series of annual cash flows in real 2016 dollars is first discounted, and then summed.

Table 1. Net disposable income calculation for FY 2026, NSW

Column	Aggregates	Units	A\$ (real, 2016)	Notes
A	Hume workforce:			
	Disposable income	\$M	\$26.6	Aggregate gross wages, less superannuation, taxes and Medicare payments for the Hume NSW workforce
	Taxes	\$M	\$10.0	
	Medicare	\$M	\$0.7	
	Total	\$M	\$37.3	
B	Alternative employment workforce:			
	Disposable income	\$M	\$10.5	Aggregate gross wages, less superannuation, taxes and Medicare payments, assuming that 80 per cent of the Hume NSW workforce is alternatively employed
	Taxes	\$M	\$2.0	
	Medicare	\$M	\$0.3	
	Total	\$M	\$12.7	
Net income benefits				
A minus B	Net disposable income	\$M	\$16.2	Incremental disposable income attributable to the Hume NSW workforce
	Taxes	\$M	\$8.0	
	Medicare	\$M	\$0.5	
	Total	\$M	\$24.7	

The relevant assumptions in relation to the alternative wage, real wage indexation and the share of the Hume workforce are documented in Appendix A. Superannuation, Medicare and tax rates are as published by the Australian Taxation Office.

Externalities

9) More quantitative details in relation to externalities

Additional detail in relation to the calculation of external effects is contained in the table below. These outlays are costs to Hume; therefore Hume's gross operating surplus is reduced. That is, the calculations account for the internalisation to Hume of these externalities and given that these charges are in accord with the requirements of the Government of NSW it is further assumed that these charges fully offset any 'externality' costs.

It is noted that the costs of acquiring water licenses for Hume has been overestimated in the original CBA analysis. The Hume budget allows for the purchase of 1,000 ML of water in each of 2019 and 2020, whereas, at the time of writing the economic assessment in late 2016, only 500 ML of water was required in each of these years. As a result, the NSW share of company taxes increases from \$27.4 million to \$27.7 million. None of the other aggregate net benefits to NSW are affected.

Table 2. Hume externalities

Externality	NPV, \$2016 millions	Consisting of:	Internalised by Hume
Visual amenity	\$0.239	<ul style="list-style-type: none"> - Direct cost of fencing (materials plus labour) - \$66,940.07 (including services of Telstra accredited cable locator). - Direct cost of trees plus labour etc. to plant them - \$49,476.40 (costs include contractor on-boarding, tree planting, and services of Telstra accredited cable locator). - Management & administration costs (300 hours @ \$200 per hour) - Ongoing maintenance costs of \$11,200 per annum fixed maintenance fee 	Yes
Noise	\$1.235	<ul style="list-style-type: none"> - Estimated noise mitigation costs for 9 properties of \$450,000 (total) - Construction of noise wall along rail loop estimated at \$1,072,500 	Yes
Groundwater (private bores) - Make-good provisions	\$4.441	<p>Derived from detailed, bottom-up calculation of groundwater impacts on private bores, including costs of:</p> <ul style="list-style-type: none"> - Incremental pumping costs (electricity costs) over the period of impacts; - Deepening pumps; - Replacing stock and domestic bores (\$50,000 per bore); - Replacing irrigation bores (\$150,000 per bore). 	Yes
Biodiversity offsets	\$0.106	Total Fund Deposit of \$121,467 has been estimated using the Biodiversity Credits Pricing Spreadsheet (administered by the NSW Office of Environment and Heritage), including management and other recurring costs extrapolated over a	Yes

Externality	NPV, \$2016 millions	Consisting of:	Internalised by Hume
		<p>20 year period in which these actions will be carried out:</p> <ul style="list-style-type: none"> - bush regeneration (weed control); - bush regeneration (weed maintenance); - fencing maintenance; and - signage installation. <p>Other recurring costs factored into the Total Fund Deposit comprise:</p> <ul style="list-style-type: none"> - annual reporting fee; - monitoring and reporting; - council rates; and - targeted Squirrel Glider surveys. 	
Water	\$4.791	Cost of purchasing water licenses for 2,000 ML in FY 2019 and FY 2020, at an average cost of \$2,650 per 1 ML license	Yes

Allowance for construction phase costs

10) Allowance for construction phase costs

Labour, operating and capital costs have been included on a cash basis during the construction phase of the project (as well as during the operational and shutdown phase).

Construction (capital) costs are incurred from financial year (FY) 2019 through FY 2022 to prepare the mine for operation. Following commencement of operations, certain underground capital costs are incurred through FY 2024. Smaller additional capital outlays occur from FY 2027 through FY 2032 corresponding to a change in the active mining area from the western part of the project to the eastern part of the project. Sustaining capital costs are incurred from FY 2021 through FY 2040. Rehabilitation (capital) costs are incurred in FY 2040 and FY 2041.

Operating costs (including pit-top costs, materials and services, power costs, insurances, recruitment and induction costs, but net of any labour cost component) are incurred from FY 2021 through FY 2040.

Labour costs refer to the costs of consultants and contractors, Hume employees, and construction and rehabilitation workers, respectively. The costs of consultants and contractors, and of Hume employees are incurred in all years from FY 2021 through FY 2040. The costs of construction and rehabilitation workers are incurred in FYs 2020 to 2022, and in FYs 2040 and 2041.

11) Omission of potential consumer surplus benefits

The Guidelines make no reference to broader economic effects such as a hypothetical consumer surplus to NSW consumers. In any case, coal is an internationally traded commodity and would be traded at export parity prices; hence there is no prospect of an (indirect) consumer benefit arising from lower coal prices.

The Berrima Rail project will benefit other existing users of the Berrima Branch Line to the extent that the lengthened siding at Berrima Junction will improve its functionality. However, these benefits

are difficult to quantify and are likely to be immaterial in the context of the overall assessment.

12) GSP as a base measure

The focus on GSP and the components of GSP is entirely consistent with the approach described in the Guidelines, but additionally ensures that a consistent accounting framework is maintained.

The Guidelines set out that the main objective of the CBA is to estimate the impacts of the project on the *State of New South Wales*. If the aim is to measure the net benefit accruing to a state or country, a suitable metric for estimating the improvement in 'welfare' to a jurisdiction is value added, and therefore GDP or GSP.

GDP or GSP is not a direct measure of economic and social 'welfare', but a measure of the production of goods and services. However, production is an important dimension of welfare because it enables greater consumption, and because strong GDP growth goes hand in hand with declining unemployment.²⁰ Dimensions of welfare that are not reflected in GDP or GSP include social inequality, security of goods and persons, and the quality of the environment. Note however that any material externalities arising from the project have been internalised, apart from the noted exceptions - e.g. GHG.

Local effects analysis

Disposable income benefits

13) Disposable income benefits

The calculation of disposable income benefits in the LEA follows the same steps as for the CBA (Questions 6) and 8)), and are shown in the table below.

²⁰Lequiller, Francois, and Blades Derek 2007, Understanding national accounts. OECD Publishing.

Table 3. Net disposable income calculation for FY 2026, NSW

Column	Aggregates	Units	A\$ (real, 2016)	Notes
	Hume workforce:			
A	Disposable income	\$M	\$17.3	Aggregate gross wages, less superannuation, taxes and Medicare payments for the Hume local workforce
	Taxes	\$M	\$6.5	
	Medicare	\$M	\$0.5	
	Total	\$M	\$24.3	
	Alternative employment workforce:			
B	Disposable income	\$M	\$6.3	Aggregate gross wages, less superannuation, taxes and Medicare payments, assuming that 80 per cent of the local Hume workforce is alternatively employed
	Taxes	\$M	\$1.0	
	Medicare	\$M	\$0.2	
	Total	\$M	\$7.5	
	Net income benefits			
A minus B	Disposable income	\$M	\$11.1	Incremental disposable income attributable to the Hume local workforce
	Taxes	\$M	\$5.5	
	Medicare	\$M	\$0.3	
	Total	\$M	\$16.8	

As is the case for the CBA, the assumption in the LEA that the majority of Hume workers would be redeployed - thereby reducing the disposable income benefits that would be attributed to these workers - is more conservative than what is required in the Guidelines. Similarly, the derivation of disposable (as opposed to unadjusted, pre-tax) income is a more conservative approach than is required in the Guidelines.

The derivation of disposable income benefits is shown in the attached pdf file. The calculation follows the structure described at 6), but is limited to workers assumed to be residing within the Southern Highlands SA3 area.

14) Treatment of in-migrants

The CBA assumes that all Hume workers are from NSW. No benefits relating to 'in-migrants' have been counted.

15) Omission of non-labour employment effects

The Guidelines make no reference to 'non-labour employment effects', nor is it clear what this term is intended to mean. We note that the Guidelines only require *material* costs and benefits to be quantified (p.2).

Environmental externalities

16) Discussion of external effects in the LEA

The Guidelines require that the LEA should identify those external effects investigated in the CBA and identify those that create material, unmitigated effects within the locality (p.24).

External effects are discussed at length in Section 3.2. As noted in Section 3.2, the external effects associated with the project are limited. In particular, there are no material unmitigated effects within the Hume region.

17) GSP flow-on benefits at the State level

The Guidelines require a flow-on analysis to be undertaken at the local level (p.23).

The analysis of flow-on effect at the state level is intended to complement the local analysis, provide additional information, and put the local figures in context.

Although the determination of state-wide flow-on effects is not required in the Guidelines (but was in earlier versions of the Guidelines), the Guidelines also do not preclude such benefits from being calculated. It is up to policy makers to decide what weight to assign to these figures, if any.

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