

2023 Benchmark Reserve Capacity Price

Cost Escalation Factors

December 2022



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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

The Economic Regulation Authority engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors related to the proposed 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 2023 and will be used by ERA in the development of a Benchmark Reserve Capacity Price (BRCP) for the 2025-26 capacity year. These cost escalation factors include:

- labour cost escalation factors specific to labour costs 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 proposed cost escalation factors reflect the dynamics of the relevant labour, financial and resources markets, and are affected by both macroeconomic factors and global events such as the COVID-19 pandemic and ongoing geopolitical tensions impacting supply chains and commodity markets.

For labour costs, PwC analysed the level and trajectory of construction costs separately from operation and maintenance costs, giving consideration to Western Australian and industry-specific trends. For the AUD/USD exchange rate and the change in the prices of steel and copper, PwC drew on historical price data and a range of forecasts from various investment banks and forecasting institutions, supplemented by a high-level analysis of commodity market trends, policy events and economic indicators.

The table below summarises the resultant cost escalation factors developed by PwC for the 2023 BRCP compared with the 2022 BRCP cost escalation factors.

2022 and 2023 BRCP Cost Escalation Factors (CEF) by financial year

		2022	2023	2024	2025	2026	2027
Operations and Maintenance Labour Costs (% Δ)	2022 CEF	2.45	2.45	2.70	2.70	2.42	-
	2023 CEF	-	2.81	3.06	3.06	3.06	2.95
Construction Labour Costs (% Δ)	2022 CEF	2.01	2.01	2.26	2.26	1.98	-
	2023 CEF	-	2.65	2.90	2.90	2.90	2.79
AUD/USD (\$)	2022 CEF	0.7700	0.7863	0.7663	0.7663	0.7663	-
	2023 CEF	-	0.7030	0.7517	0.7692	0.7692	0.7692
Steel price (% Δ)	2022 CEF	20.70	-27.97	-10.21	-6.98	-2.79	-
	2023 CEF	-	-43.82	-10.63	-4.17	-2.26	-3.12
Copper price (% Δ)	2022 CEF	4.40	-8.61	-1.61	3.84	2.34	-
	2023 CEF	-	-23.14	-3.13	2.44	2.20	0.18

Note these cost escalation factors reflect year-on-year movements (i.e. the 2023 value for each series reflects the percentage change from the 2022 value, with the exception of the exchange rate which reflects the absolute value). Each factor should be applied in a consistent manner with their development - an index is a measure of the relative change from a base value at a point in time, to a reference value at a different point in time. The application of that index parameter needs to be consistent with the way the base value is determined.

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1 Project overview

1.1 Background

The Economic Regulation Authority (ERA) engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors related to the proposed 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 2023.

The cost escalation factors comprise:

- labour cost escalation factors specific to labour costs 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 ERA in the development of a Benchmark Reserve Capacity Price (BRCP) for the 2025-26 capacity year.

1.2 Approach

For labour costs, PwC analysed the level and trajectory of construction costs separately from operation and maintenance costs reflecting the different skill sets and nuanced labour market conditions of the two sectors.

Projections for the AUD/USD exchange rate and the prices of steel and copper (converted from USD to AUD) are based on historical price data and a range of forecasts from various investment banks and forecasting institutions. This analysis was supplemented with a high-level analysis of commodity market trends, policy events and economic indicators, both national and global.

While our forecasts reflect the dynamics of the relevant labour, resources and financial markets, which are affected by both macroeconomic factors and global events (for example, the COVID-19 pandemic and the Russian invasion of Ukraine), PwC's analysis does not extend to providing quantified estimates of the precise impact of these events on specific estimates. PwC does not believe it is feasible to seek to isolate the specific impact of these events from other market and macroeconomic factors.

2 Labour

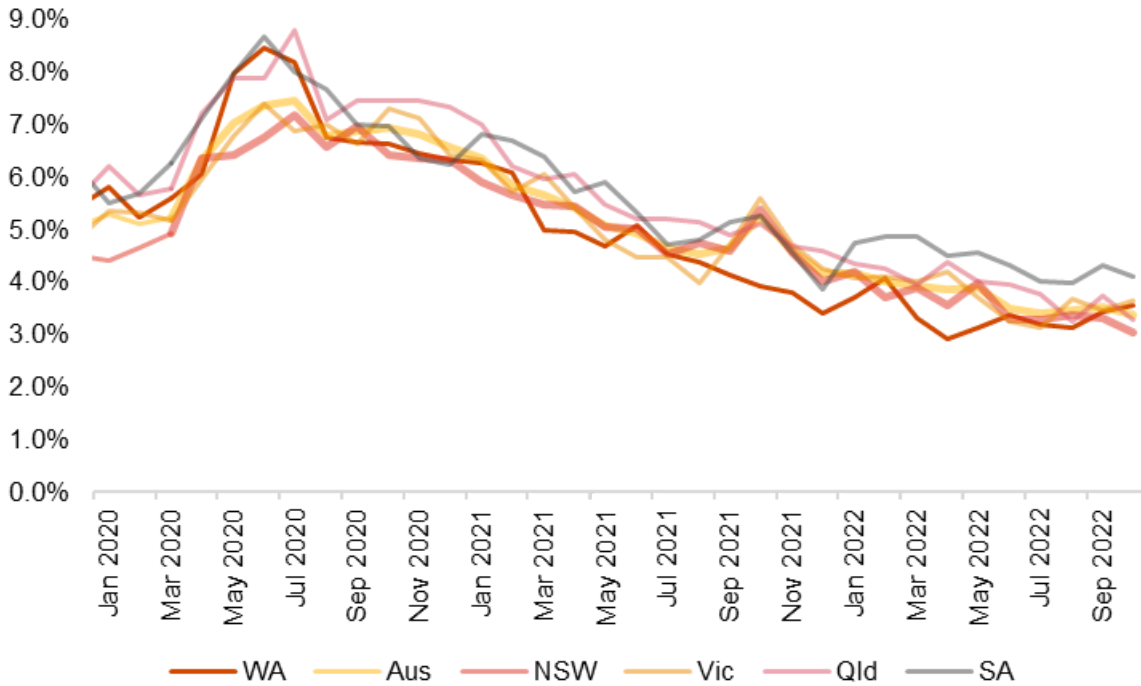
2.1 Market trends

As outlined in Figures 1 and 2, the Western Australian labour market has tightened significantly since. The unemployment rate declined to 2.9 per cent in April, its lowest level since 2008, while the participation rate reached its highest recorded level¹ in February 2022 at 70.0 per cent.² The labour market in Western Australia has recovered from the initial shock of the COVID-19 pandemic with 83,000 more people in employment in June 2022 than in February 2020 (pre-pandemic).

¹ With statistics dating back to February 1978.

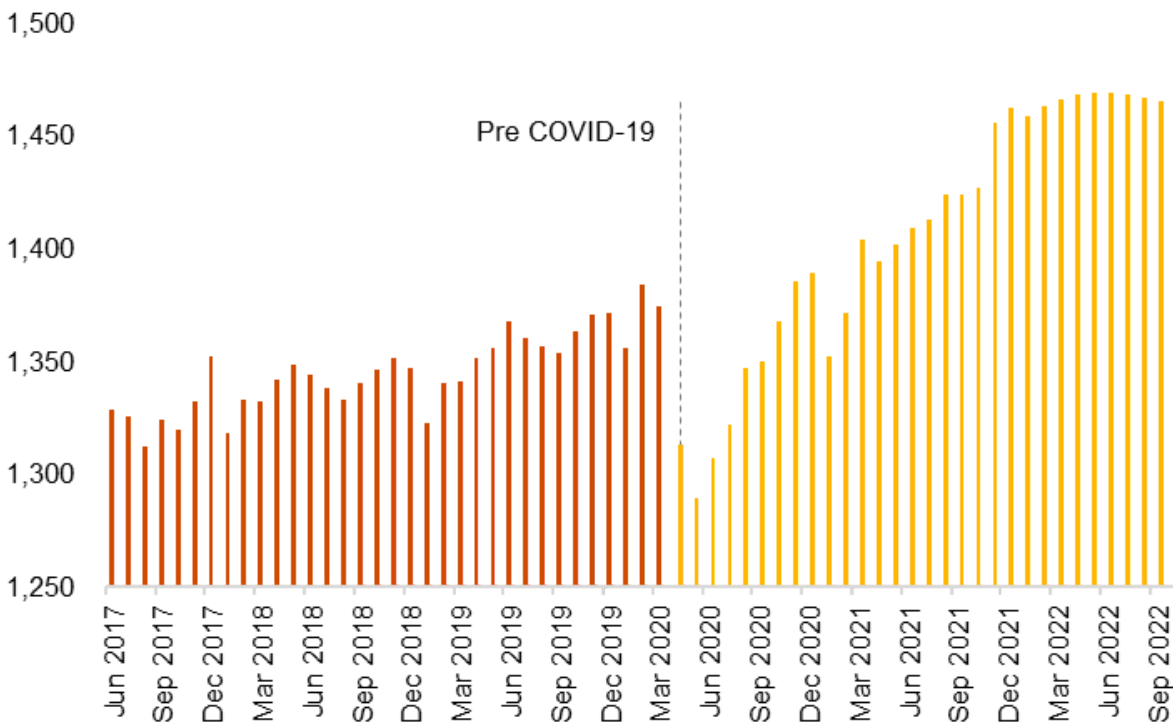
² Note both the Western Australia unemployment rate and participation rate have since declined slightly with the seasonally adjusted rates sitting at 3.6 per cent and 68.8 per cent respectively as of October 2022.

Figure 1: Unemployment rate, mainland states (% , seasonally adjusted)



Source: ABS³

Figure 2: Monthly employment, Western Australia ('000s persons)



Source: ABS⁴

The 2022-23 Western Australian Budget forecasts suggest that key employment indicators will taper off slightly, with unemployment expected to sit at 3.75 per cent over the four year budget

³ ABS (2022), *Labour Force, Australia - Table 12*, available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/oct-2022>

⁴ ABS (2022), *Labour Force, Australia - Table 8*, available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/oct-2022>

period, and the participation rate declining as the population ages.⁵ With these labour market pressures, the Budget outlines forecast wages growth across the state increasing from 2.20 per cent in 2021-22⁶ to 3.00 per cent in 2023-24 and the outer forecast years.

Previously, PwC reported labour cost estimates specific to the operation and maintenance of the power plant that were (in part) based on the national energy, gas, water and waste services (EGWWS) sector Wage Price Index (WPI) series⁷. Labour cost estimates for the construction of the power plant were based (in part) on the national construction sector WPI series.⁸ Table 1 sets out the labour cost escalation factors reported in the 2022 BRCP.

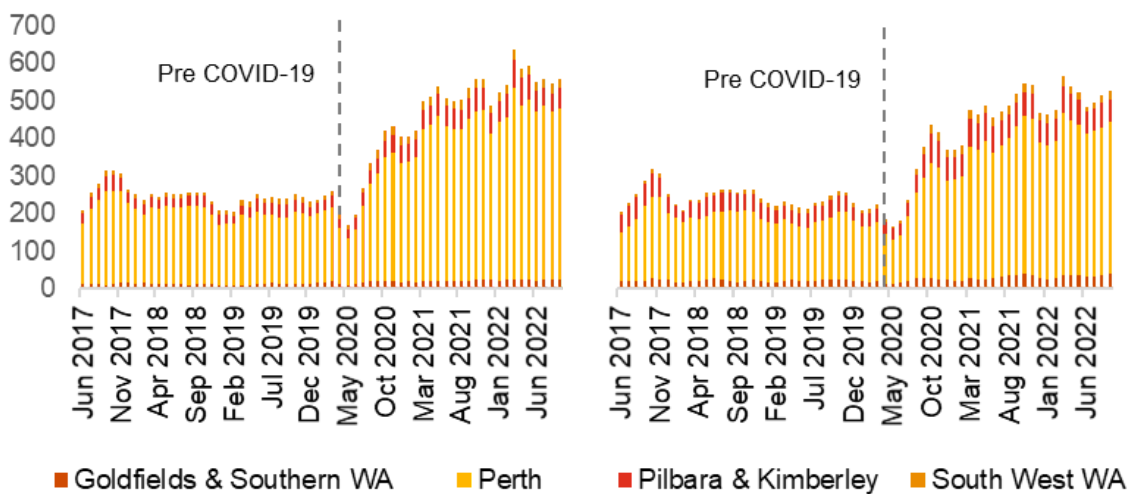
Table 1: Labour cost projections by financial year (%) for the 2022 BRCP

	2022	2023	2024	2025	2026
Operations and Maintenance	2.45	2.45	2.70	2.70	2.42
Construction	2.01	2.01	2.26	2.26	1.98

Source: PwC⁹

Construction activity statewide continues to be strong even after the removal of the Australian and State Government stimulus and industry support packages. Figure 3 shows demand for construction workers (as measured by internet job vacancies) is significantly above pre-COVID levels. The Western Australian Government has launched an initiative to attract overseas workers to tackle labour shortages in the sector.¹⁰

Figure 3: Internet Vacancy Index by ANZSCO and region, Western Australia (Construction Trades Workers - LHS, Construction and Mining Labourers - RHS)



Source: National skills Commission¹¹

⁵ Western Australia Government (2022), *State Budget 2022-23 - Budget Paper No 3 - Economic and Fiscal Outlook*, available at: <https://www.ourstatebudget.wa.gov.au/2022-23/budget-papers/bp3/2022-23-wa-state-budget-bp3.pdf>

⁶ ABS (2022), *Wage Price Index, Australia - Table 2b*, available at: <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/wage-price-index-australia/jun-2022>

⁷ Note the referenced values represent nationwide figures whereas the figures in Table 1 are Western Australia specific, meaning they are not directly comparable. The ABS does not publish West Australian-specific EGWWS or construction wage series.

⁸ As above.

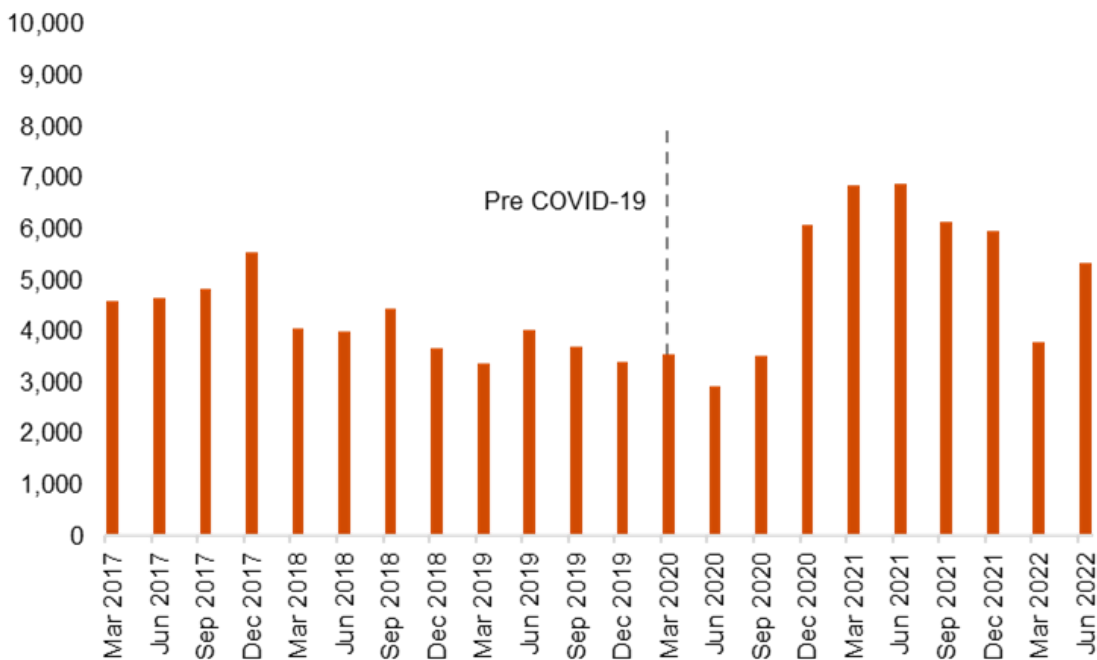
⁹ PwC (2021), *2022 Benchmark Reserve Capacity Price Cost Escalation Factors*, available at: <https://www.erawa.com.au/cproot/22243/2/-BRCP-2022-PwC---Cost-Escalation-Factors-report.PDF>

¹⁰ Western Australia Government (2022), *Media Statement - 'Build a Life in WA' expands internationally to attract workers to WA*, available at: <https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/07/Build-a-Life-in-WA-expands-internationally-to-attract-workers-to-WA.aspx>

¹¹ National Skills Commission (2022), *Internet Vacancy Index data - Regional May 2010 Onwards*, available at: <https://labourmarketinsights.gov.au/our-research/internet-vacancy-index/#3>

Reflecting capacity pressures in the construction sector from labour and materials shortages and rising interest rates, there are signs the sector may begin to slow.

Figure 4: Quarterly dwelling commencements, Western Australia



Source: ABS¹²

2.2 Labour cost projections

Consistent with the cost escalation factors for the BRCP in previous years, PwC’s forecasts for labour costs are informed by analysis of wage price based indices. PwC’s analysis of regulatory determinations indicates that regulators have generally expressed a preference for labour cost escalation factors based on long-run historical growth or forecasts of WPI, as opposed to average weekly earnings based estimates. Recent determinations by the ERA¹³ and the Australian Energy Regulator (AER)¹⁴ have adopted WPI based series to estimate appropriate labour cost escalation factors.

PwC has again 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 different labour market dynamics, and are subject to different enterprise agreements.

PwC’s forecasts are based on the Western Australian Treasury forecasts included in the 2022-23 budget with an industry specific delta applied. These industry specific deltas are outlined in Table 2 and are based on the average wage growth over the past five years across the EGWWS sector and the construction sector, respectively, relative to the wage growth nationally.

¹² ABS (2022), *Building Activity, Australia - Table 35*, available at:

<https://www.abs.gov.au/statistics/industry/building-and-construction/building-activity-australia/jun-2022>

¹³ ERA (2021), *Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025*, available at: <https://www.erawa.com.au/cproot/21855/2/PUBLIC---DBNGP---DBP---AA5-Final-Decision.PDF>

¹⁴ Australian Energy Regulator (2022), *Final Decision - AusNet Services Distribution Determination 2021 to 2026 - Attachment 6 - Operating expenditure*, available at: <https://www.aer.gov.au/system/files/AER%20-%20Final%20decision%20-%20AusNet%20Services%20distribution%20determination%202021%E2%80%9326%20-%20Attachment%206%20-%20Operating%20expenditure%20-%20April%202021.pdf>

Table 2: Historical wage increases by financial year (%)

WPI measure	2018	2019	2020	2021	2022	Ave.
WPI: All industries, National	2.10	2.30	2.20	1.50	2.60	2.12
WPI: EGWWS, National	2.00	2.80	2.60	1.80	2.20	2.18
					Δ	+0.06
WPI: Construction, National	1.80	1.80	1.80	1.30	3.20	2.02
					Δ	-0.10

Consistent with our approach last year, PwC recommends adopting the **WPI:Operations and Maintenance** series below for labour costs specific to the operation and maintenance of the power plant, and the **WPI:Construction** series below for the construction of the power plant.

Table 3: Labour cost projections by financial year (%)

WPI measure	2022	2023	2024	2025	2026	2027
	<i>Actual</i>	<i>Forecast</i>	<i>Forecast</i>	<i>Forecast</i>	<i>Forecast</i>	<i>Ave. FY22 to FY26</i>
WPI - All industries, Western Australia	2.70	2.75	3.00	3.00	3.00	2.89
Δ			+0.06			
Operations and Maintenance	-	2.81	3.06	3.06	3.06	2.95
Δ			-0.10			
Construction	-	2.65	2.90	2.90	2.90	2.79

These projections represent an increase in forecast labour costs for each year of the forecast period relative to the 2022 BRCP cost escalation factors reflecting ongoing skills shortages. With the relative transferability in skills between the EGWWS, construction and mining sectors, PwC considers it likely that wages in the EGWWS sector will follow a similar trajectory as firms look to retain their workers.

While PwC considers series which exclude bonuses to be more reflective of the underlying cost of labour, rather than the fluctuating aspects of labour impacted by the quantity and quality of work performed, we note employers have been using other methods to attract and retain workers that may not necessarily be reflected in headline WPI series. This may include bonuses or one-off payments.

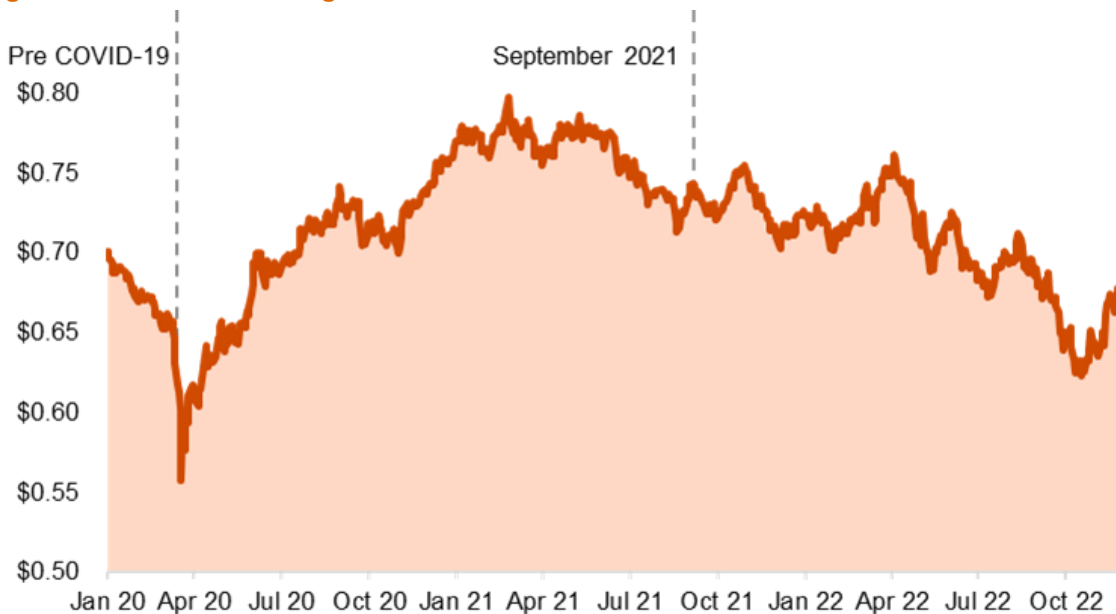
To the extent that such arrangements become more commonplace and typical of remuneration expectations of workers, and hence labour costs for employers, in future years it may be appropriate to consider again whether to amend the underlying labour cost series applied.

3 AUD/USD exchange rate

3.1 Market trends

The value of the Australian Dollar (AUD) relative to the United States Dollar (USD) has declined since our previous report in September 2021 when it sat at \$0.73. As at the time of writing, the AUD/USD exchange rate was \$0.68.

Figure 5: AUD/USD exchange rate



Source: RBA¹⁵. The AUD/USD values represent daily values.

As noted in PwC's previous report¹⁶, the Reserve Bank of Australia (RBA) had stated the cash rate would not increase until inflation was sustainably within its 2 to 3 per cent target range and had indicated that may not be before 2024.¹⁷ Both the RBA and the US Federal Reserve, responsible for setting the Cash Rate and Federal Funds Rate, respectively, have shifted away from accommodative monetary conditions. This comes in response to rapidly increasing inflation across both Australia and the US in the aftermath of Russia's invasion of Ukraine and the continued impact of COVID-19 on supply chains.

Fluctuations in the value of the AUD have been driven in part by the relativity of the Australian Cash Rate and the US Federal Funds Rate. Interest rates are indicative of financial returns available and are an important influence on capital flows, and hence, the demand for the currency to which they are tied. As the US Federal Funds rate increases (decreases) relative to the Australian Cash Rate, the AUD becomes less (or more) attractive relative to the USD, leading to depreciation (or appreciation). Forecasts by market analysts suggest the interest rate differential will narrow over the coming years presenting potential upside for the AUD.

¹⁵ RBA (2022), *Exchange Rates – Daily - 2018 to Current – F11.1, Statistical Tables*, retrieved July 2022, available at: <https://www.rba.gov.au/statistics/tables/>

¹⁶ PwC (2021), *2022 Benchmark Reserve Capacity Price Cost Escalation Factors*

¹⁷ Reserve Bank of Australia (2021), *Monetary Policy Decision - August 2021*, available at: <https://www.rba.gov.au/media-releases/2021/mr-21-14.html>

Table 4: Weighted average interest rate forecasts (per cent)

Year	2022		2023			2024				2025
Quarter	4	1	2	3	4	1	2	3	4	1
Australian Cash Rate	3.10	3.40	3.50	3.55	3.45	3.30	3.15	2.95	2.85	2.90
US Federal Funds Rate	4.38	4.87	4.87	4.77	4.53	4.03	3.67	3.24	2.97	2.88
Differential	-1.28	-1.47	-1.37	-1.22	-1.08	-0.73	-0.52	-0.29	-0.12	0.02

Source: Bloomberg

Outlined as a potential downside risk in our past reports, trade tensions and broader Chinese regional political risks have continued. Despite this, Australian commodity exports have remained strong with significant price increases for key commodities including thermal coal (up 210 per cent over the period April 2021 to April 2022), metallurgical coal (up 166 per cent) and LNG (up 118 per cent).¹⁸ While these price increases are unlikely to be sustained, global demand for new energy technologies is likely to support prices for other Australian metals and minerals (including copper) over the forecast period.

3.2 AUD/USD exchange rate projections

Consistent with our approach for the 2022 BRCP cost escalation factors, PwC recommends applying the average of the most recent forecasts published by the big 4 Australian Banks for FY23 to FY25, and thereafter holding the exchange rate constant for the remainder of the forecast period.

Recent forecasts published by analysts suggest an increase in the value of the AUD relative to the USD. This is predicated on the continued strength of Australian exports and a continued tightening of Australian monetary policy.

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

Table 5: AUD/USD exchange rate projections by financial year

	2023	2024	2025	2026	2027
AUD/USD	0.7030	0.7517	0.7692	0.7692	0.7692

¹⁸ PwC analysis of Department of Industry, Science, Energy and Resources estimates. Office of Chief Economist, Department of Industry, Science, Energy and Resources (2022), *Resources and Energy Quarterly - June 2021 - Historical Data*, available at: <https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2022/documents/REQ-June-2022-Historical-Data.xlsx>

4 Steel and copper

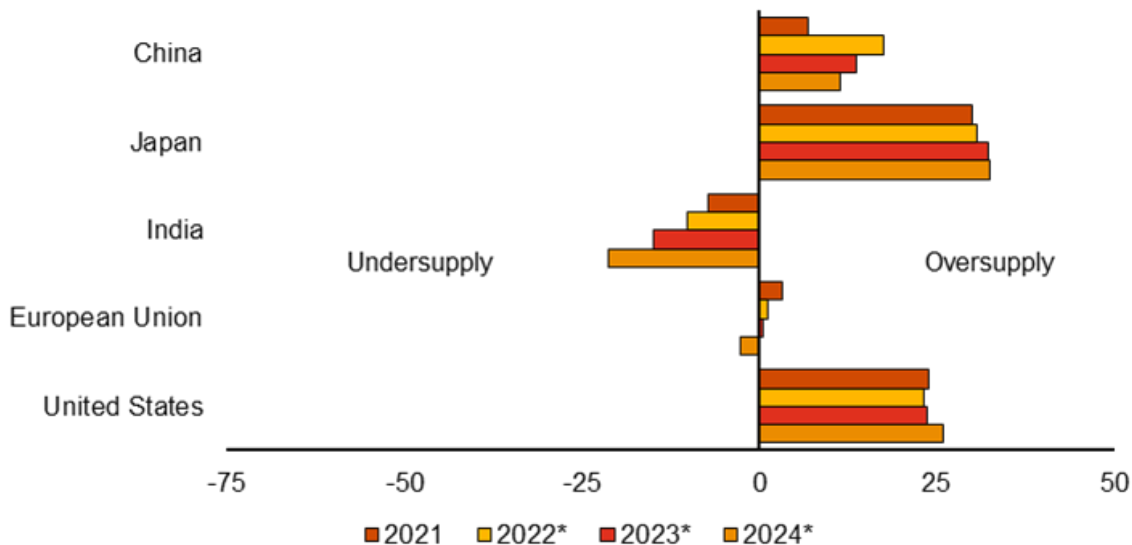
4.1 Market trends

Steel is a key input for most industrial and construction industries. As a result, demand for steel tends to rise and fall in line with general global economic activity, and in particular, industrial activity.¹⁹ Demand for copper is also strongly linked to the construction sector as copper is used extensively in new buildings, with secondary demand coming from machinery and electronics manufacturing.²⁰

Steel prices have been subject to significant swings in recent years. Steel prices fell considerably between 2018 and 2020 as global economic growth slowed. The price declines continued into 2020 as the COVID-19 outbreak in China weighed on its industrial activity, disrupting demand and ultimately global supply chains. Steel prices recovered from their 2020 lows on the back of supply shortages and global construction activity driven by infrastructure-related Government stimulus.

Inflationary pressures and tightening monetary policy are expected to lead to a slowing of demand for steel over the forecast period with prices also expected to trend lower. As opposed to the forecasts published last year by the Australian Department of Industry, Science, Energy and Resources²¹, all the major steel markets except India are expected to have an oversupply of steel placing downward pressure on prices.

Figure 6: Forecast annual production of steel relative to consumption by calendar year (million tonnes)



Source: Department of Industry, Science, Energy and Resources.²²

¹⁹ IBISWorld (2021), *World Price of Steel - Business Environment Report A5230*, accessed July 2022

²⁰ IBISWorld (2021), *World Price of Copper - Business Environment Report A5223*, accessed July 2022

²¹ PwC (2021), *2022 Benchmark Reserve Capacity Price Cost Escalation Factors*, Figure 4.2 (Page 17), available at: <https://www.erawa.com.au/cproot/22243/2/-BRCP.2022-PwC---Cost-Escalation-Factors-report.PDF>

²² PwC analysis of Department of Industry, Science, Energy and Resources estimates.

Office of Chief Economist, Department of Industry, Science, Energy and Resources (2022), *Resources and Energy Quarterly - June 2021 - Forecast Data*, available at: <https://publications.industry.gov.au/publications/resourcesandenergyquarterlyjune2022/documents/REQ-June-2022-Forecast-Data.xlsx>

Being exposed to many of the same demand and supply factors, copper prices are also expected to decline over the forecast period, though not to the same extent as steel prices. As noted in Section 3.1, global demand for low emission technologies such as electric vehicles are likely to support prices for minerals such as copper over the forecast period.

4.2 Steel and copper price projections

Consistent with PwC's prior cost escalation factor estimates, PwC has used hot rolled coil (HRC) steel as the basis of our steel price escalation. PwC considers HRC steel a reliable indicator for the price of the different types of steel used in power plant construction. PwC has again used the London Metal Exchange copper spot price as the basis of our copper price analysis.

The approach used in our steel and copper price projections are consistent with the estimates in prior years - being the average of compiled institutional spot price forecasts. For steel, PwC recommends 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. PwC considers 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 following steel and copper prices, converted from USD to AUD using the exchange rate projections in Table 5, are projected for the five year period:

Table 6: Steel price (per metric tonne) projections by financial year

Measure	2022	2023	2024	2025	2026	2027
Steel price (USD)	1,224	666	636	624	610	591
Steel price % Δ	-	-45.59	-4.44	-1.94	-2.26	-3.12
<i>AUD/USD</i>	<i>0.7258</i>	<i>0.7030</i>	<i>0.7517</i>	<i>0.7692</i>	<i>0.7692</i>	<i>0.7692</i>
Steel price (AUD)	1,686	947	846	811	793	768
Steel price % Δ	-	-43.82	-10.63	-4.17	-2.26	-3.12

Source: IHS Markit, Consensus Economics, PwC analysis.

Table 7: Copper price (per metric tonne) projections by financial year

Measure	2022	2023	2024	2025	2026	2027
Copper price (USD)	10,144	7,551	7,821	8,199	8,379	8,394
Copper price % Δ	-	-25.56	3.58	4.82	2.20	0.18
<i>AUD/USD</i>	<i>0.7258</i>	<i>0.7030</i>	<i>0.7517</i>	<i>0.7692</i>	<i>0.7692</i>	<i>0.7692</i>
Copper price (AUD)	13,976	10,741	10,405	10,659	10,894	10,913
Copper price % Δ	-	-23.14	-3.13	2.44	2.20	0.18

Source: IHS Markit, Consensus Economics, PwC analysis.

Appendix A: Estimated Cost Escalation Factors

The table below summarises the updated cost escalation factors (CEF) developed for the 2023 Benchmark Reserve Capacity Price (BRCP) in December (based on data up to November) compared with the 2023 BRCP CEF estimates published in August (based on July data).

Table A1: 2023 BRCP Cost Escalation Factors by financial year - July and November estimates

		2023	2024	2025	2026	2027
Operations and Maintenance Labour Costs (% Δ)	July	2.79	3.04	3.04	3.04	2.83
	November	2.81	3.06	3.06	3.06	2.95
Construction Labour Costs (% Δ)	July	2.49	2.74	2.74	2.74	2.53
	November	2.65	2.90	2.90	2.90	2.79
AUD/USD (\$)	July	0.7169	0.7563	0.7750	0.7750	0.7750
	November	0.7030	0.7517	0.7692	0.7692	0.7692
Steel price (% Δ)	July	-27.18	-20.67	-13.44	-3.57	-4.12
	November	-43.82	-10.63	-4.17	-2.26	-3.12
Copper price (% Δ)	July	-8.95	-11.90	-4.41	0.15	1.76
	November	-23.14	-3.13	2.44	2.20	0.18

The escalation indices need to be interpreted and applied consistent with the underlying datasets used in their estimation (i.e. the escalation factors should be applied to appropriately specified cost estimates as at July 2022).

The estimation methodology for forecasting exchange rates and estimating cost escalation factors is unchanged across the two sets of estimates, though for certain items (specifically the exchange rate and copper and steel prices) for the 2023 financial year PwC has been able to use actual data for the first three months of the financial year, with forecasts for the remaining time periods.

Otherwise key changes from the August report include:

- cost escalation factors for labour (both operations and maintenance, and construction) have increased marginally reflecting the publication of the June quarter figures.²³ We note significant commentary generally on the “tightness” of Western Australia’s labour market, and business’ concerns as to the availability and cost of skilled labour resources. However, we remain of the view that the most reliable and objective basis for forecasting movements in labour costs is to use a WPI-based approach applying an industry-specific wage “premium” to Western Australian Treasury forecasts, noting that this also preserves consistency with the approach as historically applied.
- exchange rate forecasts for financial year 2023 have moderated significantly (moving from 0.7563 to 0.7030). From 2024 onwards the updated forecasts are not materially different.

²³ Note the August estimates were based on the March quarter wage price index figures as the June quarter was yet to be published.

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- forecasts for steel and copper prices have moved materially, indicating steep reductions in steel and copper prices for the current year. This follows significant increases in the steel and copper prices over the financial year 2022 (44 and 22 per cent, respectively). The movements in the estimates between August and December reflect some “front loading” of price falls that otherwise were projected to occur over the three year period to 2023-2025. Again, we emphasise that these escalation indices need to be interpreted and applied consistent with the underlying datasets used in their estimation (refer particularly to Table 6, above, which shows how the USD price of steel is projected to be relatively stable, albeit moderating slightly, from 2023 onwards, after a significant price correction from the high prices reported in 2022).

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