



Economic Regulation Authority

# WEM Procedure

## Benchmark Reserve Capacity Prices

Version 8

D278519

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ELECTRICITY INDUSTRY ACT 2004  
*ELECTRICITY INDUSTRY (WHOLESALE ELECTRICITY MARKET)  
REGULATIONS 2004*

WHOLESALE ELECTRICITY MARKET RULES

**COMMENCEMENT**

This Procedure took effect from 8:00am (AWST) on the same date as the Wholesale Electricity Market (**WEM**) Rules.

**VERSION HISTORY**

Version	Effective Date	Notes
1	13 October 2008	Market Procedure developed to determine the Maximum Reserve Capacity Price resulting from procedure change PC_2008_06.
2	4 December 2008	Amendments resulting from procedure change PC_2008_14.
3	1 April 2010	Amendments resulting from procedure change PC_2009_12.
4	11 October 2010	Amendments resulting from procedure change PC_2010_04.
5	24 October 2011	Amendments resulting from procedure change PC_2011_06.
6	15 January 2013	Amendments resulting from procedure change PC_2012_08.
7	9 November 2020	Amendments resulting from procedure change EEPC_2020_02.
8	1 August 2024	Amendments resulting from procedure change EEPC_2024_01.

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## 1. BACKGROUND

### 1.1 Purpose of this WEM Procedure

1.1.1 Unless otherwise specified, a reference in this WEM Procedure to:

- (a) Benchmark Reserve Capacity Prices (**BRCPs**) means the Peak Benchmark Reserve Capacity Price (**Peak BRCP**) and the Flexible Benchmark Reserve Capacity Price (**Flexible BRCP**);
- (b) Benchmark Capacity Providers means the Benchmark Flexible Capacity Provider and the Benchmark Peak Capacity Provider; and
- (c) Capacity Credits means Peak Capacity Credits and Flexible Capacity Credits.

1.1.2 This WEM Procedure documents the method and processes that the Economic Regulation Authority (**ERA**) must follow in determining the BRCPs for each Reserve Capacity Cycle. [**WEM Rule 4.16.3**]

1.1.3 The ERA must manage the development of, amendment of, and replacement of this WEM Procedure. [**WEM Rule 2.9.2B**]

1.1.4 The ERA, the Australian Energy Market Operator (**AEMO**) and Rule Participants must follow this WEM Procedure when conducting any review and consultation in accordance with this WEM Procedure. [**WEM Rule 4.16.3(a)**]

### 1.2 Relationship with the WEM Rules

1.2.1 References to specific WEM Rules within this Procedure are in bold and square brackets [**WEM Rule #**] and are current as of 22 May 2024.<sup>1</sup> These references are included for convenience only and are not part of this WEM Procedure.

1.2.2 Unless the contrary intention is expressed:

- (a) Terms used in this WEM Procedure have the same meaning as those given in the WEM Rules.
- (b) To the extent that this WEM Procedure is contrary or inconsistent with the WEM Rules, the WEM Rules prevail to the extent of the inconsistency. [**WEM Rule 1.5**]

### 1.3 Associated WEM Procedures and Guidelines

1.3.1 The following WEM Procedures and Guidelines are associated with this WEM Procedure:

- (a) Procedure Administration [Coordinator of Energy Procedure];
- (b) Electric Storage Resource Obligation Intervals [AEMO Procedure];
- (c) Capacity Credit Allocations [AEMO Procedure];

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<sup>1</sup> Wholesale Electricity Market Rules (WA), 22 May 2024, ([online](#)).

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- (d) Communication and Control Systems [AEMO Procedure]; and
  - (e) Offer Construction Guideline [ERA guideline].

#### **1.4 Annual determination of the BRCPs**

- 1.4.1 The ERA must annually revise the value of the BRCPs using the method described in this WEM Procedure. **[WEM Rules 4.16.3(b) and 4.16.5]**
- 1.4.2 The ERA must determine the BRCPs so they can be implemented prior to AEMO's advertisement of a Request for Expressions of Interest for the relevant Reserve Capacity Cycle. **[WEM Rules 4.1.4, 4.1.19 and 4.16.3(b)]**
- 1.4.3 The ERA must prepare a draft report describing how it has arrived at the BRCPs' revised values. The ERA must publish this report on its website and request submissions from all sectors of the Western Australia energy industry, including end-users. **[WEM Rule 4.16.6]**
- 1.4.4 After considering the submissions on its draft report, the ERA must propose and publish final revised values for the BRCPs in a final report that includes the submissions received on the draft report. The ERA must publish the revised values and the final report on its website. **[WEM Rule 4.16.7]**
- 1.4.5 Proposed revised values for the BRCPs become the BRCPs after the ERA has posted a notice on its website of the new values of the BRCPs, with effect from the date and time specified in the ERA's notice. **[WEM Rule 4.16.8]**
- 1.4.6 Within five days of publication of the BRCPs by the ERA, AEMO must publish the BRCPs on the WEM Website. **[WEM Rule 4.16.8A]**

#### **1.5 Review of this WEM Procedure**

- 1.5.1 The ERA must review this WEM Procedure and undertake a public consultation process as part of that review:
  - (a) at least once in every five-year period; and
  - (b) within one year of the Coordinator of Energy's review of the BRCPs, where the Coordinator of Energy's review determines a change to any Benchmark Capacity Provider. **[WEM Rule 4.16.9]**
- 1.5.2 If the ERA recommends changes in its review, the ERA must either submit a Rule Change Proposal or initiate a Procedure Change Process, as appropriate, to implement those changes. **[WEM Rule 4.16.10]**
- 1.5.3 The development, amendment or replacement of this WEM Procedure must follow the process in the WEM Rules. **[WEM Rule 2.9.3(a)]**
- 1.5.4 If the WEM Procedure must be amended or replaced to maintain consistency with the Amending Rules, the ERA must amend or replace this WEM Procedure by following the process in the WEM Rules. **[WEM Rule 2.9.3(b)]**

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## 2. DETERMINATION OF THE BRCPs

### 2.1 Benchmark Capacity Providers

2.1.1 The Benchmark Peak Capacity Provider is a notional new Facility which is expected to be able to provide Peak Capacity at the lowest total of annualised capital cost and annual fixed operating and maintenance costs. **[Chapter 11 in the WEM Rules]**

2.1.2 The Benchmark Flexible Capacity Provider is a notional new Facility which is expected to be able to provide Flexible Capacity at the lowest total of annualised capital cost and annual fixed operating and maintenance costs. **[Chapter 11 in the WEM Rules]**

2.1.3 The Coordinator of Energy must determine the Benchmark Capacity Providers by the earlier of:

- (a) within six months of the revised Electricity Storage Resource (**ESR**) Duration Requirement being published in the Electricity Statement of Opportunities, if the ESR Duration Requirement determined by AEMO is different from the ESR Duration Requirement for the previous Reserve Capacity Cycle; or
- (b) within three years of the previous determination of the Benchmark Capacity Providers. **[WEM Rule 4.16.11]**

2.1.4 When determining the Benchmark Capacity Providers, the Coordinator of Energy must determine:

- (a) the appropriate reference technology to be used for each Benchmark Capacity Provider;
- (b) the technical parameters to be used for each Benchmark Capacity Provider, including size and capabilities;
- (c) the uncongested network location to be used for each Benchmark Capacity Provider, or if there is no uncongested network location, a network location with relatively low congestion; and
- (d) whether the relevant Benchmark Reserve Capacity Price is to be assessed on the basis of:
  - (i) the gross capital cost of the relevant Benchmark Capacity Provider; or
  - (ii) the capital cost of the relevant Benchmark Capacity Provider less any expected contribution to capital costs from participation in the Real-Time Market. **[WEM Rule 4.16.12]**

2.1.5 The Benchmark Capacity Providers are a lithium battery energy storage system (**BESS**) with:

- (a) 200 megawatt (MW) injection;
- (b) 800 megawatt hours (MWh) of energy storage;

- (c) a 330 kilovolt (kV) connection; and
- (d) located in an unconstrained connection near Kwinana or Pinjar.

2.1.6 Further to Clause 2.1.5 of this WEM Procedure, the Benchmark Capacity Providers:

- (a) Use a lithium iron phosphate sub-chemistry;
- (b) Have an installed capacity that enables 200 MW injection on 1 October of Year 3 of the Reserve Capacity Cycle;
- (c) Have enough energy storage capacity to enable 800 MWh charge and discharge on 1 October of Year 3 of the Reserve Capacity Cycle; and
- (d) Include the minimum level of equipment or systems required by the WEM Rules.

2.1.7 The ERA may engage a suitably qualified consultant to identify the appropriate factors affecting power and energy capacity requirements as per Clauses 2.1.6(b), 2.1.6(c) and 2.1.6(d) of this WEM Procedure. These factors include but are not limited to:

- (a) Power capacity, which include:
  - (i) Temperature derating for operation at 41 degrees Celsius **[WEM Rule 4.10.1(fA)(ii)]**;
  - (ii) Reactive power compensation for required levels according to the ideal generator performance standards in the WEM Rules **[WEM Rule A12.3.3]** and expected equipment losses;
  - (iii) Voltage stability requirements in accordance with WEM Rules **[WEM Rule A12.4.2]**; and
- (b) Energy capacity, which includes capacity loss from time based (calendar fade) and temperature-based battery degradation that occurs during the time between battery enclosure delivery and energisation.

## 2.2 Components of the BRCPs

2.2.1 The BRCPs must include all reasonable costs expected to be incurred in the development of the Benchmark Capacity Providers.

2.2.2 The BRCPs must reflect the expected annualised capital cost and the annual fixed operating and maintenance cost of the Benchmark Capacity Providers, expressed in dollars per megawatt of Capacity Credits expected to be assigned to the Benchmark Capacity Providers. **[WEM Rules 4.16.2 and 4.16.2A]**

2.2.3 The ERA must use the following formula to determine the BRCPs:

$$BRCP = \frac{CAPITAL\ COST_{Annualised} + FIXED\ O\&M\ COST_{Annual}}{CAPACITY\ CREDITS}$$

Where:

- (a) *CAPITAL COST<sub>Annualised</sub>* is a Benchmark Capacity Provider's annualised capital cost in Australian Dollars per year (\$/Year) as estimated in Section 3 of this WEM Procedure, that is:
  - (i) Calculated using the formula in Clause 3.1.1 of this WEM Procedure;
  - (ii) Annualised over a 15-year period using a nominal Weighted Average Cost of Capital (**WACC**) as estimated in Section 4.2 of this WEM Procedure; and
  - (iii) Adjusted by a tilt factor as explained in Section 4.1 of this WEM Procedure.
- (b) *FIXED O&M COST<sub>Annual</sub>* is a Benchmark Capacity Provider's annual fixed operating and maintenance cost in Australian Dollars per year (\$/Year) as determined in Section 5 of this WEM Procedure; and
- (c) *CAPACITY CREDITS* are the Benchmark Capacity Provider's Capacity Credits expected to be assigned by AEMO for Year 3 of the Reserve Capacity Cycle in megawatts (MW).

### 3. CAPITAL COSTS

#### 3.1 Determination of capital costs

3.1.1 The ERA must estimate *CAPITAL COST* using the following formula:

$$CAPITAL\ COST = [PC \times (1 + M) + TC + LC] \times (1 + WACC)^{0.5}$$

Where:

- (a) *PC* is the estimate of plant costs as per Clauses 3.3, 3.6, 3.8 and 3.9 of this WEM Procedure;
- (b) *M* is a margin to cover legal, financing and insurance costs, expressed as a fraction of plant costs (*PC*), as per Section 3.7 of this WEM Procedure;
- (c) *TC* is the estimate of transmission costs as per Section 3.4 of this WEM Procedure;
- (d) *LC* is the estimate of land cost as per Section 3.5 of this WEM Procedure; and
- (e) *WACC* is the WACC as per Section 4.2 of this WEM Procedure.

#### 3.2 Summary of capital cost components

3.2.1 The ERA must estimate the following capital costs of the Benchmark Capacity Providers:

- (a) Supply and installation costs as per Section 3.3 of this WEM Procedure;
- (b) Transmission connection capital cost and land cost as per Section 3.4 and Section 3.5 of this WEM Procedure;

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- (c) Other reasonable costs, including:
    - (i) Owner's design and project management as per Section 3.6 of this WEM Procedure;
    - (ii) Legal, financing and insurance costs as per Section 3.7 of this WEM Procedure;
    - (iii) Environmental and development approvals as per Section 3.8 of this WEM Procedure; and
    - (iv) Connection agreement, market registration and licencing costs as per Section 3.9 of this WEM Procedure.

### **3.3 Supply and installation costs**

3.3.1 The ERA must estimate the following supply and installation costs for the Benchmark Capacity Providers:

- (a) Battery containers or enclosures that typically include racks of battery modules, thermal management systems such as air conditioning or liquid cooling, control equipment, and a fire detection and suppression system;
- (b) Power conversion systems that typically comprise of multiple inverters placed in close proximity to the battery containers;
- (c) Electrical and control balance of plant incurred in developing the Benchmark Capacity Providers and typically include all enabling electrical infrastructure, cables, conduits, transformers, switchgear, protection and control equipment for the:
  - (i) BESS; and
  - (ii) BESS substation;
- (d) Civil balance of plant incurred in developing the Benchmark Capacity Providers that typically includes bulk earth works, the foundations, transformer bunds, equipment pads/hardstands and equipment structures for the:
  - (i) BESS; and
  - (ii) BESS substation;
- (e) Installation labour and temporary equipment hire that typically includes:
  - (i) Construction labour to develop the site and install the BESS; and
  - (ii) Hiring of temporary equipment during the BESS construction phase.

### **3.4 Transmission connection capital costs**

3.4.1 The transmission costs (*TC*) must include the costs to directly connect a Benchmark Capacity Provider to the transmission network to accommodate the capacity of that Benchmark Capacity Provider.

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- 3.4.2 The ERA must request for Western Power to estimate transmission costs. The ERA may also rely on an estimate of transmission costs from an alternative provider with experience in estimating network transmission connection costs.
- 3.4.3 Reference to **provider** in this section of the Procedure refers to either Western Power or the alternative provider engaged to estimate transmission costs.
- 3.4.4 The provider must follow the process outlined in Section 3.4 of this WEM Procedure to estimate transmission costs.
- 3.4.5 The alternative provider must use, where possible, the same information and data sources available to Western Power. To the extent where its information sources differ from Western Power's, the alternative provider must use the best available information and data sources available.
- 3.4.6 The provider must estimate the cost to connect the Benchmark Capacity Providers from the high voltage (HV) bus bar to the shared transmission network using the following process:
- (a) Estimate the capital cost (procurement, installation and commissioning, excluding land cost) of a generic, industry standard 330 kV substation that facilitates the connection of the Benchmark Capacity Provider and:
    - (i) Is located:
      - (A) adjacent to an existing 330 kV transmission line;
      - (B) on 50% flat - 50% undulating land, 50% rural - 50% urban location; and
    - (ii) Includes 2 kilometres of 330 kV overhead single circuit line to the power station that will have one road crossing; and
  - (b) The estimate in Clause 3.4.6(a) must:
    - (i) include all the components and costs associated with a standard substation;
    - (ii) comply with the relevant planning criteria in the Technical Rules;
    - (iii) be based on a generic three breaker mesh substation configured in a breaker and a half arrangement; and
    - (iv) Exclude any:
      - (A) unforeseen environmental or civil costs associated with the development; and
      - (B) costs associated with any staging works; and
    - (v) Comply with the requirement of Clause 3.10.1 of this WEM Procedure; and
  - (c) The provider must assume that the costs of the works described in Clause 3.4.6 are fully borne by the Benchmark Capacity Provider; and

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- (d) The connection of the substation into the existing transmission line is cut-in, cut-out and is based on the most economical (i.e. least cost) solution. The provider must assume that the existing transmission line does not require modification to allow the substation's connection, with the exception of sufficient new towers located at the substation to allow a point of connection; and
  - (e) The ERA must estimate and provide to the provider the shallow connection easement costs, which will be based on land cost as estimated in Section 3.5 of this WEM Procedure.
- 3.4.7 When estimating transmission costs as per Clause 3.4.6 of this WEM Procedure, the provider may use historical data where the provider considers these are appropriate.
- 3.4.8 The provider must detail how it estimated transmission costs in a report that may be published as part of the ERA's draft determinations of the BRCPs. The ERA may request the provider to update its report after considering any stakeholder feedback on the ERA's draft determinations of the BRCPs.
- 3.4.9 The provider must provide an assurance as to the accuracy of the information it has used in developing its estimate, why it considers the information is an appropriate source and how it has complied with the process to estimate transmission costs as outlined in Section 3.4 of this WEM Procedure. For example, the provider may engage an independent auditor to provide this assurance.
- 3.5 Land costs**
- 3.5.1 The ERA must estimate land costs (*LC*) to accommodate the Benchmark Capacity Providers.
- 3.5.2 The ERA must engage Landgate under a consultancy agreement to provide valuations on parcels of land as specified in this Section 3.5. The ERA may also rely on an estimate of land costs from an alternative provider with experience in estimating land costs.
- 3.5.3 Reference to **land valuer** in this Section 3.5 includes both Landgate and an alternative provider with experience in estimating land costs.
- 3.5.4 As specified in Clause 2.1.5(d) of this WEM Procedure, the land valuer must assess the following regions:
- (a) Pinjar; and
  - (b) Kwinana.
- 3.5.5 The land valuer must use a consistent method to estimate the land cost of a 6.5 hectare area within the specified regions.
- 3.5.6 If the land valuer considers the minimum land size available in a specific region is greater than 6.5 hectares, the land valuer must assess the minimum available land size.
- 3.5.7 The ERA's estimate of land costs *LC* must be based on the average land costs of the two regions as provided by the land valuer.

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### **3.6 Owner's design and project management costs**

3.6.1 The ERA must estimate the following costs for:

- (a) Owner's engineer and design services, which typically include:
  - (i) Feasibility studies; business case development and all site-related studies; specification; tendering; engineering, procurement and construction (EPC) contractor selection; and contract negotiations up to financial close; and
  - (ii) Construction management services to include, design drawing and document reviews, overseeing construction activities, witness testing and commissioning activities and ensuring that the operating and maintenance manuals and as-built drawings are correct; and
- (b) Project management services, which typically includes costs associated with:
  - (i) Concept, pre-feasibility and full feasibility studies;
  - (ii) Engaging an Owner's Engineer;
  - (iii) Engaging of legal and financial services; and
  - (iv) Engaging a project team.

### **3.7 Legal, financing and insurance costs**

3.7.1 The ERA must estimate legal costs associated with the development and construction of the Benchmark Capacity Providers, which typically include legal costs for:

- (a) Contract conditions for specifications, tender analysis, and negotiations;
- (b) Negotiation of any purchase power agreements or capacity contracts;
- (c) Negotiation of the grid connection agreement;
- (d) Financing or loan procurement; and
- (e) Contracts for construction phase.

3.7.2 The ERA must estimate financing costs associated with financial advisory and transaction costs associated with raising capital and setting up the project vehicle for financing during the construction phase of the Benchmark Capacity Providers.

3.7.3 The ERA must estimate costs to insure the Benchmark Capacity Providers for loss due to irreparable damage, including fire, to the major plant components during the project development phase.

### **3.8 Environmental and development approval costs**

3.8.1 The ERA must estimate environmental and development approval costs associated with the development and construction of the Benchmark Capacity Providers.

### 3.9 Connection, registration and licencing costs

3.9.1 The ERA must estimate the costs involved in connecting and registering the Benchmark Capacity Providers to the South West Interconnected System (SWIS) which typically include the following costs:

- (a) Network connection agreement with Western Power;
- (b) Market registration with AEMO;
- (c) Certification of reserve capacity with AEMO; and
- (d) Obtaining a generation licence from the ERA.

### 3.10 Adjustment for future price movements

3.10.1 The ERA must estimate capital costs for the Benchmark Capacity Providers as at 1 April in Year 3 of the Reserve Capacity Cycle, as outlined in Section 3.1 of this WEM Procedure.

3.10.2 Where capital cost components have been estimated at a date that is different to 1 April in Year 3 of the Reserve Capacity Cycle, and the ERA reasonably expects these costs to change over time, the ERA must adjust the costs by using a reasonable adjustment method and use these adjusted costs in its BRCP determination.

## 4. ANNUALISATION OF CAPITAL COST

### 4.1 Annualisation of capital costs and the annuity tilt

4.1.1 The annualisation process converts the capital cost of Benchmark Capacity Providers as detailed in Clause 3 into  $CAPITAL\ COST_{Annualised}$ , the annualised capital cost.

4.1.2 The ERA will estimate the  $CAPITAL\ COST_{Annualised}$  according to the following method:

Step	Required calculation
<i>A</i> : Constant Annuity Amount	Using a constant annuity formula with the capital costs as estimated in Section 3, the WACC as estimated in Section 4.2 and the annuity period as provided in Clause 2.2.3(a)(i).
<i>B</i> : Multiple of Constant Annuity Amount	Applying an annuity tilt adjustment through a multiple equal to 1.0 of the constant annuity amount.
$CAPITAL\ COST_{Annualised}$	$A \times B$

### 4.2 WACC

4.2.1 The ERA must estimate the cost of capital to be applied to various costing components of the BRCPs.

4.2.2 The WACC will be applied directly:

- (a) in the annualisation process used to convert the BESS project capital cost into an annualised capital cost; and
- (b) to account for the cost of capital in the time period between when capital is raised and when the revenue from Capacity Credits is expected to be realised. To maintain computational simplicity, the ERA must assume that the Capital Cost of the BESS will be incurred as at 1 April of Year 3 of a Reserve Capacity Cycle.

4.2.3 The methodology adopted by the ERA to estimate the WACC will involve a number of components that require review. These components are classed as those which require review annually (**Annual Components**) and those structural components of the WACC which require review less frequently (**Fixed Components**) as detailed in Clause 4.2.7 of this WEM Procedure.

4.2.4 In estimating the WACC, the ERA:

- (a) must annually review and estimate values for the Annual Components; and
- (b) may review and estimate values for the Fixed Components that differ from those in Clause 4.2.7 of this WEM Procedure if, in the ERA's opinion, a significant economic event has occurred since the ERA's latest determination of the BRCPs and, as a result, the ERA considers these values must be updated.

4.2.5 The ERA must compute the WACC on the following basis:

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

4.2.6 The pre-tax Officer WACC must 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:

- (a)  $R_e$  is the nominal return on equity (estimated using CAPM) and is calculated as:

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

Where:

- (i)  $R_f$  is the nominal risk-free rate;
  - (ii)  $\beta_e$  is the equity beta; and
  - (iii)  $MRP$  is the market risk premium.
- (b)  $R_d$  is the nominal return on debt and is calculated as:

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$$R_d = R_f + DM$$

Where:

- (i)  $R_f$  is the nominal risk free rate;
- (ii)  $DM$  is the debt margin, which is calculated as the sum of the debt risk premium ( $DRP$ ) and debt issuance cost ( $d$ );
- (c)  $t$  is the benchmark rate of corporate income taxation, established at either an estimated effective rate or a value of the statutory taxation rate;
- (d)  $\gamma$  is the value of franking credits;
- (e)  $\frac{E}{V}$  is the market value of equity as a proportion of the market value of total assets;
- (f)  $\frac{D}{V}$  is the market value of debt as a proportion of the market value of total assets;
- (g) The nominal risk-free rate is based on the annualised yield on Commonwealth Government bonds with a maturity of 10 years:
  - (i) using the indicative mid rates published by the Reserve Bank of Australia; and
  - (ii) averaged over a 20-trading day period;
- (h) The debt risk premium,  $DRP$ , is a margin above the risk free rate reflecting the risk in provision of debt finance. This will be estimated by the ERA as the margin between the annualised yields of Australian corporate bonds which have a BBB (or equivalent) credit rating from Standard and Poors and the nominal risk free rate;<sup>2</sup>
- (i) If there are no Commonwealth Government bonds with a maturity of 10 years on any day in the period referred to in Clause 4.2.6(g) of this WEM Procedure, the ERA may estimate 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; and
- (j) If the methods used in Clause 4.2.6(i) of this WEM Procedure cannot be applied due to suitable bond terms being unavailable, the ERA may estimate the nominal risk free rate by means of an appropriate approximation.

4.2.7 The CAPM must use the following:

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<sup>2</sup> The ERA applies the revised bond yield approach to estimate the debt risk premium. The revised bond yield approach is detailed in the 2022 final gas rate of return instrument. Economic Regulation Authority, 2023, *2022 final gas rate of return instrument*, Amended 12 September 2023, ([online](#)).

CAPM Parameter	Notation / Determination	Component	Value
Nominal risk free rate of return (%)	$R_f$	Annual	TBD
Market risk premium (%)	$MRP$	Fixed	5.80
Equity beta	$\beta_e$	Fixed	1.2
Debt risk premium (%)	$DRP$	Annual	TBD
Debt issuance costs (%)	$d$	Fixed	0.165
Corporate tax rate (%)	$t$	Annual	TBD
Franking credit value	$\gamma$	Fixed	0.50
Debt to total assets ratio (%)	$\frac{D}{V}$	Fixed	40
Equity to total assets ratio (%)	$\frac{E}{V}$	Fixed	60

## 5. FIXED OPERATING AND MAINTENANCE COSTS

### 5.1 Fixed O&M cost components

5.1.1 The ERA must estimate the following annual fixed O&M costs:

- (a) Fixed maintenance costs of the BESS including the service, inspection and preventative maintenance of:
  - (i) Inverter stations;
  - (ii) Battery modules, racks, energy management system, battery temperature monitoring and control, and container auxiliaries;
  - (iii) Earthing;
  - (iv) Protection, breakers, fuses, isolation;
  - (v) Cables;
  - (vi) SCADA and controls; and
- (b) Corporate overheads, consulting services and other reasonable fixed costs including but not limited to:
  - (i) Corporate overheads such as contribution to corporate office lease, the cost for office staff in the corporate office, ongoing training of staff, work cover contributions, and employee insurance;
  - (ii) Legal, regulatory and engineering support;
- (c) Transmission costs, including:

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- (i) Maintenance of the transmission line, the 330 kV connection switchyard and associated substation;
  - (ii) Transmission network service charges; and
- (d) Any other reasonable fixed O&M costs.

## **5.2 Adjustment for future price movements**

5.2.1 The ERA must estimate fixed O&M costs for the Benchmark Capacity Providers as outlined in Section 5.1 as at 1 October in Year 3 of the Reserve Capacity Cycle.

5.2.2 Where fixed O&M cost components have been estimated at a date that is different to 1 October in Year 3 of the Reserve Capacity Cycle, and the ERA reasonably expects these costs to change over time, the ERA must adjust the costs using a reasonable adjustment method, and use these costs in its BRCP determination.

## Appendix 1 Evolution of the WEM Procedure

Table 1 summarises the changes to this WEM Procedure since its inception in 2008.

**Table 1: Timeline of amendments to the WEM Procedure**

Version of Procedure	Effective date of Procedure	Procedure change proposal	Key amendments
1	13 October 2008	<a href="#">PC 2008_06</a>	<ul style="list-style-type: none"> <li>The new Market Procedure for determining the MRCP was developed following the approval of the Rule Change Proposal (RC_2008-11) in July 2008, amending a range of clauses in the Market Rules in respect of the determination of the MRCP based on outcomes from the working of the MRCP Advisory Group.</li> </ul>
2	4 December 2008	<a href="#">PC 2008_14</a>	<ul style="list-style-type: none"> <li>Amended to correct a typographic error in the equation for the nominal return on debt in the WACC calculation.</li> </ul>
3	1 April 2010	<a href="#">PC 2009_12</a>	<ul style="list-style-type: none"> <li>Removed the prescribed values of the Major components of the WACC to allow updated values to be included in the determination of the WACC.</li> </ul>
4	11 October 2010	<a href="#">PC 2010_04</a>	<ul style="list-style-type: none"> <li>Restated the values for the Major components of the WACC that were removed under PC_2009_12.</li> </ul>
5	24 October 2011	<a href="#">PC 2011_06</a>	<ul style="list-style-type: none"> <li>Included a provision for an inlet air cooling system in the definition of the model power station (step 2.1).</li> <li>Amended the Fixed Fuel Cost to include an allowance to initially fill the fuel tank with sufficient distillate for 14 hours of operation.</li> <li>Included in step 2.7.2(a) where the minimum land size available is greater than 3ha.</li> <li>Amended the effective compensation period for the total investment costs from 2 years to 6 months, after the escalation of values in the cost estimates in respect of power station, transmission, switchyard and O&amp;M costs is to be performed to April of Year 3.</li> <li>Included an allowance for annual asset insurance costs for the model power station within Fixed O&amp;M Costs.</li> <li>Amended the methodology for forecast Transmission Connections Works costs to be based on historical connection costs and relevant access offers determined by Western Power.</li> </ul>

Version of Procedure	Effective date of Procedure	Procedure change proposal	Key amendments
			<ul style="list-style-type: none"> <li>• Included debt issuance costs within the WACC and removed the corresponding debt financing costs from within margin M.</li> <li>• Renamed the “Minor” and “Major” components of the WACC in step 2.9.8 to “Annual” and “5-yearly” and reclassified the Review Frequency of some WACC components.</li> <li>• Provided the IMO with a discretion to nominate a method for determining the Debt Risk Premium that is consistent with current accepted Australian regulatory practice</li> </ul>
6	15 January 2013	<a href="#">PC 2012 08</a>	<ul style="list-style-type: none"> <li>• Amended the value of Franking Credit (Gamma) used in the calculation of the WACC from 0.5 to 0.25.</li> <li>• Amended the footnote on page 15 of the MRCP Market Procedure to note that the ‘Bond-Yield Approach’ methodology was broadly upheld on appeal to the Australian Competition Tribunal in June 2012 and the IMO’s intent to amend this Market Procedure in the near future to implement the ‘Bond-Yield Approach’.</li> <li>• Other amendments of administrative nature to ensure consistency with the Amending Rules resulting from the Rule Change Proposal: Competitive Balancing and Load Following Market (RC_2011_10).</li> </ul>
7	9 November 2020	<a href="#">EEPC 2020 02</a>	<ul style="list-style-type: none"> <li>• Updated references to ‘BRCP’ from ‘MRCP’ and to ‘AEMO’ from ‘IMO’ in line with changes to the WEM Rules.</li> <li>• Amended the form of the WACC from a real to a nominal WACC.</li> </ul>
8	1 August 2024	<a href="#">EEPC 2024 01</a>	<ul style="list-style-type: none"> <li>• Complete re-write of the Procedure to reflect various changes to the Reserve Capacity Mechanism, including the Coordinator of Energy’s determination of Benchmark Capacity Providers and the introduction of Flexible Capacity Credits and Flexible BRCP.</li> </ul>