2021 Benchmark Reserve Capacity Price

Cost Escalation Factors

September 2020

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The analysis also assumes that a new Open Cycle Gas Turbine (OCGT) entrant is able to access labour, currency markets, steel and copper at typical market rates. Should the OCGT entrant be able to access rates that are different from the market, the appropriate escalation factors for the entrant may be different to those provided in this report. This report is not intended to provide guidance on the total cost of building a 160 MW OCGT, which is dependent on technical specifications and technological changes that are outside the scope of this engagement.

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Executive summary

Overview

The Australian Energy Market Operator (AEMO) has engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors related to the construction of a 160 MW open cycle gas turbine generation facility. The cost escalation factors cover five consecutive financial years, with the first year being the year ending June 2021. These factors include:

- labour cost escalation factors specific to labour costs for building and maintaining a power plant in the South West Interconnected System
- the exchange rate between the Australian dollar (AUD) and the US dollar (USD)
- steel and copper prices.

The cost escalation factors will be used by AEMO in the development of a Benchmark Reserve Capacity Price (BRCP).

Proposed escalation factors

The proposed escalation factors reflect the dynamics of relevant labour, resources and financial markets, which are affected by both global and macroeconomic factors such as the COVID-19 pandemic, and more specific construction, maintenance and operational trends. They also seek to reflect the impact of global factors on the AUD/USD exchange rate and expected movements in market prices for steel and copper. The table below summarises the cost escalation factors developed by PwC for the 2021 BRCP compared with the 2020 BRCP cost escalation factors.

2019 BRCP Cost Escalation Factors and 2020 BRCP Cost Escalation Factors

Financial year		2020	2021	2022	2023	2024	2025
WPI: EGWWS (%Δ)	2020 CEF	2.46	2.46	2.46	2.46	2.46	-
	2021 CEF	-	1.71	1.96	2.50	2.50	2.50
WPI: Construction (%Δ)	2020 CEF	1.76	1.76	1.76	1.76	1.76	-
	2021 CEF	-	0.77	1.02	1.56	1.56	1.56
AUD/USD ($)	2020 CEF	0.6944	0.7250	0.7375	0.7375	0.7375	-
	2021 CEF	-	0.7375	0.7757	0.7900	0.7900	0.7900
Steel price (%Δ)	2020 CEF	-8.56	-4.15	-2.55	2.61	-0.24	-
	2021 CEF	-	-14.93	-0.06	-0.96	0.64	0.13
Copper price (%Δ)	2020 CEF	3.06	1.36	0.32	4.55	-0.09	-
	2021 CEF	-	-1.12	-2.17	-0.65	3.57	2.98

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1. Project overview

1.1 Background

The Australian Energy Market Operator (AEMO) engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors related to the construction of a 160 MW open cycle gas turbine (OCGT) generation facility. The escalation factors cover five consecutive financial years, with the first year being the year ending June 2021.

The cost escalation factors comprise:

- labour cost escalation factors specific to labour cost for building and maintaining a power plant in the South West Interconnected System (SWIS)
- the exchange rate between the Australian dollar (AUD) and the US dollar (USD)
- steel and copper prices.

The cost escalation factors will be used by AEMO in the development of the Benchmark Reserve Capacity Price (BRCP).

1.2 Approach

In this report we analyse expected price and other market trends, across the relevant cost categories, to develop escalation factors. For each cost category, we have outlined the market trends and key factors which may impact cost component movements.

For the prices of steel and copper, and the AUD/USD exchange rate, we drew on historical price data and a wide variety of forecasts from various investment banks and forecasting institutions. Supplementing this is a high-level analysis of commodity market trends, policy events affecting the AUD/USD rate and economic indicators, both national and global. For labour costs, we analysed the level and trajectory of construction costs separately from operation and maintenance costs, giving consideration to industry-specific trends and Western Australia employment data.

While our forecasts reflect the dynamics of relevant labour, resources and financial markets, which are affected by both global and macroeconomic factors such as the COVID-19 pandemic, our analysis does not extend to providing quantified estimates of the precise impact of COVID-19 on various estimates, nor a ‘with / without’ pandemic scenario. We do not believe it is feasible to seek to distil the specific impact of COVID-19 from other market and macroeconomic factors.

2. Labour

2.1 Data and sources

Consistent with the 2019 and 2020 BRCP cost escalation factors, we based our forecasts on wage price based indices.[1] Our analysis of regulatory determinations indicates that regulators have generally expressed a preference for labour cost escalation factors to be based on long-run historical growth or forecasts of WPI, as opposed to Average Weekly Earnings (AWE) based estimates.

The Australian Energy Regulator's (AER) Expenditure Forecast Assessment Guideline[2] outlines a preference for the use of WPI in assessing expenditure. Recent determinations by the Economic Regulation Authority Western Australia (ERA)[3] and the AER[4] have included WPI-based indices to escalate labour costs.

We developed separate series for construction and operations/maintenance work as the two series measure separate components of the labour force which rely on different skill sets, experience nuanced labour market dynamics, and are subject to different enterprise agreements. In our analysis we considered a range of data set and indices that could form the basis of labour cost escalation specific to building and maintaining a power plant, including:

- ABS Series: 6345.0; Total hourly rates of pay excluding bonuses; Western Australia; Private and Public compensation of employees (WPI – WA)
- ABS Series: 6345.0; Total hourly rates of pay excluding bonuses; Australia; Private and Public; Electricity, Gas, Water and Waste services (EGWWS)
- ABS Series: 6345.0; Total hourly rates of pay excluding bonuses; Australia; Private and Public; Construction (Con.)
- 2019 BRCP labour cost escalation factors (BRCP 19 EGWWS; BRCP 19 Con.)
- 2020 BRCP labour cost escalation factors (BRCP 20 EGWWS; BRCP 20 Con.)

Per the 2020 BRCP cost escalation factors, we selected series which exclude bonuses as these better reflect the underlying cost of labour, rather than the fluctuating aspects of labour impacted by the quantity and quality of work performed.

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[1] PwC (2018), *Estimating the Escalation Factors for the 2019 Benchmark Reserve Capacity Price Final report*, available at: https://www.aemo.com.au/-/media/Files/Electricity/WEM/Reserve_Capacity_Mechanism/BRCP/2019/Supporting-documents/PwC-Report-Estimating-the-Escalation-Factors-for-the-2019-Benchmark-Reserve-Capacity-Price.pdf; PwC (2019), *Estimating the Escalation Factors for the 2020 Benchmark Reserve Capacity Price Final report*, available at: https://aemo.com.au/-/media/files/electricity/wem/reserve_capacity_mechanism/brcp/2020/estimating-the-escalation-factors-for-the-2020-benchmark-reserve-capacity-price-august-2019.pdf

[2] AER (2013), *Explanatory Statement - Expenditure Forecast Assessment Guideline*, available at: https://www.aer.gov.au/system/files/Expenditure%20Forecast%20Assessment%20Guideline%20-%20Explanatory%20Statement%20-%20FINAL.pdf, Page 49; Deloitte (2020), *Labour Price Growth Forecasts - Prepared for the Australian Energy Regulator*, available at: https://www.aer.gov.au/system/files/Deloitte%20Access%20Economics%20-%20Labour%20Price%20Growth%20Forecasts%20prepared%20for%20the%20AER%20-%2020%20March%202020_0.pdf

[3] ERA WA (2018) *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network 2017/18 – 2021/22*, available at: https://www.erawa.com.au/cproot/19496/2/WP%20AA4%20-%20Final%20Decision.PDF

[4] Australian Energy Regulator (2020), *Final Decision - SA Power Networks Distribution Determination 2020 to 2025 - Attachment 6 - Operating expenditure*, available at: https://www.aer.gov.au/system/files/Final%20decision%20-%20SA%20Power%20Networks%20distribution%20determination%202020-25%20-%20Attachment%206%20-%20Operating%20expenditure%20-%20June%202020.pdf

2.2 Market trends

As outlined in Figure 2.1 below, several key measures of employment in Western Australia have declined significantly since the beginning of the COVID-19 pandemic. The unemployment rate in June peaked at 8.7 per cent (its highest level since February 1994) with the labour underutilisation rate hitting its highest level on record (with records beginning in 1978) and the participation rate sinking to its lowest level in 27 years in May.

Figure 2.1: Western Australia employment measures, 2000 to present

Source: ABS[5] & PwC analysis. The dashed line represents the value for the most recent published data point (July 2020)

In previous years we have used forecasts published by the Western Australia Treasury (and the Commonwealth Treasury) as a benchmark for our WPI series. However, the Western Australia Government[6] (and the Australian Government[7]) have delayed their budgets this year.

In the absence of these forecasts we considered estimates produced by the Western Australia Chamber of Commerce and Industry (CCI) and the Reserve Bank of Australia (RBA).[8] As shown in Figure 2.2, the recent forecasts for wage growth differ drastically from the (earlier and more optimistic) outlooks published by the WA Treasury. The CCI estimates suggest it may take wages more than three years to return to FY20 levels (1.7 per cent).

Migration is relevant to both the supply side and demand side of the labour market (particularly as it relates to the construction market).[9] As there is no clear date for when immigration restrictions may be relaxed it is hard to discern the extent to which interrupted immigration may impact the labour market.

Typically immigration restrictions would place upward pressure on wages in some industries. However, in the absence of an improvement in underemployment rates, there is unlikely to be significant upward pressure on wages in the short-term. Labour force underutilisation was persistently high in Western Australia even prior to the COVID-19 pandemic, though has since spiked further upwards (Figure 2.3).

[5] ABS (2020), *Table 8. Labour force status by Sex, Western Australia - Trend, Seasonally adjusted and Original*; *Table 19. Monthly hours worked in all jobs (Extrapolated): by Employed full-time, part-time and Sex and by State and Territory - Trend and Seasonally adjusted; Table 23. Underutilised persons by State and Territory and Sex - Trend, Seasonally adjusted and Original*, *6202.0 - Labour Force, Australia, Jul 2020*, *retrieved August 2020*, available at: https://www.abs.gov.au/ausstats/abs@.nsf/mf/6202.0

[6] Western Australia Government (2020), *Economic And Fiscal Update – 28 May 2020*, available at: https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/4013419a289350df393e80e7482585760033a25e/$file/3419.pdf

[7] The Hon Josh Frydenberg MP (2020), *2020-21 Budget announcement*, available at: https://ministers.treasury.gov.au/ministers/josh-frydenberg-2018/media-releases/2020-21-budget-announcement

[8] Noting that the RBA forecasts reflect Australia wide expectations rather than Western Australia specific expectations

[9] PwC Australia (2020), *Australia Rebooted*, available at: https://www.pwc.com.au/important-problems/australia-rebooted-resetting-economy-after-covid-19/economic-recovery-growth.html

Figure 2.2: Western Australia[10] wage growth estimates

Source: ABS, CCI, RBA, PwC analysis. See Footnote 11

Figure 2.3: Annual wage growth and labour force underutilisation in Western Australia

Source: ABS. See Footnote 12

[10] Per the above footnote, the RBA forecasts reflect Australia wide expectations rather than Western Australia specific expectations

[11] RBA (2020), *Forecast Table – August 2020 – 'Baseline' Scenario*, available at: https://www.rba.gov.au/publications/smp/2020/aug/forecasts.html; Chamber of Commerce and Industry of Western Australia (2020), *Outlook August 2020 - Eye of the Storm,* available at: https://cciwa.com/wp-content/uploads/2020/08/Outlook-Eye-of-the-Storm-August-2020.pdf; Western Australia Government (2019), *State Budget 2019-20 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: https://www.ourstatebudget.wa.gov.au/2019-20/budget-papers/bp3/2019-20-wa-state-budget-bp3.pdf; Western Australia Government (2018) *State Budget 2018-19 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: https://www.ourstatebudget.wa.gov.au/2018-19/budget-papers/bp3/2018-19-wa-state-budget-bp3.pdf; Western Australia Government (2017) *State Budget 2017-18 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: https://www.ourstatebudget.wa.gov.au/2017-18/budget-papers/bp3/2017-18-wa-state-budget-bp3.pdf; Western Australia Government (2016) *State Budget 2016-17 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: https://www.ourstatebudget.wa.gov.au/2016-17/budget-papers/bp3/2016-17-wa-state-budget-bp3.pdf; Western Australia Government (2015) *State Budget 2015-16 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: https://www.ourstatebudget.wa.gov.au/2015-16/budget-papers/bp3/2015-16-wa-state-budget_bp3.pdf

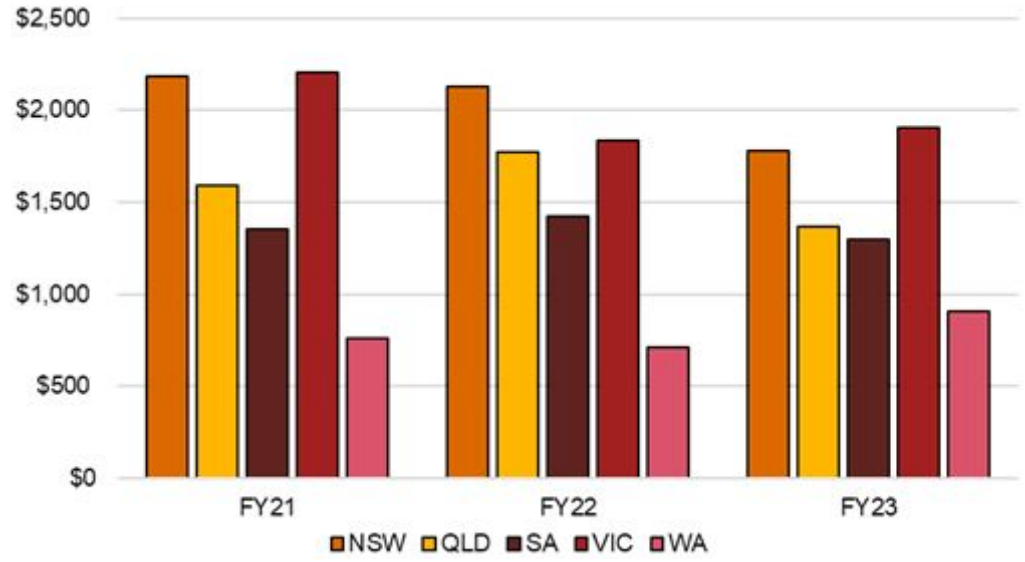
[12] ABS (2020), *Table 2a. Total Hourly Rates of Pay Excluding Bonuses: All Sectors by State, Original (Financial Year Index Numbers for year ended June quarter), 6345.0 - Wage Price Index, Australia, Jun 2020, retrieved August 2020*, available at:

Similarly, Figure 2.3 shows the West Australian construction sector exhibited signs of slowing before much of the impact of the COVID-19 pandemic was felt. Dwelling commencements hit the lowest levels in 23 years in December 2019 (Figure 2.4). In Western Australia the state government has committed considerably lower levels of funding towards infrastructure spending per capita than the other mainland states (Figure 2.5).[13]

Figure 2.4: Western Australia dwelling commencements

Source:Source: ABS[14], PwC analysis.

Figure 2.5: State Government infrastructure expenditure commitments per capita*



https://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/6345.0; ABS (2020), *Table 23. Underutilised persons by State and Territory and Sex - Trend, Seasonally adjusted and Original*, *6202.0 - Labour Force, Australia, Jul 2020*, *retrieved August 2020*

[13] Infrastructure Partnerships Australia (2020), *Committed Government Infrastructure Funding, By Jurisdiction*, available at: https://infrastructure.org.au/chart-group/government-infrastructure-investment/

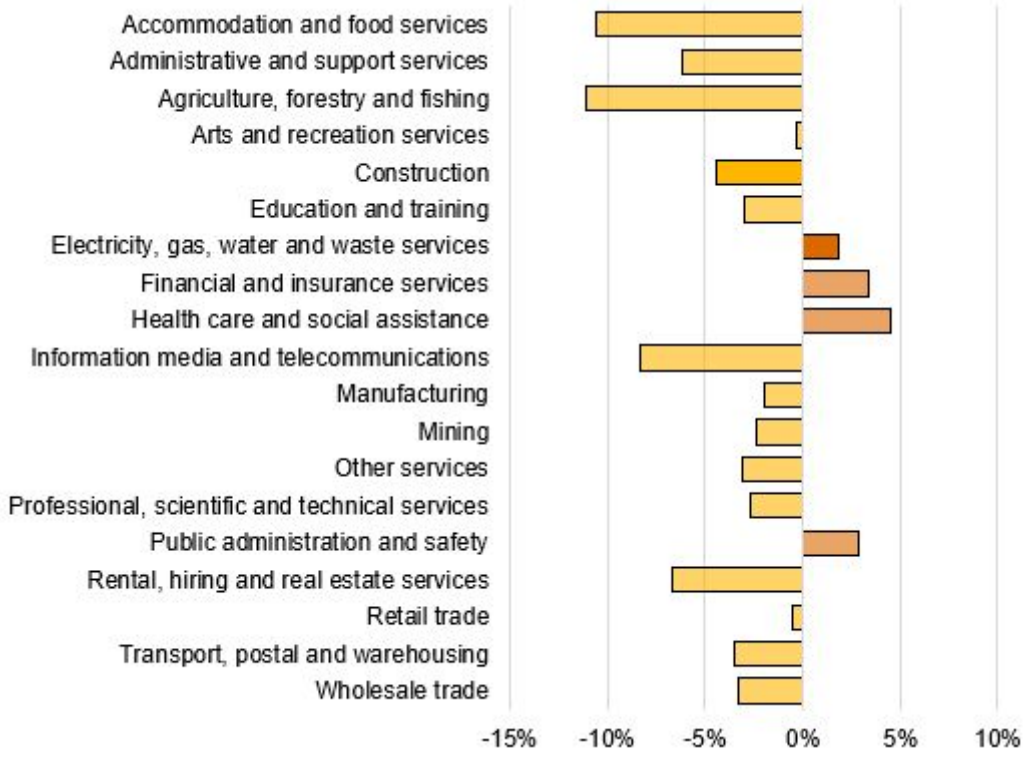
[14] ABS (2020), *Table 34. Number of Dwelling Unit Commencements by Sector, States and Territories*, *8752.0 - Building Activity, Australia, Mar 2020*, *retrieved August 2020*, available at: https://www.abs.gov.au/ausstats/abs@.nsf/mf/6202.0

Source: Infrastructure Partnerships Australia[15] & PwC analysis. Assuming static population figures as at 31 December 2019.[16]

There ar, however, reasons for optimism within the construction sector. In June the Western Australia Government announced a 'building bonus grant'[17] with the aim of driving construction activity. The Australian Government has separately announced a 'homebuilder' program.[18] These initiatives come as the RBA Governor is urging state governments to increase spending on infrastructure.[19]

In previous years we have used the Energy, Gas, Water and Waste Services (EGWWS) industry as the basis for our estimates of the labour cost of operations/maintenance work related to the operation of a power station. The EGWWS industry is relatively less cyclical than the construction industry; in the short term this should provide some level of protection to employment and wage figures in the industry. In fact, weekly payroll data published by the ABS[20] shows an increase in the number of jobs in the EGWWS sector in Western Australia since March 14 (the date in which Australia recorded its 100th case of COVID-19).

Figure 2.6: Change in employment by industry in Western Australia (March to August)



Source: ABS.[21]

[15] Infrastructure Partnerships Australia (2020), *Committed Government Infrastructure Funding, By Jurisdiction*
[16] ABS (2020), *Table 4. Estimated Resident Population, States and Territories (Number)*, *3101.0 - Australian Demographic Statistics, Dec 2019*, *retrieved August 2020*, available at: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202019?OpenDocument
[17] Western Australia Government (2020), *Building Bonus Grants*, available at: https://www.wa.gov.au/government/announcements/building-bonus-grants
[18] Commonwealth Treasury (2020), *Economic Response to the Coronavirus - Homebuilder*, available at: https://treasury.gov.au/coronavirus/homebuilder
[19] Sydney Morning Herald (2020), *Call for states to act fast on infrastructure splurge*, available at: https://www.smh.com.au/politics/federal/call-for-states-to-act-fast-on-infrastructure-splurge-20200823-p55ogv.html
[20] Reflecting 'experimental estimates' for the intended for use in assessing the impact of COVID-19 on the labour market.
[21] ABS (2020), *Table 2. 6160.0.55.001 - Weekly Payroll Jobs and Wages in Australia, Week ending 8 August 2020*, *retrieved August 2020*, available at: https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6160.0.55.001Week%20ending%208%20August%202020?OpenDocument

Last year we recommended adopting the values in Table 2.1. We recommended the WPI-EGWWS series be used for labour costs specific to the operation and maintenance of the power plant, and the WPI-Con. series be used for the construction of the power plant. These estimates applied the average wage growth for each sector for the preceding five years.

Table 2.1: 2020 BRCP recommended labour cost escalation

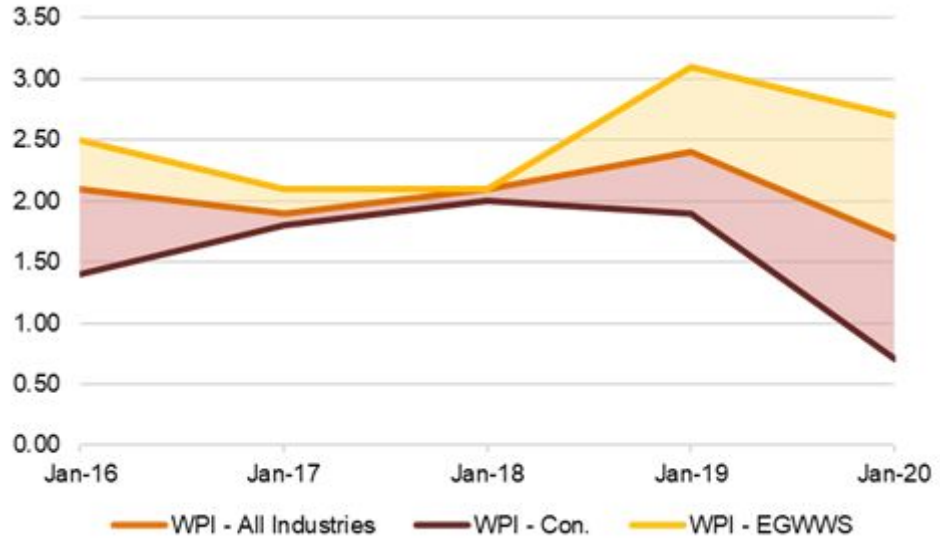
Financial year	2020	2021	2022	2023	2024
WPI - EGWWS (%Δ)	2.46%	2.46%	2.46%	2.46%	2.46%
WPI - Con. (%Δ)	1.76%	1.76%	1.76%	1.76%	1.76%

Source: PwC analysis

To capture the impact of COVID-19 on the labour market we have altered our methodology for the first two years of the forecast period (being the years commencing 1 July 2020 and 1 July 2021). We take the view that applying an average of historical wage growth over this period would not accurately capture the unique labour market conditions anticipated for that period

As one of the few wage growth forecasts issued since the emergence of the pandemic, we have used the RBA forecasts for the first two years of the forecast period[22] and then applied an industry specific delta (based on average wage growth over the past five years).[23]

Figure 2.7: Industry-specific wage growth (2016-2020)



Source: ABS & PwC analysis

[22] RBA (2020), *Forecast Table – August 2020 – 'Baseline' Scenario*

[23] This approach is similar to the approaches used/accepted by the ERA and AER in calculating industry-specific wage growth forecasts: ERA WA (2018) *Final Decision on Proposed Revisions to the Access Arrangement for the Western Power Network 2017/18 – 2021/22*; Deloitte (2020), *Labour Price Growth Forecasts - Prepared for the Australian Energy Regulator*

Over the past five years average wage growth in the EGWWS industry has outstripped wage growth across all industries by 0.46% (represented by the yellow shaded area) while workers in the construction industry have faced a wage growth gap of 0.48% relative to workers across all industries (represented by the shaded purple area). Table 2.4 applies these factors to the wage growth rates forecast by the RBA.

Table 2.4: Labour cost calculations

Financial year	2021	2022
RBA	1.25%	1.50%
EGWWS Δ	+0.46%	+0.46%
WPI - EGWWS estimate	1.71%	1.96%
Con. Δ	-0.48%	-0.48%
WPI - Con. (%Δ)	0.77%	1.02%

Source: PwC analysis

We have applied the methodology used to estimate the 2020 BRCP cost escalation factors (being the average wage growth across each industry over a five year period) for the final three years of the forecast period.

2.3 Labour cost projections

We recommend adopting the **WPI-EGWWS** series below for labour costs specific to the operation and maintenance of the power plant, and the **WPI-Con.** series below for the construction of the power plant. These projections represent a reduction in forecast wage growth in 2021 and 2022 relative to the 2020 BRCP cost escalation factors reflecting the ongoing economic uncertainty.

Our labour cost projection for operation and maintenance sits above the wage growth forecasts published by the RBA while our construction projection sits below. This reflects the relative performances of both industries prior to the pandemic as well as the current outlook for both industries.

The following labour cost escalators are proposed for the five year period:

Table 2.5: Labour cost projections

Financial year	2021	2022	2023	2024	2025
WPI - EGWWS (%Δ)	1.71%	1.96%	2.50%	2.50%	2.50%
WPI - Con. (%Δ)	0.77%	1.02%	1.56%	1.56%	1.56%

Source: PwC analysis

3. AUD/USD exchange rate

3.1 Data and sources

There are a range of data sets and indices that could form the basis of AUD/USD exchange rate projections. In our analysis, we have considered historical AUD/USD exchange rate data[24] as well exchange rate forecasts published by government bodies and other reputable sources.[25]

3.2 Market trends

The value of the AUD against the USD has shifted significantly since our previous report, collapsing to an 18 year low of $0.56 in March before recovering to a value of approximately $0.73 (as at the time of publication).

Figure 3.1: AUD/USD exchange rate (Jul 19 - Aug 20)

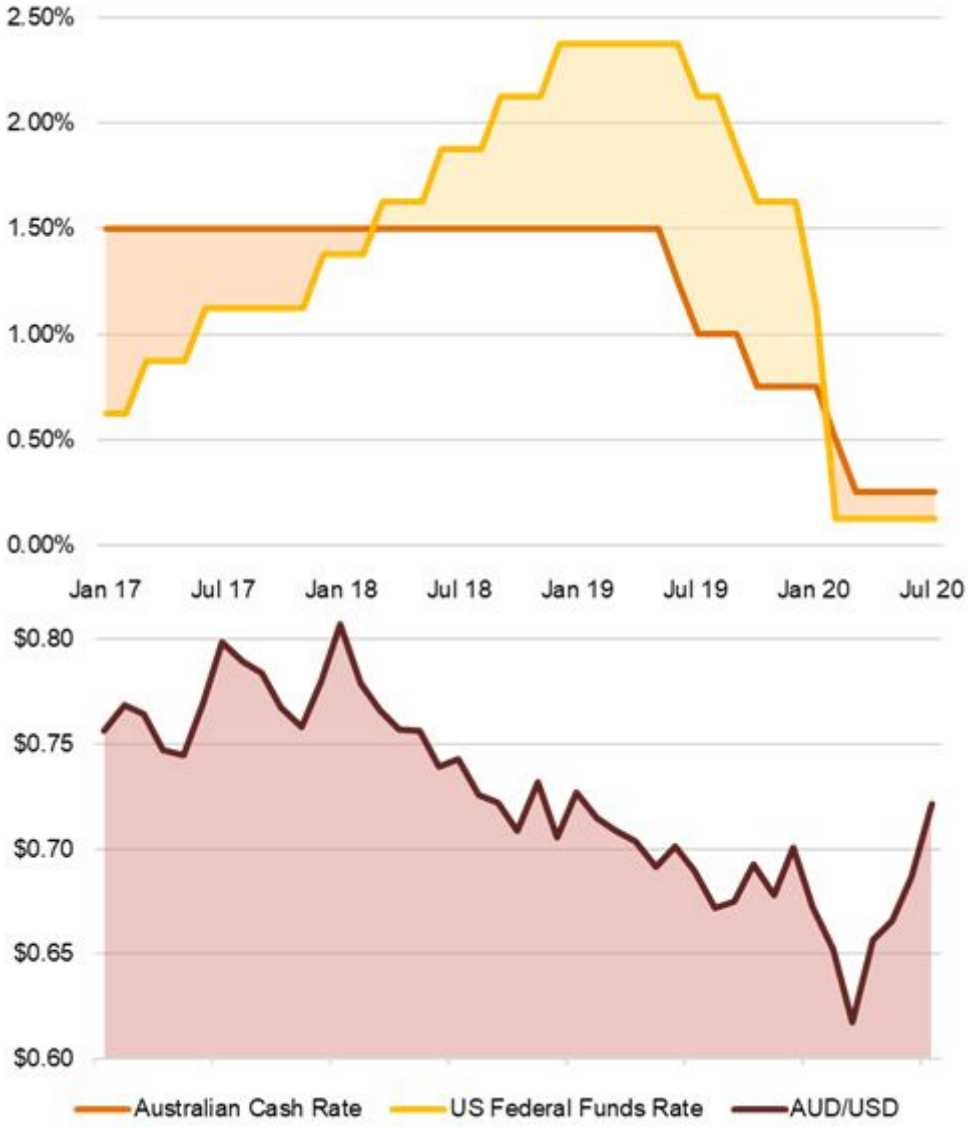
Source: RBA.[26] Note the AUD/USD values represent daily values.

The appreciation of the AUD reflects the relative success of Australia in handling the COVID-19 pandemic and the resilience of Australian commodity exports. However, the ongoing trade dispute between Australia and China (and the US and China), discussed more in-depth below, presents a downside risk for the value of the AUD. Commodities have largely been excluded from Chinese trade measures against Australia to date. It is not clear to what extent the November US election may prompt a shift in policy settings and investor sentiment.

[24] Reserve Bank of Australia (2020), *Historical Data,* available at: https://www.rba.gov.au/statistics/historical-data.html
[25] Australian Dollar/US Dollar Exchange Rate data, accessed on the Bloomberg Terminal August 2020
[26] RBA (2020), *Exchange Rates – Daily - 2018 to Current – F11.1, Statistical Tables*, *retrieved August 2020*, available at: https://www.rba.gov.au/statistics/tables/

The depreciation, and subsequent appreciation, of the AUD has also been driven in part by the relativity of the Australian Cash Rate and the US Federal Funds Rate. As interest rates are indicative of financial returns available, they are an important determinant of capital flows and hence the demand for the currency to which they are tied. As the differential grows (or shrinks), the AUD becomes less (or more) attractive relative to the USD, leading to depreciation (or appreciation).

Figure 3.2: Australian Cash Rate, US Federal Funds Rate[27] and AUD/USD



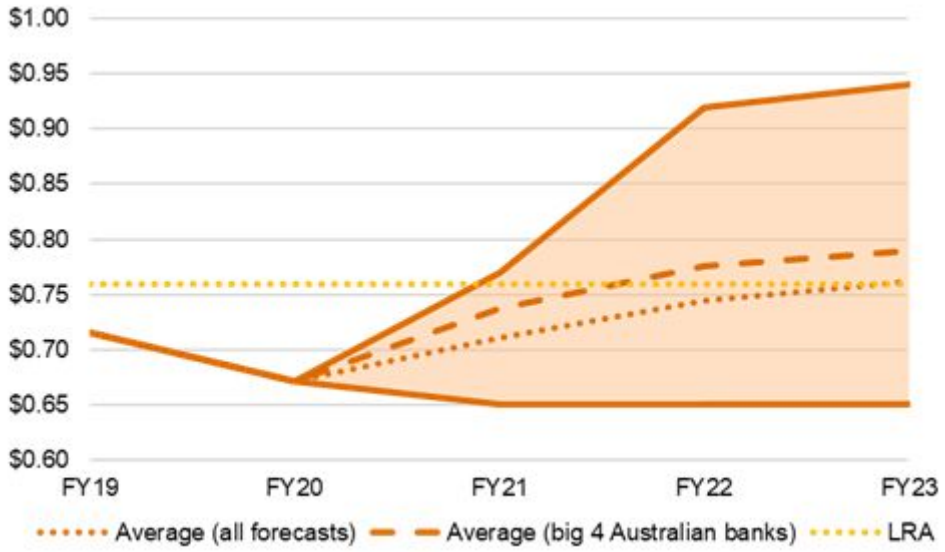
Source: Federal Reserve,[28] RBA[29] & PwC analysis. Note the AUD/USD values represent month-end values.

[27] Midpoint of the target range
[28] Federal Reserve (2020), *Policy Tools - Open Market Operations*, available at: https://www.federalreserve.gov/monetarypolicy/openmarket.htm
[29] RBA (2020), *Exchange Rates – Historical – Daily and Monthly – F11, Statistical Tables*, *retrieved August 2020*, available at: https://www.rba.gov.au/statistics/tables/

Current investor sentiment suggests the Australian cash rate will continue to remain above the US Federal Funds rate over the short-to-medium term. Public statements released by the RBA suggest the RBA is not actively considering negative interest rates and that the current cash rate of 0.25 per cent represents a 'lower bound'.[30] The recent shift in the Federal Reserve's approach to inflation and unemployment indicates a continuation of the current accommodative monetary policy settings and increasing the likelihood of prolonged near-zero rates in the US. A significant uplift in either the cash rate or federal funds rate in the short-term is unlikely.

Based on the relativity of the Australian cash rate and the US Federal Funds rate and resilient demand for Australian iron ore and gold, analysts are largely forecasting a continued appreciation of the AUD over the forecast period. The average of the institutional forecasts compiled on the Bloomberg Terminal across July and August for FY23 ($0.7619) is largely in-line with the long-run average of the AUD since it was floated ($0.7590). The average of the forecasts published by the big 4 Australian banks is slightly higher reflecting bullish forecasts by Westpac and the Commonwealth Bank which see the AUD exceeding $US0.80.

Figure 3.3: AUD/USD analyst forecasts



Source: Bloomberg Terminal,[31] RBA[32] & PwC analysis. Note the AUD/USD values represent annual averages.

[30] RBA (2020), *Statement on Monetary Policy - August 2020*, available at: https://www.rba.gov.au/publications/smp/2020/aug/pdf/statement-on-monetary-policy-2020-08.pdf, Page 5; RBA (2020), *Minutes of the Monetary Policy Meeting of the Reserve Bank Board - July 2020*, available at: https://www.rba.gov.au/monetary-policy/rba-board-minutes/2020/2020-07-07.html; RBA (2019), *Speech - Unconventional Monetary Policy: Some Lessons From Overseas*, available at: https://www.rba.gov.au/speeches/2019/sp-gov-2019-11-26.html

[31] Federal Reserve (2020), *Policy Tools - Open Market Operations*, available at: https://www.federalreserve.gov/monetarypolicy/openmarket.htm

[32] RBA (2020), *Exchange Rates – Historical – Daily and Monthly – F11, Statistical Tables*, *retrieved August 2020*, available at: https://www.rba.gov.au/statistics/tables/

3.3 AUD/USD exchange rate projections

Consistent with our approach last year, we recommend applying the average of the most recent forecasts published by the big 4 Australian Banks for FY21 to FY23, before holding the exchange rate constant for the remainder of the forecast period.

Recent forecasts published by analysts suggest the value of the AUD will largely continue its current upward trajectory. This is predicated on the relative strength of Australian exports and efforts to suppress the economic and health impacts associated with the pandemic to date. An escalation of the ongoing trade dispute with China or subsequent setbacks in the containment of COVID-19 present significant downside risks for the AUD, though.

The following exchange rates are proposed for the five year period:

Table 3.1: AUD/USD exchange rate projections

Financial year	2021	2022	2023	2024	2025
AUD/USD	0.7375	0.7757	0.7900	0.7900	0.7900

Source: PwC analysis

4. Steel and copper

4.1 Data and sources

There are a range of data sets and indices that could form the basis of steel price escalation. In our analysis, we considered global historical and forecast spot price data for different categories of steel from reputable sources including Bloomberg, Consensus Economics and IHS Markit.

Consistent with the 2019 and 2020 cost escalation factor estimates, we have used hot rolled coil (HRC) steel as the basis of our steel price escalation. We consider HRC steel a robust indicator for the price of the different types of steel used in power plant construction. We have again used the world copper LME spot price as the basis of our copper price analysis.

4.2 Market trends

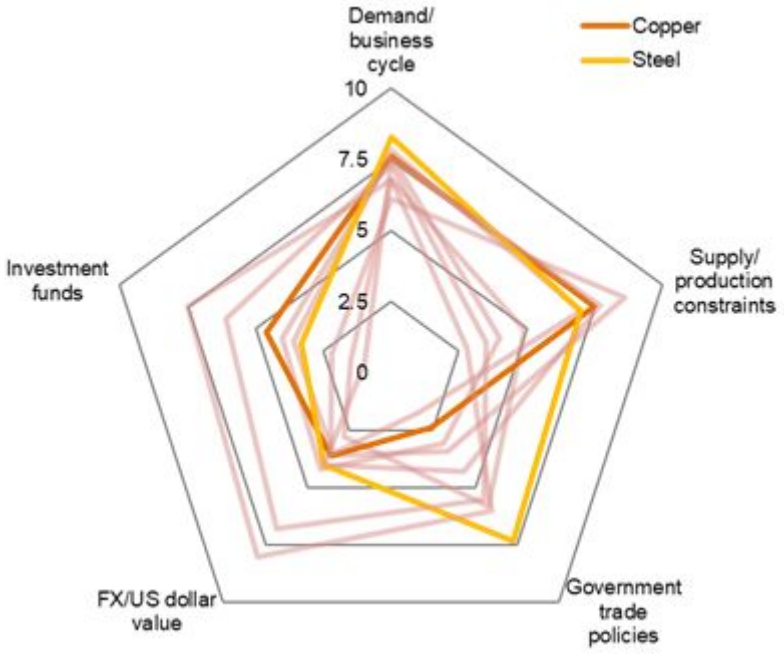
Steel and copper prices have fluctuated significantly in recent years. Figure 4.2, compiled based on a survey of energy and metals analysts published by Consensus Economics,[33] shows the key determinants of the price of steel and copper (relative to other commodities including crude oil, coal and gold). The majority of steel and copper consumption is related to building/construction, infrastructure and automotive/transport[34] - each of which are generally tied to broader business cycles. The steel industry has been particularly impacted by tariffs with the US, the European Union, China and Australia among those imposing tariffs.[35]

Figure 4.1 Percentage change from corresponding quarter of previous year (nominal USD per metric tonne)

Source: IHS Markit & PwC analysis. Note the steel price reflects the average of Chinese, European and US hot rolled coil steel.

[33] Consensus Economics (2020), *Energy & Metals Consensus Forecasts - August*
[34] Office of the Chief Economist, Department of Industry, Science, Energy and Resources (2020), *Resources and Energy Quarterly*, available at: https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2020/documents/Resources-and-Energy-Quarterly-June-2020.pdf, Pages 26 and 117
[35] New York Times (2020), *Trump Expands Steel Tariffs, Saying They Are Short of Aim*, available at: https://www.nytimes.com/2020/01/27/business/economy/trump-steel-tariffs.html; Deutsche Welle (2019), *EU claims new steel tariffs 'working well'*, available at: https://www.dw.com/en/eu-claims-new-steel-tariffs-working-well/a-50026833

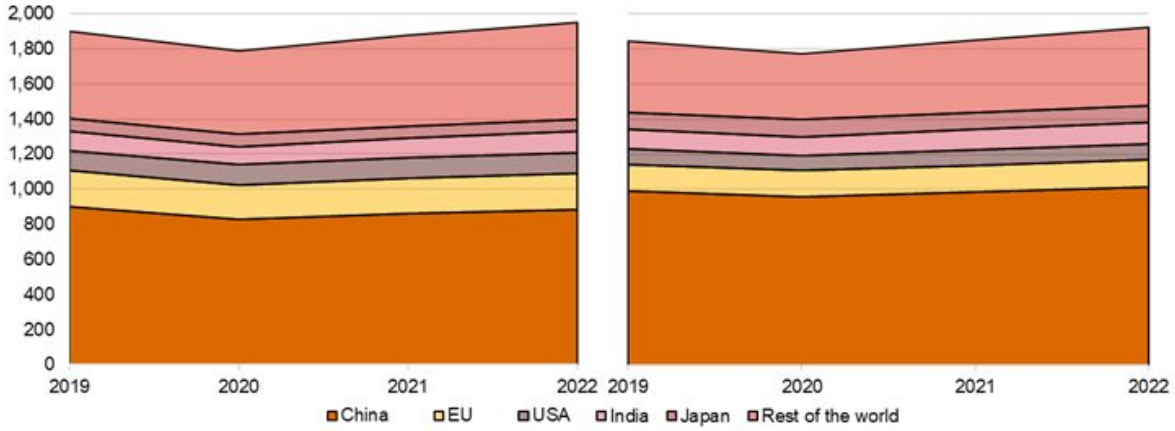
Figure 4.2: Select commodity price drivers



Source: Consensus Economics[36] & PwC analysis

Both steel and copper are inherently linked to the Chinese economy. As outlined in Figure 4.3, China is by far the largest producer and consumer of steel. China produces more steel than it consumes, this is a key point of trade tensions. Many nations have accused China of 'dumping' its steel.[37] Global excess supply will limit any significant pricing increases over the forecast period, though this downwards pressure on price may lead to localised increases in price (as displayed in Figure 4.4 across Europe and the US) as a result of protective measures (eg the imposition of tariffs and retaliatory tariffs) and producers exiting the market.

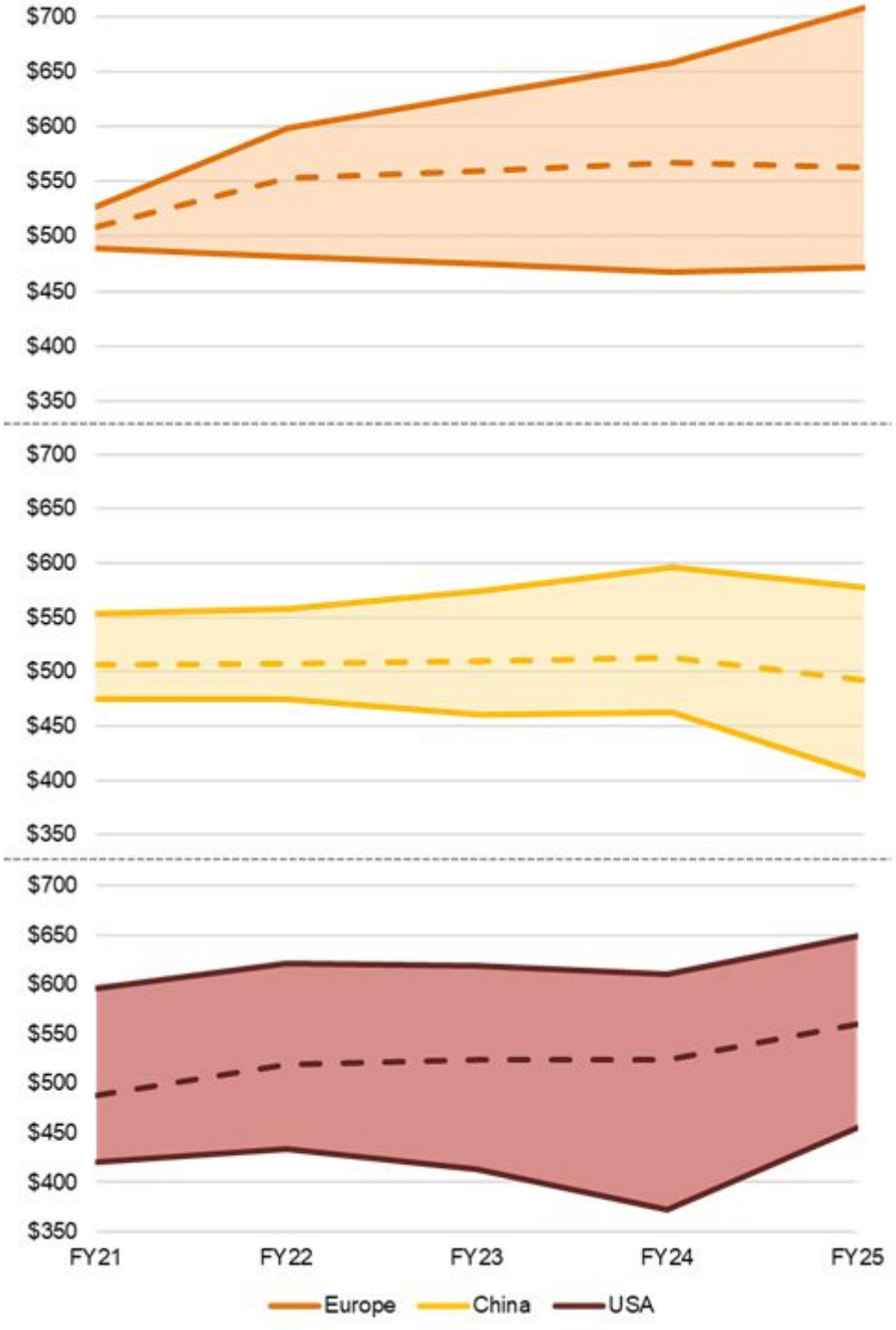
Figure 4.3: Steel production (LHS) and consumption (RHS) (million tonnes)



Source: Department of Industry, Innovation and Science[38], PwC analysis. Values for 2020, 2021 and 2022 represent forecasts.

[36] Consensus Economics (2020), *Energy & Metals Consensus Forecasts - August*
[37] New York Times (2020), *Trump Expands Steel Tariffs, Saying They Are Short of Aim*, available at: https://www.nytimes.com/2020/01/27/business/economy/trump-steel-tariffs.htm
[38] Office of the Chief Economist, Department of Industry, Science, Energy and Resources (2020), *Resources and Energy Quarterly*

Figure 4.4: HRC steel spot price projections (nominal USD per metric tonne[39])

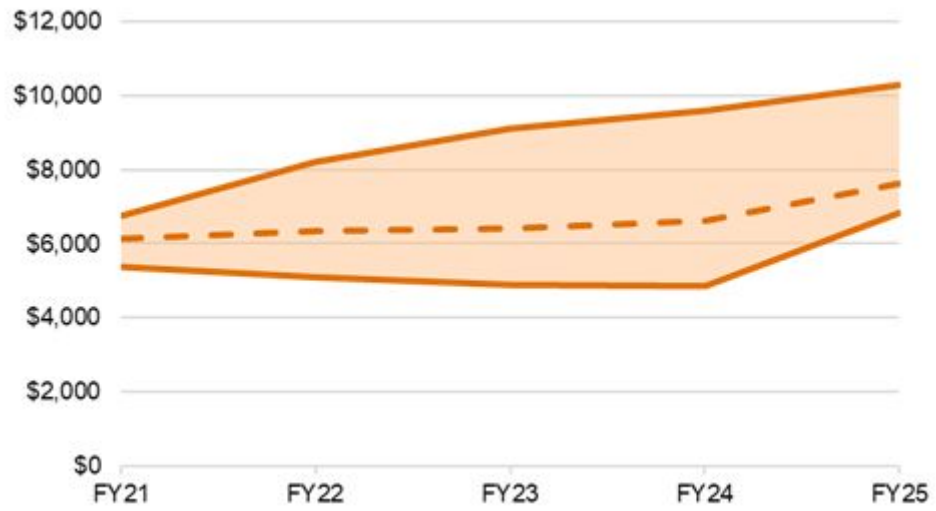


Source: Consensus Economics & PwC analysis. Note the dotted lines reflect the midpoint of the analyst forecasts.

[39] As US steel prices are reported in short tonnes, we have applied a multiplier of 0.9072 to calculate a metric tonne equivalent

China is similarly the largest consumer of copper, though its production capacity pales in comparison to Chile. The dual demand and supply side impacts of COVID-19 and continued industrial action in Chile[40] have led to significant fluctuations in the price of copper throughout 2020. Forecasters note the global copper supply deficit may be exacerbated by government stimulus programs globally. Over the longer term, actions designed to mitigate the threat of climate change pose a risk to copper supply levels. Combined these factors suggest copper prices will increase over the forecast period.

Figure 4.5: Copper spot price projections (nominal USD per metric tonne)



Source: Consensus Economics, PwC analysis. Note the dotted lines reflect the midpoint of the analyst forecasts.

4.3 Steel and copper price projections

The approaches used in our steel and copper price projections are consistent with the 2019 and 2020 BRCP cost escalation factors - being the average of compiled institutional spot price forecasts. For steel we recommend adopting the average of the forecast Chinese, European, and US HRC steel spot prices. Using this average minimises the impact of country-specific supply and demand events on steel prices. We consider this granular view of steel forecasts by source market (Chinese, European and the US) as important as a new OCGT entrant may source its steel from any one or combination of these markets.

The steel and copper prices below have been converted from USD to AUD using the exchange rate projections in Table 3.1. As can be seen in the tables below, a significant portion of the forecast changes in steel and copper prices have been driven by fluctuations in the AUD/USD exchange rate rather than fundamental market demand and supply factors.

[40] Reuters (2020), *Workers at Antofagasta's Centinela copper mine in Chile vote to strike: union*, available at: https://www.reuters.com/article/us-chile-copper-antofagasta/workers-at-antofagastas-centinela-copper-mine-in-chile-vote-to-strike-union-idUSKCN24E2OJ

The following steel and copper prices are projected for the five year period:

Table 4.1: Steel price (per metric tonne) projections

Financial year	2021	2022	2023	2024	2025
Steel price (USD)	501	527	531	535	535
Steel price (%Δ)	-6.57[41]	5.12	0.86	0.64	0.13
AUD/USD	0.7375	0.7757	0.7900	0.7900	0.7900
Steel price (AUD)	679	754	735	753	752
Steel price (%Δ)	-14.93[38]	-0.06	-0.96	0.64	0.13

Source: PwC analysis

Table 4.2: Copper price (per metric tonne) projections

Financial year	2021	2022	2023	2024	2025
Copper price (USD)	6,153	6,324	6,429	6,631	6,833
Copper price (%Δ)	8.60[38]	2.90	1.18	3.57	11.25
AUD/USD	0.7375	0.7757	0.7900	0.7900	0.7900
Copper price (AUD)	8,344	8,163	8,110	8,399	8,649
Copper price (%Δ)	-1.12[38]	-2.17	-0.65	3.57	2.98

Source: PwC analysis

[41] Against the average FY20 price