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2024 Benchmark Reserve Capacity Price

Cost Escalation Factors Data Sources

August 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 their 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.

Noting the potential price signalling impacts, the ERA engaged PricewaterhouseCoopers Consulting (Australia) Pty Ltd (PwC) to assess different forecasting approaches and sources available to inform the CEF estimates for future BRCP determinations.

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.

1.2 Uses and applications for cost escalation forecasts

There are various scenarios where it may be necessary to develop estimates for how certain input costs may change over time.

In a regulatory setting, the development of cost forecasts is a key component underpinning a regulated business' estimated revenue requirement over a regulatory period. Required revenue can be sensitive to changes in input prices, and therefore robust cost escalation factor estimates are necessary to ensure that these changes are accurately captured and reflected. The selection of a forecasting method may also be influenced by the characteristics of the regulatory regime more broadly, and particularly whether there is a mechanism to 'true up' for any forecast variance (such as a revenue cap unders/overs account, which can somewhat limit the risk of forecasting errors).

Outside of a regulatory environment, long-tenor commercial agreements for infrastructure access and other services may seek to specify that charges are periodically adjusted to reflect changes in certain sector-specific input costs. Oftentimes this adjustment can rely on *ex post* measures of cost movements (based on observed movements in various sector-specific Producer Price Indexes (PPIs) published by the Australian Bureau of

Statistics (ABS), for instance), though in some cases forward-looking measures of cost escalation may need to be defined.

A range of possible approaches could be applied to determine an escalation factor to apply to a particular cost category. For some cost categories it may be reasonable to assume that costs will move in line with a generalised measure of underlying inflation, such as the Consumer Price Index (CPI). While this measure reflects a 'basket of goods' that may not be directly comparable to goods and services purchased by the relevant business, this index has been adopted by regulators (and commercial counterparties in a contractual setting) on the basis that it is transparent, readily accessible and a familiar measure of inflation.

Alternatively, movements for some cost categories may be more closely linked to a sector-specific or composite index, reflecting that a range of underlying factors are expected to drive input prices over time. Where a cost category comprises a significant proportion of total costs, and is driven by a range of factors other than those driving general inflation, a more tailored approach (such as the development of a bespoke or composite index) may be applied.

Regardless of the proposed escalation method, there must be a clear basis for its application and appropriate justification of how the measure aligns with anticipated changes in input prices over time.

2 Cost escalation factor methods, measures, and indexes

2.1 Steel and copper prices

For the determination of cost escalation factors for the 2024 BRCP, PwC recommends using forecasts compiled by Consensus Economics to escalate steel and copper prices. This is the same approach used in past determinations.

In PwC's view, forecasts derived from market forecasters generally provide the most suitable approach for determining steel and copper components of the cost escalation factors. Those forecasts are auditable (albeit most requiring a subscription), provide data of the required granularity, forecasting frequency and term, and are an appropriately independent and reliable basis from which to generate the cost escalation factors.

Of the various market forecasters, an 'aggregator', such as Consensus Economics, offers a particular advantage in that its forecasts are less susceptible to the potential for error, bias or future unavailability of any one, individual forecaster's data series (particularly for relatively 'volatile' commodities such as steel and copper). The monthly periodicity of the forecasts means the source data is available and contemporary while the data is accessible to BRCP stakeholders (notwithstanding the subscription nature of the service).

Consistent with PwC's prior estimates[1], the 2023 BRCP Cost Escalation Factors (CEF)[2] used:

- hot rolled coil (HRC) steel as the basis of the steel price escalation
- the London Metal Exchange copper spot price as the basis of the copper price escalation

The London Metal Exchange futures market offers a broadly applied global benchmark for copper prices. However, steel prices are largely based on contractual agreements between steel producers and buyers and there are no such domestic or global benchmark prices. Steel prices are also dependent on product quality and its application, although HRC steel is generally considered a robust indicator of the price of different types of steel used in power plant construction.

Both the steel and copper price forecasts previously recommended by PwC were based on data compiled by Consensus Economics. For copper, this included forecasts from 27 forecasters (including investment banks, forecasting institutions and government bodies). The steel price forecasts were based on an average of the forecasts for Chinese (six forecaster), European (six forecasters), and US (eight forecasters) HRC steel spot prices. The averaging approach was adopted to minimise the impact of country-specific supply and demand events on steel prices, acknowledging that a new OCGT entrant may source its steel from any one or combination of these markets.

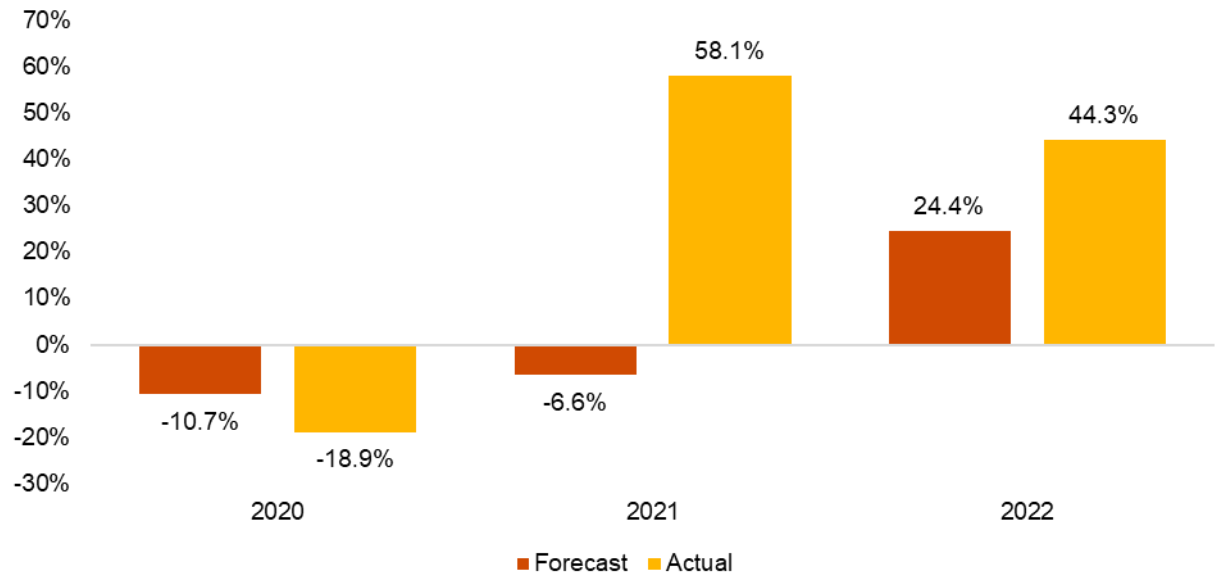
Figure 1 sets out the projected steel price changes for the past three BRCP CEF reports, which have relied on forecasts aggregated by Consensus Economics, against the 'actual' steel price changes. The estimated year-on-year change in the price of steel reflects the first year of each forecast period. For example, the first year of forecasts for the 2020 BRCP report (finalised in August 2019) was financial year 2020.

[1] See, for instance, PwC (2022), *2023 BRCP Cost Escalation Factors*

[2] ibid

PwC's steel price projections had a 'downside' bias over the past two years in that they understated the actual year-on-year increases in the price of steel. This reflected systematic underestimates by institutional forecasters, where each of the institutional forecasts compiled by Consensus Economics were below the 'actual' steel price in 2021. For 2022, MEPS (a steel market analysis company) was the only forecaster with a projected steel price higher than the 'actual' steel price in 2022.

Figure 1: BRCP steel price (per metric tonne) projections and actual steel price changes by financial year[3]

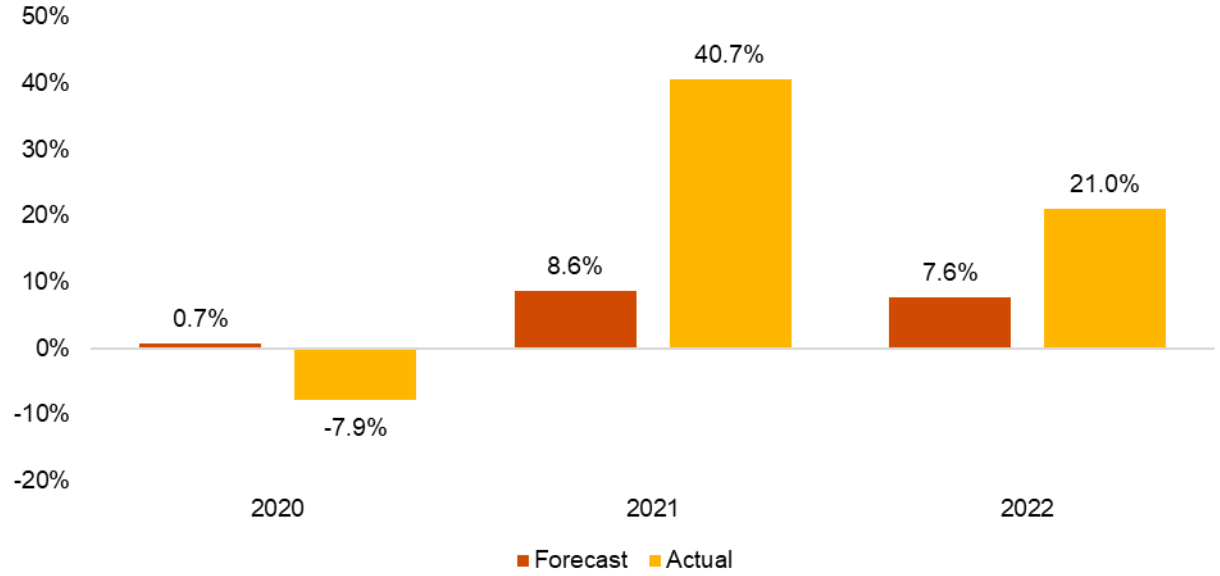


Source: Consensus Economics, prior PwC forecasts

Figure 2 shows projected copper price changes for the past three BRCP CEF reports against the 'actual' copper price changes. Similar to the steel projections, the observed 'downside' bias is reflective of generalised underestimates by institutional forecasters. Only four of the 26 forecasters in June 2021 projected an average copper price for financial year 2022 above the 'actual' price, while for financial year 2021 none of the 30 forecasters projected an average copper price above $6,313 (compared to an 'actual' price of $7,791).

[3] Refer PwC (2019), PwC (2020) and PwC (2021)

Figure 2: BRCP copper price (per metric tonne) projections and actual copper price changes by financial year[4]



Source: Consensus Economics, prior PwC forecasts

For further details on the projections included in prior CEF reports see **Appendix 1: Steel and copper projections by financial year** where **Table 8** sets out the projected steel changes in each of the past five BRCP CEF reports (from the 2019 estimates to the 2023 estimates, being the most recent estimates) while **Table 9** sets out the projected copper price changes.

2.1.1 Potential sources for forecasting steel and copper prices

There are a range of data sets and indices that could form the basis of the steel and copper price escalations.

[4] *Ibid.*

Table 1 sets out a range of potential sources for steel and copper prices.

Broadly, these can be categorised as either:

- **Market forecasters** – various private institutions which either maintain proprietary commodity forecasting models, or which consolidate and publish forecasts drawing from a range of sources, typically on a subscription basis but sometimes with publicly-accessible reports.
- **Government agencies** – which develop forecasts to support various government policy, planning or budgetary purposes
- **Other institutions** – such as various multilateral development banks (World Bank, IMF etc) which collate or publish certain forecasts to guide businesses and policymakers, particularly in emerging markets and developing economies.

Table 1: Overview of potential commodity price sources

Publisher	Description	Notes
Market forecasters		
Consensus Economics	Consensus Economics releases a monthly 'Energy & Metals Consensus Forecasts' publication which compiles forecasts from up to 40 analysts covering a range of commodities. These forecasts cover a period of five years and also include a 'long-term' forecast, out to the end of a 10-year period.	Steel forecasts are based on HRC steel and cover the European, Chinese and US markets while copper forecasts are based on London Metal Exchange (LME) cash price for 'Grade A' copper. These forecasts are subscription based.
S&P Global Market Intelligence	S&P Global Market Intelligence's commodity price forecasts are published monthly and cover a five-year forecast period.	S&P Global Market Intelligence's copper forecasts are based on the COMEX (a metals futures and options market) settlement price. These forecasts are publicly available. Steel price forecasts are not included in the publicly available forecasts published by S&P Global Market Intelligence. Note that in 2022 S&P Global merged with IHS Markit (a commodities information service provider). The subscription service includes steel forecasts that are based on hot rolled coil steel and cover the European, Chinese and US markets.
There are a range of other market forecasters that publish commodity prices forecasts. A review of potential data sources identified that forecasts for the relevant steel products (i.e. HRC steel or rebar steel) are largely restricted to 'subscription' providers (for example, Woodmac, Trading Economics, Metals Focus and Fastmarkets, and various others).		
Government agencies		
Commonwealth Department of Industry, Science and Resources	The Department of Industry, Science and Resources (DISR) releases quarterly commodity forecasts covering a three-year period.	The Department's steel forecasts relate to iron ore and metallurgical coal while the copper forecasts are based on the LME cash price. These forecasts are publicly available. The DISR projections are referenced by the Western Australia Department of Jobs, Tourism, Science, and Innovation in its monthly 'profile' of Western Australia's battery minerals industry.

Publisher	Description	Notes
Commonwealth Treasury	The Commonwealth Treasury forecasts are detailed in the Commonwealth Budget papers and cover a four-year period.	Treasury's steel forecasts relate to iron ore and metallurgical coal. Copper forecasts are not included in the Budget Papers. Treasury's commodity price forecasts are based on an assumption that commodity prices will return to their long-term 'fundamental level' within the forecast period. The 2023-24 budget notes Treasury's forecasts sit at the 'bottom-end' of the market range and are 'conservative' relative to other forecasts.
Other institutions		
International Monetary Fund	The International Monetary Fund (IMF) releases commodity price forecasts alongside its quarterly World Economic Outlook Update. The IMF's commodity forecasts cover a five-year period.	The IMF's copper forecasts are based on the LME cash price. The IMF does not include steel forecasts as part of its commodity forecasts. These forecasts are publicly available.
World Bank	The World Bank releases commodity price forecasts twice yearly (in April and October). These forecasts cover a two-year period.	The World Bank's copper forecasts are based on the LME cash price. The World Bank does not include steel forecasts as part of their commodity forecasts. These forecasts are publicly available.

2.1.2 Assessment of alternative methods, measures, and indexes

There are a range of factors relevant to the suitability of potential steel and copper price data sources, including:

- **repeatability**: the extent to which the data is able to support a method which is repeatable and would be applicable for future cost escalation forecast periods
- **auditability**: the extent to which the source data and calculation approach are 'auditable' by third parties, in that they can recreate the estimate independently and verify it has been correctly applied
- **reliability and independence**: the extent to which the source data is a reliable basis to inform the cost escalation factors as needed for the BRCP, and 'independent' in that it is unable to be influenced by parties to which the BRCP may apply.

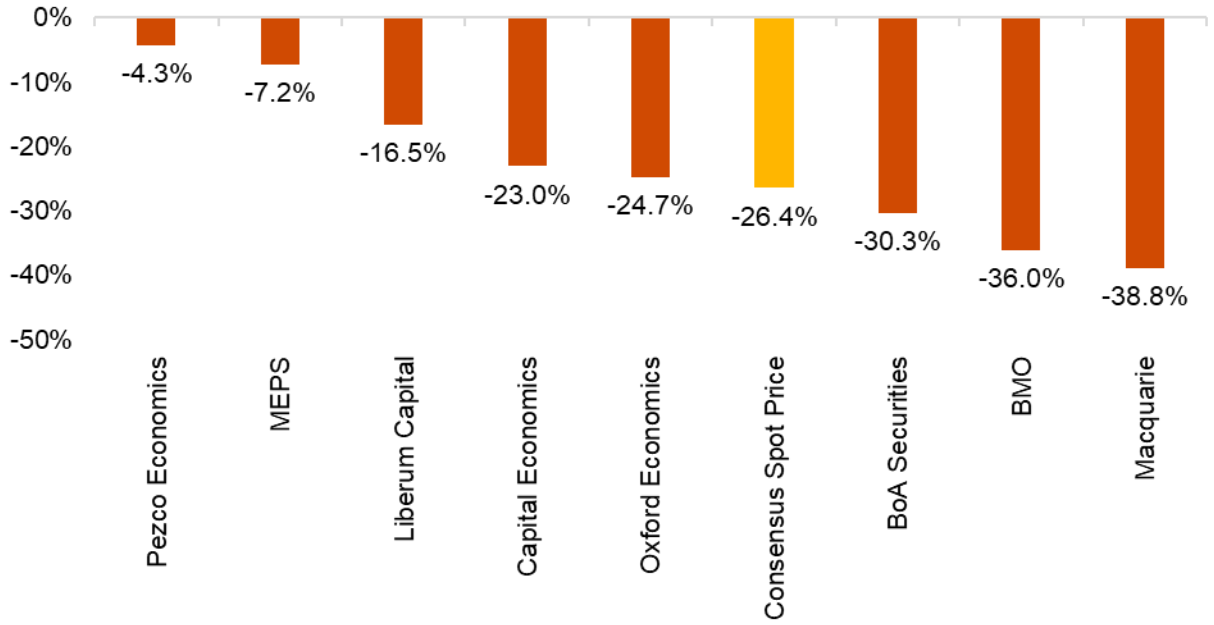
Table 2: Copper and steel price forecast considerations

Publisher	Repeatability	Auditability	Independence
Market forecasters	Generally forecasts are provided on an ongoing basis and at sufficient regularity and periodicity to support derivation of the CEFs. Periodically, some forecasters may cease publication or change the basis of certain indexes.	Noting that forecasts tend to be restricted to subscribers, and the underlying forecasting method of each agency may be proprietary and not fully disclosed, use of data from market forecasters is auditable in that third parties would be able to re-create the same CEF estimate, by accessing the same source data.	The various market forecasters produce price information for a range of parties and purposes, using methods and primary information which is not able to be influenced by any of the parties to which the BRCP may apply.
Government agencies	Government price forecasts for commodities (in this case steel and copper) typically are undertaken for other purposes, and it is possible that over time those forecasts may be discontinued or reporting may not align with the forecast period required.	While government price forecasts are publicly available, some level of extrapolation would be required to generate the CEFs given the (typically) shorter-term nature of the forecasts.	Government forecasts can be influenced by both established forecasting practices (for instance, Commonwealth Treasury's assumption that commodity prices will return to their 'fundamental level'), and may be designed to support other planning or budgetary processes which could influence the reliability of those forecasts for the CEF (for instance, deliberate adoption of 'conservative' forecasts for budgeting purposes).
Other institutions	Price forecasts for commodities (in this case steel and copper) as published by other institutions typically are undertaken for other purposes, and it is possible that over time those forecasts may be discontinued, or reporting may not align with the forecast period required.	While the IMF and World Bank forecasts are publicly available, some level of extrapolation would be required to generate the CEFs given the (typically) shorter-term nature of the forecasts.	Commodity price information is published for a range of parties and purposes, using methods and primary information which is not able to be influenced by any of the parties to which the BRCP may apply.

Generally, forecasts derived from market forecasters provide the most suitable approach for determining steel and copper components of the CEF. Those forecasts are auditable (albeit most requiring a subscription), provide data of the required granularity, forecasting frequency and term, and are appropriately independent and reliable bases from which to generate CEFs.

Of the various market forecasters, an 'aggregator', such as Consensus Economics, offers a particular advantage in that its forecasts are less susceptible to the potential for error, bias or future unavailability of any one, individual forecaster's relevant data series (see the example in **Figure 3**).

Figure 3: US HRC Steel - 12-month projected change in price (June 2022)



Source: Consensus Economics

The monthly periodicity of the forecasts also means the source data is available and contemporary while the data is accessible to BRCP stakeholders (notwithstanding the subscription nature of the service). As outlined in **Table 3**, Consensus Economics includes the data sources identified by stakeholders during the 2023 BRCP process, including IHS Markit[5] (prior to 2022), S&P Global[6] and the Commonwealth Department of Industry, Science and Resources.[7]

[5] https://www.erawa.com.au/cproot/22992/2/Australian-Energy-Council6.pdf

[6] https://www.erawa.com.au/cproot/22991/2/Alinta-Energy9.pdf

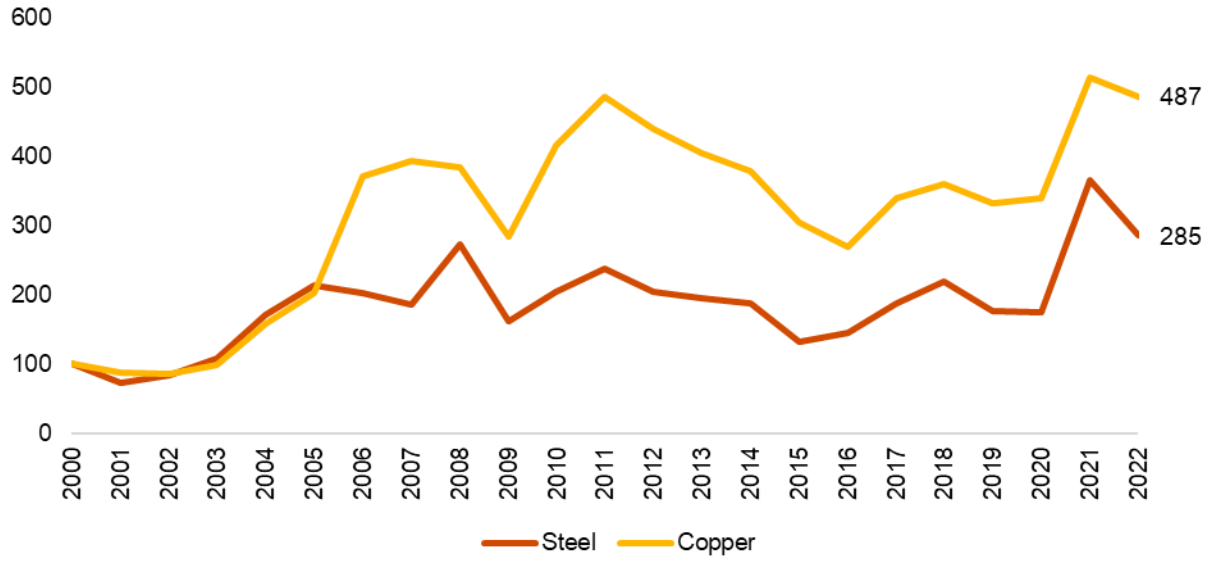
[7] https://www.erawa.com.au/cproot/22992/2/Australian-Energy-Council6.pdf

Table 3: Consensus Economics, list of forecasters (June 2023)

European Steel	Chinese Steel	US Steel	Copper	
BoA Securities	BMO	BoA Securities	ANZ	Euromonitor International
Capital Economics	BoA Securities	Capital Economics	Australia Dept of Industry	ISGR
ISGR	Capital Economics	Liberum Capital	Banco de Credito del Peru	JP Morgan
Liberum Capital	Liberum Capital	Macquarie	Bank Julius Baer	Liberum Capital
Macquarie	Macquarie	MEPS	BMO	Macquarie
MEPS	MEPS	Oxford Economics	BoA Securities	Moody's Analytics
Oxford Economics	Oxford Economics	S&P Global Mkt Intel	Capital Economics	Morgan Stanley
S&P Global Mkt Intel	Pezco Economics		Citigroup	Oxford Economics
	S&P Global Mkt Intel		Commerzbank	Pezco Economics
			Deutsche Bank	Prometeia
			Econ Intelligence Unit	RBC Capital Markets
			Goldman Sachs	S&P Global Mkt Intel
			ING Bank	Societe Generale
			Investec	Standard Chartered
				TD Securities
				UBS

Pricing for both steel and copper is relatively volatile and prices in 2021 and 2022 showed greater than average levels of variation (see **Figure 4**). 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 4: Global steel and copper price index (2000-2022, 2000 prices = 100)

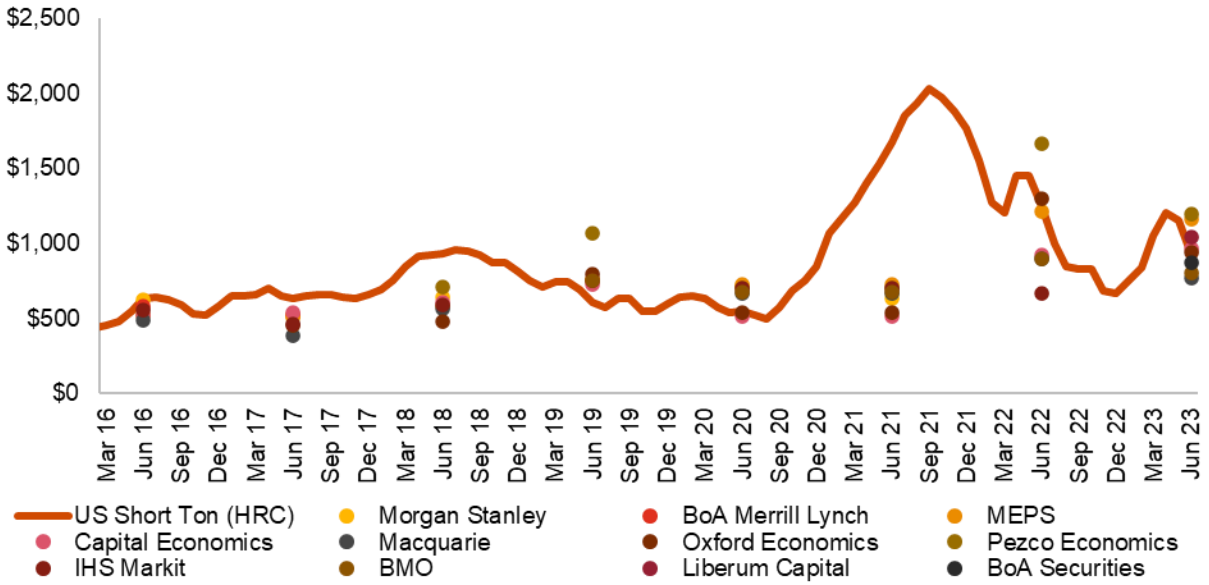


Source: IbisWorld

The year-on-year price increases in 2021 for copper and steel were not captured in any of the forecasts compiled by Consensus Economics which broadly assumed a year-on-year price decrease for US steel and for global copper (see

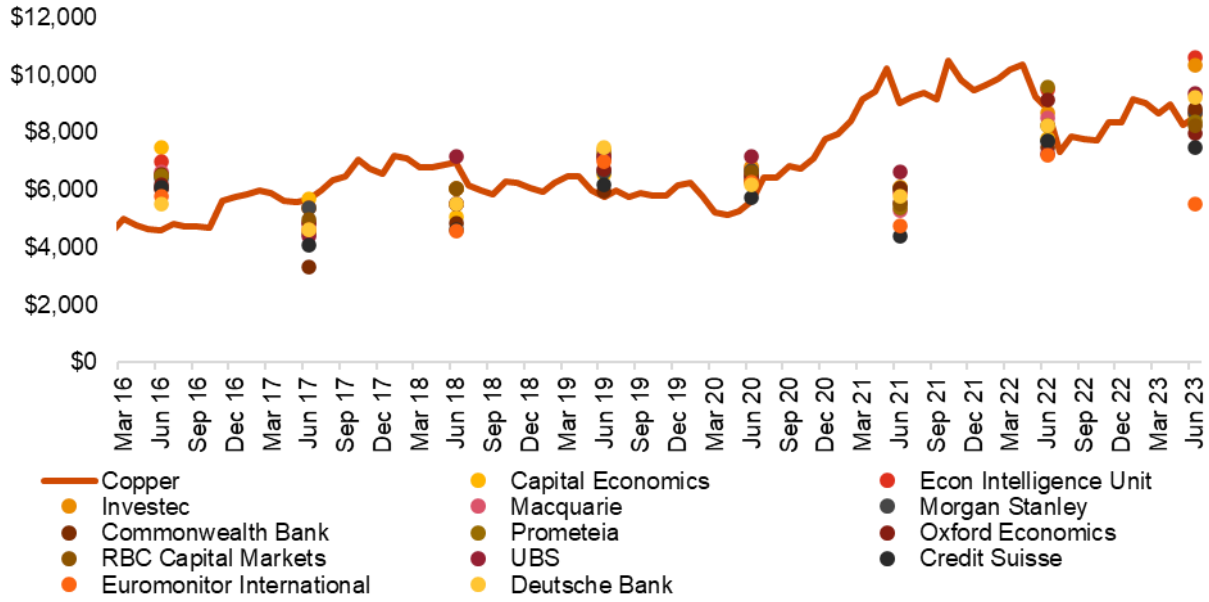
Figure 5 and **Figure 6**). The significant price variances over the last two years are atypical and, for both steel and copper, it is evident that no individual market forecaster published a forecast close to the actualised price movement in 2021. Any forecast would likely have understated the actual price change, regardless of which source/approach may have been applied. In the following period (2022) the forecast ranges spanned the actual price, though for steel particularly the difference between the highest and lowest forecast was significant – upwards of $1,000 USD.

Figure 5: US HRC steel price forecasts ($USD, short ton, March 2016 - June 2023)



Source: Consensus Economics. Note this Figure is not directly comparable to Figure 1 as that represents a 'blended' global steel price while this reflect reflects the price of US steel.

Figure 6: Copper price forecasts ($USD, metric tonne, March 2016 - June 2023)



Source: Consensus Economics

2.2 AUD/USD exchange rate

For the determination of cost escalation factors for the 2024 BRCP, PwC recommends amending the approach used in past years by expanding the number of forecasters used and using a 'long-run average approach' to estimating the AUD/USD exchange in the 'outer' forecast years.

Previously, PwC recommended applying the average of the most recent forecasts published by the 'Big Four' Australian Banks for the first three years of the forecast period and thereafter holding the exchange rate constant for the remainder of the forecast period.

PwC recommends increasing the number of forecasters by including forecasts from Macquarie and ING. A combination of market forecasters is the preferred basis for deriving the relevant exchange rate component of the cost escalation factors and the aggregation of forecasts has an advantage of reducing the risk of the cost escalation factors being impacted by bias or error in any one institution's projections.

PwC also considers it appropriate to incorporate a 'long-run average' approach to cover the outer years of the forecast period, noting most publications from the Big Four banks, ING and Macquarie cover a period of no more than three years. This is a preferrable alternative to leaving the exchange rate static over the final two years of the forecast period.

For the 2023 BRCP (and methodologically consistent with the earlier estimates), PwC recommended applying the average of the most recent forecasts published by the 'Big Four' Australian Banks for FY23 to FY25, and thereafter holding the exchange rate constant for the remainder of the forecast period.

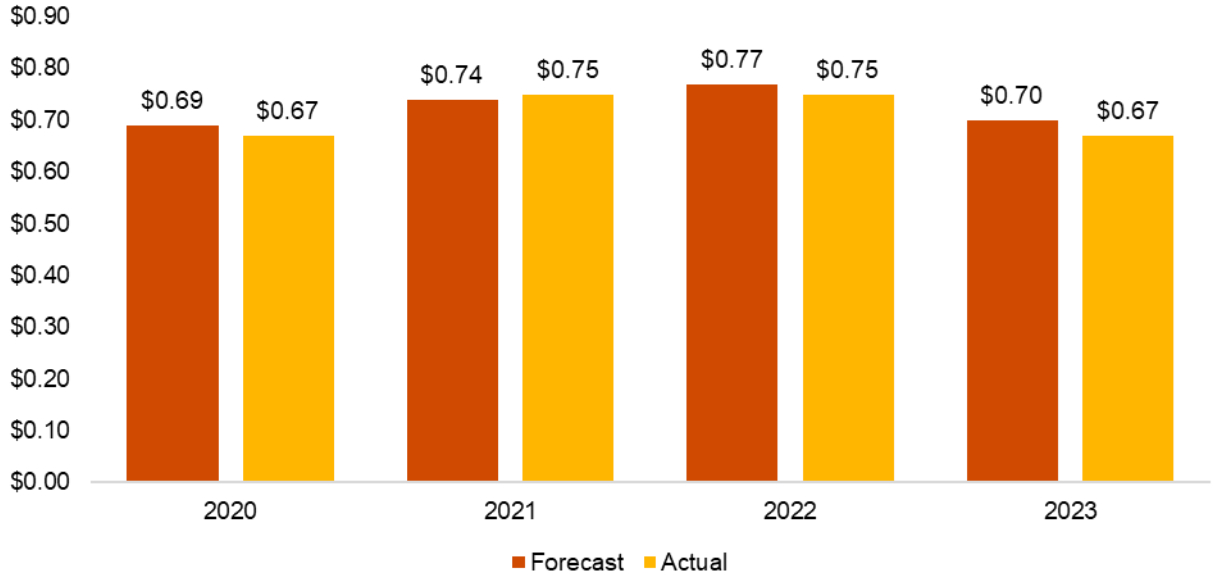
Table 4 presents the AUD/USD projections made between 2019 and 2023 for the forthcoming years by PwC compared to the actual value for that year. **Figure 7** outlines the forecast made for the first year of each BRCP period (highlighted orange in the Table) in comparison to the actual value for the financial year.

Generally, the projected exchange rate, using the previous BRCP methodology, has performed well, with the notable exception of 2023 where the actual exchange rate was materially lower than any of the forecasts indicated in the previous 2019 to 2023 BRCPs (with that variance most observable for the 2023 period forecasts included in each of the 2021 and 2022 BRCPs).

Table 4: AUD/USD projections by financial year

Metric		2020	2021	2022	2023	2024
AUD/USD projection	2019 BRCP	0.73	0.74	0.75	0.77	
	2020 BRCP	0.69	0.73	0.74	0.74	0.74
	2021 BRCP		0.74	0.78	0.79	0.79
	2022 BRCP			0.77	0.79	0.77
	2023 BRCP				0.70	0.75
AUD/USD actual		0.67	0.75	0.75	0.67	na

Figure 7: AUD/USD projections by financial year



Source: Reserve Bank of Australia, prior PwC forecasts

2.2.1 Potential sources for forecasting the AUD/USD exchange rate

There are a range of data sets and indices that could form the basis of the exchange rate forecasts.

Table 5 sets out a range of potential sources which have been categorised as market forecasters and government agencies.

Table 5: Potential exchange rate sources

Market forecasters	Government agencies
Commonwealth Bank	Commonwealth Treasury
ANZ	Reserve Bank of Australia
Westpac	WA Treasury
NAB	
ING	
Macquarie Bank	
CIBC Capital Markets	

Beyond using exchange rate projections derived from different forecasters, another approach to forecasting exchange rates is to apply a 'Long Run Average' model. The Western Australia Treasury's Forecasting review in October 2009 noted that *"taking the budget period as a whole, we find that the best performing model is the Long Run Average (or LRA) model, which assumes that the $US/$A exchange rate reverts to its average value in a linear fashion over the course of the forward estimates period (i.e. four years).*[8]

[8] https://www.wa.gov.au/system/files/2020-01/economic-research-papers-exchange-rate-forecasting-review.pdf

2.2.2 Assessment of alternative methods, measures, and indexes

Table 6 sets out the projected AUD/USD exchange rates for the identified data sources. The BRCP forecasts have performed relatively well compared to the individual market forecasters and Government agencies. Of the forecasters included in the table, only the Commonwealth Bank (2.4 per cent) had a smaller annual average difference (in percentage terms) between the projected exchange rate and the actual exchange rate over the three-year period than the BRCP forecasts (2.8 per cent).

Table 6: AUD/USD projections/assumptions by financial year

Forecaster		2021	2022	2023	Average Δ	Average %Δ
AUD/USD actual	AUD/USD	0.75	0.75	0.67		
BRCP forecasts	AUD/USD	0.74	0.77	0.70		
	Δ	-0.01	0.02	0.03	0.01	2.8%
Commonwealth Bank	AUD/USD	0.75	0.73	0.64		
	Δ	0.00	-0.02	-0.03	-0.02	2.4%
ANZ	AUD/USD	0.75	0.78	0.75		
	Δ	0.00	0.03	0.08	0.04	5.3%
Westpac	AUD/USD	0.75	0.79	0.76		
	Δ	0.00	0.04	0.09	0.04	6.3%
NAB	AUD/USD	0.70	0.79	0.72		
	Δ	-0.05	0.04	0.05	0.01	6.5%
ING	AUD/USD	0.72	0.77	0.71		
	Δ	-0.02	0.02	0.04	0.00	5.5%
Macquarie	AUD/USD			0.66		
	Δ			-0.01	-0.01	1.5%
CIBC Capital Markets	AUD/USD	0.72	0.80	0.81		
	Δ	-0.03	0.05	0.14	0.05	10.5%
Commonwealth Treasury	AUD/USD	0.72	0.77	0.72		
	Δ	-0.03	0.02	0.05	0.01	4.7%
RBA	AUD/USD	0.64	0.77	0.71		
	Δ	-0.11	0.02	0.04	-0.02	7.8%
Western Australia Treasury	AUD/USD	0.73	0.74	0.75		
	Δ	-0.02	-0.01	0.08	0.02	5.3%
Long-Run average	AUD/USD	0.69	0.75	0.75	0.01	
	Δ	-0.06	0.00	0.08	0.-01	6.6%

Source: Bloomberg, Commonwealth Treasury, Macquarie, RBA, Western Asutralian Treasury. Note PwC does not have access to a full suite of historic data for some forecasters including Macquarie.

This analysis shows how a combination of price forecasts from market forecasters has performed well compared to any other single source, with the possible exception of CBA and Macquarie. Similar to steel/copper price forecasts, a combination of market forecasters is the preferred basis for deriving the relevant exchange rate component of the CEFs. That aggregation of forecasts has the advantage of reducing the risk of the CEF being impacted by bias or error in any one institution's projections.

Acknowledging feedback from stakeholders to the 2023 BRCP, inclusion of ING's (and Macquarie's) forecasts as part of the averaging base is appropriate as the forecasts have performed broadly comparably to the 'Big Four' banks, and that adds a further layer of source diversification to the exchange rate estimate.

PwC also considers it appropriate to incorporate the long-run average approach to cover the outer years of the forecast period, noting most publications from the Big Four banks, ING and Macquarie cover a period of no more than three years presents, being a preferrable alternative to leaving the exchange rate static over the final two years of the forecast period.

2.3 Labour cost escalation factors

For the determination of cost escalation factors for the 2024 BRCP, PwC recommends developing separate series for construction and operations/maintenance work as the two series measure separate components of the labour force. Noting the ABS does not publish industry-specific wage data at a state/territory level, PwC has reviewed the past performance of the Western Australia Treasury forecasts and the Western Australia Chamber of Commerce and Industry forecasts and note the forecasts have performed relatively similarly in recent years in aggregate terms.

With limited differentiation between the performance of the two series over recent years, and the timeliness of the Treasury forecasts (typically published in May while the CEFs are typically developed in July/August), PwC considers it appropriate to maintain the Treasury forecasts, blended with historical industry-based wage price figures, as the basis of the future cost escalation factors but recommend continuing to monitor the performance of both series.

As with past iterations of the cost escalation factors, PwC developed separate series for construction and operations/maintenance work for the 2022 BRCP cost escalation factors 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. These factors are specific to labour costs for building and maintaining a power plant in the SWIS.

There forecasts were based on the Western Australian Treasury forecasts included in the 2022-23 budget with an industry specific delta applied. These industry specific deltas 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.

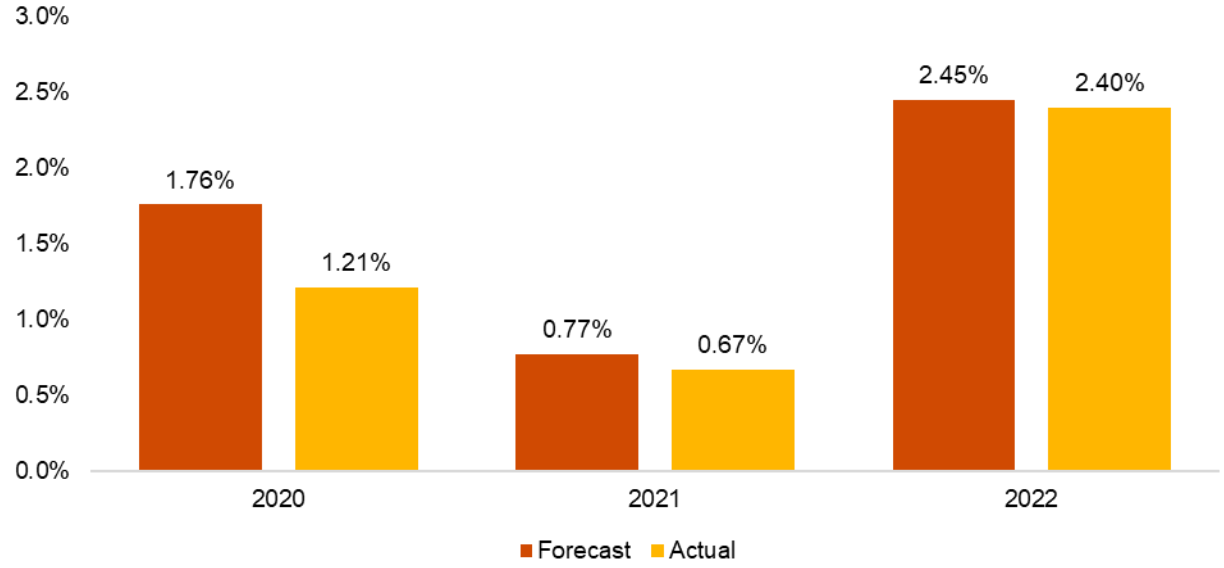
The ABS does not publish industry-specific wage data at a state/territory level. Noting this, the 'actual' labour costs outlined in **Figure 8** and **Figure 9** use the same-industry specific deltas applied in the BRCP CEF report and represent proxy values rather than representing any official benchmark. These industry specific deltas have been applied to the ABS Wage Price Index (WPI) series[9] for Western Australia (whereas the forecast

[9] While PwC considers WPI 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, PwC notes 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.

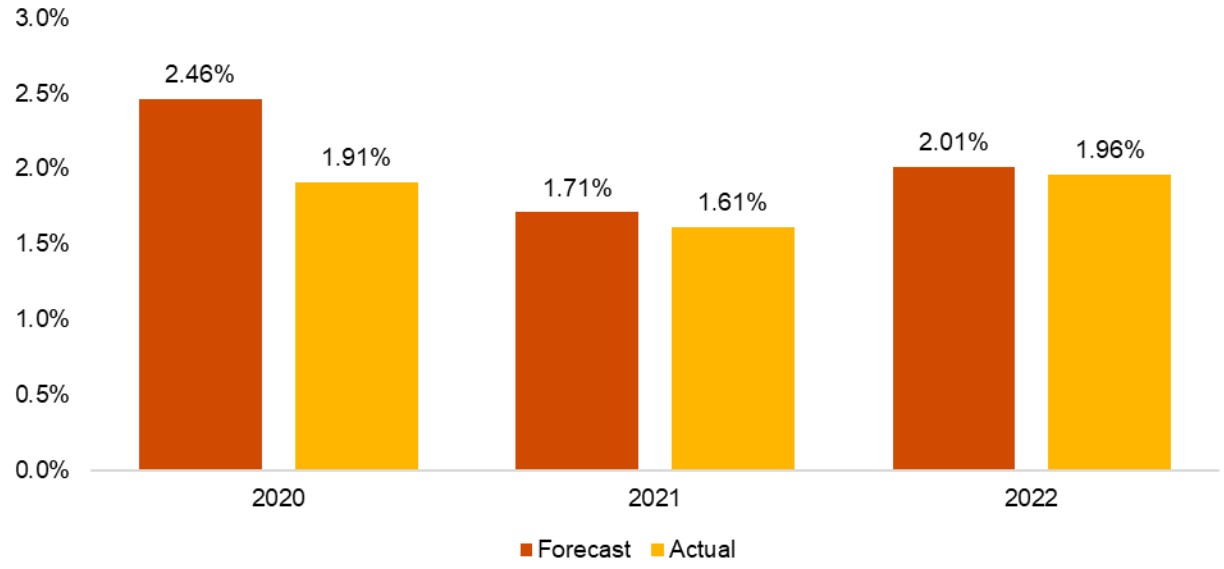
values are based on the Western Australian's Treasury forecasts) and the differences outlined in both figures are reflective of an 'upside' bias included in the wage forecasts in the Western Australia Budget Papers.[10]

Figure 8: Labour costs projections by financial year (construction)



Source: ABS, prior PwC forecasts

Figure 9: Labour costs projections by financial year (construction)



Source: ABS, prior PwC forecasts

2.3.1 Potential sources for forecasting the labour cost escalations

Noting the labour cost factors are specific building and maintaining a power plant in the SWIS, there are few comparable benchmarks or forecasts available. Other than the Western Australia Treasury, only the Western

[10] PwC analysis of Western Australia Treasury budget papers has shown a consistent upward trajectory which have largely not materialised. See, for instance, PwC (2020) 2021-BRCP CEF (Figure 2.2). Note the 2021-22 and 202-23 budget papers outlined projections which were broadly in-line with wages (being higher than actual WPI growth by just 0.10% and 0.05% respectively).

Australian Chamber of Commerce and Industry (CCI) publishes recurring forecasts (twice annually) capturing Western Australian wage prices.

2.3.2 Assessment of alternative methods, measures, and indexes

As detailed in **Table 7**, the Treasury and CCI forecasts have performed relatively similarly in recent years in aggregate terms. Noting the performance of the two series over recent years, and the timeliness of the Treasury forecasts (typically published in May while the CEFs are typically developed in July/August), PwC considers it appropriate to maintain the Treasury forecasts as the basis of the 2024 BRCP CEF but recommend continuing to monitor the performance of both series.

Table 7: Western Australian wage price projections/assumptions by financial year

Forecaster		2021	2022	2023	Average Δ
ABS	WPI	1.70%	1.40%	2.20%	
Western Australia Treasury	WPI	2.25%	1.50%	2.25%	
	Δ	0.55%	0.10%	0.05%	0.23%
Western Australia CCI	WPI	1.70%	0.50%	2.20%	
	Δ	0.00%	-0.90%	-0.00%	-0.30%

Appendix 1: Steel and copper projections by financial year

Table 8: Steel price (USD per metric tonne) projections by financial year

Metric		2020	2021	2022	2023	2024
Steel price projections (USD)	2019 BRCP	575	575	690	691	
	2020 BRCP	546	547	542	556	555
	2021 BRCP		501	527	531	535
	2022 BRCP			1,055	776	680
	2023 BRCP				666	636
Steel price 'actuals' (USD)	-	541	835	1,238	767	
Steel price % Δ	2019 BRCP	-9.99	0.02	0.52	0.19	
	2020 BRCP	-10.68	0.08	-0.87	2.61	-0.24
	2021 BRCP		-6.57	5.12	0.86	0.64
	2022 BRCP			24.42	-26.45	-12.41
	2023 BRCP				-45.59	-1.94
Steel price 'actuals' % Δ	-	-18.66	54.45	48.26	-38.08	

Table 9: Copper price (USD per metric tonne) projections by financial year

Metric		2020	2021	2022	2023	2024
Copper price (USD)	2019 BRCP	7,037	7,158	7,175	7,193	
	2020 BRCP	6,367	6,738	6,876	7,189	7,182
	2021 BRCP		6,153	6,324	6,429	6,631
	2022 BRCP			8,966	8,367	8,024
	2023 BRCP				7,751	7,821
Copper price 'actuals' (USD)	-	5,727	7,965	9,656	8,335	
Copper price % Δ	2019 BRCP	6.11	1.71	0.24	0.25	
	2020 BRCP	0.67	5.83	2.05	4.55	-0.09
	2021 BRCP		8.60	2.90	1.18	3.57
	2022 BRCP			7.61	-6.68	-4.11
	2023 BRCP				-25.56	3.58
Copper price 'actuals' % Δ		-6.53	39.07	21.23	-13.68	

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