Institute for Energy Economics and Financial Analysis
ieefa.org

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

1 May 2024

To: The EIS Coordinator (Baralaba South Project), The Chief Executive, Queensland Department of Environment, Science and Innovation
RE: Baralaba South Project – Environmental Impact Statement

Thank you for the opportunity for the Institute for Energy Economics and Financial Analysis (IEEFA) to provide input to the Environmental Impact Statement (EIS) for the proposed Baralaba South Project. IEEFA is an independent energy finance think tank that examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.

This submission examines the economic rationale for the proposed Baralaba South project under Mining Lease Application (MLA) 700057 and reviews the cost benefit analysis (CBA) submitted in the Baralaba South EIS. The submission finds critical failures in the stated project rationale and significant problems with the assumptions made in the CBA submitted in the EIS. These are summarised below and detailed in this document.

Kind regards,

Anne-Louise Knight, Lead Analyst – Australian Coal, IEEFA

Institute for Energy Economics and Financial Analysis
ieefa.org

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Summary

1. **The EIS provides no economic rationale or use case for the pulverised coal injection (PCI) coal proposed to be mined by the project.**
2. The EIS provides no details on the outlook for PCI coal demand. **PCI coal will be the first grade of metallurgical coal impacted by the decarbonisation of steel.**
3. **The EIS incorrectly asserts that there is no feasible alternative for metallurgical coal in steel production** when the accelerating steel technology transition shows otherwise.
4. **The proponent uses out-of-date data to support the claim that international trade in metallurgical coal is growing.** Australian government forecasts show Australian metallurgical coal exports are forecast to decline out to the end of the decade – the proposed operational start year of 2030 means the project would begin production during a period of structural decline in demand for metallurgical coal exports.
5. Globally, seaborne thermal coal demand is declining further and faster than metallurgical coal demand. Meaning there is unlikely to be any demand for the PCI coal produced by Baralaba South in thermal coal markets either.
6. **The critical failures in the CBA submitted in the EIS include:**
    - It likely underestimates operating expenditure.
    - It uses unrealistic PCI coal price assumptions to estimate operating revenue.
7. **The proponent uses out-of-date price forecasts for PCI coal.** Based on the declining market outlook for PCI coal, and the proponent's estimated operational start date of 2030, the PCI coal prices (USD per tonne of product coal) used in the CBA are unlikely to be achieved consistently, if at all, throughout the life of the project.
8. The EIS ignores the decline in profitability and increasing unit costs experienced across the metallurgical coal industry in Queensland.
    - On average the EBITDA margins across Queensland metallurgical coal producers fell by 40% between 2022 and 2023.
    - In their December 2023 financial results, Queensland metallurgical coal mining companies reported a 48% increase in unit costs on average, between 2021 and 2023.
9. Adjusting the minimum unit cost assumptions stated in the EIS by the price rises experienced across the metallurgical coal industry would generate a negative net present value (NPV) of **-AUD249.6 million** for the project, all else being equal (Scenario 6). If historical average PCI coal prices are substituted into the model as well, the project would generate a NPV of **-AUD1.98 billion** with a benefit-cost ratio of **0.43** (Scenario 25).
10. **Given these findings, the federal and state tax revenues proposed to be generated by the project would not be achievable.**

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Overview of project claims

This submission examines the economic rationale for the proposed Baralaba South Project and reviews the cost benefit analysis (CBA) submitted in the EIS for the Baralaba South Project under Mining Lease Application (MLA) 700057.

According to the EIS submitted, The Baralaba South Project (the project) is stated to produce approximately **36 million tonnes (Mt) of pulverised coal injection (PCI) coal** for international export to the steel production industry between 2030-2053.[1]

- The project is expected to produce up to **2.5Mt** of run-of-mine (ROM) coal per annum between 2030-2053.
- Approximately **49 Mt of ROM coal** is expected to be mined, producing approximately **36 Mt of product coal** over the 23-year life of the Project[2].
- The project will access available capacity within existing port infrastructure at the Port of Gladstone.[3]

Timeline

Construction is proposed to commence in FY2029 with operations to commence in FY2030. The life of the project is expected to be up to 23 years, including construction, operation, decommissioning and rehabilitation. Baralaba Coal states that "it is anticipated that external factors may influence production schedules, resulting in an extended mine life."[4]

Baralaba Coal also states: "It is expected that an additional three-year rehabilitation period will follow the cessation of production, with ongoing monitoring and maintenance for a period of five to ten years thereafter, subject to the performance of completed rehabilitation."[5]

All figures stated in this submission are in Australian dollars unless otherwise specified.

[1] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 7
[2] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 1.
[3] Ibid. Page 32.
[4] Ibid. Page 2.
[5] Ibid. Page 3.

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Warwick, QLD 4370
aus_staff@ieefa.org

1. Assessment of stated economic rationale for the project

i. The EIS provides no economic rationale or use case for the PCI coal proposed to be mined by the project

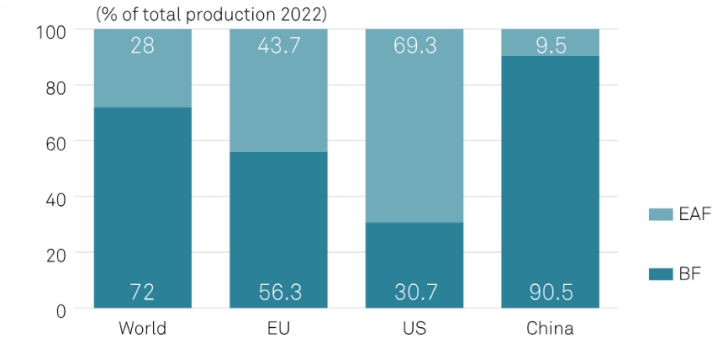
The project rationale submitted in the Baralaba South Project EIS does not provide any economic basis to support the proposed production of 36 Mt of PCI coal outlined in the EIS. The project rationale discusses metallurgical demand in broad terms and describes the major export markets for Australian metallurgical coal. **The project rationale section makes no mention of where Baralaba Coal Company proposes to sell the PCI coal produced by the project, nor is this mentioned anywhere else in the project EIS.**

ii. The EIS incorrectly asserts that there is no feasible alternative for metallurgical coal in steel production even though the accelerating steel technology transition shows otherwise

> "International steel manufacturers rely on high quality metallurgical coal for the steel fabrication process."[6]

The steel technology transition away from coal is accelerating and such transitions have an established history of happening faster than expected. The accelerating transition means coal can no longer be considered essential for steelmaking. Steel is already made without coal, with 28% of global steel production made using electric arc furnaces (EAFs) in 2022 (see Figure 1).[7]

Figure 1. Steel production by process



Source: World Steel, published by S&P Global, April 2024. Note. EAF – Electric Arc Furnace, BF – Blast Furnace

[6] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.
[7] S&P Global. INTERVIEW: Tata Steel Europe's path to decarbonization. 2 April 2024.

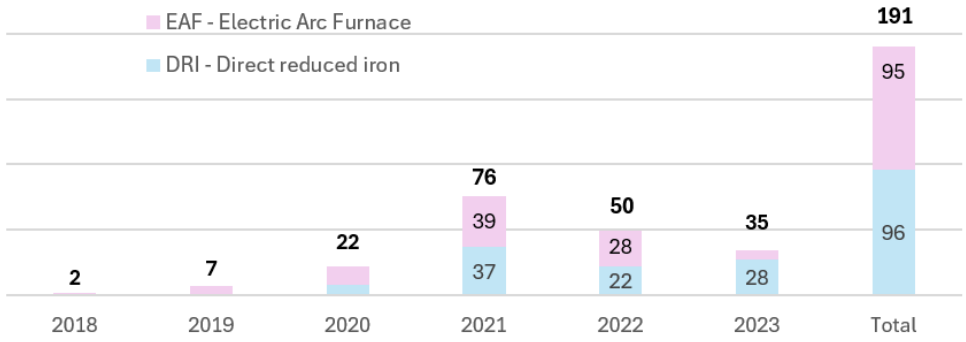
91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

> "Metallurgical coal is used in the production of 71% of the world's steel (World Coal Association, 2020) for which **there is no feasible alternative.** It is expected that international demand for metallurgical coal will grow to 323 Mt in 2024 (Resources and Energy Quarterly, 2022)." [8]

IEEFA's analysis on PCI coal has found that, "the replacement of pulverised coal injection (PCI) coal with hydrogen in blast furnaces looks like being an early decarbonising application. Lower-cost PCI coal is injected into blast furnaces to reduce coking coal consumption. Essentially high-quality thermal coal, PCI coal can be sold into either the metallurgical or thermal coal markets."[9]

In addition to the uptake of EAFs by steel producers globally, the pipeline of direct reduced iron (DRI) plants **– which do not use coal** – have also been increasing. According to Agora Industry's analysis, the 2030 project pipeline of DRI plants has already reached 96Mt as of October 2023.[10]

Figure 2. Low-carbon steel capacity announcements as of Oct 2023, Mtpa



Source: Agora Industry, October 2023.
Note: The 2030 project pipeline of DRI plants includes H_2-ready DRI plants that may operate with natural gas initially. To date, the 3D project in Dunkirk is the only demonstration-scale CCS project on the BF-BOF route announced and aims to capture 1 $MtCO_2$ per year. For more information, see Agora Industry and Wuppertal Institute (2023).

iii. The EIS provides no details on the outlook for PCI coal demand. PCI coal will be the first grade of metallurgical coal impacted by decarbonisation of steel production

Wood Mackenzie has stated that the replacement of PCI coal use in steel production by other lower-carbon injectant options is a growing risk.[11] Wood Mackenzie has previously found that PCI coal will come under particularly high pressure, **with demand falling 50%** under a 2ºC scenario.

[8] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.
[9] IEEFA. The First Metallurgical Coal Grade To Be Impacted by Decarbonisation. 10 May 2022. Page 1.
[10] Agora Industry. Global steel transformation tracker.
[11] Wood Mackenzie. Pulverised Coal Injection: the good, the bad, the ugly. 20 May 2021.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

This is based on a high adoption of unproven carbon capture and storage (CCS) technologies, and PCI coal demand would drop even further if such an uptake of CCS technology does not occur.[12]

The Baralaba South Project EIS states that production is not expected until 2030 at the earliest. Therefore, the project would come online in a period of structural decline for its product.

Major steelmakers globally are committing to reach net zero emissions by 2050. As stated in previous analysis from IEEFA, **"PCI coal will be the first grade of metallurgical coal impacted by the decarbonisation of steel production."**[13]

German conglomerate **Thyssenkrupp** was the first company globally to test **industrial-scale PCI coal replacement** with hydrogen injection in 2019. After successful completion of the initial trial it launched phase 2, the H2Stahl project, in 2022 to expand the use of hydrogen to the entire blast furnace. Following this, phase 3 will see this extended across to three furnaces.[14] By 2050, Thyssenkrupp state that its "complete steel production is to be climate-neutral and based on direct reduction with hydrogen."[15]

Nippon Steel, Japan's largest steelmaker, plans to deploy hydrogen-based processing at its Kimitsu Steel works starting in 2026.[16] This is the highest reduction in CO_2 emissions achieved through hydrogen injection so far in the world with a 33% reduction in emissions.[17]

Tata Steel has been progressing on replacing significant amounts of coke with hydrogen in its blast furnaces. On 23 April, it announced that it successfully injected a small quantity of hydrogen into one of its blast furnaces (6kg per tonne of hot metal, for four days). Globally, only two such attempts have been reported before.[18] However, the company, which aims to become net zero by 2045, said: "This is the first time in the world that such a large quantity of hydrogen gas is being continuously injected in a blast furnace."[19]

Australia's largest steelmaker **BlueScope** plans to replace PCI coal with coke oven gas, which contains 60% hydrogen, subsequently adding green hydrogen. The company is also working with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) to use biochar as a replacement for PCI coal in blast furnace steel production. Biochar technology uses biomass, such as timber waste, as a substitute for PCI coal.[20] Additionally, BlueScope has

[12] IEEFA. Carbon capture for steel? 17 April 2024.
[13] IEEFA. PCI coal for steelmaking soon to be impact by decarbonisation. 10 May 2022.
[14] Thyssenkrupp. Climate-neutral future of steel production: Real-world laboratory of the energy transition H2Stahl project to start at Duisburg site of thyssenkrupp Steel. 15 March 2022.
[15] Thyssenkrupp. Sustainable steel: review of phase 1 of the injection trials.
[16] Hydrogeninsight. Japan's largest steelmaker claims hydrogen injection has cut its test blast furnace emissions by a third. 13 February 2024.
[17] Nippon Steel. Verified the world's highest level of CO2 emissions reduction at 33% by heated hydrogen injection in the super corse50 test furnace. 6 February 2024
[18] Business Line, War on carbon. Why this Tata steel experiment made the world take notice, April 2023
[19] Reuters. India's Tata Steel begins hydrogen gas injection trial in blast furnace. 24 April 2023
[20] Wood Central. BlueScope is looking to biochar tech to 'future-proof' steel. 28 May 2023

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

partnered with **Rio Tinto** and **BHP** to develop a DRI pilot facility in Australia, which they state could be commissioned by 2027.[21]

Rio Tinto has also highlighted that global steel production will see the replacement of PCI with hydrogen and the oxygen enrichment of the blast air to enable gas recycling.[22] The company has been exploring the use of biomass to replace both PCI and coking coal in the steelmaking process.[23]

BHP has stated that: "In a decarbonising world, EAFs with reliable scrap supply running on renewable power should be very competitive."[24] The company also highlighted the 'challenged future' that PCI coal faces from replacement by 'low-carbon fuels' and has noted that the first widespread use for hydrogen in steelmaking is likely to be in the replacement of PCI coal in blast furnaces.[25] Holding on to its hard coking coal assets, BHP has started divesting mines that produce lower-quality metallurgical coal and PCI coal.

BHP and Mitsubishi announced the sale of the Blackwater mine, producing lower-quality coking as well as thermal coal, and the Daunia mine, producing lower-quality coking coal and PCI coal, to Whitehaven Coal in October 2023.[26] This follows BHP's earlier sale of its 80% holding in the BHP Mitsui Coal joint venture – which produces PCI coal along with lower-quality coking coal – to Stanmore Resources in November 2021.

iv. The EIS relies on outdated information on global demand for metallurgical coal, which is set to decline

> "The Project will utilise existing coal transport infrastructure and port facilities to **capitalise on increases in global demand for metallurgical coal."**[27]
>
> "In 2019-2020 Australia was the world's largest exporter of metallurgical coal (Resources and Energy Quarterly, 2022). Japan and India are now Australia's largest markets for metallurgical coal, accounting for over 50% of product, with China, South Korea and Taiwan also being significant long-term importers (Geoscience, 2022)."[28]

[21] ABC News. BlueScope, Rio Tinto and BHP join forces on plan for low carbon steel future. 9 February 2024
[22] Rio Tinto. Climate Change Report 2022. February 2023. Page 23.
[23] Rio Tinto. Rio Tinto targets low-carbon steel production with new technology. 15 October 2021.
[24] BHP. BHP's economic and commodity outlook financial year 2023. 22 August 2023.
[25] BHP. BHP Climate Change Report 2020. 2020.
[26] IEEFA. Funding for Whitehaven's latest acquisition reveals shallow pool for Australian coal mining. 26 October 2023.
[27] Ibid. Page 6.
[28] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

The EIS relies on outdated information to support its claim that international trade in metallurgical coal is growing. The proponent claims that: "It is expected that international demand for metallurgical coal will grow to 323 Mt in 2024 (Resources and Energy Quarterly, 2022)."[29]

The latest *Resources and Energy Quarterly* (March 2024) from the Department of Industry, Science, Energy and Resources shows that global trade in metallurgical coal is in decline.[30]

IEEFA's analysis has highlighted that, "Although its prospects are not yet as bad as those of thermal coal, the reality is that the outlook for metallurgical coal is increasingly challenged by multiple threats."[31]

The REQ report highlights that globally, metallurgical coal exports are expected to decline. From 349Mt traded in 2023, trade will drop to 333Mt by 2029.[32] Australia is the world's largest metallurgical coal exporter by far, but Australian exports are forecast to peak in two years' time and then decline out to the end of the decade.

The REQ claims that metallurgical coal's "fundamentals remain favourable". However, it adds that "there are risks to navigate", and that: "Higher electric arc furnace (EAF) and green steel production may harm the demand for metallurgical coal from steel mills using blast furnaces. […] Prices represent another risk – they are currently on an easing path which could leave them below the level required to incentivise increased output."[33]

Additionally, under the International Energy Agency (IEA)'s Net Zero Emissions by 2050 Scenario (NZE), global metallurgical coal production declines 25% by 2030, and 90% by 2050. World coal trade declines 45% by 2030 and 89% by 2050.[34]

v. Background information provided on high-quality coking coal demand is not relevant to the project rationale, given that the proposal is to mine PCI coal

> "The Queensland metallurgical coal industry is a long-standing supplier of high-quality coking coal for the global steel manufacturing industry".[35]
>
> "The Project aims to establish an open cut metallurgical coal mine in the Bowen Basin in central Queensland for the supply of metallurgical coal to international coal markets."[36]

[29] Ibid. Pages 2-6.
[30] Department of Industry, Science, Energy and Resources. Resources and Energy Quarterly March 2024. March 2024. page 51.
[31] IEEFA. Don't believe the spin: Coal is no longer essential to produce steel. 28 March 2024
[32] Department of Industry, Science, Energy and Resources. Resources and Energy Quarterly March 2024. March 2024. page 51
[33] Department of Industry, Science, Energy and Resources. Resources and Energy Quarterly March 2024. March 2024. page 53
[34] IEA. World Energy Outlook 2023. October 2023
[35] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.
[36] Ibid. Page 6.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

> "Australian metallurgical coal holds a very strong position in the traditionally important markets of India, China, Japan, Korea and Taiwan, attributed to its higher quality (particularly for coal from the Bowen Basin which is generally considered one of the best metallurgical coals in the world), proximity to key Asian markets, and Australia's geopolitical stability (Geoscience, 2022)" [37]

The project rationale submitted in the EIS is based on global demand for metallurgical coal. The background information provided on high-quality coking coal demand does not provide rationale for this project, given that the coal product proposed to be mined is PCI coal. The Baralaba South project is expected to produce PCI coal for export and will not be producing high-quality coking coal.

PCI coal can be traded into either metallurgical or thermal coal markets.[38] This has not been mentioned in the project's EIS. If Baralaba Coal Company sells coal from this project into the thermal coal market, the demand and prices achieved for these sales will be substantially lower than those proposed in the EIS and in the CBA.

Global thermal coal demand has peaked and is declining further and faster than metallurgical coal demand.[39] This means it is very unlikely there will be any demand for coal produced by Baralaba South to be sold into thermal coal markets either.

2. Assessment of the CBA results submitted in the EIS

2.1 Operating revenue

The net present value (NPV) generated in the CBA submitted in the EIS is unrealistic due to assumptions about the achievable prices per tonne of PCI coal projected to be sold from the project and a likely underestimation of operating costs.

The CBA submitted in the EIS was produced by AEC Group Pty Ltd for the proposed Baralaba South project under Mining Lease Application (MLA) 700057. The AEC report estimated a NPV for the project of approximately AUD715.6 million, with a benefit cost ratio of 1:1.29, based on a discount rate of 7%.[40]

[37] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.
[38] Queensland Treasury. New Issues supplementary submission. 12 January 2024. Page 8.
[39] IEA. Coal 2023 - analysis and forecasts to 2026. December 2023. Page 62.
[40] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page vii.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

The prices used in the CBA are based on out-of-date data, and the long-term decline in demand for PCI coal has not been factored into pricing assumptions in the CBA, given the proposed timeline of the project.

The CBA does not adequately address the high vulnerability that the project faces from fluctuations and structural changes in PCI coal prices. The proponent also provides the average prices of coking coal in 2021 and 2022, a period that has been noted by major producers as producing "fly-up pricing across the metallurgical coal industry".[41] Inputting pricing assumptions from 2021 and 2022 is not appropriate for a project set to begin operations in 2030.

Additionally, PCI coal prices are usually between 30%-50% lower than average coking coal prices and the Australian Government forecasts metallurgical coal prices to fall to USD185 by 2029.[42]

Based on the declining market outlook for PCI coal, and the proponent's estimated operational start date of 2030, the PCI coal prices (USD per tonne product coal) used in the CBA are unlikely to be achieved consistently, if at all, throughout the life of the project. While falling demand doesn't necessarily equate to lower prices for all producers, it is a strong indication that the prices proposed in the EIS are unrealistic throughout the life of the project.

Section 3.2.2.2 Coal Prices

"The quarterly average price of coking coal fluctuated between USD256/t and USD244/t over the eight quarters since the third quarter of 2021 (Focus Economics, 2023). The price for low and ultra-low volatile PCI coal is expected to be around USD154.2/t and USD270/t averaging USD211.8/t by the end of 2023 (KPMG, 2023). The price of PCI coal is expected to be between USD131.0/t – USD213.0/t over the next five years, averaging USD156.5/t by 2027. While future global demand for metallurgical coal is forecast by the IEA to fall slightly to 2030 and 2050, the decline is expected to be relatively small due to the limited number of readily available alternatives to the steel industry (Queensland Treasury, 2022a).

"In discussions with the proponent, future coal prices for the Project have been assumed to average USD180/t, which falls within the range expected by the market. An average exchange rate of 0.07AUD/USD is assumed for the analysis."[43]

Additionally, the EIS states that an average exchange rate of 0.07 AUD/USD is assumed. For the purposes of its review of the CBA, IEEFA has assumed that this is a typo and that the exchange rate used in the AEC assumptions was 0.7 AUD/USD.

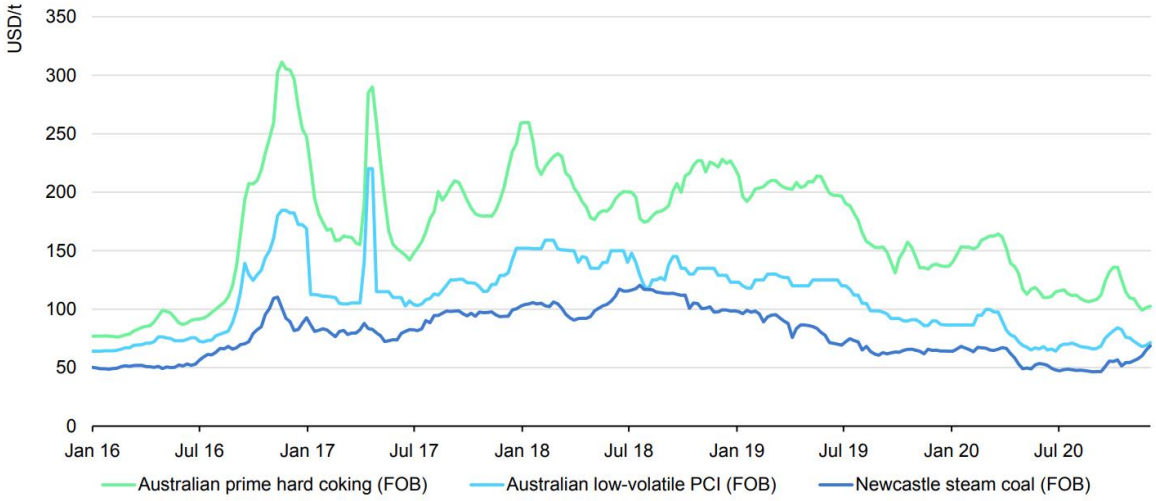
[41] BHP. BHP's economic and commodity outlook FY half year. 15 February 2022.
[42] Department of Industry, Science, Energy and Resources. Resources and Energy Quarterly March 2024. March 2024. Page 50.
[43] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 10.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Commodity prices are volatile and notoriously difficult to predict with any certainty, given the impact that unforeseen supply shocks or geopolitical tensions can have. Examining multiple pricing scenarios should be considered to test the validity of the claimed economic benefits proposed by the project. This is echoed in the EIS, which states that, "the project is most sensitive to the revenues delivered."[44]

If PCI coal sale prices returned to 2020 levels before the Baralaba South project begins operations the proponents could hope to achieve somewhere between USD64 per tonne to USD100 per tonne. This is significantly less than the average PCI coal price assumption of USD180 per tonne used in the CBA.

Figure 3: International Energy Agency – Market Prices for Different types of coal, 2016-2022



Note: FOB = free on board; PCI = pulverised coal injection.
Source: IHS Markit (2020), Coal Price Data and Indexes.

The sensitivity analysis submitted with the CBA results by AEC assert that there is a 90% probability that the total NPV of the project will be between AUD132.9 million and AUD1,228.0 million, adjusting for potential changes in the prices achieved for PCI coal.[45]

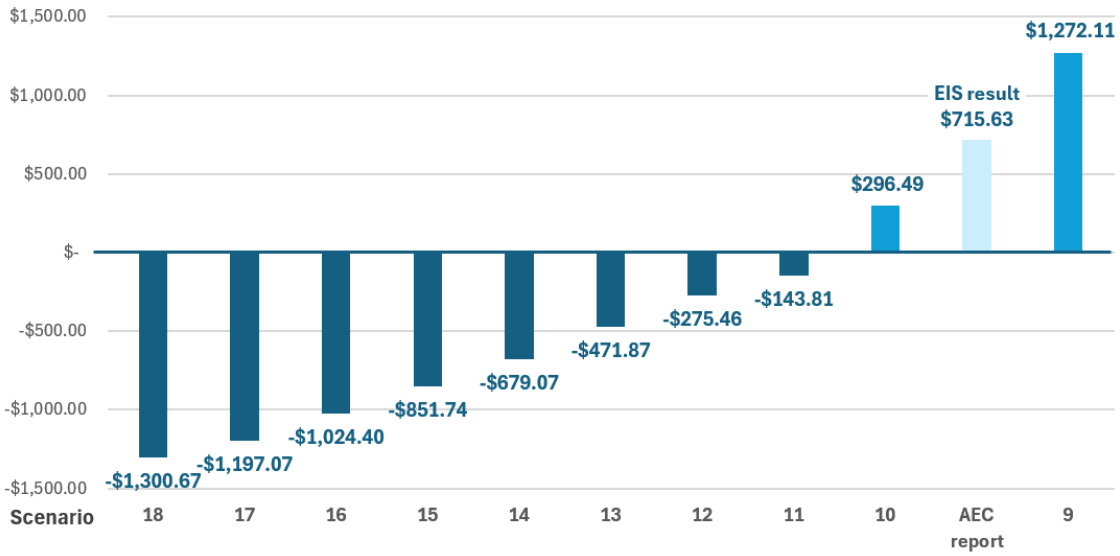
IEEFA has reviewed the estimated revenue from operations under different pricing scenarios and finds the project is highly vulnerable to lower PCI coal prices. IEEFA has examined how declining PCI coal prices could impact on the project's financial viability assuming all other inputs remain equal and found that a negative NPV is generated for the project in almost all scenarios, as shown on Figure 4. This is based on the low-end KPMG forecast submitted in the EIS as well as historical PCI coal prices achieved prior to the period of coal price spikes experienced through 2021 and 2022.

[44] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 45.
[45] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 46.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Figure 4. Estimated NPV[1] based on PCI coal price adjustments.

A$ million



Notes. 1- Net Present Values are displayed in 2023-24 prices using a discount rate of 7%
Sources: AEC Economic Impact Assessment, Appendix Y to Baralaba South EIS; IEEFA Analysis

Table 1. Description[1] of PCI coal price adjustments.

Scenario	PCI Coal price, AUD/t (0.7 AUD/USD exchange rate)	Unit cost, AUD/t	Overall NPV, AUD million	Benefit-Cost Ratio
9	304.29	180.00	1,272.11	1.50
10	223.57	180.00	296.49	1.12
11	187.14	180.00	-143.81	0.94
12	176.25	180.00	-275.46	0.89
13	160.00	180.00	-471.87	0.81
14	142.86	180.00	-679.07	0.73
15	128.57	180.00	-851.74	0.66
16	114.29	180.00	-1,024.40	0.59
17	100.00	180.00	-1,197.07	0.52
18	91.43	180.00	-1,300.67	0.48
AEC report	**257.14**	**180.00**	**715.63**	**1.29**

Note[1]: Source for adjusted PCI coal price scenarios is available at Appendix A.

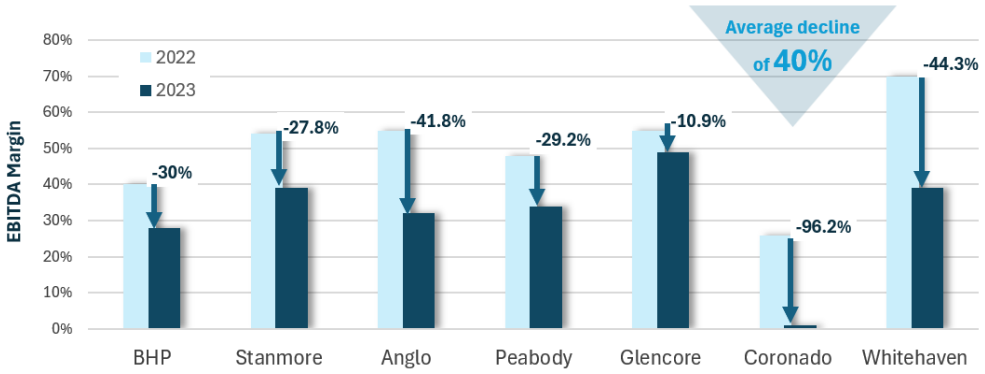
91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

2.2 Operating expenditure

The unit cost assumptions used in the CBA do not factor in the industry average cost inflation trends and ignore the decline in profitability across the metallurgical coal industry in Queensland.

IEEFA's recent analysis has found declining EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortisation) margins consistently across major Queensland metallurgical coal producers, as reported in company financial results from December 2023.[46] On average the EBITDA margins across Queensland metallurgical coal producers fell by 40% between 2022 and 2023. Additionally, the Department of Industry, Science and Resource's most recent Resources and Energy Quarterly forecasts further falls in earnings for metallurgical coal exporters in coming years, stating: "Further price falls could potentially affect the outlook for new projects."[47]

Figure 5. EBITDA[1] Margins from key Qld metallurgical coal producers



Notes: 1. EBITDA - Earnings before interest, taxes, depreciation, and amortisation)
2.Comparison shows reported EBITDA in 2022 and 2023 calendar years by company, with the exception of BHP and Whitehaven which shows a comparison of half-year results Jul-Dec 2022 to Jul-Dec 2023.
Sources: December 2023 company financial results; IEEFA

A key reason for the decreasing EBITDA margins across the industry is the combination of cost-inflationary pressures impacting on rising unit costs coupled with retreating coal prices. Previous IEEFA analysis has found Australian coal producers reported unit costs increased by 56% on average between 2021 to 2023 according to financial results released in June 2023.[48] Reviewing the latest financial results released by metallurgical coal mining companies in December 2023 shows a similar trend with an average unit cost per tonne of product coal of AUD190.85, a 48% increase on 2021 levels.

[46] IEEFA. New coalmines could deliver zero royalties and a methane headache for Queensland. 5 April 2024
[47] Office of the Chief Economist. Resources and Energy Quarterly. March 2024
[48] IEEFA. Cost inflation underlines thermal coal miners fragile profits and financing risks. 25 August 2023

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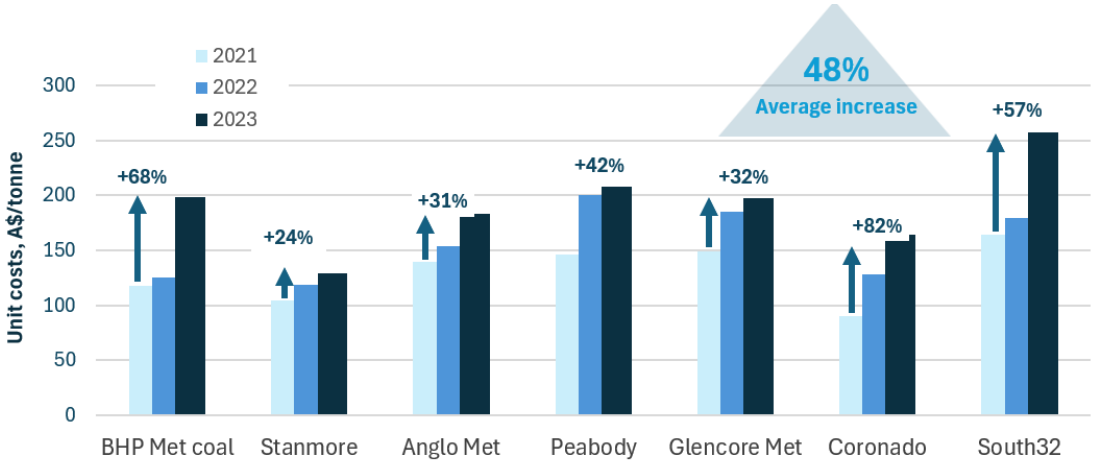
aus_staff@ieefa.org

Figure 6. Unit costs[1] reported by key Qld metallurgical coal producers, 2021 to 2023



Notes: 1. Normalised to AUD/tonne. Peabody and Glencore unit costs include royalties.
2.Comparison shows reported unit costs in2021, 2022 and 2023 calendar years by company, with the exception of BHP and South32 which shows a comparison of half-year results Jul-Dec 2021, Jul-Dec 2022 and Jul-Dec 2023.
Sources: December 2023 company financial results; IEEFA

The CBA submitted in the EIS estimates the unit costs per tonne of PCI product coal to be between AUD165 and AUD180, and excludes royalty costs from this assumption. The proponent has not specified how the estimated unit costs of AUD165-AUD180 were calculated in the EIS, or stated whether they are based on industry estimates from a specific period or not.

8.2.1.3 Operating/ Maintenance Costs

"The average cost per tonne of PCI coal is estimated to be between $165 and $180 (AUD) excluding royalty expense. Further details are outlined in section 3.2.2.3. Royalty payments of $36.64 per tonne are also anticipated. This has been excluded from the assessment as revenue is included as a benefit and royalty payments will represent a transfer payment from the proponent to the Queensland Government."[49]

3.2.2.3 Operating Expenditure

"Estimates of operating costs have been provided by the proponent. The average cost per tonne of PCI product coal is estimated to be between $165 and $180 (AUD) (excluding royalty expense)."[50]

The nearby Bluff mine, which also produces PCI coal, was recently placed into care and maintenance due to increasing operating costs. The CEO of Bowen Coking coal stated in their September 2023 Quarterly report that: "With a predicted subdued PCI market for some time yet,

[49] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 40.
[50] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 10.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

and high mining costs at Bluff, Bowen [coking coal] made the decision during the quarter to transition the mine into care and maintenance."[51]

Previous IEEFA analysis of the Bluff coal mine in Queensland provides a potential operating costs scenario to better examine the economic rationale for the Baralaba South project. The Bluff mine had a similar strip-ratio to that proposed in the Baralaba South EIS and is an open-cut mine producing PCI coal. Financial results reported in the half year to December 2023 for the mine show that the actual operating costs were 77% higher during its final six months than originally anticipated. Accordingly, in 2023 the operators of the Bluff mine deferred payment of royalties to the state government and reported NIL company tax.[52]

The Bluff mine reported unit costs of AUD298.21 per tonne of product coal in the second half of the 2023 financial year. Operating expenses per saleable tonne produced in the first six months of FY2023 were even higher at AUD741.44 per tonne.[53]

Table 2. Bluff Mine reported operating expenses

Bluff Mine operating expenses	H2 FY2023	H1 FY2023	Total FY2023
Mining costs, AUD	$53,329,052.00	$54,862,656.00	$108,191,708.00
Processing costs, AUD	$10,311,745.00	$6,930,523.00	$17,242,268.00
Transport and logistics, AUD	$7,899,302.00	$3,029,905.00	$10,929,207.00
Operating expenses, AUD	$71,540,100.00	$64,823,084.00	$136,363,184.00
Saleable tonnes produced (Kt)	239.90	87.40	327.30
Operating expenses per saleable tonne (AUD/t)	**$298.21**	**$741.44**	**$416.59**

Source: Bowen Coking Coal.

The Bluff coal mine unit costs may not be exactly comparable to the Baralaba South Project based on production targets. The proponents of the Baralaba South mine estimate that it will produce around 1,641 thousand tonnes (Kt) per annum, which is around four to five times more than the Bluff mine achieved in FY2023 (327.3Kt). The Bluff mine was targeting around 1-1.2Mt ROM production, whereas the Baralaba South project is projected to target around 2.2-2.5Mt ROM coal production per annum. While the Bluff coal mine may not necessarily generate an exact comparison of the expected unit costs of the Baralaba South project, it is important to understand the rising operational cost trends in nearby mines and across the wider industry in order to assess whether the unit cost assumptions used in the CBA are plausible.

The Bluff coal mine unit costs have been used as a worst-case scenario in an analysis of the submitted CBA. Swapping out the unit cost assumptions made by the Baralaba South proponents with the actual unit costs of the Bluff mine during H2 FY2023 would mean that the proposed Baralaba South Project would generate a negative NPV of -**AUD725.45 million and a benefit-cost ratio (BCR) of 0.82 (Scenario 8 on Figure 7). This assumes all other cost and benefit**

[51] Bowen Coking Coal. Quarterly Report for the quarter ended September 2023.
[52] IEEFA. New coalmines could deliver zero royalties and a methane headache for Queensland. 5 April 2024.
[53] Bowen Coking Coal. Bowen Coking Coal Annual Report 2023.

91 Percy Street
Warwick, QLD 4370
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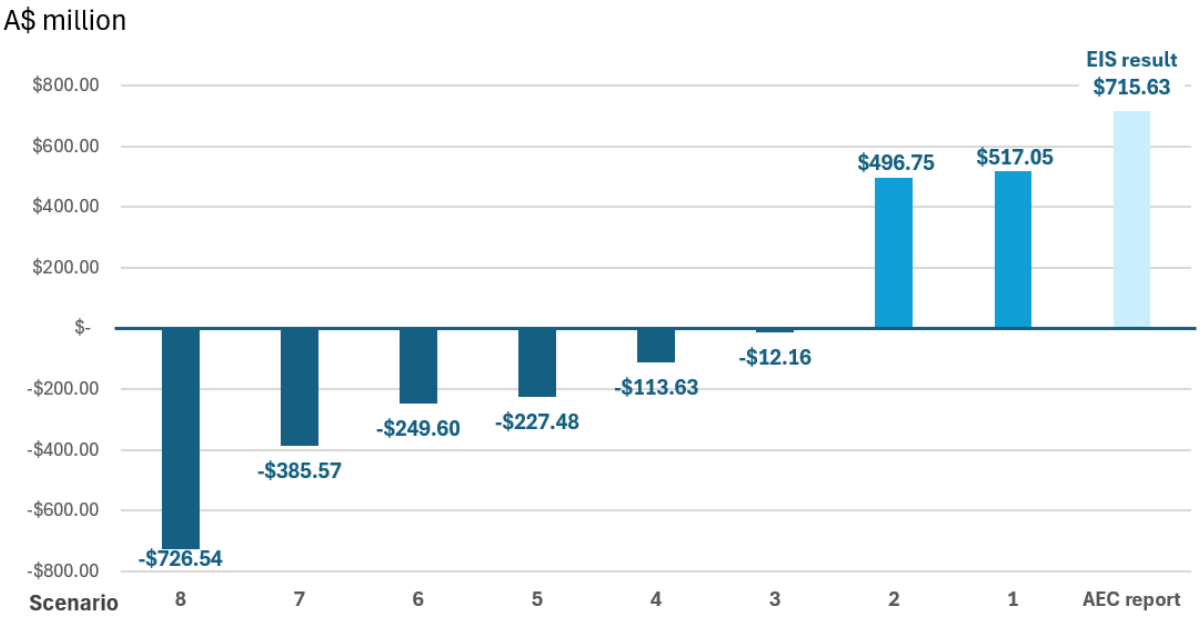
assumptions in the submitted CBA are fully realised, including the predicted PCI coal prices based on out-of-date forecasts.

Figure 7. Estimated NPV[1] based on unit cost adjustments.



Notes. 1- Net Present Values are displayed in 2023-24 prices using a discount rate of 7%
Sources: AEC Economic Impact Assessment, Appendix Y to Baralaba South EIS; IEEFA Analysis

Table 3. Description[1] of unit cost adjusted scenarios.

Scenario	PCI Coal price, AUD/t (USD180/t, 0.7 exchange rate),	Unit cost, AUD/t	Overall NPV, AUD million	Benefit-Cost Ratio
1	257.14	⬆195.32	517.05	1.19
2	257.14	⬆197.00	496.75	1.18
3	257.14	⬆239.11	-12.16	1.00
4	257.14	⬆247.50	-113.63	0.97
5	257.14	⬆256.92	-227.48	0.93
6	257.14	⬆258.75	-249.60	0.93
7	257.14	⬆270.00	-385.57	0.89
8	257.14	⬆298.21	-726.54	0.82
AEC report	**257.14**	**180.00**	**715.63**	**1.29**

Note[1]: Source for adjusted unit cost scenarios is available at Appendix B.

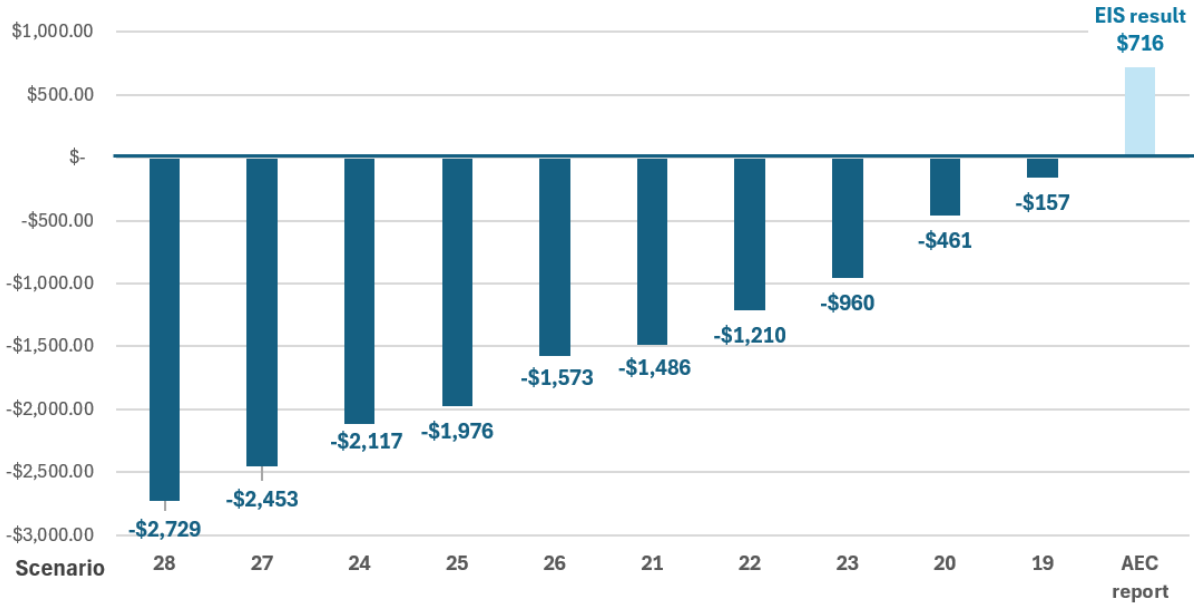
Sections 2.1 and 2.2 have highlighted the volatility of PCI coal prices and suggest that long-term demand for PCI coal will be weaker. Accordingly, it is possible that prices will subdue to pre-2021 levels. Section 2.2 outlines the industry trends of rising operating costs, indicating that the operational costs used in the CBA submitted in the EIS are likely to be underestimating the actual unit costs that the project would incur.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Figures 4 and 7 make variations to the PCI coal prices achieved and the unit costs per product coal assuming all other factors remain equal. It is unlikely that either PCI coal prices or operating costs increase or decrease in isolation; therefore it is warranted to investigate how changes in both factors would impact on the economic viability of the project. Figure 7 below runs alternate scenarios based on changes to both operating costs and achieved PCI coal prices. The findings indicate that the NPV of the project is likely to be negative, with a benefit-cost ratio of less than 1, in all scenarios. Additionally, the estimated revenue from operations generated by these scenarios is consistently less than the AUD3.1 billion published in the EIS (in present value terms using a 7% discount rate).[54]

Figure 8. Estimated NPV[1] based on adjusted scenarios

A$ million



Notes. 1- Net Present Values are displayed in 2023-24 prices using a discount rate of 7%
Sources: AEC Economic Impact Assessment, Appendix Y to Baralaba South EIS; IEEFA Analysis

[54] AEC. Baralaba South Project – Economic Impact Assessment. November 2023. Page 45.

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Table 4. Description[1] of adjusted scenarios

Scenario	PCI Coal price, AUD/t (0.7 AUD/USD exchange rate)	Unit cost, AUD/t	Overall NPV, AUD million	Benefit-Cost Ratio
19	304.29	298.21	-156.65	0.96
20	176.25	195.32	-460.63	0.83
21	91.43	195.32	-1,485.84	0.45
22	114.29	195.32	-1,209.57	0.55
23	187.14	247.50	-959.65	0.71
24	91.43	247.50	-2,116.52	0.37
25	114.29	258.75	-1,976.22	0.43
26	187.14	298.21	-1,572.57	0.60
27	114.29	298.21	-2,453.16	0.38
28	91.43	298.21	-2,729.43	0.31
AEC report	**257.14**	**180.00**	**715.63**	**1.29**

Note[1]: Source for both unit cost and PCI coal price adjusted scenarios is available at Appendix C.

2.3 Additional CBA assumptions

The adjusted scenario estimates calculated by IEEFA in figures 4, 7 and 8 assume that the remaining cost and benefit calculations made by AEC are appropriate, but further analysis into the assumptions regarding rehabilitation costs or the cost of the impact on ecosystems could yield even steeper declines in the NPV of the project.

IEEFA's review into the CBA did not explore variations or sensitivity analysis in the other listed costs and benefits as there was insufficient time and information available. However, if other costs such as rehabilitation costs of the project or the cost of carbon dioxide and methane emissions increase during the project's lifecycle then the NPV and the benefit cost ratio of the project would be even lower than suggested by IEEFA's calculations.

3. Government revenue estimates

Based on the findings listed above, the consequences inferred in the EIS if the project does not proceed regarding federal and state tax revenues are inaccurate.

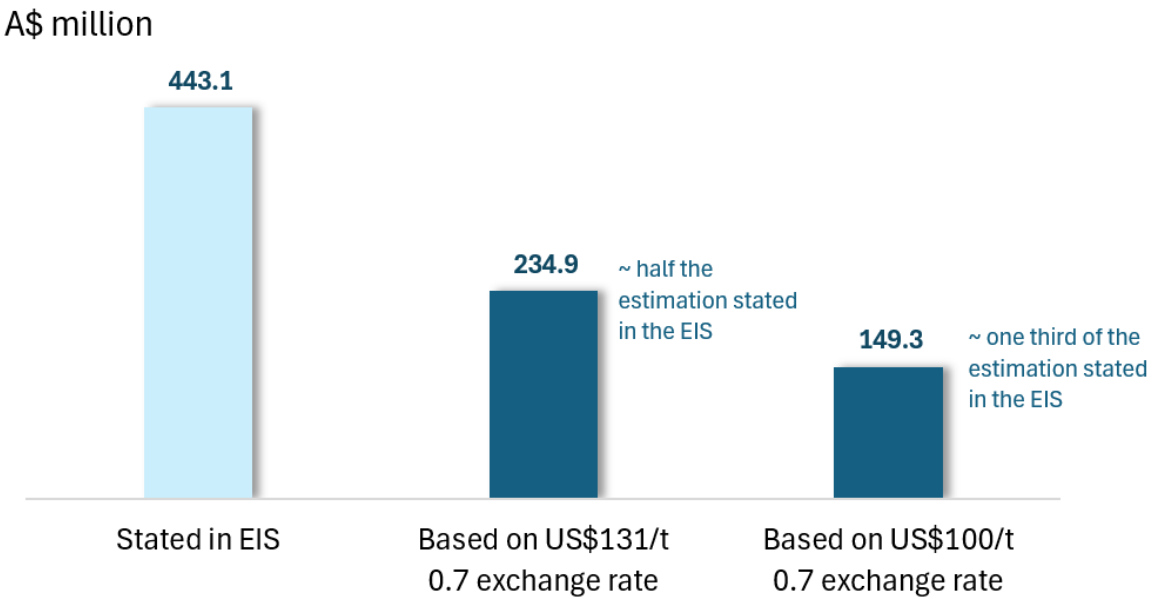
Given these findings it is significantly unlikely that the federal and state tax revenues proposed to be generated by the project could be achieved. Instead, it is more likely that lower royalty rates are paid due to lower prices achieved per tonne of coal sold, meaning there is not sufficient cash flow for the entire royalty payment.

The EIS states that if the project goes ahead, it will generate a present value (PV) of AUD512.4 million in tax revenue to the Australian Federal Government, and AUD488.3 million to the

91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Queensland government.[55] IEEFA's analysis finds that, even using the KPMG low estimate price forecast for PCI coal of USD131 per tonne and a 0.7 exchange rate, the PV of the royalties paid to the Queensland government would be almost half the **AUD443.1 million** figure stated in the EIS at **AUD234.9 million.**

Figure 9. PV[1] estimation of royalties paid to Queensland government under different scenarios.



Note 1. Present value in 2023-24 terms applying a 7% discount rate
Source: Page 28, Baralaba South EIS - Appendix Y, AEC, Baralaba South Project – Economic Impact Assessment, November 2023; IEEFA

> "The Project is estimated to provide additional tax revenues of approximately $68.7 million per annum to the Australian Government and approximately $62.6 million per annum to the Queensland Government."[56]

Based on a realised PCI coal price of between USD100-131 the estimated tax revenue generated for the Queensland government could be between AUD21.1 million and AUD33.18 million per annum. **Alternatively, there could be no royalties paid, and NIL profits or company taxes paid,** given the factors contributing to higher operating costs and lower PCI coal prices discussed earlier in this submission.

[55] AEC. Baralaba South Project – Economic Impact Assessment - Appendix Y. November 2023. Page 28
[56] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.

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Warwick, QLD 4370
aus_staff@ieefa.org

4. Employment and regional economic benefits presented in the EIS

> "Supply lines during the operational phase of the Project are likely to be via Baralaba and extend to the wider area. As such, the regional economy is expected to benefit from the economic flow-on effects of the Project through the provision of goods and services. The development of the Project is also likely to have a positive regional impact through establishment of additional new spin-off businesses and encouragement of support infrastructure development."[57]
>
> "During the peak construction period (2029), the Project's contribution to the economy is predicted at approximately $14 million annually in gross regional profit (approximately $26 million in gross state product). During operations, the Project's contribution to the economy is expected to average approximately $170 million annually in gross regional profit ($255 million annually in gross state product). Once operations are completed, the Project's contribution to gross regional profit is expected to drop to between $1.6-2.3 million annually as a result of post-mining decommissioning and rehabilitation activity."[58]

This submission has not completed a detailed analysis on the proposed employment benefits and economic flow-on effects of the project stated in the EIS. However, it is important to note that, given the problematic assumptions behind the project rationale and the CBA, it is also unlikely that the regional benefits proposed in the EIS would be fully realised.

The difficulty that Australian coal miners have faced in securing labour has impacted on coal production, meaning that potentially the risk of labour shortages should be examined in the sensitivity analysis of the CBA. Previous analysis by IEEFA has found that, "labour shortages contributed to a significant decline in coal production in the second half of 2022"; and that, "the increasingly controversial nature of coal mining means labour shortages are likely to persist into the future".[59]

Additionally, if sufficient labour is secured for the project, opening a greenfield coal mine project risks draining labour away from where it is needed, such as for housing and transport infrastructure.[60]

[57] Baralaba South. Baralaba South Project Environmental Impact Statement - Chapter 2 Project Description. December 2023. Page 6.
[58] Ibid. Page 6.
[59] IEEFA. Coal cost trends: higher labour costs could continue into the long term. 15 November 2022
[60] The New Daily. Alan Kohler: Dire labour shortage warrants moratorium on fossil fuel export projects . 28 March 2024

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91 Percy Street
Warwick, QLD 4370
aus_staff@ieefa.org

Appendix A.

Description of price adjusted scenarios used in Figure 4.

	Scenario	PCI Coal price, AUD/t	Unit cost, AUD/t	Overall NPV , AUD million	Benefit-Cost Ratio	Operating costs, PV AUD million	Estimated revenue , PV AUD million
Stated assumptions in EIS	**EIS result**	**257.14**	**180.00**	**$715.63**	**1.29**	2,163.6	3,109.4
KPMG 2027 PCI coal high forecast	9	304.29	180.00	1,272.11	1.50	2,175.6	3,677.8
KPMG 2027 PCI coal average forecast	10	223.57	180.00	296.49	1.12	2,175.6	2,702.2
KPMG 2027 PCI coal median forecast	11	187.14	180.00	-143.81	0.94	2,175.6	2,261.9
KPMG 2027 PCI coal low forecast	12	176.25	180.00	-275.46	0.89	2,175.6	2,130.3
Historical average PCI coal prices	13	160.00	180.00	-471.87	0.81	2,175.6	1,933.9
Historical max PCI coal prices 2020, IEA	14	142.86	180.00	-679.07	0.73	2,175.6	1,726.7
Historical averages PCI coal prices 2020, IEA	15	128.57	180.00	-851.74	0.66	2,175.6	1,554.0
Historical mid-point PCI coal prices 2020, IEA	16	114.29	180.00	-1,024.40	0.59	2,175.6	1,381.3
Historical low PCI coal prices 2020, IEA	17	100.00	180.00	-1,197.07	0.52	2,175.6	1,208.7
Historical min PCI coal prices 2020, IEA	18	91.43	180.00	-1,300.67	0.48	2,175.6	1,105.1

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Appendix B.

Description of unit cost adjusted scenarios used in Figure 7.

	Scenario	PCI Coal price, AUD/t	Unit cost, AUD/t	Overall NPV, AUD million	Benefit-Cost Ratio	Operating costs, PV AUD million	Estimated revenue. , PV AUD million
Average unit costs, met coal miners reported 2023	1	257.14	195.32	517.05	1.19	2,360.8	3,108.0
Uses median of industry unit costs	2	257.14	197.00	496.75	1.18	2,381.1	3,108.0
Mid-point between max proposed unit cost in EIS and actual unit cost bluff mine	3	257.14	239.11	-12.16	1.00	2,890.0	3,108.0
Applies the industry average increase in unit costs (50%) to the minimum unit cost stated in EIS ($165)	4	257.14	247.50	-113.63	0.97	2,991.4	3,108.0
South 32 Illawarra Coal unit costs Dec 2023	5	257.14	256.92	-227.48	0.93	3,105.3	3,108.0
Applies the industry average increase in unit costs (50%) to the mid-point unit costs stated in the EIS ($172.5)	6	257.14	258.75	-249.60	0.93	3,127.4	3,108.0
Applies the industry average increase in unit costs (50%) to the maximum unit costs stated in EIS $180	7	257.14	270.00	-385.57	0.89	3,263.4	3,108.0
Uses bluff mine unit costs from H2 FY2023	8	257.14	298.21	-726.54	0.82	3,604.3	3,108.0

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aus_staff@ieefa.org

Appendix C.

Description of price and unit cost adjusted scenarios used in Figure 8.

	Scenario	PCI Coal price, AUD/t	Unit cost, AUD/t	Overall NPV, AUD million	Benefit-Cost Ratio	Operating costs, PV AUD m	Estimated revenue, PV AUD m
Stated assumptions in EIS	**EIS result**	**257.14**	**180.00**	**$715.63**	**1.29**	2,163.6	3,109.4
Uses bluff mine unit costs from H2 FY2023/ and KPMG maximum price forecast stated in EIS	19	304.29	298.21	-156.65	0.96	3,604.3	3,677.8
Uses industry average unit costs reported in 2023 / and KPMG average price forecast for 2027 from EIS	20	176.25	195.32	-460.63	0.83	2,360.8	2,130.3
Uses industry average unit costs reported in 2023/ historical low PCI coal prices from 2020	21	91.43	195.32	-1,485.84	0.45	2,360.8	1,105.1
Uses industry average unit costs reported in 2023/ historical average PCI coal prices from 2020	22	114.29	195.32	-1,209.57	0.55	2,360.8	1,381.3
Applies the industry average increase in unit costs (50%) to the minimum unit cost stated in EIS ($165)/ and KPMG average price forecast for 2027 from EIS	23	187.14	247.50	-959.65	0.71	2,991.4	2,261.9
Applies the industry average increase in unit costs (50%) to the minimum unit cost stated in EIS ($165)/ historical low PCI coal prices from 2020	24	91.43	247.50	-2,116.52	0.37	2,991.4	1,105.1
Applies the industry average increase in unit costs (50%) to the minimum unit cost stated in EIS ($172.5)/ historical average PCI coal prices from 2020	25	114.29	258.75	-1,976.22	0.43	3,127.4	1,381.3
Uses bluff mine unit costs from H2 FY2023/ and KPMG average price forecast for 2027 from EIS	26	187.14	298.21	-1,572.57	0.60	3,604.3	2,261.9
Uses bluff mine unit costs from H2 FY2023/ historical average PCI coal prices from 2020	27	114.29	298.21	-2,453.16	0.38	3,604.3	1,381.3
Uses bluff mine unit costs from H2 FY2023/ historical low PCI coal prices from 2020	28	91.43	298.21	-2,729.43	0.31	3,604.3	1,105.1

91 Percy Street
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aus_staff@ieefa.org

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About the Author

Anne-Louise Knight

Anne-Louise Knight is IEEFA's Lead Research Analyst for Australian Coal. Her work examines the financial viability of coal mining projects in Australia and the demand outlooks in Australia's thermal and coking coal export markets. Anne-Louise has over 7 years of experience working in Australian government agencies, most recently as a senior economist with the Australian Trade and Investment Commission. She holds a Master's in Economics, a Master's in Environmental Management and Development from the Australian National University, for which she was awarded the Tiri Tiri Prize, and a Bachelor's of International Studies from the University of New South Wales.