Review of market procedure 2020: benchmark reserve capacity price

Draft procedure change proposal – WACC only

(Draft version for consultation with the Market Advisory Committee Working Group. The ERA Governing Body has not yet endorsed this draft paper)

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1. Introduction

The design of the Wholesale Electricity Market (WEM) includes a reserve capacity mechanism to ensure that enough supply capacity is available to reliably satisfy demand, including during some defined supply emergencies. The Australian Energy Market Operator (AEMO) uses the reliability planning criterion outlined in the Wholesale Electricity Market Rules to establish the level of capacity required to maintain system adequacy — referred to as the reserve capacity target.[1]

AEMO certifies the supply capacity of facilities two years before capacity is required. The certification process uses different methods, specified in the Market Rules, to measure the expected contribution of facilities to meeting the reserve capacity target.[2] Capacity suppliers receive capacity credits up to the amount of certified reserve capacity of a facility.

Capacity suppliers receive payments consistent with the number of capacity credits they hold and in return commit to providing their capacity to AEMO in the delivery year.[3] The capacity payments provide incentives for investment when the system requires new capacity.

The cost of capacity payments should be balanced against the benefits of procuring capacity to improve the reliability of the system. Retailers fund the procurement of capacity and ultimately pass their cost to consumers through retail electricity tariffs. Although consumers value a secure and reliable electricity supply, they should not be expected to pay for excess capacity that provides little additional benefit to system security and reliability. This is sought through the pricing of reserve capacity.

The Market Rules specify a method for determining the price of each megawatt of capacity credit provided to suppliers.[4] The benchmark reserve capacity price (BRCP) is an input to this price determination. The calculation of the BRCP, together with its application in the determination of capacity price, should ensure that the cost to consumers of procuring capacity is balanced against the benefits to consumers of improving the reliability of electricity supply.[5] In this way, the calculation of the BRCP is consistent with the objectives of the WEM. These objectives include minimising long-term cost of electricity supply to consumers, promoting the reliable supply of electricity, and avoiding discrimination against energy technologies.[6]

1 Clause 4.5.9 of the *Wholesale Electricity Market Rules 30 March 2020*, (online).

2 Clause 4.11.1 of the Market Rules specifies the capacity certification method for scheduled generators and demand side programme facilities. Clause 4.11.2(b) specifies the capacity certification method for non-scheduled generators.

3 The Market Rules refer to the capacity delivery year as capacity year. A capacity year commences on 1 October each year.

4 Clause 4.16 of the Market Rules.

5 Public Utilities Office, 2019, *Improving Reserve Capacity pricing signals – a recommended capacity pricing model, Final recommendations report*, p. 23, (online).

6 Clause 1.2.1 of the Market Rules.

1.1 The ERA's review of the market procedure for the calculation of the benchmark reserve capacity price

The Market Rules require the ERA to review the market procedure for the calculation of the BRCP at least once every five years.[7,8] The ERA must undertake a public consultation process on the outcome of the review.

If the ERA recommends changes as a result of the review, the ERA must submit a rule change proposal or initiates a procedure change process to implement those changes.[9]

The Market Rules also allow the ERA to conduct the next review of the market procedure, including any public consultation process on the outcomes of the review of the market procedure, after 31 October 2017.[10] The Independent Market Operator last reviewed the market procedure in 2013.

Under the Market Rules the ERA is also responsible for reviewing the methodology for setting the BRCP and the Energy Price Limits.[11] In its previous review of the methodology in 2013, the ERA considered that the scope of the review of the methodology covers the high-level concepts and principles for setting the BRCP, including the governance of the process. The ERA's review of the market procedure ensures those principles carry through consistently in the implementation of the method for the calculation of the BRCP.[12]

In 2019, the ERA commenced the review of the methodology for setting the BRCP and the market procedure concurrently. However, due to significant interactions between the review of the methodology and the current reform process under development by the Energy Transformation Taskforce, the ERA decided to postpone the review of the methodology until after the completion of the reforms. The ERA published a notice and advised stakeholders on this decision.[13]

The ERA also decided to continue with the review of the market procedure. In the annual BRCP determination process, many stakeholders have raised concerns with the current method for calculating the BRCP.[7] The BRCP is a main determinant of the price of the reserve capacity credits and small changes can materially influence cash flows for new and existing market participants. In February 2020, the Minister for Energy implemented a new capacity pricing mechanism, for which the BRCP is a main input. A review of the method for setting the BRCP is needed to ensure the capacity pricing mechanism also uses a reasonable estimate of the BRCP.

1.2 Interaction with other Market Rules

The price of capacity credits should incentivise investors to build new generation capacity in the WEM when it is required to support system reliability. When there is excess capacity in

7 Clauses 4.16.3 and 4.16.9 of the Market Rules.

8 The Independent Market Operator, 2013, *Market procedure: maximum reserve capacity price, version 6*, (online).

9 Clause 4.16.10 of the Market Rules.

10 Clause 1.17.5(e) of the Market Rules.

11 Clause 2.26.3 of the Market Rules.

12 ERA, 2013, *Review of methodology for setting the maximum reserve capacity price and the energy price limits in the Wholesale Electricity Market*, p. 43, (online).

13 ERA, 2020, *Notice: Review of the methods used to calculate the benchmark reserve capacity price and energy price limits, Suspension of the method reviews*, (online).

the WEM, the capacity price should signal that no new investment in generation capacity is required.

AEMO uses a market procedure to calculate the BRCP, which estimates the BRCP as the annualised fixed costs per megawatt of assigned capacity credits to a liquid-fuelled open cycle gas turbine power station with a nameplate capacity of 160 MW. The costs included in the calculation of the BRCP cover capital expenditure, a return on the capital expenditure, and fixed operating and maintenance costs.

Explanation

The main cost components of the BRCP for the 2022/23 capacity year were as follows:

- Total capital cost of $194 million, inclusive of the return on capital invested during the construction period.
- Total fixed operating and maintenance cost of $54.6 million

Using an estimated real weighted average cost of capital of 3.52 per cent per annum and an annuity period of 15 years, the total annualised cost of developing and operating the power plant was approximately $21.6 million.

The annualised cost divided by the number of capacity credits expected to be assigned to the reference power station (approximately 152 MW) yielded a BRCP of approximately $142,000 per MW per year.

The BRCP is the main input to the calculation of the administered pricing curve for capacity credits.[14] The pricing curve specifies the price of capacity credits at different levels of capacity credit beyond that estimated to meet the reliability planning criterion of the WEM – referred to as the reserve capacity target.

In 2019, the Public Utilities Office (now Energy Policy WA) recommended reforms to the pricing of the reserve capacity and procurement arrangements.[15] Energy Policy WA (EPWA) stated that previous reductions in the level of excess capacity were largely due to government intervention rather than driven by economic incentives in the design of the reserve capacity mechanism. The reform aimed to solve over-procurement of capacity by setting the reserve capacity price to reflect the economic value of incremental capacity to consumers when the supply is tight or in excess.[16] EPWA proposed to retain the administered capacity pricing arrangement and introduce a steeper price curve for reserve capacity.

[14] Since the commencement of the reserve capacity mechanism in 2005, AEMO has used the administered pricing method. An auction has never been required as there has always been enough, and excess, capacity offered.

[15] Public Utilities Office, 2019, *Improving Reserve Capacity pricing signals – a recommended capacity pricing model, Final recommendations report*, (online).

[16] Ibid, p.1.

1.3 Interaction with other Market Rules and the current reform process

In revising the capacity pricing curve, the Public Utilities Office considered that the BRCP should reflect the fixed costs of a new marginal asset in an auction for the procurement of capacity that assures a desired level of system reliability.[17]

The calculation of the BRCP should:

- identify the facility that is a suitable choice for setting the BRCP
- estimate the number of capacity credits expected to be assigned to the chosen facility
- estimate the fixed investment and operating and maintenance costs of the reference facility.

A complete review of the market procedure should consider the three elements above.

The ERA found that the identification of the reference facility for setting the BRCP is dependent on the estimate of the number of capacity credits expected to be assigned to facilities under the Market Rules. This is because the BRCP is expressed per unit of capacity credits assigned to the reference facility. Facilities with lower fixed investment and operation cost per unit of capacity credits assigned than other facilities would be suitable candidates for setting the BRCP.

EPWA is currently developing changes to the Market Rules that account for the effect of network constraints in assigning capacity credits to facilities. EPWA is also developing a method for the assignment of capacity credits to storage facilities. The details of the changes are currently under development and it is not clear how they affect capacity credits to facilities, including new facilities that intend to enter the market.

EPWA has indicated the possibility of further changes to the reserve capacity mechanism. However, the scope of these possible changes is not clear at this stage.[18]

1.4 The ERA's plan for the review of the market procedure

The ERA's review of the market procedure overlaps with current reform process under development, as explained in section 1.3.

The ERA considers that an objective assessment of the choice of reference facility for setting the BRCP is not possible at this stage. The ERA proposes to postpone the assessment of choice of reference facility after the completion of reforms and more clarity on the expected constraints on network and the amount of network access quantity available to new entrants to the market in different areas of the system.

For the review this year the ERA proposes to focus on the review of the method for the estimation of the weighted average cost of capital. This is in response to stakeholders' concern

[17] Public Utilities Office, 2019, *Improving Reserve Capacity pricing signals – a recommended capacity pricing model, Final recommendations report*, p. 24, (online).

[18] ETIU, Webpage: *Improving reserve capacity pricing signals*, accessed: 26 March 2020, (online).

about the current calculation of the cost of capital. Section 2 presents the ERA's proposed changes to the calculation of the weighted average cost of capital.

2. Cost of capital in the market procedure

Step 2.9 of the market procedure calculates a weighted average cost of capital (WACC):

- To estimate initial 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 realisation of revenues from participation in the WEM.
- To convert 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.

Each year, the market procedure requires AEMO to estimate the WACC. AEMO's annual review involves two sets of components in steps 2.9.3 and 2.9.8 of the market procedure:

- Annual components, which require review annually, and comprise the risk-free rate, expected inflation, debt risk premium and corporate tax rate.
- Structural components, which are fixed in the procedure and remain constant between the five-yearly reviews of the BRCP by the ERA. As part of the annual review, AEMO may review and determine values for structural components that differ from those specified in the procedure. This is when AEMO considers a significant economic event since the previous review of the market procedure has influenced those components. These structural components include the market risk premium, equity beta, debt issuance costs, franking credit value and gearing ratio.

The ERA's reviews of WACC and its approach to determining the rate of return

The ERA has reviewed and updated its approach to the calculation of WACC for rail and gas pipelines in 2018 and 2019. These reviews help inform the ERA's review of the WACC for the calculation of the BRCP.

Section 30 of the National Gas Law require the ERA to make and publish a rate of return instrument. The instrument must set out:

- The methods that the ERA proposes to use to estimate the allowed rate of return.
- The estimation methods, financial models, market data and other evidence the ERA proposes to consider when estimating the return on equity, return on debt and value of imputation credits.

On 18 December 2018, after a detailed review, the ERA published its final gas rate of return guidelines.[19] These guidelines specify the ERA's approach to determining the rate of return for the gas pipelines it regulates.

In April 2019, the Western Australian Government adopted a binding rate of return legislation. This binding instrument forms the basis for determining the rate of return for the five-year gas access arrangement. Further information about the gas rate of return instrument and the relevant documents can be found on the ERA website.[20]

On 22 August 2019, the ERA published its final determination for the WACC to be used in the regulation of access to railways in Western Australia for the 2018 and 2019 periods.[21] Under the *Railways (Access) Code 2000*, the ERA is required to determine each year a WACC to be

[19] ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018.

[20] ERA, Gas Rate of Return Guidelines (online) (accessed March 2020).

[21] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019.

applied in the establishment of capital costs for regulated railways in that year. Every five years the ERA is required to invite submissions and consider its approach to determining the rail WACC. The ERA's 2019 final determination reflects the outcomes from its latest review of the rail WACC.

The purpose of the WACC in the rail framework is similar to the purpose of the WACC used for the BRCP because the WACC:

- Represents a long-term required rate of return.
- Is used in an annuity calculation to calculate an annual compensation to the investor for capital costs over the life of the asset.
- Is updated annually to reflect efficient financing costs at a point in time.

Approach to the calculation of WACC for the benchmark reserve capacity price

Step 2.9 of the market procedure provides AEMO with direction on how WACC is to be calculated. Specifically steps 2.9.6 and 2.9.7 detail the high-level framework to be used:

2.9.6 The IMO 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 real Officer WACC shall be calculated using the following formulae:

$$WACC_{real} = \left(\frac{\left(1 + WACC_{nominal}\right)}{\left(1 + i\right)} \right) - 1$$

and

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

where,

$WACC_{real}$	is real WACC
$WACC_{nominal}$	is nominal WACC
i	is forecast inflation
t	is corporate tax rate
γ	is the value of franking credits
R_e	is nominal return on equity
R_d	is nominal return on debt
$\frac{E}{V}$	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 ERA's approach

The ERA's overall rate of return approach across energy and rail sectors is largely consistent with that detailed in the market procedure for the calculation of the BRCP.

The ERA's gas rate of return instrument requires that the ERA adopts a 'nominal vanilla' WACC to develop the rate of return for the benchmark efficient entity. A vanilla WACC does not include any adjustment for tax effects, such as the effect of imputation credits on the rate of return. The effect of tax on returns must be accounted for separately, as an explicit deduction from the relevant cash flow. A vanilla WACC is therefore a 'post-tax' framework.

The requirements for the WACC for BRCP are similar to those for the ERA's rail WACC:

- The *Railways (Access) Code 2000* requires the estimation of annual capital costs through an annuity that provides for the return on and of the cost of building a new railway.
- For rail the ERA calculates a pre-tax WACC. The pre-tax approach is preferred as the estimation of future tax liabilities may not be consistent with the light-handed nature of the *Railways (Access) Code 2000* and the determination of the asset base on a gross replacement valuation basis. The development of tax accounts is also complex.

For the calculation of the BRCP the ERA continues to support a WACC calculated:

- on a pre-tax basis
- through the standard Officer WACC method.

At present, the market procedure details how the WACC is to be calculated: initially a nominal WACC, which is then converted to a real WACC. This implies a real WACC should be used for the purposes of the annuity calculation of the BRCP. In its annual review AEMO has applied the real WACC.

Return on equity

The return on equity is the return that investors require from a firm to compensate them for the risk they take by offering their capital. There are no readily observable proxies for the expected return on equity. While estimates of the cost of debt can be obtained by observing debt instruments, financial markets do not provide a directly observable proxy for the cost of equity, for either individual firms or for the market.

To date, Australian regulators have used the Sharpe-Linter Capital Asset Pricing Model to quantify the return on equity:

$$R_i = R_f + \beta_i(R_m - R_f)$$

where,

R_i is the required rate of return on equity for the asset, firm or industry in question

R_f is the risk free rate

β_i is the equity beta that describes how the return for a particular asset will follow the market return, which is defined as,

$$\beta_i = cov(R_i, R_m)/\sigma_{R_m}^2$$

$R_m - R_f$ is the market risk premium.

The operator $cov(.)$ represents the covariance and $\sigma_{R_m}^2$ denotes the variance of market portfolio return.

The market procedure 2.9.6(a) and 2.9.7(a) require AEMO to determine the nominal return on equity by using the CAPM.

The ERA's approach

The ERA uses the CAPM to determine a single point estimate for the return on equity. The CAPM directly estimates the required return on the equity share of an asset as a linear function of the risk free rate and a component reflecting the market risk premium that investors would require over the risk free rate. For the BRCP the ERA continues to support the use of the CAPM.

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 risk free rate of return can be estimated as either a nominal or real. The nominal risk free rate includes compensation to investors for the reduction in purchasing power caused by inflation. The real risk free rate of return would prevail if the expected inflation rate was zero during an investment period.

The market procedure specifies how the nominal risk free rate should be determined.

> 2.9.7 (g) The nominal risk free rate, for a Capacity Year is the rate determined for that Capacity Year by the IMO 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;
>
> 2.9.7 (i) 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), the IMO 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.
>
> 2.9.7 (j) If the methods used in step 2.9.7(i) cannot be applied due to suitable bond terms being unavailable, the IMO may determine the nominal risk free rate by means of an appropriate approximation.

The Market Procedure does not treat the risk free rate for debt and equity differently. Step 2.9.8 details that the risk free rate is reviewed annually.

The ERA's approach

The ERA uses observed yields from Commonwealth Government bonds as the best proxy for risk free assets in Australia to estimate the risk free rate of return.

In calculating the risk free rate, the ERA uses indicative mid-rates published by the Reserve Bank of Australia. 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.

The use of a 10-year term for the risk free rate is consistent with that intended for the WACC for the purposes of BRCP calculations, which is to reflect a long-term rate of return for the annuitisation of capital costs over the life of the reference plant.

The use of a 10-year term is consistent with the ERA's approach to the rail WACC. For a return on equity and debt, a term of 10 years is used to estimate returns. Although terms longer than 10 years are available for the risk free rate, a risk free rate with a 10-year term allows components of models to be estimated consistently and provides for inclusion of reasonable number of bonds in the calculation.

The ERA supports:

- The existing approach to determine the risk free rate.
- The risk free rate being updated annually.

Market risk premium

The market risk premium is the expected rate of return over and above the risk free rate that investors require to invest in a fully-diversified portfolio. Ex ante, investors always require a rate of return above the risk free rate to invest and so the expected market risk premium is always positive.

The market risk premium compensates an investor for the systematic risk of investing in a fully diversified portfolio. Systematic risk is risk that cannot be eliminated by investing in a diversified portfolio of assets, because such risk affects all assets in the market.[22] Therefore, the market risk premium represents an investor's required return, over and above the risk free rate of return, on a fully diversified portfolio of assets. This is a forward-looking concept.

Step 2.9.8 of the market procedure details a market risk premium of 6.0 per cent and for it to be reviewed every five years. For the 2020 BRCP calculation, AEMO adopted a market risk premium of 6.0 per cent.[23]

The ERA's approach

While estimates of the cost of debt can be obtained by observing debt instruments, the financial markets do not provide a directly observable proxy for the cost of equity for either individual firms or the market. The market risk premium cannot be directly observed because it depends on investor expectations at the time of investment. In order to set the return on equity, the market risk premium needs to be estimated for a future time period.

The ERA reviewed the market risk premium as part of its rail determination. For rail networks, the ERA's forward-looking market risk premium was estimated for a 10-year period, consistent with the long lives of rail networks and the regulatory framework. The same approach is appropriate for the BRCP given it requires a long-term WACC.

[22] The foundation of the Sharpe-Lintner CAPM is the proposition that adding an asset to a portfolio reduces risk via the diversification effect but not beyond the risks that the assets in a portfolio share in common, that is, their systematic risk. At the limit, when one has invested in all available assets in the market portfolio, there is only systematic risk left. An important assumption of the CAPM is that assets are priced as though it is only their systematic risk that is relevant to investors.

[23] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p.23.

For its rail WACC final determination, the ERA adopted a market risk premium of 5.9 per cent.[24]

The ERA supports:

- Updating the market risk premium to be 5.9 per cent.
- Fixing the market risk premium until the next BRCP review.

Discussion point 1: update of market risk premium

The ERA invites submissions from interested parties on updating the market risk premium to 5.9 per cent.

Equity beta

Equity beta is the 'slope' parameter b_i in the Sharpe-Lintner Capital Asset Pricing Model. The slope parameter b_i correlates the return on the specific asset, in excess of the risk free rate of return, to the return on the market portfolio.

The risk of an asset is typically thought of as the variance in asset returns. This variance is a measure of the total risk of an asset. Total risk consists of systematic and non-systematic risk. Systematic risk is that part of total risk in a firm's returns that stems from the economy and markets more broadly. Systematic risk cannot be eliminated through diversification. Non-systematic risk is the risk stemming from unique attributes of the firm, which may be eliminated by an investor through diversification. For this reason, only systematic risk is compensated in the return on equity.

The equity beta is a parameter that measures the systematic risk of a security or a portfolio in comparison to the market portfolio.

Step 2.9.8 of the market procedure specifies an equity beta of 0.83. For the 2020 BRCP calculation, AEMO adopted an equity beta of 0.83.[25]

The ERA's approach

In determining an appropriate beta for regulated businesses, the ERA considers that empirical evidence must be used to inform its judgement for equity beta. In determining an equity beta, the ERA first selects a benchmark sample of comparable listed companies and then uses empirical approaches to estimate equity beta.[26,27]

[24] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, p. 53.

[25] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p.23.

[26] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, Chapter 8.3.

[27] ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, Chapter 13.

Discussion point 2: evidence of change in equity beta for an investor in the reference technology

The ERA invites submissions from interested parties to provide evidence to justify a change to the value of equity beta.

Discussion point 3: benchmark sample for a peaking generator

The ERA invites submissions from interested parties on developing a benchmark sample of Australian listed companies comparable to an investor in the reference technology.

Return on debt

The return on debt is the return that debtholders require from a firm to compensate them for the risk they take in providing debt financing to the company.

The market procedure details how the return on debt is to be calculated. Step 2.9.7(b) specifies the nominal return on debt, R_d, for the relevant capacity year is:

$$R_d = R_f + DM$$

where R_f is the nominal risk free rate for the capacity year and DM is the debt margin, which is calculated as the sum of the debt risk premium, DRP, and debt issuance cost, d.

The ERA's approach

For energy and rail WACC determinations the ERA estimated the return on debt based on a risk premium over and above the risk free rate, combined with an additional margin for administrative costs: [28, 29]

Return on debt = risk free rate + debt risk premium + administrative costs

For the BRCP the ERA continues to support the current approach to the return on debt in the market procedure.

Debt risk premium

The debt risk premium is the return above the risk free rate that lenders require to compensate them for the risk of providing debt funding to a firm. The debt risk premium compensates holders of debt securities 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 the bond.

The market procedure details how the debt risk premium is to be calculated.

> 2.9.7(h) 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 the IMO as the margin between the observed annualised yields of Australian

[28] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, p. 20.

[29] ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, p. 83.

> corporate bonds which have a BBB (or equivalent) credit rating from Standard and Poors and the nominal risk free rate. The IMO must determine the methodology to estimate the DRP, which in the opinion of the IMO is consistent with current accepted Australian regulatory practice.

Step 2.9.8 of the market procedure provides for an annual update to the debt risk premium.

AEMO has used the ERA's bond yield approach to estimate the debt risk premium since the 2018 BRCP determination, as it considered the ERA's method to be representative of the current accepted Australian regulatory practice.[30]

The ERA's approach

For energy and rail the ERA uses the 'revised bond yield approach' to determine the debt risk premium at a point in time by taking the following steps: [31, 32]

- Determining the benchmark sample – identifying a sample of relevant corporate bonds that reflect the credit rating of the benchmark efficient entity.
- Converting the bond yields from the benchmark sample into hedged Australian dollar equivalent yields inclusive of Australian swap rates.
- Calculating an average Australian dollar equivalent bond yield for each bond across the averaging period.
- Estimating yield curves on the bond data by applying various techniques including Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.
- Estimating the 10-year cost of debt by averaging the three yield curves of 10-year cost of debt based on the techniques used in the previous step.
- Calculating the debt risk premium by subtracting the 10-year risk free rate (or base rate) from the 10-year cost of debt.

The ERA revises the return on debt each year to incorporate an annual update of the estimate of the debt risk premium. Each year, the ERA calculates the latest value of the debt risk premium over the specified averaging period.

As part of its 2018 review of the gas rate of return guidelines, the ERA refined and developed publicly available tools for its debt risk premium method. This refinement has meant that the debt risk premium process is more robust and easier to implement. The tools and process documents are available on the ERA's website. [33] These set out the operating procedure for updating the debt risk premium estimates.

For energy, the ERA uses the annual estimate of the debt risk premium to calculate a 10-year trailing average for the debt risk premium. As the ERA estimates a new year's debt risk premium, the oldest estimate in the 10-year series is removed. This approach recognises that an efficient financing strategy for existing assets is to refinance 10 per cent of the debt portfolio every year.

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30 AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, pp.13-14.

31 ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, Chapter 10.

32 ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, Chapter 7.3.

33 ERA, Gas Rate of Return Guidelines (online) (accessed March 2020).

For rail, however, the ERA uses the annual estimate of the on-the-day debt risk premium to reflect the debt premium at a forward-looking point in time. This approach seeks to determine a long-term rate of return for new assets.

Like rail, the BRCP requires the establishment of a long-term WACC, which is updated annually, for application to new assets. Therefore, it is reasonable to use the debt risk premium at a point in time, rather than a 10-year trailing average.

The ERA uses a 10-year bond term. Ten years is the longest feasible term that could be reliability estimated from the observed data. In Australia there is a limited market for corporate bonds for more than ten years, which makes estimating a long-term yield curve difficult.

To calculate the debt risk premium for the BRCP the ERA supports:

- The use of the ERA 'revised bond yield approach'. Tools, including Excel spreadsheets, are available on the ERA's website. [34]
- The use of a corporate bond that has a 10-year term, which is consistent with the long-term nature of a peaking power plant and the intent to establish a long-term WACC.
- The continued use of a benchmark sample of BBB corporate bonds.
- The use of a 10-year Government bond as the risk free rate for calculating the debt risk premium.
- The use of an on-the-day debt risk premium.
- The debt risk premium being updated annually to reflect market conditions.

Discussion point 4: use of the updated revised bond yield approach

The ERA invites submissions from interested parties on the use of its revised bond yield approach to estimate the debt risk premium for the BRCP.

Discussion point 5: use of BBB-rated corporate bonds

The ERA invites submissions from interested parties on continuing the use of a benchmark sample of BBB corporate bonds. Is there any evidence to justify a change from BBB bonds? What are the credit ratings of a sample of representative peaking power plants?

Debt raising costs

Debt-raising costs are the administrative costs and other charges incurred by businesses when obtaining finance. Debt-raising costs should only include direct costs, which will be compensated in proportion to the average annual debt issuance.

Step 2.9.8 of the market procedure set debt issuance costs at 0.125 per cent of the amount of debt. This parameter is to be reviewed every five years.

For the 2020 BRCP calculation, AEMO used an allowance of 0.125 per cent for debt issuance costs.[35]

[35] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p. 21.

The ERA's approach

The ERA has accepted that it is reasonable to recover the direct costs of debt-raising as recommended by the Allen Consulting Group in its 2004 report to the Australian Competition and Consumer Commission. Australian regulators have generally accepted the recommendations in this report.[36]

For its gas rate of return guidelines and the rail WACC final determination, the ERA adopted an allowance of 0.100 per cent for debt-raising costs. The ERA reviewed the historic use of 0.125 per cent and found that this number included a double counting error. The ERA subsequently revised debt-raising costs down to 0.100 per cent. [37]

Consistent with the ERA's rail final determination and past practice for BRCP, the ERA does not consider that an allowance for financial hedging costs is warranted for estimating a WACC for BRCP.

- As asset lives are long, firms have more certainty about the future and can enter into long-term funding arrangements, which reduces the need for an efficient entity to hedge refinancing.
- Unlike some other regulated industries, the BRCP is not subject to periodic regulatory revenue resets of the WACC (for example, five-year revenue determinations for gas pipelines). Therefore, for BRCP there is no need to hedge for revenue resets.

The ERA supports:

- Setting debt-raising costs to 0.100 per cent.
- Fixing the debt issuance cost allowance until the next BRCP review.

Discussion point 6: revision to debt issuance costs

The ERA invites submissions from interested parties on its revision to debt issuance costs to 0.100 per cent.

Gearing ratio

Gearing ratio is the proportion of a business's assets assumed to be financed by debt to equity. Gearing is defined as the ratio of the value of debt to total capital (that is, including debt and equity) and used to weight the costs of debt and equity when the regulated WACC is determined. A regulatory gearing estimate contributes to a rate of return that reflects efficient financial costs. The higher level of risk an industry has the lower its general levels of gearing will be.

Step 2.9.8 of the market procedure details gearing (debt to total assets ratio) of 40 per cent and for it to be reviewed every five years.

For the 2020 BRCP calculation, AEMO adopted a gearing ratio of 40 per cent.[38]

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36 ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, p. 237.

37 ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, pp. 32-34.

38 AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p. 21.

The ERA's approach

For energy and rail determinations, the ERA selects a relevant benchmark sample of businesses and observes the gearing levels of these firms. The use of a benchmark sample of firms is consistent with the estimation of equity beta and the credit rating.

The ERA considers the benchmark sample approach provides incentives to service providers to adopt efficient gearing structures and prevents exposing consumers to variability of individual service provider gearing levels.

The BRCP uses a gearing ratio of 40 per cent to reflect the financing structure of an efficient peaking power plant. This compares to a higher gearing ratio of 55 per cent in the gas rate of return guidelines for regulated gas pipelines. The lower gearing for a peaking power plant reflects that these businesses are exposed to more risk than that of a regulated gas pipeline.

Discussion point 7: evidence to justify change to gearing ratio

The ERA invites submissions from interested parties on continuing the use of gearing of 40 per cent for a peak generator. Is there any evidence to justify a change from 40 per cent? What are the gearing ratios of a sample of representative peaking power plants?

Inflation rate (assuming a real WACC only)

Inflation is the rate of change in the general level of prices of goods and services. A nominal rate of return incorporates the real rate of return, compounded with a rate that reflects expectations of inflation.

The market procedure details how the expected inflation should be determined.

> 2.9.7 (k) is the forecast average of inflation for the 10 year period from the date of determination of the WACC. In establishing a forecast of inflation, the IMO must have regard to the forecasts of the Reserve Bank of Australia and, beyond the period of any such forecasts, the mid-point of the Reserve Bank's target range of inflation.

The market procedure also details that the expected inflation is reviewed annually.

In its 2020 BRCP report, AEMO noted that a negative real risk-free rate, and subsequently a low WACC, did not reflect Australian market conditions at that point in time.[39] AEMO also noted that market participants queried the WACC method and provided this information to the ERA for consideration in the five-yearly review of the market procedure.[40, 41]

[39] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, pp. 12, 14.

[40] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p. 14.

[41] Alinta Energy, *Submission to AEMO Draft Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year,* October 2019.

The ERA's approach

The ERA assessed inflation forecast methods, including the approach currently detailed in the market procedure, in its consideration of the 2018 gas rate of return guidelines and its rail determinations.[42, 43]

The ERA considers that it is appropriate to use the Treasury bond implied inflation approach for the purpose of estimating inflation. The Treasury bond implied inflation approach is based on the premise that the yield on Commonwealth Government Securities and the yield on Treasury bonds differ by an inflation component.

The ERA uses the Fisher equation and the observed yields of the following bonds to calculate forecast inflation:

- Commonwealth Government Securities, which reflect a market-based estimate of the nominal risk free rate.
- Indexed Treasury bonds, which reflect a market-based estimate of a real risk free rate.

The Fisher equation can be expressed in the equation below:

$$\pi = \frac{(1 + R_f)}{(1 + R_{Rf})} - 1$$

where:

π	is the expected inflation rate
R_f	is the 10-year nominal risk free rate of return estimated on Treasury bonds
R_{Rf}	is the 10-year real risk free rate of return estimated on Treasury indexed bonds.

The use of a 10-year term for both bonds is consistent with the ERA's approach to the rail WACC and establishing a long-term WACC.

The ERA supports the Treasury bond implied inflation approach as:

- It utilises both nominal and real risk free rates directly observed in the market, which includes information on the market's view of the expected inflation rate. The rationale for using market-based approaches is that market prices reflect the aggregation of diverse market participant expectations.
- It is a dynamic market measure that is updated daily.
- It is not driven by static policy targets.

The ERA considers that a move to the Treasury bond implied inflation approach will help address concerns expressed by AEMO and market participants.

At present AEMO applies the real WACC in its annuity calculation, which then is used to calculate the BRCP. The use of a real WACC means that the estimate of the inflation forecast plays an important role in determining the BRCP.

[42] ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, Chapter 15.

[43] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, Chapter 10.

- An overestimated inflation forecast will reduce the real WACC and therefore reduce the BRCP.
- An underestimated inflation forecast will increase the real WACC and therefore increase the BRCP.

It should be noted that the use of a nominal WACC will remove the effect of inflation forecasts on the cost of capital used in the BRCP. This is due to market bond yields already including an inflation expectation in the yield.

The ERA supports:

- Updating the forecast inflation method to the Treasury bond implied inflation approach.
- Continuing the forecast term of 10 years.
- Using a 20-day averaging period, consistent with the period used for the risk free rate.
- Updating the inflation forecast annually.

Discussion point 8: update the inflation forecast method

The ERA invites submissions from interested parties on updating the forecast inflation method to the Treasury bond implied inflation approach.

Value of imputation credits (gamma)

The imputation tax system prevents corporate profits from being taxed twice. Under the Australian imputation tax system, franking credits are distributed to investors at the time that dividends are paid and provide an offset to those investors' taxation liabilities.

The gamma parameter accounts for the reduction in the effective corporate taxation that arises from the distribution of franking credits to investors. Generally, investors who are able to use franking credits will accept a lower required rate of return, before personal tax, on an investment that has franking credits, compared with an investment that has similar risk and no franking credits.

The Market Procedure 2.9.8 details a gamma of 0.25 and for it to be reviewed every five years.

For the 2020 BRCP calculation, AEMO adopts a gamma of 0.25.[44]

The ERA's approach

In its energy and rail WACC reviews the ERA considered it was necessary to update the past gamma approach used as:[45,46]

- Contemporary Tribunal and Federal Court judicial reviews support the use of the utilisation approach.
- ATO data should not be applied to all aspects of the imputation system. This was confirmed by the opinions expressed by the ATO.

[44] AEMO, *Final Report: 2020 Benchmark Reserve Capacity Price for the 2022-23 Capacity Year*, December 2019, p. 23.

[45] ERA, *Final Gas Rate of Return Guidelines Explanatory Statement*, December 2018, Chapter 16.

[46] ERA, *Final Determination 2018 and 2019 Weighted Average Cost of Capital for the Freight and Urban Networks and Pilbara Railways*, August 2019, Chapter 9.

- New reports and analysis provided by Dr Lally present new methods and numbers to inform improved calculations of gamma.
- There is no observable market price for gamma. This includes the dividend drop off approach which is flawed and produces unreliable estimates.

The ERA estimates gamma as the product of the distribution rate and the utilisation rate to provide a gamma of 0.5.

- The distribution rate represents the proportion of imputation credits generated by a benchmark efficient entity that is expected to be distributed to investors. The ERA considers that the distribution rate is a firm-specific rather than a market-wide parameter. The ERA uses a distribution rate of 0.9 informed by the distribution rate from financial reports of the 50 largest ASX-listed firms.
- The utilisation rate is the weighted average over the utilisation rates of individual investors, with investors able to fully use the credit having a rate of 1 and those unable to use them having a rate of zero. The ERA uses a utilisation rate of 0.6 based on the equity ownership approach to determine the percentage of domestic investors in the Australian equity market.

The ERA supports:

- Updating gamma to 0.5.
- Fixing the value of gamma until the next BRCP review.