



**Economic Regulation Authority**

# 2024 benchmark reserve capacity price for the 2026/27 capacity year

Draft determination

4 October 2023

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## Invitation to make submissions

**Submissions are due by 4:00 pm WST, Wednesday, 8 November 2023**

The ERA invites comment on this paper and encourages all interested parties to provide comment on the matters discussed in this paper and any other issues or concerns not already raised in this paper.

We would prefer to receive your comments via our online submission form <https://www.erawa.com.au/consultation>

You can also send comments through:

Email: [publicsubmissions@erawa.com.au](mailto:publicsubmissions@erawa.com.au)

Post: Level 4, Albert Facey House, 469 Wellington Street, Perth WA 6000

Please note that submissions provided electronically do not need to be provided separately in hard copy.

All submissions will be made available on our website unless arrangements are made in advance between the author and the ERA. This is because it is preferable that all submissions be publicly available to facilitate an informed and transparent consultative process. Parties wishing to submit confidential information are requested to contact us at [info@erawa.com.au](mailto:info@erawa.com.au).

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## Executive summary

The Economic Regulation Authority has made its draft determination that the 2024 benchmark reserve capacity price (BRCP) will be \$220,700 per megawatt per year. The ERA will consider stakeholder submissions to this draft determination before making its final determination.

The BRCP is an input into the calculation of the reserve capacity price, which is the price paid to generators for each megawatt (MW) of reserve capacity that they make available in that year.<sup>1</sup> The Australian Energy Market Operator (AEMO) uses the 2024 BRCP to determine the reserve capacity price for the 2026/27 capacity year – this is part of the Reserve Capacity Mechanism (RCM).<sup>2</sup>

The RCM aims to ensure sufficient capacity in the SWIS so that electricity is available when required. It provides price signals for capacity providers, like generators, to enter the market. The revenue from reserve capacity payments adds to other revenues from generating electricity and providing essential system services to provide an overall return for investors.

The BRCP is an estimate of the annualised cost to build and connect a hypothetical 160 MW liquid fuelled open cycle gas turbine generator to provide reserve capacity to the South West Interconnected System. The BRCP market procedure sets out the size, type of generator and method to calculate the BRCP, which the ERA has followed in making this draft determination.

The 2024 BRCP draft determination of \$220,700 per MW per year is 14.1 per cent higher than the 2023 BRCP (\$193,400 per MW per year).<sup>3</sup> The change is primarily due to an increase in capital costs.

This report details how the ERA made its BRCP draft determination. The ERA used data and analysis from consultants (GHD Advisory and PricewaterhouseCoopers), Western Power and Landgate to determine the 2024 BRCP. These reports are available on the ERA's website.<sup>4</sup>

The ERA used the current market procedure, as required by the rules, to determine the 2024 BRCP calculation. This procedure does not currently account for the Network Access Quantity or penalties for high emissions technologies which have potential implications for the BRCP reference technology. Energy Policy WA is undertaking reviews of the reserve capacity mechanism and investment certainty that cover these policies. The BRCP method review will commence following the completion of these reviews when the implications for the reference technology are understood. The procedure will be amended following the method review.

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<sup>1</sup> All holders of capacity credits receive capacity payments. Although generators are the largest capacity credit holders, capacity credits can be provided to storage and demand side programmes. Generators that do not participate in the reserve capacity mechanism (or are ineligible) do not receive capacity payments.

<sup>2</sup> The reserve capacity timeline is defined in the Wholesale Electricity Market Rules (WA), 22 Jul 2023, ([online](#)).

<sup>3</sup> The 2023 BRCP determination is available on the ERA's website – Economic Regulation Authority, 'Benchmark Reserve Capacity Price', ([online](#)).

<sup>4</sup> Economic Regulation Authority, 'Benchmark Reserve Capacity Price', ([online](#)).

# 1. Introduction

To ensure reliable supply of electricity, generation needs to continuously meet consumer demand. To achieve this, Western Australia's Wholesale Electricity Market (WEM) uses the reserve capacity mechanism (RCM) to provide an investment signal to install capacity in the SWIS.

AEMO sets the reserve capacity requirement (RCR) two years ahead of a capacity year.<sup>5</sup> The RCR supports AEMO to ensure the reliability standard for the SWIS is met and sufficient capacity will be available.<sup>6</sup> Facilities are allocated certified reserve (expressed in MWs) based on their expected contribution to system reliability.

Certified reserve capacity suppliers, which are mostly generators, are paid to make capacity available during the reserve capacity year regardless of whether they physically supply electricity.<sup>7</sup> The payment is based on the number of reserve capacity they hold and the applicable price to each unit of reserve capacity – the reserve capacity price.

AEMO determines the reserve capacity price, which varies year to year based on the BRCP and the WEM's level of excess reserve capacity, beyond that required to meet the reliability planning criterion.<sup>8,9</sup>

The BRCP, stated in dollars per megawatt per year, is a forecast annualised cost estimate to build a new 160 MW liquid fuelled open cycle gas turbine generator set (OCGT) to provide capacity to the SWIS for a capacity year commencing two years into the future.<sup>10</sup> The 2024 BRCP assessment applies to the 2026/27 capacity year. A capacity year commences on 1 October each year.<sup>11</sup> The BRCP is based on a bottom-up, annualised cost estimate for the benchmark generator.<sup>12</sup> The cost estimate consists of:

- Fixed operating and maintenance costs for the power station, fuel handling, and transmission connection components.
- Land costs.
- Liquid fuel storage and handling facilities.
- Transmission connection costs.

<sup>5</sup> Wholesale Electricity Market Rules (WA) 22 July 2023, Rule 4.6.1, ([online](#)).

<sup>6</sup> The required amount of reserve capacity for a particular capacity year is based on the reliability standard which is part of the planning criterion in the Wholesale Electricity Market Rules (WA), 22 July 2023, Rule 4.5.9, ([online](#)). Excess reserve capacity is based on how much more reserve capacity is being offered into the SWIS relative to the amount required under the planning criterion.

<sup>7</sup> For convenience, the term 'generators' has been used to refer to suppliers of reserve capacity as they are the dominant group. All providers of capacity are remunerated through the reserve capacity mechanism, which includes demand side programmes and storage (i.e., batteries, hydro, etc).

<sup>8</sup> AEMO conducts the reserve capacity price determination process with the reserve capacity timeline defined under Wholesale Electricity Market Rules (WA), 22 July 2023, Rule 4.1, ([online](#)).

<sup>9</sup> The amount of capacity required in a capacity year is determined by the Long Term Projected Assessment of System Adequacy study which AEMO conducts. The results are published annually in AEMO's Electricity Statement of Opportunities.

<sup>10</sup> The power station that the BRCP must be based on is defined as a 160 MW OCGT under section 2.1 of the *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, ([online](#)).

<sup>11</sup> Wholesale Electricity Market Rules (WA), 22 July 2023, Rule 4.1, ([online](#)).

<sup>12</sup> Details of the power station requirements are defined in section 2.1 of the *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, ([online](#)). The power station must be able to operate on distillate fuel. All OCGT references in this determination refer to an OCFT that must be able to run on distillate fuel.

- Other ancillary and infrastructure costs that are normally incurred when developing a power station.
- Allowances for legal, insurance, financing, and environmental approvals costs including a contingency margin.

The ERA is responsible for determining the benchmark reserve capacity price. The WEM rules require the ERA to use the market procedure to guide an annual review of the price. This includes public consultation on a draft determination that outlines how the proposed value was derived.<sup>13,14</sup>

The ERA will consider stakeholder submissions to this draft determination before making its final determination by the end of 2023.

Throughout this determination:

- References to the market procedure refer to the BRCP market procedure unless otherwise specified.<sup>15</sup>
- Cost and price estimates are in Australian dollars excluding Goods and Services Tax unless otherwise specified.
- All references to the 2024 BRCP refer to the ERA's BRCP draft determination price of \$220,700 per MW per year applicable to the 2026/27 capacity year, unless otherwise specified.<sup>16</sup>

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<sup>13</sup> Wholesale Electricity Market Rules (WA), 22 Jul 2023, rule 4.16.3 ([online](#)).

<sup>14</sup> Wholesale Electricity Market Rules (WA), 22 Jul 2023, rule 4.16.6 ([online](#)).

<sup>15</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, ([online](#)).

<sup>16</sup> This is not to be mistaken for the BRCP that applies to the 2024/25 capacity year.

## 2. Scope of the BRCP

The 2024 BRCP must include all reasonable costs expected when developing a power station for the 2026/27 capacity year. The market procedure details how the BRCP components must be calculated. The major components are:

- An annualised fixed operating and maintenance component, which includes:
  - transmission connection costs
  - land costs
  - fixed fuel costs
  - a margin for other costs including approvals, legal and financing.
- the annualised total capital cost of the power plant.

To determine the 2024 BRCP, the ERA has followed the market procedure and used public information and advice from consultants, Western Power and Landgate.

### 2.1 Future considerations for the BRCP determination

Market reforms including network access quantities (NAQ) and the treatment of high emissions technologies have potential bearing on the calculation of the BRCP. For example, the NAQ reflect how capacity constraints in the electricity network may limit the available capacity from generators. The current market procedure does not specify a location for a benchmark generator. Instead, estimation of relevant costs is based on an average of six regions.<sup>17</sup> However, the NAQ may make some regions less favourable than others. Also, incorporating penalties for emissions intensity through the capacity mechanism may have implications for the selection of reference technology.

Energy Policy WA (EPWA) is currently reviewing the reserve capacity mechanism and its review on WEM Investment Certainty will consider how to apply emissions penalties through the reserve capacity mechanism. The scope of these reviews includes the BRCP reference technology. The outcomes of these reviews may require changes to the BRCP method scheduled for review in coming months and subsequently the market procedure.<sup>18,19</sup> Updates to the market procedure will be informed by the outcomes of underpinning policy decision on reference technology.

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<sup>17</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, section 2.7, ([online](#)).

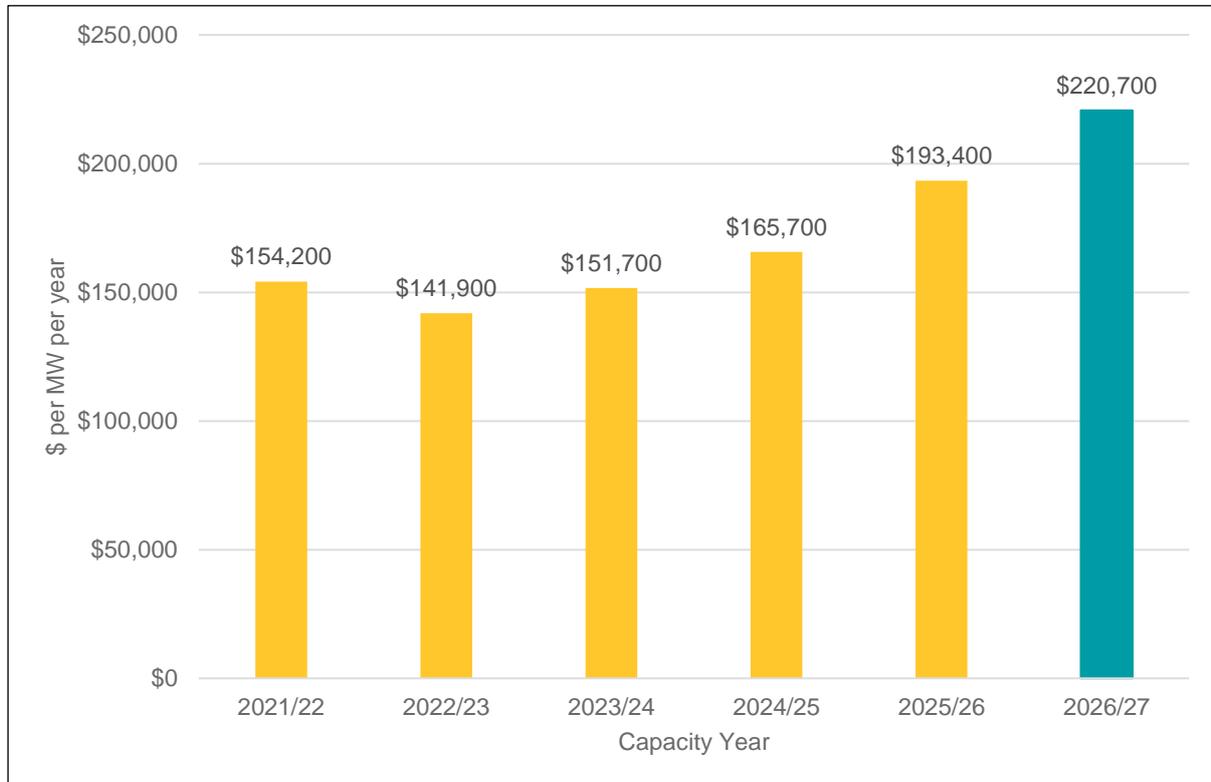
<sup>18</sup> The update of the market procedure will include changes to reflect the transfer of responsibility from AEMO to the ERA.

<sup>19</sup> The ERA has an obligation to review the BRCP calculation method every five years. Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, section 2.11, ([online](#)).

### 3. The BRCP calculation

The ERA has determined that the draft 2024 BRCP is \$220,700 per MW per year for the 2026/27 capacity year.<sup>20</sup> Figure 1 shows the BRCP since the 2021/22 capacity year.

**Figure 1: BRCP from 2021/22 by capacity year including 2024 BRCP draft determination**



Source: ERA analysis of BRCP data.

The formula for calculating the BRCP as stated in the market procedure is:<sup>21</sup>

$$BRCP = \text{Annualised Fixed Operations and Maintenance} + \frac{\text{Annualised Capital Costs}}{\text{Expected Capacity Credits}}$$

Table 1 provides a comparison of the 2024 BRCP draft determination and its components against the 2022 BRCP values.

<sup>20</sup> Wholesale Electricity Market Rules (WA), 22 Jul 2023, Rule 4.16, ([online](#)).

<sup>21</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, clause 2.10.1, ([online](#)).

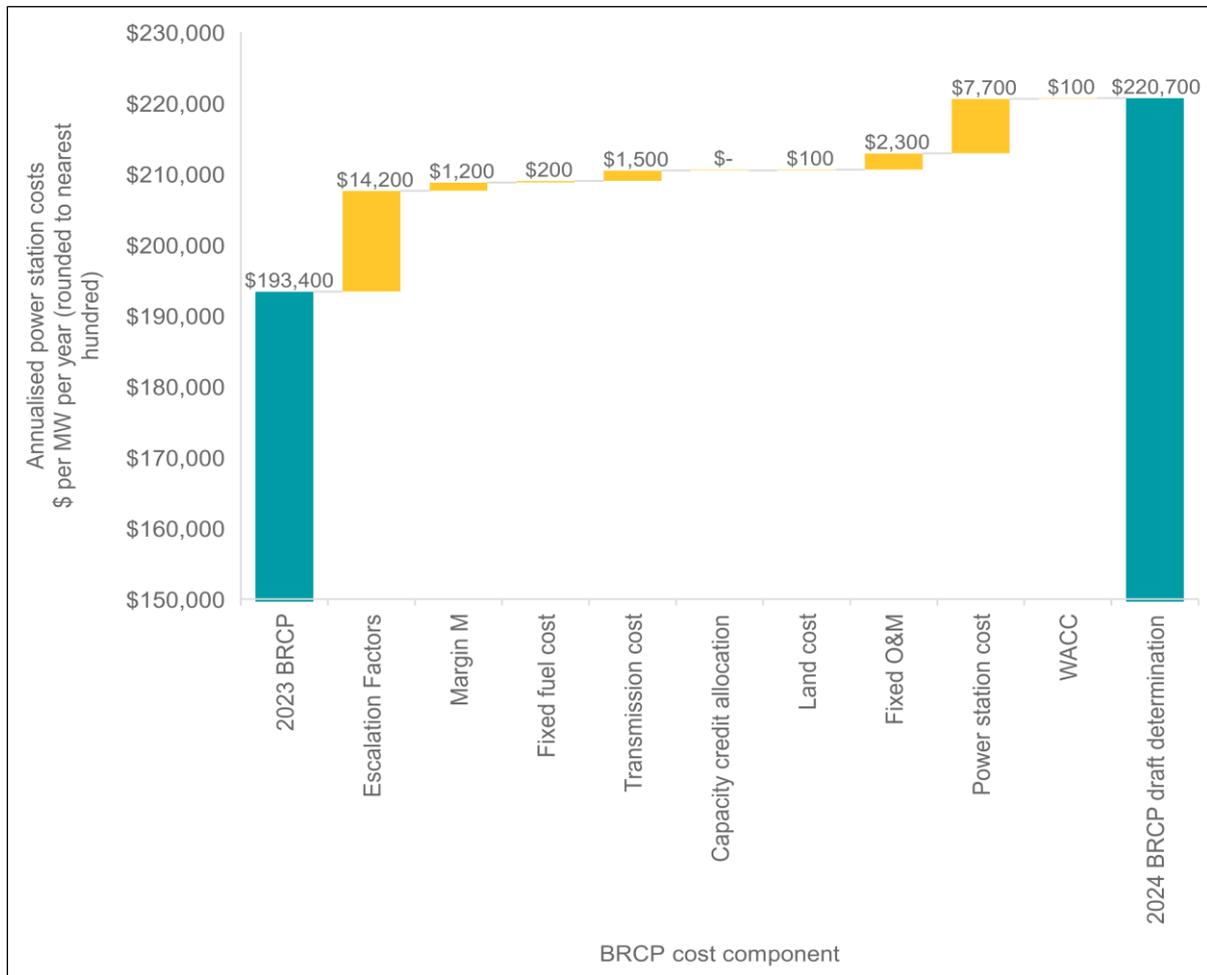
**Table 1: 2024 BRCP draft determination values compared to the 2023 BRCP values**

Component	2024 BRCP draft determination	2023 BRCP	Change from 2023	
			(\$)	(%)
<b>BRCP (\$/MW/Year)</b>	<b>220,700</b>	<b>193,400</b>	<b>27,300</b>	<b>+14.1</b>
Annualised capital costs (\$/Year)	27,474,573	23,757,776	3,716,797	+15.6
Annualised fixed O&M costs (\$/MW/Year)	38,916	36,228	2,688	+7.4
Expected capacity credits (MW)	151.17	151.17	-	-

Source: ERA analysis of BRCP data

Figure 2 illustrates the change between the 2024 BRCP draft determination and 2023 BRCP by cost component. All components of the 2024 BRCP increased with the largest incremental increases due to power station costs, primarily driven by increased cost escalation factors. The breakdown of the different components of the annualised capital costs is detailed in Chapter 4 and further in Appendix 4, with the annualised fixed operations and maintenance (O&M) costs discussed in Chapter 5 and further in Appendix 5.

**Figure 2: Changes between the 2024 draft determination and 2023 BRCP by cost component**



Source: ERA analysis of BRCP data

### 3.1 Expected capacity credits

The expected capacity credits for a 160 MW OCGT entering the SWIS for the 2026/27 capacity year is 151.17 MW. The generator's expected capacity credits are determined based on the expected output of the generator operating at 41°C, adjusted for site conditions including likely output at 41°C, humidity and other relevant factors, as required by the market procedure.<sup>22</sup> The ERA's consultant, GHD Advisory (GHD), assessed generators worldwide and recommended one to use as a proxy for the ERA to derive the expected capacity credits for this determination.<sup>23</sup>

The expected capacity credits for the reference generator are unchanged from the 2023 BRCP (151.17 MW).

<sup>22</sup> Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, section 3.4 ([online](#)); and *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, clause 2.3.1, ([online](#)).

<sup>23</sup> Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, section 3.2 to 3.4 ([online](#)).

## 4. Annualised capital costs of the power station

The 2024 BRCP annualised capital costs of the reference generator is approximately \$27.5 million, which is 15.6 per cent or \$3,716,797 higher than the 2023 BRCP annualised capital costs. This component is the largest contributor to the 2024 BRCP increase. The increase in the annualised capital costs in the 2024 BRCP draft determination was primarily due to increases to power station costs, driven by increased cost escalation factors.

Table 2 shows the change in the cost components between the 2023 BRCP and the 2024 BRCP draft determination. The main drivers affecting the annualised capital cost components of the BRCP (power station costs) are discussed below with the remaining items discussed in Appendix 4.

**Table 2: Annualised components for the 2024 BRCP draft determination against 2023 BRCP values**

Cost Component	2024 BRCP draft determination	2023 BRCP	Change from 2023	
			(unit)	(%)
<b>Annualised capital cost (\$/year)</b>	<b>27,474,573</b>	<b>23,757,776</b>	<b>3,716,797</b>	<b>+15.6</b>
Power station cost (\$/MW)	974,854	819,378	155,476	+19.0
Margin 'M' costs (%)	16.35	16.42	Down 7 basis points	-0.4
Transmission cost (\$/MW)	207,493	195,935	11,558	+5.9
Fixed fuel cost (\$)	8,532,826	8,632,788	-99,962	-1.2
Land cost (\$)	3,058,672	3,048,874	9,798	+0.3
WACC (%)	8.83	8.82	Up 1 basis point	+0.1
Expected capacity credits (MW)	151.17	151.17	-	-

Source: ERA analysis of BRCP data

Note: The change in the values correspond to each cost component, not the total draft BRCP. Individual components do not result in a like for like increase on the total draft BRCP due to the operation of the calculation specified in the BRCP market procedure.<sup>24</sup>

### 4.1 Power station costs

Power station development costs increased from \$819,378 in 2023 to \$974,854 per MW in 2024 (up 19 per cent from 2023) mostly driven by increases to the input costs driven by the cost of raw materials.

<sup>24</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, clause 2.10.1, ([online](#)).

The escalation factor is applied to the current price of the reference generator to derive an estimated future cost of the power station. The overall power station cost increased as a higher power station escalation factor was used for the 2024 BRCP draft determination. The power station escalated cost is expected to increase by 1.3 per cent over the three years to 2026/27.<sup>25</sup>

#### 4.1.1 Cost escalation factors

Cost escalation factors are required for the development of the BRCP determination. The cost escalation factors include the AUD/USD exchange rate, steel, copper and labour costs. The cost escalation factors are provided to the power station consultant who use them as an input to determine capital, fixed operational and maintenance escalation factors that are applied to the power station costs.<sup>26</sup>

The BRCP assumes the hypothetical 160 MW OCGT generator would be built two years into the future and forecasts for these input costs are required to estimate the cost of building the power plant in time for the 2026/27 capacity year.<sup>27</sup> The ERA engaged PricewaterhouseCoopers (PwC) to forecast the cost escalation factors for the 2024 BRCP.

In the 2023 BRCP final determination, following feedback from stakeholders,<sup>28</sup> the ERA committed to consider alternative data sources for the calculation of cost escalation factors.<sup>29</sup> In preparation for the 2024 BCRP, ERA engaged PwC to review existing and alternative data sources to determine if alternatives could provide more accurate forecasts for the BRCP cost escalation factors.

PwC recommended retaining the sources and approach used in prior years for steel and copper prices, and labour cost escalation factors. On review of the approach used for the AUD/USD, PwC recommended expanding the number of data sources for exchange rates from 4 to 6 and using a 'long-run average approach' to estimate the AUD/USD in outer forecast years.<sup>30</sup> The full report of the data source review is available on the ERA website.<sup>31</sup>

ERA accepted the recommendation to include two additional sources and use the long run average for out years. While it is unlikely to increase the accuracy of the forecast, it is not expected to have a detrimental effect. Adding additional sources may also moderate outlier forecasts from any one institution given not all sources forecast into years 2 and 3.

ERA also considered and accepted PwC's reasoning to retain the source for commodity cost escalation factors on the basis that although a subscription service, it aggregated a wide variety of forecasts. For labour costs, the ERA accepted the view that the timeliness of

<sup>25</sup> The 1.3 per cent is the overall escalation factor applied to the power station cost using the cost escalation factors from the 2024 BRCP. This is calculated as the final estimated cost of the generator relative to the cost of the generator today ( $(\$147,369,991 / \$145,464,441 - 1) * 100$ ) – Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, chapter 2 ([online](#)).

<sup>26</sup> Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, chapter 2 ([online](#)).

<sup>27</sup> This approach of applying cost escalation factors to the BRCP reference generator priced at today's costs had been used consistently in previous BRCP determinations.

<sup>28</sup> These submissions are available on the ERA's website – Economic Regulation Authority, 'Benchmark Reserve Capacity Price', ([online](#)).

<sup>29</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 Capacity Year: Final determination*, p.15, ([online](#)).

<sup>30</sup> Economic Regulation Authority, August 2023, *2024 Benchmark Reserve Capacity Price – Cost Escalation Factors Data Sources*, Report prepared by PwC, p.16 ([online](#)).

<sup>31</sup> Economic Regulation Authority, August 2023, *2024 Benchmark Reserve Capacity Price – Cost Escalation Factors Data Sources*, Report prepared by PwC ([online](#)).

Treasury forecasts provided a more current view of expected changes to labour costs. Table 3 summarises the updated year on year cost escalation factors used to inform the development of the 2024 BRCP draft determination.

**Table 3: Year on year cost escalation factors used to calculate the 2024 BRCP by financial year**

Cost Escalation Factor	Financial Year				
	2023/24	2024/25	2025/26	2026/27	2027/28
Labour costs – operations and maintenance (%)	4.12	3.87	3.37	3.12	3.12
Labour costs – construction (%)	4.02	3.77	3.27	3.02	3.02
AUD/USD (\$)	0.6983	0.7417	0.7733	0.7669	0.7605
Steel price (%)	-0.71	-10.85	-0.58	4.51	0.15
Copper (%)	-2.10	-1.90	-1.38	-0.98	1.00

Source: Economic Regulation Authority, August 2023, 2024 Benchmark Reserve Capacity Price, Report prepared by PwC (online)<sup>32</sup>

#### 4.1.2 Power station generator model selection

The ERA engaged GHD to assess the appropriate generator for the 2024 BRCP determination. GHD selected the Siemens SGT5-2000E as it most closely aligns with the power station requirements in the BRCP market procedure, including the output requirement at the specified site conditions, and provides good value in terms of capital and O&M costs.<sup>33</sup> The power station requirements are:

- An industry standard OCGT power station with a nominal nameplate capacity of 160 MW prior to installing any inlet cooling system.
- It can use distillate for fuel.
- Has a capacity factor of 2 per cent. This means that the BRCP generator is expected to generate at its maximum capacity for 2 per cent of the year.

When determining the capital costs of this power station, GHD incorporated other power station requirements, such as:

- Technologies like low nitrous oxide burners, which are commonly used for this type of power station.
- An inlet air cooling system and water receipt and storage facilities to allow 14 hours of continuous operation where this would be cost effective.

This generator is the same generator used in the 2022 and 2023 BRCP determinations with technical updates by the manufacturer applied.

<sup>32</sup> Economic Regulation Authority, August 2023, 2024 Benchmark Reserve Capacity Price, Report prepared by PwC (online).

<sup>33</sup> Economic Regulation Authority, 31 August 2023, Power station and associated costs, Report prepared by GHD Advisory, section 3.2 (online).

## **4.2 Weighted Average Cost of Capital (WACC)**

The weighted average cost of capital (WACC) is used to estimate the financing costs of the power station and represents the long term required rate of return when determining the power station's annualised cost. For example, in the 2023 BRCP determination the WACC was a substantial driver for changes to the BRCP, as relatively small movements to the WACC can have a large effect on the BRCP. However, minimal change from the 2023 BRCP of 8.82 per cent, up only one basis point to 8.83 per cent in 2024 means the WACC has not been a key driver of change this year. The WACC is discussed in more detail in Appendix 4.

## **4.3 Other capital cost components**

The other power station cost components, including land costs and fixed fuel costs, did not significantly contribute to the increase in power station capital costs. These are covered in Appendix 4.

## 5. Annualised fixed O&M costs

The annualised fixed operating and maintenance (O&M) cost for the 2024 BRCP is \$38,916 per MW per year, up \$2,688 or 7.4 per cent from 2023.

The O&M costs component consists of five parts: generation O&M costs, switchyard O&M costs, transmission line O&M costs, asset insurance costs and network charges. These costs are expected to be annually incurred in operating and maintaining the MRCP 160 MW OCGT generator and are detailed in Table 4.

**Table 4: Comparison of 2024 BRCP draft determination annualised fixed O&M costs to 2023 BRCP values**

Component	2024 BRCP draft determination	2023 BRCP determination <sup>34</sup>	Change from 2023	
			(\$)	(%)
<b>Annualised fixed O&amp;M costs (\$/MW/year)</b>	<b>38,916</b>	<b>36,228</b>	<b>2,688</b>	<b>+7.4</b>
Generation O&M costs (\$/MW/year)	17,688	15,934	1,754	+11.0
Switchyard O&M costs (\$/MW/year)	650	572	78	+13.7 <sup>35</sup>
Transmission O&M costs (\$/MW/year)	40.6	36	4.9	
Asset insurance costs (\$/MW/year)	7,575	7,154	421	+5.9
Fixed network access and ongoing charges (\$/MW/year)	12,962	12,531	431	+3.4

Source: ERA analysis of BRCP data. Some figures may not add up due to rounding.

The main drivers of the fixed O&M cost increase are discussed below with the remainder covered in Appendix 5.

### 5.1 Generation O&M cost

Generation O&M costs are based on a single gas turbine that can deliver a nominal 160 MW of electricity using diesel fuel with an operating life of up to 60 years and a 2 per cent capacity factor as outlined in the market procedure. An allowance for balance of plant costs is included, which includes items like the servicing of pumps, water plants, fire systems, etc.

The increase in generation O&M cost is largely driven by the increase in labour costs (see Table 3) for services including plant operations, electrical sub-contractors, and engineering support.

<sup>34</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 Capacity Year: Final determination*, p.17, ([online](#)).

<sup>35</sup> These elements use a common escalation factor.

## 5.2 Other operating and maintenance components

The other components making up the fixed operating and maintenance costs (asset insurance, fixed network access and ongoing charges, switchyard O&M and transmission line O&M) did not significantly contribute to its increase. These components are covered in Appendix 5.

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## Appendix 3 Components of the 2024 BRCP draft determination compared to 2023 BRCP

Table 5 is a consolidation of the differences between 2024 and 2023 of each component of the BRCP.

**Table 5: Comparison of components between the 2024 BRCP draft determination and 2023 BRCP.**

Component	2024 BRCP draft determination	2023 BRCP	Change from 2023
Expected capacity credits (MW)	151.17	151.17	-
Weighted Average Cost of Capital	8.83%	8.82%	Up 1 basis point
Power station cost (\$/MW)	974,854	819,378	155,476
Margin for legal, financing, and other costs	16.35%	16.42%	Down 7 basis points
Transmission Costs (\$/MW)	207,493	195,935	11,558
Fixed Fuel Costs (\$)	8,532,826	8,632,788	-99,962
Land Costs (\$)	3,054,672	3,048,874	9,798
Generation O&M cost (\$/MW/year)	17,688	15,934	1,754
Switchyard O&M cost (\$/MW/year)	650	572	78
Transmission Line O&M cost (\$/MW/year)	40.6	35.7	4.9
Asset Insurance Costs (\$/MW/year)	7,575	7,154	421
Fixed Network Access and ongoing charges (\$/MW/year)	12,962	12,531	431
<b>Total Capital Costs (\$)</b>	<b>223,690,084</b>	<b>193,514,674</b>	<b>30,175,410</b>
<b>Annualised capital costs (\$/year)</b>	<b>27,474,573</b>	<b>23,757,776</b>	<b>3,716,797</b>
<b>Annualised fixed O&amp;M (\$/MW/year)</b>	<b>38,916</b>	<b>36,228</b>	<b>2,688</b>
<b>BRCP (\$/MW/year)</b>	<b>220,700</b>	<b>193,400</b>	<b>27,300</b>

Source: ERA analysis of BRCP data

## Appendix 4 Annualised capital costs

The formula for calculating the BRCP capital costs is:

$$CAPCOST = ((PC \times (1 + M) + TC) \times CC + FFC + LC) \times (1 + WACC)^{0.5}$$

The values for each input in the capital cost formula is provided in Table 6. An explanation of each of the unshaded input values is provided below the table.

**Table 6: Comparison of the 2024 BRCP draft determination and 2023 BRCP capital costs**

Component	2024 BRCP draft determination	2023 BRCP	Change from 2023	
			(unit)	(%)
Power station cost (PC) (\$/MW)	974,854	819,378	155,476	+19.0%
Weighted Average Cost of Capital (WACC)	8.83%	8.82%	Up 1 basis point	+0.1%
Expected capacity credits (CC) (MW)	151.17	151.17	-	-
Margin for legal, financing, and other costs (M) (%)	16.35	16.42	Down 7 basis points	-0.4%
Transmission Costs (TC) (\$/MW)	207,493	195,935	11,558	+5.9%
Fixed Fuel Costs (FFC) (\$)	8,532,826	8,632,788	-99,962	-1.2%
Land Costs (LC) (\$)	3,058,672	3,048,874	9,798	+0.3%
<b>Total Capital Costs (\$)</b>	<b>223,690,084</b>	<b>193,514,674</b>	<b>30,175,410</b>	<b>+15.6%</b>
<b>Annualised capital costs (\$/Year)</b>	<b>27,474,573</b>	<b>23,757,776</b>	<b>3,716,797</b>	<b>+15.6%</b>

Source: ERA analysis of BRCP data

Note: Shaded components are discussed in 3.1 or Chapter 4.

This appendix covers the other components that were minor contributors to the overall change in the power station capital costs.

### Weighted Average Cost of Capital (WACC)

The cost of capital represents the minimum return that a firm must earn on an asset to satisfy its creditors, owners, and other providers of capital. A weighted average cost of capital

(WACC) weights a firm's cost of capital in line with its debt to equity financing structure. For the BRCP, the WACC is used to estimate the financing costs of the power station and represents the long term required rate of return when determining the power station's annualised cost. Consequently, small changes in the WACC can have a large effect on the BRCP, as the power station's life is projected over 50 years.

The ERA has reviewed and calculated the annual WACC components: the nominal risk free rate, the debt risk premium and the corporate tax rate.<sup>36</sup>

For the draft 2024 BRCP, the indicative nominal pre-tax WACC is 8.83 per cent (see Table 7). This is in line with the 8.82 per cent nominal pre-tax WACC for the 2023 BRCP.<sup>37</sup>

The WACC will be updated in the ERA's final determination for the 2024 BRCP to account for changes in the WACC components between the draft and final determinations.

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<sup>36</sup> The WACC components that are required to be reviewed by the ERA are in *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, section 2.9, ([online](#)).

<sup>37</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, p.9, ([online](#)).

**Table 7: Indicative WACC for the draft 2024 BRCP**

Parameter	2024 BRCP draft determination value	2023 BRCP value <sup>38</sup>
<b>WACC</b>		
<b>Nominal pre-tax WACC (%)</b>	<b>8.83</b>	<b>8.82</b>
<b>Cost of equity parameters</b>		
Nominal risk free rate (%)	3.97	3.96
Equity beta	0.83	0.83
Market risk premium (%)	5.90	5.90
Pre-tax return on equity (%)	10.43	10.42
<b>Cost of debt parameters</b>		
Nominal risk free rate (%)	3.97	3.96
Debt risk premium (%)	2.360	2.369
Debt issuance costs (%)	0.100	0.100
Pre-tax return on debt (%)	6.43	6.43
<b>Other parameters</b>		
Debt proportion (gearing) (%)	40	40
Franking credits (gamma) (%)	50	50
Corporate tax rate (%)	30	30

Source: ERA analysis of BRCP data

### *Nominal risk free rate*

The risk free rate is the return an investor expects from investing in an asset with no risk and is a fundamental component to calculate the WACC. The market procedure requires the ERA to use 10-year Commonwealth Government bonds as a proxy for risk free assets in Australia to estimate a long-term risk free rate of return. This aligns the WACC with a long-term rate of return for the capital costs of the BRCP power station. The BRCP WACC calculation uses a nominal risk free rate, which includes the market's inflation expectations.

As an indicative figure for this draft determination, the ERA's estimate of the nominal risk free rate is 3.97 per cent, which is in line with the 3.96 per cent nominal risk free rate for the 2023 BRCP.<sup>39,40</sup>

<sup>38</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, pp.9-10, ([online](#)).

<sup>39</sup> The nominal risk free rate of 3.97 per cent is based on a 20-trading day averaging period up to 30 June 2023.

<sup>40</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, p.10, ([online](#)).

The indicative figure for the draft 2024 BRCP is provided to give market participants an idea of the nominal risk free rate that the ERA will use in its final determination. The ERA's final determination of the nominal risk free rate may differ depending on changes to market conditions since this draft figure was calculated.

### *Debt risk premium*

The debt risk premium is the rate of return above the risk free rate that lenders require to compensate them for lending funds to a firm. The debt risk premium compensates debt holders for the possibility of default by the issuer and is closely aligned with the risk of the business. The BRCP market procedure requires the ERA to assess corporate bonds that have a credit rating of BBB (or equivalent).<sup>41</sup> A bond's credit rating reflects the probability of default of the issuer, which is the risk that the bondholder bears. The ERA's approach to determining the debt risk premium for the BRCP is detailed in Appendix 6.

As an indicative estimate for this draft determination, the ERA's estimate of the debt risk premium is 2.360 per cent, which is in line with the 2.369 per cent debt risk premium for the 2023 BRCP.<sup>42,43</sup>

The indicative debt risk premium for the 2024 BRCP draft determination is provided to give market participants an idea of the debt risk premium that the ERA will use in its final

### *Corporate tax rate*

The corporate tax rate is 30 per cent, it has not changed since the 2023 BRCP final determination.

### *Margin cost (M)*

The 'M' margin includes costs for regulatory approval, financing, contingencies and legal. This margin is added as a percentage of capital cost of developing the power station and is 16.35 per cent for this draft determination. This is lower than the 2023 BRCP value of 16.42 per cent. While the base M cost increased,<sup>44</sup> as a proportion of the overall power station costs the change was lower in comparison to last year.

### *Transmission costs*

Western Power estimated the shallow connection cost for the 2024 BRCP draft determination at \$26.6 million.<sup>45</sup> Applying the specific escalation requirements set out in the market procedure this comes to \$207,493 per MW.<sup>46</sup> Shallow connection costs include the

<sup>41</sup> Economic Regulation Authority, 2020, *Market Procedure: Benchmark Reserve Capacity Price*, clause 2.9.7(h), ([online](#)).

<sup>42</sup> The debt risk premium of 2.360 per cent is based on a 20-trading day averaging period up to 30 June 2023.

<sup>43</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 Capacity Year: Final determination*, p.11, ([online](#)).

<sup>44</sup> Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, section 5.3, ([online](#)).

<sup>45</sup> Economic Regulation Authority, 2022, *Total Transmission Cost Estimate for the Benchmark Reserve Capacity Price for 2026/27*, Report prepared by Western Power, p 5 ([online](#)).

<sup>46</sup> *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, section 2.4.1, ([online](#)) and Economic Regulation Authority, 2022, *Total Transmission Cost Estimate for the Benchmark Reserve Capacity Price for 2026/27*, Report prepared by Western Power, ([online](#)).

construction of a substation, two kilometres of overhead line and the associated easement for that line.<sup>47</sup> The increase of 5.9 per cent compared to the 2023 BRSP is driven by increases in land, substation, and transmission line costs.

Western Power provided an independently audited report that verifies its estimates as the underlying data is confidential and cannot be published. Western Power's report, with KPMG's audit report, is available on the ERA's website.<sup>48</sup>

### **Fixed fuel costs**

Fixed fuel costs are estimated at \$8.5 million for the 2024 BRCP, 1.2 per cent lower than the fixed fuel cost inputs for the 2023 BRCP. The decrease is due to a lower CPI forecast by the RBA in its August 2023 Statement of Monetary Policy which are used to escalate future costs.<sup>49</sup>

The fixed fuel costs include the development and construction of an onsite liquid fuel storage and supply facility with supporting infrastructure. In addition, 14 hours of fuel is added to the costs, as required by the market procedure, which includes the cost of deliver and any excise rebate.<sup>50</sup>

### **Land costs**

The land costs provided by Landgate for the six regions assessed under the market procedure increased to \$3.06 million for the 2024 BRCP. This is \$9,798 higher than the 2023 BRCP land costs due to increases in all regions except Eneabba (part of the North Country region). Landgate's assessment is available on the ERA's website.<sup>51</sup>

The hypothetical land sites were assessed for each region specified in the market procedure (Collie, Kalgoorlie, Kemerton Industrial Park, Kwinana, North Country, and Pinjar) that are suitable for building a BRCP reference generator. These assessments were made as at 30 June 2023 with the ERA applying the applicable transfer duty. The per hectare cost for the BRCP is averaged over these regions and escalated to 1 April 2026.<sup>52</sup>

<sup>47</sup> The ERA provided the land costs to Western Power for their calculation. The land costs are from Economic Regulation Authority, 2023, *Land values for the 2024 Benchmark Reserve Capacity Price*, Report prepared by Landgate ([online](#))

<sup>48</sup> Economic Regulation Authority, 2022, *Total Transmission Cost Estimate for the Benchmark Reserve Capacity Price for 2026/27*, Report prepared by Western Power, ([online](#)).

<sup>49</sup> Reserve Bank of Australia. August 2023. *Statement on Monetary Policy*, Appendix: Forecasts. ([online](#))

<sup>50</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, section 2.6, ([online](#)).

<sup>51</sup> Economic Regulation Authority, 2023, *Land values for the 2024 Benchmark Reserve Capacity Price*, Report prepared by Landgate ([online](#)).

<sup>52</sup> The land costs are escalated to 1 April 2026 as the land must be acquired prior to construction of the BRCP reference generator. This is specified in *Market Procedure: Benchmark Reserve Capacity Price*, 9 November 2020, clause 2.7.5, ([online](#)).

## Appendix 5 Other operating and maintenance costs

This appendix covers the other components that contributed to the increase in the fixed operating and maintenance costs discussed in Chapter 4 and detailed in Table 8 below.

**Table 8: Comparison of 2024 BRCP annualised fixed O&M costs draft determination values to 2023 BRCP values**

Component	2024 BRCP draft determination	2023 BRCP	Change from 2023	
			(unit)	(%)
<b>Annualised fixed O&amp;M costs (\$/MW/year)</b>	<b>38,916</b>	<b>36,228</b>	<b>2,688</b>	<b>+7.4</b>
Fixed network access and ongoing charges (\$/MW/year)	12,962	12,531	431	+3.4
Asset insurance costs (\$/MW/year)	7,575	7,154	421	+5.9
Generation O&M costs (\$/MW/year)	17,688	15,934	1,754	+11.0
Switchyard O&M costs (\$/MW/year)	650	572	78	+13.7
Transmission line O&M costs (\$/MW/year)	40.6	35.7	4.89	+13.7

Source: ERA analysis of BRCP data.

### Fixed network access and ongoing charges

The other main contributor to the rise in fixed O&M costs is the increase in Western Power's fixed network access and ongoing charges to \$12,962 per MW per year, an increase of 3.4 per cent (or \$431 per MW per year) when compared to the 2023 BRCP value (\$12,531 per MW per year).

Network access charges were determined using Western Power's network access tariffs data from the 2023/24 price list.<sup>53</sup> Since the fixed network access and ongoing charges are a small contributor to the BRCP, changes to these prices will not significantly affect the overall BRCP.

In line with how network access charges have been assessed in previous BRCP determinations, the ERA applied the highest Transmission Reference Tariff 2 unit price from across the regions where the BRCP can be located.<sup>54</sup> The Muja Power Station substation has the highest unit price, which the ERA used to estimate the fixed network access charges applicable to the BRCP generator. The charge is based on the cost to Western Power of that generator using the SWIS network and depends on factors including the location, transmission line-length and the complexity of the grid connection.

<sup>53</sup> Transmission Reference Tariff 2 was used as it applies to generators – Western Power, 2023, *2023/24 Price List for the Western Power network* ([online](#)) [accessed 21 August 2023]

<sup>54</sup> These regions are Collie, Kemerton Industrial Park, Pinjar, Kwinana, North Country (Eneabba and Geraldton) and Kalgoorlie – Economic Regulation Authority, 2020, *Market Procedure: Benchmark Reserve Capacity Price*, Clause 2.7.1 ([online](#)).

The other inputs for this cost component are:

- Control system service charges – this is the general overhead of Western Power’s control system costs applied to generator proportionately per kilowatt.
- Transmission metering service charges – this is a fixed daily charge per revenue meter.

Table 9 provides a comparison of these cost inputs against the 2023 BRPC values for fixed network access and ongoing charges.

**Table 9: Comparison of 2024 BRCP draft determination fixed network and ongoing charges to the 2023 BRCP determination**

Component	2024 BRCP draft determination	2023 BRCP	Change from 2023	
			(unit)	(%)
Control system service charge (\$/year)	131,321	121,390	9,931	+7.56%
Transmission metering (\$/year)	3,459	3,209	250	+7.23%
Use of system charge (\$/year)	1,638,758	1,520,128	118,630	+7.24%
Total annual Western Power charges (\$)	1,773,539	1,644,726	128,813	+7.26%
Cost per MW per year <sup>55</sup>	12,962	12,531	431	+3.3%

Source: ERA analysis of BRCP data

The 2024 BRCP fixed network and ongoing charges were calculated as of July 2023 with the total cost per MW figure escalated by the forecast inflation rates to 1 October 2026 as required by the BRCP market procedure.

## Asset insurance costs

The asset insurance costs cover power station asset replacement, business interruption and public and products liability insurance. To maintain consistency with previous insurance estimates for the BRCP calculations, the ERA sourced the insurance quote from an independent insurance broker with expertise in power generation insurance, particularly in Western Australia.<sup>56</sup> The asset insurance cost components are detailed in Table 10.

<sup>55</sup> Includes escalation by forecast inflation – Economic Regulation Authority, 31 August 2023, *Power station and associated costs*, Report prepared by GHD Advisory, section 2.2, ([online](#)).

<sup>56</sup> The insurance broker is the same broker used by AEMO and the ERA for determining past BRCPs. The broker has requested for their name to be withheld.

**Table 10: Comparison of the 2024 BRCP draft determination asset insurance costs to the 2023 BRCP determination**

Component	2024 BRCP draft determination	2023 BRCP determination	Change from 2023	
			(\$)	(%)
<b>Asset insurance cost (\$/MW/year)</b>	<b>7,575</b>	<b>7,154</b>	<b>421</b>	<b>+5.9</b>
Asset replacement insurance (\$/year)	634,733	614,560	20,173	+3.3
Business interruption insurance (\$/year)	325,043	283,711	41,332	+14.6
Public and products liability insurance (\$/year)	170,456	167,783	2,673	+1.6

Source: ERA analysis of insurance cost information provided for the 2024 BRCP.

Asset insurance costs for the 2024 BRCP determination rose by 5.9 percent to \$7,575 per MW per year when compared to the asset insurance costs for the 2023 BRCP. This is mostly due to increases in business interruption insurance.

### **Switchyard operating and maintenance costs**

The estimated switchyard O&M cost (\$650 per MW per year) was higher than the 2023 BRCP. The increase was due to an increase in the forecast material costs as detailed in the cost escalation factors estimate (see Table 3).<sup>57</sup>

The switchyard O&M costs are derived from the isolator on the high voltage side of the generator's transformer and does not include any generator transformer or switchgear costs. These costs are based on the annual charge for connection assets and includes estimates of overheads, machine hire and labour for maintenance services. Details are available in GHD's report on the ERA's website.<sup>58</sup>

### **Transmission line operating and maintenance costs**

The estimated transmission line O&M cost (\$40.6 per MW per year) increased from the 2023 BRCP value. The increase was due to an increase in the forecast material costs as detailed in the cost escalation factors estimate (see Table 3).<sup>59</sup>

<sup>57</sup> Economic Regulation Authority, 2023, *Power station and associated costs*, Report prepared by GHD Advisory, sections 2.4 and 4.3 ([online](#)) – discusses how the cost escalation for switchyard O&M is derived and applied.

<sup>58</sup> Ibid, section 4.4 ([online](#)).

<sup>59</sup> Economic Regulation Authority, 2023, *Power station and associated costs*, Report prepared by GHD Advisory, sections 2.4 and 4.3 ([online](#)) – discusses how the cost escalation for switchyard O&M is derived and applied.

The transmission line O&M is derived from a transmission line that is assumed to be a single circuit 330 kilovolt construction with two conductors per phase with a 60-year asset life. The line can transport up to 200 megavolt amperes with a power factor of 0.8.

## Appendix 6 Weighted Average Cost of Capital

The weighted average cost of capital (WACC) is a calculation of a firm's cost of capital in which each component of capital, debt and equity, is proportionately weighted.

When calculating the BRCP, the WACC is used in:

- Estimating financing costs, which are added into the reference power station's capital expenditures. This accounts for project financing costs before the commissioning of the power station and the realisation of revenues from participation in the wholesale electricity market.
- Converting the power station's capital costs into an annualised cost that can be recovered over the assumed life of the power station. In this annuity approach, the WACC represents a long-term required rate of return over the life of the asset.

### Calculation of the WACC in the market procedure

Section 2.9 of the market procedure directs the ERA on how the WACC for the BRCP is to be calculated.<sup>60</sup>

Specifically, clauses 2.9.6 and 2.9.7 of the market procedure detail the high-level framework to be used:

2.9.6 [ERA] shall compute the WACC on the following basis:

- (a) The WACC shall use the Capital Asset Pricing Model (CAPM) as the basis for calculating the return to equity.
- (b) The WACC shall be computed on a Pre-Tax basis.
- (c) The WACC shall use the standard Officer WACC method as the basis of calculation.

2.9.7 The pre-tax Officer WACC shall be calculated using the following formulae:

$$WACC_{nominal} = \frac{1}{(1 - t(1 - \gamma))} R_e \frac{E}{V} + R_d \frac{D}{V}$$

Where:

$R_e$  is the nominal return on equity (determined using the Capital Asset Pricing Model) and is calculated as:

$$R_e = R_f + \beta_e \times MRP$$

Where:

$R_f$  is the nominal risk free rate for the Capacity Year;

$\beta_e$  is the equity beta; and

$MRP$  is the market risk premium.

<sup>60</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, Section 2.9, ([online](#)).

$R_d$  is the nominal return on debt and is calculated as:

$$R_d = R_f + DM$$

Where:

$R_f$  is the nominal risk free rate for the Capacity Year;

$DM$  is the debt margin, which is calculated as the sum of the debt risk premium (DRP) and debt issuance cost (d).

$t$  is the benchmark rate of corporate income taxation, established at either an estimated effective rate or a value of the statutory taxation rate;

$\gamma$  is the value of franking credits;

$\frac{E}{V}$  is market value of equity as a proportion of the market value of total assets;

$\frac{D}{V}$  is market value of debt as a proportion of the market value of total assets;

The nominal risk free rate, for a Capacity Year is the rate determined for that Capacity Year by [ERA] on a moving average basis from the annualised yield on Commonwealth Government bonds with a maturity of 10 years:

- using the indicative mid rates published by the Reserve Bank of Australia; and
- averaged over a 20-trading day period;
- The debt risk premium, DRP, for a Capacity Year is a margin above the risk free rate reflecting the risk in provision of debt finance. This will be estimated by [ERA] as the margin between the observed annualised yields of Australian corporate bonds which have a BBB (or equivalent) credit rating from Standard and Poor's and the nominal risk free rate. [ERA] must determine the methodology to estimate the DRP, which in the opinion of [ERA] is consistent with current accepted Australian regulatory practice.<sup>61</sup>
- If there are no Commonwealth Government bonds with a maturity of 10 years on any day in the period referred to in step 2.9.7(g), [ERA] must determine the nominal risk free rate by interpolating on a straight line basis from the two bonds closest to the 10 year term and which also straddle the 10 year expiry date.
- If the methods used in step 2.9.7(i) cannot be applied due to suitable bond terms being unavailable, [ERA] may determine the nominal risk free rate by means of an appropriate approximation.

Since the ERA is responsible for calculating the 2024 BRCP, the ERA must estimate the WACC following the market procedure. The ERA's annual BRCP review involves two sets of components listed in clause 2.9.3:

- Annual components, which require review each year which comprises the risk free rate, debt risk premium and corporate tax rate.
- Structural components, which are fixed in the market procedure and remain constant between the ERA's five-yearly methodology reviews of the BRCP. As part of the annual

<sup>61</sup> The ERA has adopted an alternative 'Bond-Yield Approach' to establishing the DRP and has applied this since its Final Decision on revisions proposed by WA Gas Networks (WAGN) to the access arrangement for the Mid West and South West gas distribution systems in 2011.

review, the ERA may review and determine values for structural components that differ from those specified in the market procedure if it considers that a significant economic event has influenced those components. These structural components include the market risk premium, equity beta, debt issuance costs, franking credit value and gearing ratio.

Clause 2.9.8 of the market procedure details the parameters that the CAPM must use as variables each year (see Table 11):

**Table 11: CAPM parameters for the BRCP calculation**

CAPM parameter	Notation	Review frequency	Value
<b>The following variables are to be determined<sup>62</sup></b>			
Nominal risk free rate (%)	$R_f$	Annual	
Debt risk premium (%)	$DRP$	Annual	
Corporate tax rate (%)	$t$	Annual	
<b>The following variables are specified in the market procedure</b>			
Market risk premium (%)	$MRP$	5-Yearly	5.90
Asset beta	$\beta_a$	5-Yearly	0.5
Equity beta	$\beta_e$	5-Yearly	0.83
Debt issuance costs (%)	$d$	5-Yearly	0.100
Franking credit value	$\gamma$	5-Yearly	0.5
Debt to total assets ratio (%)	$\frac{D}{V}$	5-Yearly	40
Equity to total assets ratio (%)	$\frac{E}{V}$	5-Yearly	60

Source: ERA analysis of BRCP data

## Updated annual WACC

The ERA has reviewed and calculated the annual components listed in the market procedure, which are the nominal risk free rate, the debt risk premium, and the corporate tax rate.

### Nominal risk free rate

The risk free rate is the return an investor would expect when investing in an asset with no risk. This is the rate of return an investor receives from holding an asset with a guaranteed payment stream. Since there is no likelihood of default, the return on risk free assets compensates investors for the time value of money.

The BRCP market procedure uses Commonwealth Government bonds as the proxy for risk free assets in Australia for estimating the risk free rate of return. To estimate the risk free rate,

<sup>62</sup> See Table 7 for these values for the draft 2024 BRCP.

the market procedure uses information published by the Reserve Bank of Australia (RBA). Where there are no Commonwealth Government bonds with a maturity of exactly 10 years the ERA interpolates the risk free rate on a straight line basis.

On 31 March 2023, the RBA ceased publishing the new F16 data series “Indicative Mid Rates of Australian Government Securities” and removed all historical data from its website. As the F16 data series is no longer available, the ERA uses RBA F2 data series ‘Capital Market Bonds – Government – Daily’ for the 10-year nominal risk free rate calculation. This data series provides the RBA’s own linear interpolation of yields for maturities of two, three, five and 10 years.

The use of a 10-year term for the risk free rate is to reflect a long-term rate of return for the capital costs of the reference generator. This is consistent with the purposes of the BRCP calculations and aligns the WACC to represent a long-term rate of return for the capital costs over the life of the reference plant.

The BRCP process uses a nominal risk free rate, which includes a component for the market expectations of inflation.

As an indicative figure for the draft 2024 BRCP determination, the ERA estimated a nominal risk free rate of 3.97 per cent.<sup>63</sup> This is in line with the 3.96 per cent nominal risk free rate for the 2023 BRCP.<sup>64</sup>

The nominal risk free rate will be updated in the ERA’s final determination for the BRCP to account for changes to market conditions.

### *Debt risk premium*

The debt risk premium is the rate of return above the risk free rate that lenders require to compensate them for lending funds to a firm. The debt risk premium compensates debt holders for the possibility of default by the issuer.

The debt risk premium is closely aligned with the risk of the business. When issuing debt in the form of bonds, a credit rating can be assigned that reflects the probability of default of the issuer, and therefore the risk present in that entity’s bonds. The market procedure requires the use of a BBB (or equivalent) credit rating from Standard and Poor’s.<sup>65</sup>

The ERA uses a “revised bond yield approach” to determine the debt risk premium at a point in time by:<sup>66</sup>

- Step 1: Determining the benchmark sample – Identifying a sample of relevant domestic and international corporate bonds that reflect the BBB credit rating.<sup>67</sup>

<sup>63</sup> The nominal risk free rate of 3.97 per cent is based on a 20-trading day averaging period up to 30 June 2023.

<sup>64</sup> Economic Regulation Authority, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, p.9, ([online](#)).

<sup>65</sup> Economic Regulation Authority, 9 November 2020, *Market Procedure: Benchmark Reserve Capacity Price*, clause 2.9.7(h), ([online](#)).

<sup>66</sup> Economic Regulation Authority, 2022, *Explanatory Statement for the 2022 final gas rate of return instrument*, p.84, ([online](#)).

<sup>67</sup> The market procedure details that a benchmark generator for the purposes of BRCP having a credit rating of BBB.

- Step 2: Collecting data and converting the bond yields to Australian dollar equivalents – converting the bond yields from the sample into hedged Australian dollar equivalent yields inclusive of Australian swap rates.
- Step 3: Averaging yields over the averaging period - Calculating an average Australian dollar equivalent bond yield for each bond across the averaging period.
- Step 4: Estimating curves – Estimating yield curves on the bond data by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.<sup>68</sup>
- Step 5 - Estimating the cost of debt – Calculating the simple average of the three yield curves' 10-year cost of debt to arrive at a market estimate of the 10-year cost of debt.
- Step 6 – Calculating the debt risk premium - Calculating the debt risk premium by subtracting the 10-year risk free rate from the 10 year cost of debt.
- The ERA estimates the latest value of the debt risk premium over the specified averaging period each year for the BRCP.
- As an indicative figure for the draft 2024 BRCP determination, the ERA estimates a debt risk premium of 2.360 per cent.<sup>69</sup> This is in line with the 2.369 per cent debt risk premium for the 2023 BRCP.<sup>70</sup>
- The debt risk premium will be updated in the ERA's final determination for the BRCP to account for changes to debt markets.

### Corporate tax rate

The ERA has reviewed the corporate tax rate, which has not changed from the 30 per cent rate.

### Updated BRCP WACC

This appendix provides an illustrative rate of return for the BRCP based on the approach detailed in the market procedure and the 20-trading day averaging period to 30 June 2023 as a placeholder.

For the draft 2024 BRCP, the indicative nominal pre-tax WACC is 8.83 per cent (see [Table 12](#)). This is in line with the 8.82 per cent nominal pre-tax WACC for the 2023 BRCP.<sup>71</sup>

**Table 12: Indicative WACC for the draft 2024 BRCP**

Parameter	Draft 2024 BRCP value	2023 BRCP value <sup>72</sup>
<b>Cost of equity parameters</b>		

<sup>68</sup> The Gaussian Kernel method recognises that the observed spreads on bonds with residual maturities close to the target tenor (or maturity) contains more relevant information for estimation. The Nelson-Siegel model captures many of the typical observed shapes that the yield curve assumes over time. As an extension of the Nelson-Siegel model, the Nelson-Siegel-Svensson method incorporates additional flexibility to more precisely capture the movement of the yield curve in a more volatile market.

<sup>69</sup> The debt risk premium of 2.360 per cent is based on a 20-trading day averaging period up to 30 June 2023.

<sup>70</sup> ERA, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, p.9, ([online](#)).

<sup>71</sup> Ibid, p.9.

<sup>72</sup> ERA, 2022, *2023 Benchmark Reserve Capacity Price for the 2025/26 capacity year: Final determination*, pp.9-10, ([online](#)).

Parameter	Draft 2024 BRCP value	2023 BRCP value <sup>72</sup>
Nominal risk free rate (%)	3.97	3.96
Equity beta	0.83	0.83
Market risk premium (%)	5.90	5.90
Pre-tax return on equity (%)	10.43	10.42
<b>Cost of debt parameters</b>		
Nominal risk free rate (%)	3.97	3.96
Debt risk premium (%)	2.360	2.369
Debt issuance costs (%)	0.100	0.100
Pre-tax return on debt (%)	6.43	6.43
<b>Other parameters</b>		
Debt proportion (gearing) (%)	40	40
Franking credits (gamma) (%)	50	50
Corporate tax rate (%)	30	30
<b>Weighted Average Cost of Capital</b>		
<b>Nominal pre-tax WACC (%)</b>	<b>8.83</b>	<b>8.82</b>

Source: ERA analysis of BRCP data