COMMERCIAL IN CONFIDENCE

FINAL REPORT

Review of Economic Analysis supporting the Revised Bylong Coal Project

Prepared for
NSW Department of Planning and Environment

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Summary

About the project

The Bylong Coal project (the Project) is a proposed greenfield mine located around 55 kilometres north east of Mudgee. The Project plans to construct and operate an open cut and underground mine over 25 years, comprising 2 years of construction and 23 years of operation. Rehabilitation and decommissioning will take place during and after the Project.

Following concerns raised by the Planning Assessment Commission (now the Independent Planning Commission) review report and the Heritage Council regarding impacts on the Tarwyn Park property, the NSW Department of Planning and Environment has requested information on the effects of reducing the extent of the open cut mine plan to remain outside of the Tarwyn Park property (the revised project). The change to the revised mining plan relates solely to the south-eastern extent of the proposed Western Open Cut, which would not be mined, while the main component of the project remains the underground longwall operation. The revised Project is expected to result in a reduction in production in early years of the mine and will reduce the Run of Mine (ROM) production by around 4.6 million tonnes (2.5 million tonnes of product coal) from the original Project. The original Project has a total ROM of 124 Mt and product coal production of 90 Mt.

Hansen Bailey Environmental Consultants commissioned Gillespie Economics to undertake a brief Economic Impact Assessment (EIA) of the revised Project on behalf of the Proponent of the Project, KEPCO Bylong Australia Pty Ltd. This consists of an updated Cost Benefit Analysis (CBA), updated Input Output analysis and Computable General Equilibrium (CGE) analysis of the original and revised Project.

The CIE's 2015 and 2016 reviews

In December 2015 the CIE completed a review of the CBA conducted by Gillespie Economics in relation to the Project. The CIE concluded that the analysis was undertaken in a manner that was consistent with the NSW Government's November 2012 *Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals*.

In September 2016 the CIE completed a review of additional material provided by the Proponent, including a response to the CIE's 2015 review and response to submissions by Government Agencies and other stakeholders. This review was based on the NSW Government's December 2015 *Guidelines for the economic assessment of mining and coal seam gas proposals* and Draft Technical notes. The new information assessed in 2016 did not materially impact the conclusions drawn in the CIE's 2015 review.

This review

This review considers new material provided by the Proponent relating to the revised Project. We also consider a submission to the IPC from the Institute for Energy Economics and Financial Analysis (IEEFA), and the Proponent's response. The focus of this review is to evaluate the extent to which the new material has a bearing on the findings of the earlier CBA and whether the conclusions of the 2015 and 2016 CIE reviews remain valid.

In reviewing the response, we consider whether it is consistent to the NSW Government's December 2015 *Guidelines for the economic assessment of mining and coal seam gas proposals*[1] and April 2018 *Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*.[2]

The key finding are summarised below:

- **The updated material does not materially impact the conclusions of the CIE's 2015 and 2016 reviews**
- **The revised Project delivers slightly lower benefits than the original Project, however the differences in net social benefit between the two are small and consistent with the reduction in production of coal**
- **The CBA and Input-Output analysis of the revised Project uses the same methodology and parameters considered in the CIE's 2015 and 2016 review of the economic impact analysis**
- **A CGE model has been used to estimate the regional impacts of the original Project and the revised Project – this is not immediately comparable to the input output results as CGE results are expressed in present value and input output impacts are reported as annual averages**
- **While there are significant uncertainties regarding future prices, the implied coal price of A$90- A$100 per tonne for export thermal coal prices used in the CBA is reasonable. Sensitivity testing shows that the net social benefit remains positive with lower prices.**
- **Assuming no debt financing of the project will overstate the amount of company tax paid by the project, and the social benefits of the project. This is not expected to have a material impact on the economic assessment because the analysis apportions 7 per cent of company tax benefits to NSW, which is conservative.**

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

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

Economic Impact Assessment for Revised Mine Plan (the revised Project)

The EIA has been updated to show the impact of the revised Project alongside the original Project. The main impact of the revised Project is a reduction in production of coal of approximately 2.5 million tonnes in the early years of mining. This change leaves capital costs unchanged, but reduces operating costs and revenues associated with mining. This corresponds to lower royalties and company tax to NSW.

Cost benefit analysis

Table 1 provides a summary of the estimated benefits for both the original Project and the revised Project. The Project costs and benefits are identical to those reported in 2015, implying that the methodology and parameters (e.g. coal price) used in the new analysis are unchanged. The main difference between the two projects is the net production benefit to the state government, which is lower in the revised Project due to lower coal volumes.

1 Costs and benefits for NSW – Gillespie estimates (present value, 7% discount rate)

	Original project	Revised project	Difference
	$m	$m	$m
Net production benefits to KEPCO	0	0	0
Net production benefits to the Commonwealth Government [a]	21 (102)	21 (99)	0 (-3)
Net production benefits to the NSW Government	290	278	-12
Voluntary contributions	4	4	0
Total benefits	**315 (396)**	**302 (381)**	**-13 (-15)**
Greenhouse gas emissions	0	0	Reduced
Historic heritage	1	1	Reduced
Total costs	**1**	**1**	**Reduced**
Net benefits NSW (excluding non-market benefits of employment)	**314 (395)**	**301 (380)**	**-31 (-15)**

[a] Net production benefits to the Commonwealth government in brackets is calculated consistent with NSW Guidelines for the economic assessment of mining and coal seam gas proposals. The estimate outside of the brackets is consistent with the approach used in the proponent's 2015 submission.

Source: Gillespie Economics (2018), *Revision to Project Mine Plan Economic Impact Assessment*, p.11.

The net production benefits to the Commonwealth Government has been estimated in two ways. The value outside of the bracket is consistent with the methodology used by

Gillespie Economics in 2015 and assumes a corporate tax rate of 28.5 per cent with 7 per cent accruing to NSW.[3] The value in brackets is consistent with the 2015 Guidelines and based on a corporate tax rate of 30 per cent with 32 per cent accruing to NSW.[4] When using the approach in the guidelines, this benefit component is significantly higher.

In addition to the lower benefits under the revised Project, social costs are expected to also be reduced due to lower volumes of coal being mined and transported and the smaller footprint of the mine. Similarly, unquantified benefits, such as Aboriginal heritage costs, are likely to be reduced. These changes result in a small (or no) reported change in residual cost after mitigation. Insofar as the quantified costs are small for the original Project and the costs of mitigation are internalised by the Proponent, the change in costs is not likely to impact on the viability of the project.

The reduced scope of the mine seems likely to reduce social costs by some amount; however, these costs are not likely to have a material effect on the conclusions of the assessment as:

- unmitigated costs are small for the original Project, so that impact reductions associated with the revised Project are immaterial
- the costs of mitigation are internalised by the Proponent (the revised Project could reduce the costs of mitigation, however, this does not appear to have entered the CBA).

Regional and State economic impacts – input output analysis

The input output analysis in the updated information appears to be the same as that evaluated in the 2015 CIE review. The revised project has the same construction costs as the original project, however has slightly lower operation costs due to the reduced production from the open cut mine. The regional and NSW economic impacts for the revised project are between 3 and 4 per cent lower than the original Project, which is broadly consistent with the fall in benefits from the CBA (around 4 per cent lower) and the reduction in the volume of production of coal (around 3 per cent lower based on 90 Mt production coal for the Project and a 2.5 Mt reduction for the revised project). This change is not material.

There are several issues with the input-output method to measure regional effects and this should be considered an upper bound.[5]

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[3] Gillespie Economics (2018), Revision to Project Mine Plan Economic Impact Assessment, p. 6.

[4] In the guidelines company tax is attributed to NSW based on the population share of Australia in NSW.

[5] See CIE's 2015 review, p. 28-30 for a summary of these issues.

Regional and State economic impacts – computable general equilibrium analysis

At the suggestion of the IPC, a CGE analysis of the project was commissioned in 2017. This analysis has been updated to also consider the revised Project.

The analysis was conducted by Cadence Economics using their Cadence Economics General Equilibrium Model (CEGEM). It presents results in real gross regional / state product (GRP / GSP), real gross regional / state income (GRI / GSI) and employment FTE for the Mid-Western Regional Council LGA and NSW. The model captures direct and indirect increases in demand, labour market displacement and revenue leakage. The model is estimated under three labour elasticity scenarios: inelastic with (zero labour supply elasticity), medium (0.15 labour supply elasticity) and high (0.3 labour supply elasticity). It is not clear at what regional level the supply elasticity applied (i.e. LGA, state or whole of Australia).

Using the medium labour supply elasticity assumption, the original Project is expected to increase GRP for the LGA by $4.9 billion in present value terms over the life of the project, compared to $4.7 billion for the revised Project. GRI for the LGA is expected be $5.3 billion higher due to the project in present value terms and $4.9 billion higher due to the revised Project.[6] FTE is expected to increase by 272 and 260 for the original Project and revised Project respectively. At the state level, these impacts are larger. The smaller impacts for the revised Project are consistent with the reduced scope compared to the original Project. The impacts of the revised project are between 4 and 8 per cent lower than those of the original Project.

The higher labour supply elasticity results in higher benefits, as instead of drawing labour from other parts of the economy the project increases total employment.

We are not able to compare the CGE model results directly to the input output results as the CGE impacts are reported in present value terms, while input output impacts are reported as an annual average. There is limited information provided around the estimation of the CGE model, such as how the project enters the model. Also, GRI impacts are larger than GRP impacts – we would expect this to be reversed as increased coal production overtime increases GRP, while GRI would be lower due to profits from coal mining flow offshore to the overseas owners. In subsequent consultation, Cadence Economics indicated that the higher GRI in the model is driven the low labour supply elasticity (across all scenarios, as even the high scenario of 0.3 is relatively low) which drives wages higher due to the increased labour demand caused by the Project. This would imply that higher wages more than offset the net overseas income transfers arising from the project. Further information about the CGE modelling would be required to further explore this.

The CGE modelling provides an alternative estimate of the regional impacts of the project and does not change the conclusions of the assessment.

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6 Gillespie Economics (2018), Revision to Project Mine Plan Economic Impact Assessment, p. 16.

Other issues

Two issues have been raised by IEEFA: the amount of debt funding and the coal price. These assumptions affect royalties paid (coal prices) and the amount of company tax paid (coal prices and debt funding).[7] In this section we consider these issues.

Coal forecast prices

Gillespie Economics state they source coal price estimates in USD from Wood McKenzie (2014) but do not provide these estimates. The USD/AUD exchange rate is assumed to be 0.84, which would likely understate price in Australian dollars given the current USD/AUD exchange rate is around 0.72. The 2015 CIE review found an implied coal price of between A$90 to A$100 per tonne for thermal coal based on royalties estimates.[8]

The implied coal price used has attracted some attention, with the IEEFA arguing the coal prices used in the CBA are not reliable and are likely to overstate royalties collected by NSW.[9] IEEFA highlights that Office of the Chief Economist forecasts falling prices:

> the Newcastle benchmark spot price is forecast to decline from an average of US$105 a tonne in 2018 to US$75 [US$73 real 2018] a tonne in 2020, as demand growth slows.[10]

This corresponds to a to A$97 per tonne (real, spot) using an exchange rate of 0.75, which is broadly within the range of the coal prices used by the Proponent.

An alternative benchmark price prepared by Wood Mackenzie forecasts thermal coal spot FOB Newcastle to fall in the short term before stabilising at between A$80 and A$107 per tonne out to 2035, with the precise price dependent on quality.[11] The upper range of prices is above the implied range used by the proponent, while the bottom of this forecast range is below the implied range used by the proponent. However, both these

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[7] NSW Department of Planning and Environment (2018), Bylong Coal Project State Significant Development – Final Assessment Report (SSD6367), October, p. 17.

[8] CIE (2015), Peer review of economic assessment Bylong Coal Project, December, p. 14

[9] Institute for Energy Economics and Financial Analysis (2018), Bylong Coal Project Reply to KEPCO Bylong Australia's Response to IEEFA, November, p. 6.

[10] Department of Industry, Innovation and Science (2018), Resources and Energy Quarterly, September, p. 39

[11] Wood Mackenzie (2018), Export Report for the NSW Land and Environment Court Proceedings No. 2017/383565, p. 40.

prices are within the +/- 30 per cent sensitivity test implemented by the Proponent, which show the net social benefits remain substantial across price scenarios.[12] [13]

Debt funding of the project

IEEFA argues that the potential debt funding, together with equity funding, may be used to reduce the company tax benefits to NSW from the project.[14] Corporate tax is paid on company profits and interest paid on debt can be used to reduce taxable income.

Gillespie Economics argues that

> the method of financing mining projects is highly uncertain and determined by complex financial, legal matters. Consequently, profit and loss calculations used in discounted tax flow analysis to estimate company tax payments of projects generally default to 100% equity funding.[15]

Gillespie goes on to acknowledge that in practice the debt component of the project may be between 0 and 60 per cent. IEEFA indicates that there is very little chance the Project would be funded without any debt.[16] This conclusion seems plausible, given the incentives for the use of debt financing to reduce corporate tax obligations. Assuming 100 per cent equity funding will overstate the benefit of the project, noting the *Guidelines for the economic assessment of mining and coal seam gas proposals* do not provide specific guidance on how to estimate company tax or provide guidance as to the level of debt funding to assume in an evaluation.

This, however, is not expected to have a material impact on the economic analysis because of the approach used to apportion Commonwealth tax receipts to NSW. The Proponent apportions only 7 per cent of company tax revenues whereas the Guidelines recommend using the share of Australian population in NSW (32 per cent); the Proponent's estimate is around one fifth of the benefit estimate using the Guidelines. Given company tax benefits are already understated

Also, Gillespie Economics indicates

> Even if KEPCO chose to use the maximum allowable debt financing, this would only reduce the estimated company tax benefits by approximately one third.[17]

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[12] NSW Department of Planning and Environment (2018), Bylong Coal Project State Significant Development – Final Assessment Report (SSD6367), October, p. 18.

[13] The same sensitivity test is not conducted for the revised Project, however, the outcome is likely to be the same as for the Project, given the net social benefits for the two projects are very close.

[14] NSW Department of Planning and Environment (2018), Bylong Coal Project State Significant Development – Final Assessment Report (SSD6367), October, p. 17.

[15] Gillespie Economics (2018), Response to the Institute for Energy Economics and Financial Analysis' Submission, July, p. 18.

[16] Institute for Energy Economics and Financial Analysis (2018), Bylong Coal Project Reply to KEPCO Bylong Australia's Response to IEEFA, November, p. 9.

[17] Gillespie Economics (2018), Response to the Institute for Energy Economics and Financial Analysis' Submission, July, p. 19.

A one third reduction in the net production benefits to the Commonwealth government would not be material to the conclusions, given this benefit is around $21 million.

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