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Our reference: First period estimate for 2020 BRCP determination
Your reference: First period estimate for 2020 BRCP determination

Dear Trevor

2020 Benchmark Reserve Capacity Price Debt Risk Premium for the South West Interconnected System, using the ERA's 'Bond Yield Approach'

The Australian Energy Market Operator (AEMO) engaged PricewaterhouseCoopers Consulting (Australia) Pty Limited (PwC) to advise on the debt risk premium (DRP)¹ derived by applying the Economic Regulation Authority of Western Australia's (ERA) 'Bond Yield Approach'. The estimate of the DRP will be used by AEMO, in conjunction with various other parameters, to estimate a Weighted Average Cost of Capital (WACC), a necessary input for determining the 2020 Benchmark Reserve Capacity Price (BRCP).

AEMO requested the DRP be estimated over the 20 business days ending on and including 23 August 2019 (the First Period) and 18 October 2019 (the Second Period). This memorandum provides our estimate of the DRP for the First Period.²

As instructed by you, we have applied the ERA's 'Bond Yield Approach' that was set out in the ERA's Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas

¹ For the avoidance of doubt the estimated DRP reflects only the risk margin attributable to debt financing, and not other debt related costs such as financing, arrangement and underwriting fees.

² The 5th of August has been excluded from the averaging period as it was a bank holiday in NSW. As a result the sample period was extended to 26 July to ensure the averaging period captured 20 days of trading data.



Pipeline (Goldfields Decision).³ AEMO requires PwC to use Australian corporate bonds which have a BBB (or equivalent) credit rating from Standard and Poor's, and to use Commonwealth Government bond yields as the risk free rate (RFR), in estimating the DRP as per version 6 of the ERA's Market Procedure document.⁴

The ERA's 'Bond Yield Approach' changed following the Goldfields Decision. Compared with the 'Bond Yield Approach' from previous years, the new approach is much more extensive. A more detailed explanation of the differences is provided in Appendix A.

This advice is provided pursuant to the scope and terms set out in the consultancy agreement commencing 6 August 2019 between PwC and AEMO.

Disclaimer

We prepared this report solely for AEMO's use and benefit in accordance with and for the purpose set out in our consultancy agreement with AEMO dated 6 August 2019. In doing so, we acted exclusively for AEMO and considered no-one else's interest. We accept no responsibility, duty or liability:

- to anyone other than AEMO in connection with this report
- to AEMO for the consequences of using or relying on it for a purpose other than that referred to above.

We make no representation concerning the appropriateness of this report for anyone other than AEMO. If anyone other than AEMO chooses to use or rely on it they do so at their own risk.

PwC has not sought any independent confirmation of the reliability, accuracy or completeness of the information, statements, statistics and commentary (together the "information") contained in this report. It should not be construed that PwC have carried out any form of audit of the information which has been relied upon.

³ See Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline (pages 565-592) - <https://www.erawa.com.au/cproot/14401/2/GGP%20-%20GGT%20-%20AA3%20-%20Amended%20Final%20Decision%20-PUBLIC%20VERSION.PDF>

⁴ <https://www.erawa.com.au/cproot/14362/2/Market%20Procedure%20-%20Maximum%20Reserve%20Capacity%20Price.pdf>



Whilst the statements made in this report are given in good faith, PwC accept no responsibility for any errors in the information provided by AEMO or other parties nor the effect of any such errors on our analysis, suggestions or report.

This disclaimer applies:

- to the maximum extent permitted by law and, without limitation, to liability arising in negligence or under statute
- even if we consent to anyone other than AEMO using this report.

Liability limited by a scheme approved under Professional Standards legislation.

Results

As shown in Table 1 below, we have estimated a DRP of 233 basis points (bp) for the First Period applying a modified version of the ERA's 'Bond Yield Approach' to estimating a DRP. A 10 year BBB yield of 3.35 per cent was estimated. When applied to a Commonwealth Government Security (CGS) 10 year yield of 1.02 per cent, we estimate the DRP of 233 basis points.

The ERA's 'Bond Yield Approach' for regulated gas businesses applies a sample of bonds with a credit rating of between BBB- and BBB+.⁵ Further, the ERA's 'Bond Yield Approach' uses Australian Dollar interest rate swap yields as the RFR.

AEMO, in contrast to WA's regulated gas businesses and in accordance with its BRCP market procedures, can only:

- consider corporate bonds with a BBB credit rating; and
- use Commonwealth Government Security (CGS) yields as the RFR rate to estimate the DRP.

Although we have followed the ERA's 'Bond Yield Approach', to be consistent with the BRCP procedures we have restricted the sample of bonds to only those with a Standard and Poor's

⁵ ERA, *Rate of Return Guidelines - Meeting the requirements of the National Gas Rules*, 16 December 2013



credit rating of BBB and applied CGS yields as the RFR to estimate the DRP. We note that this resulted in a sample of 41 bonds for the First Period.⁶

The ERA’s ‘Bond Yield Approach’ required the application of three separate calculation methodologies to estimate a DRP. These are the:

- Gaussian Kernel methodology (GS);
- Nelson-Siegel methodology (NS); and
- Nelson-Siegel Svernnson methodology (NSS).

The DRP values estimated by applying GS, NS and NSS methodologies are averaged to estimate the final DRP as shown in Table 1.

Table 1 - Summary of DRP estimates using the ERA’s ‘Bond Yield Approach’, restricted to bonds with a BBB credit rating – 20 business days to 23 August 2019 (basis points)⁷

Methodology	DRP	Average DRP	Difference
Gaussian Kernel	228	233	-5
Nelson-Siegel	231		-2
Nelson-Siegel Svernnson	241		7

The observed trend for BBB rated bonds (as reported by the RBA) exhibited significant variability over the 10 months between averaging periods. The monthly DRP average increased significantly to January 2019 (peaking at 226 basis points) and subsequently eased to 191 basis points through to July this year. In the first 2018 averaging period the DRP for the 10 year bonds published by the RBA was 179 basis points.

The difference between the 2019 first period BRCP DRP estimate and the July RBA BBB DRP estimate was 39 basis points. This is the largest spread observed over the last 3 years of BRCP

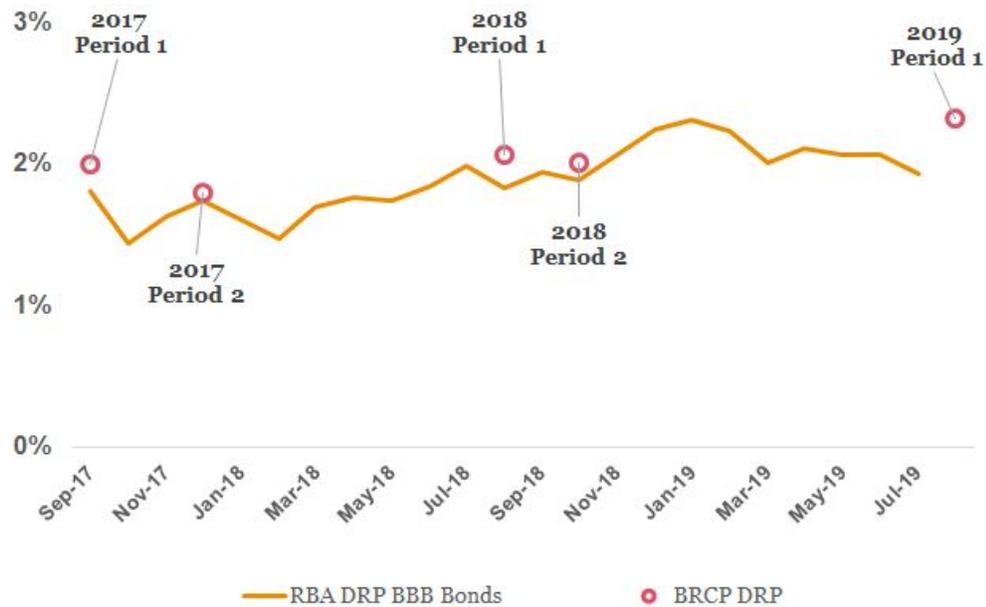
⁶ Beginning with a sample of 59 bonds, we have removed 16 bonds with duplicate features, one bond that did not return results for the required 10 trading days and one that displayed a number of duplicate and unusual features (AZ1682162 Corp).

⁷ The exclusion of AZ1682162 Corp reduced the DRP by 1.1 basis points



estimates, with the previous maximum spread being 28 basis points. The first period BRCP estimate further represents a 31 basis point increase on the 2018 second period estimate.⁸

Figure 1 - Comparison of RBA BBB 10 year DRP with BRCP DRP over the last 12 months



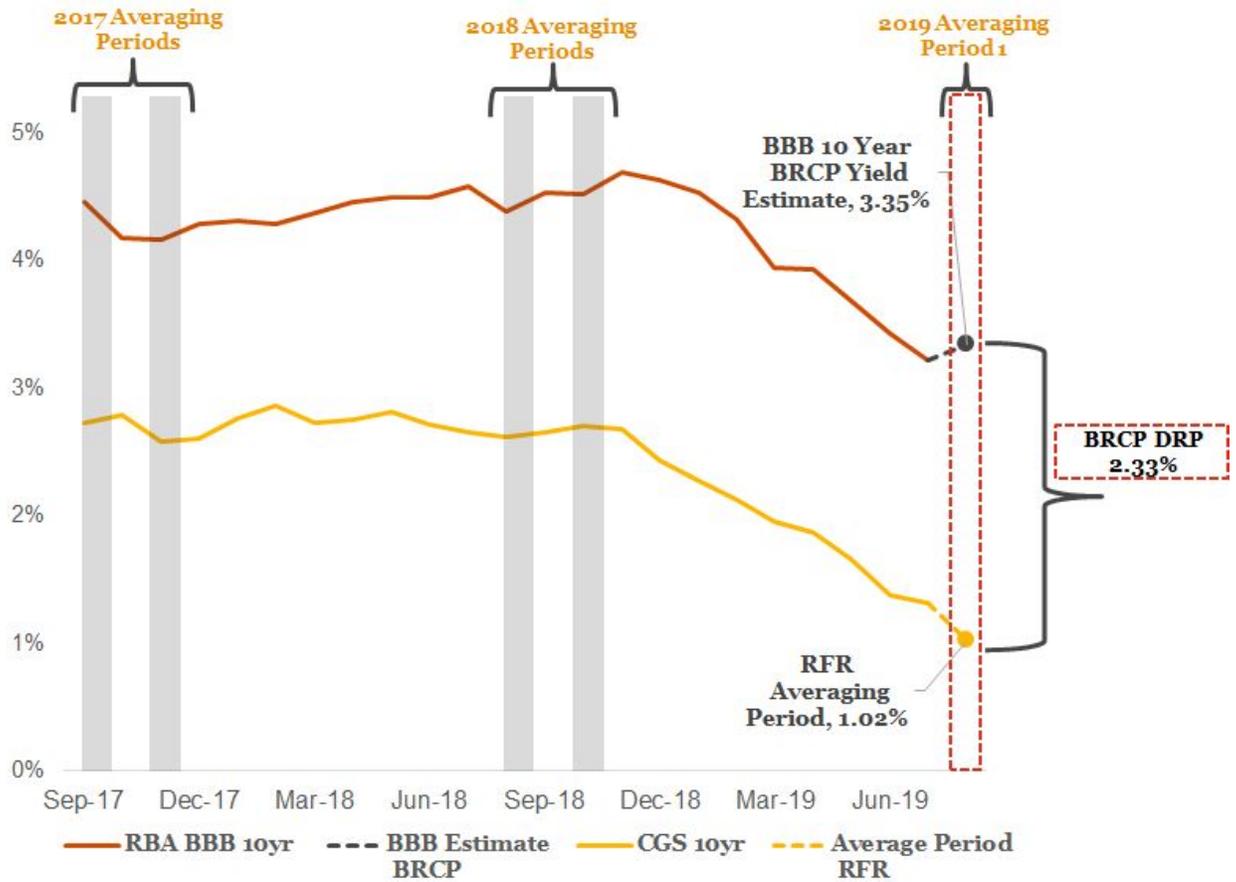
Source: PwC’s analysis applying the ERA’s ‘Bond Yield Approach’, Bloomberg, RBA

This unusual deviation appears to be driven largely by movements in the Commonwealth Government 10 year bonds over the averaging period. The average CGS 10 year bond yield for the averaging period was 1.02%. In contrast the July CGS 10 year figure reported by the RBA was 1.31%, a differential of 29 basis points.

⁸ The DRP for the 2018 BRCP was 202 basis points and the 10 year BBB yield 4.73%



Figure 2 - Comparison of BBB bonds yields and Commonwealth Government Securities - 10 year target tenor



Source: RBA (CGS 10 year yield & BBB 10 year target tenor (non-financial)), Bloomberg

Figure 2 above plots the 10 year CGS yield (yellow) and the RBA BBB 10 year bond yield (orange). It also shows the first period BRCP BBB yield estimate (grey dot) and the averaging period RFR (yellow dot). The chart shows that the RFR for the averaging period is materially



lower than the RBA's reported CGS July average figure. In contrast the BRCP estimate is higher than the RBA's July BBB yield estimate. The result is that the DRP, as calculated by the prescribed methodology, has increased relative to previous BRCP estimates. We will include a further comparison to published RBA BBB yields and DRP for August in our second period analysis.

If you wish to discuss further the derivation of these estimates, please do not hesitate to call me on the number provided below.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Craig Fenton', written in a cursive style.

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Appendix A – ERA’s ‘Bond Yield Approach’

The ERA changed its ‘Bond Yield Approach’ in 2016 following its Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline (Goldfields Decision).⁹ Compared with the previous ‘Bond Yield Approach’ there are three major differences:

- Bond criteria - Bonds issued in foreign currencies are now accepted in the sample, but those issued by financial institutions or which are inflation-linked are now excluded.
- Estimation methodology – Estimating the DRP now follows a more extensive process. Instead of taking a simple weighted average of each bond’s DRP, the Gaussian Kernel methodology, Nelson-Siegel methodology, and Nelson-Siegel Svensson methodology are applied to estimate three individual 10 year DRPs, which are then averaged to estimate the final DRP.
- Risk free rate – Interest rate swap yields are used as the RFR, instead of Commonwealth Government Security yields.

A detailed exposition of the precise process of the ‘Bond Yield Approach’ is provided in the Goldfields Decision. We have provided the results of applying the bond criteria in Table 2, though only restricted to bonds with an S&P rating of BBB.¹⁰

⁹ See Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline (pages 565-592) - <https://www.erawa.com.au/cproot/14401/2/GGP%20-%20GGT%20-%20AA3%20-%20Amended%20Final%20Decision%20-PUBLIC%20VERSION.PDF>

¹⁰ We have removed duplicate bonds that were issued in different financial markets, but otherwise had identical features, in accordance with advice from the ERA. 18 bonds were excluded from the sample drawn from Bloomberg SRCH function. 17 displayed duplicate characteristics (although we note one had a minor variance in yield, though also a very small issuance value of \$0.08m), and one did not return yields for a sufficient number of days in the averaging period for inclusion.



Table 2 – Debt risk premium key statistics for 20 business days to 23 August 2018

Issuer Name	S&P Rating	Currency	Issuance size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-Annual)
Ancor Finance USA Inc	BBB	USD	\$787	28/04/2026	6.68	2.77%
Ancor Finance USA Inc	BBB	USD	\$669	15/05/2028	8.73	3.05%
Ancor Finance USA Inc	BBB	USD	\$719	15/05/2028	8.73	3.11%
Ancor Finance USA Inc	BBB	USD	\$854	28/04/2026	6.68	2.75%
Ancor Ltd/Australia	BBB	EUR	\$373	22/03/2023	3.58	2.05%
APT Pipelines Ltd	BBB	USD	\$731	11/10/2022	3.13	2.00%
APT Pipelines Ltd	BBB	GBP	\$536	26/11/2024	5.26	2.17%
APT Pipelines Ltd	BBB	GBP	\$1 154	22/03/2030	10.58	3.13%
APT Pipelines Ltd	BBB	EUR	\$905	22/03/2027	7.58	2.73%
APT Pipelines Ltd	BBB	EUR	\$974	22/03/2022	2.58	1.65%
APT Pipelines Ltd	BBB	USD	\$381	23/03/2035	15.58	4.19%
APT Pipelines Ltd	BBB	USD	\$381	23/03/2035	15.58	4.19%
APT Pipelines Ltd	BBB	USD	\$1 396	23/03/2025	5.58	2.56%
APT Pipelines Ltd	BBB	AUD	\$200	20/10/2023	4.16	1.76%
APT Pipelines Ltd	BBB	USD	\$1 114	15/07/2027	7.89	2.97%
APT Pipelines Ltd	BBB	GBP	\$746	18/07/2031	11.90	3.21%
Ausgrid Finance Pty Ltd	BBB	EUR	\$1 042	30/07/2025	5.94	2.30%
Ausgrid Finance Pty Ltd	BBB	USD	\$668	01/08/2028	8.94	2.94%
Ausgrid Finance Pty Ltd	BBB	USD	\$668	01/05/2023	3.69	1.98%
AusNet Services Holdings Pty Ltd	BBB	USD	\$490	17/03/2076	56.57	2.65%
Boral Finance Pty Ltd	BBB	USD	\$651	01/05/2028	8.69	3.12%
Boral Finance Pty Ltd	BBB	USD	\$586	01/11/2022	3.19	2.25%
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$350	24/04/2025	5.67	1.95%
DBNGP Finance Co Pty Ltd	BBB	AUD	\$125	28/09/2023	4.10	1.86%
DBNGP Finance Co Pty Ltd	BBB	AUD	\$350	28/05/2025	5.76	2.11%
Incitec Pivot Finance LLC	BBB	USD	\$503	03/08/2027	7.94	3.67%



Issuer Name	S&P Rating	Currency	Issuance size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-Annual)
Incitec Pivot Ltd	BBB	AUD	\$450	18/03/2026	6.57	2.57%
Newcastle Coal Infrastructure Group Pty Ltd	BBB	USD	\$638	29/09/2027	8.10	4.14%
Newcrest Finance Pty Ltd	BBB	USD	\$491	15/11/2041	22.23	4.96%
Newcrest Finance Pty Ltd	BBB	USD	\$491	15/11/2041	22.23	4.96%
Newcrest Finance Pty Ltd	BBB	USD	\$737	15/11/2021	2.23	1.99%
Newcrest Finance Pty Ltd	BBB	USD	\$724	01/10/2022	3.11	2.08%
Origin Energy Finance Ltd	BBB	USD	\$484	14/10/2021	2.14	2.02%
Origin Energy Finance Ltd	BBB	EUR	\$188	05/04/2023	3.62	2.41%
Origin Energy Finance Ltd	BBB	EUR	\$1 149	04/10/2021	2.11	1.75%
QPH Finance Co Pty Ltd	BBB	AUD	\$250	07/06/2023	3.79	1.71%
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$250	08/12/2021	2.29	1.55%
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	16/12/2024	5.31	2.14%
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	12/10/2023	4.14	1.78%
Transurban Queensland Finance Pty Ltd	BBB	USD	\$647	19/04/2028	8.66	3.29%
Woolworths Group Ltd	BBB	AUD	\$400	23/04/2024	4.67	1.72%

Source: PwC's analysis of the ERA's 'Bond Yield Approach', Bloomberg