

2024 Benchmark Reserve Capacity Price

Cost Escalation Factors

August 2023



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Executive summary

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 2024, and will be used by ERA in the development of a Benchmark Reserve Capacity Price (BRCP). 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
- 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 2024 BRCP compared with the 2023 BRCP cost escalation factors.

2023 and 2024 BRCP Cost Escalation Factors (CEF) by financial year

Financial year	CEF	2023	2024	2025	2026	2027	2028
Operations and Maintenance Labour Costs	2023	2.81%	3.06%	3.06%	3.06%	2.95%	
(% Δ)	2024		4.12%	3.87%	3.37%	3.12%	3.12%
Construction Labour Costs	2023	2.65%	2.90%	2.90%	2.90%	2.79%	
(% Δ)	2024		4.02%	3.77%	3.27%	3.02%	3.02%
AUD/USD	2023	\$0.7258	\$0.7030	\$0.7692	\$0.7692	\$0.7692	
(\$)	2024		\$0.6983	\$0.7417	\$0.7733	\$0.7669	\$0.7605
Steel price (AUD)	2023	-43.82%	-10.63%	-4.17%	-2.26%	-3.12%	
(% Δ)	2024		-0.71%	-10.85%	-0.58%	4.51%	0.15%
Copper price (AUD)	2023	-23.14%	-3.13%	2.44%	2.20%	0.18%	
(% Δ)	2024		-2.10%	-1.90%	-1.38%	-0.98%	1.00%

Note these cost escalation factors reflect year-on-year movements (i.e. the financial year 2024 value for each series reflects the percentage change from the financial year 2023 value, exception for the exchange rate which reflects the absolute value).

The application of the labour, steel and copper parameters needs to be consistent with the way the base values are determined, being in this instance the average financial year value. For example, the financial year 2024 value of -0.71 per cent for steel should be applied to the average financial year 2023 value as opposed to a 'point in time' value (i.e. 30 June 2023).

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1 Project overview

1.1 Context to this report

The Economic Regulation Authority (ERA) conducts an annual process to determine a Benchmark Reserve Capacity Price (BRCP) which sets the price paid to generators for capacity that is made available to the Western Australia Wholesale Electricity Market (WEM). The ERA must determine the 2024 BRCP before 15 January 2024. This forms part of the WEM's Reserve Capacity Mechanism (RCM), which aims to ensure there is enough capacity in the SWIS to meet electricity demand. The RCM provides price signals for generators to enter the market and make capacity available. The revenue from making capacity available adds to revenues from generating electricity and providing essential system services to generate an overall return for investors.

The BRCP determination requires the development of appropriate cost escalation factor (CEF) forecasts related to the hypothetical construction of a 160 MW open cycle gas turbine (OGCT) generation facility in the South West Interconnected System (SWIS). The CEFs comprise:

- **labour cost** escalation factors specific to labour costs for building and maintaining a power plant in the SWIS
- the **exchange rate** between the Australian dollar (AUD) and the US dollar (USD)
- **steel** and **copper** price escalation rates.

The ERA engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to determine appropriate cost escalation factors over a five financial year period, with the first year being the year ending June 2024.

1.2 Approach

The development of past CEF estimates has drawn on price forecasts from various investment banks, forecasting institutions and government departments/bodies. In 2022, some stakeholders challenged the forecasts as advised to the ERA by PwC, noting the projected cost escalation factors differed from forecasts by other providers. As part of the 2024 BRCP process, PwC assessed different forecasting approaches and sources available to inform the CEF estimates for future BRCP determinations (see the 'Cost Escalation Factors Data Sources' or 'Data Sources' report¹) which sets out the approaches used to estimate the CEFs in this report.

For labour costs, PwC analysed the level and trajectory of construction labour costs separately from operation and maintenance labour 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, forecasting institutions and Government bodies. This 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, financial, and commodities 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.

¹ PwC (2023), *2024 Benchmark Reserve Capacity Price - Cost Escalation Factors Data Sources*

2 Labour cost escalation

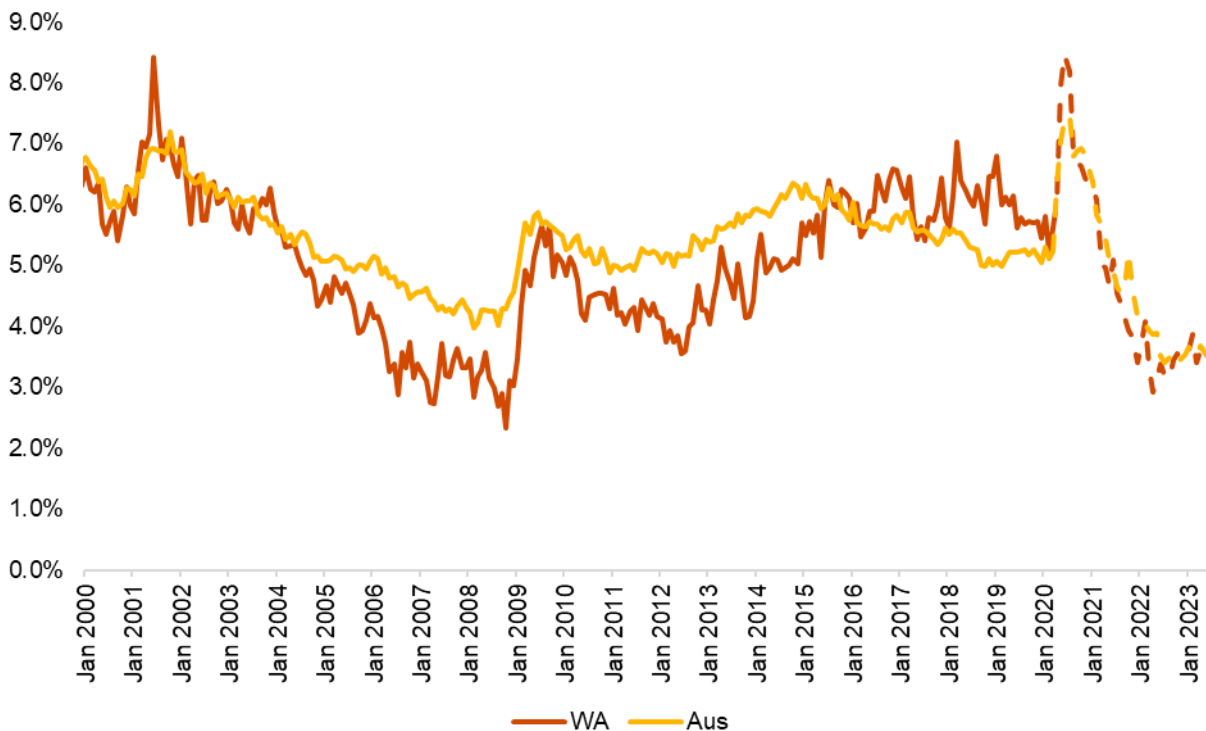
PwC recommends that the ERA escalate labour costs using separate series for the building and maintenance components related to the hypothetical construction of a 160 MW OGCT. PwC also recommends maintaining the Western Australia Treasury forecasts, blended with historical industry-based wage price figures, as the basis of the cost escalation forecasts. This is in-line with the approach applied in prior years.

Applying this approach, and noting the ongoing labour market pressures, growth is expected to be higher over the forecast period than in recent years. Construction wages are forecast to increase by an annual average of 3.42 per cent over the period with maintenance wages increasing by an annual average of 3.52 per cent.

2.1 Market trends

As outlined in **Figure 1**, the Western Australian labour market has tightened significantly since the initial impacts of the COVID-19 pandemic (denoted by the dashed lines). The unemployment rate declined to 2.9 per cent in April 2022, its lowest level since 2008 though this has increased to 3.6 per cent as of June 2023. Unemployment in Western Australia has remained below four per cent for 21 months, the longest period since January 2009 (34 months).

Figure 1: Unemployment rate (% , seasonally adjusted)

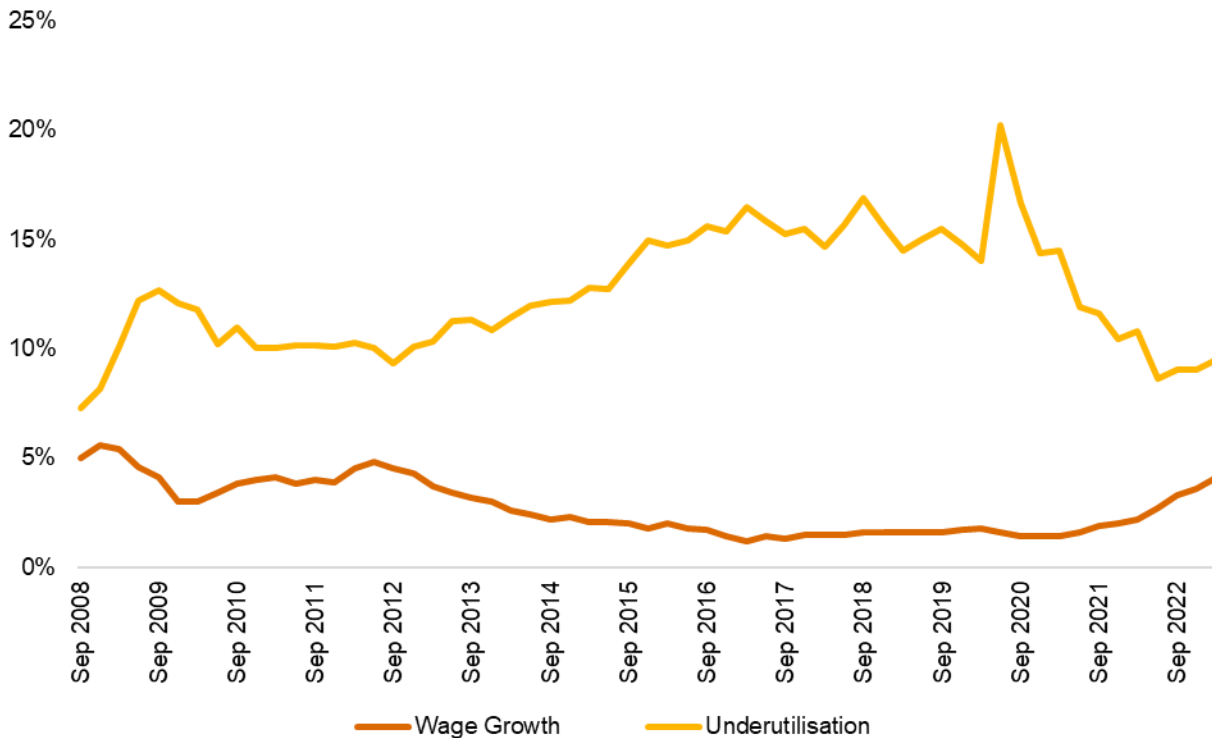


Source: Australian Bureau of Statistics (ABS²)

² ABS (2023), *Labour Force, Australia - Table 12*, available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/jun-2023>

Labour force underutilisation has also decreased which has placed upwards pressure on wages (**Figure 2**). Year-on-year wage growth to March 2023 was 4.1 per cent, the highest rate in more than a decade (4.3 per cent in December 2012). The 2023-24 Western Australian Budget forecasts suggest, however, that key employment indicators will taper off slightly over coming years, with unemployment expected to increase to 4.5 per cent in financial year 2027 (currently 3.6 per cent) and the participation rate declining as the population ages.

Figure 2: Western Australian wage growth and underutilisation (% , seasonally adjusted)



Source: ABS^{3,4}

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) series⁵. Labour cost estimates for the construction of the power plant were based (in part) on the national construction sector WPI series.⁶ **Table 1** sets out the labour cost escalation factors reported in the 2023 BRCP.

Table 1: Labour cost projections by financial year (%) for the 2023 BRCP

	2023	2024	2025	2026	2027
Operations and Maintenance	2.81	3.06	3.06	3.06	2.95
Construction	2.65	2.90	2.90	2.90	2.79

Source: PwC⁷

³ ABS (2023), *Labour Force, Australia - Table 23*, available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/jun-2023>

⁴ ABS (2023), *Wage Price Index, Australia - Table 2b*, available at: <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/wage-price-index-australia/mar-2023>

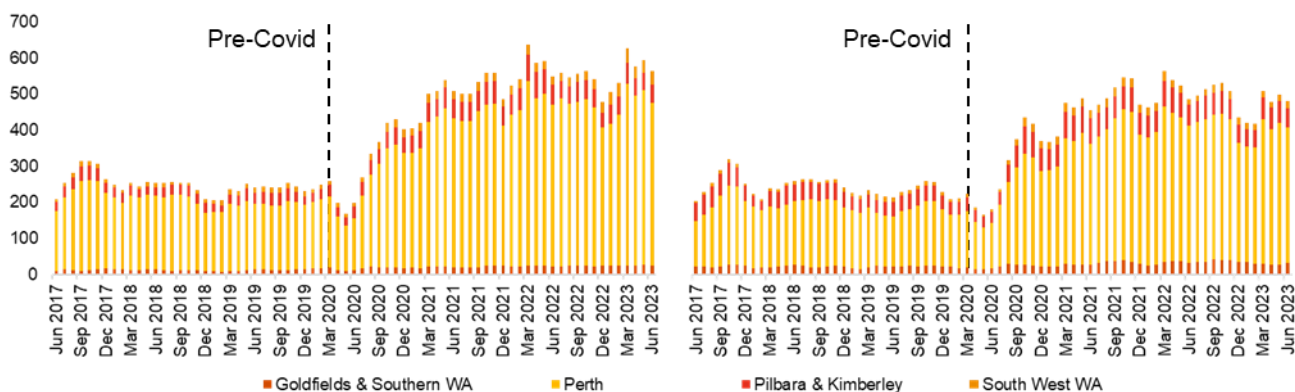
⁵ Note the referenced values represent nationwide figures whereas the figures in Table 1 are Western Australia specific, meaning they are not directly comparable. The ABS do not publish West Australian-specific EGWWS or construction wage series.

⁶ As above.

⁷ 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>

Construction activity state-wide continues to be strong even after the removal of the Australian and State Government stimulus and industry support packages. **Figure 3** shows that while demand for construction workers (as measured by internet job vacancies) has dipped slightly from the highs of last year, demand remains significantly higher than pre-COVID levels.

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



Source: Jobs and Skills Australia⁸

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 ERA⁹ and the Australian Energy Regulator (AER)¹⁰ 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 2023-24 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.

⁸ Jobs and Skills Australia (2023), *Internet Vacancies, ANZSCO2 Occupations, IVI Regions - June 2023*, available at: <https://www.jobsandskills.gov.au/work/internet-vacancy-index>

⁹ ERA (2023), *Final decision on proposed revisions to the access arrangement for the Western Power Network 2022/23 - 2026/27 - Attachment 6: Operating expenditure*, available at: <https://www.erawa.com.au/cproot/23187/2/Final-Decision---Attachment-06---Operating-expenditure.PDF>

¹⁰ Australian Energy Regulator (2023), *Final decision - AusNet Gas Services - Gas distribution access arrangement 1 July 2023 to 30 June 2028 - Attachment 6 - Operating expenditure*, available at: <https://www.aer.gov.au/system/files/AER%20-%20AusNet%202023-28%20-%20Final%20decision%20-%20Attachment%206%20Operating%20expenditure%20-%20June%202023.pdf>

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

	2019	2020	2021	2022	2023	Five-year ave.
WPI: All industries, National	2.40	1.70	1.80	2.60	3.60	2.42
WPI: EGWWS, National	2.80	2.50	1.30	2.20	3.90	2.54
Δ						+0.12
WPI: Construction, National	1.90	0.80	2.20	3.40	3.90	2.44
						+0.02

Source: ABS.

*Note the financial year 2023 figures reflect the March 2022 to March 2023 as the June quarter figures have not been released.

Consistent with our approach last year and the approach detailed in the PwC's 'Data Sources' report, PwC recommends adopting the **WPI:Operations and Maintenance** series in **Table 3** for labour costs specific to the operation and maintenance of the power plant, and the **WPI:Construction** series for the construction of the power plant.

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

	*2023	2024	2025	2026	2027	^2028
WPI: All industries, Western Australia	3.75	4.00	3.75	3.25	3.00	^
Δ: +0.12%						
Operations and Maintenance	-	4.12	3.87	3.37	3.12	3.12
Δ: +0.02%						
Construction		4.02	3.77	3.27	3.02	3.02

* Reflects 'actuals'

^ Note the 2028 WPI: All Industries, Western Australia series has been held constant for financial year 2028.

These projections represent an increase in forecast labour costs for each year of the forecast period relative to the 2023 BRCP cost escalation factors reflecting ongoing skills shortages. With the relative transferability in skills between the EGWWS, construction and mining sectors, it is likely that wages in the EGWWS sector will follow a similar trajectory as firms look to retain their workers.

3 AUD/USD exchange rate

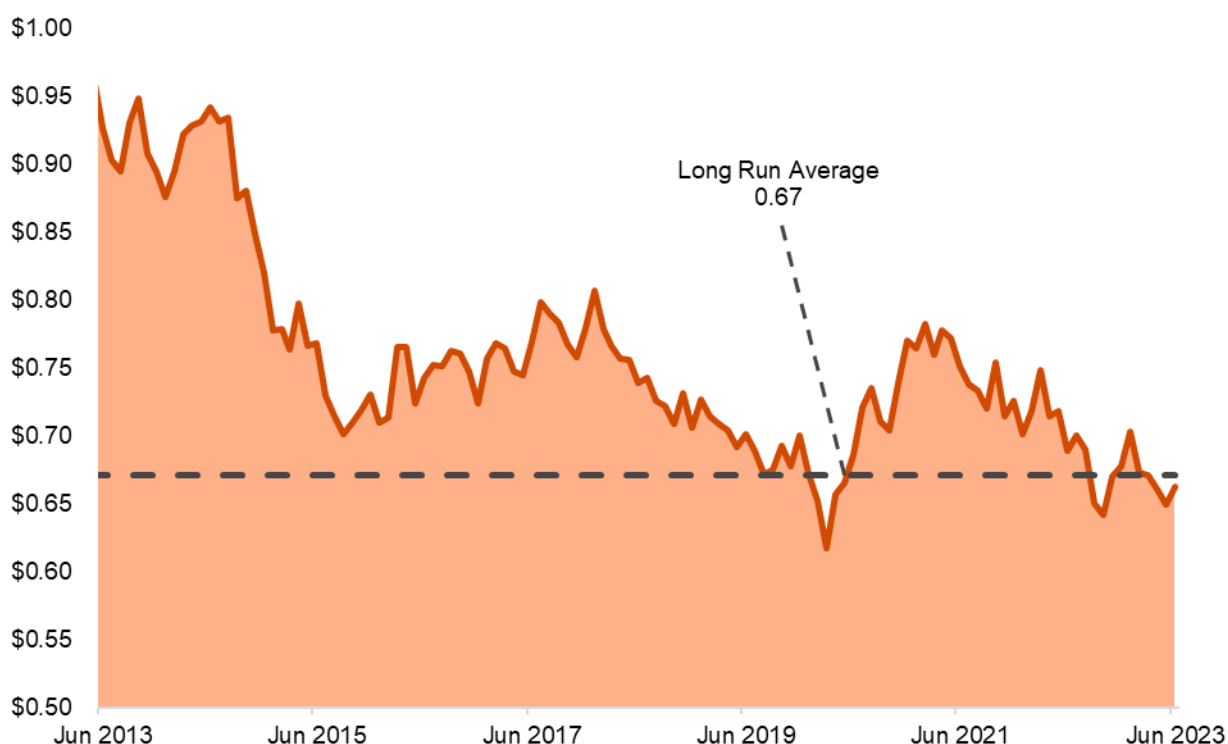
PwC recommends amending the approach used in past years by expanding the number of forecasters used to six (previously four) and using a 'long-run average approach' to estimating the AUD/USD exchange in the 'outer' forecast years (as opposed to holding the exchange rate constant for the final two years of the forecast period).

Applying this approach, the Australian Dollar is expected to appreciate relative to the US Dollar over the forecast period, increasing from \$0.65 (as at the time of writing) to \$0.76 in financial year 2027 (the final year of the forecast period). This appreciation is expected to be supported by a reduction in the interest rate 'differential' between the Australian and US Central Banks and continued, strong demand for Australian commodities.

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 December 2022 when it sat at \$0.68. As at the time of writing, the AUD/USD exchange rate is \$0.65.

Figure 4: AUD/USD exchange rate



Source: RBA¹¹. The AUD/USD values represent average monthly values.

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 and changes in expectations of China's economic growth. 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).

¹¹ RBA (2023), *Exchange Rates – Daily - 2018 to Current – F11.1, Statistical Tables*, retrieved July 2023, available at: <https://www.rba.gov.au/statistics/tables/>

In response to 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, 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. The US Federal Funds rate is currently higher than the Australian Cash Rate, forecasts by market analysts suggest the interest rate differential will narrow over the coming years presenting potential upside for the AUD.

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

Year Quarter	2023		2024				2025		
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Australian Cash Rate	4.50	4.50	4.40	4.20	4.00	3.70	3.55	3.30	3.20
US Federal Funds Rate	5.38	5.38	5.14	4.68	4.22	3.84	3.48	3.24	3.08
Differential	-0.88	-0.88	-0.73	-0.48	-0.22	-0.14	0.07	0.06	0.12

Source: Bloomberg¹²

Outlined as a potential downside risk in our past reports, trade tensions and broader south-Pacific regional political risks have continued. Unit prices for key Australian commodity exports have also decreased with metallurgical coal prices (down 46 per cent over the period April 2022 to April 2023 from \$609 per tonne to \$327) and thermal coal (down 20 per cent from \$332 per tonne to \$266) dropping significantly and iron ore (down three per cent from \$161 per tonne to \$155) and LNG (down seven per cent from \$18 per gigajoule to \$17) dropping slightly.¹³ Note these price changes likely represent a price ‘normalisation’ and 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

In a minor shift from our approach for prior BRCP cost escalation factor estimates, PwC recommends applying the average of the most recent forecasts by six Australian banks¹⁴ (an increase in the number of forecasters used) and using a ‘long-run average approach’ to estimating the AUD/USD exchange in the ‘outer’ forecast years (as opposed to holding the exchange rate constant for the remainder of the forecast period).

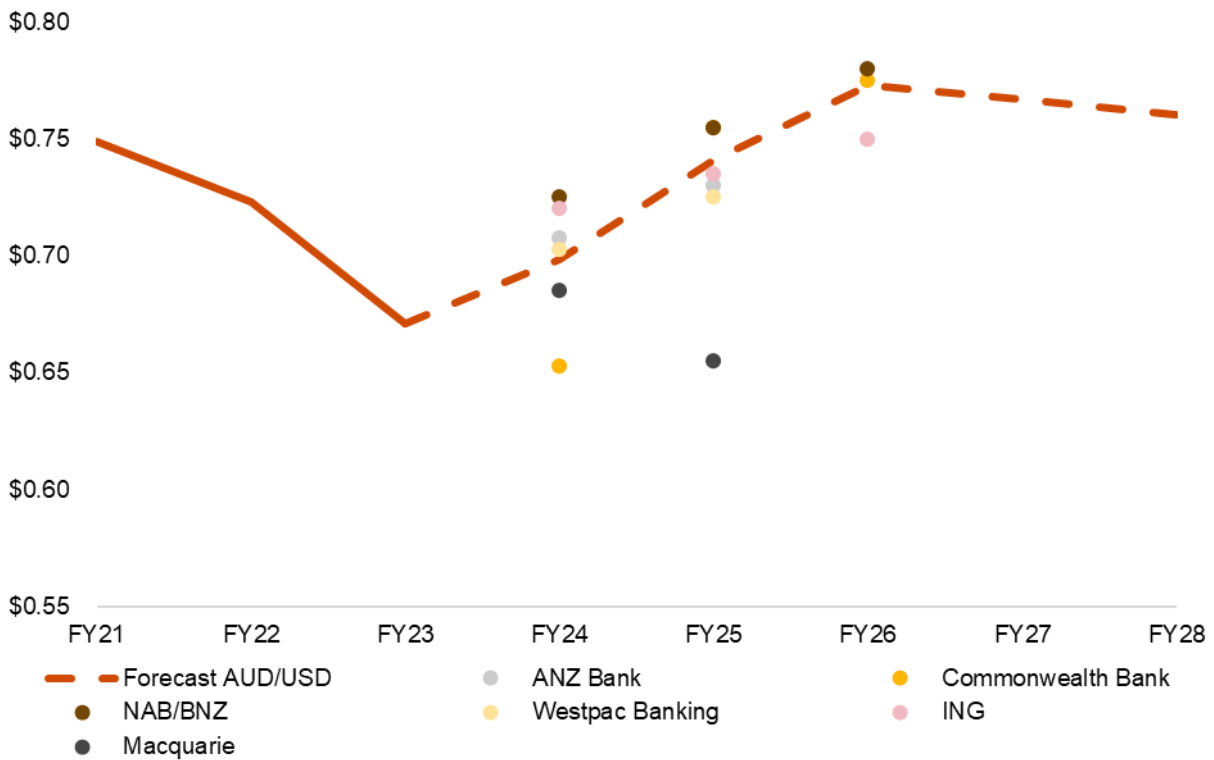
Recent forecasts published by analysts suggest an increase in the value of the AUD relative to the USD (**Figure 5**). This is predicated on the continued strength of Australian exports and a continued tightening of Australian monetary policy.

¹² Retrieved July 2023

¹³ PwC analysis of Department of Industry, Science, Energy and Resources estimates. Office of Chief Economist, Australian Government Department of Industry, Science, Energy and Resources (2023), *Resources and Energy Quarterly - June 2023 - Historical Data*, available at: <https://www.industry.gov.au/sites/default/files/2023-07/resources-and-energy-quarterly-june-2023-historical-data.xlsx>

¹⁴ Being the Commonwealth Bank, ANZ, Westpac, NAB, ING and Macquarie, the latter two institutions added for this years’ CEF analysis.

Figure 5: Forecast AUD/USD exchange rate (financial year average)



Source: Bloomberg, Westpac, Macquarie, RBA.

Note two of the six banks - ANZ Banks and Macquarie - do not have forecasts available for FY26 as at the time of writing. The average calculation for FY26 has accordingly been based on forecasts from the four banks where forecasts are available (while FY24 and FY25 are based on forecasts from each of the six banks).

Based on the above forecasts and employing a long run average calculation over the final two years of the period, projections of exchange rates are shown in **Table 5**, below.

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

	2024	2025	2026	2027	2028
AUD/USD	0.6983	0.7417	0.7733	0.7669	0.7605

Source: PwC¹⁵

¹⁵ 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>

4 Steel and copper price escalation

Consistent with past Cost Escalation Factor estimates, PwC recommends using forecasts compiled by Consensus Economics to escalate steel and copper prices. Hot rolled coil (HRC) steel has been used as the basis of the steel price escalation noting it is generally considered a robust indicator of the price of the different types of steel used in power plant construction while the London Metal Exchange copper spot price – which offers a broadly applied global benchmark – has been used as the basis of the copper price escalation. This is in-line with the approach applied in prior years.

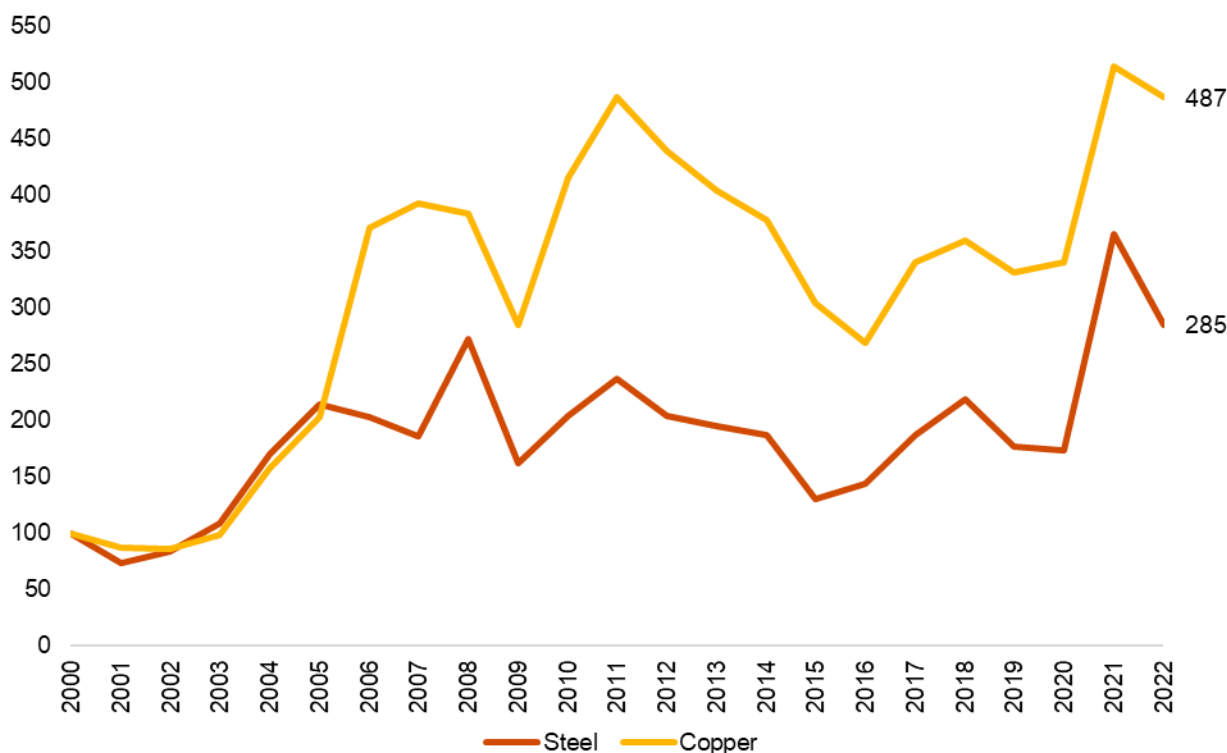
The steel and copper price movements are expected to be relatively muted over the forecast period in comparison to previous years. Note the price movements for both steel and copper are captured in Australian Dollar terms meaning the changes in prices reflect fluctuations in the price of the underlying commodities (being steel and copper) as well as the AUD/USD exchange rate.

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.¹⁶ 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.¹⁷

Pricing for both steel and copper is relatively volatile and prices in 2021 and 2022 showed greater than average levels of variation (see **Figure 6**). The year-on-year price increases in 2021 for copper and steel were the largest recorded by IbisWorld (with data going back to 1980) while the price decreases in 2022 represented the largest steel price decline since 2009 and the largest copper price decline since 2015.

Figure 6: Global steel and copper price index (2000-2022, 2000 prices = 100)



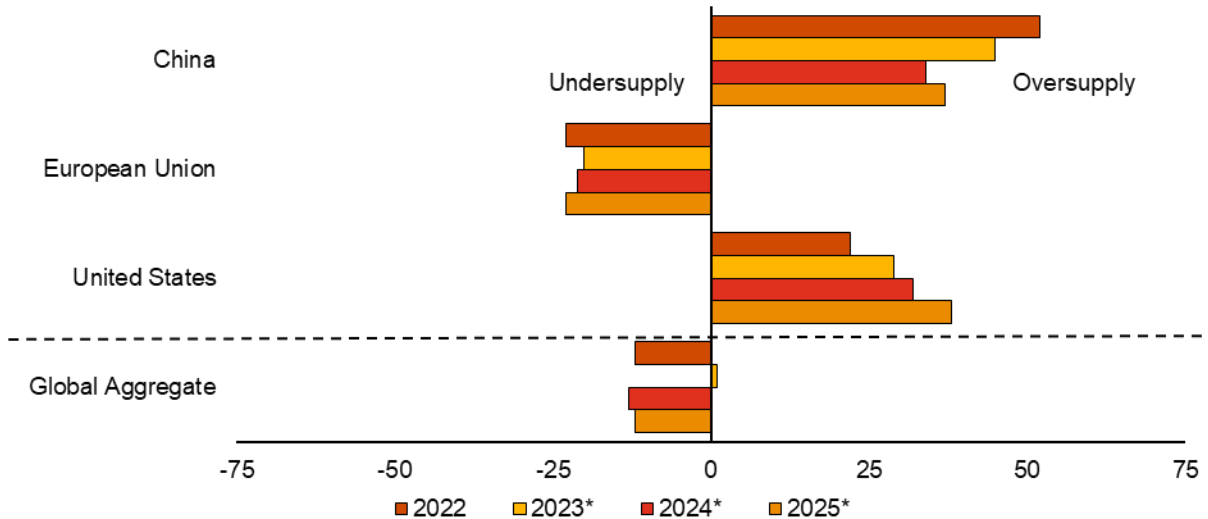
Source: IbisWorld

¹⁶ IBISWorld (2021), *World Price of Steel - Business Environment Report A5230*, accessed July 2023

¹⁷ IBISWorld (2021), *World Price of Copper - Business Environment Report A5223*, accessed July 2023

Inflationary pressures and tightening monetary policy are expected to lead to a moderation of demand for steel over the forecast period with prices also expected to trend lower. Two of the three steel markets PwC's forecasts are based on (being the United States, Chinese and European markets) are expected to have an oversupply of steel placing slowing the upward pressure on prices in the short-term.¹⁸ Being exposed to many of the same demand and supply factors, copper prices are also expected to remain relatively stable over the forecast period.

Figure 7: Forecast annual production of steel relative to consumption (million tonnes, calendar years)



Source: Australian Government Department of Industry, Science and Resources, PwC analysis

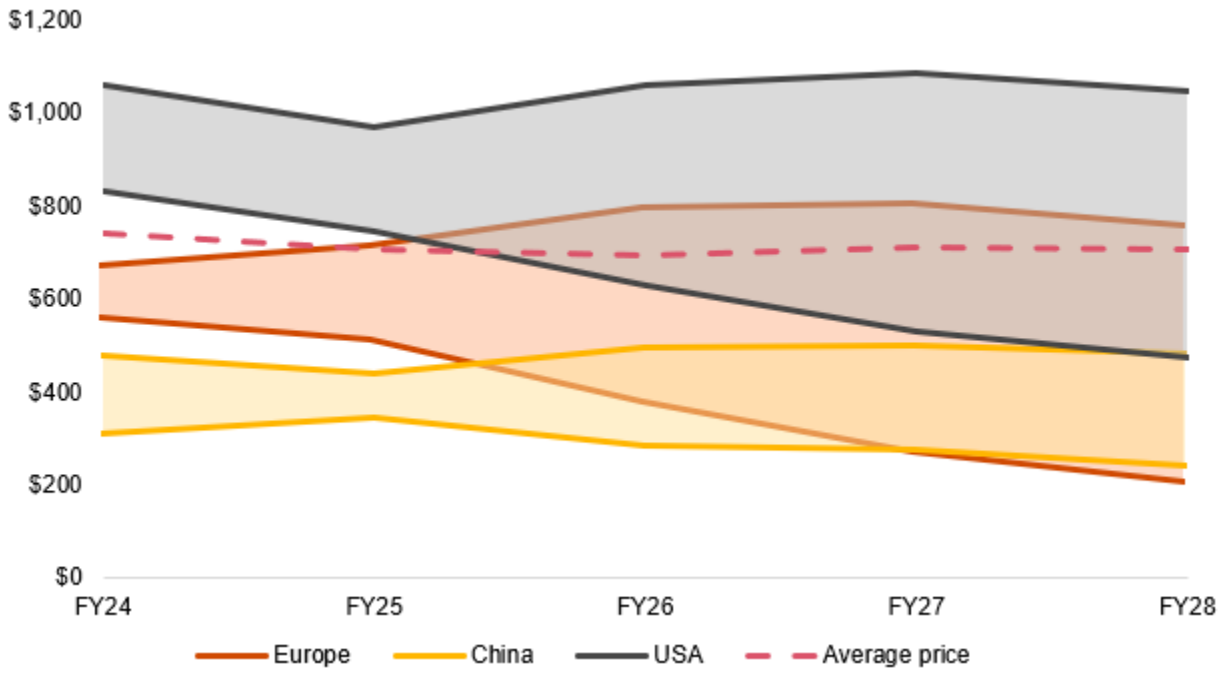
4.2 Steel and copper price projections

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

The approach used in our steel and copper price projections is consistent with that adopted in prior years - being the average of compiled institutional spot price forecasts. For steel, PwC recommends adopting the average of the compiled forecasts for Chinese, European, and US HRC steel spot prices (see **Figure 8**). A granular view of steel forecasts by source market (Chinese, European and the US) is important as a new OCGT entrant may source steel from any one or combination of these markets. Using an average minimises the impact of country-specific supply and demand events on steel prices as well as being less susceptible to the potential for error, bias or future unavailability of any single forecaster's data series.

¹⁸ Australian Government (2023), *Resources and Energy Quarterly: June 2023*, available at: <https://www.industry.gov.au/publications/resources-and-energy-quarterly-june-2023>

Figure 8: Steel price forecasts by market (\$USD, metric tonne)



Source: Consensus Economics, PwC analysis. Note the shaded areas represent the range of price forecasts for each market.

Table 6 and **Table 7** outline the projected changes in steel and copper prices for the five-year period. The steel and copper prices have been converted from USD to AUD using the exchange rate projections in **Table 5**.

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

Measure	2023	2024	2025	2026	2027	2028
Steel price (USD)	\$767	\$792	\$750	\$778	\$806	\$800
Steel price % Δ		3.34%	-5.32%	3.67%	3.65%	-0.68%
AUD/USD	0.6710	0.6983	0.7417	0.7733	0.7669	0.7605
Steel price (AUD)	\$1,142	\$1,134	\$1,011	\$1,005	\$1,051	\$1,052
Steel price % Δ		-0.71%	-10.85%	-0.58%	4.51%	0.15%

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

Measure	2023	2024	2025	2026	2027	2028
Copper price (USD)	\$8,335	\$8,492	\$8,848	\$9,098	\$8,934	\$8,948
Copper price % Δ		1.89%	4.19%	2.83%	-1.80%	0.16%
AUD/USD	0.6710	0.6983	0.7417	0.7733	0.7669	0.7605
Copper price (AUD)	\$12,422	\$12,161	\$11,929	\$11,765	\$11,649	\$11,766
Copper price % Δ		-2.10%	-1.90%	-1.38%	-0.98%	1.00%

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