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5 August 2021

Matthew Sprott
Director – Resource Assessments
Department of Planning, Industry and Environment (DPIE)

E | Matthew.Sprott@planning.nsw.gov.au

Dear Matt

Re: Addendum to the 2019 EY Economic Impact Assessment for the Glendell Continued Operations Project

In light of feedback from various stakeholders for other recent coal mine project assessments, the appropriateness of the inclusion of employee and supplier benefits in the projected benefits to the State from Glencore's Glendell Continued Operations Project has been reviewed by Ernst and Young (EY). Enclosed with this letter is an addendum to the 2019 EY Economic Impact Assessment for the Glendell Continued Operations Project, which should be considered to form Appendix F of that Report. For the reasons outlined in Appendix F, EY maintain that the inclusion of the employee and supplier benefits is justified having regard to the specific nature of the Project and the NSW Government projections of employment in the coal mining sector contained in the 2021 NSW Intergenerational Report, 'Towards 2061 – planning for the future' (NSW Treasury, 2021).

For context we note:

- The approach adopted by EY in the Economic Impact Assessment undertaken for the Glendell Continued Operations Project includes a similar approach to the quantification of economic benefits to the State of NSW flowing from employees and suppliers that was adopted for the economic assessment of the recently approved Mangoola Coal Continued Operations Project and Tahmoor South Project. The quantification of these benefits was rejected by the Independent Planning Commission (IPC) in each of those assessments.

- These recent assessments by DPIE and IPC have applied a zero wage premium for employees in their assessment of economic benefits from coal mining projects. This has the effect of entirely discounting the benefits from employees despite the obvious economic benefits to the State, which flows from the higher wages and additional employment demand created by both new and extended mining operations.

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- The 'Guidelines for the Economic Assessment of mining and Coal Seam Gas proposals' (DPIE 2021) specifically provide the following in relation to employee benefits:

  > *'Although a zero wage premium is a useful starting* assumption*, the appropriateness of this assumption must be assessed on a case by case basis. This is because benefits to workers can be one of the major economic benefits from a project. 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 primary reason put forward in submissions to the DPIE and IPC regarding the application of a zero wage premium is that employees currently employed at Glendell would simply get another job in the coal mining sector and therefore receive the same wages. This scenario is appropriate in a sector that has growing employment demand and alternative jobs readily available, however, this is not considered to be the case for the coal mining sector, as has been recognised in the NSW Government's own 2021 Intergenerational Report.

If you have any queries regarding this matter, please contact the undersigned.

Yours sincerely

David Holmes
Principal Environmental Consultant

Economic impact assessment of the Glendell Continued Operations Project

Glendell Tenements Pty Limited

29 July 2021

Building a better working world

Release notice

Ernst & Young ("EY") was engaged on the instructions of Umwelt (Australia) Pty Ltd ("Client") to perform an economic impact assessment in relation to the proposed Glendell Continued Operations Project ("Project"), in accordance with the engagement agreement dated 29 August 2018, including the General Terms and Conditions ("the Engagement Agreement").

Pursuant to the terms of the Engagement Agreement, the report was issued on 29 October 2019 (the Main Report). However, we were recently instructed to undertake additional analysis on certain aspects of the Main Report. The outcome of the additional analysis is included in this Appendix dated 29 July 2021 (Appendix F to the Main Report). The Main Report and this Appendix F are hereinafter collectively referred to as the "Report". The results of Ernst & Young's work, including the assumptions and qualifications made in preparing the Report, are set out in the Report. The Report should be read in its entirety including the transmittal letter, the applicable scope of the work and any limitations. A reference to the Report includes any part of the Report. No further work has been undertaken by Ernst & Young since the date of the Report to update it. The readers must read this Appendix F in conjunction with the Main Report.

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Appendix F Worker and Supplier Benefits

1.1 Executive Summary

In this Appendix F we provide a more detailed framework for assessing worker and supplier benefits. Additional supporting evidence is presented to substantiate the addition of worker and supplier benefits as part of the economic cost-benefit-analysis (CBA) that has been undertaken for the extension of the life of the Glendell mine.

1.1.1 Worker Benefits

The general criticisms on including worker benefits when assessing the economic impacts of mining projects in NSW tend to follow a few common approaches, that:

- Should mining cease at a site, workers would likely gain employment elsewhere in the industry
- Projects will generally not employ people locally, and rather source employees through drive-in-drive out and fly-in-fly-out arrangements from broader areas and interstate
- That any calculation of worker benefits should include an adjustment for the disutility and the extra skills needed to work in the mining industry
- By measuring the mining wage against the average wage in NSW implies that workers will find alternative work at an average wage paid in NSW, which implies that there are no significant differences in skills between miners and the average worker.

It is worth noting that the first argument focuses on whether there are any gains to workers that should be considered; whereas arguments 2-4 focus on the reasonable assessment of their magnitude (and thereby implicit concede argument 1).

Argument 1 (if mining ceased workers would be employed elsewhere in the industry) seems to imply that there are no worker benefits associated with the cessation of mining at a site and therefore worker benefits should be excluded entirely.

It is worth noting such an argument could, in theory, be applied to any industry (i.e. it does not matter if certain economic activities cease in any industry because the workers will always be able to gain employment elsewhere in the industry). On this basis, workers regardless of their industry, gain no benefit or bear no cost from any increase or decrease in activity in any industry. The same argument could be applied to the other factors of production (e.g. capital and suppliers in this case), so it is not obvious why this particular argument should be applied only to labour and only to mining labour in this instance.

Putting aside the implausibility of this general argument, there are reasons to conclude that this is a weak argument in respect of mining, as we discuss below.

Further, standing in contrast to the assertion that employees will find employment elsewhere in the industry, employees in the coal mining sector are going to find it increasingly difficult to find alternative mining employment as coal mining output is expected to remain relative stable[1] and, in line with NSW Treasury forecasts[2], employment in the coal mining industry is expected to gradually fall over the same period.

[1] https://resourcesandgeoscience.nsw.gov.au/__data/assets/pdf_file/0004/1236973/Strategic-Statement-on-Coal-Exploration-and-Mining-in-NSW.pdf

[2] NSW Treasury (2021) TTRP21-07 The sensitivity of the NSW economic and fiscal outlook to global coal demand and the broader energy transition for the 2021 NSW Intergenerational Report

Argument 2 has nothing to do with the argument about whether worker benefits should be included; it only relates to the locations to which those benefits should accrue (i.e. where the worker's live). In the Glendell mine, many of the workers that are currently employed are likely to remain employed at the mine site, of which an estimated 95 per cent reside within New South Wales from information gathered through the social impact assessment[3], meaning that we expect the majority of employees will not be employed under fly-in-fly-out, or similar, arrangements.

Argument 3 concedes the primary point about whether there are worker benefits; it focuses on their magnitude (i.e. whether there are some matters that should be taken into account in assessing the net worker benefits).

Secondly, it has been argued that the high disutility incurred of working in the mining sector is one of the main drivers of the high wages relative to other industries. Therefore, any wage premium should be adjusted due to the challenges of working in mining. Noting that any metrics around the disutility of working in mining are very difficult to obtain, we provide evidence that is contrary to these claims, in both an absolute (mining specific) and relative way (industry specific).

One reasonable approximation for the mining specific levels of disutility are the hardship allowances paid to employees. For example, the Black Coal Mining Industry Award 2010 provides for the payment of an Underground allowance at 0.23 per cent per day above the standard rate/reimbursement to an adult employee who works underground in any shift. These rates appear to be non-material in comparison to the differences in wages paid to workers in the mining industry. In addition, in assessing the safety of the mining sector relative to comparable industries, we find that according to statistics gathered by Safe Work Australia[4], the mining sector has recently outperformed on a claims per million hour basis relative to comparable industries such as construction, agriculture and manufacturing. Thus, it is unclear whether there is any significant disutility incurred from working in the mining sector relative to other industries.

Argument four also concedes the primary point about whether there are worker benefits; it focuses on the reasonable estimation of its magnitude given that an observable wage premium exists.

Lastly, based on longitudinal census data analysis, we show that the mining industry does not appear to be any more difficult to transfer into other industries in Australia, and that a significant portion of those working in the mining sector in 2016 were previously working in industries such construction, manufacturing and professional services. Further, there does not seem to be any significant differences in levels of educational attainment or experience (proxied by age) between those in the mining sector and in some comparable industries.

1.1.2 Supplier benefits

To proxy for producer surplus, we have estimated the gross operating surplus attributed to suppliers from the spending by Glendell in the region. Gross operating surplus is a measure of the profits earned by firms in the economy. Noting that such an approach was considered broadly consistent with the specifications in the Guidelines (Guidelines published by the NSW Government[5]), in previous cost-benefit analysis work completed.

One of the main criticisms against the inclusion of supplier benefits in cost benefit analysis is that it is expected that suppliers to the mining industry will earn similar margins relative to what they receive under the base case, such that there are no additional benefits which accrue to suppliers. However, there is evidence to suggest that the suppliers in the region are highly dependent on mining, and that should the Project's operations not be extended it would result in a consequent reduction in the demand for local goods and services.

[3] Umwelt (2019), Glendell Continued Operations Project – Social Impact Assessment

[4] Safe Work Australia National Data Set for Compensation-based Statistics (NDS).

[5] NSW Government (2015) Guideline for the economic assessment of mining and coal seam gas proposals.

Secondly, the supply curve for those supplying the mining industry can be considered "horizontal" (under the current output and scale of operations pertaining to Glendell), meaning that an increase in demand from a mine is unlikely to result in a change in prices from suppliers. This means that the change in demand that is directly the result of the Project, must result in at least, a linear increase in overall gross operating surplus.

This is further compounded with our longer-term observations on inflation and unemployment. Some evidence suggests that the economy is operating persistently with some level of slack in its capacity, meaning that any increase in demand from services due to the Project can be viewed as providing a key benefit for suppliers that may not be running at full capacity.

1.2 Introduction

In this Appendix F, additional supporting evidence is presented to substantiate the addition of worker and supplier benefits as part of the economic cost-benefit-analysis (CBA) undertaken for the extension of the life of the Glendell mine. In this case, we have considered the relevant New South Wales (NSW) planning guidelines, including:

1. NSW Government (2015) Guideline (the "Guidelines") for the economic assessment of mining and coal seam gas proposals.

2. NSW Government (2018) Technical Notes supporting the Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals.

Mining approvals in NSW require a CBA to be undertaken based on the above Guidelines published by the NSW Government[6]. At the outset, we believe that it is important to recognize the relatively unique role that the economic CBA plays in the approvals process. Whilst it is common for governments to undertake CBA when considering public expenditures such as large infrastructure developments or programs, it is much less common for governments to undertake CBA for private sector investments.

The Guidelines explicitly recognise that there are a range of potential beneficiaries from a mining project, along with the direct and indirect costs. These beneficiaries are appropriate to consider when assessing private investment and include the NSW government through tax and royalty collection, workers at a mine and suppliers to the mine. Furthermore, the Guidelines explicitly recognise that the "benefits to workers can be one of the major economic benefits from a project".

What we have observed in the approvals process broadly, is that much of the commentary around the merits of CBA analysis calls for the exclusion of key benefits, such as those that accrue to workers and suppliers at a new mine. The exclusion of these benefits are often based on highly theoretical arguments, with little supporting evidence provided, and are only justifiable under the most restrictive of circumstances. Further, the commentary overlooks the fact that the assessment considers net benefits, that is, the benefits of the Project proceeding versus there being no project (and therefore no additional demand for suppliers nor additional employment).

In this appendix we set out to address some of the common (often unsubstantiated) claims that are used to justify the exclusion key benefits, such as those related to worker and supplier benefits.

In addition, a further set of sensitivity analysis is presented with the impact on the overall benefits and costs of the Glendell Continued Operations Project of a range of benefits to workers and suppliers. This Appendix is additional to the analysis undertaken in the *Economic impact assessment of the Glendell Continued Operations Project,* which was finalised on 29 October 2019 (the "Report").

[6] NSW Government (2015) Guideline for the economic assessment of mining and coal seam gas proposals.

1.3 Benefits to workers

The Guidelines are explicit in their allowance of positive worker benefits and recognise that such benefits can represent a major proportion of the overall benefits of a project, provided there is sufficient evidence to support it. The basis for estimating the benefits that accrue to workers in a mine is based on the following principles, as highlighted in the Guidelines:

- Wages earned in the mine
- Minus the opportunity costs of labour for working in the mining sector, compared to working in non-mining sectors (or being unemployed)
- Minus the wage difference due to skills and the disutility of working in the mining industry

To measure the opportunity cost compared to the non-mining sector, the wages earned by Glendell Mine workers are compared to the average wage paid in NSW, implying that should the Project not go ahead, those who would have been employed by Glendell would find alternative work at the average wage paid in NSW. The average wage across NSW is $67,193 per annum, based on 2016 Census data (updated to 2019 dollars using ABS cat. No. 6401.0).

However, the inclusion of worker benefits is a key area of debate in the assessment process for many mine applications, as the Guidelines are not explicitly prescriptive in their treatment of these benefits. For example, in the Independent Planning Commission's (the "IPC") statements[7] regarding the Mangoola Coal Continued Operations Project, which was approved in April 2021[8], it is noted that worker benefits were overstated and were not prepared in accordance with the Guidelines. It was in part, because that "should mining cease at the site, workers would likely gain employment elsewhere in the mining industry".

Further general criticisms on the inclusion of worker benefits for mining projects in NSW tend to follow three common approaches, that:

- Projects will generally not employ people locally, and rather source employees through drive-in-drive out and fly-in-fly-out arrangements from broader areas and interstate
- That any calculation of worker benefits should include an adjustment for the disutility of working in the mines and the extra skills needed to work in the mining industry
- By measuring the mining wage against the average wage in NSW implies that workers will find alternative work at an average wage paid in NSW, which implies that there are no significant differences in skills between miners and the average worker.

Each of these arguments are addressed in commentary below.

1.3.1 Worker locations and jobs

Mining Jobs

Standing in contrast to the assertion that coal miners will simply find employment in alternative mines, Figure F.1 details the forecasted coal mining employment in NSW[9]. These projections of employment also operate as a proxy for coal production. Under all scenarios, there is an overall decline in projected employment within the coal sector in NSW over the expected life of the project with only the high demand scenario showing a potential increase in employment over the short

[7] New South Wales Government Independent Planning Commission, Mangoola Coal Continued Operations Project – Statement of Reasons for Decision

[8] Notice of State Significant Development Determination – Mangoola Coal Continued Operations Project – SSD 8642

[9] NSW Treasury (2021) TTRP21-07 The sensitivity of the NSW economic and fiscal outlook to global coal demand and the broader energy transition for the 2021 NSW Intergenerational Report

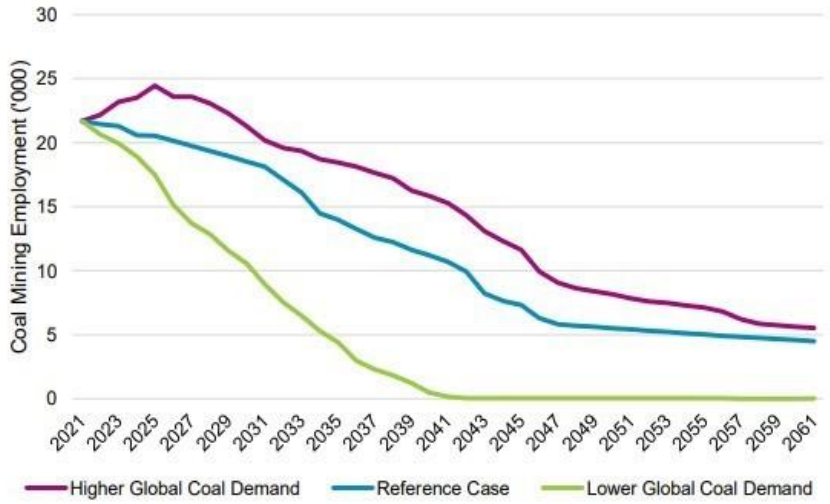
term. In contrast to the 2016 NSW Intergenerational report (IGR), the 2021 IGR, *The sensitivity of the NSW economic and fiscal outlook to global coal demand and the broader energy transition for the 2021 NSW Intergenerational Report,* the NSW Treasury highlights a quick and significant shift in the outlook for the coal mining industry, with Australia's top three thermal coal export countries (Japan, South Korea and China) committing to achieving net zero emissions by the middle of the century.

In the 2021 IGR, the NSW Treasury writes that a "declining global demand for NSW coal will impact employment in coal mining. Under the reference case, employment in coal mining is projected to decline by an average of 600 per year for the next two decades".

As global demand for coal is forecast to plateau, NSW plans to slowly unwind investing in coal mining projects, as countries transition to a clean energy framework[10]. Those currently employed in the sector are going to face increasing challenges in finding alternative employment within the mining sector. Those that do will displace a person already in the workforce, who may either retire from the workforce or seek employment in some other profession.

Furthermore, the progressive increase in employment over the life of the Project coincides with reductions in employment at the Mount Owen Mine in the Mt Owen Complex[11]. In this regard, the Project may also partially maintain the workforce levels from the Mount Owen Complex throughout much of the life of the Project. Therefore, the proposed long lifetimes of the Project may give the employees at the Mount Owen Mine and Glendell an opportunity to have access to long-term employment in an environment where global factors mean that alternative opportunities in coal mining in NSW are becoming increasingly scarce.

Figure F.1: Forecasted Coal Mining Employment



Source: NSW Treasury and VURM

In the establishment of a base case to compare the Project against, one of the key assumptions in the Guidelines is that alternative project and land uses should continue on in a business as usual fashion, unless there is a significant and material impact that a new project would have.

[10] https://resourcesandgeoscience.nsw.gov.au/__data/assets/pdf_file/0004/1236973/Strategic-Statement-on-Coal-Exploration-and-Mining-in-NSW.pdf

[11] The Mt Owen complex comprises of three mining areas: Mt Owen, Ravensworth East and Glendell. The three areas are run as an integrated operation utilising Mt Owen's coal preparation plant and transport infrastructure. The mine is owned and operated by Glencore.

In this respect, we also assume that alternative mines would be operating in a business as usual manner, irrespective of whether a project is approved. That is, they would be also be attempting to maximise their production though the minimisation of vacancies, which would result in minimal lateral transitions between operations. Taking this assumption in conjunction with the estimates shown in Figure F.1, it becomes increasingly difficult to argue that, should the Project not proceed, that the existing workforce would find alternative employment in the coal mining industry in NSW. While these employees may find employment in other jurisdictions, this would result in a net loss of benefits to NSW relative to the Project Case (and assumed base case).

Worker locations

Relatedly, it is also commonly argued that many workers would not be sourced locally, and that workers would alternatively be resourced through Fly-In-Fly-Out (FIFO) programs. As such, many of the employment benefits would accrue to workers that may not be from the state. However, since this is an extension of a currently operating mine, it is expected that many of the workers currently employed will remain working at Glendell and the increase in worker numbers as productions rates increase would be met primarily through workers no longer required at the Mount Owen Mine as production rates at that mine reduce. To the extent that increased workforce numbers associated with this project would dislodge workers from alternative mines, the subsequent filling of that vacancy would eventually result in workers being sourced either from other sectors or the unemployment queue. According to the social impact assessment published by Umwelt,[12] nearly 95 per cent of the workforce resides within broader Hunter Region, therefore it is reasonable to expect that the vast majority of wage benefits that accrue to employees in the project case would be attributable to NSW.

1.3.2 The skills argument

The second major criticism usually put against worker benefit estimations is the fact that miners will possess specialised and unique skillsets, which would mean that, should approvals for a project not be granted, workers would simply end up employed elsewhere in the mining industry. Alternatively, that a project will generally source most of its employees from within the mining sector. Therefore, the reservation wage that should be utilised in the estimation of worker benefits is the average mining wage. However, as noted in Section 1.3.1, it is unlikely that any workers at Glendell that are to lose a prospective employment opportunity by this project not proceeding can assume they would gain employment in the NSW mining industry. Accordingly, the assumption that the use of the average mining wage as a reservation wage cannot be justified unless there is evidence of additional demand for mining employment in NSW that would enable the displaced workers to be employed in the mining sector. In the following section we aim to show that using the average mining wage as a reservation wage is not appropriate, based on an examination of inter-industry movements and the average age and education level of occupations that are found in the mining industry, and of comparable industries.

1.3.2.1 Inter-industry movement

One of the major arguments levied on the estimation of worker benefits are that jobs in the mining sector require a very specialised and niche set of skills. Such an implication would mean that there would be a significantly lower level of transitions from other industries into the mining sector, whether individuals work in the same occupation (for example, technicians) or not.

Figure F.2 outlines the proportion of workers that reported changing industries between 2011 and 2016 from Census data. Longitudinal census analysis can represent a reasonable proxy on estimating the level of difficulty, or levels of qualifications required, to enter certain industries, as these can be compared on a like-for-like basis across a range of sectors in the Australian economy. For example, the industries which showed the lowest proportions of lateral transfers (i.e. staying in the same occupation but switching sectors) were the financial services, health care, and education

[12] Umwelt (2019), Glendell Continued Operations Project – Social Impact Assessment

and training. These industries generally require significant qualifications and educational levels to enter, which explains the lower level of lateral transfers into these industries.

Alternatively, the industries which saw the highest lateral transfers were the accommodation and food services, administration and support services and arts and recreation services. These industries are characterised as having lower barriers to entry for jobs (in terms of educational or required qualifications), as well as generally providing short term employment.

From 2011 to 2016 (at the time of the census), roughly half of the employees in the mining sector had transferred from alternative industries, placing it roughly between the construction and professional, scientific and technical services sectors in terms of ease of entry. In this respect, there doesn't appear to be any significant differences in the level of accessibility for employees of this industry relative to the rest of Australia. Figure F.3 demonstrates that the construction, manufacturing and professional services sectors are the main sectors supplying skilled workers to mining between 2011 and 2016.

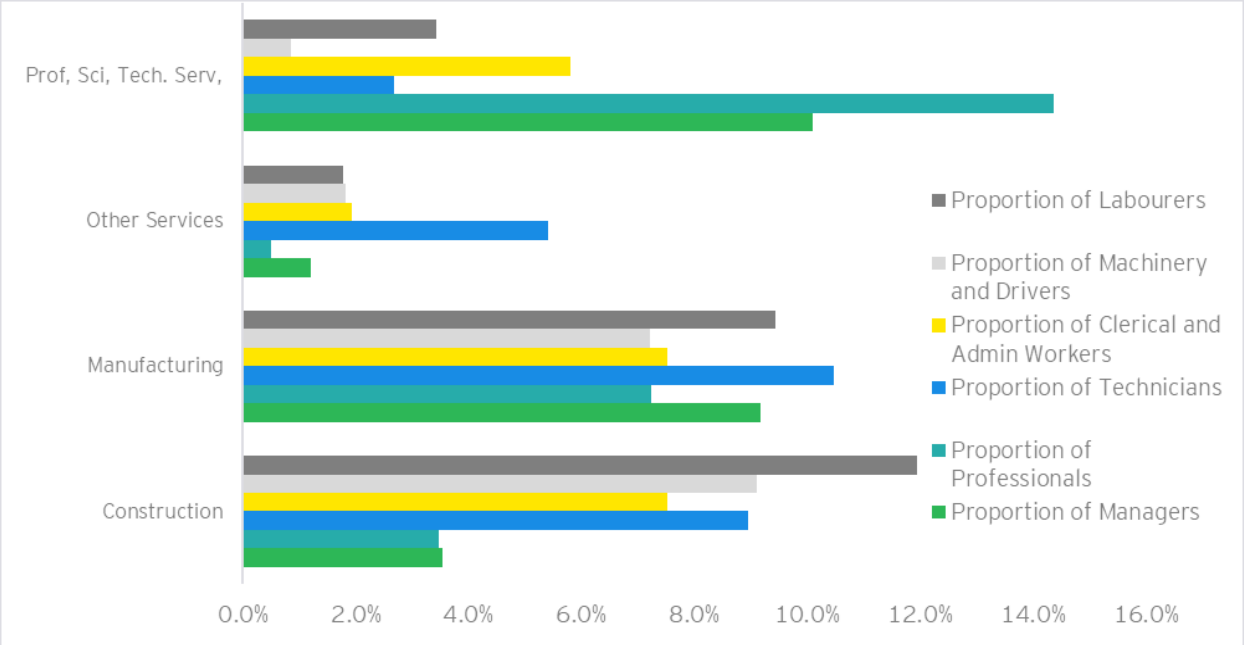
Moreover, this implies that there doesn't appear to be any significant differences in the level of qualification, or education needed to secure entry into the mining, with that of the general employment landscape in Australia, which we show in more detail below.

Figure F.2: Proportion of workers that transferred laterally into select industries from 2011 - 2016[13]

Source: Australian Bureau of Statistics (2016)

[13] From 2011 and 2016 the ABS changed their method of collecting industry of employment data. The changes were aimed at reducing the amount of responses which provided an industry but failed to provide sufficient information to code the information at the Australia New Zealand Industry Classification (ANZIC) 2-Digit level or higher. As such, we've limited the longitudinal analysis to only consider ANZIC 1-Digit industry codes, as we believe this change would not have a material effect on these results

Figure F.3: Longitudinal movements into the mining sector from 2011 - 2016 at the occupational level



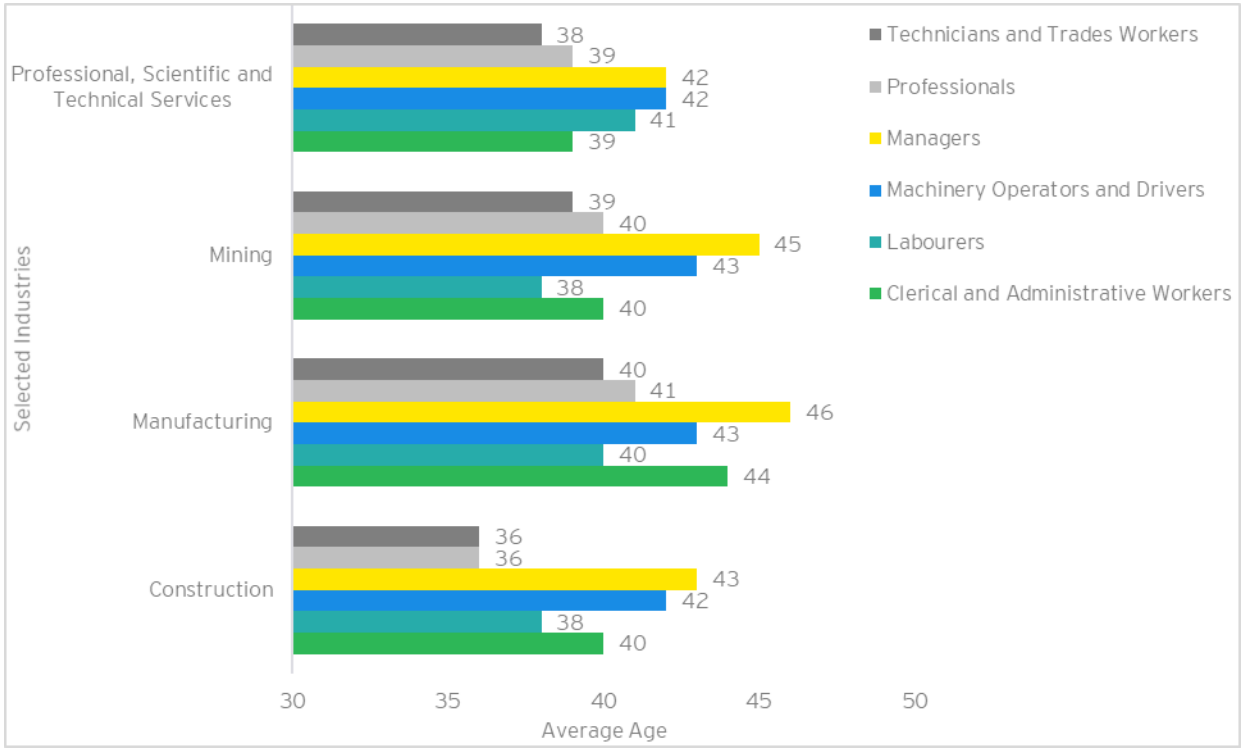
Source: Australian Bureau of Statistics (2016)

1.3.2.2 Average age of the workforce

Measuring the unique skillsets of a workforce also presents challenges, however some reasonable proxies can be utilised to examine whether occupations in the mining sector are different relative to these comparable industries. These can be, for example, examining demographics such as the average age of occupations as a proxy for experience, as well as the total years of reported schooling, to measure education and skill levels.

Figure F.4 details the average age of workers by occupation across the mining sector in comparison to the sectors that supplied the most workers to mining between 2011 and 2016. Broadly speaking it appears that there are no significant differences in the age of workers at the occupational level between mining and the three comparable industries. For example, the occupation which sees the largest representation in the mining workforce, machinery operators and drivers, has an average age of its workforce at around 43 years old, which is consistent with machinery operators and drivers in other sectors. This shows that there may be no significant differences in the level of experience between those employed in the mining sector, and those that are employed in comparable industries.

Figure F.4: Average age of employees at the occupation level



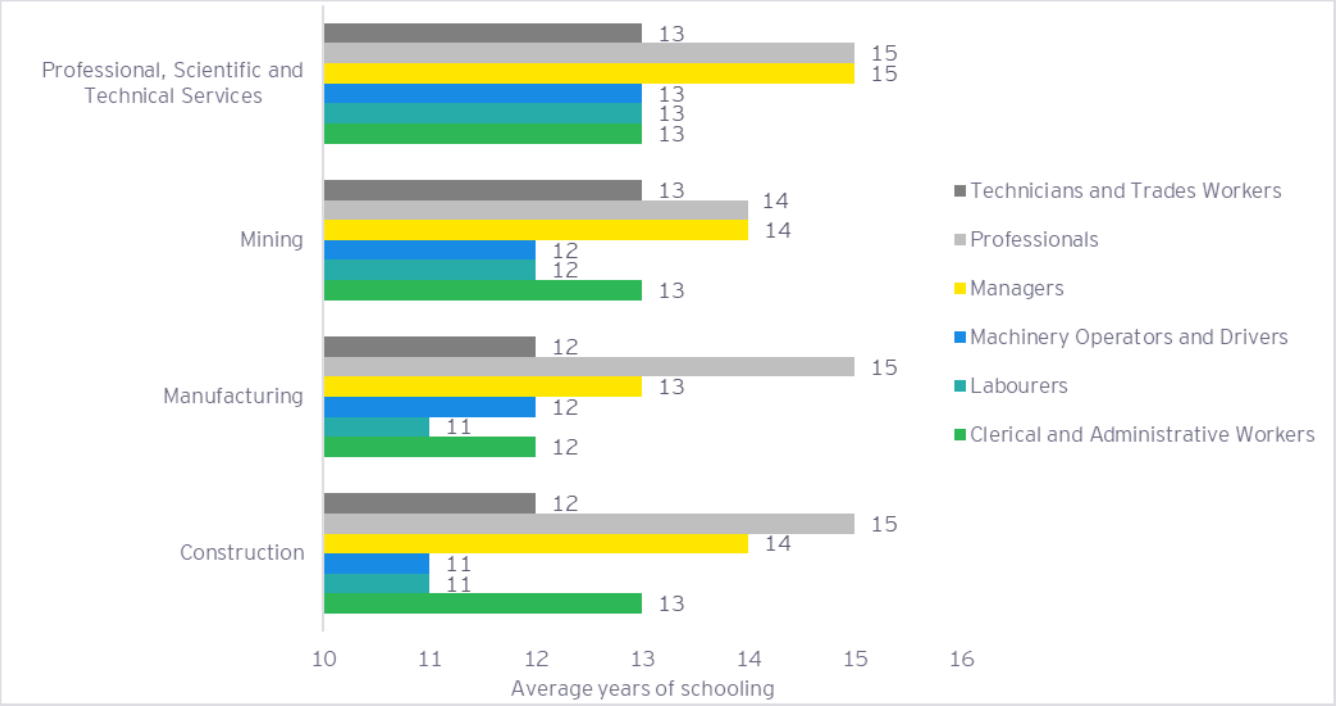
Source: Australian Bureau of Statistics (2016)

1.3.2.3 Skills and qualifications

A suitable proxy for examining the skill and qualification levels of employees in occupations is to look at the amount of time each employee has spent in schooling. Figure F.5 details the average number of years of schooling that employees have by each occupation and industry.

In mining, professionals and managers have the highest levels of schooling, at 14 years on average. This in contrast to the Professional Scientific and Technical Services industry, where, on average, managers and professionals undertake and extra year of schooling. Overall, education levels in each occupation is similar across mining and other sectors. This implies that there are no significant differences in the amount of schooling that employees undertake in the mining sector relative to some of the comparable industries.

Figure F.5: Estimated^ average number of years of schooling



Source: Australian Bureau of Statistics (2016) ^Based on reported highest levels of education achieved.

1.3.3 Disutility argument

General criticisms against worker benefits tend to argue that the high reservation wage is due to the disutility of working at the mine face, and therefore any wage premium should be adjusted due to the challenges of working in the mining sector. The application of any premium to account for these externalities will be specific to the mine site and type of commodity being mined.

Any metrics around the disutility of working in mining are very difficult to ascertain in both an absolute (mining specific) or relative (compared with other industries) way. As noted in the Report, regarding the mining specific measures of disutility, one source of information considered in this analysis was any documented 'hardship' allowances recognized in mining awards. However, these allowances appear to be relatively minor. For example, the Black Coal Mining Industry Award 2010 does provide for the payment of an Underground allowance (Electrical/ Mechanical) of 0.23 per cent per day or shift (above the standard rate/ reimbursement) to an adult employee who works underground on any shift. In addition, there is a Confined space allowance of 0.08 per cent and a Dirty work allowance of 0.23 per cent, that may apply to underground workers. However, the Project is an open cut mine and these allowances do not apply. Even if these allowances were applicable, these are not significant uplift rates relative to allowances in other sectors (for example, the First Aid Officer Allowance is 0.76 per cent per day or shift above the standard rate).

On the other hand, one possible way to measure the relative disutility of working in mining, would be through published work health and safety statistics, which examine various fatality and injury statistics, nation-wide, for all industries.

The mining sector has focused on providing a safe working environment for all its workers. Table F.1 outlines the incidence rates by sector per million hours worked from 2000 to 2019. During the period of analysis, the Australian mining sector has reduced their average number of claims per million hours worked by 57 per cent, which represented the largest decline in incidence rates, from 2000 to 2019, of any sector, except for financial services.

Comparable industries, such as agriculture, forestry and fishing, construction and manufacturing reduced their rates (defined as claims per million hours worked) from between 35 and 42 per cent over the same period.

Based on a 5-year moving average, on a claims per million hours worked basis, the mining industry also ranks well below these comparable industries and delivered incidence rates below the national average.

Table F.1: Work health and safety statistics for Australia

Industry	Average claims per million hours worked (2013 – 2019)	Change from 2000 to 2019	Ranking
Agriculture, forestry, and fishing	9.2	-35%	19
Manufacturing	8.5	-39%	18
Transport, postal and warehousing	8.4	-44%	17
Construction	8.1	-33%	16
Retail trade	5.1	-42%	9
Mining	4.6	-57%	7
Information media and telecommunications	1.5	-51%	3
Financial and insurance services	0.9	-58%	1

Source: Safe work Australia (2020)[14]

Given the relative safety of the mining industry, the minor allowances for working in a coal mine and the measurement difficulties associated with measuring these disutility's generally, we have assumed the disutility for workers under the project cases is zero. This implies, effectively, that those workers employed by the Project experience no additional disutility from working in the mine compared with any alternative employment they would have secured in the absence of the Project.

1.3.4 Concluding remarks

The evidence presented here supports the argument for the inclusion of worker benefits in the CBA. For example, by utilising census data, we have shown that, not only does the industry not appear to be any more difficult to transfer into related industries such as construction manufacturing, but that a significant proportion of those working in the mining sector, as of 2016, had previously been drawn from said industries. Moreover, the level of educational attainment and estimated level of experience (proxied by age) support the argument that the characteristics of workers in the mining industry are not significantly different to those in comparable industries.

Secondly, on the concept of disutility, evidence suggests that there are minor additional negative externalities incurred by workers,[15] especially given that a sizeable portion of the workforce would not be working at the mine face. Relative to comparable industries, the mining sector appears to have implemented significant safety measures over the last two decades, which has resulted in a consistently lower claims rate. Lastly, the Hunter Valley is hardly remote, and the majority of the current Glendell workforce reside in the local region, so there is unlikely to be any significant disutility arising due to the location of the mine.

In this respect, we believe that, not only would the majority of worker benefits accrue to NSW, but that employees in this Project would be paid a significant wage premium driven primarily by the

[14] Safe Work Australia National Data Set for Compensation-based Statistics (NDS)

[15] That is, would be subject to any negative externalities over and above those incurred from alternative employment

highly capital-intensive nature of the mining sector which results in a higher average labour productivity for workers in the sector. The high capital requirements of the sector imply high operating leverage (i.e. a higher proportion of fixed to total costs). Such businesses have a strong incentive to maximise the utilisation of those assets, failing which, their margins fall disproportionately. This means that such firms, including mining firms, would be willing to pay a large premium to ensure that vacancies are minimised, turnover is kept low, employees are trained sufficiently, and that the safety of employees are considered as top priority.

1.4 Benefits to suppliers

One of the key benefits of private sector investment is through the establishment of supply chain networks that act to disperse economic benefits to a myriad of businesses.

The Guidelines are clear in their allowance for the use of supplier benefits as part of the CBA. Consistent with the Guidelines, we have made an estimate of the producer surplus associated with the additional demand for inputs into production.

1.4.1 Supplier demographics

Based on surveys completed by Umwelt (2019)[16], 81 per cent of inputs are sourced from NSW, with 65 per cent being sourced locally from the Hunter Valley region.

On average, suppliers (120 respondents) indicated that 71 per cent of their income was dependent on the mining industry. Of those with current contracts with Glendell (106 respondents), these suppliers indicated that around 12 per cent of their income was dependent on the Glendell Mine. As a result, many of the suppliers are operating in an environment that is significantly dependent on the mining industry, with the majority of these respondents reporting a significant income-dependence on Glendell.

1.4.2 Methodology for the estimation of supplier benefits

The economic benefit to suppliers is estimated as a producer surplus generated from goods and services provided from NSW-based firms to the Project, requiring $1,751.6 million (in NPV terms) in intermediate inputs, as detailed in the Main Report. As per the supplier demographics highlighted above, Glendell advises that around 81 per cent of inputs to the mine are sourced from NSW-based suppliers, resulting in $1,418.8 million (in NPV terms) for the Project.

The producer surplus is not readily observable through this spend that is allocated to local suppliers by the Glendell mine. However, aligning with the assumptions in setting up the CBA, this spend represents a net increase in demand for the production of goods and services in the NSW economy.

To proxy for producer surplus, we have used the gross operating surplus allocated to suppliers from the spend by Glendell in the region. Gross operating surplus is a measure of the profits earned by firms in the economy. According to the ABS, gross operating surplus is "the surplus accruing from processes of production before deducting any explicit or implicit interest charges, land rent or other property incomes payable on the financial assets, land or other tangible non-produced assets required to carry on the production".[17] In using an average gross operating surplus ratio for suppliers of around 20 per cent, derived from an in-house regional input-output model, the total benefits to suppliers are estimated at $286.3 million in NPV terms.

1.4.3 Current criticisms and responses

In its reasons for approving the Mangoola Coal Continued Operations project, the IPC noted: "[The IPC] is of the view that local suppliers will earn similar margins relative to what they receive under

[16] Umwelt (2019), Glendell Continued Operations Project – Social Impact Assessment

[17] https://www.abs.gov.au/AUSSTATS/ABS@.NSF/2f762f95845417aeca25706c00834efa/ac6c11a0f11910fbca2569a40006164b!OpenDocument

the base case, such that there are no additional benefits to suppliers in NSW".[18] However, the base case that would result in the Project's operations not being extended is a direct and significant reduction in demand for goods and services in the region, as outlined in the supplier demographics section above, which will not necessarily be replaced by other projects or alternative sectors. The supply curve for goods and services in this instance can be considered as "horizontal" meaning that there are strong levels of competition in the region for goods and services to be supplied to mines. An increase in demand from a mine is unlikely to result in a change in prices from suppliers, especially when we consider the long run nature of the operations of a mine. In the long run, we can expect relatively low barriers to entry for firms to fill changes in demand, and equally, there is likely to be some form of spare capacity in the economy (as is evidenced with the low levels of inflation in the region, and discussed below). Mining companies are likely to have access to a variety of firms to supply products, who are competing and reducing their overall margins.

However, this does mean that the change in demand that is directly a result of the Project case must result, at a minimum, in a linear increase in overall gross operating surplus (which again, is the profits that firms receive from supplying their goods into the mining sector). This can be considered as a relatively conservative estimate of the change in producer surplus, as we could see a more inelastic supply curve for some goods and services, and this would result in an increase in the gross operating surplus relative to the base case.

Put another way, the Project is unlikely to increase the margin that suppliers receive, however the extended life of the Projects and the associated required capital and operational expenditure of the mine is expected to increase the demand for services and supplies relative to the base case of the Project not proceeding. The effect of this is that the same margin is applied to increased turnover which can be considered as a supplier benefit associated with the Project that should be considered as part of the benefits indirectly accruing to NSW.

Lastly, in contrast to the IPCs view, in their review of the Tahmoor South Coal Mine[19] BIS Oxford Economics (2020) writes that such an approach appears to be broadly consistent with the specifications in the Guidelines. Whilst the use of gross operating surplus is not quite equivalent to a strict definition of Producer Surplus, the approach is said to be reasonable, given data limitations.

1.4.4 The relationship between spare capacity, inflation and, unemployment

An important consideration that the Reserve Bank of Australia (RBA) considers in their monetary policy actions is the level of spare capacity in the economy. Spare capacity relates to the balance of demand for goods and services, relative to the economy's potential to produce them.

At an aggregate level, inflationary pressure is likely to be greater in an economy operating at a higher level of capacity utilisation than if it is operating at a lower level[20]. For example, firms that have a greater degree of pricing power should be able to expand their mark-ups in an economy experiencing strong growth in demand relative to available supply.

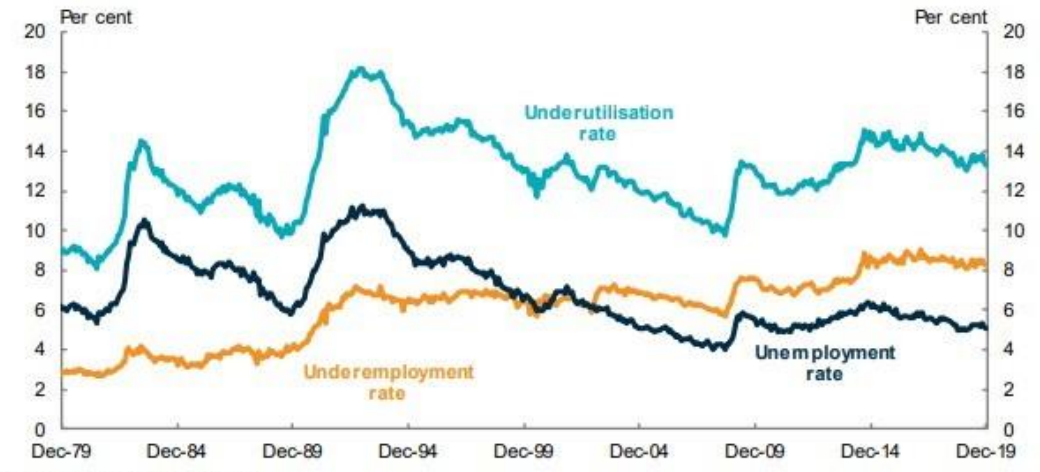
A second indicator of spare capacity in the economy is the unemployment rate and underemployment rate. A high unemployment rate implies that there is a large pool of workers willing to work, but are not engaged in production, which suggests that the economy is operating below its potential. Whilst the unemployment rate has been relatively consistent, if trending slightly downwards, as shown in Figure F.7 and Figure F.7, over the past four decades the underemployment rate has trended upwards, and has been higher than the unemployment rate since the early 2000s.

[18] Mangoola Coal Continued Operations Project (SSD 8642) – Statement of Reasons for Decision

[19] Oxford Economics (2020) Peer Review of Economic Impact Assessment Tahmoor South Coal Project

[20] RBA (2015), Firm-level Capacity Utilisation and the Implications for Investment, Labour and Prices

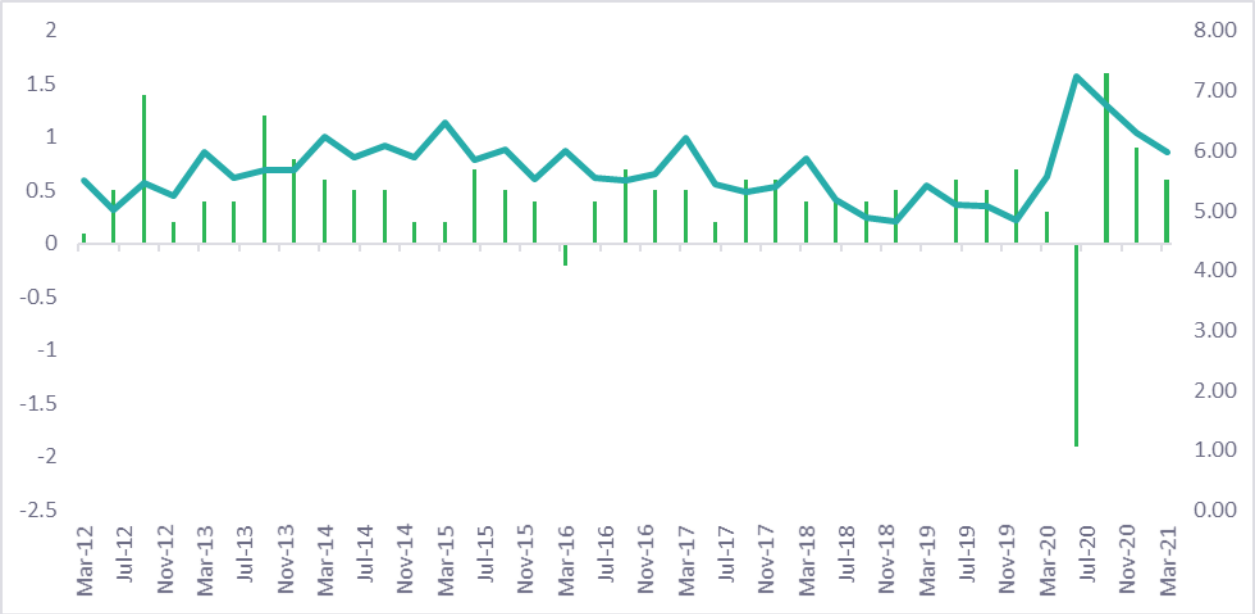
Figure F.6: Unemployment, Underemployment and Underutilisations rates[21]



Source: ABS Cat. no. 6202.0.

What we've observed more broadly, in Figure F.7, is that inflation has been benign and dropped into negative territory in July-2020, due to the large spike in unemployment related to the COVID-19 pandemic. Given that the rate of inflation has not been changing significantly, in addition to a relatively elevated underutilisation rate, it could be argued that the economy has persistently been operating with some level of slack in its capacity.

Figure F.7: Quarterly Change in CPI (LHS) and the Unemployment Rate (RHS)



Source: ABS (2021)

1.5 Workforce characteristics in the Lower Hunter region

The Glendell mine is located in the Lower Hunter region in NSW. This region is heavily reliant on the mining sector. Table F.2 outlines the education and employment characteristics of workers within this region, compared with New South Wales and Australia. The average worker in the Lower Hunter area earns around $1,217 per week, relative to $960 for New South Wales and $942 for Australia.

[21] Treasury Working Paper, 2021, Estimating the NAIRU in Australia

A high proportion of workers in the region are in occupations that are typically found within both the mining sector and in those industries that supply that sector. According to statistics issued by the Australian Bureau of Statistics in 2016, technicians and trades workers and machinery operators and drivers make up around 35.4 per cent of the Lower Hunter region's labour force, compared to 19.3 per cent for New South Wales and 20.3 per cent for Australia.

Around 18.4 per cent of workers in the in the Hunter Valley region work within the coal mining industry, relative to 0.3 per cent in New South Wales and 0.2 per cent in Australia. Much like the occupational data, workers in the Lower Hunter region tend to work in the mining industry, or in industries which provide services to the mining sector.

These occupational outcomes are also reflected in the educational outcomes within the Lower Hunter region, where around 57.8 per cent of respondents have at least achieved an advanced diploma or certification level of education or above.

Table F.2: Education and employment characteristics for the Lower Hunter^ region, New South Wales, and Australia

	Lower Hunter	New South Wales	Australia
Weekly Salary ($)	1,217.43	960.30	942.45
Educational Attainment	%	%	%
Bachelor's degree or Above	15.9	20.9	19.8
Advanced Dip. & Cert.	41.9	22.1	23.0
Year 12 or Below	42.3	56.9	57.2
Occupation	%	%	%
Managers	9.3	13.7	13.2
Professionals	13.1	23.4	22.1
Technicians and Trades Workers	19.4	12.9	13.7
Community and Personal Service Workers	11.3	10.0	10.7
Clerical and Administrative Workers	8.4	13.9	13.5
Sales Workers	8.8	9.2	9.3
Machinery Operators and Drivers	16.0	6.4	6.5
Laborers	12.2	8.8	9.4
Industry of Employment, top responses	%	%	%
Coal Mining	18.4	0.3	0.2
School Education	6.1	2.6	2.8
Cafes, Restaurants and Takeaway Food Services	4.8	2.1	2.2
Accommodation	3.5	0.5	0.5
Supermarket and Grocery Stores	2.8	1.2	1.3

Source: Australian Bureau of Statistics (2016), ^Defined as the Lower Hunter Statistical Area 3

The coal mining industry is important for both NSW, and the Lower Hunter region, and represents a significant source of direct and indirect jobs in the region. The coal industry also forms the State's largest export commodity, which contrasts with the criticisms levied against measuring worker, and indeed supplier benefits associated with the Project. Further, over the coming decades, as shown in Figure F.1 above, coal mining output is expected to decline. In their Strategic Statement on Coal Exploration and Mining in NSW[22], the NSW government sets out how the NSW Government will take a balanced approach to scaling back the State's dependence on coal exports, whilst continuing to meet a global demand that is forecast to plateau.

[22] NSW Government (2021) Strategic Statement On Coal Exploration and Mining in NSW

The ways in which the NSW Government could work to support coal-reliant communities in the future is through both encouraging diversification away from coal mining, whilst considering reasonable operating extensions to currently operating coal mines, to make such a transition as smooth as possible for the community. The Project is consistent with this approach.

Overall, this evidence indicates a high dependence on coal mining in the region, both from a supplier and worker standpoint. The negative outlook for coal demand, coupled with the expectation that the mine is planned to operate for an additional 24 years and will provide around 411 employees (on average over the life of the Project), and stable demand for goods and services in the region provide strong evidence to account for the benefits that accrue to both workers and suppliers in the CBA.

1.6 Sensitivity Analysis

In addition to the arguments put forward in this Appendix, we extend the sensitivity analysis presented in the Report to include a full range in both worker and supplier benefits. These results are presented in Table F.3, below.

Table F.3: Worker benefits scenario analysis

Planned Project	Worker Benefits			Supplier Benefits		
Scenario	25% Worker Benefits	50% Worker Benefits	75% Worker Benefits	25% Supplier Benefits	50% Supplier Benefits	75% Supplier Benefits
Direct Benefits	$369.4	$369.4	$369.4	$369.4	$369.4	$369.4
1. Net producer surplus	$0	$0	$0	$0	$0	$0
2. Royalties, payroll tax and Council rates	$319.5	$319.5	$319.5	$319.5	$319.5	$319.5
3. Company income tax apportioned	$49.9	$49.9	$49.9	$49.9	$49.9	$49.9
Indirect Benefits	$401.0	$518.0	$635.0	$537.23	$608.81	$680.40
1. Net economic benefit to existing landholders	$0	$0	$0	$0	$0	$0
2. Net economic benefit to Local workers	$117.0	$234.0	$351.0	$468.0	$468.0	$468.0
3. Net economic benefit to Local suppliers	$286.3	$286.3	$286.3	$71.6	$143.2	$214.7
Indirect (Environmental costs)	$2.4	$2.4	$2.4	$2.4	$2.4	$2.4
Potential Net Benefits	$770.34	$887.34	$1,004.35	$906.61	$978.19	$1,049.77

*Source: EY estimates based on information from various sources. * Estimated as the benefits of the Planned Project case less the Baseline case. ** NPV in 2019 dollars based on a 7 percent real discount rate.*

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