18 June 2018

Mr Ravi Prasad
Queensland Competition Authority

Dear Ravi

DBCT Declaration Review – addendum and disclosure of data

DBCTM's submission of 30 May 2018 in respect of the DBCT declaration review which was redacted for publication (**the DBCTM submission**) contained the following appendices:

- Appendix 10 - HoustonKemp expert report on criterion (b) (**HoustonKemp Report on (b)**); and
- Appendix 12 - AME Coal Industry Report (**AME Report**).

HoustonKemp Report on (b) was redacted for confidential data of AME and Wood Mackenzie contained in the tables in Appendices A1 and A3 to that report. The AME Report did not contain confidential information of AME in Figures 14, 15 and 16 of that report.

DBCTM has now obtained the consent of AME and Wood Mackenzie for the disclosure of that information. Accordingly, please find attached for publication:

- A copy of the AME Report which includes Figures 14, 15 and 16.
- A copy of the HoustonKemp Report on (b) with the data in tables in Appendices A1 and A3 unredacted. Note that some information on pages 14, 15, 23, 24, and 28 of the report remains redacted as it is confidential information of particular users of DBCTM.

We note that the source of the data in table A1.1 of Appendix A and tables A3.1, A3.4, A3.5 and A3.6 of Appendix A3 to the HoustonKemp Report on (b) is AME, March 2018. The disclaimers set out at start of the AME Report also apply to that data.

The source of the data in tables A3.2 and A3.3 of Appendix A3 to the HoustonKemp Report on (b) is Wood Mackenzie, October 2017. In respect of that data, Wood Mackenzie has noted that:

> The data does not include, nor shall it be construed as including, advice, guidance or recommendations from Wood Mackenzie to take, or not to take, any actions or decisions in relation to any matter, including without limitation relating to investments or the purchase or sale of any securities, shares or other assets of any kind. Should members of the public take any such action or decision based on information in this report, you do so entirely at your own risk and Wood Mackenzie shall have no liability whatsoever for any loss, damage, costs or expenses incurred or suffered by you as a result.
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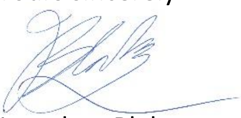
> The data may contain forward looking statements including statements regarding Wood Mackenzie's intent, belief or current expectations. Members of the public are cautioned not to place undue reliance on these forward looking statements. Wood Mackenzie does not undertake any obligation to publicly release the result of any revisions to these forward looking statements to reflect events or circumstances after the date hereof. While due care has been used in the preparation of forecast information, actual results may vary in a materially positive or negative manner. Forecasts and hypothetical examples are subject to uncertainty and contingencies outside Wood Mackenzie's control. Past performance is not a reliable indication of future performance.

In addition, we attach for publication an addendum which corrects certain AME figures referred to in the DBCTM submission, and provides clarifying notes on some of the tables in Appendix A3 to the HoustonKemp Report on (b).

Accordingly, the confidentiality claim issued to the QCA in respect of the DBCTM submission should be considered amended to the extent noted in this letter. Note that the reference to Appendix 15 in the confidentiality claim template should instead be Appendix 16.

Please contact me if you have any related queries.

Yours sincerely



Jonathan Blakey
General Manager — Commercial & Regulation
DBCT Management

Attachment 1: Addendum to DBCTM submission

Attachment 1

Addendum to DBCTM Submission

1 DBCTM provides this addendum to its submission on the DBCT declaration review dated 30 May 2018 to correct for some figures set out in that submission (**DBCTM Submission**) and provide explanatory notes on some of the tables in Appendix A3 to the HoustonKemp Report on criterion (b) (Appendix 10 to the DBCTM Submission).

2 The following table corrects the figures in respect of AME estimates of foreseeable demand in Figure 9 at paragraph 217 of the DBCTM Submission.[1] No corrections have been made to the HoustonKemp estimates of foreseeable demand in the table.[2]

Figure 9: Comparison of estimates of total foreseeable demand from HoustonKemp and AME (throughput basis)

Year	Foreseeable demand including all BMA and BMC production (Mtpa)		Foreseeable demand excluding HPCT (Mtpa)[3]	
	HoustonKemp	AME	HoustonKemp	AME
2021	150.9	151.0	91.1	96.0
2022	156.1	155.6	95.2	100.6
2023	164.8	161.5	102.7	106.5
2024	172.7	172.1	109.6	117.1
2025	182.4	178.4	117.8	123.4
2026	186.7	190.2	120.6	135.2
2027	179.0	191.8	111.3	136.8
2028	181.9	181.8	112.7	126.8
2029	181.6	182.7	112.5	127.7
2030	182.1	182.0	113.0	127.0

3 Having regard to the figures in that table, DBCTM also corrects:

3.1 The figures in paragraph 219 of the submission to read:

"The table shows that on a throughput basis AME's peak forecast demand figures are 191.8Mtpa (including all BMA and BMC forecast production) and 136.8Mtpa (excluding 55Mtpa of BMA forecast production). Converted to a demand for coal handling contract capacity basis, those figures become 213Mtpa (including all BMA and BMC forecast production) and 152Mtpa (excluding 55Mtpa of BMA forecast production)."

[1] As noted in the DBCTM Submission, the AME foreseeable demand figures in this table come from the AME Report, pages 18 to 19. Note that Figures 14 and 15 in AME's report specify totals for DBCT, Gladstone, Abbot Point and Hay Point (which reflect AME's view of which terminals the coal might be railed to in those years). This is because as noted in paragraph 215 of the DBCTM Submission, AME is forecasting throughput at DBCT rather than total foreseeable demand in the market in which the DBCT service is supplied. DBCTM has included the overall totals from those Figures in the table in order to specify total foreseeable demand in the market in which the DBCT service is supplied, which can include demand from mines proximate to DBCT which is served by other terminals.

[2] As noted in the DBCTM Submission, the HoustonKemp foreseeable demand figures come from Table 5.1 of the HoustonKemp Report on (b).

[3] HoustonKemp's figures exclude all BMC and BMA forecast production whereas AME's figures exclude 55Mtpa of BMA forecast production.

3.2 The references in paragraphs 63.1, 191.3, 203.2 and 223 of the DBCTM Submission of 218 Mtpa to read 213 Mtpa.[4]

4 DBCTM provides the following explanatory notes on the tables in Appendix A3 to the HoustonKemp Report on criterion (b):

4.1 Table A3.1 – Coal handling charges at each terminal (A$ per tonne) – AME provided the "port handling charges" data covering terminal access and handling charges in US$, which was converted to A$ in HoustonKemp's model using an exchange rate of US$1.00 = A$1.30 (provided by AME).

4.2 Table A3.4 – Seaborne coal price assumptions ($US per tonne) – AME provided a price series in US$/t for benchmark coal types, to which was applied the relevant discount or premium due to the specific quality of coal at the respective mines (supplied by AME), to calculate the specific price for each product of each mine.

4.3 Table A3.5 – Production cost assumptions for each mine ($US per tonne) – the figures in the table are actually $A per tonne including maintenance capex. AME provided the production cost data in US$, which was converted to A$ in HoustonKemp's model using an exchange rate of US$1.00 = A$1.30 (provided by AME).

[4] Note this correction is made because on a demand for coal handling contract capacity basis, AME's estimate of maximum total foreseeable demand over the period 2021 to 2030 is approximately 213Mtpa (including all BMA and BMC forecast production).

HOUSTONKEMP
Economists

Does DBCT's coal handling service satisfy criterion (b)?

A report for DLA Piper

28 May 2018

HoustonKemp.com

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Disclaimer

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Executive Summary

We have been asked by DLA Piper (DLA), on behalf of Dalrymple Bay Coal Terminal Management Limited (DBCTM), to review whether the coal handling service supplied at Dalrymple Bay Coal Terminal (DBCT) satisfies criterion (b) of section 76(2) of the *Queensland Competition Authority Act 1997* (QCA Act). Criterion (b) poses the question as to whether the facility for the service could meet the total foreseeable demand in the market in which the service is offered at the least cost, as compared to using any two or more facilities. The criterion is generally known as the 'natural monopoly test' element of the declaration criteria.

Recent changes made to the QCA Act mean that the assessment of whether the coal handling service provided by DBCT (the DBCT service) should be declared for a further period will be made under new access criteria. The new criterion (b) reads:[1]

> that the facility for the service could meet the total foreseeable demand in the market—
>
> (i) over the period for which the service would be declared; and
>
> (ii) at the least cost compared to any 2 or more facilities (which could include the facility for the service);

Context for the DBCT service

The central Queensland coal network (CQCN) is a set of interconnected rail networks that serve five coal terminals in north and central Queensland, namely:

- Adani Abbot Point Terminal (AAPT) near Bowen, which is served by the Newlands rail system;
- DBCT and Hay Point Coal Terminal (HPCT) at the Port of Hay Point near Mackay, which is served by the Goonyella rail system; and
- RG Tanna Coal Terminal (RGTCT) and Wiggins Island Coal Export Terminal (WICET) at the Port of Gladstone, which are served by the Blackwater and Moura rail systems.

These varying degrees of interconnectedness for different sections of the network dictate the options that each mine has in relation to the coal handling port for which it can access, for example:

- a mine on the Goonyella system has the potential to access all coal terminals at Abbot Point, Hay Point and Gladstone; whereas
- a mine on the Moura system only has access to the coal terminals at Gladstone.

The production in central Queensland is expected to grow over time, including in areas proximate to the Port of Hay Point. Many mines in central Queensland are already proximate to the Port of Hay Point. It is therefore likely that the expected growth in volumes will need to be met using expanded capacity at DBCT and/or available or expanded capacity at terminals other than DBCT.

Expansions of coal terminals are generally considered to be costly relative to utilising existing capacity. For example, expressed on an annualised basis, the unit cost of the expansions noted in DBCT's 2018 Master Plan are substantially more expensive than existing charges for capacity at DBCT.

Framework for analysis

It is uncontroversial that:

[1] Queensland Competition Authority Act, s. 76(2)(b)

- the 'facility for the service' is DBCT, which is the physical infrastructure by which the service is provided and in relation to which the declaration review is being undertaken; and
- the 'service' provided by the facility is the DBCT service, which is the service that is currently declared and regulated by the QCA.

For the purpose of our analysis, we have taken the period over which the potential declaration of the service is to be considered as 10 years from the date at which the current declaration period expires, that is, September 2020. The relevant period for our assessment therefore extends until September 2030. Since the data generally available to us is on a calendar year basis, we assess criterion (b) over the period from 2021 to 2030.

Criterion (b) is satisfied if, over this period, all foreseeable demand in the market in which the service is provided would be met at least cost by the facility. Conversely, criterion (b) is not satisfied if, during this period, it is lower cost for at least some of the foreseeable demand in the market in which the service is provided to be met by another facility.

The principal economic elements of the criterion are:

- the market for the service;
- the foreseeable demand in that market; and
- the assessment of least cost.

Market in which the service is supplied

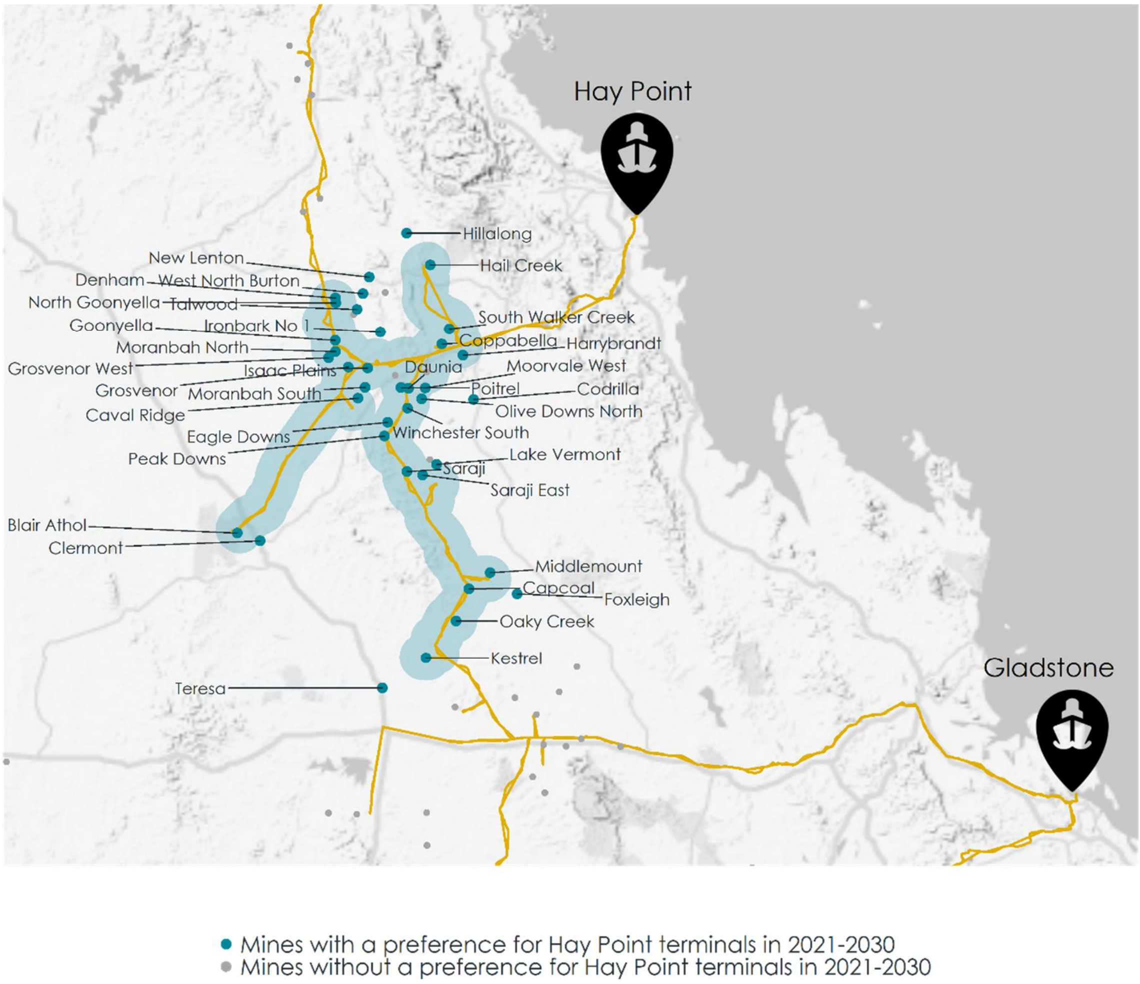
In DBCT's case, the geographic scope of the market is the most consequential dimension in the market definition process for the assessment of criterion (b). We define the geographic dimension of the market by reference to a three-step framework for analysis, as set out below:

- begin with the narrowest reasonable geographic dimension of the market;
- evaluate the effect of a small but significant non-transitory increase in price (SSNIP) applied by a hypothetical monopolist operating in this market in eliciting both potential demand side substitutes as well as additional sources of supply, and assess whether these responses would defeat the SSNIP; and
- repeat the above process of evaluating each potentially wider definition of the market until the boundaries of the relevant market are ultimately established.

We approximate the geographic area from which DBCT's future customers may be drawn by identifying the mines that would prefer to use coal handling services provided at the Port of Hay Point instead of those provided at other locations if there were no constraints from existing supply contracts. We describe this as *'the market for coal handling services for mines that are proximate to the Port of Hay Point'*.

The figure below shows the extent of the geographic market over the period from 2021 to 2030 as determined by the approach set out above. This area is defined by mines that would prefer to export through the Port of Hay Point in any year or years during this period. This area is substantially similar to the region defined by the location of DBCT's current and recent customers.

Starting point for geographic dimension of the market using preferences over 2021 to 2030



Source: DBCTM, AME and Wood Mackenzie data, HoustonKemp analysis
Note: Grey dots within or near the shaded area represent mines that are not expected to operate between 2021 and 2030.

We find that a SSNIP applied to the prices of the suppliers of coal handling service in this market would be profitable, and so the geographic boundaries of the market do not extend beyond those established by reference to the narrowest reasonable market that we identify at the outset.

Estimating foreseeable demand in the market

Once the geographic scope of the market is determined, we estimate total foreseeable demand in the market as the sum of expected production from mines in this region. We express total foreseeable demand in the market in two (equivalent) terms:

- demand for coal handling throughput, estimated as the total expected production of mines that are located within the market; and
- demand for coal handling contract capacity, estimated from demand for coal handling throughput adjusting for average utilisation of contract capacity of 90 per cent.

In addition to our preferred estimate, DLA has asked us to assess criterion (b) under the assumption that the production of BMA and BMC mines is excluded from the calculation of total foreseeable demand in the market. This is despite the evidence that there is significant substitution by many of these mines between HPCT and DBCT.

Our estimates of foreseeable demand are set out in the table below.

Total foreseeable demand in the market

Year	Total foreseeable demand		Total foreseeable demand excluding BHP mines	
	Throughput (mtpa)	Capacity (mtpa)	Throughput (mtpa)	Capacity (mtpa)
2021	150.9	167.7	91.1	101.2
2022	156.1	173.4	95.2	105.7
2023	164.8	183.2	102.7	114.1
2024	172.7	191.9	109.6	121.8
2025	182.4	202.7	117.8	130.9
2026	186.7	207.4	120.6	133.9
2027	179.0	198.8	111.3	123.7
2028	181.9	202.1	112.7	125.2
2029	181.6	201.8	112.5	124.9
2030	182.1	202.3	113.0	125.5

Source: AME and Wood Mackenzie data, HoustonKemp analysis

Assessing the least cost means of meeting foreseeable demand

We assess whether foreseeable demand in the market could be met at least cost by facilities in the market. The focus of our assessment is on the incremental costs to society (or the resource costs) associated with rail access and rail haulage as well as terminal infrastructure and handling costs.

The evaluation of resource costs in relation to the provision of any service is likely to be significantly affected by whether:

- foreseeable demand can be met with the existing infrastructure used to provide the service, incurring relatively low resource costs since rail and terminal infrastructure is capital intensive in nature and the sunk costs associated with their construction have already been incurred and should not be captured in resource costs; or
- foreseeable demand can only be met through the construction of new infrastructure, incurring resource costs that may potentially be significantly higher, since the capital costs of new infrastructure are potentially avoidable and must be factored into an assessment of resource costs.

We use an optimisation model to evaluate the least cost means of meeting total foreseeable demand in the market. The model compares the costs of meeting foreseeable demand using a combination of:

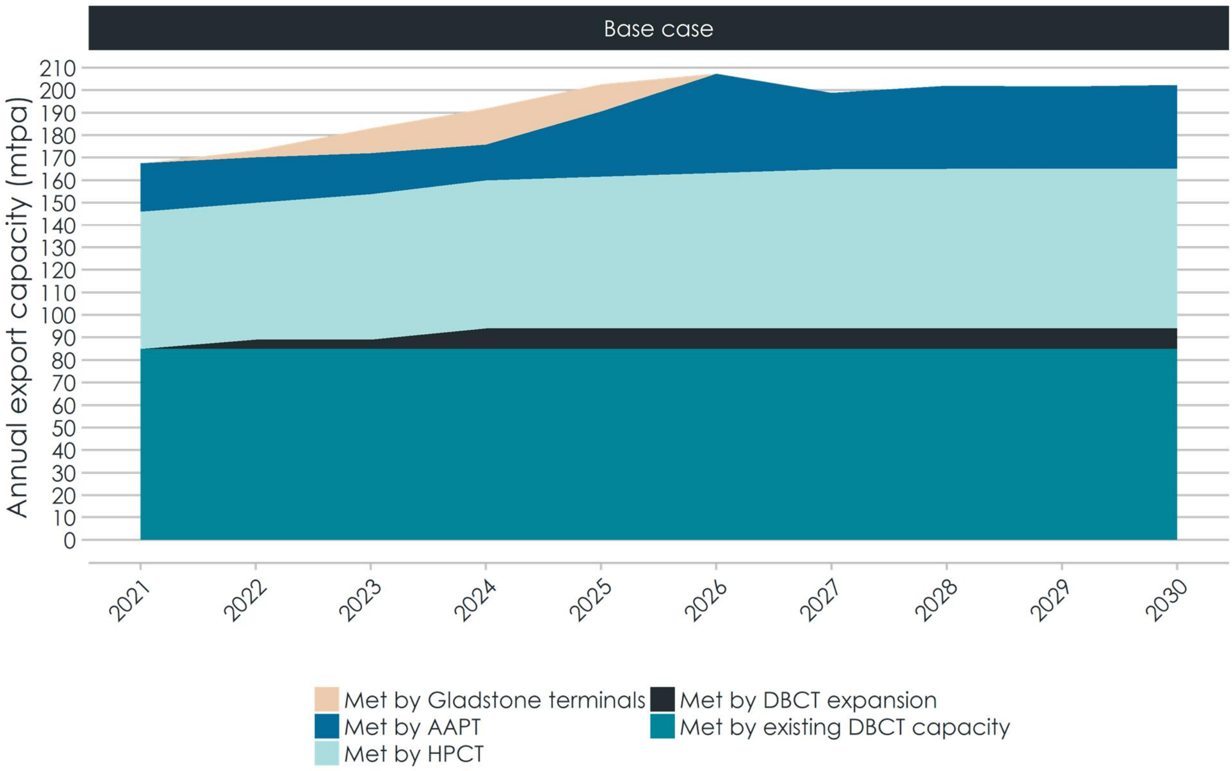
- existing capacity at DBCT;
- expanded capacity at DBCT, given information about its expansion options;
- existing capacity at other coal terminals; or
- expanded capacity at other coal terminals.

Criterion (b) is satisfied if all foreseeable demand in the market in which the DBCT service is supplied can be met at least cost by existing or expanded capacity at DBCT.

The figure below shows the result of our assessment adopting the base case assumptions. It breaks down total foreseeable demand in the market by reference to how it is met at least cost over the period from 2021 to 2030. It shows that:

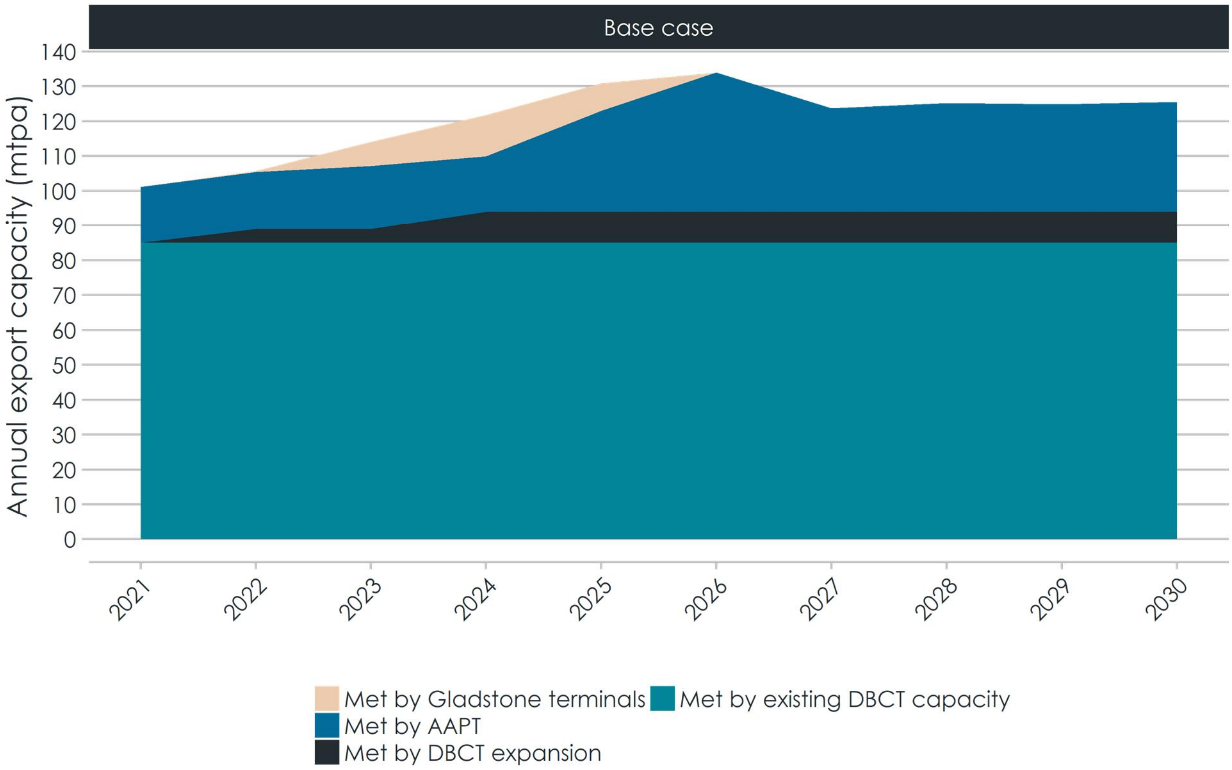
- total foreseeable demand in the market is materially higher over the entire 2021 to 2030 period than the capacity that DBCT has, or potentially has, available; and
- total foreseeable demand in the market is met at least cost by four facilities, being DBCT (including expansions of the facility), HPCT, AAPT and RGTCT.

Least cost provision of total foreseeable demand in the market



It follows from this analysis that criterion (b) is not satisfied, since total foreseeable demand in the market cannot be met at least cost by DBCT (whether expanded or otherwise) and would instead be met by two or more facilities. This result continues to hold if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Least cost provision of total foreseeable demand in the market (excluding BMA and BMC mines)



We investigate a range of alternatives to the base case scenario, assessing the sensitivity of these conclusions to changes in input assumptions. In each of these sensitivities, we continue to find that, over the period for which the service would be declared, it is least cost for total foreseeable demand in the market to be met by a combination of two or more terminals rather than by DBCT alone.

Conclusion

We find that the coal handling service provided at DBCT does not satisfy criterion (b) under Part 5, Division 2 of the QCA Act. These findings are robust, since they are not sensitive to any reasonable changes to the assumptions that underpin our analysis.

1. Introduction

We have been asked by DLA Piper (DLA), on behalf of Dalrymple Bay Coal Terminal Management Limited (DBCTM), to review whether the coal handling service supplied at Dalrymple Bay Coal Terminal (DBCT) satisfies criterion (b) of section 76(2) of the *Queensland Competition Authority Act 1997* (QCA Act). Criterion (b) poses the question as to whether the facility for the service could meet the total foreseeable demand in the market in which the service is offered at the least cost, as compared to using any two or more facilities. The criterion is generally known as the 'natural monopoly test' element of the declaration criteria.

Section 250 of the QCA Act provides that the current service provided by DBCT is taken to be declared by the Minister under Part 5, Division 2 of the QCA Act. The declared status of DBCTM's coal handling facility expires on 8 September 2020. At least six months but not more than 12 months prior to the expiry date of the declaration, the Queensland Competition Authority (QCA) must recommend to the responsible Minister whether the service provided by DBCT should be declared for a further period.

Recent changes made to the QCA Act mean that the assessment of whether the coal handling service provided by DBCT (the DBCT service) should be declared for a further period will be made under new access criteria. The new criterion (b) reads:[2]

> that the facility for the service could meet the total foreseeable demand in the market—
>
> (i) over the period for which the service would be declared; and
>
> (ii) at the least cost compared to any 2 or more facilities (which could include the facility for the service);

In a companion report, we examine whether the DBCT service satisfies criterion (a).

The central finding of the analysis we present in this report is that DBCT is not capable of meeting the total foreseeable demand in the market for coal terminal services proximate to the Port of Hay Point at least cost, as compared to any two or more facilities. Accordingly, we conclude that criterion (b) is not satisfied and that the QCA should recommend that the DBCT service not be declared, irrespective of whether the other three criteria are met.

This report is structured as follows:

- section 2 describes the broader context within which the DBCT service is supplied, including a description of coal supply networks in Central Queensland;
- section 3 sets out the conceptual framework under which we assess whether the DBCT service satisfies criterion (b);
- section 4 implements our approach to defining the market within which the DBCT service is supplied, focusing particularly on the geographic dimension of the market;
- section 5 estimates total foreseeable demand in this market, including forecast demand for capacity, given forecasts of production within the geographic scope of the market;
- section 6 introduces the modelling framework and assumptions under which we assess the least cost means of meeting foreseeable demand in the market and applies these to a base case scenario;
- section 7 examines the sensitivity of these findings to changes in key input assumptions that would be expected to influence the results of our analysis; and

[2] Queensland Competition Authority Act, s. 76(2)(b)

- section 8 concludes that the DBCT service does not satisfy criterion (b) and that this conclusion is robust to reasonable changes in the assumptions of the analysis.

2. Context for the DBCT service

This section sets out the context within which DBCT provides coal handling services, focusing on the essential facts upon which we rely in our assessment of criterion (b).

2.1 Seaborne exports of coal

The global market for coal is one of the key trade platforms for Australia, accounting for just under 15 per cent of Australia's exports by value in 2016-17, with total value of $54.3 billion.[3]

The coal that Australia exports primarily belongs to two categories:

- metallurgical (coking and PCI) coal that is used in the manufacturing process of steel; and
- thermal coal that is used in coal-fired power stations for electricity generation.

Australia is one of the largest exporters within each of these categories, with the annual volumes exported into each of these markets being:[4]

- 177 million tonnes of metallurgical coal in 2016-17 – in which Australia is the world's largest exporter; and
- 202 million tonnes of thermal coal in 2016-17 – in which Australia is the world's second largest exporter.

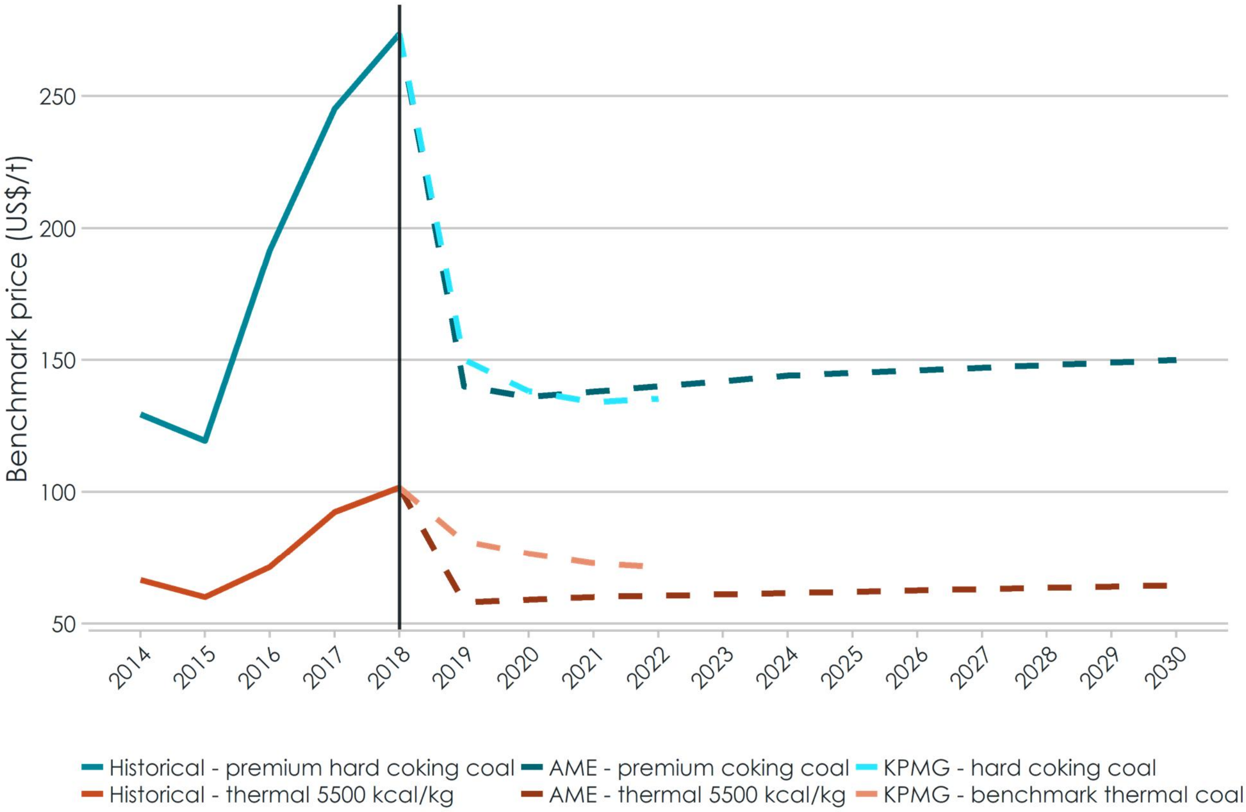
Australia's exports to global coal markets are all seaborne. Coal is transported by rail from mines to terminals for shipping to its final destination. The structure of this network means that Australian coal mines are dependent on rail and terminal infrastructure to access export markets.

Within these global markets, the price achieved for Australia's exports is determined by a range of factors, including energy content and impurity levels. Figure 2.1 shows a benchmark price for both a premium hard coking coal product and a thermal coal product that sets aside this complexity in the level of achieved price and indicates general trends in export prices over time.

[3] Australian Trade Commission, *Australia's export performance in FY2017*, December 2017, p 5.

[4] Office of the Chief Economist, *Resources and energy quarterly,* March 2018, p 38 and p 45.

Figure 2.1: Historical and forecast benchmark prices for coking and thermal coal

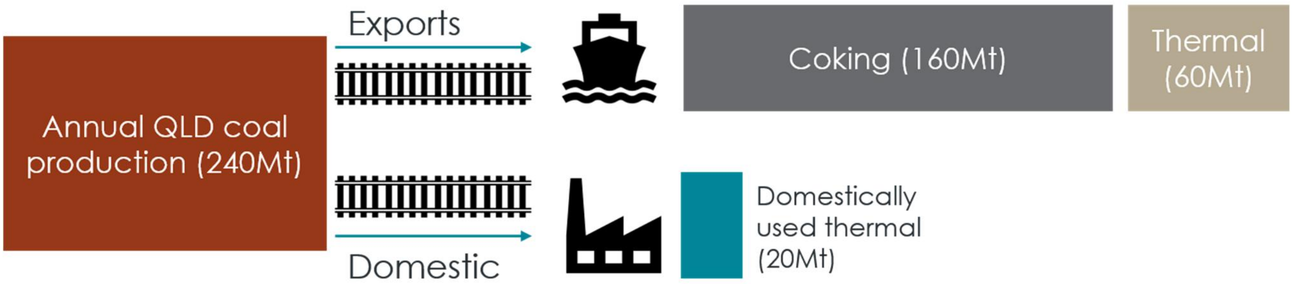


Source: Bloomberg, AME and KPMG.

2.2 Coal production in central Queensland

Within Australia, Queensland contributes over half of total coal production by volume, producing around 240 million tonnes total of thermal and coking coal per annum[5] and exporting over 90 per cent of this amount.[6]

Figure 2.2: The supply network for Queensland coal production



Source: Department of Natural Resources and Mine, Queensland coal – mines and advanced projects, July 2017, p 1.

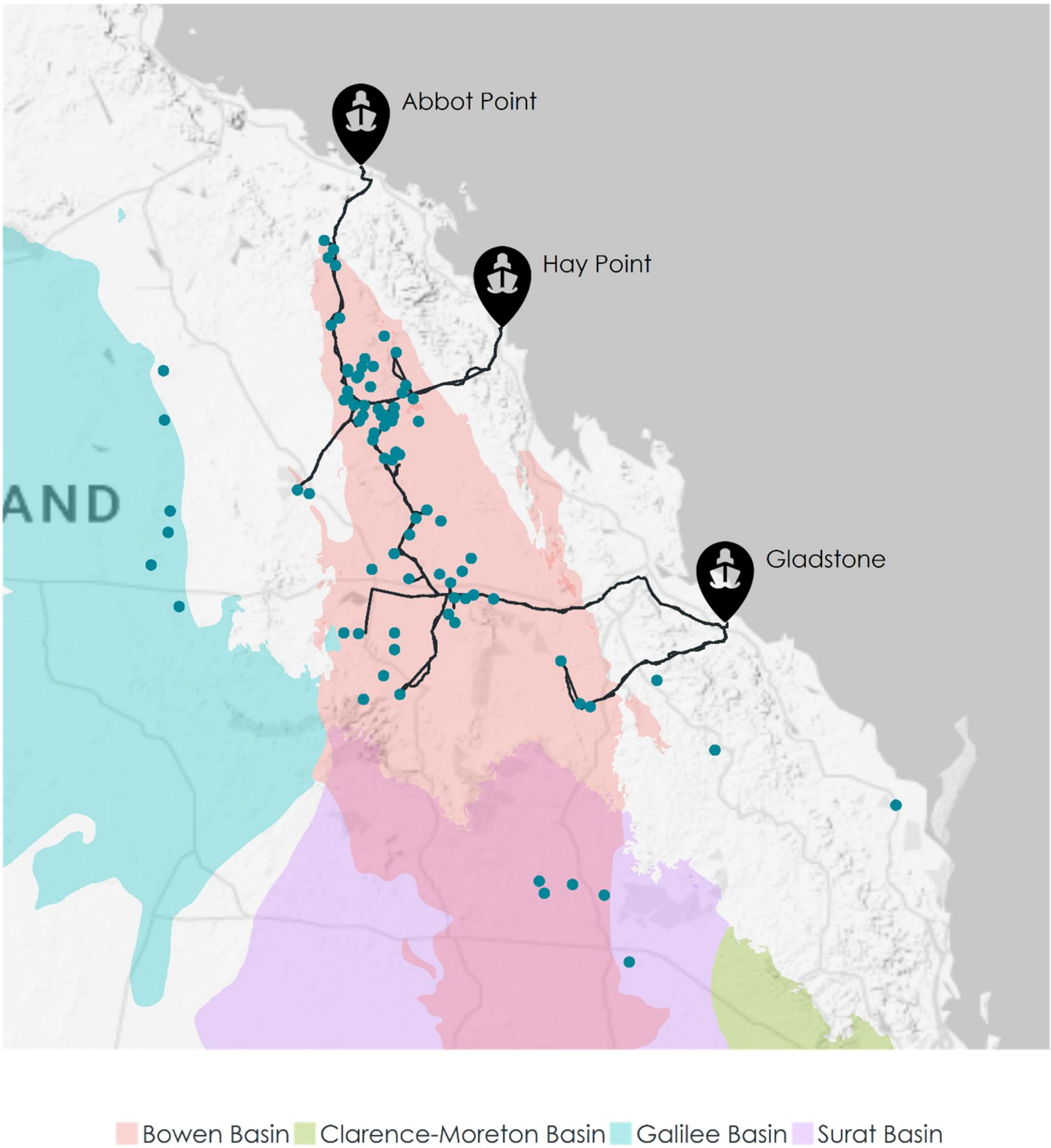
[5] Department of Industry, Innovation and Science, *Australia's major export commodities: coal,* December 2016, p 2.

[6] Department of Natural Resources, Mines and Energy, *Queensland coal – mines and advanced projects,* July 2017, p 1.

The Bowen Basin is the largest coal producing region within Queensland, supplying almost all coking coal exported from Queensland. In the 2015-16 financial year, there were 41 mines operating in the Bowen Basin that produced 217 million tonnes of the 242 million tonnes of coking and thermal coal produced in Queensland that year.[7]

Figure 2.3 shows that the highest density of existing and prospective mines in Queensland is within the Bowen Basin and served by an interconnected rail network operated by Aurizon Network, the details of which are outlined in section 2.3.

Figure 2.3: Overview of the Queensland export coal network



[7] Op. cit., p 2.

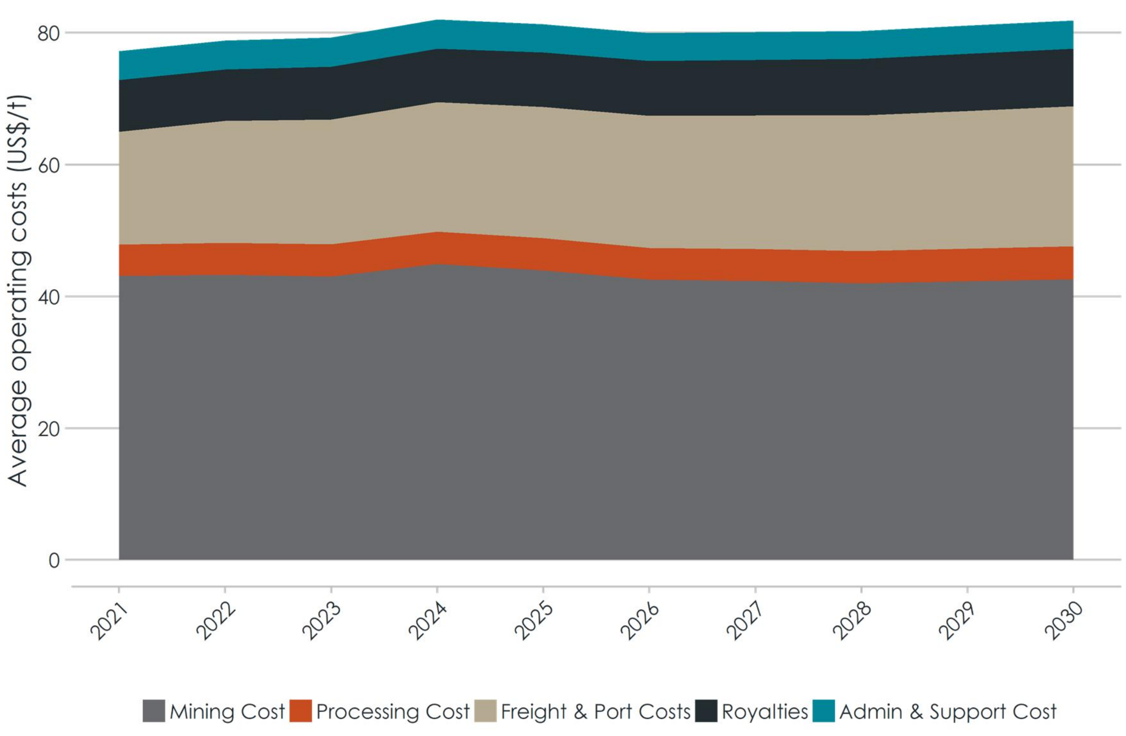
Source: AME, Australian Geological Provinces Database, Google Maps.

Besides the Bowen Basin, a significant amount of future production capacity may arise from potential developments in the surrounding Galilee and other basins.[8]

Forecasts prepared by coal industry analysts, AME, indicate that the operating costs of these operating and prospective mines are expected to remain relatively flat over the medium term, with average operating costs ranging between $77 and $82 per tonne over the declaration period. The physical mining cost contributes the majority of costs to this profile, with an average value in 2021 of $43 per tonne out of the total operating costs of $77 per tonne.

The reliance on rail for these mines to gain access to the global export market is expected to contribute a larger proportion of the operating costs in the future. Freight and terminal costs are expected to increase in both absolute and relative terms, from $18 per tonne and 22 per cent in 2021, to $21 per tonne and 26 per cent in 2030. A key driver for these trends appears to be high freight and terminal costs in relation to the potential development of coal resources in the Galilee Basin.

Figure 2.4: Average production costs of operating and prospective Queensland mines

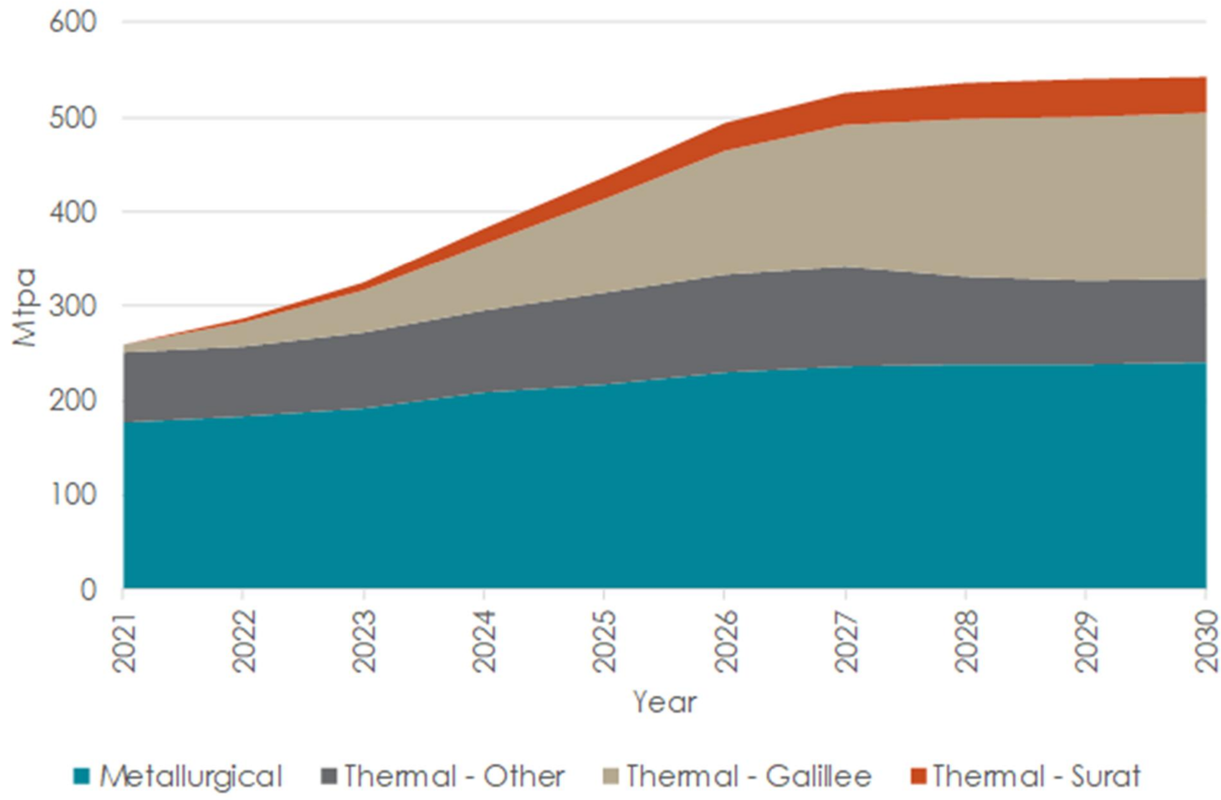


Source: AME

Figure 2.5 shows AME's forecast production of coal by coal type and for new basins. The figure illustrates that potential production of metallurgical and thermal coal is projected to grow. The growth in thermal coal is more pronounced due to the potential production from prospective developments in the Galilee and Surat basins.

[8] Department of Natural Resources and Mine, *Queensland coal – mines and advanced projects,* July 2017, p 1.

Figure 2.5: Production of coal by type and for new basins



Source: AME

The forecasts of coal production set out in figure 2.5 above are closely aligned with the forecasts of coal production prepared by Resource Management International (RMI) for the QCA in the context of Aurizon Network's draft access undertaking.[9] In table 4.1 of its report, RMI forecasts total coal railings on Aurizon's railway network over the period from 1 July 2017 to 30 June 2021. Table 2.1 below compares AME's and RMI's forecasts of coal production.

Table 2.1: Comparison between AME and RMI production forecasts in central Queensland (mtpa)

Data provider	2018	2019	2020	2021
AME	228.8	239.9	242.3	258.6
RMI	236.4	250.2	259.3	264.3

Source: AME, RMI

2.3 Coal export supply networks

To utilise seaborne export markets, mines are dependent on their ability to access a supply network to move their coal from their mine to one or more coal terminals, using an interconnected rail network. Key services in the supply networks that are considered in this report include the provision of:

- rail access services;

[9] RMI, *A confidential report by Resource Management International to the Queensland Competition Authority*, May 2017.

- rail haulage services; and
- coal handling services at coal terminals.

2.3.1 Coal terminals

Five coal terminals are available to mines located in central Queensland from which to access the export market for their production:

- DBCT and Hay Point Coal Terminal (HPCT) at the Port of Hay Point near Mackay;
- Adani Abbot Point Terminal (AAPT) near Bowen at the Port of Abbot Point; and
- RG Tanna Coal Terminal (RGTCT) and Wiggins Island Coal Export Terminal (WICET) at the Port of Gladstone.

These coal terminals transfer coal from rail wagons to bulk carriers and include facilities such as:

- rail unloading facilities;
- stockyard and coal blending facilities;
- wharves, jetties, berths and ship loading systems.

Of these terminals, HPCT has the highest level of vertical integration, being owned and operated by the BHP Mitsubishi Alliance (BMA). Historically, we understand that HPCT has only provided coal handling services to mines operated by BMA and by BHP Mitsui Coal (BMC), another joint venture involving BHP.

Among these terminals, DBCT is currently the only facility that is declared.[10] As a result of this status, the QCA must review access undertakings submitted by DBCTM. An access undertaking takes effect if it is approved by the QCA. The QCA also enforces approved access undertakings and arbitrates disputes.

Of the five coal terminals, DBCT's coal loading facility has the highest nominal capacity and is able to serve 85 million tonnes per annum (mtpa) to the export market. Table 2.2 below shows indicative nominal capacities of each of the coal terminal facilities.[11]

Table 2.2: Existing capacity of coal export terminals in central Queensland

Coal terminal	Nominal capacity (mtpa)
AAPT	50
DBCT	85
HPCT	55
RGTCT	75
WICET	27

Source: AME

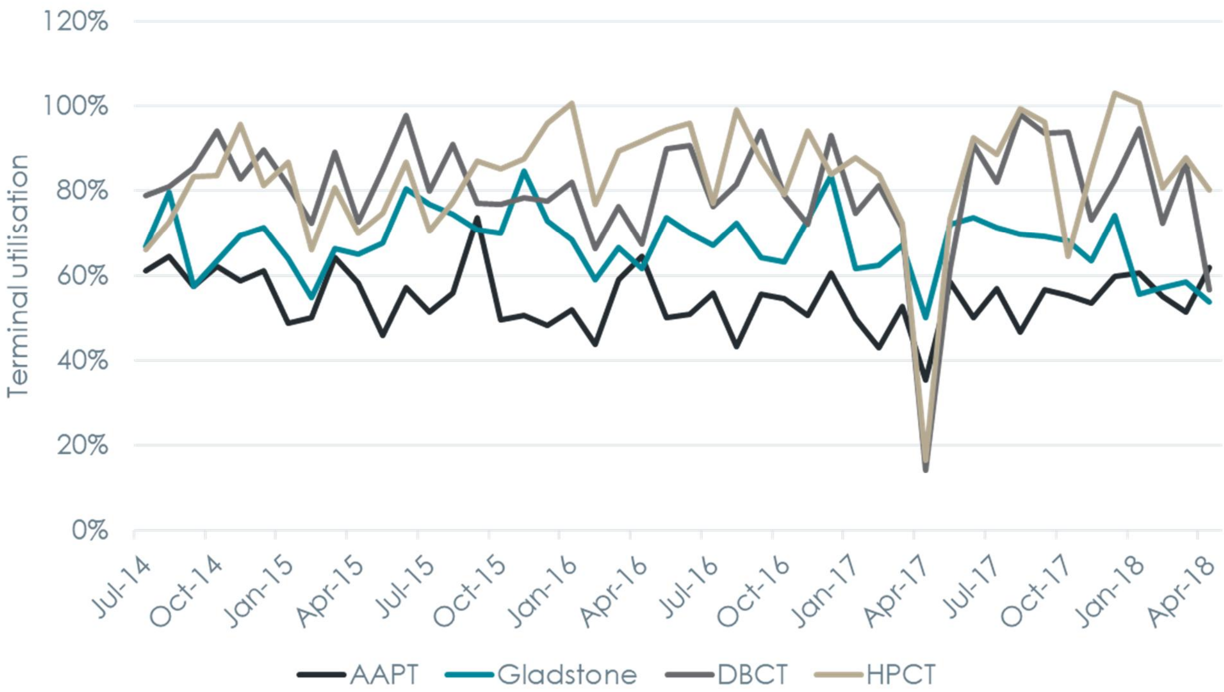
Figure 2.6 below shows a recent history of the utilisation of each of these terminals, with the exception of the terminals located at Gladstone, which are presented jointly. The figure shows that the average utilisation of capacity at DBCT and HPCT has been high over this period, at 80 per cent and 83 per cent respectively. By

[10] Queensland Competition Authority's website, http://www.qca.org.au/Ports, accessed 5 April 2018.

[11] The effective capacity that these terminals provide might be considerably lower than this figure at any point in time. Similarly, these nominal capacities may change over time as each of the facilities are able to expand their capacity through capital programs, which we outline further below.

comparison, average capacity utilisation has been lower at the Port of Gladstone, at 68 per cent, and lower still at AAPT, at 54 per cent. These estimates, and figure 2.6 below, include the impact of tropical cyclone Debbie, which resulted in the temporary closure of DBCT, HPCT and AAPT.[12]

Figure 2.6: Utilisation of coal terminal capacity over time



Source: North Queensland Bulk Ports, Port of Gladstone

2.3.2 Central Queensland coal network

The coal mines in the Bowen Basin connect to various combinations of the coal terminals identified above, and so to the export market, through the central Queensland coal network (CQCN), an interconnected set of railway systems that is owned, operated and maintained by Aurizon Network.

This rail system is declared under the QCA Act and must provide access to third-party above-rail operators in accordance with Aurizon Network's access undertaking.[13] Currently, the above-rail operators providing coal haulage across the CQCN are Aurizon, Pacific National and BHP. BHP provides rail haulage only from mines operated by affiliated entities, but hauls to DBCT as well as HPCT.

The CQCN comprises five interconnected rail systems:

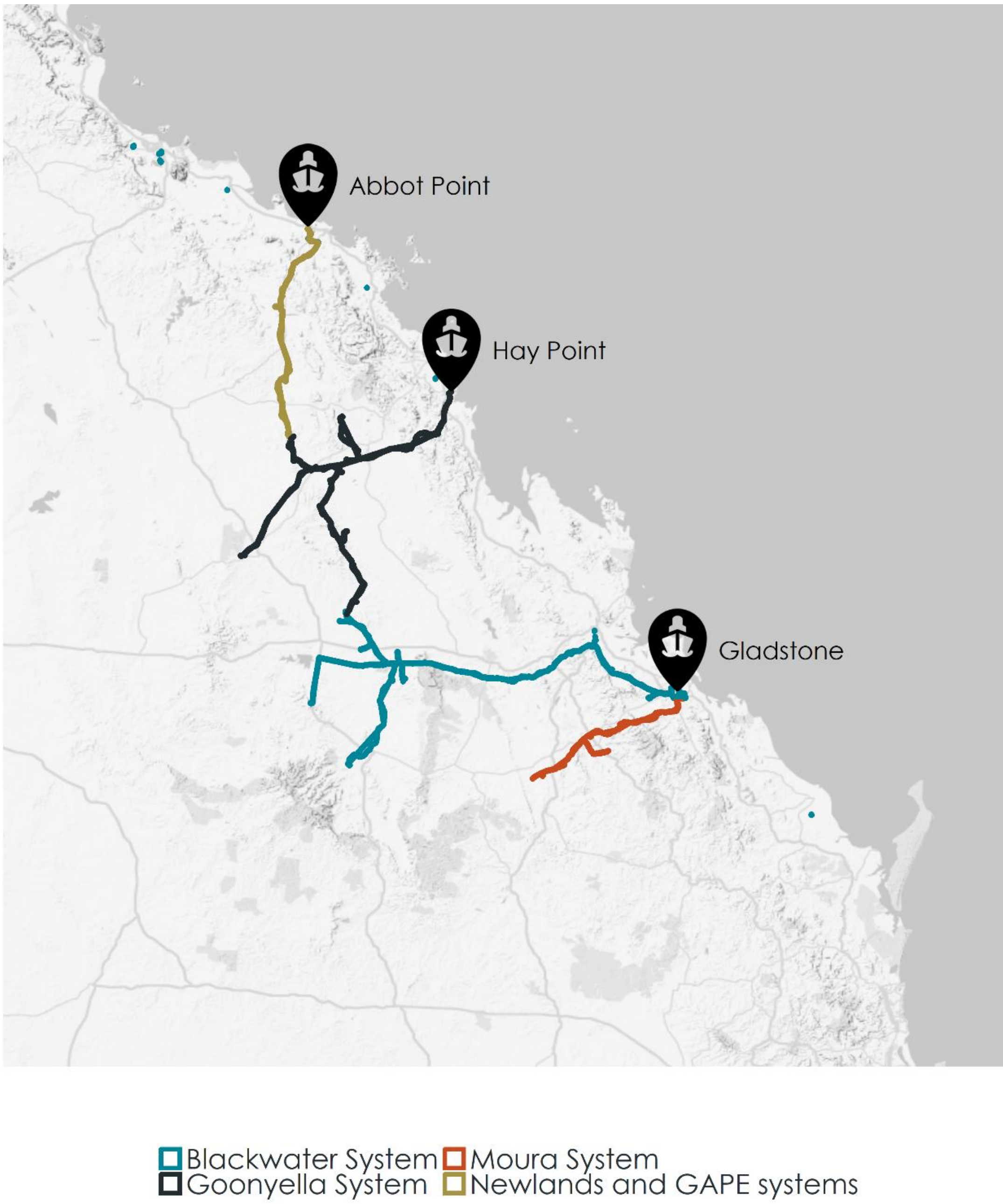
- the Goonyella system, which links central Bowen Basin mines to DBCT and HPCT;
- the Newlands system, which links northern Bowen Basin mines to AAPT;
- the Goonyella to Abbot Point extension (GAPE), which provides a link between the Goonyella system at North Goonyella to Newlands at the southern extremity of the Newlands system;
- the Blackwater system, which links southern Bowen Basin mines to RGTCT and WICET;
- the Moura system, which links mines from Moura to Gladstone to RGTCT and WICET.

[12] Platts, *Australia's Dalrymple Bay, Hay Point, Abbot Point coal terminals shut ahead of cyclone*, 27 March 2017.

[13] QCA, *More on Aurizon Network,* http://www.qca.org.au/Rail/Aurizon/Intro-to-Aurizon, accessed 5 April 2018.

The existing rail systems of the CQCN are shown in figure 2.7 below.

Figure 2.7: Rail systems of the central Queensland coal network



Rail system source: Department of Natural Resources, Mines and Energy, Rail network – Queensland, April 2017. Base map source: Google Maps 2018.

In addition to these five existing rail systems, further rail systems are proposed to connect the prospective mines in the Galilee and Surat basins to the ports at Abbot Point and Gladstone, respectively.[14] The Galilee

[14] Department of Transport and Main Roads, *Coal transport infrastructure development,* https://www.tmr.qld.gov.au/business-industry/Transport-sectors/Coal-transport-infrastructure-development, accessed 6 April 2018.

rail project is proposed to be separate from the CQCN and will connect directly with AAPT.[15] The Surat Basin rail project is proposed to connect with the Moura system but not further to the CQCN.[16]

Although the entire CQCN is interconnected*,* the degree to which each of these systems is linked varies between connections:

- the Goonyella system is connected to the Newlands system via the GAPE – a 69km rail link including 14km of duplicated sections;[17]
- the Goonyella system is connected to the Blackwater system via a single line;[18] and
- there is no interconnection between the Moura system and the other coal rail systems.

These varying degrees of interconnectedness for different sections of the network dictate the options that each mine has for the coal handling ports that it may access. For example:

- a mine on the Goonyella system has the potential to access all coal terminals at Abbot Point, Hay Point and Gladstone; whereas
- a mine on the Moura corridor has access only to the coal terminals at Gladstone.

Additionally, the extent to which mines are able to access terminals on a different rail system to their own will be dictated by the capacity of the connecting rail links. For example, given its duplicated sections, the GAPE system can handle a higher capacity than the link connecting the Goonyella and Blackwater systems.

2.3.3 Location of coal production volumes in central Queensland

Figure 2.8 below shows AME's projections of coal production volumes, by rail system from which the mine is located.

Potential production volumes across central Queensland are projected to grow significantly over time. Although much of this growth is driven by the anticipated development of mines in the Galilee Basin, AME also expects modest growth of coal volumes from the Bowen Basin. The future potential production volumes from the Goonyella system increase relative to current volumes from approximately 152 mtpa to 195 mtpa in 2026.

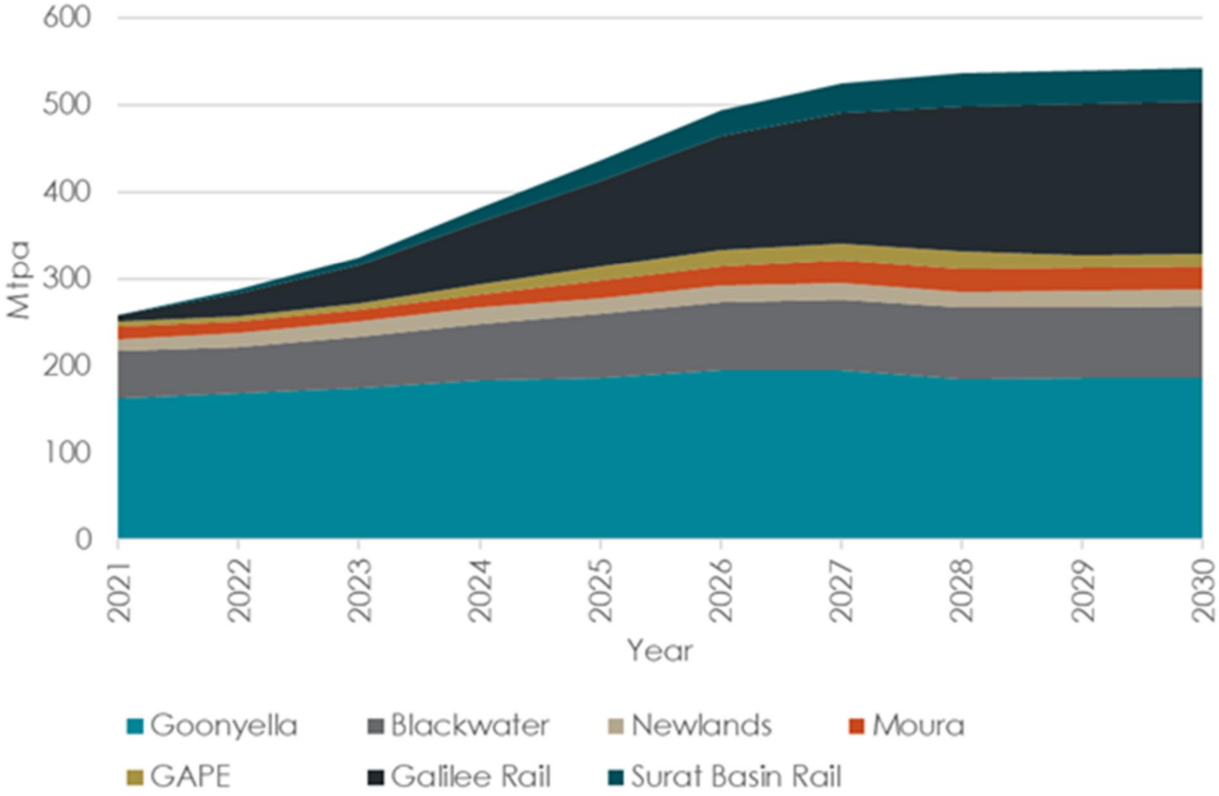
[15] Department of State Development, Manufacturing, Infrastructure and Planning, *Nortth Galilee Basin rail project,* https://www.statedevelopment.qld.gov.au/assessments-and-approvals/north-galilee-basin-rail-project.html*,* accessed 6 April 2018.

[16] Department of State Development, Manufacturing, Infrastructure and Planning, *Surat Basin rail project,* https://www.statedevelopment.qld.gov.au/assessments-and-approvals/surat-basin-rail.html*,* accessed 6 April 2018.

[17] Aurizon, *Goonyella to Abbot Point expansion project*, undated, p 2.

[18] Aurizon, *Goonyella system information pack*, March 2017, p 6.

Figure 2.8: Total projected production by rail system



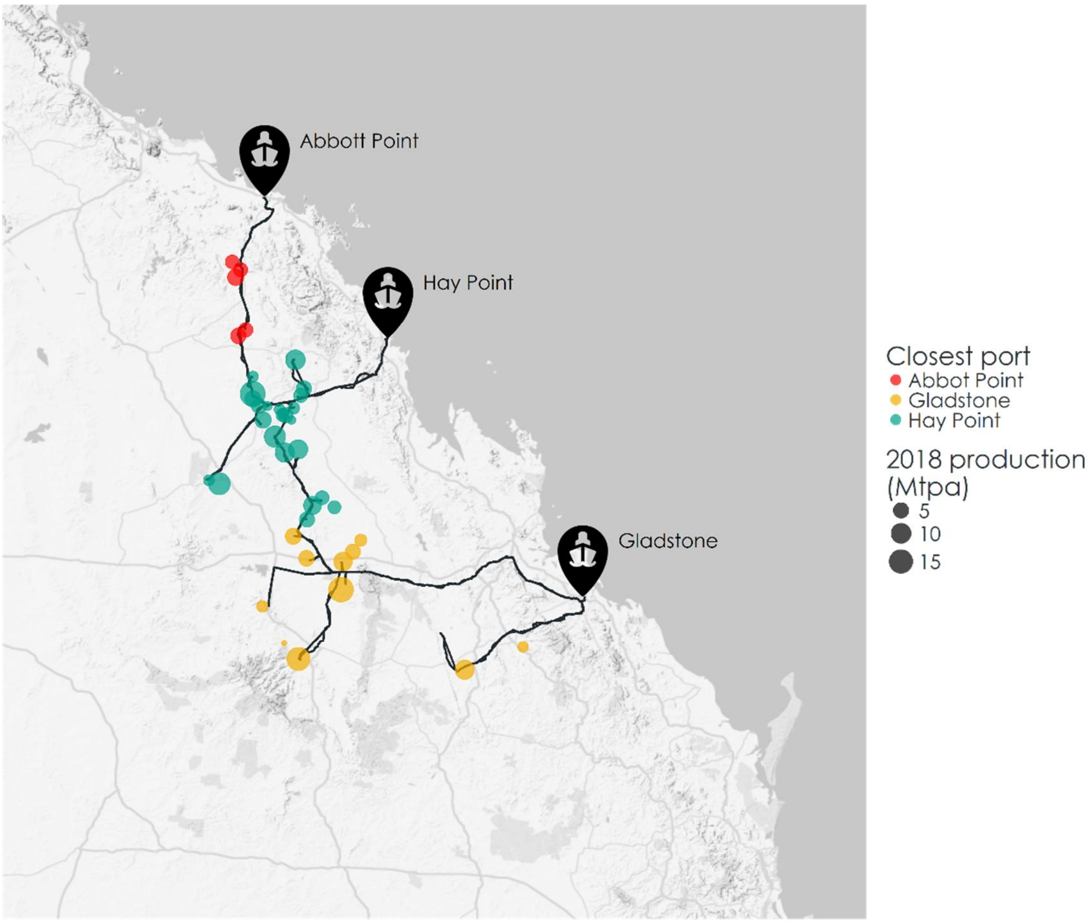
Source: Independent coal industry data - AME

2.4 Use of coal handling services by miners

A mine's use of coal handling services at a terminal is influenced by the relative location of the mine and the terminal, which in turn affects the above and below rail charges required to send coal to that terminal. However, this is not the only factor determining the use of coal handling services.

Figure 2.9 identifies the terminal location that is the closest to each mine based on rail distances alone. The figure also provides a snapshot of projected production in 2018, highlighting the relative volumes that are proximate to each port.

Figure 2.9: Location of mines proximate to each port

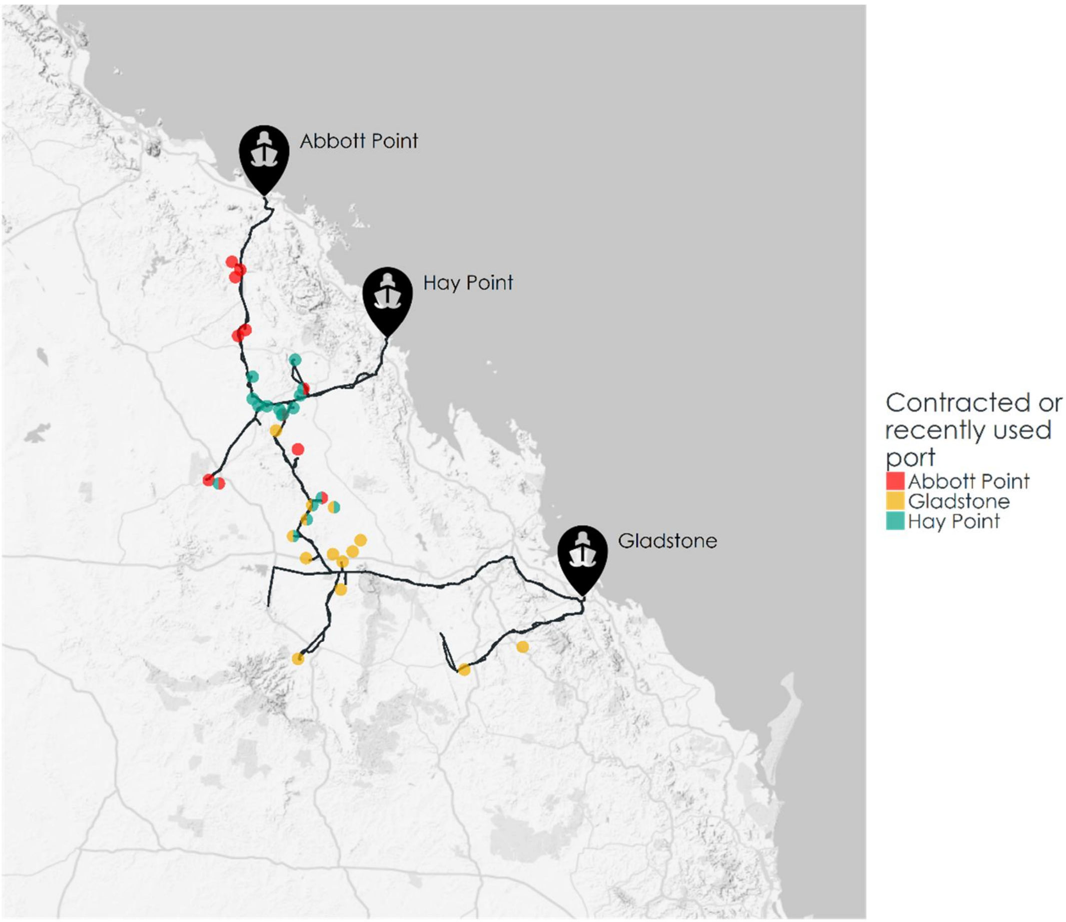


Source: AME, Google Maps

By contrast, figure 2.10 identifies the terminal locations for which miners have existing contracts for coal handling services in 2018. The figure does not indicate the volume of the contracted capacity because it is not possible in all cases to attribute this to individual mines.[19]

[19] Contracts may be used to export volumes from more than one mine and, in these circumstances, it is not possible to identify the contract volumes are attributable to each mine.

Figure 2.10: Location of mines with contracts at each port



Source: AME, DBCTM, Google Maps

Figure 2.10 shows that the geographic regions from which customers at each terminal location are served has a degree of overlap. This is consistent with both current and past examples of mines sending coal to terminals to which they are not proximate.

Mines that are located proximately to Hay Point but which currently export coal from Abbot Point or Gladstone include:

- Lake Vermont (operated by Jellinbah), which has 6 mtpa contracted capacity at AAPT, and also a rail haulage contract to Gladstone;[20]
- Middlemount (operated by Yancoal), which has 3 mtpa contracted capacity at AAPT, and also a contract for [redacted] mtpa with DBCT;[21]

[20] Jellinbah's website notes that 'Lake Vermont is able to rail to Gladstone Port and Dalrymple Bay and Abbott Point Coal Terminals'. See Jellinbah's website, http://www.jellinbah.com.au/lake-vermont/, accessed 15 May 2018. See also Aurizon's website, https://www.aurizon.com.au/news/news/qr-national-expands-tonnages-with-jellinbah, accessed 15 May 2018.

[21] FIIG, *Adani Abbot Point Terminal Pty Ltd*, 9 June 2015. p 5, and DBCTM. See also Yancoal's website, http://www.yancoal.com.au/page/assets/mine-sites/middlemount/, accessed 15 May 2018.

- South Walker Creek and Poitrel mines (operated by BHP Mitsui Coal), which have 4 mtpa contracted capacity at AAPT, in addition to [redacted] mtpa at DBCT and to the ability to access HPCT;[22]
- Capcoal (operated by Anglo American), which has contracted capacity at RGTCT, in addition to contracted capacity at DBCT;[23] and
- Oaky Creek (operated by Glencore), which has a contract with RGTCT in addition to its contract with DBCT for [redacted] mtpa.[24]

Conversely, Rio Tinto's Kestrel mine in the Blackwater system, which is located closest to RGTCT and ships through that terminal, is currently using DBCT for some of its throughput requirements.[25]

Mines that have previously sent coal to Abbot Point or Gladstone while being located proximately to the Port of Hay Point include:

- Blair Athol (operated at the time by Queensland Coal, a subsidiary of Rio Tinto), had 9.3 mtpa contracted capacity at AAPT before this was terminated and transferred to Adani Mining with the agreement of AAPT;[26]
- Clermont (operated by Glencore), which had a contract to send coal to AAPT in addition to sending coal to DBCT;[27] and
- Gregory and Norwich Park (operated by BMA), which had contracted capacity at RGTCT in addition to having previously sent coal to DBCT.[28]

[22] FIIG, *Adani Abbot Point Terminal Pty Ltd*, 9 June 2015, p 5, and DBCTM.

[23] See for example, Mitsui Coal Holdings' website, https://www.mitsui.com/au/en/group/1216673_9223.html, accessed 15 May 2018. The Capcoal project is a joint venture between Anglo American and Mitsui Coal Holdings. See also The Australian, *Asciano poaches key QR coal contract*, 16 June 2010.

[24] See Glencore's website: http://www.glencore.com.au/en/who-we-are/energy-products/oaky-creek/Pages/default.aspx, accessed 24 May 2018.

[25] DBCTM. See also Rio Tinto's website, http://www.riotinto.com/australia/rtca/kestrel-mine-10423.aspx, accessed 15 May 2018.

[26] IEEFA, *A house of cards in Australia: Adani's Abbot Point Coal Terminal faces escalating financial risk*, October 2017, p 10.

[27] See for example, Aurizon's website, https://www.aurizon.com.au/news/news/aurizon-secures-performance-based-contract-with-rio-tinto-coal-australia, accessed 24 May 2018.

[28] RGTCT was constructed to export coal from Gregory – see Port of Gladstone's website, https://www.gpcl.com.au/about-us/our-history, accessed 25 May 2018. See also Energy Economics, *Moura and Blackwater coal railings forecast*, July 2015, pp 3, 24.

3. Economic framework for assessment

Recent changes made to the QCA Act mean that the assessment of whether the DBCT service should be declared for a further period will be made under new access criteria. The new criterion (b) reads:[29]

> that the facility for the service could meet the total foreseeable demand in the market—
>
> (i) over the period for which the service would be declared; and
>
> (ii) at the least cost compared to any 2 or more facilities (which could include the facility for the service);

This section summarises the economic and analytical framework that should be applied in the assessment of criterion (b) to the DBCT service.

We understand it is uncontroversial that:

- the 'facility for the service' is DBCT, being the physical infrastructure by which the service is provided and in relation to which the declaration review is being undertaken; and
- the 'service' provided by the facility is the coal handling service at DBCT, being the service that is currently declared and regulated by the QCA.

We assume that the period for which the service would be declared is 10 years from the time at which the current period of declaration expires. Since declaration expires in September 2020, the relevant period extends to September 2030.

Criterion (b) is satisfied if, over this period, all foreseeable demand in the market in which the service is provided would be met at least cost by the facility. Conversely, criterion (b) is not satisfied if, during this same period, it is lower cost for at least some of the foreseeable demand in the market in which the service is provided to be met by another facility.

The remainder of this section presents a framework for assessing the three economic elements of the criterion, being:

- the market for the service;
- the foreseeable demand in that market; and
- the assessment of least cost.

3.1 The market for the service

Criterion (b) refers to total foreseeable demand in 'the market'. The market within which the service is provided is therefore a central element of the economic framework for assessing whether the DBCT service satisfies criterion (b).

3.1.1 What is a market?

Section 71 of the QCA Act states that, within the Act:

> (1) A market is a market in Australia or a foreign country.
>
> (2) If market is used in relation to goods or services, it includes a market for—

[29] *Queensland Competition Authority Act, s. 76(2)(b)*

> (a) the goods or services; and
>
> (b) other goods or services that are able to be substituted for, or are otherwise competitive with, the goods or services mentioned in paragraph (a).

More generally, a market can be taken to be the area of close competition between firms.[30] The Trade Practices Tribunal has described a market as:[31]

> …the field of actual and potential transactions between buyers and sellers amongst whom there can be strong substitution, at least in the long run, if given a sufficient price incentive.

Defining a market involves the identification of the competitive constraints that are likely to have a material effect on a product or service (they are 'in the market'), and those that have a less immediate effect (they are 'out of the market'). However, such bright lines rarely exist in practice and firms selling products that are out of the market may act as a competitive constraint, albeit to a lesser degree.

The boundaries of a market are conventionally determined by reference to four dimensions:[32]

- the products or services supplied – the product dimension;
- the geographic area over which the products are supplied – the geographic dimension;
- the level in the supply chain at which the parties operate – the functional dimension; and
- the period within which the market operates – the time dimension.

In DBCT's case, the geographic scope of the market is the most consequential dimension of the market definition process for the assessment of criterion (b) and we discuss our approach to defining this in section 3.1.2 below. In relation to the other dimensions of the market:

- the product dimension of the market is the coal handling service, since there are no close substitutes for moving coal from rail to ships, and no other firm can easily begin offering a coal handling service with its existing infrastructure;
- the functional dimension of the market is the coal handling service, which is separate from other port and transport services such as harbour towage, port security or dredging because those services are not vertically integrated with the coal handling service; and
- the time dimension of the market is likely to be the period for which the declaration of DBCT would apply, which we assume to be 10 years from September 2020, and is sufficiently long to allow competition for coal handling services through long term contracts.[33]

The process of defining a market should be guided by the purpose of the exercise. The High Court has said:[34]

> Identifying a market and defining its dimensions is a "focusing process", requiring selection of "what emerges as the clearest picture of the relevant competitive process in the light of commercial reality and the purposes of the law."

[30] Re Queensland Co-Op Milling Association Limited and Defiance Holdings Limited (1976) 8 ALR 481 at 22

[31] Re Queensland Co-Op Milling Association Limited and Defiance Holdings Limited (1976) 8 ALR 481 at 190

[32] As identified, for example, in *Re Tooth & Co Ltd (1979) 39 FLR 1*, by the Trade Practices Commission.

[33] No contract to use coal handling services at DBCT extends to 2030, and nor are we aware of any contract exceeding this duration to use coal handling services at any other coal terminal.

[34] Flight Centre HCA 49 para 69

The purpose of criterion (b) is to test whether the service is a natural monopoly.[35] It follows that, to the extent there is any doubt in relation to choices to be made in the market definition process, it is appropriate to adopt the definition that is most appropriate for the purpose of this assessment.

3.1.2 The geographic dimension of the market

The geographic dimension of a market identifies the area from which consumers can source supply without too much additional cost and inconvenience, and from which other suppliers can provide supply quickly and without the need for significant investment.[36] The Tribunal has described the geographic dimension of the market in the following terms:[37]

> The geographic area of the market (ie whether it is local, regional, national or international) takes into account, principally, the area within which buyers choose to purchase their goods (ie actual buying patterns) and the areas within which sellers traditionally supply (or could easily supply in response to changed market conditions) their goods.

In other words, the geographic dimension of the market is the area over which a product or service is supplied, or could be supplied quickly without significant investment.

A generally accepted framework for defining the geographic dimension of a market is the 'hypothetical monopolist test', which involves the following three-step process.[38]

Step 1: Begin with the narrowest reasonable geographic dimension of the market

The process begins with the narrowest reasonable geographic dimension of the market, bearing in mind the conduct at hand or the purpose of the exercise. In relation to the geographic market, this generally means the area over which the product or service in question is supplied. This is consistent with authorities on market definition and the practice of the Australian Competition and Consumer Commission (ACCC).

For example, Maureen Brunt has examined the original formulation of the concept of a market and explained that it should include:

> …all considerations which [a seller] takes into account in determining his business policies and practices.

She suggests that a methodology for defining markets begins with the product that is supplied by the defendant in a particular case.[39] Applying this principle to geographic areas would suggest starting with the area over which a product is supplied.

For the purpose of examining the competitive effects of mergers, the ACCC also starts the market definition process with the geographic regions actually or potentially supplied by the merger parties:[40]

> The ACCC's starting point for delineating relevant markets to assess a merger under s. 50 of the Act is identifying the products and geographic regions actually or potentially supplied by the merger parties.

[35] Competition and Consumer Amendment (Competition Policy Review) Bill 2017, Explanatory memorandum, para 12.22.

[36] Smith, R and A Duke, *The geographic dimension of markets: some observations*, Competition and Consumer Law Journal, 2017, 25(1), p 2.

[37] Application by Chime Communications Pty Ltd (No 2) [2009] ACompT 2 (27 May 2009), para 21.

[38] ACCC, *Merger Guidelines*, November 2008, paras 4.19-4.21.

[39] Brunt, M, *Market definition issues in Australian and New Zealand trade practices litigation*, Australian Business Law Review, 1990, 18, p 208.

[40] ACCC, *Merger Guidelines*, November 2008, para 4.10.

It begins the hypothetical monopolist test with the area supplied by one of the firms in question:[41]

> The process of applying the [hypothetical monopolist test] starts with one of the products and geographic areas supplied by one or both of the merger parties.

Similarly, in relation to the misuse of market power, the ACCC has said that the best starting point is where the good or service is supplied:[42]

> To determine the geographic market, it is first necessary to identify the area in which the good or service under analysis is supplied. The ACCC then considers the geographic areas where consumers would be able or willing to find substitutes for the goods or services in question.

We conclude that the starting point for defining the geographic market for the purpose of a test for the existence of a natural monopoly is the area over which a product is supplied by the facility in question. This is consistent with the definition of the geographic market given by the Tribunal, described above.

Step 2: Apply a SSNIP to a hypothetical monopolist operating in this market

The next step is to evaluate whether it would be profitable for a hypothetical monopolist controlling all suppliers serving the geographic area of demand in the candidate market to impose a small but significant and non-transitory increase in price (SSNIP) of five to ten per cent. This action may not be profitable if a sufficient number of customers switch to using one or more coal terminals that are not already part of the candidate market in response to the price rise.

The hypothetical monopolist test is complete and the market is taken to have been defined if the SSNIP is profitable, thereby signifying that no further substitute products or additional sources of supply closely constrain the hypothetical monopolist.

Step 3: Expand the candidate market

If the SSNIP is not profitable, the candidate geographic dimension of the market identified at step 2 should be expanded to include the area from which the competitive constraint came to prevent the SSNIP being profitable, after which step 2 should be applied again.

3.2 Calculating foreseeable demand in the market

Criterion (b) refers to 'total foreseeable demand in the market'. 'Foreseeable demand' is not a term of art in economics. However, we note that:

- *'foreseeable'* suggests a value that could reasonably be expected, given information that is currently available; and
- '*demand'* in an economic sense refers to the willingness of potential buyers to purchase a good or service at a particular price at some point in time.

Further, the total foreseeable demand of interest is that 'in the market', rather than the foreseeable demand 'for the service'. This means that total foreseeable demand should be estimated as the total requirement for coal handling services arising for production (or expected production) of coal at locations that are within the geographic dimension of the market. Whether these volumes are being served, or will ultimately be served, by DBCT is not relevant to the calculation of foreseeable demand.

[41] *Op. cit.*, para 4.20.

[42] ACCC, *Interim guidelines on misuse of market power*, October 2017, para 2.8.

3.3 Calculating least cost

Criterion (b) requires an assessment of whether foreseeable demand in the market in which the service is offered can be served at least cost by the facility compared to any two or more facilities. In this section, we set out the framework that we apply for assessing the least cost means of serving foreseeable demand.

An assessment to the effect that it is *least cost* for DBCT to meet total foreseeable demand in the market requires one to establish that it would not reduce costs to handle some or all foreseeable demand at one or more alternative terminals. Such an assessment must therefore consider alternative ways that foreseeable demand could be met, taking into account:

- the availability of capacity at DBCT and other terminals to handle some or all foreseeable demand in the market, as well as the costs associated with utilising this capacity; and
- the potential for DBCT and other terminals to be expanded or other terminals constructed so as to handle some or all foreseeable demand, and the costs associated with these expansions.

We describe below that this assessment should also extend to the availability of capacity, and the potential and costs for expansion, of the rail networks that enable the coal handling services which are provided by DBCT and other terminals.

In this section we present a framework for the assessment of the least cost means of service. We describe the costs that should, in principle, be captured in this assessment, and the methodological approach by which we assess whether it is least cost for foreseeable demand in the market to be met by the coal handling service at DBCT.

3.3.1 Assessing costs requires regard to resource costs across the supply network

Criterion (b) refers to *'least cost'* but does not offer guidance on either the scope or form of costs that are to be considered in this assessment.[43] We set out our analysis of these parameters below.

Scope of the costs included in the assessment

The costs referred to in criterion (b) should not be limited to those incurred by the provider of the facility for the service. To do so would overlook the fact that coal handling services are part of a supply network and that to meet foreseeable demand in the market requires costs to be incurred throughout that supply network. This is particularly relevant in the case of capacity expansions, which require that the system capacity is expanded to match, including below rail, above rail, terminal and port channels.

Comparing the costs of meeting foreseeable demand at one facility compared to any two or more facilities therefore requires consideration of all the supply network costs that would be affected by any decision as to whether foreseeable demand is met at DBCT or any two or more facilities. This approach is also consistent with the approach to defining the geographic dimension of the market, which must take into account the potentially different costs of transport applying in identifying the extent and responsiveness of demand for and use of different service providers that may (or may not) be in the market.

It follows that the least cost assessment must consider all the costs that may be incurred in the coal supply network to meet the foreseeable demand. This includes costs associated with both rail access and rail haulage, as well as the port terminal infrastructure and handling costs.

In principle, the costs to be considered should also include any other costs incurred in the supply network that may be affected by any decision as to whether foreseeable demand is met at DBCT or any two or more facilities. These may include, for example, the costs associated with the provision of other port services such

[43] Except that section 76(4) of the QCA Act specifies that the costs include *'…all costs associated with having multiple users of the facility for the service, including costs that would be incurred if the service were declared.'*

as pilotage and port security, or the costs associated with dredging shipping channels, where incurred to meet foreseeable demand.

Type of costs included in the assessment

The focus of our criterion (b) assessment is on the incremental costs to society associated with rail access and rail haulage as well as terminal infrastructure and handling. These are the costs that society bears associated with the expected use of rail and terminal infrastructure. In this report we refer to these as the 'resource costs' of these activities.

Our focus on the costs associated with rail and terminal usage reflects that these elements are the most likely to vary when different terminal facilities are used to meet total foreseeable demand in the market. For other elements of coal supply networks:

- it is reasonable to assume that the resource costs incurred to meet foreseeable demand are similar regardless of which facility is used to meet that demand – for example, in relation to port security; or
- there is limited empirical information available on which to base an assessment that the resource costs incurred to meet foreseeable demand would differ significantly between terminals – for example, in relation to dredging.[44]

Our focus on incremental costs to society (or resource costs) is appropriate because:

- the sunk costs of existing rail and terminal infrastructure have already been incurred and will not be incurred again over the period for which the service would be declared; and
- even if the sunk costs of existing rail and terminal infrastructure were to be taken into account in an assessment of least cost, these costs would be captured under all scenarios in which total foreseeable demand in the market is met and are therefore not relevant to determining whether the facility for the service can meet this demand at least cost.

The evaluation of the resource costs of meeting foreseeable demand is likely to be significantly affected by the fact that the provision of rail and terminal infrastructure is capital intensive. It follows that the resource costs of meeting foreseeable demand using existing infrastructure (which does not require new capital investment) are likely to be significantly lower than the resource costs associated with the construction and use of new infrastructure.

However, the incremental cost of using existing infrastructure may be difficult to estimate. One proxy for this cost may be the price of using that infrastructure, but this is likely to overestimate significantly the resource costs of using the infrastructure since the price will often reflect a return of and on the sunk capital costs of the assets used to provide the service – which are not part of the incremental cost of providing the service over the relevant period. For capital intensive services such as coal handling at terminals, and rail access services, it would be reasonable to expect the resource of costs of using existing infrastructure to be much lower than the price that is charged for infrastructure services.

By contrast, the incremental cost of using new infrastructure will include the capital costs of the construction that is required to realise this investment. It could also include any further costs associated with operating and maintaining the new infrastructure, even if these costs are fixed in nature, if they would be avoided had the infrastructure not been developed.

It follows that the resource costs of meeting foreseeable demand using existing capacity are likely to be substantially lower than the resource costs of meeting foreseeable demand using expanded capacity. This suggests that, if total foreseeable demand in the market exceeds the existing capacity of DBCT, and there is

[44] However, we understand that there may be qualitative reasons to believe that dredging to facilitate expansions would be costlier for DBCT than it would be for terminals based at Gladstone and Abbot Point.

existing capacity at other terminals, then it is very likely that it is least cost to meet some of this foreseeable demand using this existing capacity.

3.3.2 Assessing the least cost of provision requires optimisation

To demonstrate that DBCT can meet foreseeable demand in the market at least cost requires showing that it would not be lower cost for at least some of this demand to be handled at another terminal. For coal from any given mine in the market to be handled at another terminal, instead of at DBCT, requires:

- incurring the incremental costs of handling coal at that terminal and saving the resource costs associated with handling coal at DBCT instead; and
- incurring the incremental costs of railing coal to that terminal and saving the resource costs associated with railing coal to DBCT instead.

This approach to assessing least cost is also consistent with the overall purpose of criterion (b), which is to identify whether or not the facility that provides the service is a natural monopoly.[45] A prerequisite for access at DBCT is the ability to transport coal by rail to DBCT, therefore requiring below rail access from Aurizon Network and above rail services from a rail haulage provider.

By way of example, suppose that the resource costs of exporting coal produced at a given mine from terminals A and B are the same, because:

- the total incremental costs associated with exporting coal from terminal A are $20 per tonne, consisting of $5 per tonne terminal costs and $15 per tonne rail costs; and
- the total incremental costs associated with exporting coal from terminal B are $20 per tonne, consisting of $7 per tonne terminal costs and $13 per tonne rail costs.

In these circumstances, terminal A incurs the lowest terminal costs to meet the demand from the customer. However, these lower costs do not make terminal A a natural monopoly (or a monopoly at all in relation to demand originating from the mine in question) because its cost advantage in providing terminal services is offset by the greater cost of coal transport.

Confirming that there is no lower cost means of serving foreseeable demand than only by means of the DBCT service requires an assessment against many potential alternatives or counterfactuals. These include utilising either existing available capacity at other terminals, expanded capacity at other terminals or building a new facility to accommodate the foreseeable demand.

The proper assessment of each of these possibilities involves the application of an optimisation framework, in the presence of constraints. In particular, given various assumptions about the resource costs required to utilise existing port and rail facilities, and the resource costs required to expand existing facilities or build new ones, the least cost option for meeting foreseeable demand requires that:

- the cost to be minimised (or 'objective function') be set equal to the total resource costs of serving the production at each mine – ensuring that the solution is least cost; subject to
- constraints requiring that the foreseeable demand be met using available capacity (whether existing or expanded capacity) at port and rail facilities.[46]

We provide a full description of the optimisation modelling process by which we assess the least cost means of meeting total foreseeable demand in the market at in section 8.A2.1 of this report.

[45] Competition and Consumer Amendment (Competition Policy Review) Bill 2017, Explanatory memorandum, para 12.22.

[46] Assuming that the resource costs associated with meeting foreseeable demand in the market are no greater than the charges associated with each mine's utilisation of rail and port terminal capacity.

4. Defining the market for the service

The appropriate product and functional dimensions of the market, for the purpose of examining whether the DBCT service should be declared, is the provision of coal terminal services.[47] In this section, we apply the hypothetical monopolist test, as described in section 3.1.2 above, to identify the geographic dimension of the market.

We explain in section 3.1.2 that the starting point for determining the geographic dimension of the market is the area over which the relevant service is currently being or will be supplied. In other words, this is the geographic area that encompasses all of DBCT's existing and potential customers.

Since we cannot be sure precisely which mines will use DBCT's services over the entire period for which the assessment is to be undertaken, we identify the geographic scope of likely and potential customers for DBCT's services by reference to the mines that are proximate to the Port of Hay Point.

Finally, we test whether a hypothetical monopolist could profitably apply a SSNIP within this geographic market.

4.1 Current and recent customers of DBCT

Table 4.1 below sets out the mines that have exported coal through DBCT over the past five years, and so might reasonably be regarded as existing or potential customers of DBCT.

Table 4.1: Mines that have exported coal through DBCT since 2014

Miner	Mine	Miner	Mine
Peabody	Coppabella	Anglo American	German Creek
	Millennium		Moranbah North & Grosvenor
	Burton	Jellinbah	Lake Vermont
	North Goonyella	Terracom	Blair Athol
	Middlemount	Rio Tinto	Kestrel
	Moorvale		Hail Creek
BMC	South Walker Creek	Glencore	Oaky Creek
BMA	Caval Ridge		Clermont
	Saraji	Stanmore	Isaac Plains
	Peak Downs	Fitzroy	Carborough Downs
	Riverside	Realm Resources	Foxleigh
	Goonyella		

Source: DBCTM

Further, we understand that DBCTM has agreed new contracts with the following miners to export coal from mines not listed as current or recent customers in table 4.1 above:

- Fitzroy Australia Resources, for [redacted] mtpa from its [redacted] mines, commencing in [redacted]; and

[47] See section 3.1.1.

- Pembroke Resources, for [redacted] mtpa from its [redacted] mines, the first contract for [redacted] mtpa commencing in [redacted] and the second contract for [redacted] commencing in [redacted].

Figure 4.1 identifies the location of mines that are:

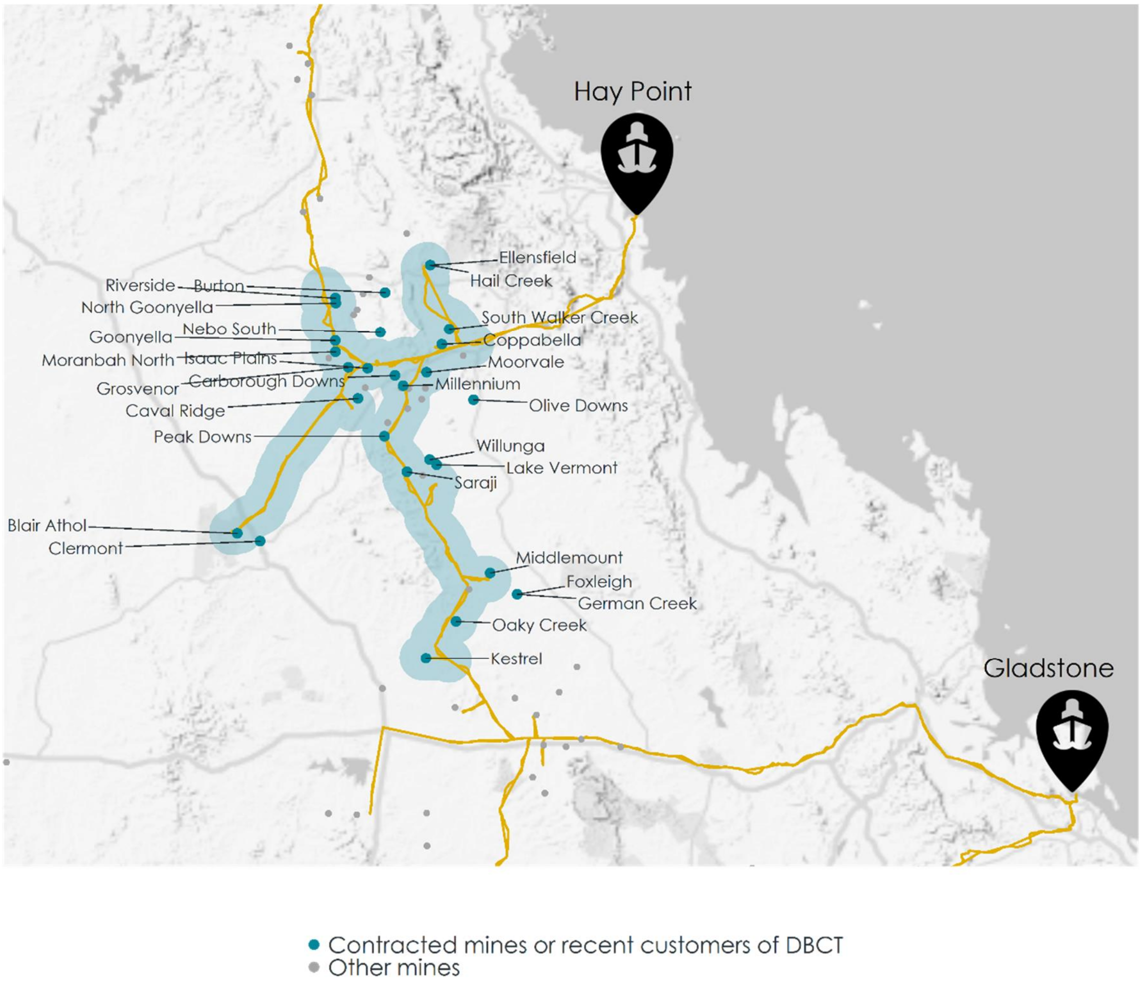
- listed in table 4.1 as being current or recent customers of DBCT; or
- identified above as having recently entered into contracts with DBCT.

The shaded area identifies the starting point for determining the geographic dimension of the market, being those parts of the railway system from which mines prefer to use DBCT. This area encompasses the entirety of the Goonyella system and part of the Blackwater system, extending:

- north to North Goonyella;
- northeast along the Hail Creek branch line to Hail Creek;
- west along the Blair Athol line to Clermont; and
- south to Kestrel.

Within the shaded area are mines that use coal handling services at other terminals, and parts of the Goonyella and Blackwater systems through which these mines would connect. Mines that are not current or recent customers at DBCT are identified with a small grey circle in figure 4.1, since the focus is on identifying the geographic region from which DBCT's customers are drawn.

Figure 4.1: Starting point for geographic dimension of the market using DBCT's current and recent customers



Source: DBCTM and AME data, HoustonKemp analysis

The bounds of this market include mines that use (or have recently used) coal handling services at HPCT, AAPT and RGTCT, in addition to those that use (or have recently used) the DBCT service. We list these mines at table 4.2 below and include all mines that are in production in 2018 and lie either within the shaded region at figure 4.1 above or which would connect to the Goonyella system within the shaded region.

In addition to the mines identified at table 4.2, a number of new mines are being developed (or have plans to develop) in this region and, to our knowledge, do not currently hold a contract for capacity with any terminal.

Table 4.2: Mines within the geographic market that use (or have used) other terminals

Company	Mine	Terminals used
BHP Mitsubishi Alliance	Caval Ridge	DBCT and HPCT
	Daunia	DBCT and HPCT
	Peak Downs	DBCT and HPCT
	Saraji	DBCT and HPCT
	Goonyella Riverside	DBCT and HPCT
	Gregory	HPCT and RGTCT
	Norwich Park	HPCT and RGTCT
BHP Mitsui Coal	South Walker Creek	DBCT, HPCT and AAPT
	Poitrel	DBCT, HPCT and AAPT
Anglo American	Capcoal	DBCT and RGTCT
Jellinbah	Lake Vermont	DBCT, AAPT and RGTCT
Middlemount Coal	Middlemount	DBCT and AAPT
Glencore	Oaky Creek	DBCT and RGTCT
	Clermont	DBCT and AAPT
Rio Tinto	Kestrel	DBCT and RGTCT
Terracom	Blair Athol	DBCT and AAPT

Source: DBCTM, HoustonKemp analysis

Table 4.2 shows that the boundaries of the starting point for the geographic market for the service in 2018 include mines which use coal handling services supplied by DBCT, HPCT, AAPT and RGTCT. This result is consistent with the observations made at section 2.4 above, which show that the geographic regions from which terminals draw their customers have significant areas of overlap.

4.2 Customers that prefer to use coal handling services at Hay Point

For the purpose of the criterion (b) assessment, it is necessary to define a market for the period from 2021 for at least 10 years. Since the geographic bounds of the market may change over time, to account for this possibility we have identified the geographic boundary of current and potential customers of DBCT in each year from 2021 until 2030.

It is not possible to be certain which mines will be customers of DBCT in each year from 2021 to 2030. In order to avoid speculation as to which mines will or will not export coal from DBCT in each of these years, we have estimated the geographic area from which DBCT's future customers may be drawn by reference to economic considerations.

In particular, we have identified those mines that would prefer to use coal handling services provided at the Port of Hay Point, assuming there were no constraints from existing supply contracts. We describe this as *'the market for coal handling services for mines that are proximate to the Port of Hay Point'*. The concept of mines that are proximate to Hay Point could also be described as the 'Hay Point catchment'.

The expected production from a mine is in this market if:

- it is physically feasible for that mine to use coal handling services at the Port of Hay Point; and
- it is financially preferable for that mine to use coal handling services at the Port of Hay Point, given:
  - the coal handling options available to that mine; and

> the rail and terminal charges involved with exercising each of these options.

On these considerations, a mine would prefer to use coal handling services provided at the Port of Hay Point, absent contractual constraints, when its total below rail, above rail and coal terminal charges associated with using these services are expected to be lower than those associated with any other option available to it. This calculation is informed by the data in table a3.1, table a3.2 and table a3.3 at appendix A3 to this report. We explain the basis for this approach to estimating the area from which DBCT's customers might be drawn in box 4.1 below.

Box 4.1: No need to distinguish the locations of DBCT and HPCT customers

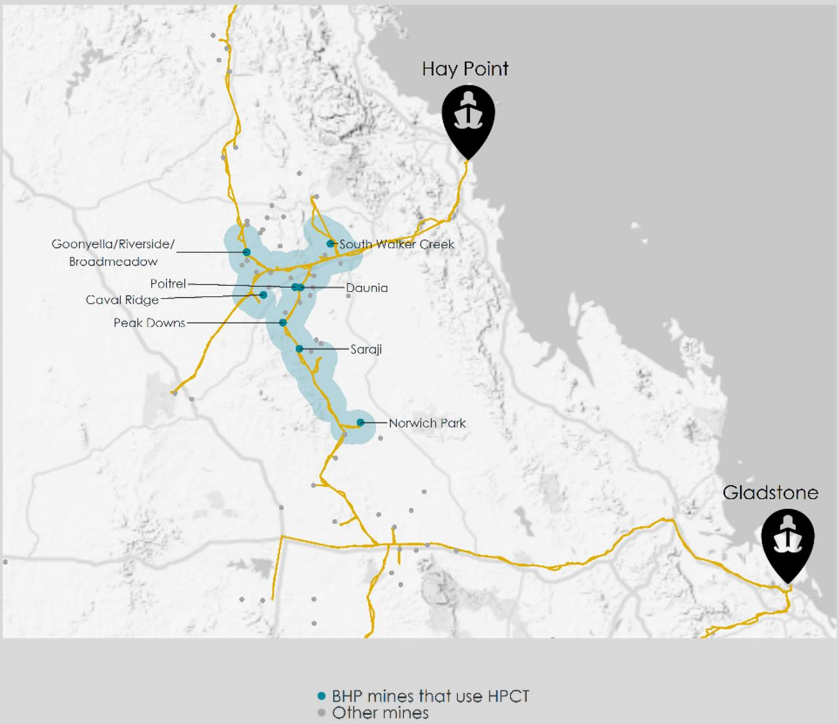
In identifying the location of customers who prefer to use coal handling services at the Port of Hay Point, we do not distinguish between customers that may prefer or may be constrained to use one or other of the services provided at either DBCT or HPCT. Put another way, we assume that a mine that would prefer to use coal handling services at HPCT would also be a potential customer for DBCT, since the terminals are immediately adjacent in their location at the Port of Hay Point.

Although HPCT has historically only provided coal handling services to BMA or BMC mines, many of the mines that currently use HPCT have, at some stage, also used coal handling services at DBCT. For example:[48]

- BMC's South Walker Creek and Poitrel hold contracts with DBCT and AAPT as well as exported coal through HPCT;
- BMA's Goonyella/Riverside/Broadmeadow complex of mines exported [redacted] Mt of coal through DBCT between 2002 and 2018;
- BMA's Peak Downs mine exported [redacted] Mt of coal through DBCT between 2010 and 2018;
- BMA's Saraji mine exported [redacted] Mt of coal through DBCT between 2010 and 2017; and
- BMA's Caval Ridge mine exported [redacted] Mt of coal through DBCT between 2015 and 2018.

Figure 4.2 below shows the geographic region within which BMA and BMC mines that currently use or have recently used HPCT are located. It demonstrates that the area from which HPCT's customers are drawn is similar to, but wholly contained within, the area from which DBCT's customers are drawn.

Figure 4.2: Geographic region of mines using HPCT



Source: DBCTM and AME data, HoustonKemp analysis

48 Data provided by DBCTM.

The geographic area defined by the customers that would prefer to use a coal handling service at the Port of Hay Point may not be precisely the same as that defined by reference to the actual customers of any terminal at any particular time because:

- the geographic area defined on preferences may be **less** than the area based on existing customers because contracts reflect the circumstances that prevailed (or were expected to prevail) at the time they were entered into, so that some mines that presently have a contract with DBCT may prefer to use another terminal if they did not hold that contract; or
- the geographic area defined on preferences may be **greater** than the area based on existing customers because the total number of mines that would prefer to use coal handling services provided at the Port of Hay Point is likely to be greater than the number of mines that currently have contracts with DBCT.

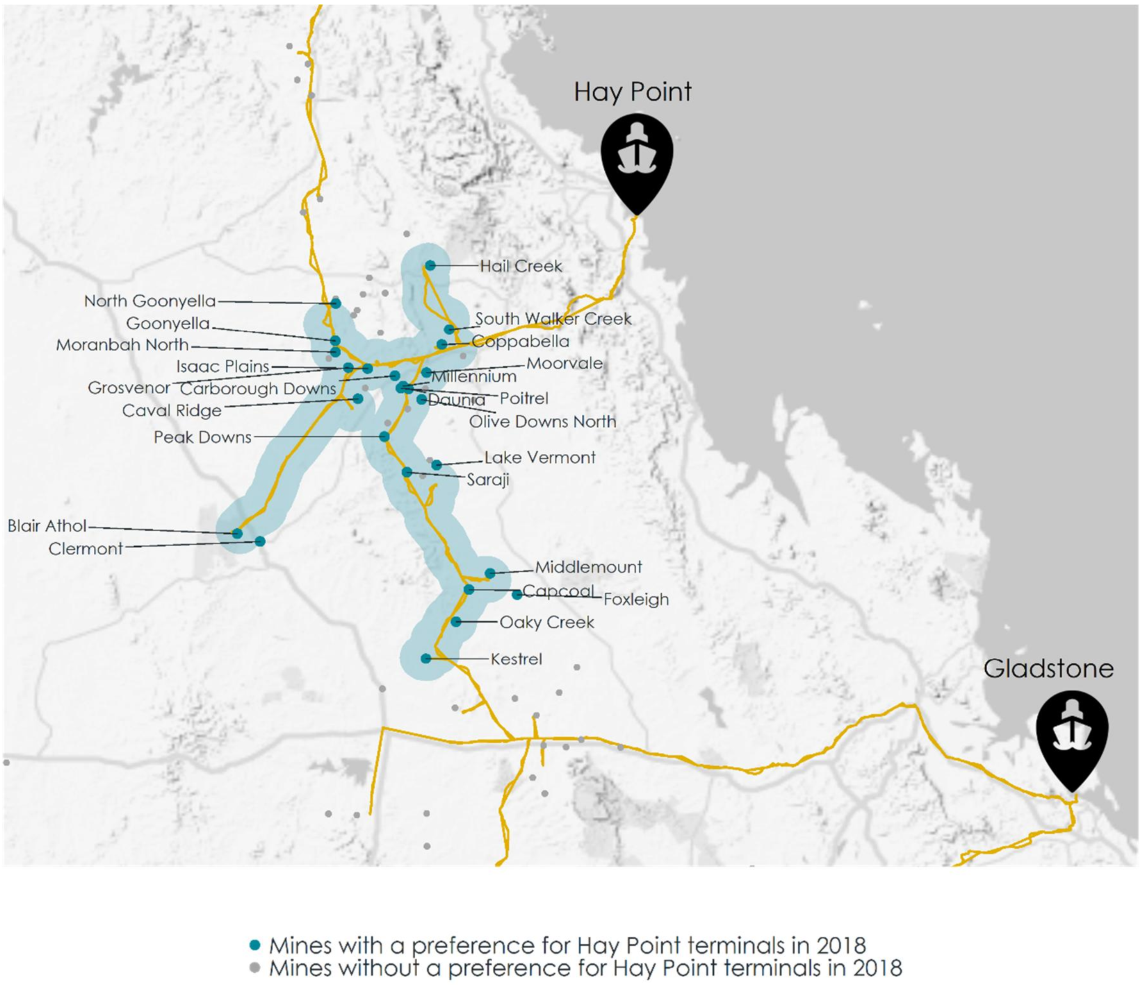
We conclude that geographic areas defined by DBCT's existing customers and by customers who would prefer to use coal handling services at the Port of Hay Point may not be the same but are likely to be very similar. This reflects that the geographic boundaries of any market are rarely definitive.

Rather, some differences in the boundaries drawn according to mine preferences and those drawn according to factual circumstances are likely because current customers of DBCT may reflect not only the set of potential customers of DBCT, but also the availability of capacity at the time it was sought by the customer.

Any mine that would prefer to use coal handling services at the Port of Hay Point is a potential customer of DBCT. Further, it is likely that mines who have a preference for other terminals could also be potential customers of DBCT depending on the availability of their preferred terminal, and so the geographic area defined strictly according to preferences is likely to be a conservatively small estimate of the geographic boundaries of the market.

Figure 4.3 below shows the geographic dimension of the market as defined by mines that would prefer to use coal handling services at the Port of Hay Point, assessed on the basis that we discuss above.

Figure 4.3: Starting point for geographic dimension of the market using preferences in 2018

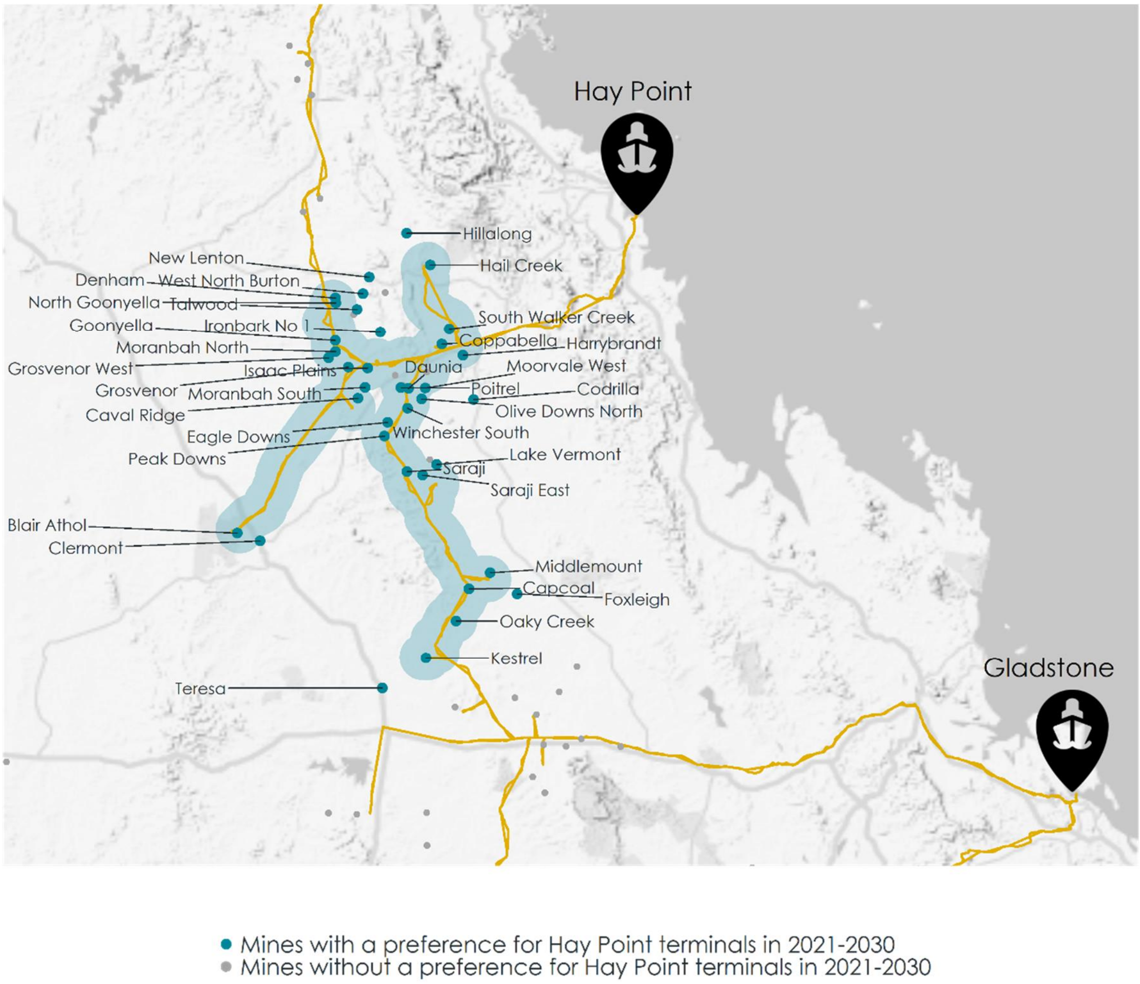


Source: DBCTM, AME and Wood Mackenzie data, HoustonKemp analysis
Note: Grey dots within or near the shaded area represent mines that are not expected to operate in 2018.

A comparison of figure 4.1 and figure 4.3 shows that the geographic area defined by mines that prefer to use coal handling services at the Port of Hay Point is nearly identical to the area defined by existing customers of DBCT in 2018.

Figure 4.4 shows the geographic market over years 2021 to 2030 as determined by the approach we describe above. This area is defined by mines that would prefer to export coal at the Port of Hay Point in any year or years during this period. Again, this area is very similar to the region defined by reference to current customers shown at figure 4.1 above and is almost identical to (but slightly smaller than) the region defined by preferences in 2018 shown at figure 4.3 above.

Figure 4.4: Starting point for geographic dimension of the market using preferences over 2021 to 2030



Source: DBCTM, AME and Wood Mackenzie data, HoustonKemp analysis
Note: Grey dots within or near the shaded area represent mines that are not expected to operate between 2021 and 2030.

We conclude that estimating the area within which customers would prefer to use coal handling services at the Port of Hay Point provides a good approximation of the geographic boundary that would include current customers in each of the years 2021 to 2030. Accordingly, this is the approach we have adopted for defining the geographic boundaries of the market in examining whether criterion (b) is satisfied.

We note that the approach of defining the geographic dimension of the market by reference to customer preferences is consistent with the ACCC's approach to market definition in the not dissimilar circumstance where it examined the level of competition between bulk wheat port terminals in Victoria. We describe the ACCC's approach in that instance in more detail at box 4.2 below.

Box 4.2: ACCC's approach to defining the geographic dimension of the market for wheat terminals

In examining the level of competition between the bulk wheat port terminals in Victoria in 2015, the ACCC considered the relevant grain catchment areas for each port terminal and the extent to which these areas can supply grain to alternative terminals to facilitate competition.[49]

The ACCC explained that port terminals may be in competition with each other if, for instance, grain from one area could practically move to either of the two (or more) other terminals. [50]

It explained that the relevant catchment area for each Victorian port terminal is likely to be related to established transportation links to each port including rail networks and road pathways that connect the port terminals to growing regions and the associated upcountry storage infrastructure. [51]

To assist in determining the relevant grain catchment areas for each port terminal, the ACCC considered it appropriate to examine the relevant transportation costs to move grain from upcountry locations to each of the Victorian port terminals.[52]

This allowed the ACCC to identify the grain catchment areas for each terminal where the transport costs are lowest. This provided the ACCC with an indication of where these grain catchment areas overlap with each other and allow grain to be transported to alternative (or substitute) terminals at a similar transport cost which would facilitate competition between the terminals. [53]

Our method for defining the geographic dimension of the market for the DBCT service is consistent with the approach adopted by the ACCC for assessing the degree of competition between bulk wheat port terminals.

4.3 Incorrect starting points for market definition

We describe above that application of the conventional approach to geographic market definition in the context of services provided at the Port of Hay Point starts by identifying the geographic span of DBCT's existing customers. We also show that, in assessing this same question over the period 2021 to 2030 (for which customers cannot be observed directly) the relevant geographic area can be well approximated by the locations of mines that prefer to use coal handling services at the Port of Hay Point.

Notwithstanding, we describe below two potential missteps in this approach that, if adopted, would give rise to different and misleading outcomes. These involve defining a starting point for a geographic market assessment that either:

- incorporates only the series of disparate geographic locations of mines that use DBCT, and so excludes mines located adjacent to or in between these locations that use other terminals; or
- seeks to constrain the production volume within the geographic region for which mines prefer to use coal handling services at the Port of Hay Point to be no more than the capacity of DBCT.

We explain below that the adoption of one or other of these missteps would give rise to incorrect starting points for defining the geographic boundaries of the market and would be inconsistent with the purpose of the criterion (b) assessment.

[49] ACCC, *Exemptions in respect of Emerald's Melbourne Port Terminal Facility, Graincorp's Geelong Port Terminal Facility and Graincorp's Portland Port Terminal Facility*, 25 June 2015, p 32.

[50] *Op. cit.*, p 41.

[51] *Op. cit.*, p 41.

[52] *Op. cit.*, p 46.

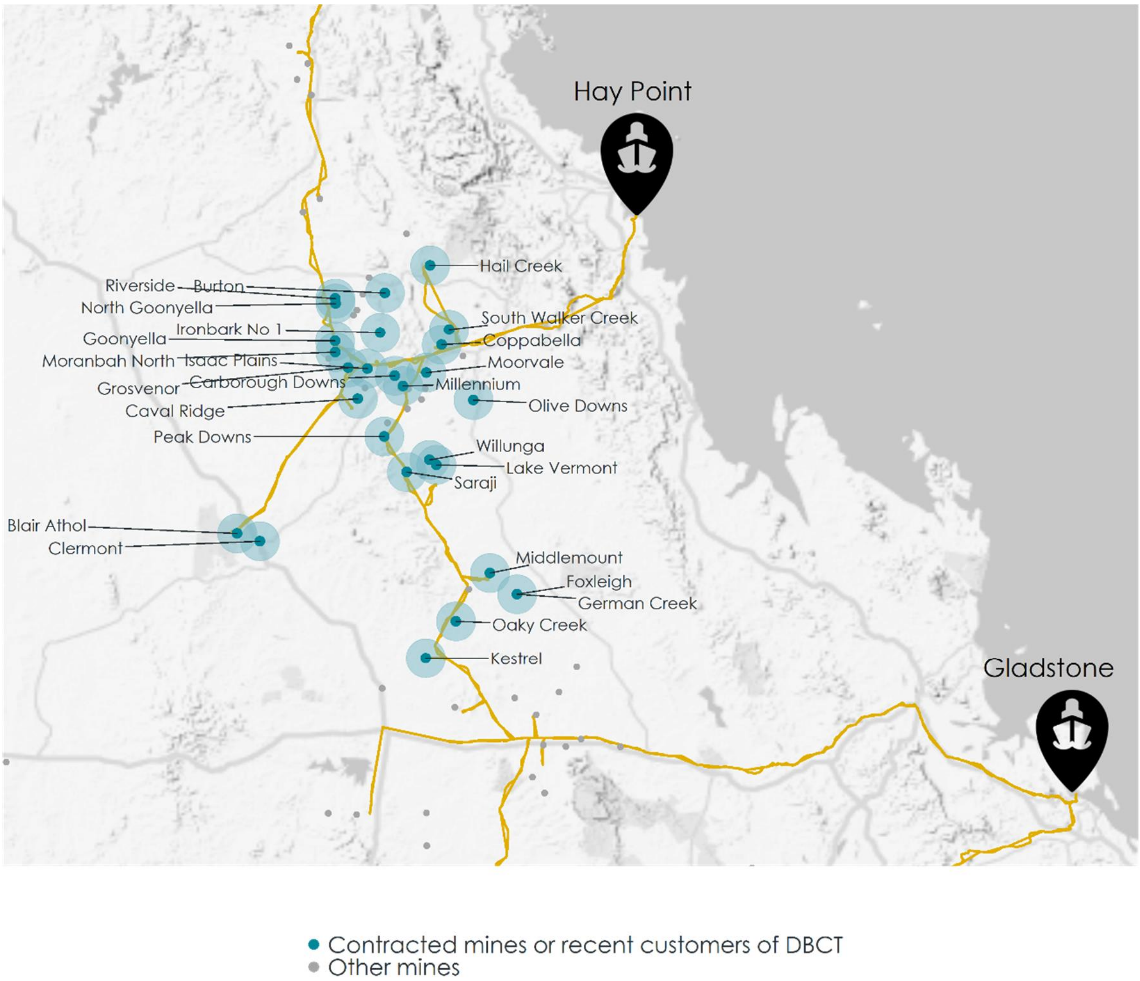
[53] *Op. cit.*, p 46.

4.3.1 Defining a market by reference to disparate geographic locations

The first potential misstep involves defining the geographic market of the narrowest reasonable market that is not contiguous, that is, composed of disparate locations that are not connected to each other by rail.

Figure 4.5 below demonstrates that the area defined under this approach would be a series of small circles drawn about the location of mines that use or have recently used DBCT. It illustrates that the region captured by this approach would exclude mines that are included in the geographic region defined in figure 4.1 above.

Figure 4.5: Disparate geographic areas of DBCT customers



Source: DBCTM, AME and Wood Mackenzie data, HoustonKemp analysis

To the best of our knowledge, there are no examples of the geographic dimension of a market being defined in this way. Further, such an approach could not be a reasonable basis for approaching geographic market definition, since it would exclude mines that are located adjacent to or in between mines that currently use DBCT and so can reasonably be expected to be potential customers of DBCT. Such mines can safely be presumed to regard DBCT as closely substitutable for whichever coal handling services they are using, and so must fall within the market. Put another way, this approach would explicitly disregard geography in its assessment of the geographic dimension of the market.

By way of example, miners at Lake Vermont and Middlemount currently utilise coal handling services at AAPT. However, both mines are significantly closer to DBCT than AAPT, and the charges associated with transporting coal to DBCT and handling it there are substantially less than the charges that would be incurred to export through AAPT.[54] These volumes must therefore form part of foreseeable demand in the market for coal handling services provided at the Port of Hay Point because they represent potential customers for DBCT over the period for which the service would be declared.

Lake Vermont and Middlemount are within the area defined in figure 4.1 but excluded from the area defined in figure 4.5.

4.3.2 Defining a market that is constrained by the capacity of DBCT

The second potential misstep involves defining a market that is constrained by the capacity of the existing DBCT facility. Such an approach could potentially give rise to a contiguous geographic area, but this would be smaller than that indicated by our preferred approach because some mines would need to be excluded so that the total volume of coal delivered did not exceed DBCT's capacity.

Defining the scope of the geographic market by reference to the capacity of a facility is not consistent with the standard approach to market definition. We describe above that the standard approach starts with the area over which the product is supplied.

Further, we note above that the purpose for which any market is to be defined should be considered in selecting an approach to market definition. In this instance, the purpose is to identify whether criterion (b) is satisfied such that the facility for the service can meet total foreseeable demand in the market over the period for which the service would be declared at least cost compared to two of more facilities.

Foreseeable demand in the market encompasses coal volumes that, by preference, would be served by coal handling services at the Port of Hay Point. In principle, this volume is not constrained by the capacity of DBCT – either at present or in the future.

If foreseeable demand in the market is estimated so as to be constrained by the capacity of DBCT, then the assessment of criterion (b) would be predisposed to identify the service provided by that terminal as a natural monopoly in circumstances where this was not the case.

A facility that involves significant fixed or sunk costs is likely to be able to meet total foreseeable demand in the market at least cost if demand is constrained to be less than its capacity – because the costs of using capacity, once built, are very low. It follows that any approach that limits foreseeable demand in the market to that served by the facility of interest will typically find that the facility satisfies criterion (b), irrespective of the degree of substitution between any two facilities.

The economic reasoning as to why such an approach to determining foreseeable demand in the market is not capable of accurately assessing whether a terminal is a natural monopoly can be illustrated by way of example, set out in box 4.3 below.

[54] See appendix A3 to this report.

Box 4.3: Defining a market constrained by capacity is not consistent with the purpose of criterion (b)

Suppose that coal mine production in a region near terminal A grows by 40 mtpa, and:

- 10 mtpa of this additional production is handled using available capacity at terminal A, which is costless; and
- 30 mtpa of this additional production is handled at another terminal B, because the cost of expanding terminal A is greater than the cost of sending these volumes to terminal B.

The service provided at terminal A *is not* a natural monopoly because:

- foreseeable demand in the market for coal handling services in the region near terminal A cannot be met by that terminal; such that
- some additional production is handled at another terminal B, because the cost of expanding terminal A is greater than sending these volumes to terminal B.

By contrast, an approach that determines the geographic scope of the market served at terminal A by reference to the capacity of that terminal will not include the locations of the new mine production, because to do so would cause demand in the market to exceed the capacity of terminal A.

Application of such an approach would give rise to the incorrect conclusion that the service provided at terminal A *is* a natural monopoly, because the foreseeable demand in the market estimated on this basis can, at least cost, be served within the terminal's capacity.

4.4 Application of a SSNIP

The next step in the application of the hypothetical monopolist test is to examine whether it would be profitable for a hypothetical monopolist supplying (in each year) across the geographic area that has initially been defined to increase its prices by five to ten per cent.

Our analysis shows that such a SSNIP applied to the starting geographic market that we identify at figures figure 4.3 and figure 4.4 would be profitable (in each year) and so the market should not be expanded beyond these geographic boundaries.

4.5 Coal handling services for mines proximate to the Port of Hay Point

The analysis we set out above shows that the service at DBCT's facility is provided in the market for coal handling services for mines that are proximate to the Port of Hay Point.

Over the period for which declaration is to be considered (which we assume to be 2021 to 2030) the geographic extent of this market can be best approximated as the region within which mines would prefer to use coal handling services provided at the Port of Hay Point.

The suppliers of coal handling services in this market are DBCT, HPCT, AAPT and RGTCT.

5. Estimating foreseeable demand in the market

In this section, we present our estimate of total foreseeable demand in the market for coal handling services for mines that are proximate to the Port of Hay Point, over the period for which period for which declaration of the service is to be assessed, which we have taken to be 2021 to 2030. We describe our approach to assessing the geographic scope of this market in section 4.

In addition to our preferred estimate of total foreseeable demand in the market, DLA has asked us to assess criterion (b) under the assumption that the production of BMA and BMC mines is excluded from the calculation of total foreseeable demand in the market. This is despite the evidence presented at section 4.2 above that there is significant substitution by many of these mines between HPCT and DBCT.

5.1 Total foreseeable demand

We express total foreseeable demand in the market in two (equivalent) terms:

- demand for coal handling throughput, estimated as the total expected production of mines that are located within the market; and
- demand for coal handling contract capacity, estimated from demand for coal handling throughput adjusting for an average of 90 per cent utilisation of contract capacity.

We explain the basis for the adjustment between coal handling throughput and coal handling capacity at section 5.2 below.

Table 5.1 below presents our estimates of total foreseeable demand in the market, on a throughput and contract capacity basis, as well as estimates for total foreseeable demand excluding production from BMA and BMC mines.

Table 5.1: Total foreseeable demand in the market

Year	Total foreseeable demand		Total foreseeable demand excluding BHP mines	
	Throughput (mtpa)	Capacity (mtpa)	Throughput (mtpa)	Capacity (mtpa)
2021	150.9	167.7	91.1	101.2
2022	156.1	173.4	95.2	105.7
2023	164.8	183.2	102.7	114.1
2024	172.7	191.9	109.6	121.8
2025	182.4	202.7	117.8	130.9
2026	186.7	207.4	120.6	133.9
2027	179.0	198.8	111.3	123.7
2028	181.9	202.1	112.7	125.2
2029	181.6	201.8	112.5	124.9
2030	182.1	202.3	113.0	125.5

Source: AME and Wood Mackenzie data, HoustonKemp analysis

Our estimates of total foreseeable demand in the market are established initially on a throughput basis, by reference to forecast production from mines located within the market. For example, appendix A1 sets out total foreseeable demand for throughput based on the expected annual production of each mine within the geographic bounds of the market.

DLA has asked us to assess criterion (b) under the assumption that the entire production of BMA and BMC mines is excluded from the calculation of total foreseeable demand in the market. In our opinion, the removal of these volumes is likely to underestimate total foreseeable demand in the market, because:

- in practice, BMA and BMC mines hold contracts with, or export coal through DBCT, or both, demonstrating that they are in fact (and potential) customers of terminals other than HPCT; and
- even if it is assumed that BMA and BMC mines have a strong preference to use HPCT, that facility may not always have sufficient capacity to satisfy this demand – however, the removal of all production from BMA and BMC mines from foreseeable demand in the market assumes that the ability of HPCT to meet this demand is unconstrained.

Notwithstanding these concerns, our estimates of total foreseeable demand under this alternative approach, consistent with DLA's request, are set out at table 5.1 above.

5.2 Total foreseeable demand for contract capacity

In practice demand for coal terminal capacity is realised as demand for take-or-pay contracts rather than for volumes of coal handled. Under these arrangements, it is normal for contracted capacity to exceed the volumes of coal handled by a significant margin, even in a long run equilibrium.

In practice, we understand that:[55]

- despite having contracts with miners of approximately 80 mtpa, during 2017 DBCT served volumes of 65.0 mt – representing unserved contracted volumes of 19 per cent; and
- despite having contracts with miners for take-or-pay volumes of 72 mtpa, RGTCT served only 59.8 mt of coal in 2016-17, representing unserved contracted volumes of 17 per cent.

Although these values were affected by tropical cyclone Debbie, DBCT and RGTCT handled only slightly greater volumes in 2016 – 68.6 mt and 62.6 mt respectively.

Such apparently 'excess' levels of contracted capacity and the empirical observations underpinning its utilisation is consistent with rational decision-making by miners because it provides an option value for future expansions of mining capacity. In determining the optimal level of contract capacity at coal terminals, miners must weigh up:

- the costs of contracting capacity, by reference to the take-or-pay charges to terminal operators; against
- the costs of not contracting capacity, by reference to the potential lost revenues from future production volumes that may exceed contracted capacity, if that capacity cannot be procured at a later time.

Since the value of coal exceeds terminal charges by many multiples, the expected value of lost coal exports from potential mine expansions may often significantly exceed the costs of reserving capacity to ensure that such coal can reach its markets.

Over the long term, we assume that demand for contract capacity is derived from the demand for coal throughput, with demand for throughput being 90 per cent of the demand for contract capacity. This is equivalent to assuming that, on average, 10 per cent of contracted capacity is not used. This assumption reflects a cautious approach to estimating this parameter, since it is likely to underestimate the total foreseeable demand for capacity in the market, relative to the recent rates of capacity utilisation that we summarise above.

[55] North Queensland Bulk Ports and Port of Gladstone data on volumes, DBCTM data on contracts.

6. Meeting foreseeable demand at least cost

Having established the appropriate definition of the market and quantified foreseeable demand in that market, the final step in assessing whether the coal handling service at DBCT satisfies criterion (b) involves assessing whether it would be least cost for this demand to be handled at DBCT. On this question:

- if foreseeable demand in the market can be met at least cost by DBCT (or by expanded capacity at DBCT) then criterion (b) is satisfied; whereas
- if foreseeable demand in the market can be met at least cost by a combination of DBCT and available or expanded capacity at one or more other coal terminals then criterion (b) is not satisfied.

The remainder of this section describes:

- the modelling framework with which we assess how total foreseeable demand in the market can be met at least cost;
- the input assumptions that we have used to populate this framework; and
- the results of our modelling analysis under a 'base case' set of assumptions.

6.1 Modelling framework and assumptions

To assess whether the facility for the service can meet the total foreseeable demand in the market at least cost compared to two or more facilities, we have developed an economic model of coal production and export within the bounds of the central Queensland coal network.

6.1.1 Framework for the model

The model is in the form of an optimisation program that seeks to identify the least cost means by which total foreseeable demand in the market estimated at section 5 above can be met by coal handling services available to miners. It follows that:

- if the results of this assessment identify that the least cost means of serving total foreseeable demand in the market is through the use of the DBCT service alone, then criterion (b) is satisfied; whereas
- if the results of this assessment identify that the least cost means of serving total foreseeable demand in the market through the use of at least one other coal handling service apart from the DBCT service, then criterion (b) is not satisfied.

In section 3.3.2 we present our opinion that the costs captured in this assessment should include incremental costs to society (or resource costs), namely:

- rail transport costs, including both access and haulage costs and the costs of expanding rail infrastructure where necessary; and
- coal terminal costs, including the costs of expanding coal terminal infrastructure where necessary.

Consistent with this, our modelling captures the resource costs associated with the use and expansion of rail and terminal infrastructure. The model produces outputs showing not only the coal terminal (or terminals) used by the production from each mine, but also the total use of each terminal and railway system, and the extent to which these have been expanded to accommodate this use.

A more detailed description of our modelling methodology is set out at appendix A2 to this report.

6.1.2 Resource cost inputs to the model

To assess the least cost means of meeting total foreseeable demand in the market requires assumptions about the resource costs associated with the use of each of:

- existing terminal infrastructure;
- expanded terminal infrastructure;
- current rail infrastructure; and
- expanded rail infrastructure.

There is a significant degree of uncertainty as to how best to measure resource costs. This uncertainty arises because:

- the incremental costs of using existing terminal infrastructure are inherently unobservable;
- there is limited information available about the extent and expense of options to expand or construct terminal infrastructure; and
- it is not straightforward to describe (or quantify) the capacity of a rail network or the incremental costs required to expand this capacity.

We set out a summary of our base case assumptions for estimating the resource costs of terminal and rail infrastructure below. A detailed description of our approach is set out at appendix A2 to this report.

The resource costs of existing terminal services

The resource costs of using existing coal terminal capacity are likely to be much lower than coal terminal charges since many of the costs incurred in providing coal terminal capacity are fixed in nature, with terminal charges reflecting a return of and return on sunk capital costs.

Terminals recover handling charges that vary with throughput (variable costs) and charges that do not vary with throughput (fixed costs). We assume that the resource costs of utilising existing coal terminal capacity are equal to the variable component of coal handling charges applied at each terminal. These charges are set out in table a3.1 at appendix A3 to this report.

We estimate the variable proportion of charges at DBCT as equal to the Handling Charge Variable (HCV) as a proportion of the total coal handling charges for 2017/18 – 22 per cent.[56] We estimate resource costs of using existing capacity at other terminals by applying the same proportion to coal handling charges at those terminals.

The resource costs of expanded terminal services

We assume that the resource costs incurred to use expanded coal terminal capacity include both the fixed and variable costs of the expanded capacity. We estimate these costs as:

- the incremental capital expenditure required to realise this expansion – these capital costs are shown in table 6.1 below; and
- the variable component of port handling charges, as discussed above.

[56] The total port handling charges include the Terminal Infrastructure Charge (TIC), Handling Charge Fixed (HCF) and Handling Charge Variable (HCV). The HCV for DBCT effective from 1 April 2018 is $1.0953 per tonne while the total port handling charges were $4.9467 per tonne.

DBCT provides transparent information about potential capacity expansions and their costs in its Master Plan that it updates periodically. The most recent DBCT Master Plan was prepared in 2018.[57]

Other terminals may also provide information about potential capacity upgrades. For example, AAPT and WICET have publicly revealed plans for significant increases in capacity. However, the potential costs of these expansions are typically not disclosed.

We therefore approximate the unit costs of capacity expansions for other terminals by the weighted average cost of expansions reported by DBCT, as shown in table 6.1 below. Reflecting this lack of certainty of coal terminal expansion costs, at section 7.2 below we present the results of sensitivities demonstrating the effect of assuming both higher and lower unit expansion costs for DBCT relative to other terminals.

Table 6.1: Future options for capacity expansion of coal export terminals in central Queensland

Port	Expansion name	Expansion capacity (mtpa)	Cumulative capacity (mtpa)	Capital cost ($/t)	Capital cost ($ million)
DBCT	Zone 4	4.0	89	98.84	533.76
	DB 8X Phase 1	5.0	94	78.74	251.97
	DB 8X Phase 2	8.0	102	113.10	780.42
	DB 9X Phase 1	12	114	144.62	1,735.46
	DB 9X Phase 2	12	126	151.75	1,820.98
	DB 9X Phase 3	10	136	159.24	1,592.45
HPCT	HPX4	20	75	124.00	2,480.00
AAPT	T0 Phase 1 (Adani)	35	85	124.00	4,340.00
	T0 Phase 2 (Adani) 1	12	97	124.00	1,488.00
	T0 Phase 2 (Adani) 2	12	109	124.00	1,488.00
	T0 Phase 2 (Adani) 3	11	120	124.00	1,364.00
	T3 Phase 1 (GVK-Hancock)	30	150	124.00	3,720.00
	T3 Phase 2 (GVK-Hancock) 1	10	160	124.00	1,240.00
	T3 Phase 2 (GVK-Hancock) 2	10	170	124.00	1,240.00
	T3 Phase 2 (GVK-Hancock) 3	10	180	124.00	1,240.00
WICET	Stage 2 (WEXP1) Phase 1	11	38	124.00	1,364.00
	Stage 2 (WEXP1) Phase 2	11	49	124.00	1,364.00
	Stage 2 (WEXP1) Phase 3	11	60	124.00	1,364.00
	Stage 3 (WEXP2) Phase 1	12	72	124.00	1,488.00
	Stage 3 (WEXP2) Phase 2	12	84	124.00	1,488.00
	Stage 4 Phase 1	10	94	124.00	1,240.00
	Stage 4 Phase 2	10	104	124.00	1,240.00
	Stage 4 Phase 3	10	114	124.00	1,240.00

Source: DBCTM

The resource costs of rail access and haulage

We estimate the resource costs for using rail infrastructure as equal to the charges for rail access and rail haulage.

[57] DBCTM, *Master Plan 2018: Expansion opportunities at the Dalrymple Bay Coal Terminal*, 26 April 2018.

Unlike for coal terminals, it is not straightforward to describe (or quantify) the capacity of a rail network or the costs required to expand this capacity, since this will always depend upon where in the network the incremental requirements for volume are experienced. It may therefore not be possible to know, given a level of total foreseeable demand, whether this can be met within existing rail network capacity or whether the network would require expansion in order to deliver this demand to the relevant terminals.

This raises difficulties in estimating the resource costs for using rail infrastructure since it may not always be clear whether any particular use can be accommodated by existing infrastructure or would require new infrastructure.

By using rail charges as a proxy for the resource costs of rail access and haulage, we assume that:

- rail charges substantially reflect variable costs; and
- the expansion costs of rail access and haulage capacity reflect the costs of past capacity as reflected in charges.

We expect that this approach will overstate the resource costs associated with the use of the existing rail network, particularly for rail access charges that reflect substantial fixed costs. By doing so, our assessment is more likely to find that the DBCT service satisfies criterion (b). This is because overstating the resource costs associated with meeting foreseeable demand using existing capacity at terminals other than DBCT makes it more likely we will find that the least cost means of meeting foreseeable demand in the market is by using existing or expanded capacity at DBCT.

6.2 Results of the base case scenario

In this section we set out the results of our assessment of the least cost means of meeting foreseeable demand in the market, under the assumptions in our 'base case' scenario.[58] We describe the framework for this assessment at section 3 of our report.

For clarity, in addition to the input assumptions set out above (and in more detail at appendix A2 below) the specification of the base case scenario in our modelling includes:

- assumptions pertaining to costs, prices and production projections have been sourced from independent industry analysts and public sources – we consider the sensitivity of results to a range of these input assumptions in sections 7.1, 7.2 and 7.3 below;
- the 9X expansion option at DBCT will not proceed during the declaration period and so DBCT cannot expand beyond a nameplate capacity of 102 mtpa during the period for which the service would be declared – we consider the sensitivity of results to this assumption in section 7.4 below;
- mines in the Galilee Basin do not commence operations during the period for which the service would be declared – we consider the sensitivity of results to this assumption in section 7.5 below;
- in assessing least cost, resource costs are equal to:
  - charges faced by miners for rail access and haulage; and
  - the variable component of charges faced by miners for coal handling services plus the costs of expansion for ports – however, we also consider alternative approaches to approximating resource costs below.

[58] In section 7 below we assess the sensitivity of these results to changes in the specification of the assumptions in the base case scenario.

6.2.1 Least cost provision of total foreseeable demand in the market

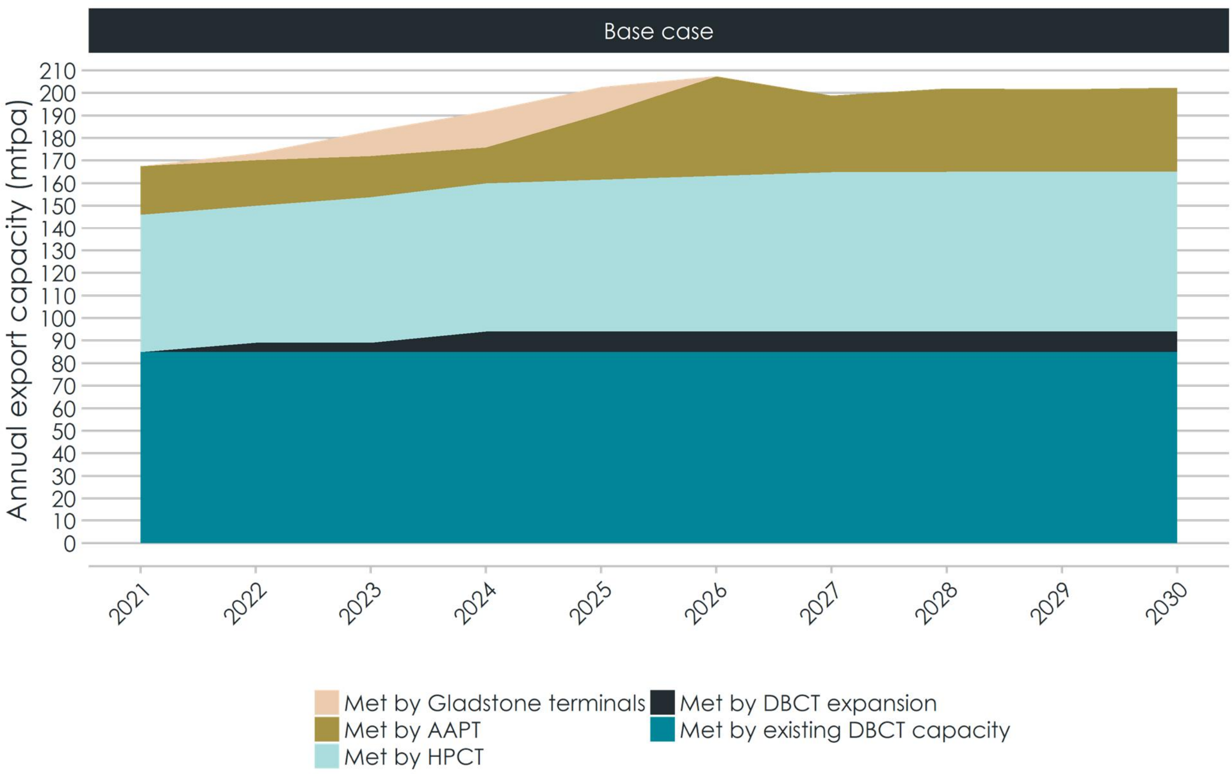
Figure 6.1 shows the result of this assessment for the base case assumptions. It shows which terminals or locations are deployed in order to meet total foreseeable demand in the market at least cost over the 2020 to 2031 period.

The results indicate that:

- total foreseeable demand in the market is materially higher over the entirety of the 2021 to 2030 period than DBCT has the capacity to meet – maximum foreseeable demand for capacity is over 200 mtpa, whereas the capacity of DBCT with the 8X expansion is capped at 102 mtpa (or 136 mtpa if the 9X expansion were feasible); and
- total foreseeable demand in the market is met at least cost by four facilities, being DBCT (including expansions of the facility), HPCT, AAPT and RGTCT.

It follows that criterion (b) is not satisfied, since total foreseeable demand in the market cannot be met at least cost by DBCT (whether expanded or otherwise) and would be instead met by two or more facilities.

Figure 6.1: Least cost provision of total foreseeable demand in the market



6.2.2 Least cost provision of total foreseeable demand, excluding BMA and BMC mines

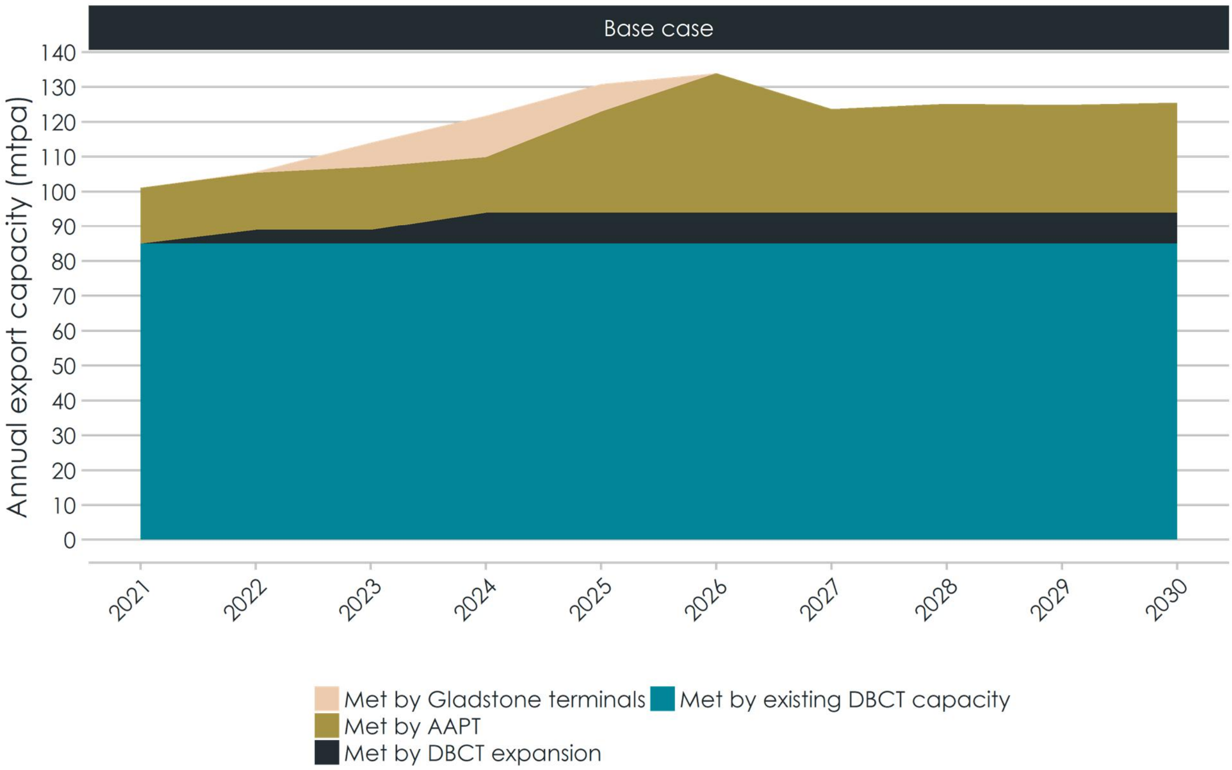
DLA has asked us also to assess criterion (b) under the assumption that the production of BMA and BMC mines is excluded from the calculation of total foreseeable demand in the market. This is despite the evidence that there is significant substitution by many of these mines between HPCT and DBCT. In section 5 above we estimate total foreseeable demand in the market after making this adjustment.

Figure 6.2 shows how total foreseeable demand in the market, assessed on this basis, is met at least cost. The results indicate that:

- even with all production from BMA and BMC mines removed from the market, total foreseeable demand in the market still substantially exceeds the capacity of DBCT – maximum foreseeable demand for capacity is over 130 mtpa; and
- total foreseeable demand in the market is met at least cost by three facilities, being DBCT (including expansions of the facility), AAPT and RGTCT.

It follows that criterion (b) is also not satisfied after exclusion of the BMA and BMC mines from the market, since total foreseeable demand in the market still cannot be met at least cost by DBCT (whether expanded or otherwise) and would instead be met by two or more facilities.

Figure 6.2: Least cost provision of total foreseeable demand (excluding BMA and BMC mines)



6.2.3 Least cost provision of total foreseeable demand under alternative resource cost scenarios

We discuss at section 6.1.2 above that there is a significant degree of uncertainty as to how best to measure resource costs, particularly in respect of the use of rail services, for which it is difficult to measure capacity and to estimate expansion costs.

Recognising the level of uncertainty regarding the resource cost component of charges, we implement the least cost step of our assessment of criterion (b) under three scenarios, as outlined in table 6.2 below. These scenarios reflect:

- two approaches to estimating the resource costs for coal handling services for existing capacity, based either on full coal handling charges or only the variable component of those charges; and
- three different approaches to modelling resource costs for rail services, which we discuss in more detail at appendix A2.2.2 to this report.

Table 6.2: Resource cost assumptions for least cost scenarios

Scenario	Rail costs	Terminal costs
Charges based	• Resource costs assumed to be equal to rail access and haulage charges	• Resource costs for existing capacity assumed to be equal to terminal charges • Resource costs for new capacity equal to the variable component of terminal charges plus capital costs of expansions.
Variable costs	• Resource costs assumed to be equal to the variable components of rail access and haulage charges	• Resource costs for existing capacity assumed to be equal to variable component of terminal charges • Resource costs for new capacity equal to the variable component of port charges plus capital costs of expansions.
No rail costs	• Resource costs assumed to be irrelevant for assessment of least cost	• Resource costs for existing capacity assumed to be equal to variable component of port charges • Resource costs for new capacity equal to the variable component of port charges plus capital costs of expansions.

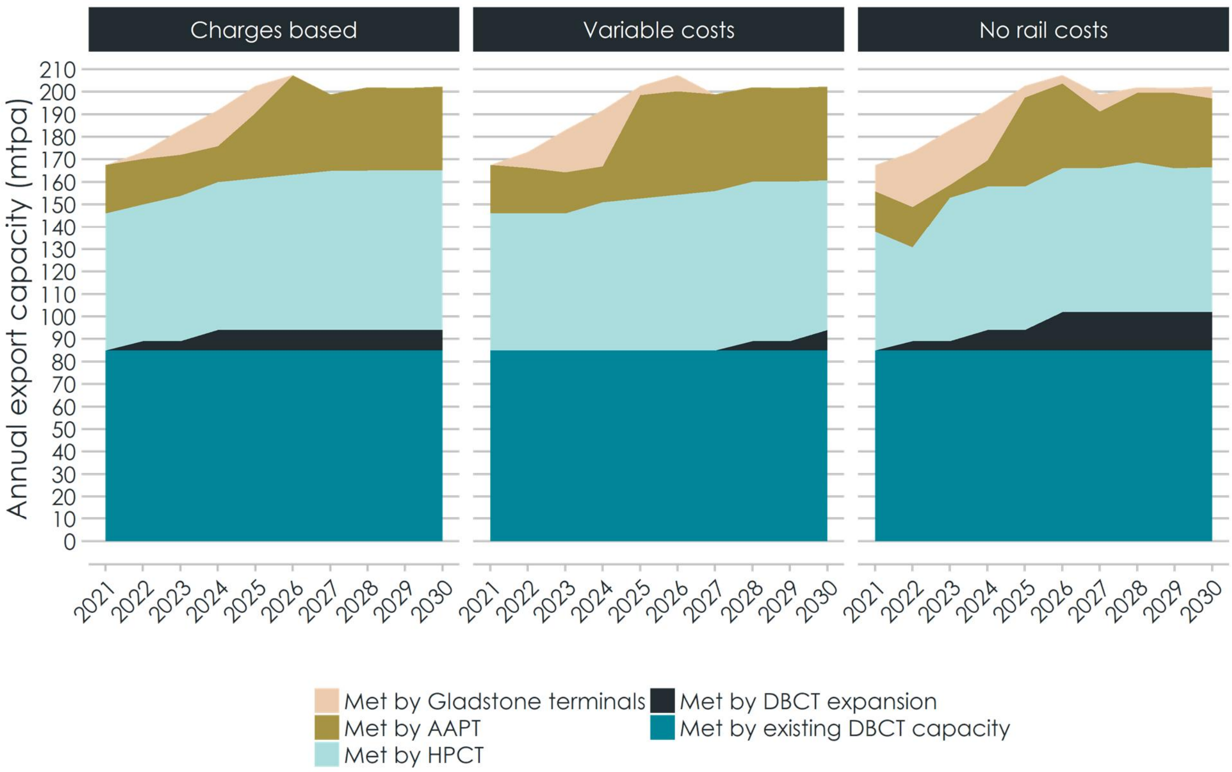
Figure 6.3 below shows the how total foreseeable demand in the market is met at least cost under each of these alternative approaches to resource costs. It shows that:

- total foreseeable demand in the market is not affected by assumptions about the measurement of resource costs, and in all cases this demand substantially exceeds the potential capacity of DBCT; and
- total foreseeable demand in the market is met at least cost by four facilities, being DBCT (including expansions of the facility), HPCT, AAPT and RGTCT.

It follows that criterion (b) is not satisfied, since total foreseeable demand in the market cannot be met at least cost by DBCT (whether expanded or otherwise) and would instead be met by two or more facilities.

These results remain unchanged if, as requested by DLA, all production from BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 6.3: Results of least cost provision under different approaches to estimating rail resource costs



7. Sensitivity of results to changes in assumptions

In this section we investigate additional sensitivities to our assessment of criterion (b) in addition to the base case results presented at section 6.2 above, showing how our results are affected by changes in input assumptions. This is particularly important in relation to those assumptions for which the publicly available information is limited and so are subject to a degree of uncertainty.

We consider the following additional sensitivities:

- low and high metallurgical coal prices – these cases consider outcomes where the price for metallurgical coal increases (+33 per cent) or decreases (-33 per cent) relative to the base case;[59]
- low and high thermal coal prices – these cases consider outcomes where the price for thermal coal increases (+33 per cent) or decreases (-33 per cent) relative to the base case;
- low and high DBCT expansion costs – these cases consider outcomes across a range of potential expansion costs based on confidence intervals of the estimates of capital expenditure;[60]
- low and high transport costs for Goonyella mines – these cases consider outcomes where travel costs for mines located within the Goonyella system to travel to DBCT are 25 per cent higher and lower than the base case;[61]
- low and high prices for GAPE system – these cases consider outcomes where costs to utilise the GAPE system are $3 per tonne high or lower than the current charges assumed in the data;
- inclusion of 9X expansion option – this case considers outcomes where the 9X option for expansion of DBCT is deemed to be feasible within the proposed declaration period;
- mines in the Galilee Basin – this sensitivity assumes that mines in the Galilee Basin commence operations, reflecting the current uncertainty regarding future government support for these projects;
- a reasonable WICET charge – this case considers a scenario where terminal charges at WICET are aligned to charges at RGTCT and therefore provides for more low priced coal handling capacity at Gladstone; and
- compounding assumptions – this case considers a combination of low metallurgical and thermal coal prices, low expansion costs and feasibility of the 9X expansion within the proposed declaration period.

In all cases, the foreseeable demand for coal handling services in the market is met at least cost by two or more facilities over the period for which the service would be declared. In each case, these facilities include at least one other terminal aside from DBCT and HPCT.

7.1 Sensitivity to coal prices

Coal prices exhibit variation over time and this has a bearing on the future viability of some mines located in central Queensland. To assess the potential for changes in projects coal prices to alter the outcomes of assessment of criterion (b) we consider the sensitivity of the outcomes of the assessment to:

- metallurgical coal prices; and
- thermal coal prices.

[59] This variance is based on a historical analysis of the variance in coal prices. 33 per cent is approximately equal to one standard deviation of historic annual changes in prices.

[60] The low and high expansion cost estimates are derived based on the nature and detail of the cost estimates for each expansion. In particular, the range of expansion costs are: Zone 4 between -15 per cent and 20 per cent, 8X expansion between -25 per cent and 35 per cent and 9X expansion between -25 per cent and 50 per cent.

[61] We consider sensitivities with +25 per cent (high) and -25 per cent (low) applied to transport costs, that is, rail access and rail haulage charges.

For both sensitivity analyses we have considered cases where the coal price is 33 per cent higher and lower than the base case price forecast. 33 per cent is based on an historical analysis of the variance in coal prices and is approximately equal to one standard deviation of the historical range, applied to the mean coal price forecast.

7.1.1 Sensitivity to metallurgical coal prices

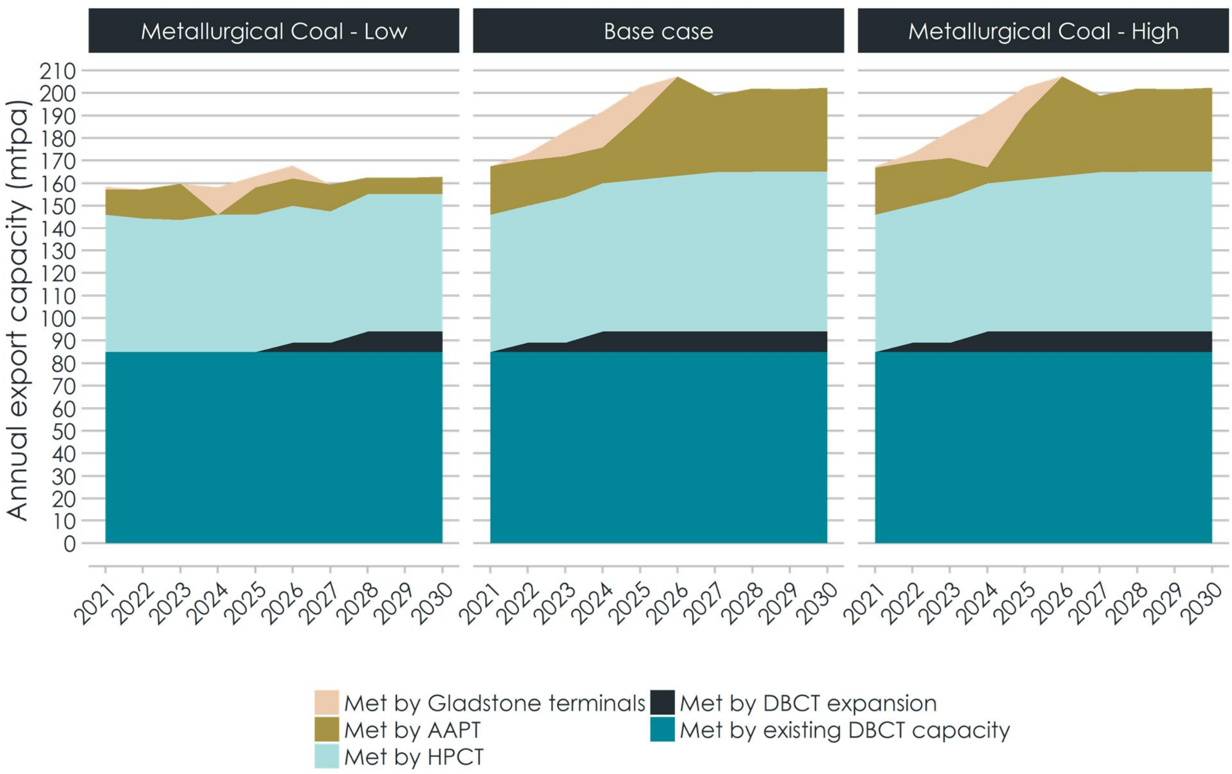
The majority of foreseeable demand in the market is metallurgical coal. It follows that the assessment of criterion (b) may be influenced by the forecast metallurgical coal price, because decisions to produce are driven by the expected profitability of mines. We reflect this in our analysis by assuming that, where mine expansions are deemed to be 'probable' or 'possible', only expansions that are profitable, given coal prices, go into production.

Figure 7.1 shows the decomposition of foreseeable demand in the market in response to different forecasts for the price of metallurgical coal:

- at low prices, we see a notable reduction in the foreseeable demand in the market; and
- at high prices, there is no difference in the foreseeable demand in the market as compared with the base case.

Notwithstanding, under both scenarios we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.1: Sensitivity of results to changes in metallurgical coal prices



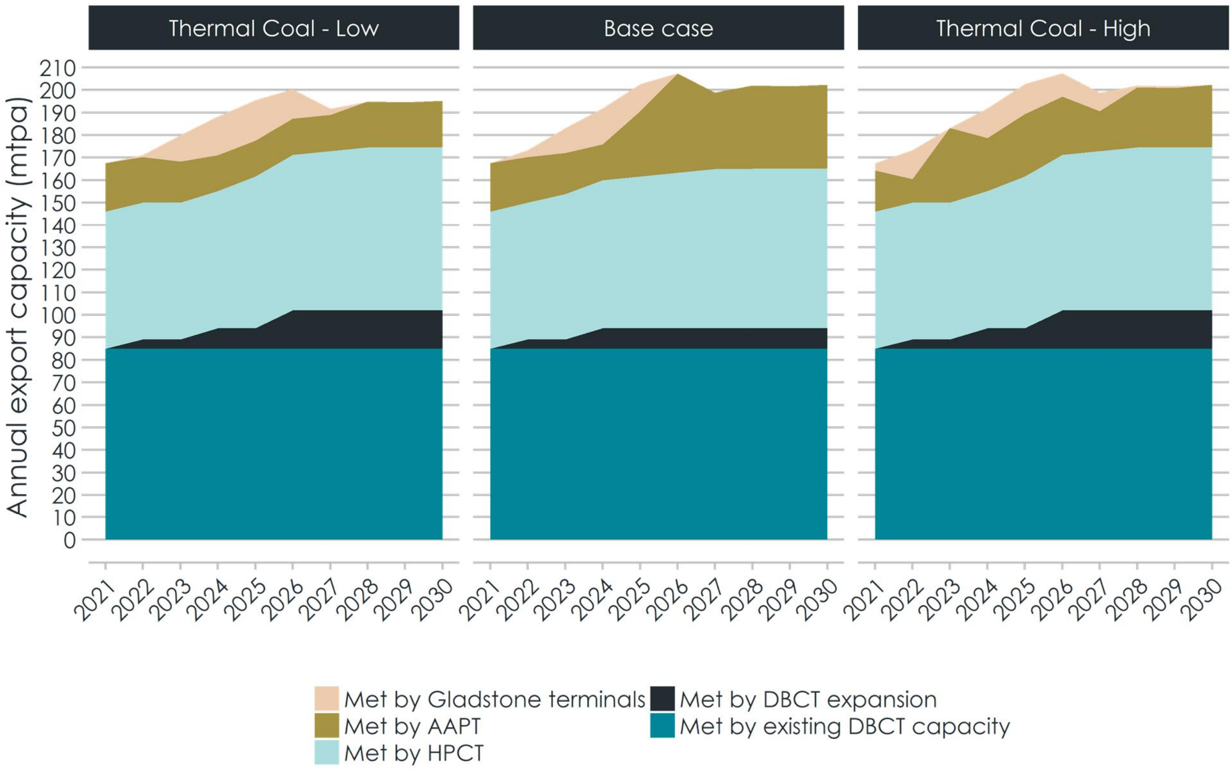
7.1.2 Sensitivity to thermal coal prices

Thermal coal comprises a smaller proportion of the foreseeable demand in the market relative to metallurgical coal. It follows that the sensitivity of the results to changes in thermal prices is less pronounced.

Figure 7.2 shows the sensitivity of the results to changes in thermal coal prices. As indicated in the figure, the assessment of foreseeable demand does not change significantly relative to the base case for either the high or low thermal price cases. This reflects the low proportion of thermal coal in the total foreseeable demand in the market.

Under both low and high terminal coal price scenarios, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.2: Sensitivity of results to changes in thermal coal prices



7.2 Sensitivity to DBCT expansion costs

The costs of coal terminal expansions are an important determinant of how future increases in coal production will be served at coal terminals in central Queensland. Lower costs of expansion at DBCT relative to expansions at other terminals, all things being equal, will increase the likelihood that total foreseeable demand in the market can be met at DBCT, rather than at other terminals.

We discuss at section 6.1.2 above that information regarding potential expansions at DBCT and their associated costs is publicly available. However, less information is available in relation to the options and costs for expansion of other terminals. In light of this uncertainty, we adopt a base case that assumes identical unit expansion costs at terminals other than DBCT, equal to the average cost per unit of capacity based on DBCT's expansion options.

Recognising the imprecision of this approach to cost estimates for expansions at ports other than DBCT, in this section we consider sensitivity cases in which DBCT's expansion costs are higher and lower than those assumed in the base case. The changes in expansions costs in each of the sensitivity cases reflect upper and lower bounds based on the estimated degree of precision of cost estimates. Table 7.1 shows the values assumed for the upper and lower values for the inflation/deflation for the sensitivities.

Table 7.1: Terminal expansion cost sensitivity assumptions

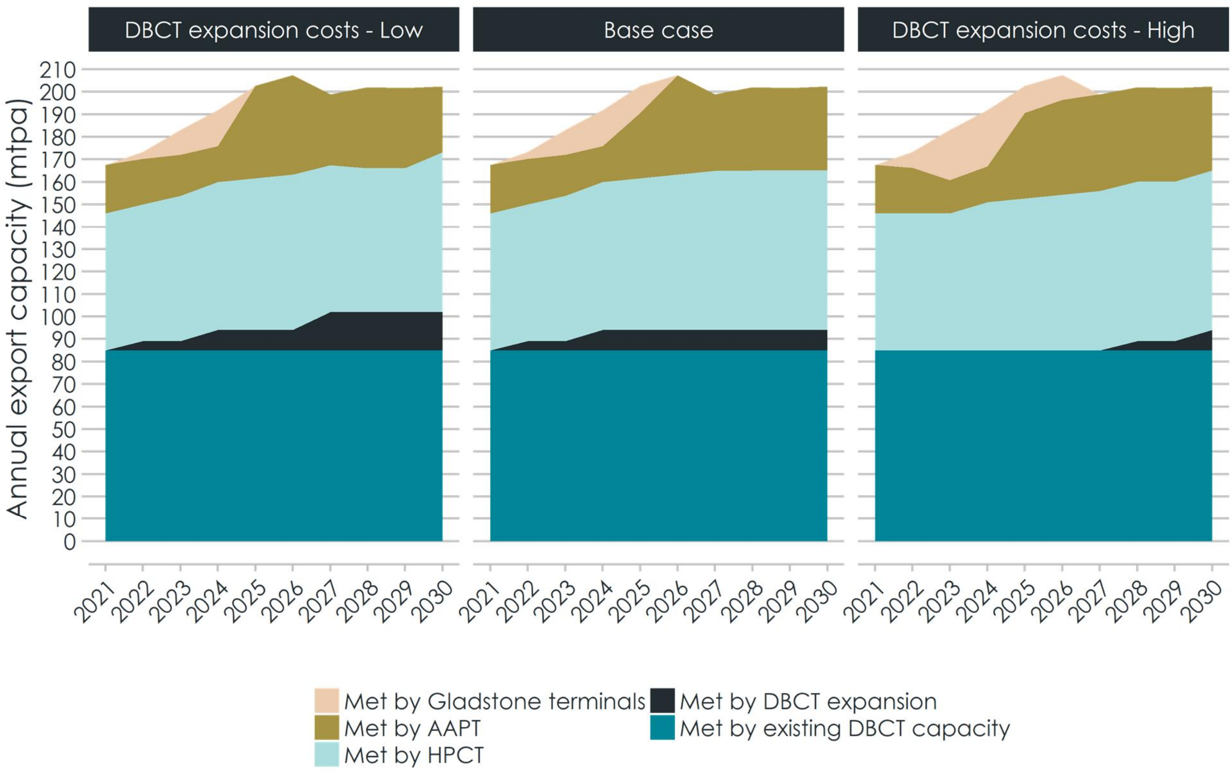
Expansion	Lower sensitivity	Upper sensitivity
Zone 4	-15%	20%
DB 8X	-25%	35%
DB 9X	-25%	50%

Figure 7.3 shows the sensitivity of our assessment of criterion (b) to changes in expansion costs for DBCT. The results indicate that changes to the relative expansion costs for DBCT has limited effect on the means by which foreseeable demand in the market is met:

- under the high DBCT expansion costs scenario, expansions to DBCT are delayed, with Zone 4 and the first phase of 8X implemented only towards the end of the period; and
- under the low DBCT expansion costs scenario, the second phase of the 8X expansion occurs in 2027.

Under both the high and low expansion costs scenarios, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.3: Sensitivity of results to changes in DBCT expansion costs



7.3 Sensitivity to rail transportation charges

We consider two sets of sensitivity cases for transportation costs faced by miners in utilising the rail network. These are:

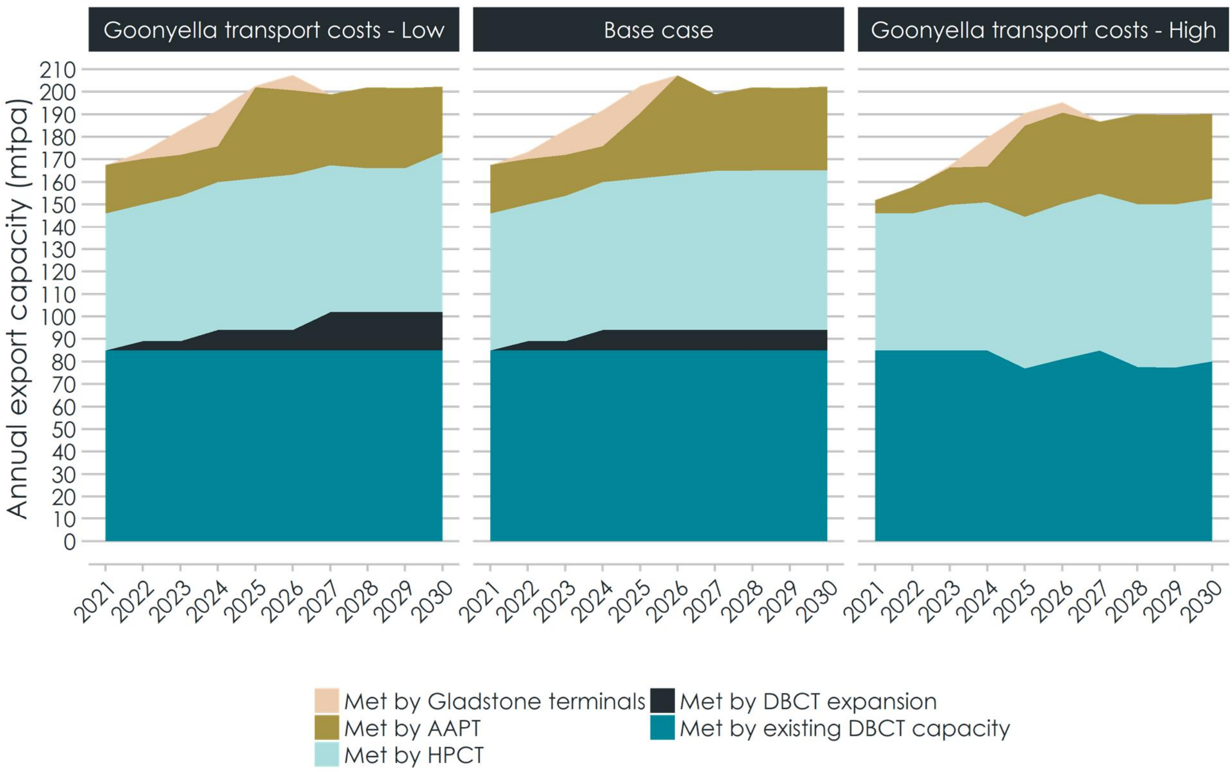
- sensitivity to transportation charges for mines utilising the Goonyella system – we consider cases where rail transportation charges for mines located within the Goonyella system are 25 per cent higher and lower relative to the base case; and
- sensitivity to charges associated with utilising the GAPE system – we consider cases where rail transportation charges for utilisation of the GAPE system are $3 per tonne higher and lower than the base case.

Figure 7.4 shows the sensitivity of our results to changes in Goonyella rail system transport charges. With low transportation charges for mines within the Goonyella system, foreseeable demand in the market is not affected compared to the base case. However, in this scenario DBCT serves a higher proportion of total foreseeable demand than under the base case, and the 8X expansion is fully implemented.

With high transportation costs for mines within the Goonyella system, foreseeable demand in the market is lower than under the base case. The decrease in foreseeable demand is due to substitution to other terminals, rather than changing the extent to which mines are profitable.

Under both low and high transportation costs, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.4: Sensitivity of results to Goonyella rail system transport charges



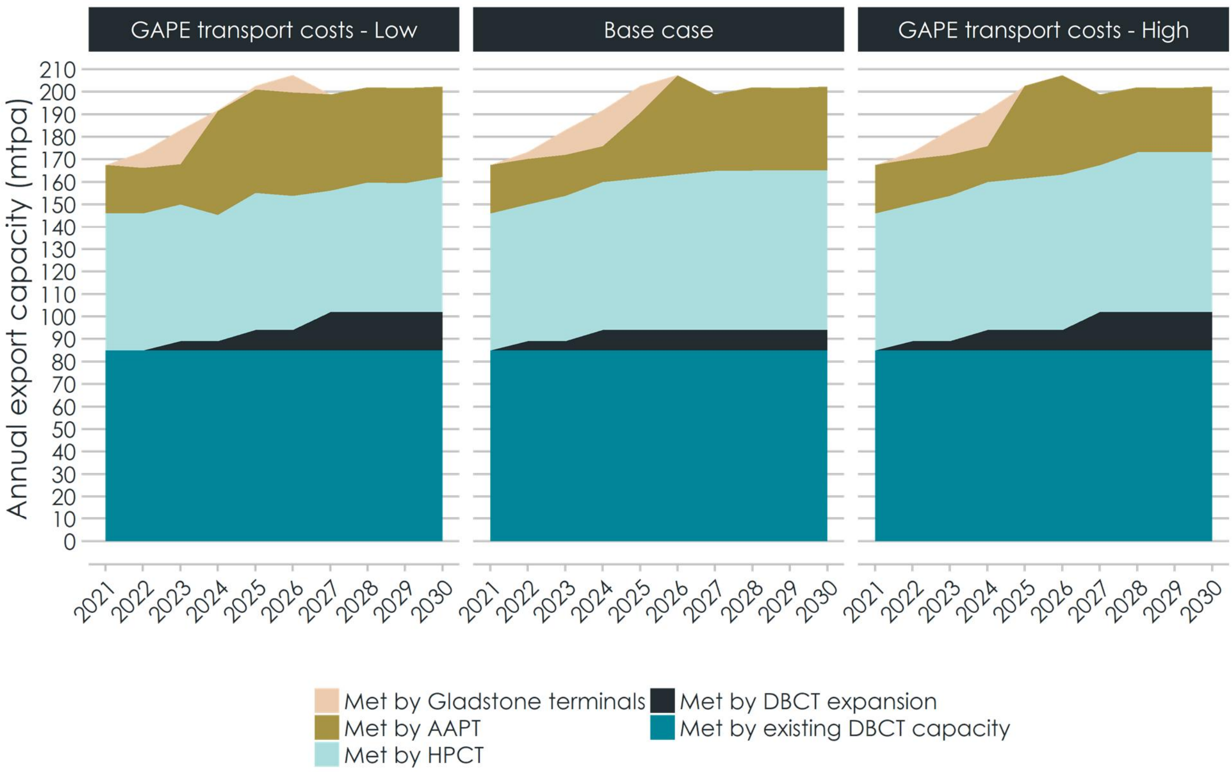
The GAPE system connects the Newlands and Goonyella rail systems. Current charges for usage of the GAPE system are high relative to other rail systems because the system is lowly utilised. The future utilisation of the GAPE system is expected to have a material influence on the rail charges incurred by users of the network, since any increase in volumes would enable the capital costs of the GAPE to be spread more thinly over its users.

Reflecting this uncertainty, we consider the sensitivity of the assessment of foreseeable demand in the market to the charge to users of the network to transport coal through the network by considering cases where the costs for utilisation of the network are $3 per tonne higher and lower than the base case. Figure 7.5 shows the sensitivity to the cost of utilising the GAPE system.

Under this range of charges for GAPE system costs there is no change in the foreseeable demand in the market. However, the means by which foreseeable demand is met changes modestly. In particular, lower charges for the GAPE system increase the extent to which foreseeable demand is served at AAPT.

Under both low and high GAPE system costs, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results continue to hold if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.5: Sensitivity of results to GAPE rail system transport charges



7.4 Sensitivity to the feasibility of the 9X expansion

If feasible, the 9X expansion would expand the capacity of DBCT by 34 mtpa. In combination with the 8X expansion option, this would result in the total capacity of DBCT increasing to 136 mtpa.

However, significant uncertainty exists as to the feasibility of the 9X expansion due to, amongst other impediments:

- the potential for restrictions on the dredging required for the completion of the project and
- the requirement for compulsory resumption of the land upon which the expansion would be developed.

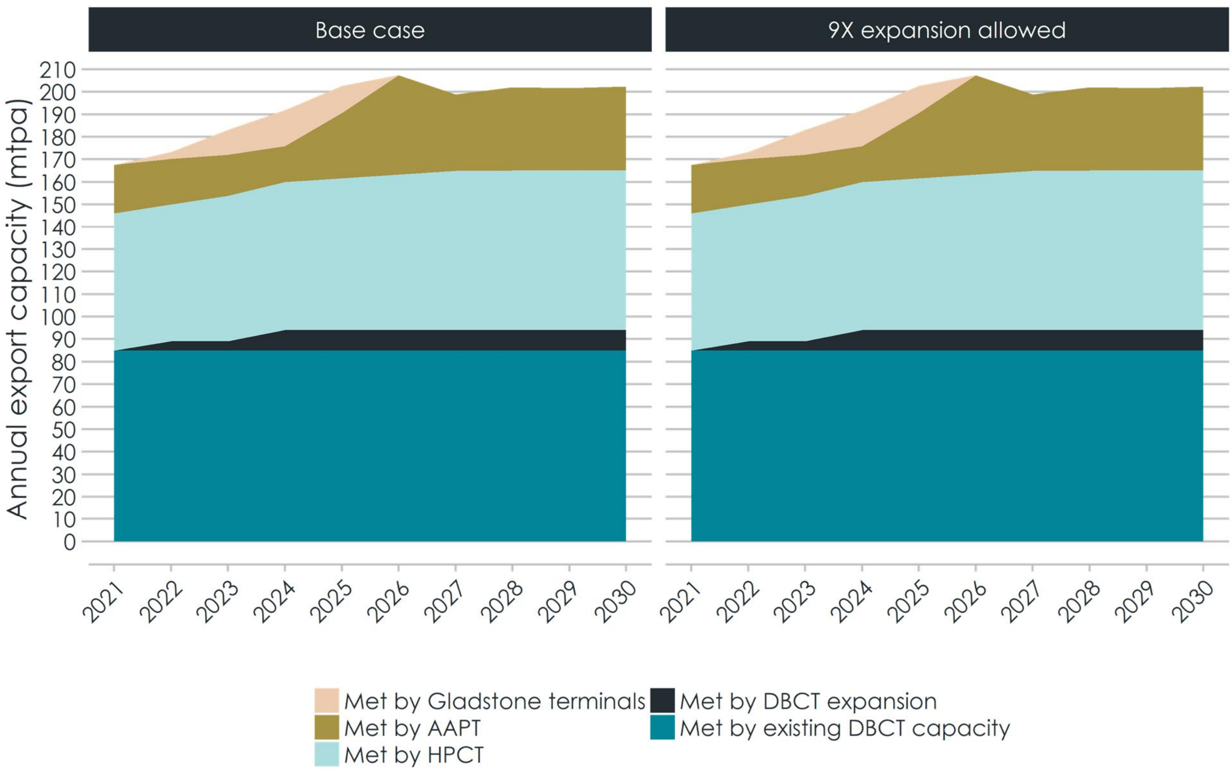
Further, notwithstanding these threshold issues, it is highly unlikely that the 9X expansion could in any case be completed within the declaration period because of the time it would take to plan and execute the Zone 4 and 8X expansions, which would need to be completed first.

Nonetheless, in this sensitivity, we consider a case where the 9X expansion is feasible within the declaration period. The 9X expansion is assumed be implemented in three parts, as outlined in table 6.1 above.

Figure 7.6 shows the sensitivity of the assessment to the feasibility of the 9X expansion. Despite being feasible and reflecting an assumption that expansions can be completed every two years, our results indicate that no part of the 9X expansion would be used to meet total foreseeable demand at least cost, and the results of our base case analysis are not affected.

When we assume that the 9X expansion is feasible, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.6: Sensitivity of results to feasibility of the 9X expansion



7.5 Sensitivity to production from the Galilee Basin

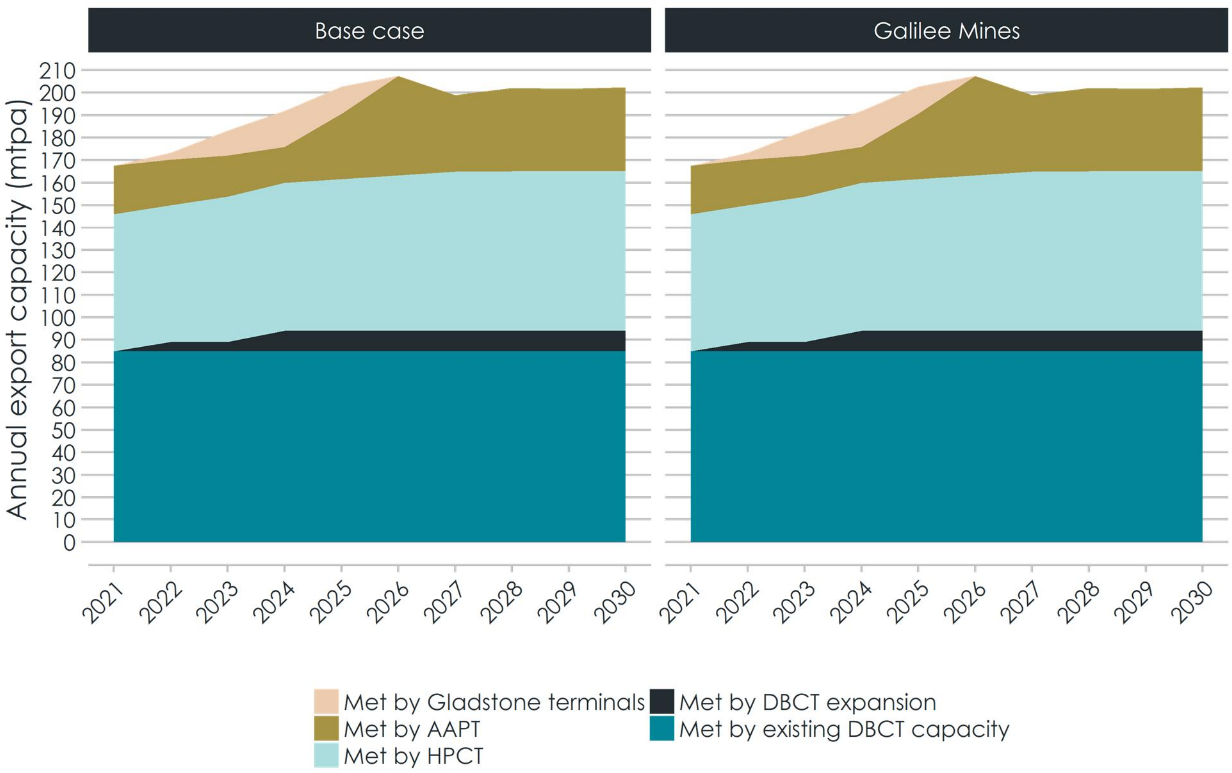
In our base case scenario, we assume that production from the Galilee Basin is not forthcoming over the period for which the DBCT service would be declared. This assumption reflects that the success (or otherwise) of proposals to develop mines in the Galilee Basin is subject to a significant degree of uncertainty.

This sensitivity assesses criterion (b) under an assumption that mines in the Galilee Basin commence operations over the period for which the DBCT service would be declared. We assume that coal from the Galilee Basin utilises dedicated rail infrastructure to reach AAPT, and therefore does not substantially rely on new or existing Aurizon rail infrastructure to access export markets.

Figure 7.7 shows the sensitivity of the results to production from the Galilee Basin. The future status of Galilee basin mines is not projected to alter the extent to which foreseeable demand in the market is met by other terminals, including AAPT.

When we assume that mines from the Galilee Basin commence production during the period for which the service would be declared, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.7: Sensitivity of results to production from the Galilee Basin



7.6 Sensitivity to the terminal charge for WICET

The unit charges at WICET in the assumptions set provided are substantially above the charges for other coal terminals. This is caused by a combination of:

- the socialised pricing policy adopted by WICET and;
- the reduction in contracted volumes through WICET that have been experienced over recent years.

The combination of these factors means that the remaining mines utilising WICET are charged higher relative prices as the fixed costs of WICET are spread over a smaller base of contracted volumes.

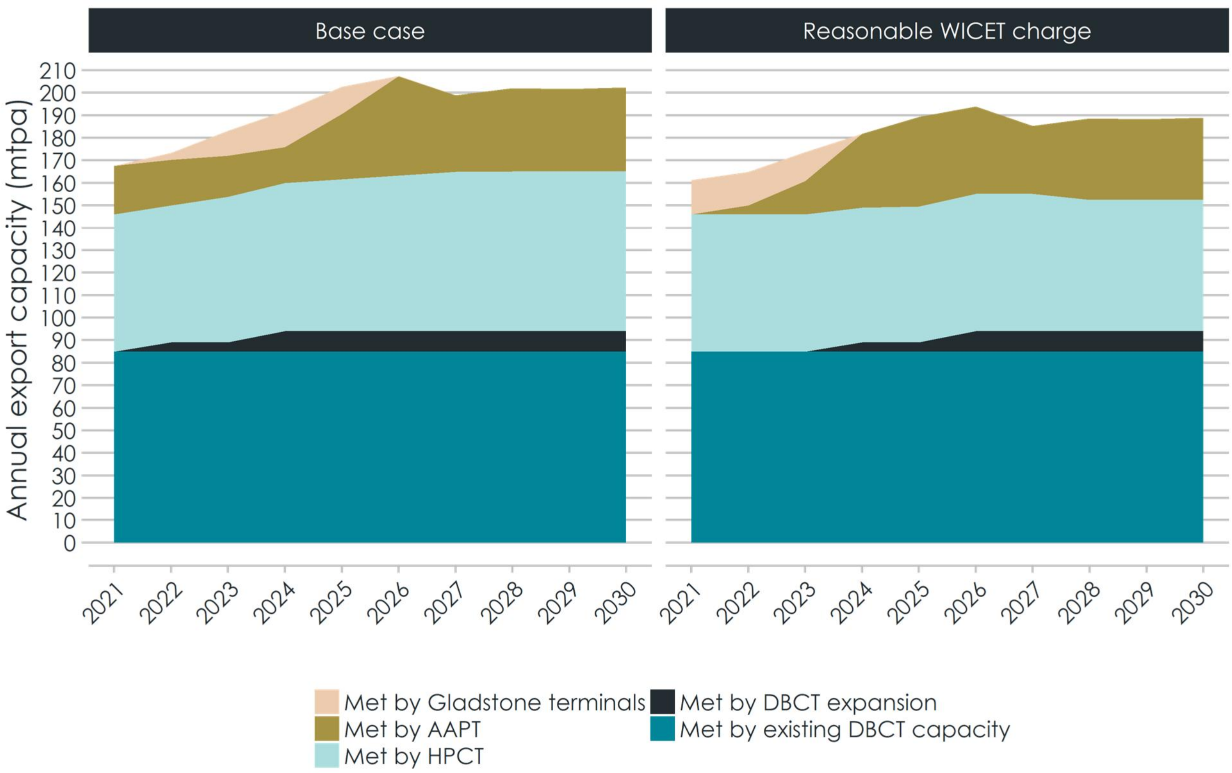
Should volumes increase in the future, the socialised pricing regime would mean that the terminal charges at WICET would reduce. However, our base case assessment of criterion (b) adopts the forecast of charges at WICET provided by AME, regardless of any conclusions that we draw about volumes that are exported from WICET.

To account for the uncertainty that this interaction creates in relation to future WICET charges, we consider a scenario where charges for existing capacity at WICET are equal to charges at RGTCT. This sensitivity reflects an extreme case where charges for WICET are at the bottom of the reasonable of range of potential future charges. In effect, this sensitivity provides for a greater amount of competitively priced coal terminal capacity at Gladstone.

Figure 7.8 shows the result of this sensitivity. As the figure illustrates, the lower charge at WICET reduces total foreseeable demand in the market for coal handling services for mines proximate to the Port of Hay Point. However, it does not materially change how total foreseeable demand in the market is met.

When we assume that the WICET charge is aligned with the charge applied at RGTCT, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results continue to hold if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Figure 7.8: Sensitivity to terminal charge at WICET



7.7 Sensitivity to compounding assumptions

In our assessment of sensitivities above, we consider each sensitivity to the base case assumptions in isolation. In this section, we consider the combined effect of those assumptions that appear to have the greatest effect on our assessment of criterion (b).

This scenario assumes:

- low prices for metallurgical and thermal coal, as described at section 7.1 above;
- that the costs of expanding the DBCT facility are low, as described at section 7.2; and
- that 9X is feasible during the period for which the DBCT service would be declared, as described at section 7.4.

This combination of sensitivities offers a scenario that is tilted towards a finding that DBCT is able to meet total foreseeable demand in the market at least cost.

Figure 7.9 and Figure 7.10 below show the results of our assessment of criterion (b) under this scenario. These result show that, even under this combination of assumptions, criterion (b) is not satisfied.

Figure 7.9 shows that DBCT is unable to meet total foreseeable demand in the market, since this demand exceeds the potential capacity of DBCT. Other terminals that meet this demand over the period for which the DBCT service would be declared include HPCT, AAPT and RGTCT.

Figure 7.10 shows that, even if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market, DBCT is still unable to serve total foreseeable demand in the market at least cost. In this scenario, DBCT is not expanded because, despite the relatively low total foreseeable demand, it is least cost to meet at least some of this using available capacity at other terminals.

Figure 7.9: Sensitivity to compounding assumptions (including BMA and BMC mines)

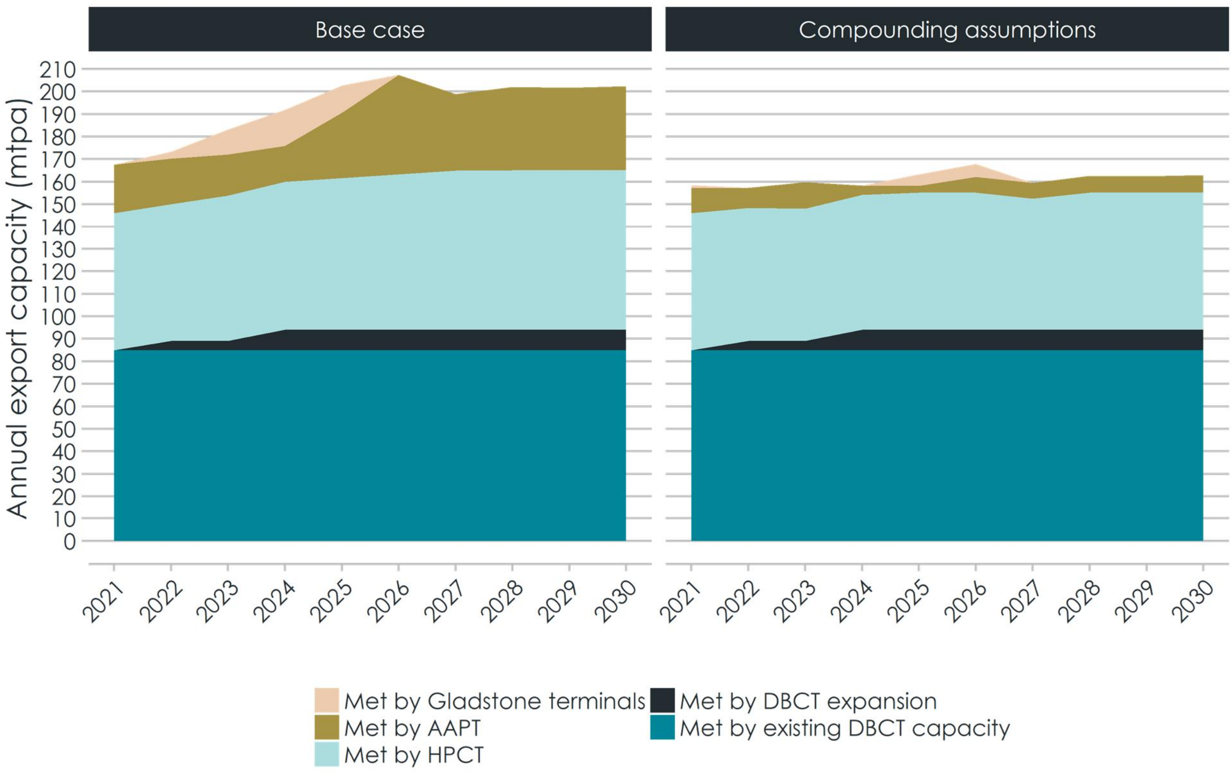
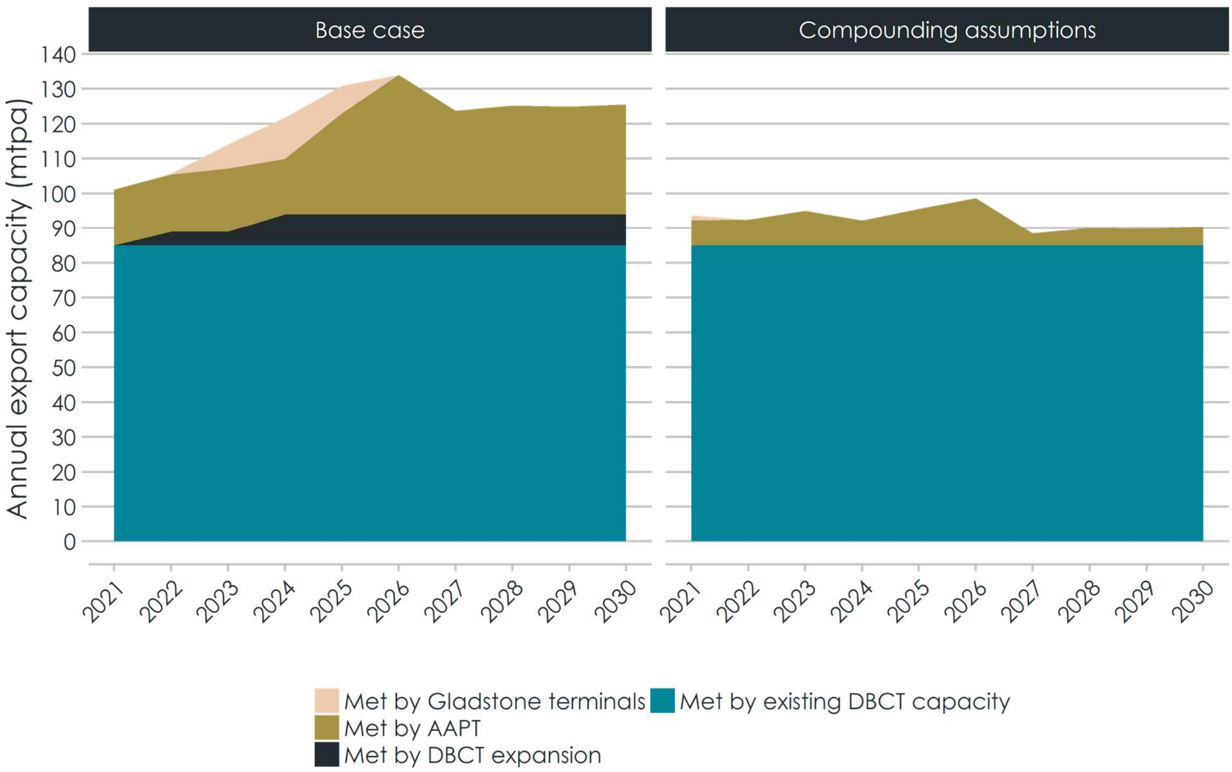


Figure 7.10: Sensitivity to compounding assumptions (excluding BMA and BMC mines)



8. Conclusion

In this report we assess whether the coal handling service provided at DBCT would satisfy criterion (b) under Part 5, Division 2 of the QCA Act, which is:

> that the facility for the service could meet the total foreseeable demand in the market—
>
> (i) over the period for which the service would be declared; and
>
> (ii) at the least cost compared to any 2 or more facilities (which could include the facility for the service);

We conclude that the DBCT service does not satisfy criterion (b). Our finding derives from the following results established by our analysis:

- at current and forecast prices for coal terminal, rail access and rail haulage services, the forecast production of coal from mines proximate to the Port of Hay Point substantially exceeds the capacity of DBCT to serve these volumes;
- our finding that total foreseeable demand substantially exceeds the current and expanded capacity of DBCT remains even if the entire production volumes of BMA and BMC mines are excluded from the market;
- foreseeable demand in the market for coal handling services for mines proximate to the Port of Hay Point includes mines that are currently served by other terminals, including HPCT, AAPT and RGTCT; and
- an assessment of the resource costs of meeting foreseeable demand in the market shows that it is least cost for at least some of the foreseeable demand in the market to be met at HPCT, AAPT or RGTCT, instead of being met in its entirety by DBCT.

Despite these conclusions, our analysis employs a range of assumptions that cause our analysis to be predisposed to finding that criterion (b) is satisfied. These assumptions include that:

- our approach to defining the market limits the geographic dimension to the areas in which mines prefer to use coal handling services at the Port of Hay Point – this is likely to understate the geographic extent of the market and so underestimate total foreseeable demand in the market since some mines outside this area may also be potential customers of the DBCT service;
- our approach to taking into account physical constraints restricts the coal handling services that mines can access in competition to those provided by DBCT – this is likely to understate foreseeable demand in the market since these constraints could be relaxed with investment at the coal mine to allow greater choice of services;
- our exclusion of all BMA and BMC mines' production from foreseeable demand in the market overstates the effect of the preference of these mines to have their coal handling services provided by HPCT – this is likely to understate foreseeable demand in the market since some of these mines are likely to (and currently do) use DBCT either by preference or because HPCT capacity may not always be available;
- our approach to estimating foreseeable demand for contract capacity assumes that only 10 per cent of contracted capacity is unused over time – this is likely to understate foreseeable demand in the market since recent empirical evidence suggests the proportion of unused capacity is higher than this; and
- our approach to estimating resource costs in our base case analysis assumes that these are equal to coal terminal and rail charges – this is likely to overstate the incremental costs of serving foreseeable demand at terminals other than DBCT, making it relatively cheaper to meet total foreseeable demand at DBCT.

On all of these considerations, we regard our findings as robust, such that they are not sensitive to reasonable changes to the assumptions adopted in our analysis.

To test these conclusions, we have investigated a range of alternatives to the base case scenario, assessing the sensitivity of our findings to changes in input assumptions. In each of these sensitivities, we find that total foreseeable demand in the market is met at least cost by two or more facilities, and so criterion (b) is not satisfied. In each case, these facilities include at least one other terminal aside from DBCT and HPCT. These results remain unchanged if the production from all BMA and BMC mines is excluded from the estimate of total foreseeable demand in the market.

Consistent with these results, we find that the coal handling service provided at DBCT does not satisfy criterion (b) under Part 5, Division 2 of the QCA Act.

A1. Total foreseeable demand by mine

Table A1.1 presents our estimates of foreseeable demand in the market on a mine by mine basis, over the period for which declaration of the service is to be assessed.

The underlying forecasts of mine production from which these estimates are drawn are set out at table a3.6 at appendix A3 to this report. When assessing foreseeable demand, we assume that forecasts of production for existing mines and mine expansions that are deemed to be 'highly probable' will be realised. For mine expansions that are deemed to be 'probable' or 'possible', we assess whether they are expected to recover their costs using the cheapest combination of port and rail capacity. Only expansions that are expected to recover their costs on this basis are included in the assessment of foreseeable demand in the market.

Table A1.1: Total foreseeable demand for throughput in the market by mine

Operator	Mine	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Anglo American	Capcoal	7.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
	Grosvenor	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	Moranbah North	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80
	Moranbah South	1.80	5.00	9.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Aquila	Eagle Downs	3.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
	Talwood	0.00	0.00	0.00	0.91	1.60	3.60	3.60	3.60	3.60	3.60
BHP Mitsubishi Alliance	Caval Ridge	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	Daunia	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	Goonyella	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80
	Grosvenor West	1.50	2.60	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
	Peak Downs	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	Saraji	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
	Saraji East	0.00	0.00	0.00	1.00	2.50	4.00	5.50	7.00	7.00	7.00
BHP Mitsui Coal	Poitrel	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
	South Walker Creek	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
Fitzroy Resources	Ironbark No. 1	1.70	2.56	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26
Glencore	Clermont	13.00	13.00	13.00	13.00	13.00	13.00	0.00	0.00	0.00	0.00
	Oaky Creek	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
Jellinbah Group	Lake Vermont	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.30	9.30
Middlemount Coal	Middlemount	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
New Hope	New Lenton	1.30	1.30	1.30	3.16	3.16	3.16	3.16	3.16	3.16	3.16
Peabody	Codrilla	0.00	0.00	0.00	0.00	0.90	1.80	3.20	3.20	3.20	3.20
	Coppabella	4.00	4.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Denham	0.00	0.00	0.00	0.00	0.70	2.90	3.50	4.50	5.50	6.00
	Moorvale West	0.00	0.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Operator	Mine	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
	North Goonyella	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	Olive Downs North	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Vermont East/Willunga	0.00	0.00	0.63	1.25	1.95	3.13	3.13	3.13	3.13	3.13
	West/North Burton	0.00	0.00	0.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00
Realm Resources	Foxleigh	3.30	3.30	3.30	3.30	3.30	0.00	0.00	0.00	0.00	0.00
Rio Tinto	Hail Creek	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
	Kestrel	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71
	Winchester South	0.00	0.00	0.00	0.00	0.00	1.80	3.60	4.00	4.00	4.00
Shandong Energy Group	Hillalong	3.60	3.64	3.60	3.62	3.64	3.64	3.60	3.61	3.54	3.54
Stanmore Coal	Isaac Plains	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	0.00	0.00
Terracom	Blair Athol	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00
United Mining Group	Teresa	0.00	2.00	2.85	3.33	6.40	6.40	6.40	6.40	6.40	6.40
Yanzhou	Harrybrandt	0.00	0.00	0.00	1.00	2.51	2.51	2.51	2.51	2.51	2.51
Total foreseeable demand (including BMA and BMC)		**150.90**	**156.10**	**164.84**	**172.73**	**182.42**	**186.70**	**178.96**	**181.87**	**181.60**	**182.10**
Less volumes of BMA and BMC mines		59.85	60.95	62.15	63.15	64.65	66.15	67.65	69.15	69.15	69.15
Total foreseeable demand (excluding BMA and BMC)		**91.05**	**95.15**	**102.69**	**109.58**	**117.77**	**120.55**	**111.31**	**112.72**	**112.45**	**112.95**

Source: AME and Wood Mackenzie data, HoustonKemp analysis

A2. Description of modelling framework and assumptions

This appendix sets out a detailed description of:

- the modelling framework that we use to assess the least cost means by which total foreseeable demand in the market can be met; and
- the assumptions that we use to populate this framework in our assessment of criterion (b).

A2.1 Modelling framework for the assessment of least cost

To assess whether the facility for the service could meet the total foreseeable demand in the market at least cost compared to two or more facilities, we have developed an economic model of coal production and export within the bounds of the central Queensland coal network. In this section we describe the structure and functionality of our economic model.

Our modelling framework utilises a constrained optimisation approach that projects the optimal pattern of coal exports from mines located within central Queensland. This approach allows the model to capture a number of trade-offs inherent in the use and development of system capacity, for example that between expanding a port to accommodate higher demand or transporting the coal to an alternative port for export.

In specifying the model, we make a number of simplifying assumptions to ensure it is tractable:

- there is perfect foresight on behalf of an overall system planner; and
- there are negligible switching costs to a mine in changing its port of export, save for the change in rail haulage, rail access and coal terminal charges.[62]

A2.1.1 Objective function

The model makes use of an objective function that represents the outcome the model is seeking to minimise – the resource costs of exporting total foreseeable demand in the market (as set out at section 5 above) over the period from 2021 to 2030.

A2.1.2 Model variables

To find the least cost means of meeting total foreseeable demand in the market, the model chooses the values of a range of variables that represent the inherently interrelated decisions that the mines, ports and rail network operators can make. The model variables are:

- mine expansions – binary variables representing the decisions of potential future mines to commence operations;
- rail flows – the flows of coal through each segment of the rail network;
- rail expansion – expansions (on a generic basis) to different networks within the broader rail network to accommodate higher coal throughput;
- port exports – exports of coal from each port; and
- port expansions – expansions to ports, based on specific expansion projects, to allow for increased coal export through the port.

[62] We impose constraints on the locations to which individual mines can send coal, consistent with their existing infrastructure. The most common constraints that are taken into account are the loading loop direction, the rail interchange direction or a requirement for a new loading loop.

The model finds the unique value of each of these variables that gives rise to the least cost means of meeting foreseeable demand, subject to any constraints imposed on the solution.

A2.1.3 Model constraints

The constraints imposed upon the model's solution represent physical and economic limitations on the movement of coal in central Queensland. These constraints reflect the real-world dynamics of coal logistics. The types of constraints that are included in the modelling are:

- mine production constraints – constraints that require the outputs from a mine to be equal to its projected production, including both existing mines and new mine expansions that are determined within the model;
- port capacity constraints – constraints on the maximum volume of coal that can be exported through a terminal;
- port expansion constraints – constraints that influence the first year that each expansion can occur and the minimum time between expansions at the same terminal;
- rail network capacity constraints – constraints on the maximum quantity of coal that can utilise a system within the rail network;
- supply-demand constraints – constraints that ensure that the flow of coal in and out of each location within the network sums to zero at all points in time and for each mine;[63] and
- expansion consistency constraints – constraints that ensure that once capacity is expanded it remains expanded over the modelling period.

A2.1.4 Model outputs

The outputs of the model show the values of the variables that represent the least cost means of meeting total foreseeable demand and include:

- the volume of exports through each coal terminal by each mine in each year;
- the volume of haulage on each segment on the CQCN rail network in each year;
- the extent and timing of port expansions; and
- the extent and timing of rail expansions.

The granular level of model outputs allows us to examine the dynamics of coal export activity from central Queensland in detail and to track the flow-on effects of changes to constraints and inputs throughout the supply network.

A2.2 Input assumptions

This section introduces each of the assumptions that we utilise to estimate how total foreseeable demand in the market can be met at least cost by existing or expanded coal terminal capacity. It presents:

- the approach we take and assumptions we use approximating the resource costs of existing and expanded terminal and rail infrastructure; and
- other assumptions that we rely upon in our assessment of criterion (b).

There is a significant degree of uncertainty as to how best to measure resource costs. This uncertainty arises because:

[63] To model the movement of coal throughout the network, we describe the network as a series of 'nodes' representing mines, ports or rail junctions. At each node, coal is either injected by a mine, transported to or from by rail or exported through a port. These constraints ensure that the coal passing into each node is equal to the coal passing out of the node.

- the incremental costs of using existing terminal infrastructure are inherently unobservable;
- there is limited information available about the extent and expense of options to expand or construct terminal infrastructure; and
- it is not straightforward to describe (or quantify) the capacity of a rail network or the incremental costs required to expand this capacity.

A2.2.1 Resource costs of coal terminal capacity

In this section, we describe our approach to estimating the resource costs for:

- existing terminal infrastructure; and
- expanded terminal infrastructure.

Resource costs of existing coal terminal capacity

The resource costs of using existing coal terminal capacity are likely to be much lower than coal terminal charges since many of the costs incurred in providing coal terminal capacity are fixed in nature, with terminal charges reflecting a return of and return on sunk capital costs.

Terminals recover handling charges that vary with throughput (variable costs) and charges that do not vary with throughput (fixed costs). We assume that the resource costs of utilising existing coal terminal capacity are equal to the variable component of coal handling charges applied at each terminal. These charges are set out in table a3.1, at appendix A3 to this report. We estimate the variable proportion of charges at DBCT as equal to the Handling Charge Variable (HCV) as a proportion of the total coal handling charges for 2017/18 – 22 per cent.[64]

We estimate resource costs of using existing capacity at other terminals by applying the same proportion to coal handling charges at those terminals.

Resource costs of new coal terminal capacity

We assume that the resource costs incurred to use expanded coal terminal capacity include both the fixed and variable costs of the expanded capacity. We estimate these costs as:

- the incremental capital expenditure required to realise this expansion – these capital costs are shown in table a2.2 below; and
- the variable component of port handling charges, as discussed above.

Although we capture the capital costs associated with expansions of coal terminal capacity, our approach to doing so takes into account the value of these investments beyond the period for which the facility for the service would be declared. We do this by:

- calculating an amortised value of the capital expenditure associated with a capacity expansion for each year of the useful life of the capacity – which we assume to be 40 years; and
- calculating the cost of the expansion as the present value of these amortised cashflows over the period for which the facility for the service would be declared – that is, 2021 to 2030.

This approach is likely to understate the resource costs associated with expanding terminal capacity to meet total foreseeable demand during the period for which the service would be declared. This is the case because:

[64] The total port handling charges include the Terminal Infrastructure Charge (TIC), Handling Charge Fixed (HCF) and Handling Charge Variable (HCV). The HCV for DBCT effective from 1 April 2018 is $1.0953 per tonne while the total port handling charges were $4.9467 per tonne.

- criterion (b) requires an assessment of the least cost means of meeting foreseeable demand over this period, which may be consistent with accounting for upfront capital expenditures in their entirety; but
- the approach we apply spreads a large proportion of the cost of expansions made during the declaration period to years beyond that period, thereby understating the total cost of meeting foreseeable demand *in that period*.

It follows that this approach to estimating resource costs will reduce the cost of meeting foreseeable demand using expanded capacity at DBCT relative to using available capacity at other terminals and so make it more likely that our assessment will find that the coal handling service at DBCT satisfies criterion (b).

Future terminal capacity expansions

The potential size and cost of future capacity expansions at DBCT and other coal terminals in central Queensland are an important input into an assessment of how total foreseeable demand in the market can be met at least cost.

If capacity expansions at DBCT require lower resource costs than those at other terminals, taking into account any difference in rail access and haulage resource costs, then this indicates that it may be lower cost to serve foreseeable demand at expanded capacity at DBCT than it would be to expand capacity at other coal terminals.

Table A2.2 sets out the list of potential future expansions of coal export terminal capacity that we have used in our assessment of how to meet foreseeable demand at least cost. In relation to these expansions, we assume that:

- each terminal must complete expansions in the order indicated;
- the earliest year in which expansions at any terminal can be completed is 2022; and
- each terminal can only undertake a maximum of one expansion every two years.

The information about potential capacity expansions shown in table a2.2 has been collected by DBCTM from publicly available information.

DBCT provides transparent information about potential capacity expansions and their costs in its Master Plan that it updates periodically. The most recent DBCT Master Plan was prepared in 2018.[65]

Other terminals may provide information about potential capacity upgrades. For example, AAPT and WICET have publicly revealed plans for significant increases in capacity. However, the potential costs of these expansions are typically not revealed.

We therefore approximate the unit costs of capacity expansions for other terminals by the weighted average cost of expansions reported by DBCT, as shown in table a2.2 below. Reflecting this lack of certainty of coal terminal expansion costs, at section 7.2 we present the results of sensitivities demonstrating the effect of assuming both higher and lower unit expansion costs for DBCT relative to other terminals.

[65] DBCTM, *Master Plan 2018: Expansion opportunities at the Dalrymple Bay Coal Terminal*, 26 April 2018.

Table A2.2: Future options for capacity expansion of coal export terminals in central Queensland

Port	Expansion name	Expansion capacity (mtpa)	Cumulative capacity (mtpa)	Capital cost ($/t)	Capital cost ($ million)
DBCT	Zone 4	4.0	89	98.84	533.76
	DB 8X Phase 1	5.0	94	78.74	251.97
	DB 8X Phase 2	8.0	102	113.10	780.42
	DB 9X Phase 1	12	114	144.62	1,735.46
	DB 9X Phase 2	12	126	151.75	1,820.98
	DB 9X Phase 3	10	136	159.24	1,592.45
HPCT	HPX4	20	75	124.00	2,480.00
AAPT	T0 Phase 1 (Adani)	35	85	124.00	4,340.00
	T0 Phase 2 (Adani) 1	12	97	124.00	1,488.00
	T0 Phase 2 (Adani) 2	12	109	124.00	1,488.00
	T0 Phase 2 (Adani) 3	11	120	124.00	1,364.00
	T3 Phase 1 (GVK-Hancock)	30	150	124.00	3,720.00
	T3 Phase 2 (GVK-Hancock) 1	10	160	124.00	1,240.00
	T3 Phase 2 (GVK-Hancock) 2	10	170	124.00	1,240.00
	T3 Phase 2 (GVK-Hancock) 3	10	180	124.00	1,240.00
WICET	Stage 2 (WEXP1) Phase 1	11	38	124.00	1,364.00
	Stage 2 (WEXP1) Phase 2	11	49	124.00	1,364.00
	Stage 2 (WEXP1) Phase 3	11	60	124.00	1,364.00
	Stage 3 (WEXP2) Phase 1	12	72	124.00	1,488.00
	Stage 3 (WEXP2) Phase 2	12	84	124.00	1,488.00
	Stage 4 Phase 1	10	94	124.00	1,240.00
	Stage 4 Phase 2	10	104	124.00	1,240.00
	Stage 4 Phase 3	10	114	124.00	1,240.00

Source: DBCTM

We note that the approach to approximating the costs of capacity expansions at other terminals is an average of DBCT's reported expansion costs, including the costs of the 9X expansion, which is the most expensive expansion measured above and will not proceed during the period for which the DBCT service would be declared. This approach may have the potential to overestimate the average costs associated with expanding other terminals and therefore increase the prospect that it would be least cost to meet total foreseeable demand at DBCT.

A2.2.2 Resource costs and capacity of rail access and haulage

In this section, we describe our approach to estimating the resource costs for rail access and haulage.

Unlike for coal terminals, it is not straightforward to describe (or quantify) the capacity of a rail network or the costs required to expand this capacity, since this will always depend upon where in the network the incremental requirements for volume are experienced. It may therefore not be possible to know, given a level of total foreseeable demand, whether this can be met within existing rail network capacity or whether the network would require expansion in order to deliver this demand to the relevant terminals.

Although Aurizon Network makes available high-level information on expansion options in its network development plan,[66] this does not provide a straightforward basis upon which to estimate whether additional foreseeable demand from a specific mine (or combination of mines) in central Queensland would give rise to additional capital expenditure requirements and, if so, the amount of expenditure that would be required.

The complexity of capturing rail expansion costs suggests that a simplified approach is reasonable unless better estimates of rail capacity and expansion costs reach the public domain.

In our analysis, we consider three approaches to resources costs for rail access and haulage charges, where the resource costs for the provision of rail services are equal to:

- estimates of rail access and haulage charges;
- the variable component of rail access and haulage charges; and
- zero, on the assumption that resource costs for rail services should not be included in the least cost analysis.

The assumed rail access and haulage charges are set out in table a3.2 and table a3.3 at appendix A3.

All these approaches to assessing the resource costs of rail usage are simplified and reflect the paucity of public information that is available regarding the capacity and expansion costs of Aurizon's rail network.

We anticipate that the actual resource costs are likely to lie somewhere between those estimated by the first two approaches described above. There is no *a priori* reason to expect that either approach is likely to be best since it depends on the extent of expansion to the rail network capacity that is required and the associated costs of this expansion. We explain these approaches in greater detail below.

We also consider an additional scenario where we exclude the costs of transporting coal via the rail path that is required to access alternative facilities. This reflects the approach undertaken in analysis conducted by the QCA in its issues paper.[67] In our opinion, this approach is likely to underestimate the resource costs of utilising existing and expanded capacity, since it does not take into account relevant costs in coal supply networks that will be incurred in order to meet foreseeable demand.

Estimating rail resource costs equal to charges

Estimating resource costs as equal to rail charges assumes that:

- rail charges substantially reflect variable costs; and
- the expansion costs of rail access and haulage capacity reflect the costs of past capacity as reflected in charges.

We expect that this approach will overstate the resource costs associated with the use of the existing rail network, particularly for rail access charges that reflect substantial fixed costs. This approach to measuring the resource costs of existing rail infrastructure capacity is likely to make our assessment more likely to satisfy criterion (b). This is because it will overstate the incremental costs associated with meeting foreseeable demand using existing capacity at terminals other than DBCT and so make it more likely we will find that the least cost means of meeting foreseeable demand in the market is by using existing or expanded capacity at DBCT.

[66] Aurizon, *Network development plan 2016/17*, available online at https://www.aurizon.com.au/~/media/aurizon/files/what%20we%20do/network/network%20development%20plans/ndp/networkdevelopmentplan_2016-17.pdf.

[67] The example provided by the QCA in Appendix B of the issues paper did not include the costs of transportation between facilities see QCA (2018), *Staff Issues Paper: Declaration Reviews*, April 2018, pp 31-32.

The assumption that expansion costs reflect the costs of past investments in capacity effectively assumes constant returns to scale and that capacity can expand continuously, that is, without lumpy investments. This is not likely to be an accurate reflection of expansion costs, particularly in relation to rail access.

Rather, the costs of expanding the capacity of a particular coal terminal in central Queensland to accommodate increases in foreseeable demand from nearby mines are likely to be lumpy and, on a unit basis, could be either lower or higher than the price of existing capacity depending upon the characteristics of the existing railway connecting these mines to the terminal. These costs may be affected by:

- the capacity of the existing railway – where the required rail path has available capacity this would be expected to reduce the costs of sizing the rail network to meet foreseeable demand;
- the configuration of the existing railway, reflecting the type of investment that would be required in order to increase its capacity – whether this requires additional signalling, new sidings or track duplication; and
- the geography of the existing railway – which is likely to influence the costs of implementing any plan to expand network capacity.

Estimating rail resource costs equal to the variable component of charges

Conversely, the approach that resource costs are equal to the variable component of rail charges assumes that:

- rail charges for existing capacity contain a substantial proportion that recovers fixed costs – the removal of this part of the charge will therefore increase the accuracy of resource costs for the use of existing capacity; and
- no expansions to the rail network capacity are required (or, rather, that the capacity of the rail network is more than sufficient to meet total foreseeable demand) or that the capital costs associated with these expansions is negligible.

By omitting the fixed cost component of current charges, this approach will provide a better estimate of the resource costs of using existing capacity. However, the use of the variable cost component alone will underestimate resource costs in circumstances where additional rail demand requires the existing capacity to be expanded.

We have estimated the variable proportion of rail access charges by reference to access undertakings for Aurizon's rail network. For the purpose of the analysis we assume that 50 per cent of rail haulage charges are variable.

A2.2.3 Other assumptions

Discount rate utilised in calculating present value costs

Assessing the costs of meeting total foreseeable demand in the market requires the use of a discount rate to estimate the present value cost of each means of meeting this demand.

For the purpose of this report, we adopt a central estimate for this discount rate of seven per cent. We examine sensitivities to this discount rate, modelling low and high values of four per cent and 10 per cent respectively.

Miners' ability to access services at coal terminals

The assumptions documented in appendix A3 dictate the extent to which it is physically feasible for a mine to utilise the coal handling services at any terminal – no data indicates a lack of feasibility.[68] These assumptions include that mines which are not operated by BMA or BMC are unable to utilise HPCT.

Miners' contractual positions

Consistent with the basis on which we define the market within which the service for the facility is provided, we do not take into account the existing contractual positions of miners in our analysis of the least cost means of meeting total foreseeable demand. In our opinion, taking into account contractual positions is not necessary in the least cost part of the assessment of criterion (b) because contracts do not impose or affect resource costs.

In any case, it would not be practicable to take contracts into account in an assessment of least cost because:

- insufficient information is available in respect of the contracting positions of miners with coal terminals and rail service providers to be able to draw robust conclusions about incentives to enter into new contracts; and
- predicting the behaviour of miners considering entering into new contracts with coal terminals and rail service providers, including the interaction of this with the availability of spare capacity, would be excessively complex even if good information on existing contracts were available.

[68] The most common constraints that are taken into account are the loading loop direction, the rail interchange direction or a requirement for a new loading loop.

A3. Schedule of input assumptions

In this appendix we set out the input assumptions (not otherwise presented in our report) that underpin our estimates of the geographic scope of the market, calculation of total foreseeable demand in the market and assessment of least cost. These assumptions have been provided to us by DBCTM and are sourced from independent industry experts, publicly available information and market data:

- table a3.1 presents forecasts of coal handling charges at each coal export terminal in central Queensland;
- table a3.2 presents forecasts of rail access charges faced by each mine in central Queensland to transport coal to each coal export terminal for which this is physically feasible without new capital expenditure;
- table a3.3 presents forecasts of rail haulage charges faced by each mine in central Queensland to transport coal to each coal export terminal for which this is physically feasible without new capital expenditure;
- table a3.4 presents forecasts of prices in the seaborne market (or markets) for the coal produced by each mine on the CQCN, by coal type;
- table a3.5 presents forecasts of production costs for each mine in central Queensland; and
- table a3.6 presents forecasts of coal production for each mine in central Queensland.

Table A3.1: Coal handling charges at each terminal (A$ per tonne)

Year	AAPT	DBCT	HPCT	RGTCT	WICET
2018	5.98	6.64	6.64	6.64	18.85
2019	6.06	6.72	6.72	6.72	17.55
2020	6.12	6.81	6.81	6.81	17.55
2021	6.20	6.89	6.89	6.89	17.55
2022	6.28	6.98	6.98	6.98	17.55
2023	6.36	7.06	7.06	7.06	17.55
2024	6.44	7.15	7.15	7.15	17.55
2025	6.53	7.24	7.24	7.24	17.55
2026	6.60	7.33	7.33	7.33	17.55
2027	6.68	7.42	7.42	7.42	17.55
2028	6.77	7.51	7.51	7.51	17.55
2039	6.85	7.61	7.61	7.61	17.55
2030	6.94	7.71	7.71	7.71	17.55
2032	7.02	7.80	7.80	7.80	17.55
2033	7.02	7.80	7.80	7.80	17.55
2034	7.02	7.80	7.80	7.80	17.55
2035	7.02	7.80	7.80	7.80	17.55
2036	7.02	7.80	7.80	7.80	17.55
2037	7.02	7.80	7.80	7.80	17.55

Source: AME

Table A3.2: Rail access charge assumptions for each mine-terminal pair ($A per tonne)

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Alpha	APCT					15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29
Arcturus	RGTCT								6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
	WICET								6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	6.46	3.93	3.77	3.77	3.77
Baralaba	APCT	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83	16.83			
	DBCT	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67	12.67			
	RGTCT	4.43	4.49	4.77	5.07	4.42	4.93	4.85	4.56	4.72	4.46	4.27	4.64	4.58	4.47	4.56	4.83	4.78			
	WICET	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Belvedere	APCT								16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
	DBCT								12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56
	RGTCT								4.46	4.42	4.33	4.59	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	WICET								4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38
Belview	APCT						12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87
	DBCT						7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
	RGTCT						6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27
	WICET						6.17	6.17	6.17	6.17	6.17	6.17	6.17	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19
Blackwater	HPCT	11.55	12.05	12.04	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81	11.81
	RGTCT	8.25	8.61	8.6	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43	8.43
	WICET	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
Blair Athol	APCT	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85											
	DBCT	4.65	4.65	4.65	4.65	4.65	4.65	4.65	4.6	4.6											
	RGTCT	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98											
	WICET	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88											
Bluff	APCT			12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87			
	DBCT			7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96			
	RGTCT			6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27			
	WICET			6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	6.17	8.19	8.19	8.19	8.19	8.19			
Bundi	RGTCT					9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET					9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Byerwen	APCT	3.03	2.34	2.26	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23	2.23
Callide	APCT	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65	16.65
	DBCT	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22	12.22
	RGTCT	3.24	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
	WICET	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
Capcoal	APCT	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48
	DBCT	4.91	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59
	RGTCT	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11
	WICET	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01
Carborough Downs	DBCT	3.65	3.65																		
	RGTCT	7.68	7.68																		
	WICET	7.59	7.59																		
Carmichael	APCT				16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12	16.12
Caval Ridge	APCT	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02	8.02
	DBCT	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
	HPCT	3.88	3.77	3.77	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	RGTCT	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13	8.13
	WICET	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03
China Stone	APCT				9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32	9.32
Clermont	APCT	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85	8.85										
	DBCT	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.6										
	RGTCT	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98	8.98										
	WICET	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88										
Codrilla	DBCT								3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.91	3.91	3.91
Collinsville (Bowen Central)	APCT	0.3	0.3	1.58	1.58	1.58	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.74	1.74	1.74	1.74
Columboola	RGTCT								9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26
	WICET								9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Cook	RGTCT	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04
Coppabella	DBCT	3.16	3.16	3.34	3.01	3.01	3.01	3.01													
Curragh	RGTCT	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
	WICET	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Daunia	APCT	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
	DBCT	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
	HPCT	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72
Dawson (Moura)	APCT	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73
	DBCT	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56
	RGTCT	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.42	4.33	4.59	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	WICET	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38
Denham	APCT								7.82	7.82	7.82	7.82	7.82	7.82	7.82	8.78	8.75	8.38	8.38	8.38	8.38
	DBCT								3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
	RGTCT								7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78
	WICET								7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
Dingo West	RGTCT							5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85	5.85
	WICET							5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Drake	APCT	1.86	1.91	1.88	1.86	1.84	1.91	1.89	1.89	1.89	1.89	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Eagle Downs	APCT				8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45	8.45
	DBCT				3.55	3.55	3.55	3.55	3.55	3.55	4.95	4.95	3.83	3.77	3.71	3.66	3.84	3.78	3.73	3.73	3.73
	RGTCT				7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12	7.12
	WICET				7.02	7.02	7.02	7.02	7.02	7.02	13.27	12.33	12.33	12.33	12.33	12.33	12.33	12.33	12.33	12.33	12.33
Elimatta	RGTCT							8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	7.94	7.94	7.94
	WICET							8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	8.37	7.94	7.94	7.94
Ensham	RGTCT	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	8.81	6.68	6.68	6.68	6.68	6.68	6.68	6.68	6.68	6.68	6.68	6.68
	WICET	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58
Foxleigh	APCT	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48	9.48											
	DBCT	4.78	4.78	4.78	4.78	4.78	4.78	4.4	4.59	4.59											
	RGTCT	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11	6.11											

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01	6.01											
Galilee (China First)	APCT							16.33	16.33	16.33	16.33	16.33	16.56	16.79	16.79	16.79	16.79	16.79	16.79	16.79	16.79
Goonyella	DBCT	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76
	HPCT	3.75	4.08	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	RGTCT	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12	8.12
	WICET	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03	8.03
Grosvenor	DBCT	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	RGTCT	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06
	WICET	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Grosvenor West	DBCT				3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.3	3.69	3.69	3.69	3.69
	RGTCT				8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06
	WICET				7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Hail Creek	DBCT	3.76	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	2.22	3.49	3.49	3.49	3.49	3.49	3.49
Harrybrandt	DBCT							4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87
Hillalong	DBCT				3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	2.22	3.49	3.49	3.49	3.49	3.49	3.49
Ironbark No. 1	DBCT				3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.13	3.04	3.04	3.04
	HPCT				3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06
Isaac Plains	DBCT	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.32	3.45	3.45								
	RGTCT	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81								
	WICET	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72	7.72								
Jellinbah East	RGTCT	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91
	WICET	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04
Kestrel	DBCT	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10
	RGTCT	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18
	WICET	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82
Kevin's Corner	APCT							16.33	16.33	16.33	16.33	16.33	16.56	16.79	16.79	16.79	16.79	16.79	16.79	16.79	16.79
Lake Vermont	APCT	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13	9.13
	DBCT	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24	4.24
	RGTCT	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72	6.72

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62
Middlemount	APCT	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	17.68	20.52	9.55	9.55	9.55	9.55	9.55	9.55	9.55
	DBCT	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.62	4.66	4.66	4.66	4.66	4.66	4.66	4.66
Millennium	APCT	8.25	8.25																		
	DBCT	3.81	3.34																		
Minerva	RGTCT	10.68	10.68	10.68	10.68																
	WICET	7.25	7.25	7.25	7.25																
Minyango	APCT								12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87	12.87
	DBCT								7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
	RGTCT								6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27	6.27
	WICET								6.17	6.17	6.17	6.17	6.17	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19
Monto	RGTCT										4.87	4.87	4.87	4.87	4.63	4.41	4.41	4.41	4.41	4.41	4.41
	WICET										4.87	4.87	4.87	4.87	4.63	4.41	4.41	4.41	4.41	4.41	4.41
Moorvale	APCT	8.17	8.17	8.17																	
	DBCT	4.66	4.66	4.66																	
Moorvale West	APCT						8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17
	DBCT						3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27
Moranbah North	DBCT	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.3	3.69	3.69	3.69	3.69
	RGTCT	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06	8.06
	WICET	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96	7.96
Moranbah South	DBCT				3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
New Lenton	APCT		7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	8.78	8.75	8.38	8.38	8.38	8.38
	DBCT		3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
	RGTCT		7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78
	WICET		7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
Newlands	APCT	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.55	2.27									
North Goonyella	DBCT	5.28	4.65	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
	RGTCT	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29
	WICET	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19	8.19

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Oaky Creek	APCT	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69	9.69
	DBCT	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	HPCT	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
	RGTCT	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89
	WICET	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Olive Downs North	APCT	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17					
	DBCT	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.91	3.54	3.54	3.54	3.54	3.54	3.54					
Orion Downs	RGTCT	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	7.42	7.42	7.42
	WICET	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.7	7.32	7.32	7.32
Peak Downs	APCT	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	DBCT	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	HPCT	3.91	3.89	3.86	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85
Poitrel	APCT	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25	8.25
	DBCT	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.81	3.35	3.35	3.35	3.35	3.35
	HPCT	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.81	3.35	3.35	3.35	3.35	3.35
Red Hill (BMA)	APCT					7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45	7.45
Rolleston	RGTCT	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	10.23	7.42	7.42	7.42
	WICET	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.16	10.7	7.32	7.32	7.32
Saraji	APCT	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75
	DBCT	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
	HPCT	4.19	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Saraji East	APCT							8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75
	DBCT							3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
	HPCT							3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Sarum Complex	APCT					1.58	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.74	1.74	1.74	1.74
Sonoma	APCT	2.13	2.07	2.13	2.18	2.24	2.31	2.38	2.38	2.38	2.38	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
South Galilee	APCT					17.89	17.89	17.89	17.89	17.89	17.89	17.89	17.89	17.89	17.89	17.89	17.9	17.89	17.89	17.89	17.89
South Walker Creek	DBCT	3.29	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.13	3.04	3.04	3.04
	HPCT	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06	3.06

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Springsure Creek	RGTCT					6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
	WICET					6.46	13.63	10.64	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34
Talwood	APCT							7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	8.78	8.75	8.38	8.38	8.38	8.38
	DBCT							3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
	RGTCT							7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78
	WICET							7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
Teresa	DBCT					9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10	9.10
	RGTCT					10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18	10.18
	WICET					6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82
The Range	RGTCT						6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
	WICET						6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
Vermont East / Willunga	DBCT						4.24	4.24	4.24	4.24	4.24	4.24	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81
Wandoan	RGTCT					9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26	9.26
	WICET					9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Washpool	RGTCT						8.36	8.36	8.36	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
	WICET						8.27	8.27	8.27	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
West Rolleston	RGTCT						7.39	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78	6.78
	WICET						7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29	7.29
West/North Burton	APCT							7.82	7.82	7.82	7.82	7.82	7.82	7.82	7.82	8.78	8.75	8.38	8.38	8.38	8.38
	DBCT							3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41	3.41
	RGTCT							7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78	7.78
	WICET							7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
Winchester South	APCT									8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17	8.17
	DBCT									3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27
Yarrabee	RGTCT	9.33	9.33	9.33	9.33	9.33	9.33	9.33	9.33	9.33	10.13	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14
	WICET	8.21	8.21	8.21	8.21	8.21	8.21	8.21	8.21	8.21	8.25	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04	6.04

Source: Independent coal industry data

Table A3.3: Rail haulage charge assumptions for each mine-terminal pair ($A per tonne)

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Alpha	APCT					8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65	8.65
Arcturus	RGTCT								7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13
	WICET								7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03	4.85	4.65	4.65	4.65
Baralaba	APCT	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17	14.17			
	DBCT	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52	12.52			
	RGTCT	2.76	2.78	2.93	3.08	2.75	3	2.97	2.82	2.9	2.77	2.68	2.86	2.83	2.77	2.82	2.96	2.93			
	WICET	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71	5.71			
Belvedere	APCT								14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09
	DBCT								12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44
	RGTCT								5.75	5.71	5.61	5.89	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
	WICET								5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62
Belview	APCT						9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42
	DBCT						7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
	RGTCT						6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81
	WICET						6.71	6.71	6.71	6.71	6.71	6.71	6.71	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Blackwater	HPCT	6.91	7.2	7.2	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06	7.06
	RGTCT	4.93	5.14	5.14	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04
	WICET	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89
Blair Athol	APCT	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63											
	DBCT	6.62	6.66	6.73	6.69	6.69	6.69	6.69	6.6	6.6											
	RGTCT	10.66	10.66	10.66	10.66	10.66	10.66	10.66	10.66	10.66											
	WICET	10.55	10.55	10.55	10.55	10.55	10.55	10.55	10.55	10.55											
Bluff	APCT			9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42			
	DBCT			7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77			
	RGTCT			6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81			
	WICET			6.71	6.71	6.71	6.71	6.71	6.71	6.71	6.71	6.71	6.71	5.4	5.4	5.4	5.4	5.4			
Bundi	RGTCT					8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET					8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38
Byerwen	APCT	7.4	5.88	5.68	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62
Callide	APCT	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06	14.06
	DBCT	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18	12.18
	RGTCT	4.7	4.82	4.86	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84
	WICET	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36	5.36
Capcoal	APCT	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24
	DBCT	7.01	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59	6.59
	RGTCT	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94
	WICET	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83	7.83
Carborough Downs	DBCT	5.82	5.85																		
	RGTCT	9.43	9.43																		
	WICET	9.33	9.33																		
Carmichael	APCT				7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43
Caval Ridge	APCT	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83	6.83
	DBCT	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
	HPCT	3.57	3.48	3.48	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	RGTCT	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85
	WICET	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
China Stone	APCT				7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43
Clermont	APCT	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63										
	DBCT	6.62	6.65	6.73	6.69	6.69	6.69	6.69	6.69	6.69	6.6										
	RGTCT	10.65	10.65	10.65	10.65	10.65	10.65	10.65	10.65	10.65	10.65										
	WICET	10.55	10.55	10.55	10.55	10.55	10.55	10.55	10.55	10.55	10.55										
Codrilla	DBCT								5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.13	5.13	5.13
Collinsville (Bowen Central)	APCT	1.46	1.44	4.47	4.45	4.45	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.8	4.79	4.79	4.79	4.79
Columboola	RGTCT								8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24
	WICET								8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Cook	RGTCT	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
	WICET	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
Coppabella	DBCT	5.19	5.21	5.52	5	5	5	5													
Curragh	RGTCT	5.55	5.54	5.54	5.54	5.54	5.54	5.54	5.54	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	WICET	5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Daunia	APCT	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
	DBCT	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	HPCT	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3.31
Dawson (Moura)	APCT	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09	14.09
	DBCT	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44	12.44
	RGTCT	5.69	5.72	5.78	5.75	5.75	5.75	5.75	5.75	5.71	5.61	5.89	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
	WICET	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62	5.62
Denham	APCT								6.64	6.64	6.64	6.64	6.64	6.64	6.64	5.29	5.28	5.11	5.11	5.11	5.11
	DBCT								5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
	RGTCT								9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
	WICET								9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41
Dingo West	RGTCT							6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35
	WICET							6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Drake	APCT	4.07	4.16	4.12	4.07	4.03	4.18	4.13	4.13	4.13	4.13	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4.08
Eagle Downs	APCT				7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24
	DBCT				5.59	5.59	5.59	5.59	5.59	5.59	6.99	6.99	5.49	5.41	5.33	5.25	5.5	5.42	5.35	5.35	5.35
	RGTCT				8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	WICET				8.79	8.79	8.79	8.79	8.79	8.79	16.52	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29	15.29
Elimatta	RGTCT							12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.1	12.1	12.1
	WICET							12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.54	12.1	12.1	12.1
Ensham	RGTCT	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	7.27	7.27	7.27	7.27	7.27	7.27	7.27	7.27	7.27	7.27	7.27
	WICET	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16
Foxleigh	APCT	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24											
	DBCT	6.82	6.86	6.94	6.89	6.89	6.89	6.35	6.59	6.59											

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	RGTCT	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7.94											
	WICET	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84											
Galilee (China First)	APCT							9.05	9.05	9.05	9.05	9.05	9.3	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56
Goonyella	DBCT	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
	HPCT	2.77	3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	RGTCT	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85	9.85
	WICET	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74	9.74
Grosvenor	DBCT	5.69	5.72	5.77	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74	5.74
	RGTCT	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79
	WICET	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68
Grosvenor West	DBCT				5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.17	5.74	5.74	5.74	5.74
	RGTCT				9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79
	WICET				9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68
Hail Creek	DBCT	5.91	5.55	5.61	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	3.68	5.54	5.54	5.54	5.54	5.54	5.54
Harrybrandt	DBCT							6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Hillalong	DBCT				5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	5.58	3.68	5.54	5.54	5.54	5.54	5.54	5.54
Ironbark No. 1	DBCT				3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.89	5.11	5.11	5.11
	HPCT				5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13
Isaac Plains	DBCT	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.74	5.5	5.5								
	RGTCT	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56								
	WICET	9.45	9.45	9.45	9.45	9.45	9.45	9.45	9.45	9.45	9.45	9.45	9.45								
Jellinbah East	RGTCT	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.08
	WICET	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
Kestrel	DBCT	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21
	RGTCT	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	4.11	4.11	4.11
	WICET	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42
Kevin's Corner	APCT							9.05	9.05	9.05	9.05	9.05	9.3	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56
Lake Vermont	APCT	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
	DBCT	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	RGTCT	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52
	WICET	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41	8.41
Middlemount	APCT	16.53	16.62	16.84	16.72	16.72	16.72	16.72	16.72	16.72	16.72	16.72	16.72	18.83	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	DBCT	6.62	6.66	6.73	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	6.69	7.53	6.65	6.65	6.65	6.65	6.65	6.65	6.65
Millennium	APCT	7.05	7.05																		
	DBCT	6.08	5.4																		
Minerva	RGTCT	7.7	7.7	7.7	7.7																
	WICET	7.9	7.9	7.9	7.9																
Minyango	APCT								9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42
	DBCT								7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
	RGTCT								6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81
	WICET								6.71	6.71	6.71	6.71	6.71	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Monto	RGTCT										6.21	6.21	6.21	6.21	5.96	5.73	5.73	5.73	5.73	5.73	5.73
	WICET										6.21	6.21	6.21	6.21	5.96	5.73	5.73	5.73	5.73	5.73	5.73
Moorvale	APCT	6.98	6.98	6.98																	
	DBCT	6.01	6.02	6.02																	
Moorvale West	APCT						6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98
	DBCT						5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
Moranbah North	DBCT	5.88	5.91	5.97	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.17	5.74	5.74	5.74	5.74
	RGTCT	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79	9.79
	WICET	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.68
Moranbah South	DBCT				5.83	5.83	5.83	5.83	5.83	5.83	5.83	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13
New Lenton	APCT		6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	5.29	5.28	5.11	5.11	5.11	5.11
	DBCT		5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
	RGTCT		9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
	WICET		9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41
Newlands	APCT	5.49	5.51	5.57	5.54	5.54	5.54	5.54	5.54	5.54	6.12	5.49									
North Goonyella	DBCT	7.56	6.7	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82	6.82
	RGTCT	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	WICET	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Oaky Creek	APCT	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44	8.44
	DBCT	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79	6.79
	HPCT	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81	6.81
	RGTCT	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74	7.74
	WICET	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63
Olive Downs North	APCT	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98					
	DBCT	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.37	4.89	4.89	4.89	4.89	4.89	4.89					
Orion Downs	RGTCT	8.18	8.23	8.33	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.07	8.07	8.07
	WICET	8.12	8.17	8.27	8.21	8.21	8.21	8.21	8.21	8.22	8.22	8.22	8.22	8.22	8.22	8.22	8.22	8.67	7.97	7.97	7.97
Peak Downs	APCT	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	DBCT	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
	HPCT	3.65	3.63	3.61	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Poitrel	APCT	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
	DBCT	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	5.13	5.4	5.4	5.4	5.4	5.4
	HPCT	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	5.13	5.4	5.4	5.4	5.4	5.4
Red Hill (BMA)	APCT					6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28	6.28
Rolleston	RGTCT	8.18	8.23	8.33	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.27	8.07	8.07	8.07
	WICET	8.12	8.17	8.27	8.21	8.21	8.21	8.21	8.21	8.22	8.22	8.22	8.22	8.22	8.22	8.22	8.22	8.67	7.97	7.97	7.97
Saraji	APCT	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54
	DBCT	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89
	HPCT	4.08	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
Saraji East	APCT							7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54	7.54
	DBCT							5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89	5.89
	HPCT							3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82
Sarum Complex	APCT					4.45	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.8	4.79	4.79	4.79	4.79
Sonoma	APCT	3.85	3.78	3.85	3.94	4.03	4.12	4.22	4.22	4.22	4.22	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
South Galilee	APCT					9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.66	9.66	9.66	9.66	9.66
South Walker	DBCT	4.08	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.89	5.11	5.11	5.11

Mine	Port	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Creek	HPCT	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13	5.13
Springsure Creek	RGTCT					7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13	7.13
	WICET					7.03	11.15	8.64	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Talwood	APCT							6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	5.29	5.28	5.11	5.11	5.11	5.11
	DBCT							5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
	RGTCT							9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
	WICET							9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41
Teresa	DBCT					6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21	6.21
	RGTCT					6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	6.95	4.11	4.11	4.11
	WICET					7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42	7.42
The Range	RGTCT						6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07
	WICET						6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07	6.07
Vermont East / Willunga	DBCT						6.25	6.25	6.25	6.25	6.25	6.25	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45
Wandoan	RGTCT					8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8.24
	WICET					8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38
Washpool	RGTCT						5.54	5.54	5.54	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	WICET						5.49	5.49	5.49	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
West Rolleston	RGTCT						8.04	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03	6.03
	WICET						7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93
West/North Burton	APCT							6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	5.29	5.28	5.11	5.11	5.11	5.11
	DBCT							5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47	5.47
	RGTCT							9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
	WICET							9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41	9.41
Winchester South	APCT									6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98
	DBCT									5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33	5.33
Yarrabee	RGTCT	7.8	7.84	7.94	7.89	7.89	7.89	7.89	7.89	7.89	8.54	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6.67
	WICET	6.89	6.93	7.01	6.96	6.96	6.96	6.96	6.96	6.96	6.99	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57

Source: Independent coal industry data

Table A3.4: Seaborne coal price assumptions ($US per tonne)

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Alpha	Thermal					61.68	62.19	62.70	63.21	63.72	64.23	64.74	65.25	65.76	66.27	66.78	67.29	67.29	67.29	67.29	67.29
Arcturus	Thermal								65.11	65.64	66.16	66.69	67.21	67.74	68.26	68.79	69.31	69.31	69.31	69.31	69.31
Baralaba	LVPCI	128.48	115.92	111.09	113.02	113.99	114.95	115.92	116.89	117.85	118.82	119.78	120.75	121.72	122.68	123.65	124.61	124.61			
Belvedere	SS/HVPCI								105.50	106.53	107.55	108.58	109.60	110.62	111.65	112.67	113.70	113.70	113.70	113.70	113.70
	HCC								131.88	132.79	133.70	134.61	135.52	136.43	137.33	138.24	139.15	139.15	139.15	139.15	139.15
	LVPCI								127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72	135.77	135.77	135.77	135.77	135.77
Belview	HCC						115.54	117.33	119.13	120.92	122.71	123.60	124.50	125.39	126.29	127.19	128.08	128.98	129.87	129.87	129.87
	LVPCI						103.45	104.31	105.18	106.05	106.92	107.79	108.66	109.53	110.40	111.27	112.14	112.14	112.14	112.14	112.14
Blackwater	HCC	153.46	122.40	121.45	123.34	125.22	127.10	128.99	129.93	130.87	131.81	132.75	133.69	134.63	135.58	136.52	137.46	137.46	137.46	137.46	137.46
	SS/HVPCI	113.57	99.62	96.63	98.62	99.62	100.62	101.61	102.61	103.60	104.60	105.60	106.59	107.59	108.59	109.58	110.58	110.58	110.58	110.58	110.58
	Thermal	110.50	98.23	90.97	91.53	92.09	92.64	93.20	93.76	94.32	94.88	95.44	95.99	96.55	97.11	97.67	98.23	98.23	98.23	98.23	98.23
Blair Athol	Thermal	91.65	81.47	75.45	75.92	76.38	76.84	77.30	77.77	78.23											
Bluff	LVPCI			110.69	112.61	113.58	114.54	115.50	116.46	117.43	118.39	119.35	120.31	121.28	122.24	123.20	124.16	124.16			
Broadlea North	HCC	163.00																			
	Thermal	102.30																			
Bundi	Thermal					85.12	85.63	86.15	86.66	87.18	87.69	88.21	88.73	89.24	89.76	90.27	90.79	90.79	90.79	90.79	90.79
Byerwen	HCC	168.30	134.23	133.19	135.26	137.32	139.39	141.45	142.49	143.52	144.55	145.58	146.62	147.65	148.68	149.71	150.75	150.75	150.75	150.75	150.75
	Thermal	95.83	85.18	78.89	79.38	79.86	80.34	80.83	81.31	81.80	82.28	82.76	83.25	83.73	84.22	84.70	85.18	85.18	85.18	85.18	85.18
Callide	Thermal	60.35	53.10	47.47	48.28	48.68	49.08	49.48	49.89	50.29	50.69	51.09	51.49	51.90	52.30	52.70	53.10	53.10	53.10	53.10	53.10
Cameby Downs	Thermal	79.53	69.99	62.56	63.62	64.15	64.68	65.21	65.74	66.28	66.81	67.34	67.87	68.40	68.93	69.46	69.99	69.99	69.99	69.99	69.99
Capcoal	HCC	185.00	136.30	127.84	129.72	131.60	133.48	135.36	136.30	137.24	138.18	139.12	140.06	141.00	141.94	142.88	143.82	143.82	143.82	143.82	143.82
	LVPCI	133.00	120.00	115.00	117.00	118.00	119.00	120.00	121.00	122.00	123.00	124.00	125.00	126.00	127.00	128.00	129.00	129.00	129.00	129.00	129.00
	Thermal	102.14	90.79	84.08	84.60	85.12	85.63	86.15	86.66	87.18	87.69	88.21	88.73	89.24	89.76	90.27	90.79	90.79	90.79	90.79	90.79
Carborough Downs	HCC	157.25	123.25																		
	LVPCI	124.02	111.90																		
Carmichael	Thermal				55.54	56.00	56.47	56.93	57.39	57.86	58.32	58.78	59.24	59.71	60.17	60.63	61.10	61.10	61.10	61.10	61.10

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Caval Ridge	HCC	179.36	140.58	131.85	133.79	135.73	137.67	139.61	140.58	141.55	142.52	143.49	144.46	145.43	146.39	147.36	148.33	148.33	148.33	148.33	148.33
	Thermal	107.42																			
China Stone	Thermal				57.98	58.47	58.95	59.43	59.92	60.40	60.88	61.37	61.85	62.33	62.82	63.30	63.78	63.78	63.78	63.78	63.78
Clermont	Thermal	101.03	89.80	83.17	83.68	84.19	84.70	85.21	85.72	86.23	86.74										
Codrilla	LVPCI								127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72	135.77	135.77	135.77	135.77	135.77
	Thermal								93.59	94.15	94.71	95.26	95.82	96.38	96.94	97.49	98.05	98.05	98.05	98.05	98.05
Collinsville (Bowen Central)	HCC		114.08	113.20	114.95	116.71	118.46	120.22	121.10	121.97	122.85	123.73	124.61	125.48	126.36	127.24	128.12	128.12	128.12	128.12	128.12
	SS/HVPCI		98.37	95.42	97.39	98.37	99.35	100.34	101.32	102.30	103.29	104.27	105.26	106.24	107.22	108.21	109.19	109.19	109.19	109.19	109.19
	Thermal	90.51	80.45	74.51	74.96	75.42	75.88	76.34	76.79	77.25	77.71	78.16	78.62	79.08	79.54	79.99	80.45	80.45	80.45	80.45	80.45
Colton	HCC						128.93	130.84	131.79	132.75	133.70	134.66	135.61	136.57	137.52	138.48					
	Thermal						80.34	80.83	81.31	81.80	82.28	82.76	83.25	83.73	84.22	84.70					
Columboola	Thermal								67.82	68.36	68.91	69.46	70.00	70.55	71.10	71.64	72.19	72.19	72.19	72.19	72.19
Cook	HCC	168.30	134.23	133.19	135.26	137.32	139.39	141.45	142.49	143.52	144.55	145.58	146.62	147.65	148.68	149.71	150.75	150.75	150.75	150.75	150.75
Coppabella	LVPCI	135.66	122.40	117.30	119.34	120.36	121.38	122.40													
Curragh	HCC	163.00	130.00	129.00	131.00	133.00	135.00	137.00	138.00	139.00	140.00	141.00	142.00	143.00	144.00	145.00	146.00	146.00	146.00	146.00	146.00
	SS/HVPCI	115.29	101.13	98.10	100.12	101.13	102.14	103.15	104.16	105.18	106.19	107.20	108.21	109.22	110.23	111.24	112.25	112.25	112.25	112.25	112.25
	LVPCI	125.69	113.40	108.68	110.57	111.51	112.46	113.40	114.35	115.29	116.24	117.18	118.13	119.07	120.02	120.96	121.91	121.91	121.91	121.91	121.91
	Thermal																				
Daunia	HCC	172.13	137.28	136.22	138.34	140.45	142.56	144.67	145.73	146.78	147.84	148.90	149.95	151.01	152.06	153.12	154.18	154.18	154.18	154.18	154.18
	SS/HVPCI	114.48	100.42	97.41	99.42	100.42	101.42	102.43	103.43	104.44	105.44	106.45	107.45	108.45	109.46	110.46	111.47	111.47	111.47	111.47	111.47
Dawson (Moura)	HCC	153.63	122.53	121.58	123.47	125.35	127.24	129.12	130.07	131.01	131.95	132.89	133.84	134.78	135.72	136.66	137.61	137.61	137.61	137.61	137.61
	SS/HVPCI	115.29	101.13	98.10	100.12	101.13	102.14	103.15	104.16	105.18	106.19	107.20	108.21	109.22	110.23	111.24	112.25	112.25	112.25	112.25	112.25
	Thermal	104.82	93.17	86.29	86.82	87.35	87.88	88.41	88.94	89.47	90.00	90.53	91.06	91.59	92.12	92.65	93.17	93.17	93.17	93.17	93.17
Denham	HCC								155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85	164.98	164.98	164.98	164.98	164.98
	Thermal								84.00	84.50	85.00	85.50	86.00	86.50	87.00	87.50	88.00	88.00	88.00	88.00	88.00
Dingo West	LVPCI							117.72	118.70	119.68	120.66	121.64	122.63	123.61	124.59	125.57	126.55	126.55	126.55	126.55	126.55
Drake	HCC	167.89	133.90	132.87	134.93	136.99	139.05	141.11	142.14	143.17	144.20	145.23	146.26	147.29	148.32	149.35	150.38	150.38	150.38	150.38	150.38
	LVPCI	130.01	117.30	112.41	114.37	115.35	116.32	117.30	118.28	119.26	120.23	121.21	122.19	123.17	124.14	125.12	126.10	126.10	126.10	126.10	126.10
	Thermal	99.33	88.29	81.77	82.27	82.77	83.27	83.78	84.28	84.78	85.28	85.78	86.28	86.79	87.29	87.79	88.29	88.29	88.29	88.29	88.29

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Eagle Downs	HCC				141.48	143.64	145.80	147.96	149.04	150.12	151.20	152.28	153.36	154.44	155.52	156.60	157.68	157.68	157.68	157.68	157.68
	Thermal				93.62	94.19	94.76	95.33	95.90	96.47	97.04	97.62	98.19	98.76	99.33	99.90	100.47	100.47	100.47	100.47	100.47
Elimatta	Thermal							63.92	64.44	64.96	65.48	66.00	66.52	67.04	67.56	68.08	68.60	68.60	68.60	68.60	68.60
Ensham	Thermal	111.30	98.93	91.62	92.18	92.75	93.31	93.87	94.43	94.99	95.56	96.12	96.68	97.24	97.81	98.37	98.93	98.93	98.93	98.93	98.93
Foxleigh	LVPCI	136.06	122.76	117.65	119.69	120.71	121.74	122.76	123.78	124.81											
Galilee (China First)	Thermal							66.51	67.05	67.59	68.13	68.67	69.21	69.75	70.29	70.83	71.37	71.37	71.37	71.37	71.37
Goonyella	HCC	180.65	141.59	132.80	134.76	136.71	138.66	140.62	141.59	142.57	143.55	144.52	145.50	146.48	147.45	148.43	149.40	149.40	149.40	149.40	149.40
Grosvenor	HCC	166.75	132.99	131.97	134.01	136.06	138.11	140.15	141.17	142.20	143.22	144.24	145.27	146.29	147.31	148.34	149.36	149.36	149.36	149.36	149.36
Grosvenor West	HCC				127.37	129.22	131.07	132.91	133.84	134.76	135.68	136.60	137.53	138.45	139.37	140.30	141.22	141.22	141.22	141.22	141.22
	Thermal				69.97	70.44	70.91	71.39	71.86	72.33	72.80	73.28	73.75	74.22	74.69	75.17	75.64	75.64	75.64	75.64	75.64
Hail Creek	HCC	186.20	145.94	136.88	138.90	140.91	142.92	144.94	145.94	146.95	147.96	148.96	149.97	150.98	151.98	152.99	153.99	153.99	153.99	153.99	153.99
	Thermal	75.26	66.22	59.20	60.20	60.71	61.21	61.71	62.21	62.71	63.21	63.72	64.22	64.72	65.22	65.72	66.22	66.22	66.22	66.22	66.22
Harrybrandt	LVPCI							127.26	128.32	129.38	130.44	131.50	132.56	133.62	134.68	135.74	136.80	136.80	136.80	136.80	136.80
	Thermal							98.09	98.67	99.26	99.85	100.44	101.02	101.61	102.20	102.79	103.37	103.37	103.37	103.37	103.37
Hillalong	HCC				123.40	96.33	95.59	97.07	98.55	100.03	101.51	102.26	103.00	103.74	104.48	105.22	105.96	106.70	107.44	107.44	107.44
	SS/HVPCI				89.20	90.10	91.00	91.90	92.80	93.70	94.60	95.50	96.41	97.31	98.21	99.11	100.01	100.01	100.01	100.01	100.01
	Thermal				75.61	76.12	76.63	77.14	77.65	78.16	78.67	79.18	79.69	80.20	80.71	81.23	81.74	81.74	81.74	81.74	81.74
Ironbark No. 1	HCC				148.03	150.29	152.55	154.81	155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85	164.98	164.98	164.98	164.98	164.98
	Thermal				79.38	79.86	80.34	80.83	81.31	81.80	82.28	82.76	83.25	83.73	84.22	84.70	85.18	85.18	85.18	85.18	85.18
Isaac Plains	SS/HVPCI	114.72	100.63	97.61	99.62	100.63	101.64	102.64	103.65	104.66	105.66	106.67	107.67								
	Thermal	79.20	70.40	65.20	65.60	66.00	66.40	66.80	67.20	67.60	68.00	68.40	68.80								
Jellinbah East	LVPCI	123.03	111.00	106.38	108.23	109.15	110.08	111.00	111.93	112.85	113.78	114.70	115.63	116.55	117.48	118.40	119.33	119.33	119.33	119.33	119.33
	Thermal	100.17	88.06	80.91	81.46	82.01	82.56	83.11	83.66	84.21	84.76	85.31	85.86	86.41	86.96	87.51	88.06	88.06	88.06	88.06	88.06
Kestrel	HCC	148.49	118.43	117.52	119.34	121.16	122.99	124.81	125.72	126.63	127.54	128.45	129.36	130.27	131.18	132.10	133.01	133.01	133.01	133.01	133.01
	Thermal	109.08	96.96	89.80	90.35	90.90	91.45	92.00	92.55	93.10	93.65	94.20	94.75	95.31	95.86	96.41	96.96	96.96	96.96	96.96	96.96
Kevin's Corner	Thermal							63.28	63.80	64.31	64.83	65.34	65.86	66.37	66.89	67.40	67.91	67.91	67.91	67.91	67.91
Lake Vermont	HCC	171.56	136.83	135.77	137.88	139.98	142.09	144.19	145.25	146.30	147.35	148.40	149.46	150.51	151.56	152.61	153.67	153.67	153.67	153.67	153.67
	LVPCI	134.66	121.50	116.44	118.46	119.48	120.49	121.50	122.51	123.53	124.54	125.55	126.56	127.58	128.59	129.60	130.61	130.61	130.61	130.61	130.61

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	Thermal	104.59	92.97	86.10	86.63	87.16	87.69	88.22	88.75	89.27	89.80	90.33	90.86	91.39	91.92	92.44	92.97	92.97	92.97	92.97	92.97
Middlemount	HCC	122.25	97.50	96.75	98.25	99.75	101.25	102.75	103.50	104.25	105.00	105.75	106.50	107.25	108.00	108.75	109.50	109.50	109.50	109.50	109.50
	LVPCI	127.88	115.38	110.57	112.50	113.46	114.42	115.38	116.34	117.30	118.26	119.23	120.19	121.15	122.11	123.07	124.03	124.03	124.03	124.03	124.03
Millennium	HCC	133.66	106.60																		
	SS/HVPCI	112.88	99.02																		
Minerva	Thermal	104.77	93.13	86.25	86.78																
Minyango	HCC								142.25	143.23	144.21	145.19	146.17	147.15	148.13	149.11	150.09	150.09	150.09	150.09	150.09
	SS/HVPCI									107.52	108.55	109.58	110.62	111.65	112.68	113.72	114.75	114.75	114.75	114.75	114.75
	Thermal								89.27	89.80	90.33	90.86	91.39	91.92	92.45	92.99	93.52	93.52	93.52	93.52	93.52
Monto	Thermal										89.25	89.78	90.30	90.83	91.35	91.88	92.40	92.40	92.40	92.40	92.40
Moorvale	HCC	176.86	141.05	139.97																	
	SS/HVPCI	118.99	104.38	101.25																	
	LVPCI	131.54	118.68	113.74																	
Moorvale West	HCC						113.40	115.08	115.92	116.76	117.60	118.44	119.28	120.12	120.96	121.80	122.64	122.64	122.64	122.64	122.64
	LVPCI						125.25	126.30	127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72	135.77	135.77	135.77	135.77	135.77
Moranbah North	HCC	166.67	132.93	131.90	133.95	135.99	138.04	140.08	141.11	142.13	143.15	144.17	145.20	146.22	147.24	148.26	149.29	149.29	149.29	149.29	149.29
Moranbah South	HCC				137.59	139.58	141.57	143.57	144.57	145.56	146.56	147.56	148.55	149.55	150.55	151.54	152.54	152.54	152.54	152.54	152.54
New Acland	Thermal	96.48	84.82	77.92	78.45	78.98	79.52	80.05	80.58	81.11	81.64	82.17	82.70	83.23	83.76	84.29	84.82	84.82	84.82	84.82	84.82
New Lenton	HCC		132.08	131.06	133.10	135.13	137.16	139.19	140.21	141.22	142.24	143.26	144.27	145.29	146.30	147.32	148.34	148.34	148.34	148.34	148.34
	LVPCI		126.90	121.61	123.73	124.79	125.84	126.90	127.96	129.02	130.07	131.13	132.19	133.25	134.30	135.36	136.42	136.42	136.42	136.42	136.42
	Thermal		85.95	79.60	80.09	80.58	81.07	81.55	82.04	82.53	83.02	83.51	84.00	84.48	84.97	85.46	85.95	85.95	85.95	85.95	85.95
Newlands	Thermal	102.10	90.75	84.05	84.57	85.08	85.60	86.11	86.63	87.14	87.66	88.18									
North Goonyella	HCC	203.50	159.50	149.60	151.80	154.00	156.20	158.40	159.50	160.60	161.70	162.80	163.90	165.00	166.10	167.20	168.30	168.30	168.30	168.30	168.30
North Surat Joint Venture	Thermal							67.64	68.19	68.74	69.29	69.84	70.39	70.94	71.49	72.04	72.59	72.59	72.59	72.59	72.59
Oaky Creek	HCC	187.31	146.81	137.70	139.73	141.75	143.78	145.80	146.81	147.83	148.84	149.85	150.86	151.88	152.89	153.90	154.91	154.91	154.91	154.91	154.91
Olive Downs North	HCC	184.19	146.90	145.77	148.03	150.29	152.55	154.81	155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85					
	LVPCI	139.98	126.30	121.04	123.14	124.20	125.25	126.30	127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72					

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
	Thermal	107.25	95.33	88.29	88.83	89.37	89.91	90.46	91.00	91.54	92.08	92.62	93.16	93.71	94.25	94.79					
Orion Downs	Thermal	107.96	95.96	88.88	89.42	89.97	90.51	91.06	91.60	92.15	92.69	93.24	93.78	94.33	94.87	95.42	95.96	95.96	95.96	95.96	95.96
Peak Downs	HCC	184.45	144.57	135.59	137.59	139.58	141.57	143.57	144.57	145.56	146.56	147.56	148.55	149.55	150.55	151.54	152.54	152.54	152.54	152.54	152.54
Poitrel	HCC	151.10	120.51	119.58	121.44	123.29	125.15	127.00	127.93	128.85	129.78	130.71	131.63	132.56	133.49	134.42	135.34	135.34	135.34	135.34	135.34
	SS/HVPCI	113.91	99.92	96.92	98.92	99.92	100.92	101.92	102.92	103.92	104.92	105.92	106.91	107.91	108.91	109.91	110.91	110.91	110.91	110.91	110.91
Red Hill (BMA)	HCC					141.96	143.99	146.02	147.03	148.04	149.06	150.07	151.09	152.10	153.11	154.13	155.14	155.14	155.14	155.14	155.14
Rolleston	Thermal	83.90	73.83	66.00	67.12	67.68	68.23	68.79	69.35	69.91	70.47	71.03	71.59	72.15	72.71	73.27	73.83	73.83	73.83	73.83	73.83
Saraji	HCC	185.74	145.58	136.54	138.55	140.56	142.57	144.58	145.58	146.58	147.59	148.59	149.60	150.60	151.60	152.61	153.61	153.61	153.61	153.61	153.61
Saraji East	HCC							144.58	145.58	146.58	147.59	148.59	149.60	150.60	151.60	152.61	153.61	153.61	153.61	153.61	153.61
Sarum Complex	HCC					135.66	137.70	139.74	140.76	141.78	142.80	143.82	144.84	145.86	146.88	147.90	148.92	148.92	148.92	148.92	148.92
	Thermal					82.50	83.00	83.50	84.00	84.50	85.00	85.50	86.00	86.50	87.00	87.50	88.00	88.00	88.00	88.00	88.00
Sonoma	HCC	157.70	125.78	124.81	126.74	128.68	130.61	132.55	133.52	134.48	135.45	136.42	137.39	138.35	139.32	140.29	141.26	141.26	141.26	141.26	141.26
	Thermal	93.36	82.98	76.85	77.33	77.80	78.27	78.74	79.21	79.68	80.16	80.63	81.10	81.57	82.04	82.51	82.98	82.98	82.98	82.98	82.98
South Galilee	Thermal					55.74	56.20	56.66	57.12	57.58	58.04	58.50	58.96	59.42	59.88	60.35	60.81	60.81	60.81	60.81	60.81
South Walker Creek	LVPCI	134.20	121.08	116.04	118.05	119.06	120.07	121.08	122.09	123.10	124.11	125.12	126.13	127.13	128.14	129.15	130.16	130.16	130.16	130.16	130.16
Springsure Creek	Thermal					67.09	67.65	68.20	68.76	69.31	69.87	70.42	70.98	71.53	72.09	72.64	73.19	73.19	73.19	73.19	73.19
Talwood	HCC							154.81	155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85	164.98	164.98	164.98	164.98	164.98
	SS/HVPCI							105.45	106.48	107.52	108.55	109.58	110.62	111.65	112.68	113.72	114.75	114.75	114.75	114.75	114.75
	Thermal							80.83	81.31	81.80	82.28	82.76	83.25	83.73	84.22	84.70	85.18	85.18	85.18	85.18	85.18
Teresa	SS/HVPCI					63.35	63.98	64.62	65.25	65.88	66.52	67.15	67.78	68.42	69.05	69.69	70.32	70.32	70.32	70.32	70.32
	Thermal					53.87	54.31	54.76	55.20	55.65	56.10	56.54	56.99	57.43	57.88	58.32	58.77	58.77	58.77	58.77	58.77
The Range	Thermal					68.11	68.66	69.22	69.78	70.34	70.90	71.46	72.01	72.57	73.13	73.69	73.69	73.69	73.69	73.69	73.69
Vermont East / Willunga	HCC						152.55	154.81	155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85	164.98	164.98	164.98	164.98	164.98
	LVPCI						125.25	126.30	127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72	135.77	135.77	135.77	135.77	135.77
Wandoan	Thermal					64.57	65.10	65.63	66.17	66.70	67.23	67.77	68.30	68.83	69.37	69.90	70.44	70.44	70.44	70.44	70.44
Washpool	HCC						126.09	127.96	128.89	129.83	130.76	131.69	132.63	133.56	134.50	135.43	136.36	136.36	136.36	136.36	136.36

Mine	Product	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
West Rolleston	Thermal						75.00	75.50	76.00	76.50	77.00	77.50	78.00	78.50	79.00	79.50	80.00	80.00	80.00	80.00	80.00
West/North Burton	HCC							154.81	155.94	157.07	158.20	159.33	160.46	161.59	162.72	163.85	164.98	164.98	164.98	164.98	164.98
	LVPCI							126.30	127.35	128.41	129.46	130.51	131.56	132.62	133.67	134.72	135.77	135.77	135.77	135.77	135.77
	Thermal							79.82	80.35	80.88	81.40	81.93	82.46	82.99	83.52	84.05	84.58	84.58	84.58	84.58	84.58
Winchester South	SS/HVPCI									104.92	105.92	106.93	107.94	108.95	109.96	110.97	111.98	111.98	111.98	111.98	111.98
	LVPCI									111.94	112.85	113.77	114.69	115.61	116.52	117.44	118.36	118.36	118.36	118.36	118.36
	Thermal									80.96	81.49	82.02	82.55	83.08	83.61	84.13	84.66	84.66	84.66	84.66	84.66
Yarrabee	LVPCI	131.67	118.80	113.85	115.83	116.82	117.81	118.80	119.79	120.78	121.77	122.76	123.75	124.74	125.73	126.72	127.71	127.71	127.71	127.71	127.71
	Thermal	105.11	93.43	86.53	87.06	87.59	88.12	88.65	89.18	89.71	90.24	90.78	91.31	91.84	92.37	92.90	93.43	93.43	93.43	93.43	93.43

Source: Independent coal industry data

Table A3.5: Production cost assumptions for each mine (US$ per tonne)

Mine	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Alpha					95.36	98.68	83.2	77.97	62.63	62.44	66.84	66.81	64.52	63.82	70.38	67.44	67.56	67.69	67.69	67.69
Arcturus								56.6	53.67	49.64	50.33	51.98	52.22	54.57	54.78	55	55.17	55.32	55.32	55.32
Baralaba	104.15	106.48	93.81	97.09	98.65	99.78	100.83	101.64	103.59	104.11	104.72	105.27	105.75	106.04	106.3	106.54	111.25	103.13	103.13	103.13
Belvedere								91.68	108.04	85.17	87.11	86.46	87.12	87.76	88.4	89.05	111.99	112.49	112.49	112.49
Belview						107.38	99	86.15	86.59	87.01	87.41	95.24	95.65	96.05	96.44	96.84	97.12	97.39	97.39	97.39
Blackwater	91.14	88.51	89.46	90.93	92.31	93.33	94.29	95.04	95.75	96.27	96.78	97.34	97.84	98.32	98.77	99.22	99.52	99.82	99.82	99.82
Blair Athol	70.71	71.38	71.93	73.13	74.27	69.88	70.62	71.2	71.73											
Bluff			77.01	77.35	78.79	79.49	80.49	80.88	82.07	82.48	82.85	83.26	83.65	84.61	83.29	83.69	83.92			
Bundi					80.64	75.8	68.95	69.26	69.56	69.83	76	76.31	76.6	76.87	77.14	81.62	81.84	82.07	82.07	82.07
Byerwen	72.9	73.26	68.2	69.23	70.27	70.99	76.85	77.33	77.78	78.11	78.38	82.36	83.3	83.54	83.79	84.75	84.89	85.02	85.02	85.02
Callide	45.22	45.05	45.8	46.25	47.06	47.34	47.64	47.95	48.27	48.59	48.89	49.22	49.54	49.87	50.19	50.53	50.74	50.94	50.94	50.94
Capcoal	105.69	93.92	86.18	85.9	94.37	102.19	103.01	103.67	104.31	104.84	105.37	105.92	106.44	106.94	107.43	107.91	108.26	108.58	108.58	108.58
Carborough Downs	84.58	79.47																		
Carmichael				62.13	63.18	57.11	50.54	47.57	44.62	47.53	47.92	48.3	48.69	49.04	51.47	51.83	52.14	52.47	52.47	52.47
Caval Ridge	121.12	99.01	87.22	88.74	90.24	91.31	95.91	96.68	97.43	99.98	100.62	101.29	101.93	102.54	103.15	103.74	104.19	104.64	104.64	104.64
China Stone				81.86	82.5	72.64	68.96	64.98	61.66	59.72	59.98	60.24	60.48	60.73	62.08	62.31	62.51	62.69	62.69	62.69
Clermont	45.07	46.27	46.19	46.79	47.36	47.8	48.19	44.04	40.34	40.53										
Codrilla								102.56	88.54	78.97	79.54	80.12	82.31	82.71	83.1	83.49	84.87	85.27	85.27	85.27
Collinsville (Bowen Central)	66.39	66.42	72.13	74.95	76.02	76.74	77.43	77.97	78.63	79.02	79.4	79.81	80.19	80.63	80.97	80.51	81.45	81.74	81.74	81.74
Columboola								80.93	70.94	71.23	71.55	71.87	72.18	76.54	76.84	77.12	77.4	77.64	77.64	77.64
Cook	201.69	182.6	184.72	187.3	189.82	191.46	193.13	194.64	204.37	205.83	207.27	208.76	210.23	211.65	213.08	214.55	215.85	217.15	217.15	217.15
Coppabella	126.24	127.92	129.01	131.35	129.88	129.09	130.47													
Curragh	102.17	100.84	101.38	103.09	104.7	105.85	106.93	107.76	108.54	109.12	109.7	110.28	110.84	111.35	111.82	112.3	112.65	113.01	113.01	113.01
Daunia	105.14	101.65	102.92	104.73	106.48	110.38	111.61	112.5	113.36	114.02	114.65	123.12	123.79	124.4	124.97	125.54	125.94	126.33	126.33	126.33
Dawson (Moura)	97.38	88.63	89.35	90.63	91.88	92.75	93.62	94.29	94.95	95.5	96	96.55	97.08	97.6	98.1	98.58	98.97	99.36	99.36	99.36
Denham								130.2	112.43	109.34	108.32	105.71	102.8	103.29	103.76	104.23	104.53	104.84	104.84	104.84

Mine	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Dingo West							107.91	106.47	109.58	110.97	111.62	112.29	118.85	119.46	120.04	120.61	121.03	125.67	125.67	125.67
Drake	73.09	73.28	75.92	78.55	79.07	80.62	81.58	83.93	84.24	84.54	84.84	85.16	85.46	85.76	86.07	86.39	86.61	87.96	87.96	87.96
Eagle Downs				125.53	105.29	87.71	88.35	88.88	97.63	98.16	98.68	99.23	99.76	106.14	106.68	107.19	107.48	107.76	107.76	107.76
Elimatta							101.78	62.98	54.62	55.27	55.07	57.32	68.31	68.62	68.98	69.39	65.94	69.41	69.41	69.41
Ensham	76.17	75.57	75.6	76.47	77.32	77.92	78.49	78.98	79.4	79.78	80.13	80.52	80.87	81.21	67.26	67.54	67.75	67.97	67.97	67.97
Foxleigh	87.3	91.05	94.58	96.63	99.68	99.72	99.74	99.78	99.82											
Galilee (China First)							89.61	81.12	72.97	67.54	63.45	62.34	63.25	63.77	63.62	63.8	63.93	64.04	64.04	64.04
Goonyella	101.24	91.53	91.22	92.67	94.13	98.82	99.85	100.6	101.34	101.97	104.81	105.44	106.07	106.68	107.25	107.85	108.28	108.71	108.71	108.71
Grosvenor	121.31	89.52	103.22	104.26	97.07	97.83	98.59	107.84	108.4	108.97	109.54	110.1	110.67	111.22	111.78	112.34	112.73	113.12	113.12	113.12
Grosvenor West				90.03	93.47	93.03	94.23	94.67	95.13	99.47	99.94	100.41	100.85	101.3	104.54	105.01	105.37	105.7	105.7	105.7
Hail Creek	96.76	92.86	93.26	95.18	97.12	98.59	100.41	101.24	102.02	103.13	103.73	104.35	105.1	105.92	106.75	108.68	109.24	109.66	109.66	109.66
Harrybrandt							123.08	109.19	110.49	111.42	112.35	113.68	115.98	116.9	117.82	118.75	119.11	120.45	120.45	120.45
Hillalong				76.82	76.4	77.36	77.35	73.45	73.94	83.43	83.45	85.26	85.39	82.85	79.23	95.08	96.36	84.96	84.96	84.96
Ironbark No. 1				84.83	81.83	72.34	72.86	75.79	76.15	81.61	81.97	82.33	82.69	83.04	83.4	83.75	83.97	84.18	84.18	84.18
Isaac Plains	102.31	90.31	85.83	87.74	96.6	97.64	98.63	99.46	100.24	100.83	94.46	95.06								
Jellinbah East	93.39	90.71	91.2	92.55	93.7	94.54	95.3	95.95	96.56	97.03	97.47	97.92	98.37	98.77	99.18	99.58	99.83	100.09	100.09	100.09
Kestrel	76.81	72.95	73.35	74.23	75.12	78.36	80	80.5	80.99	81.49	81.98	82.45	82.94	83.42	83.88	84.45	84.8	85.14	85.14	85.14
Kevin's Corner							134.86	166.58	105.56	115.9	71.39	68.11	65.31	54.17	52.65	54.81	55.67	55.28	55.28	55.28
Lake Vermont	90.9	86.97	87.41	88.66	89.8	90.67	91.49	92.09	92.63	93.09	93.5	93.93	94.39	94.8	95.18	95.38	95.57	95.79	95.79	95.79
Middlemount	88.44	86.24	87.09	88.6	90.03	91.06	92.05	92.83	93.57	94.14	94.7	95.28	95.86	96.01	96.15	97.23	97.23	97.23	97.23	97.23
Millennium	136.51	133.95																		
Minerva	71.74	68.95	70.17	72.06																
Minyango								127.95	106.61	78.74	79.35	79.75	79.12	82.26	82.57	82.89	83.11	83.35	83.35	83.35
Monto										106.11	80.23	81.44	81.79	82.12	82.47	88.18	88.47	88.78	88.78	88.78
Moorvale	79.97	74.02	74.53																	
Moorvale West						113.31	96.55	97.25	97.96	98.64	103.17	103.86	104.53	101.36	102.04	102.7	103.21	103.71	103.71	103.71
Moranbah North	94.05	87.56	88.06	89.07	90.1	90.85	91.58	92.15	92.71	93.27	93.84	94.41	94.96	95.52	96.06	96.61	97	97.39	97.39	97.39
Moranbah South				149.73	134.59	120.58	100.19	103.85	104.38	109.66	110.13	110.66	111.14	111.63	112.12	112.63	112.89	113.15	113.15	113.15
New Lenton		115.28	102.03	103.72	105.32	106.47	88.3	91.61	94.11	94.58	95.01	95.46	97.81	98.23	98.61	98.98	99.26	99.53	99.53	99.53

Mine	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Newlands	64.5	64.18	64.57	65.66	66.74	67.45	68.13	68.71	69.31	65.22	65.72									
North Goonyella	131.87	124.72	124.4	128.43	129.86	130.86	131.86	132.67	133.46	134.21	134.99	135.75	136.51	137.25	138.01	138.75	139.33	139.92	139.92	139.92
Oaky Creek	104.11	98.76	99.44	100.64	101.81	102.66	107.34	107.99	108.66	109.29	109.91	114.39	115.03	115.65	116.28	116.93	117.38	117.85	117.85	117.85
Olive Downs North	80.47	73.72	74.33	75.74	77.06	78.69	80.31	81.02	81.68	82.21	83.16	83.69	82.9	83.4	83.86					
Orion Downs	72.7	69.6	60.4	61.51	62.56	63.29	64.79	65.33	65.88	66.28	66.66	67.65	68.03	68.38	68.71	69.04	69.32	69.59	69.59	69.59
Peak Downs	99.59	92.6	92.35	94.33	95.88	97	98.09	98.87	103.94	104.55	105.14	105.75	106.34	109.1	109.67	110.23	110.6	110.96	110.96	110.96
Poitrel	86	82.48	83.4	84.82	90.11	91.1	92.06	92.78	93.48	94.01	100.47	101.01	101.56	102.04	102.52	103.01	103.33	103.68	103.68	103.68
Red Hill (BMA)					120.85	114.21	92.54	79.78	71.13	71.65	76.85	77.38	77.96	78.49	79.05	82.93	83.27	83.63	83.63	83.63
Rolleston	45.22	43.9	43.94	44.63	45.74	46.19	46.63	46.97	47.31	47.56	47.78	48.02	48.26	48.49	48.69	48.89	49.05	49.19	49.19	49.19
Saraji	105.51	98.85	98.78	100.56	104.36	105.6	106.84	107.75	108.61	113.64	114.35	115.09	115.82	116.54	117.23	117.91	121.14	121.63	121.63	121.63
Saraji East							120.55	105.59	91.64	86.7	80.63	80.99	91.51	91.91	92.3	92.71	92.9	100.35	100.35	100.35
Sarum Complex					87.54	75.69	66.01	66.58	67.16	67.75	71.46	72.05	72.64	73.15	73.67	76.41	76.93	88.55	88.55	88.55
Sonoma	88.01	87.11	87.84	89.18	90.49	91.44	92.34	94.44	95.07	95.5	95.88	96.22	96.52	96.79	97.02	97.26	97.41	97.58	97.58	97.58
South Galilee					52.39	66.31	66.37	62.67	62.72	62.77	67.59	60.82	60.88	60.92	58.06	60.49	60.49	60.29	60.29	60.29
South Walker Creek	80.12	78.9	79.08	80.45	84.38	88.96	89.78	90.45	91.12	91.62	92.14	92.66	98.12	98.6	99.06	99.5	99.8	100.1	100.1	100.1
Springsure Creek					78.42	68.5	57.2	45.36	39.58	39.86	43.39	43.69	43.97	44.26	44.51	47.12	47.35	47.57	47.57	47.57
Talwood							113.91	97.6	87.42	87.83	93.4	93.8	94.21	94.58	94.99	99.08	99.31	99.55	99.55	99.55
Teresa					57.37	56.62	52.39	47.61	47.87	48.09	50.53	50.76	51	51.22	51.46	53.25	53.44	53.64	53.64	53.64
The Range						58.58	59.57	54.14	54.53	54.83	55.14	60	60.31	60.58	60.84	61.12	61.34	61.56	61.56	61.56
Vermont East / Willunga						90.13	93.2	89.94	86.8	87.22	87.68	90.95	91.38	91.83	92.25	92.68	94.93	95.18	95.18	95.18
Wandoan					66.34	74.8	62.61	58.59	55.56	52.83	56.31	56.78	57.09	57.39	57.69	67.58	67.68	67.81	67.81	67.81
Washpool						110.39	106.09	106.68	107.69	108.27	112.35	112.95	113.52	114.05	114.55	118.62	118.97	114.39	114.39	114.39
West Rolleston						105.55	78.68	80.16	81.13	81.93	82.73	87.27	88.06	88.86	89.65	90.44	93.54	94.09	94.09	94.09
West/North Burton							144.86	97.05	97.6	98.11	98.63	99.19	105.63	105.99	106.35	106.72	107.04	111.61	111.61	111.61
Winchester South									88.04	84.54	79.39	81.82	81.96	82.35	82.73	83.11	85.03	85.32	85.32	85.32
Yarrabee	79.76	75.35	76.11	77.5	78.75	79.59	80.41	81.13	81.81	82.41	82.98	83.57	84.14	84.7	85.22	86.39	86.79	87.17	87.17	87.17

Source: Independent coal industry data

Table A3.6: Forecast production from existing and proposed mines (mt)

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Alpha	Thermal	0.00	0.00	0.00	0.00	3.80	12.00	18.10	25.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Arcturus	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	3.20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Athena	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baralaba	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Belvedere	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Belview	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blackwater	Thermal	1.17	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26
Blair Athol	Thermal	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bluff	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broadlea North	Thermal	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bundi	Thermal	0.00	0.00	0.00	0.00	1.90	3.40	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Byerwen	Thermal	1.13	1.75	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Callide	Thermal	1.80	1.85	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
Cameby Downs	Thermal	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16
Capcoal	Thermal	0.40	0.32	0.41	0.42	0.32	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Carborough Downs	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carmichael	Thermal	0.00	0.00	0.00	3.00	8.88	13.68	20.16	22.96	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Caval Ridge	Thermal	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
China Stone	Thermal	0.00	0.00	0.00	4.60	9.20	14.72	20.24	26.68	32.20	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Clermont	Thermal	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Codrilla	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.59	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
Collinsville (Bowen Central)	Thermal	2.63	3.38	3.38	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
Colton	Thermal	0.00	0.00	0.00	0.00	0.00	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.07	0.04	0.00	0.00	0.00	0.00	0.00
Columboola	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Cook	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coppabella	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Curragh	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daunia	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dawson (Moura)	Thermal	2.96	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33	3.33
Denham	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.87	1.05	1.35	1.65	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Dingo West	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drake	Thermal	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Eagle Downs	Thermal	0.00	0.00	0.00	0.15	0.35	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Elimatta	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.32	3.70	4.60	4.64	5.00	4.98	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Ensham	Thermal	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	4.50	4.50	4.50	4.50	4.50	4.50
Foxleigh	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galilee (China First)	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	6.39	12.07	22.01	33.37	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Goonyella	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grosvenor	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grosvenor West	Thermal	0.00	0.00	0.00	0.51	0.88	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
Hail Creek	Thermal	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Harrybrandt	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Hillalong	Thermal	0.00	0.00	0.00	1.68	1.58	1.48	1.48	1.54	1.62	1.66	1.53	1.28	1.26	1.25	1.23	1.18	1.18	1.15	1.15	1.15
Ironbark No. 1	Thermal	0.00	0.00	0.00	0.85	1.28	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Isaac Plains	Thermal	0.29	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jax	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jellinbah East	Thermal	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Kestrel	Thermal	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Kevin's Corner	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	3.20	4.40	13.00	16.10	22.00	26.50	28.20	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Lake Vermont	Thermal	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Middlemount	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Millennium	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minerva	Thermal	2.30	2.30	2.30	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minyango	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.82	1.40	1.33	1.33	2.09	2.66	2.66	2.66	2.66	2.66	2.66	2.66
Monto	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Moorvale	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moorvale West	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moranbah North	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moranbah South	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Acland	Thermal	4.80	2.80	4.80	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30
New Lenton	Thermal	0.00	0.25	0.65	0.65	0.65	0.65	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
Newlands	Thermal	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Goonyella	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Surat Joint Venture	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	1.75	2.80	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
Oaky Creek	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Olive Downs North	Thermal	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.00	0.00	0.00	0.00	0.00
Orion Downs	Thermal	0.48	0.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Peak Downs	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poitrel	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red Hill (BMA)	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rolleston	Thermal	13.12	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76	14.76
Saraji	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saraji East	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sarum Complex	Thermal	0.00	0.00	0.00	0.00	0.84	2.10	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Sonoma	Thermal	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04	3.04
South Galilee	Thermal	0.00	0.00	0.00	0.00	3.45	3.45	3.45	8.28	8.28	8.28	11.88	13.68	13.68	13.68	17.01	18.81	18.81	15.71	15.71	15.71
South Walker Creek	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Springsure Creek	Thermal	0.00	0.00	0.00	0.00	0.60	2.40	4.00	5.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Talwood	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.34	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Teresa	Thermal	0.00	0.00	0.00	0.00	1.60	2.28	2.66	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12	5.12
The Range	Thermal	0.00	0.00	0.00	0.00	0.00	0.80	2.20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Vermont East / Willunga	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wandoan	Thermal	0.00	0.00	0.00	0.00	3.00	5.00	9.00	12.00	15.00	18.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Washpool	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Rolleston	Thermal	0.00	0.00	0.00	0.00	0.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
West/North Burton	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Winchester South	Thermal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.80	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Yarrabee	Thermal	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Alpha	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arcturus	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Athena	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baralaba	Metallurgical	1.10	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	1.64	0.00	0.00	0.00
Belvedere	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	3.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Belview	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.50	1.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Blackwater	Metallurgical	14.95	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10	16.10
Blair Athol	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bluff	Metallurgical	0.00	0.00	0.50	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	0.00	0.00	0.00
Broadlea North	Metallurgical	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bundi	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Byerwen	Metallurgical	0.75	3.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Callide	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cameby Downs	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capcoal	Metallurgical	9.60	7.61	9.77	10.13	7.61	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Carborough Downs	Metallurgical	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Carmichael	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caval Ridge	Metallurgical	6.86	6.00	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
China Stone	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clermont	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Codrilla	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	1.21	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14	2.14
Collinsville (Bowen Central)	Metallurgical	0.00	0.50	0.50	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Colton	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.35	0.40	0.40	0.40	0.40	0.40	0.40	0.38	0.27	0.15	0.00	0.00	0.00	0.00	0.00
Columboola	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cook	Metallurgical	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Coppabella	Metallurgical	3.80	4.00	4.00	4.00	4.00	4.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Curragh	Metallurgical	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52	8.52
Daunia	Metallurgical	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Dawson (Moura)	Metallurgical	5.04	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67	5.67
Denham	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	2.03	2.45	3.15	3.85	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
Dingo West	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Drake	Metallurgical	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Eagle Downs	Metallurgical	0.00	0.00	0.00	1.35	3.15	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
Elimatta	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ensham	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foxleigh	Metallurgical	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galilee (China First)	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Goonyella	Metallurgical	16.49	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80	17.80
Grosvenor	Metallurgical	3.65	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Grosvenor West	Metallurgical	0.00	0.00	0.00	0.99	1.72	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51
Hail Creek	Metallurgical	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Harrybrandt	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.95	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38	2.38
Hillalong	Metallurgical	0.00	0.00	0.00	1.92	2.06	2.12	2.14	2.10	2.02	1.94	2.08	2.26	2.28	2.30	2.26	1.44	1.42	1.46	1.46	1.46
Ironbark No. 1	Metallurgical	0.00	0.00	0.00	0.85	1.28	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Isaac Plains	Metallurgical	1.26	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jax	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jellinbah East	Metallurgical	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
Kestrel	Metallurgical	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.85
Kevin's Corner	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lake Vermont	Metallurgical	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Middlemount	Metallurgical	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
Millennium	Metallurgical	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minerva	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minyango	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	1.20	2.11	2.21	2.21	3.47	4.41	4.41	4.41	4.41	4.41	4.41	4.41
Monto	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moorvale	Metallurgical	2.51	2.51	2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moorvale West	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Moranbah North	Metallurgical	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80	5.80
Moranbah South	Metallurgical	0.00	0.00	0.00	1.80	5.00	9.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
New Acland	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Lenton	Metallurgical	0.00	0.25	0.65	0.65	0.65	0.65	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
Newlands	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Goonyella	Metallurgical	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
North Surat Joint Venture	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oaky Creek	Metallurgical	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
Olive Downs North	Metallurgical	0.60	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.00	0.00	0.00	0.00	0.00
Orion Downs	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Mine	Type	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Peak Downs	Metallurgical	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Poitrel	Metallurgical	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30	3.30
Red Hill (BMA)	Metallurgical	0.00	0.00	0.00	0.00	0.50	1.40	4.80	8.80	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Rolleston	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saraji	Metallurgical	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
Saraji East	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	1.00	2.50	4.00	5.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Sarum Complex	Metallurgical	0.00	0.00	0.00	0.00	0.36	0.90	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Sonoma	Metallurgical	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
South Galilee	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Walker Creek	Metallurgical	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
Springsure Creek	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Talwood	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.72	1.26	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84	2.84
Teresa	Metallurgical	0.00	0.00	0.00	0.00	0.40	0.57	0.67	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
The Range	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vermont East / Willunga	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.63	1.25	1.95	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13	3.13
Wandoan	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Washpool	Metallurgical	0.00	0.00	0.00	0.00	0.00	2.13	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
West Rolleston	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West/North Burton	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Winchester South	Metallurgical	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.80	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Yarrabee	Metallurgical	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25

Source: Independent coal industry analyst

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Advisory

DBCT MANAGEMENT PTY LTD

COAL INDUSTRY REPORT

ame Advisory

21 May 2018

Mr. Jonathan Blakey
DBCT Management Pty Ltd
Level 25, Waterfront Place
1 Eagle Street
Brisbane, Qld 4000
AUSTRALIA

Dear Mr. Blakey,

RE: Coal Industry Report Update

AME Consulting Pty Ltd ("AME") has been engaged by DBCT Management Pty Ltd ("DBCT") to provide an Industry Report on the coal industry (the "Report"). We understand that the Report will be used, in part or whole, to support DBCT's submission to the Queensland Competition Authority ("QCA"). A version of this report will be provided to DBCT that may be attached as a reference document to the submission. The Report may only be used for this purpose and is to be kept private and confidential between DBCT and its legal counsel, and will not be distributed to any third party without the written permission of AME.

Production and Cost Analysis

Available data varies greatly between operations and projects. Much information is not reliable due to language difficulties, the confidential nature of the information, the inability to estimate the reliability of AME's sources and general lack of data. Consequently, much information has to be estimated and the quality, accuracy and completeness of the resulting cost comparisons will reflect this and cannot be guaranteed. Furthermore, forecast costs embody a number of significant assumptions with respect to exchange rates and other technical variables. Because of these factors, direct comparability between individual projects may be limited and, as such, our supply and cost estimates must be treated with caution and cannot be relied upon.

Supply/Demand Analysis

In addition, AME has supplied tables of historical data and estimated future supply, demand and market trends by compiling, interpreting and analysing engineering, supply, economic, statistical and technical information from many third-party sources. Such company and country statistics usually contain inconsistencies and utilise sampling data techniques and, thus, should not be relied upon.

Data Accuracy

AME has prepared this Report using information from its in-house database as well as a wide range of public domain and industry data sources for which assessment cannot be made in regard to accuracy. This is because AME does not have access to confidential company information to verify our data quality. Therefore, reliance can only be provided where we have data of sufficient quality that is acceptable to an international commercial court.

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Forward-Looking Statements

Statements in this document may contain forward-looking information identified by words such as 'estimates', 'intends', 'expects', 'believes', 'may' and 'will' and include, without limitation, statements regarding companies' plans of business operations, supply levels and costs, potential contractual arrangements and the delivery of equipment, receipt of working capital, anticipated revenues, mineral reserve and mineral resource estimates, and projected expenditures. There can be no assurance that such statements will prove to be accurate—actual results and future events could differ materially from such statements. Factors that could cause actual results to differ materially include, among others, changes to metal prices, risks inherent in the mining industry, changes in the economic environment, financing risks, labour risks, uncertainty of mineral reserves and resource estimates, equipment and supply risks, regulatory risks and environmental concerns. Caution is needed and no reliance on forward-looking information can be made. Except as otherwise required by applicable securities statutes or regulation, AME expressly disclaims any intent or obligation to update publicly forward-looking information, whether as a result of new information, future events or otherwise.

Third-Party Sources

AME's research is undertaken through both primary and secondary research from various sources. Primary sources include contact with market participants and industry experts, such as producers, industry consultants and associations. Secondary research involves desktop research of government departments and statistics, trade data, industry journals, company reports, public domain information, and data from the AME proprietary research database. AME makes attempts to obtain information from multiple sources to cross-reference and ensure consistency. Information and data collected has been analysed, assessed and reasonably validated using the in-house techniques of AME.

Best wishes,

AME Consulting Pty Ltd

ame Advisory

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1.0 Executive Summary

AME Consulting Pty Ltd (“AME”) has been engaged by DBCT Management Pty Ltd (“DBCTM” or the “Client”) to provide a report on the export metallurgical and thermal coal industry, their drivers and the response of the Australian coal industry to changes in demand, as well as how this could impact the throughput of the Dalrymple Bay Coal Terminal (“DBCT”) (the “Report”).

DBCT is a multi-user coal export facility located at the Port of Hay Point, approximately 35km south of the city of Mackay in Queensland. The port was established in 1983, and after a series of expansions, currently has an annual capacity of 85Mt. DBCT is the largest terminal coal terminal servicing the Bowen Basin and exported 64.9Mt in 2017, down from 68.5Mt in 2016 due to the impacts of Cyclone Debbie. Over the next 18 years, the potential throughput of the terminal could reach around 130Mt by 2027, based on AME’s estimate of the potential response of mines in the Bowen Basin to forecast changes in global coal demand.

Metallurgical coal demand is driven by production of steel. Global apparent finished steel demand is estimated to have grown by 4.3% in 2017 and to further increase by 1.4% in 2018. Global steel demand is forecast to grow at a CAGR of 1.6% over 2017–2035 to reach over 2Bt.

AME estimates that global export metallurgical coal demand will grow around from 328Mt in 2017 to around 522Mt in 2035. The majority of this demand growth is expected to come from increased steel production in developing nations within in Asia, such as Vietnam and India. Demand growth from China is expected to moderate over the forecast period after increasing significantly in 2017.

AME forecasts the global supply of export metallurgical coal to grow from 334Mt in 2017, surging to 354Mt in 2018, and then continuing to grow to 522Mt in 2035. As the market gradually returns to a balance in 2017 with an oversupply of just 6Mt, global supply of export metallurgical coal is forecast to grow at a CAGR of 4.3% between 2017 and 2019. Over this period, Australia is forecast to continue to account for roughly 53% of export metallurgical coal supply.

Electricity production is the main driver of demand for thermal coal. With other sources of energy for power generation rising at a faster pace than coal, its share of total generation is forecast to fall from 41% in 2013 to around 34% in 2035. Despite this, overall electricity generation from coal is expected to grow in absolute terms, which is expected to support the continued growth in consumption of thermal coal.

AME estimates that global thermal coal import demand in 2016 to have declined approximately 1% to around 972Mt. However, there was a bounce back in imported thermal coal in 2017, with growth of around 5% to 1,020Mt. By 2035 AME is forecasting demand to reach around 1,353Mt, a CAGR of around 1.6%.

AME estimates that the global thermal coal exports rose 4.1% in 2017 to 1,020Mt, following an estimated 2.2% fall in 2016. Supply growth in the December Quarter of 2017 was moderate, quarter on quarter, as increased demand in China over winter saw prices strengthen, against an expectation that China would reduce imports over winter to combat pollution in major northern cities. Global thermal coal exports are expected to increase around 2.5% in 2018, and AME forecasts thermal coal supply to grow at a CAGR of around 1.5% over the period to 2035, growing to 1,333Mt.

Australia is expected to be well positioned to respond to an increase in the demand for both export thermal coal and export metallurgical coal. Based on the current schedule of coal projects in Australia tracked by AME, it is possible for Australian coal exports to reach up to around 800Mt by 2027. However, as part of AME’s base case for coal exports, from Australia, it is estimated that only around 406Mt of this production will be required to satisfy export coal demand. Queensland has the largest pipeline of projects covering both thermal and metallurgical coal projects. As DBCT is the closest to the Bowen Basin, it is expected to be the terminal that benefits most from the increase in demand for Australian coal.

2.0 Export Metallurgical Coal

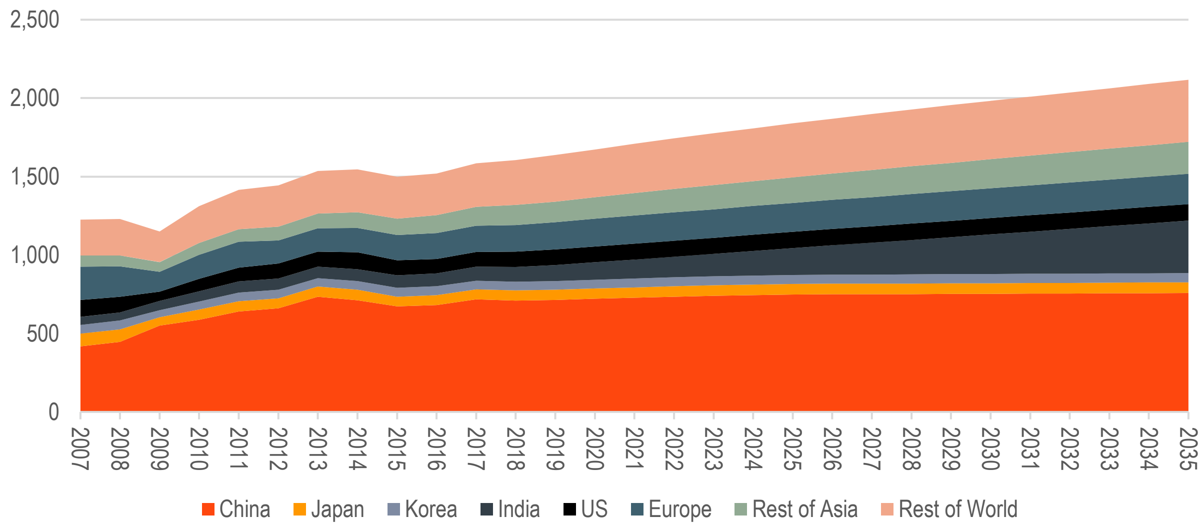
2.1 Overview

Metallurgical coal's primary use is in the production of coke for blast furnace steelmaking, with a small amount used in other metallurgical processes. As a result, demand for metallurgical coal is heavily dependent upon crude steel production.

2.2 Global Steel Outlook

The adaptability and cost effectiveness of steel sees it used extensively in construction, infrastructure development and manufacturing industries, such as the automotive, shipbuilding, machinery and consumer durables. AME believes that the construction, transport and consumer durables industries are the main drivers of steel demand. Growth in these sectors for a given country or region is typically correlated to a number of factors, including economic growth, represented by changes in GDP and IP, population growth and household formation, amongst others. Furthermore, the steel industry has historically been cyclical, as it is impacted by economic fluctuations of a country or region's business cycle and stage of development, in turn influencing changes in productive capacity utilisation and fluctuations in steel imports and protective trade measures.

Figure 1: Estimated Global Finished Steel Demand for Key Countries and Regions, Mt



Source: AME

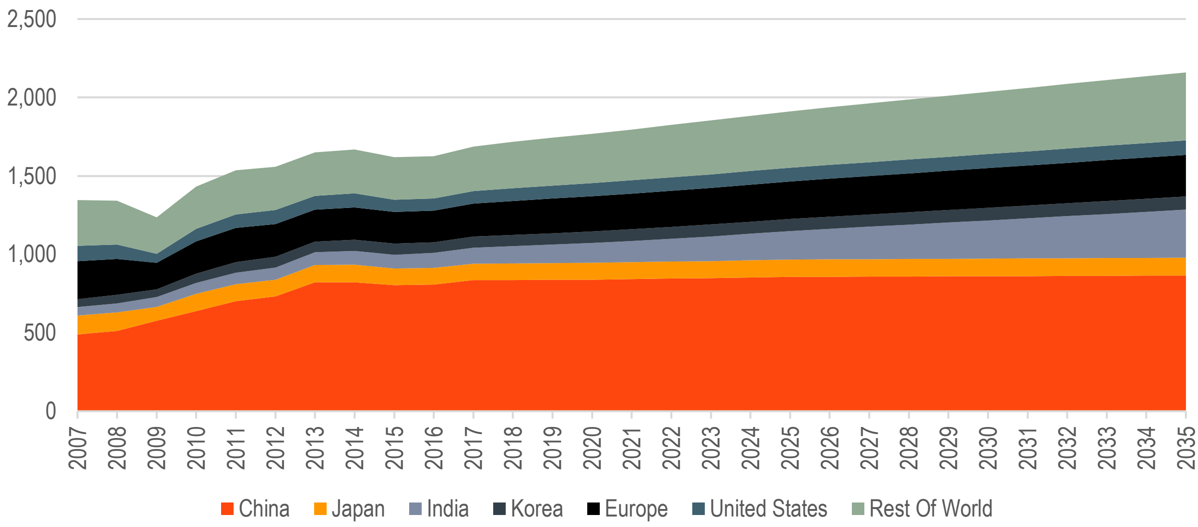
Global apparent finished steel demand is estimated to have grown by 4.3% in 2017 and to further increase by 1.4% in 2018. Global steel demand is forecast to grow at a CAGR of 1.6% over 2017–2035 to reach over 2Bt. In the short term, growth is focused on China's apparent demand, with consumption expected to grow 5.3% in 2017, in response to the central government's continued efforts to target its stimulus programs to maintain growth. After pulling back stimulus in the real estate sector to cool an overheated market at the end of 2016, stimulus was then targeted towards infrastructure. As a result, infrastructure investment is up almost 20% in 2017, year on year, increasing demand for steel products, especially rebar, offsetting lower demand from the construction industry.

Global steel demand growth is forecast to pick up pace in the medium term, as China's relatively strong property sector and growing infrastructure investment flow through to improving steel demand, which saw absolute declines in 2014 and 2015. Chinese steel consumption over the last decade has been largely driven by fixed asset investments, but as steel demand moves toward more consumer-related sectors (such as white goods), demand per capita consumption will begin to plateau. The key upside risk to this assumption is the potential of China's 'One Belt One Road' policy. The successful implementation of this global infrastructure pathway over the next few decades could see demand per capita continue to rise to the upper end of the demand per capita curve that has been seen from developed economies.

Long term, China's demand growth will continue to slow as the broader economy matures. Demand in China is forecast to grow at a CAGR of 0.3% in 2022–2035, similar to its medium-term forecast over 2018–2021. This forecast for China's consumption does not yet take into account increased consumption from China's Belt and Road Initiative, which is still too early to include in the base case scenario. Over time, other major emerging economies, notably India, will become more important centres of demand growth. However, although influential, this demand will not compensate for the slower rates of demand growth in China. Asian steel demand is expected to grow at a CAGR of 1.7% in 2022–2035. Demand in both Western Europe and North America is expected to rise at a rate of approximately 0.4% and 0.8% over the same period, as steel demand reverts towards historic levels. Asia will account for the majority of new demand in tonnage terms and is forecast to represent around 67% of total global demand by 2035.

By 2035, China is forecast to account for 36% of total demand, down from an estimated 45% in 2015, while Europe and the US will see their shares of world demand gently ease. In the long term, developing markets like India will emerge as the brightest demand prospects, with India expected to take over from China in around 2019 as the largest driver of demand growth in terms of volume. India's demand is forecast to grow at a CAGR of 7.6% in 2022–2035, similar to its growth rate in the medium term.

Figure 2: Estimated Crude Steel Production by Key Country and Region, Mt



Source: AME

For the majority of the 20th Century, global steel production was dominated by developed nations in Europe, North America and Asia. As the development of China ramped up from the 1990's, steel production in China surpassed Japanese production in 1996, to become the largest global producer. The dramatic growth of China, and to a lesser extent India, together with ongoing established steel production in Japan and South Korea, has seen Asia grow to dominate global steel production.

In 2017, global crude steel production continued with the strength seen in the second half of 2016, to end the year up 4% to 1,688Mt, as steel output was buoyed by strong demand and prices. In China, crude steel production rose 3.3% year on year to 832Mt, as more steelmakers returned into the market on restored profitability. Indian crude steel output was up 6.4% to 102Mt for the year, benefitting from new projects and robust demand. On the other hand, production from steelmakers in the UK stabilised at 7.6Mtpa after plant shut downs in 2016, while Brazilian output also grew 10% to 33.2Mtpa due to the recovery in the economy.

Although finished steel demand is estimated to have grown 4.3% in 2017 to 1,584Mt after returning to positive growth of 1.3% in 2016, in comparison, crude steel supply grew 3.8% in 2017 to 1,688Mt after growing just 0.4% in 2016 to 1,625Mt. In 2017–2020, finished steel demand is forecast to grow at a CAGR of 1.5%. The steel market supply and demand balance is set to improve moderately, as demand growth is expected to be quicker than that of supply, but overcapacity will overhang the industry in the short to medium term as it takes time to remove or absorb the excess capacity. In 2017, consolidation and restructuring amongst players in the industry has continued. In Europe, ThyssenKrupp has taken headlines with several asset sales as it transitions from its core business of producing steel into a technology conglomerate. In September 2017, ThyssenKrupp agreed to merge their European steel operations with Tata Steel Europe to form ThyssenKrupp Tata Steel, forming the second largest steelmaker in Europe, a formal agreement between the companies is expected in early 2018. London based metals trading and manufacturing company, Liberty House Group (LHG), has purchased a number of steelmaking assets around the UK and Australia, including Arrium's Whyalla works located in South Australia. An ArcelorMittal-Marcegaglia conglomerate (AM Investco) has been selected as the preferred bidder for ILVA's steelmaking assets in Italy, which includes the 6Mtpa Taranto works.

In China, the industry continues its restructuring in an attempt consolidate and streamline production, reduce operating costs, eliminate excess capacity and move polluting operations away from urban areas. Recent significant mergers have included Shangang's acquisition of Dongbei Special Steel, and Jianlong's acquisition of Beiman, Jianglong has announced that they will continue to try and increase their production capacity from 23 to 50Mtpa through mergers and acquisitions by 2020.

The majority of new steel plants for delivery over the short term are located in China and India. Upcoming Chinese projects are typically the result of capacity swaps, where old capacities are pulled down and the capacity quota is then relocated to a new and more efficient plant away from urban areas, and often on the coast to take advantage of access to seaborne raw materials. It is expected that Chinese capacity may drop by 11%, or approximately 135Mt, in 2016–2020, due to government-mandated capacity cuts. Projects in India are the result of the National Steel Policy, which aims to triple capacity to 300Mt by 2030. The CAGR for capacity growth in India is expected to be 8.9%, or 64Mt, of new capacity over 2018-2021.

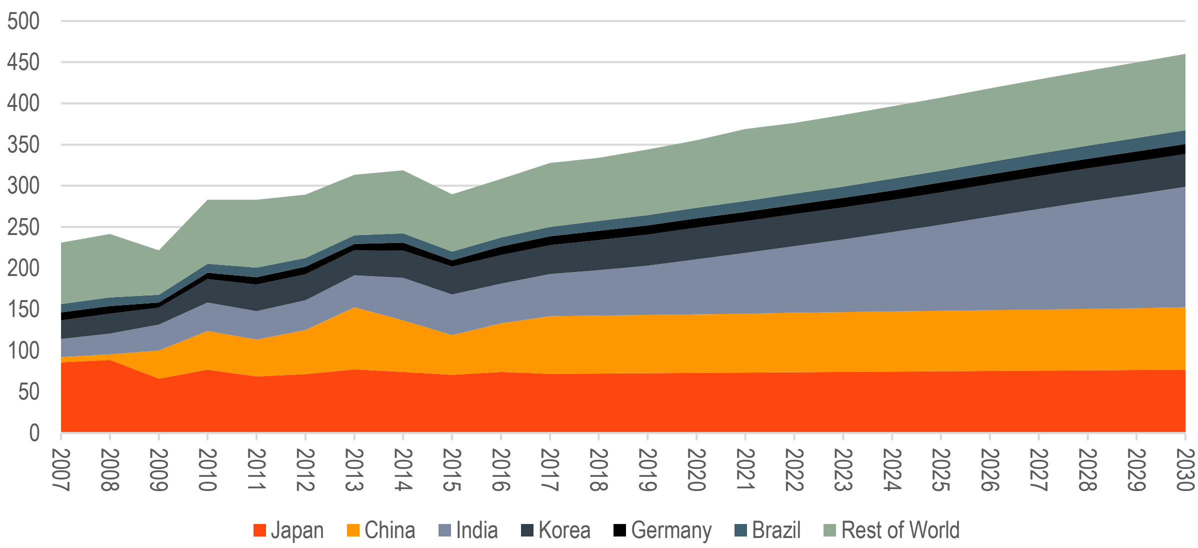
Looking forward, China will continue to dominate crude steel supply, but its share of global production will fall. AME expects that China will contribute 40% of global supply by 2035, down from 50% in 2016. Other developing countries, particularly India, will gain market share. It is expected that India will contribute 305Mt or 14% of global production by 2035, up from 96Mt or 5.9% in 2016. Further consolidations amongst steelmakers are likely, particularly for those in China, as China is targeting to achieve a top ten market share concentration above 60% by 2025, up from 34% in early 2016. After the ongoing merger of Baosteel and Wuhan Iron and Steel, state-owned steelmakers owned by the same provincial government are more likely to merge while those owned by different entities may face difficulties from political and operational issues.

Over the long term, India will remain the largest contributor of supply growth, up around 202Mt or 150%. In the developed regions of Europe and North America, growth is expected to be modest, broadly in line with economic growth in the two regions, with supply additions of around 32Mt, up 13%, and around 14Mt, up 11%, respectively. In China, capacity and supply growth are expected to remain largely flat over 2022–2035, as the Chinese economy is shifting from an investment-driven economy to a consumer driven one. Over 2022–2035, AME estimates steel production in China to grow by around 2% to around 864Mt, with a capacity utilisation rate of around 80%. China will continue to dominate steel production long term, although its share of global supply will begin to fall due to stronger supply growth in other developing economies. By 2035, China will account for 40% of steel supply, down from 50% in 2015.

2.3 Demand Analysis – Export Metallurgical Coal

AME estimates that global export metallurgical coal demand will grow around from 328Mt in 2017 to around 522Mt in 2035. The majority of this demand growth is expected to come from increased steel production in developing nations within in Asia, such as Vietnam and India. Demand growth from China is expected to moderate over the forecast period after increasing significantly in 2017.

Figure 3: Estimated Export Metallurgical Coal Demand for Key Countries and Regions, Mt



Source: AME

The demand outlook for export metallurgical coal over the next ten years is expected to shift from a focus on demand growth in China, to growth in India and other emerging markets, particularly in South East Asia. In the last decade, China shifted from being a net exporter of coal to a net importer. This shift since 2009 has been the largest single contributor to the growth in traded coal demand during this period. The pace of economic growth in China has now slowed, despite the current surge, and although there is optimism surrounding Indian demand into the long term, the scale of China's 2009–2013 boost to demand is unlikely to be replicated by any other country. Global metallurgical coal import demand growth between 2017 and 2022 is forecast to be around 2.8% CAGR, lower than the estimated 3.6% CAGR between 2012 and 2017.

After picking up moderately in the short term, metallurgical coal import demand growth in China is expected to slow from 2018, as the Chinese steel industry goes through a phase of consolidation and steel production growth slows. Chinese steel consumption over the last decade has been largely driven by domestic fixed asset investments. As domestic fixed asset investment growth slows, China's steel production is forecast to remain relatively steady, supported by continued steel exports. This is expected to be driven by construction in western regions, and partner nations as part of the government of China's Belt and Road Initiative.

In the medium term, steady production in China will see metallurgical coal demand growth driven more by other emerging giants, notably India. Indian demand will be assisted by the country's comparatively strong economic growth, and is likely to receive an additional boost from the government's plans to dramatically increase spending on infrastructure development, including railways. Although India aims to reduce reliance on imported coals, high Indian demand and the relatively poor quality of most domestic coals has still resulted in increased metallurgical coal imports, particularly from Australia.

Export metallurgical coal demand from major established steel producing nations Japan and Korea is expected to remain relatively stable, with demand growth growing at CAGR's of 0.5% and 0.9% respectively over the next five years.

In the long term, it is forecast that global demand for internationally traded metallurgical coal may increase at a CAGR of around 2.6% in 2022–2035 to reach around 522Mt, slowing from a CAGR of 2.8% in 2018–2022. As China moves away from manufacturing to consumption, other emerging economies, such as India and Brazil, will become more important centres of demand growth. Since 2015, India and China have competed for the position of second-largest importer of metallurgical coal. China's significant increase in demand for imports in 2017 saw it almost overtake Japan as the largest importer of metallurgical coal, globally. As China's demand growth moderates in subsequent years, AME anticipates India will become the global leader in metallurgical coal imports by 2021, surpassing both China and Japan.

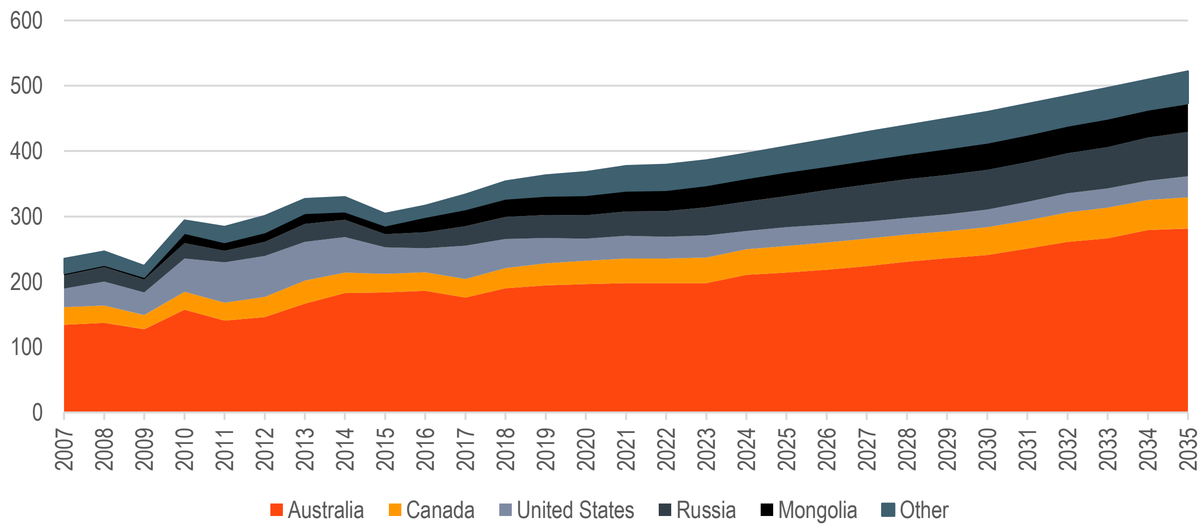
Demand from emerging markets will remain an important source of growth of metallurgical coal imports in the long term. Asian demand is expected to grow at a CAGR of 2.5% in 2022–2035. Internationally traded metallurgical coal demand in Europe is expected to remain relatively flat, with a CAGR of 0.6% over the same period, as its steel production reverts towards levels achieved in the mid-2000s. Asia will account for the majority of new demand in tonnage terms, and is forecast to represent approximately 78% of global internationally traded metallurgical coal demand by 2035.

China is estimated to account for approximately 21% of global metallurgical coal imports in 2017. This is anticipated to moderate to 15% by 2035, as stronger demand growth is experienced in other markets. India will be the brightest growth prospect going forward, with metallurgical coal import demand forecast to grow at a CAGR of 6.5% to around 190Mt between 2022 and 2035, driven by robust steel production growth and supported by the fact that the quality of its domestically produced metallurgical coal cannot compete with imports. India is anticipated to import around 35% of global internationally traded metallurgical coal by 2035.

2.4 Supply Analysis – Export Metallurgical Coal

AME forecasts the global supply of export metallurgical coal to grow from 334Mt in 2017, surging to 354Mt in 2018, and then continuing to grow to 522Mt in 2035. As the market gradually returns to a balance in 2017 with an oversupply of just 6Mt, global supply of export metallurgical coal is forecast to grow at a CAGR of 4.3% between 2017 and 2019. Over this period, Australia is forecast to continue to account for roughly 53% of export metallurgical coal supply.

Figure 4: Estimanted Metallurgical Coal Exports from Key Countries and Regions, Mt



Source: AME

AME estimates export metallurgical coal supply to have totalled 316Mt in 2016, up around 4% year on year, as increased production spurred by higher prices offset the closure of high-cost operations, and delays in the development of new mines. Supply rates increased throughout the year as market conditions improved, with around 27% of the annual 2016 production occurring in the December Quarter. This supply recovery has continued into 2017, through to the end of the year, with an estimated increase of 6% year on year to 334Mt. Strong supply growth is expected to continue into 2018, with additional supply contributed mainly by Australia, Russia, Mozambique and Mongolia, increasing to around 354Mt. In the long term, it is forecast that export metallurgical coal supply will increase at a CAGR of around 2.5% based on current mine plans and scheduled openings.

Export metallurgical demand is estimated to have totalled 308Mt in 2016, up around 6% from 290Mt in 2015. Consequently, the metallurgical coal market is estimated to have been oversupplied by around 8Mt over 2016. This represented a 45% reduction from the 15Mt oversupply in 2015. And in 2017, this oversupply is estimated to have reduced again to around 6Mt, before starting to grow again from 2018.

Significant disruption to supply from mines in Queensland as a result of Tropical Cyclone Debbie in March-April 2017, had a substantial impact on total export supply, as did geological issues in the following months at two key underground operations in Australia, resulting in a further tightening of supply. These short-term reductions in supply lead to significant increases in benchmark metallurgical coal prices through the last three quarters of 2017. Continued market tightness has seen prices hold up into the first quarter of 2018.

With the dramatic increase in global metallurgical coal prices that occurred in the second half of 2016 and the first half of 2017, several producers have recommenced or announced plans to recommence production at idled operations in 2017. Some examples include Conuma Coal's Perry Creek and Willow Creek mines in Canada and ICVL's 2Mtpa Benga mine in Mozambique. After having approximately 32Mt of coal removed from the market in 2015, US metallurgical coal exports are estimated to have grown by 14Mt in 2017. As a result, it is forecast that supply growth will outstrip demand growth over the next three years, rapidly increasing the oversupply in the market. Whether all these mines restart may depend on a combination of how quickly they can commence operations, and whether coal prices remain sufficiently elevated through the remainder 2018.

In the long term, metallurgical coal supply is forecast to grow, with additional supply expected to be required to meet the demand growth from India and other industrialising countries. Medium-term supply is set to increase at a faster rate, with supply in 2022 estimated to hit 379Mt, up approximately 20% from the 316Mt produced in 2016. The high rate of short- to medium-term growth is due to the large number of committed projects that were planned to commence despite low coal prices prevailing from 2014-2016. This increase in supply is expected to be driven by increased production in Mozambique, the restart of Canadian and Mongolian production, and the ramp up of projects in Russia and Australia. Over the longer term, an anticipated gradual rise in coal prices, along with increased demand from China and India, will lead to a gradual increase in supply from brownfield and greenfield sites as demand and prices are expected to stabilise.

AME expects metallurgical coal supply to grow at a CAGR of 2.5% to approximately 522Mt by 2035. This supply will be needed to meet the rapidly growing demand of India and other developing countries. Short to medium-term supply is set to increase at a faster rate, with supply in 2020 estimated to hit 368Mt, 16% higher than the 316Mt produced in 2016. From 2020 to 2035, global export metallurgical coal supply is forecast to increase more slowly, at a CAGR of 2.5%. The high rate of short- to medium-term growth is due to the large number of projects and mines that have announced intentions to commence producing. It is uncertain which idled mines will reopen, with several already delaying restarts to 2018. Over the longer term, while prices are expected to decrease from the heights seen in 2016–17, steady demand growth from emerging markets such as India will lead to a gradual supply increase from both brownfield and greenfield sites, as well as a steady uptick in prices. AME's analysis assumes demand and supply to balance in the long run, with the short- to medium-term oversupply and medium-term growth expected to be muted over time as market forces in the metallurgical coal industry once again revert to equilibrium.

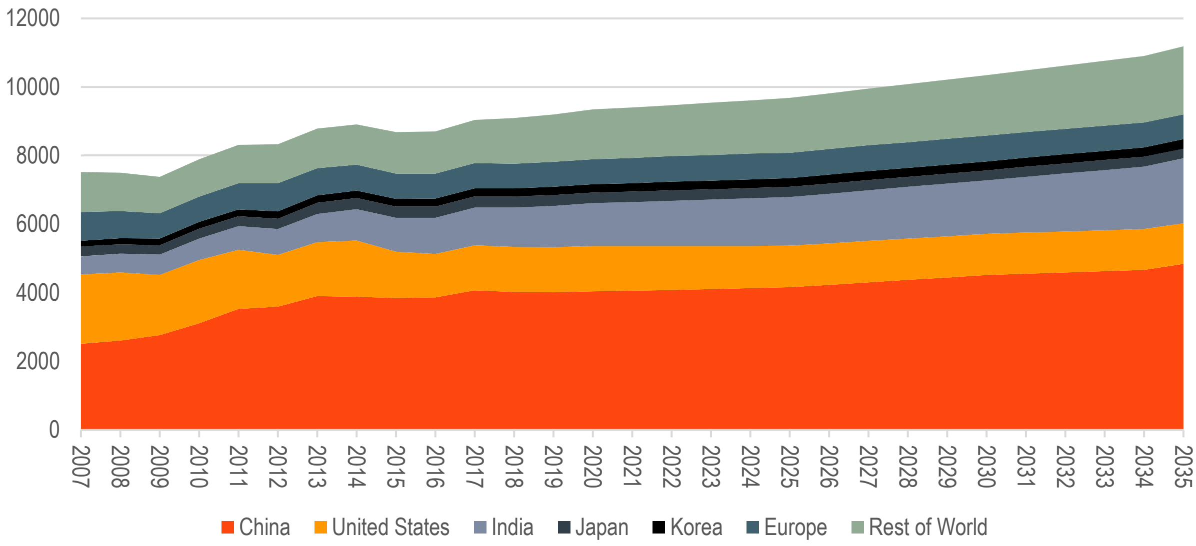
3.0 Export Thermal Coal

3.1 Overview

Thermal coal's primary use is for the raising of steam for electricity production. The next largest user of thermal coal is for the production of cement. Smaller amounts of thermal coals are used in industrial processes for steam generation, reduction and various chemical processes. As a result, thermal coal demand is driven strongly by electricity generation.

3.2 Global Energy Outlook

Figure 5: Estimated Eletricity Generation from Coal for Key Countries and Regions, bn kWh



Source: AME

The energy mix is a key driver of demand for various forms of energy, and assumptions about future shifts in the energy mix are an integral part of energy demand forecasts. Essentially, the energy mix breaks down total primary energy demand into the different energy sources that feed it, i.e. oil, coal, gas and hydro and other renewables.

Forecasting consumption of the individual energy sources is inherently difficult as it is subject to various independent external factors. Still, it is necessary to derive an in-depth analysis of the future role and limitations of each energy resource, as well as the sectors they are utilised in. Government policies, economic activity, demographic change, energy prices, as well as the rate of energy efficiency play significant roles in the future energy mix—and, hence, also call for consideration.

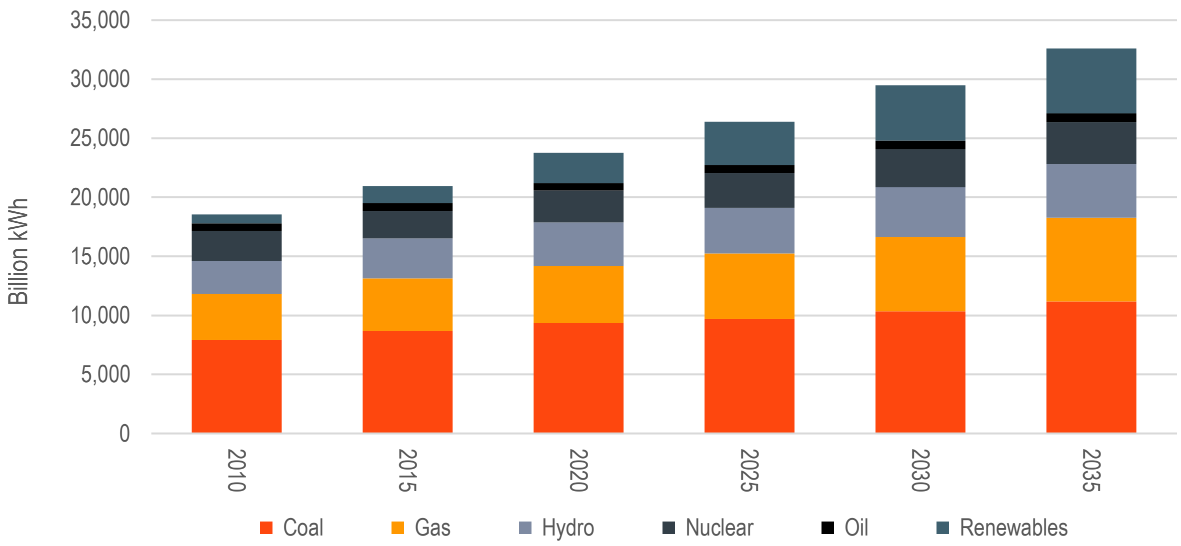
- Strong economic growth usually implies higher industrial output and higher demand for electricity, while rising income levels can lead to increases in average gas consumption per person.
- Population growth is also important for gas demand. Holding other factors constant, faster population growth and a larger population base implies higher electricity demand, residential gas consumption and transportation demand.

The concept of 'energy intensity' is of increasing importance in energy analysis. This analysis relates energy consumption compared to total economic activity. Usually, this is expressed in energy units used per US$1 billion of GDP at constant prices. This index reflects the relative efficiency with which energy is used to generate economic growth.

Energy intensity at the global level has been falling since at least 1980. Energy intensity is brought down by more efficient use of energy in a wide range of areas, such as better insulation of buildings and more fuel efficient vehicles. Technological advancements in industry are also a key driver, which helps explain why China's economy has become steadily less energy intensive even at a time when it has been rapidly industrialising. High energy prices tend to act as an incentive to increase efficiency. For example, in the aluminium smelting industry—one of the most energy-intensive processes—Chinese producers' proprietary smelting technology has rapidly caught up with Western technology, motivated by high power costs.

Due to the environmental implications of using thermal coal for electricity generation, there have been considerable shifts in government policies towards limiting its use. For instance, China targets increasing the share of non-fossil fuels in primary energy consumption to 20% by 2030. As countries move to reduce their carbon intensity, in order to meet commitments made under international agreements, power grids will see increasing deployment of renewable energy sources, as well as energy storage facilities to back up intermittent sources of generation.

Figure 6: Estimated Historical and Forecast Global Electricity Generation by Source



Source: AME, IEA

Notwithstanding efforts to curb carbon emissions, thermal coal is estimated to remain one of the cheapest and most reliable sources for electricity generation. However, demand growth is expected to slow over the long term due to the continuing maturation of economies and the implementation of new energy based technologies targeting alternative energy sources such as renewable energy and energy storage. Despite this, overall electricity generation from coal is expected to grow in absolute terms, which is expected to support the continued growth in consumption of thermal coal. Should thermal coal prices remain relatively cheap and accessible (compared to other energy sources), power utilities are expected to remain incentivised to consume thermal coal.

Over the long term, global demand for electricity will continue to rise, albeit at a slower pace than in the past, driven by income and population growth in developing economies. At the same time, electricity generation will make additional efficiency gains, both in terms of the quantity of primary energy to produce one unit of electricity, and the amount of electricity lost in transit from power plants to the end-user. Demand for electricity and demand for primary energy to produce electricity will, therefore, not increase at the same rate. Nevertheless, in light of the continued rise in demand for electricity, consumption of primary energy by the electricity sector is forecast to rise at a CAGR of 2.2% between 2013 and 2035, compared with 2.4% in 1990–2013.

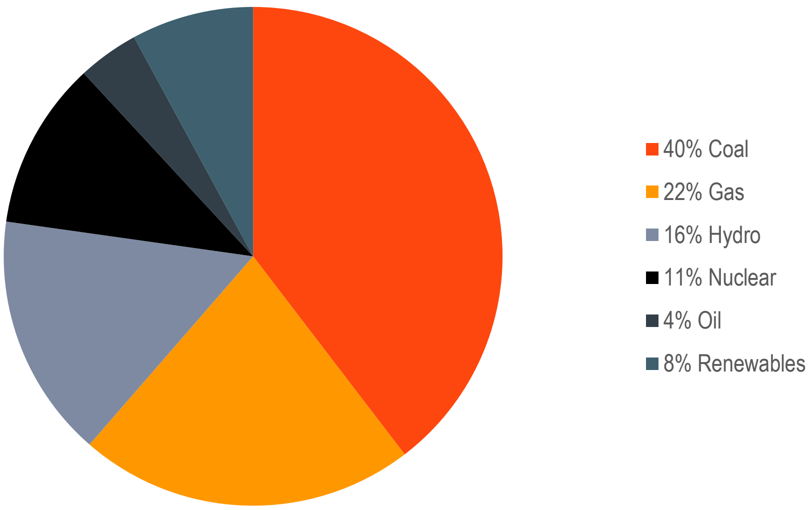
Over the past century, coal has been the fuel of choice for electricity generation in many nations. However, environmental policies are encouraging a shift to cleaner fuels. Due to its current size and continued growth, coal will remain the backbone of electricity generation. Especially in large developing regions such China and India, coal's cost advantage over other fuels will make it the dominant source of energy over the forecast period. Nevertheless, with other sources of energy for power generation rising at a faster pace, its share of total generation is forecast to fall from 41% in 2013 to around 34% in 2035.

Despite the shadow that the Fukushima disaster has cast over the nuclear sector, nuclear energy will remain a firm pillar in the energy generation industry over the medium term. However, owing to lingering public concern over the safety of nuclear energy, its share in total electricity generation is expected to ease to 10.4% by 2030, after the gradual restart of nuclear plants in Japan is expected to drive up nuclear's global share in the medium term, to 11.3% in 2020 from 10.6% in 2013. Following Fukushima, Germany reaffirmed its intention to phase out nuclear energy entirely by 2022.

In terms of the electricity generation energy mix, natural gas and renewables will see stronger growth rates over the next two decades as electricity producers shift to lower-carbon sources. Natural gas emits up to 60% less CO2 than coal when used during the electricity generation process and will, therefore, maintain or even gain importance as a fuel. This shift has already been evident in the US where coal fired electricity generation has been declining for over ten years. According to the IEA, by 2035, natural gas will account for 26.2% of global electricity generation, compared to 21.5% in 2015. However, the exact mix of fuel remains a big variable, as producers are exposed to influential factors such as government policies, gas prices outside the US and available supplies to major consuming regions such as Asia. Issues surrounding supplies also include available infrastructure to transport natural gas from the producing counties to domestic utilities—gas pipeline infrastructure is, hence, a hotly debated topic.

Electricity generation from renewable sources (excluding hydro) is forecast to have the greatest market share increase worldwide, rising from 6.8% in 2015 to 11.4% in 2035. Europe is a leader in this regard, with 23% of the EU's electricity forecast to come from renewables by 2030, compared with 16.3% in 2015.

Figure 7: Estimated Global Electricity Generation by Source 2017

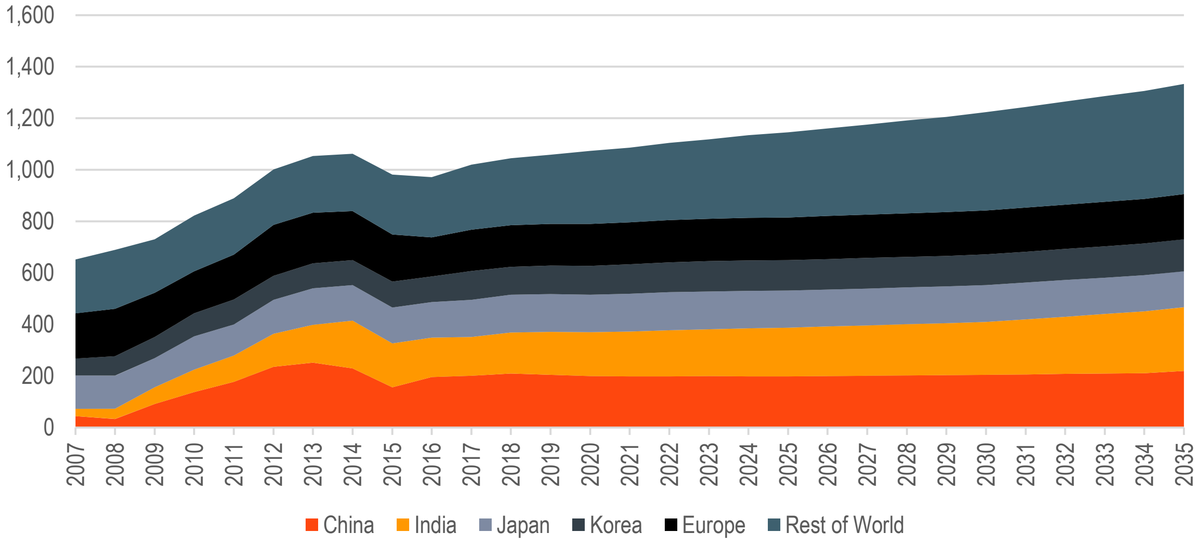


Source: AME, IEA

3.3 Demand Analysis – Export Thermal Coal

AME estimates that global thermal coal import demand in 2016 to have declined approximately 1% to around 972Mt. However, there was a bounce back in imported thermal coal in 2017, with growth of around 5% to 1,020Mt. By 2035 AME is forecasting demand to reach around 1,353Mt, a CAGR of around 1.6%.

Figure 8: Estimated Export Thermal Coal Demand for Key Countries and Regions, Mt



Source: AME

During the first half of 2016, China imported 70Mt of thermal coal (including bituminous, sub-bituminous and lignite), up a moderate 4.3% year on year. However, with the Chinese government's restriction on domestic coal supply had a flow-on effect to power utilities' stockpiles. As a result, demand for thermal coal imports increased to 127Mt for July–December, up a significant 57% year on year. Overall, China's thermal coal imports increased 26% year on year in 2016 to 196Mt, while China's domestic thermal coal production decreased 10% to 2.7Bt over the same period. However, production from unauthorised mines and the large number of small coal mines is not included in the production figures. Imports grew marginally in 2017, to be an estimated 201Mt, and are estimated to remain stable at around this level over the forecast period.

Indian 2016 thermal coal imports were approximately 152Mt, down 11% year on year. State-owned Coal India Limited (CIL) produced 514Mt thermal coal in 2016, and aims to produce approximately 600Mt thermal coal in FY2017/18. CIL has already fallen behind its target for the new Indian financial year, and is expected to fall approximately 5% behind this target at 567Mt. Extensive transport disruptions have impacted the ability of CIL to meet the needs of its main power customers, with Indian power utilities unable to sufficiently restock. However, high export thermal coal prices have discouraged Indian buyers from making up for the shortfall in domestic produced via imports. AME estimates that Indian import demand declined a further 4% in 2017, with thermal coal imports of around 149Mt for the year.

The demand outlook for thermal coal has weakened in recent years due to the slowdown in the Chinese economy, the US gas supply glut, and governments pushing for cleaner energy. Conversely, with the Indian domestic producers regularly falling short of their production targets by 5–8%, demand for imports may be higher than anticipated.

As with other established markets and more developed economies, Chinese GDP growth in the future is expected to be less electricity and energy intensive. Additionally, the Chinese government has expressed aims to further diversify the country's energy mix away from coal. The energy mix assumptions for China comprise a reduction in coal's share of total electricity generation from 70% in 2015 to 51% by 2035, with renewables, nuclear and gas all increasing their shares. In India, coal's electricity production share is forecast to remain stable over the medium term at around 72%, but decline to 51% by 2035. In Japan, coal has benefitted in recent years from the nuclear shutdown following the 2011 Fukushima accident, but is expected to see its share of the energy mix decline slightly by 2020, as nuclear capacity is gradually brought back on line, but remain stable over the longer term.

In the longer term, AME forecasts global thermal coal imports to grow at a CAGR of 1.7% in 2022–2035. The growth outlook has diminished over the past 18 months, primarily attributable to stable import demand from India, as the country moderates its thermal coal imports and slows its coal-fired generation growth, compared to previous plans. While many other sizeable emerging economies (such as Indonesia) are expected to be largely self-sufficient in coal production, Vietnam and Malaysia are expected to be increasingly reliant on imports.

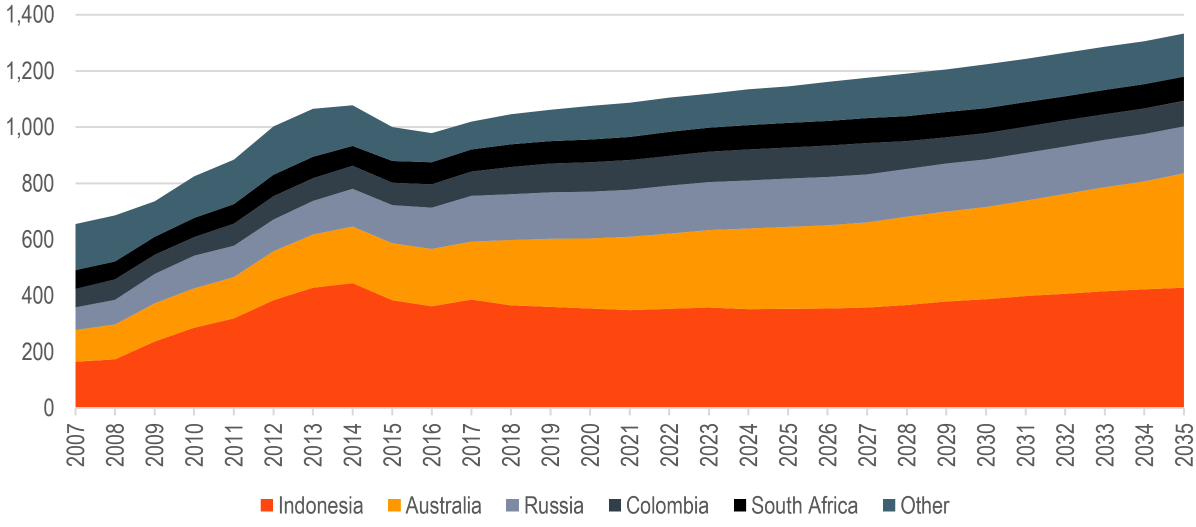
Indian thermal coal imports are forecast to post solid growth of 2.8% CAGR over the period 2022-2035, down on a CAGR of 5.1% in the short to medium term, while Malaysian and Vietnamese imports are forecast to grow at CAGRs of 2.8% and 10.5%, respectively over the same period.

Overall, emerging markets are anticipated to remain the primary contributors to thermal coal demand growth in the long term, with Asian thermal coal imports forecast to grow at a CAGR of 1.9% over 2022–2035. Meanwhile, the developed world—in particular, the EU and US—is expected to continue to shift its energy mix away from coal under the increasing impact of environmental policies. Even China and India are anticipated to shift their energy input marginally away from coal over the forecast period, albeit still with significant growth in coal-fired electricity production. The impact of the global climate deal reached in Paris in December 2015, which will take effect in 2020, will depend on the approach taken by individual countries to implement their pledged targets, but it does add to the growing movement towards lower-emission energy sources.

3.4 Supply Analysis – Export Thermal Coal

AME estimates that the global thermal coal exports rose 4.1% in 2017 to 1,020Mt, following an estimated 2.2% fall in 2016. Supply growth in the December Quarter of 2017 was moderate, quarter on quarter, as increased demand in China over winter saw prices strengthen, against an expectation that China would reduce imports over winter to combat pollution in major northern cities. Global thermal coal exports are expected to increase around 2.5% in 2018, and AME forecasts thermal coal supply to grow at a CAGR of around 1.5% over the period to 2035, growing to 1,333Mt.

Figure 9: Estimated Export Thermal Coal Supply from Key Countries and Regions, Mt



Source: AME

With China relaxing its domestic production restrictions in December 2016, premium thermal coal spot prices have moved over a broad range from US$98.5/t at the end of 2016, a low of US$71.0/t in May 2017, a high of US$108/t in January 2018, to settle around US$92.0/t at the end of the March Quarter 2018. AME estimates that Indonesian thermal coal exports increased approximately 6% year on year in 2017 due to strong demand for lignite from China. To limit this growth in lignite imports, China banned the import of coal into its provincial ports in the south and in September closed Guangzhou port to further coal imports for 2017, although these restrictions were temporarily relaxed in December. Australian thermal coal exports were flat in 2017, although New South Wales exports increased on the back of increased Chinese demand for bituminous coal, including high ash Hunter Valley coal.

South African thermal coal exports were flat at around 79Mt in 2017, as increased demand in South Asia and North Asia offset decreased Indian demand. In contrast, Russian thermal coal exports increased by an estimated11% to 162Mt in 2017, as operators continue to expand production and increase market share in the Asian region. US exports are forecast to rise over 50% to 33Mt, as high thermal coal prices make exporting profitable again.

The period from 2006–2011 saw strong increases in supply of thermal coal, as demand increased and prices rose. This supply continued to increase around the world, peaking in 2014, as demand for thermal coal reached new highs. In 2015, demand levels tapered off, causing prices to fall and high-cost supply to no longer be economically viable to produce. This supply decrease is expected to reverse in 2017, mirroring demand, with price recovery allowing producers to consolidate their current operations.

AME expects net thermal coal exports to continue to recover over the period 2018-2022 as conditions slowly improve and low-cost producers increase production at the expense of higher-cost mines. This new supply is not regarded as a certainty, since some of these projects are yet to gain approval or funding.

Over the next 13 years, AME forecasts thermal coal exports to increase at a CAGR of around 1.5% to reach 1,333Mt by 2035. Indonesia will remain the largest contributor in 2035, however, its market share is anticipated to decrease from 38% in 2017 to 32% by 2035, starting in the short term, as power utilities turn to higher energy coal, Indonesia’s deposits of medium calorific value coal are depleted and increased domestic demand reduce the total amount of coal available for export. Australia is expected to remain the second largest thermal coal exporting country by volume, increasing its market share from 20% in 2017 to 31% by 2035, due to its low sulphur, high calorific value coal, combined with its supply security and relative proximity to Asia.

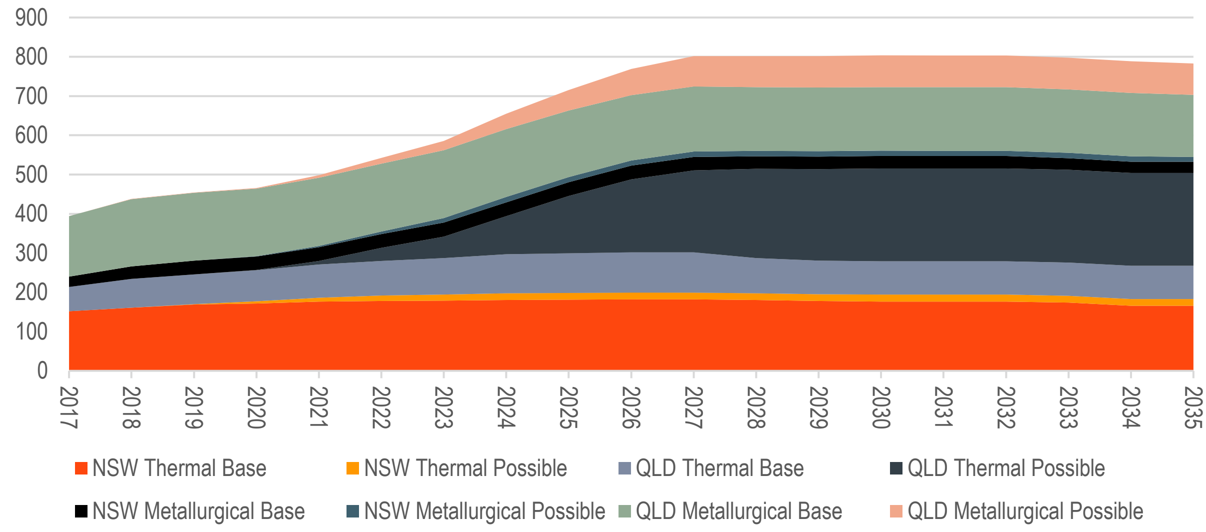
AME anticipates demand and supply to balance in the long run. Short-term constraints and medium-term growth are expected to be muted over time as market forces in the thermal coal industry come to equilibrium. This rebalancing of the market will support a reversion to more normal market dynamics and sustainably higher prices.

Indonesia and Australia will remain the largest exporters, although Indonesian production faces challenges from government policies and the depletion of higher-quality deposits in the longer term. Nevertheless, with its low ash content, demand for Indonesian sub-bituminous coal is likely to remain, primarily as a blending product. In the long term, AME anticipates the majority of new supply growth to come from Australia, Indonesia, Colombia and South Africa. US exports are forecast to increase from 33Mt in 2017 to 35Mt in 2022, as stabilises from the previous volatility seen in exports. Supplies from South Africa are expected to remain restricted by the lack of infrastructure in the medium term, with the railway to the Richards Bay export terminal currently operating at approximately 12% below Richards Bay’s 91Mtpa nameplate capacity. However, the rail operator Transnet Freight Rail plans to increase capacity to 96Mtpa by 2020. South African thermal coal exports are expected to peak at around 90Mt by 2028. Colombian thermal coal exports are anticipated to increase at a CAGR of 5% to approximately 107Mt by 2022, before slowing to a CAGR of 0.2% from 2022 to 2035.

4.0 Australian Supply Analysis

Australia is expected to be well positioned to respond to an increase in the demand for both export thermal coal and export metallurgical coal. Based on the current schedule of coal projects in Australia tracked by AME, it is possible for Australian coal exports to reach up to around 800Mt by 2027. However, as part of AME's base case for coal exports, from Australia, it is estimated that only around 406Mt of this production will be required to satisfy export demand. Queensland has the largest pipeline of projects covering both thermal and metallurgical coal projects, and in particular, the potential supply of large quantities of thermal coal out of the Galilee Basin. As a result, it is expected that growth in exports will be centres around the projects in Queensland. For both thermal and metallurgical coal, projects outside of the base case projects may be required in order to meet projected exports, which may include a significant proportion located in Queensland.

Figure 10: Estimated Profile of Australian Coal Exports

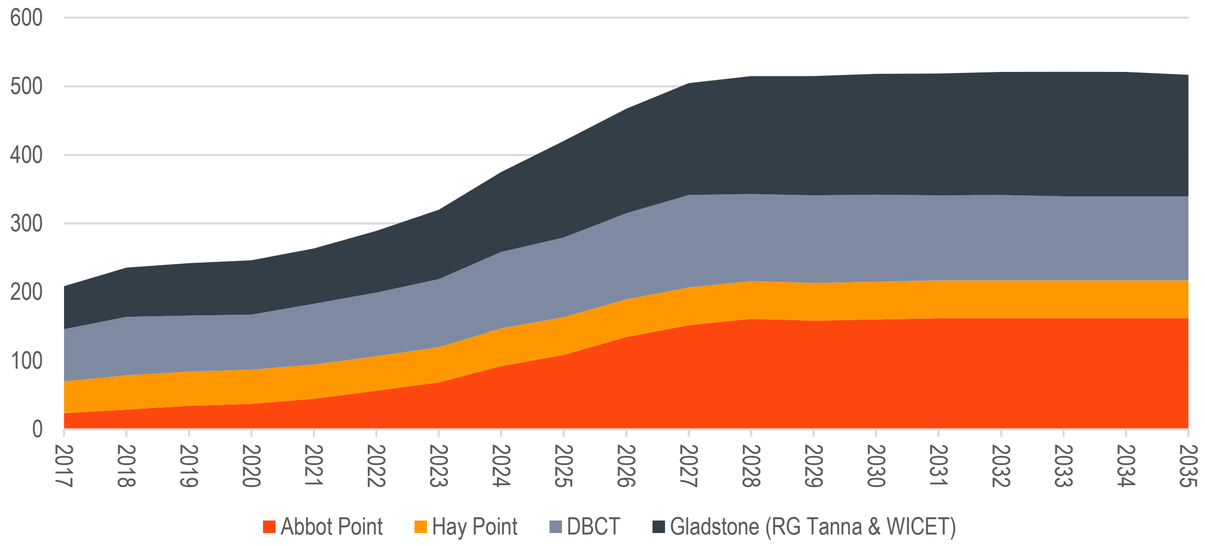


Source: AME

Focusing on the potential of exports out of central Queensland, there are five coal terminals located at three ports, that are used for current exports, and may be expanded to account for future exports. These are the Abbot Point Coal Terminal at the Port of Abbot Point, the Hay Point Coal Terminal and DBCT at the Port of Hay Point, and the RG Tanna Coal Terminal and the Wiggins Island Coal Terminal (WICET) located at the Port of Gladstone. It is expected that the catchment for these terminals will be geographically focussed, with Abbot Point exporting coal from the northern Bowen Basin and Galilee Basin, Hay Point and DBCT exporting coal form the central Bowen Basin, and the Gladstone terminals exporting coal from the southern Bowen Basin and northern Surat Basin. Currently, there are rail links required to be constructed in order for exports from the Galilee Basin and northern Surat Basin to reach their respective ports.

The expansion of exports for thermal coal out of Queensland is expected to be through Gladstone and Abbot Point, as most large thermal projects as located in the Galilee and Surat Basins. Whereas, additional metallurgical coal exports are expected to be through Hay Point and DBCT, as most new metallurgical projects are located in the central Bowen Basin.

Figure 11: Estimated Profile of Queensland Exports by Ports

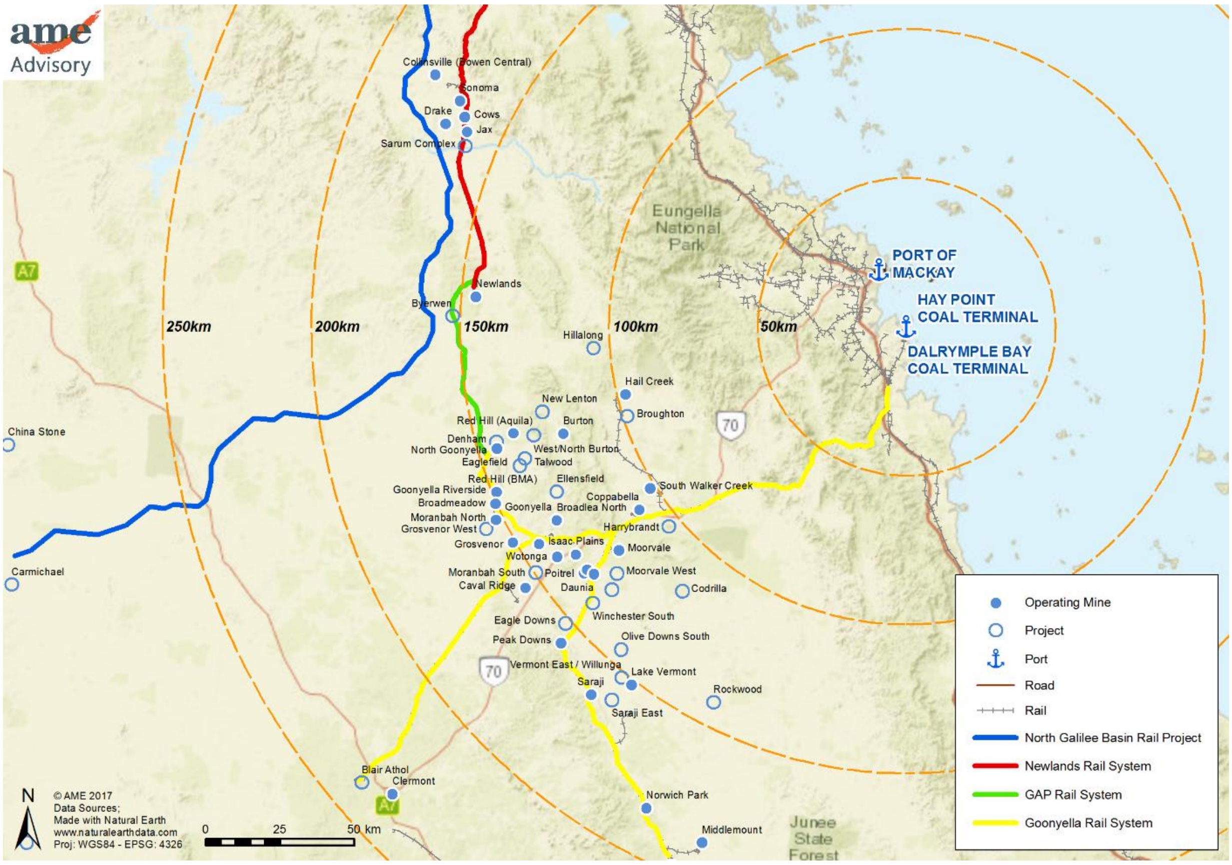


Source: AME

5.0 DBCT Throughput Analysis

DBCT is a multi-user coal export facility located at the Port of Hay Point, approximately 35km south of the city of Mackay in Queensland. The port was established in 1983, and after a series of expansions, currently has an annual capacity of 85Mt. DBCT is the largest terminal coal terminal servicing the Bowen Basin and exported 64.9Mt in 2017, down from 68.5Mt in 2016 due to the impacts of Cyclone Debbie. The terminal currently services a number of mines in the Central Bowen basin area.

Figure 12: DBCT, Rail Network and Nearby Mines



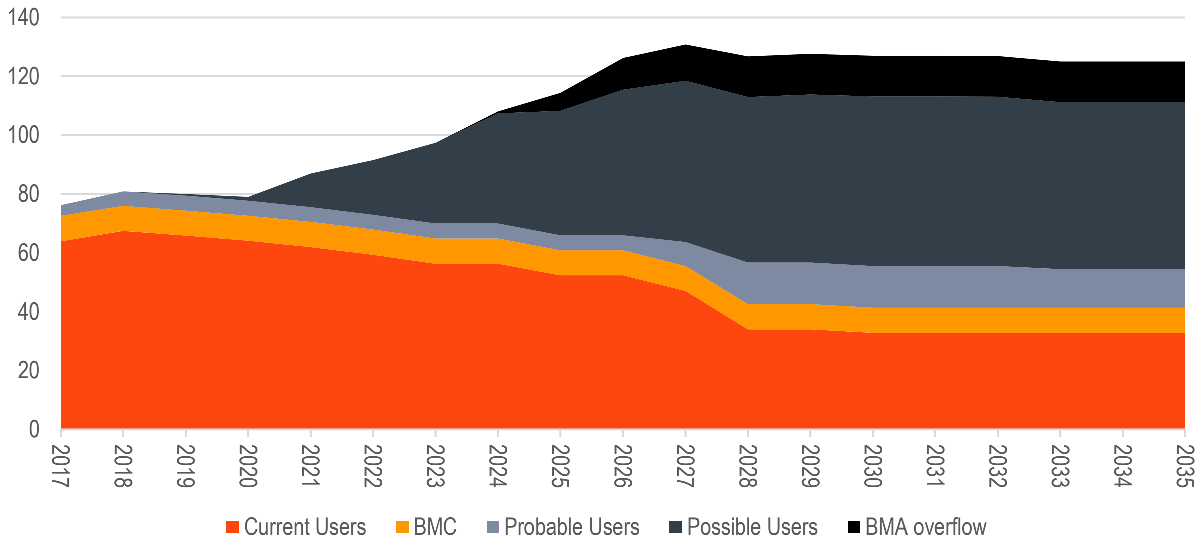
Source: AME

AME's analysis of the mines within the Bowen Basin have identified a number of mines that currently utilise DBCT to export their coal, as well as mines and projects that may utilise the terminal in the future. Due to the various logistics structures, these mines have been placed into four separate categories:

- Current users of DBCT
- BHP Mitsui Coal ("BMC")
- BHP Mitsubishi Alliance ("BMA")
- Potential future users of DBCT

BMC is a current user of DBCT, but also has contracted capacity at the Abbot Point Coal Terminal. However, due to the integrated logistics chains of BMC and BMA, including BMA's own Hay Point Coal Terminal, nominal port capacity is shared amongst all the mines in order to be utilised in the most efficient way. There are other users of DBCT that also utilise capacity at more than one port due to reasons such as blending requirements or the requirements to utilise contracted capacity at other terminals, particularly those mines that are further south and also have the ability to rail coal to the terminals in Gladstone. As a result of these factors, the total production of DBCT users and BMC is greater than current DBCT throughput.

Figure 13: Estimated Production Profile of Actual and Potential DBCT Users



Source: AME

The production profile of the current users of DBCT is expected to peak in 2018, and then slowly decline until 2027, as smaller mines reach the end of their life. However, 2027 is expected to be the last year of operation for the large Clermont mine, which would see the production base of current uses decline by approximately 13Mt over a twelve month period.

Figure 14: Estimated Production Profile of Current Users & BMC

Project	Operator	Status	Export Coal Production (Mt)																		
			2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Capcoal	AngloAmerican	Production	9.7	10.0	7.9	10.2	10.6	7.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Grosvenor	AngloAmerican	Production	2.1	3.7	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Moranbah North	AngloAmerican	Production	6.1	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Carborough Downs	Fitzroy Resources	Production	2.0	2.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Broadlea North	Fitzroy Resources	Production	-	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oaky Creek	Glencore	Production	6.3	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Clermont	GS Coal	Production	12.6	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	-	-	-	-	-	-	-	-
Foxleigh	Middlemount South	Production	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	-	-	-	-	-	-	-	-	-
Coppabella	Peabody Energy	Production	3.6	3.8	4.0	4.0	4.0	4.0	4.0	4.0	-	-	-	-	-	-	-	-	-	-	-
Millennium	Peabody Energy	Production	2.3	2.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moorvale	Peabody Energy	Production	2.4	2.5	2.5	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Goonyella	Peabody Energy	Production	2.7	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Hail Creek	Rio Tinto	Production	9.4	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Isaac Plains	Stanmore Coal	Production	1.1	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	-	-	-	-	-	-
Blair Athol	Terracom	Production	0.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	-	-	-	-	-	-	-	-	-
Poitrel	BHP Mitsui Coal	Production	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
South Walker Creek	BHP Mitsui Coal	Production	5.6	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Total			72.7	76.0	74.4	72.6	70.5	67.9	64.9	64.9	60.9	60.9	55.6	42.6	42.6	41.4	41.4	41.4	41.4	41.4	41.4
DBCT Total			64.7	68.0	66.4	64.6	62.5	61.4	58.4	62.4	58.4	58.4	53.1	40.1	40.1	38.9	38.9	38.9	38.9	38.9	38.9
Gladstone Total			2.5	2.5	2.5	2.5	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Abott Point Total			1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Hay Point Total			4.0	4.0	4.0	4.0	4.0	4.0	4.0												

Source: AME

For future throughput of DBCT, there are several potential sources, which have been placed into two categories. The first category is possible users, which is comprised of mines in the central Bowen Basin who do not currently use DBCT as their primary terminal, and future projects in the central Bowen Basin, for which DBCT is the most likely terminal due to proximity. The two key mines that do not currently utilise DBCT as their primary port are Jellinbah Resources' Lake Vermont mine and Middlemount Coal's Middlemount mine. These mines are within the catchment area of DBCT, however, due to these mines coming into production at a time of little available capacity at DBCT, these tonnages were contracted elsewhere. These two mines currently utilise the Abbot Point Coal Terminal as their primary port with contracts that expire in 2028 and 2027, respectively. There is the potential for these two mines to send their production that is in excess of their current allocation at the Abbot Point Coal Terminal to DBCT to take advantage of shorter rail distances, as well as blending and marketing opportunities.

The second category is BMA overflow, which is comprised of the projected production by the BMA mines in the Goonyella-Hay Point logistics system that would be in excess of the 55Mtpa capacity of BMA's Hay Point Coal Terminal. Without expansion of the Hay Point Coal Terminal, this coal would require capacity through third party port, the most likely of which is DBCT, as the closest terminal and situated adjacent to the BMA terminal, presenting greater marketing synergies than sending coal to other ports.

Figure 15: Estimated Production Profile of Possible and Probable Users of DBCT

Project	Operator	Status	Export Coal Production (Mt)																		
			2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Eagle Downs	Acquila Resources	Construction	-	-	-	-	1.5	3.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Talwood	Acquila Resources	Possible	-	-	-	-	-	-	-	0.5	0.9	2.0	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Moranbah South	AngloAmerican	Possible	-	-	-	-	1.8	5.0	9.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Grosvenor West	Carabella Resources	Possible	-	-	-	-	1.5	2.6	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Ellensfield	Fitzroy Resources	Possible	-	-	-	-	1.7	2.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Lake Vermont	Jellinbah Resources	Production	8.8	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
Middlemount	Middlemount Coal	Production	3.6	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
New Lenton	New Hope Group	Possible	-	-	0.5	1.3	1.3	1.3	1.3	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Codrilla	Peabody Energy	Possible	-	-	-	-	-	-	-	-	0.9	1.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Denham	Peabody Energy	Concept	-	-	-	-	-	-	-	-	0.7	2.9	3.5	4.5	5.5	6.0	6.0	6.0	6.0	6.0	6.0
Moorvale West	Peabody Energy	Possible	-	-	-	-	-	-	0.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
West/North Burton	Peabody Energy	Concept	-	-	-	-	-	-	-	0.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Olive Downs North	Pembroke Resources	Probable	-	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-	-	-
Vermont East / Willunga	Pembroke Resources	Possible	-	-	-	-	-	-	0.6	1.3	2.0	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Winchester South	Rio Tinto	Possible	-	-	-	-	-	-	-	-	-	1.8	3.6	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Hillalong	Shandong Energ	Possible	-	-	-	-	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.6	3.5	2.6	2.6	2.6
Harrybrandt	Yancoal	Possible	-	-	-	-	-	-	-	1.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Total			12.5	13.9	14.6	15.4	25.5	32.7	41.6	51.6	56.4	63.5	68.9	70.4	71.3	71.8	71.8	71.7	69.9	69.8	69.8
DBCT Total			3.5	4.9	5.6	6.4	16.5	23.7	32.6	42.6	47.4	54.5	59.9	64.4	71.3	71.8	71.8	71.7	69.9	69.8	69.8
Gladstone Total																					
Abott Point Total			9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	6.0							

Source: AME

With a number of projects within the catchment area of DBCT planning on commencing production between 2019 and 2025, there is the potential for DBCT to exceed its 85Mt capacity before 2023. If all available coal within the catchment area was shipped through DBCT, throughput could reach a peak of around 130Mt by 2027, which would fall slightly to 125Mt by 2035. With Abbot Point Coal Terminal potentially reaching capacity on the start-up of the Carmichael project, it is most likely that projects within the catchment area will seek to use DBCT.

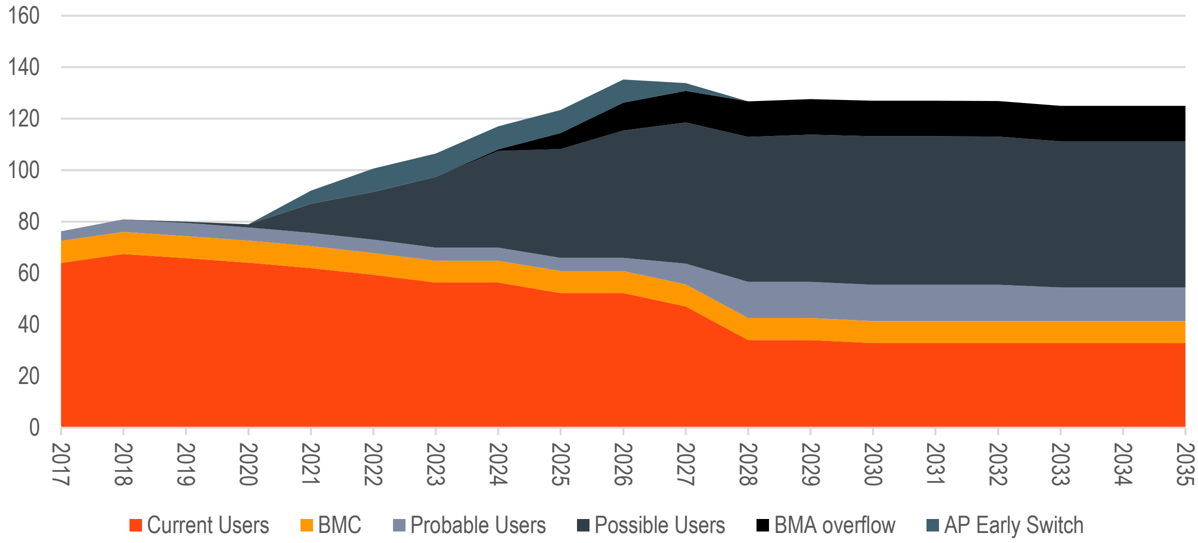
Figure 16: Estimated BMA Production Profile and Hay Point Overflow

Project	Operator	Status	Export Coal Production (Mt)																		
			2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Peak Downs	BHP Mitsubishi	Production	11.6	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Red Hill (BMA)	BHP Mitsubishi	Possible	-	-	-	-	-	0.5	1.4	4.8	8.8	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Saraji	BHP Mitsubishi	Production	9.6	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Saraji East	BHP Mitsubishi	Possible	-	-	-	-	-	-	-	1.0	2.5	4.0	5.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Caval Ridge	BHP Mitsubishi	Production	7.9	7.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Goonyella	BHP Mitsubishi	Production	12.1	16.5	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Daunia	BHP Mitsubishi	Production	5.2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Potential Hay Point Overflow										0.6	6.1	10.8	12.3	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
Total			46.3	50.0	50.3	49.8	49.8	50.3	51.2	55.6	61.1	65.8	67.3	68.8	68.8	68.8	68.8	68.8	68.8	68.8	68.8
DBCT Total										0.6	6.1	10.8	12.3	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
Hay Point Total			46.3	50.0	50.3	49.8	49.8	50.3	51.2	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0

Source: AME

With the planned start-up of the Carmichael Project in 2021, there is the possibility that the Lake Vermont and Middlemount mines may use this opportunity to switch to their natural port of DBCT early by trading their Abbot Point capacity to the Carmichael Project. This would allow these mines to switch their primary capacity to DBCT earlier than expected, which could provide an upside case scenario to the throughput of the port.

Figure 17: Possible DBCT Throughput Upside Scenario



Source: AME