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Reference: First period estimate for 2021 BRCP determination

Dear Andrei

2021 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 2021 Benchmark Reserve Capacity Price (BRCP).

AEMO requested the DRP be estimated over the 20 business days ending on and including 14 September 2020 (the First Period) and 16 October 2020 (the Second Period). This letter 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 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

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 7th of September has been excluded from the averaging period as it was Labor Day in the US. With only limited trading US denominated bonds were displaying anomalous yields relative to the rest of the sample. As a result the sample period was extended to 17 August to ensure the averaging period captured 20 days of trading data.

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>

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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 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 dated 28 August 2020 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 28 August 2020. 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.

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.

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



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- to the maximum extent permitted by law and, without limitation, to liability arising in negligence or under statute
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Results

As shown in Table 1 below, we have estimated a **DRP of 201 basis points** (bp) for the First Period applying a modified version of the ERA's 'Bond Yield Approach' to estimating a DRP. We estimated a ten year BBB yield of 2.95 per cent, and when applied to a Commonwealth Government Security (CGS) 10 year yield of 0.94 per cent, we estimate the DRP of 201 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 credit rating of BBB and applied CGS yields as the RFR to estimate the DRP. We note that this resulted in a sample of 50 bonds for the First Period.⁶

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

⁶ Beginning with a sample of 67 bonds, we removed 17 bonds with duplicate features using the Bloomberg SRCH 'consolidate duplicate bonds' feature per ERA guidance.



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 Svensson 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 14 September 2020 (basis points)

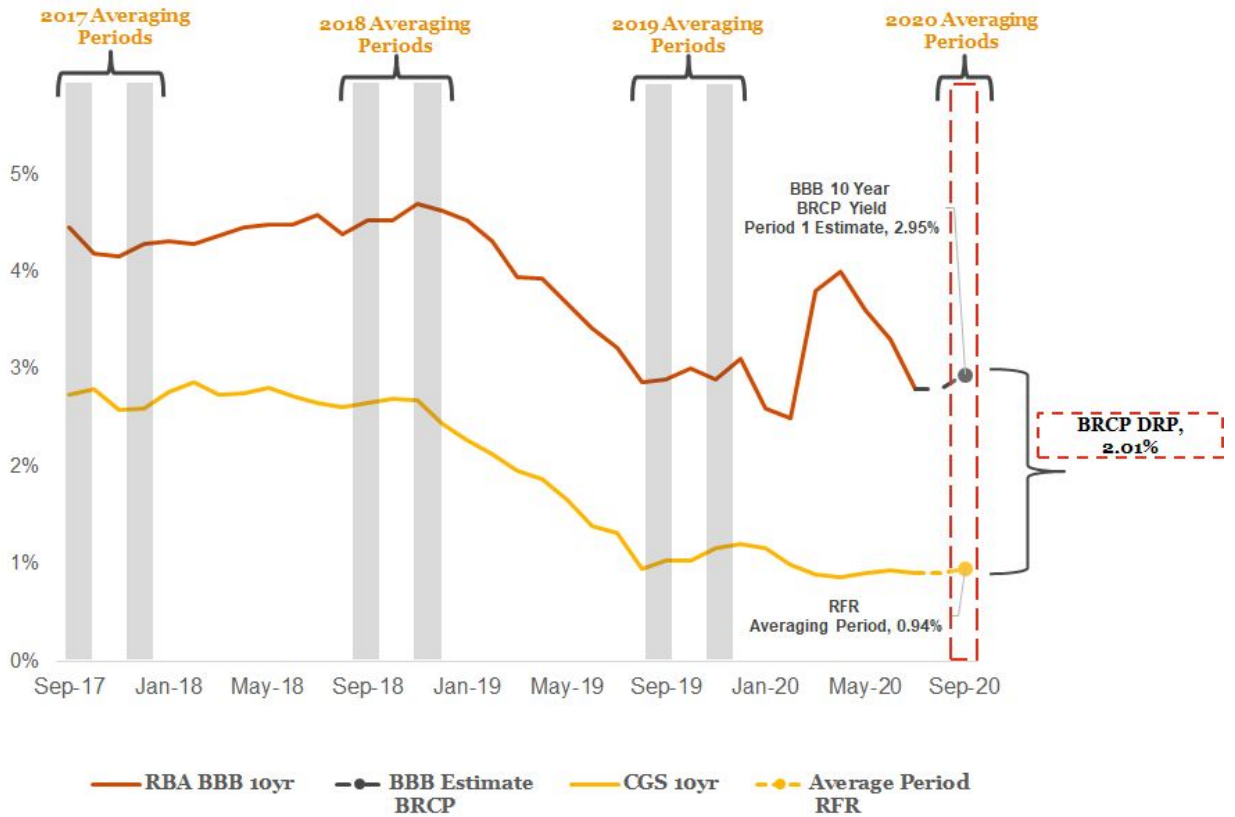
Methodology	DRP	Average DRP	Difference
Gaussian Kernel	189		-12
Nelson-Siegel	200	201	-1
Nelson-Siegel Svensson	214		13

*Note: Figures may not sum due to rounding

Figure 1 below plots the ten 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 has remained quite stable since the 2020 BRCP estimates. In contrast the observed trend for BBB rated bonds (as reported by the RBA) exhibited significant variability over the 11 months between averaging periods.



Figure 1 - Comparison of BBB bonds yields and Commonwealth Government Securities - ten year target tenor



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

Impact of Covid-19 on Non-financial Corporate Bond Yields

Of particular interest is the period between February 2020 and June 2020. The spread between the CGS and BBB yields almost doubled from 153bp in February 2020 to 295bp in March, a 142bp increase. It subsequently peaked in April with a spread of 318bp and has eased each month since.



This volatility would appear to be attributable to the market's response to the economic uncertainty caused by Covid-19. The uncertainty influenced investors to move out of higher risk corporate assets (such as those included in the sample) into low(er) risk assets, principally sovereign bonds and fixed income securities.⁷ Subsequently, non-financial corporate borrowers experienced 'particularly sharp tightening in financial conditions in March as investors grew concerned about the ability of firms to continue to service or roll over debt.'⁸

The result was that DRP, the spread between the GCS and BBB yields, rose to levels significantly above those observed since the first determination period in 2017. This volatility in BBB yields has reduced in months subsequent to the peak of Covid-19 lockdowns in April. This is reflected in the spread between the RBA's BBB estimates and the CGS risk free rate (192bp as of the last available observation in July). This is slightly below the average monthly DRP of 197bp since September 2017, but is generally consistent with the long run trend observed since September 2017.

The BRCP BBB cost of debt estimate at 2.95% is slightly higher than the RBA's July BBB yield estimate, but is a significant decrease on the RBA's observed yields in the March to May 2020 periods. This appears to reflect a trend return to levels consistent with pre- Covid-19 market conditions.

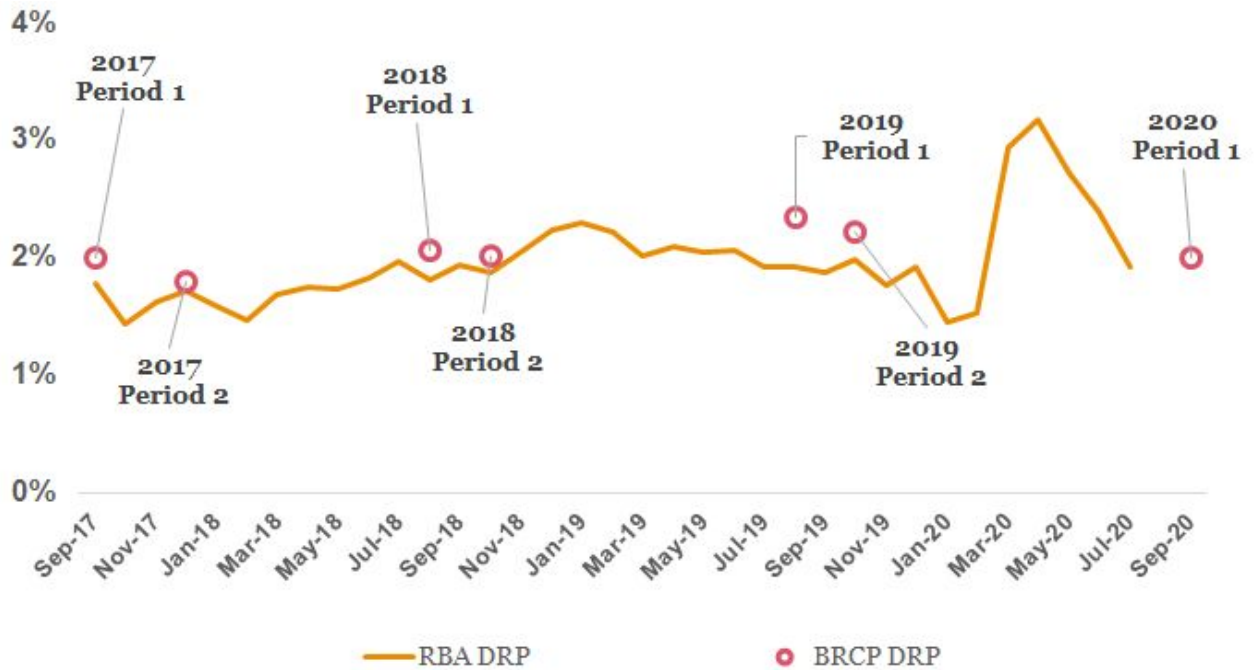
The first period DRP estimate of 201bp is broadly consistent with the RBA estimates and reflects a normalised spread between the BBB corporate bonds and CGS risk free rate. Figure 2 below charts the RBA's inferred DRP (orange line) and compares it to historic BRCP estimates (pink dots).

⁷ Reserve Bank of Australia, Statement on Monetary Policy; May 2020, Domestic Financial Conditions, Available at: <https://www.rba.gov.au/publications/smp/2020/may/domestic-financial-conditions.html>

⁸ Reserve Bank of Australia, Statement on Monetary Policy; May 2020, Domestic Financial Conditions, Available at: <https://www.rba.gov.au/publications/smp/2020/may/international-financial-conditions.html>



Figure 2 - Comparison of RBA BBB 10 year DRP with BRCP DRP



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

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,

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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 in accordance with advice from the ERA. 17 bonds were excluded from the sample drawn from Bloomberg SRCH function. This was conducted utilizing Bloomberg’s ‘consolidate duplicate bond’ function per the ERA guidance.



Table 2 – Debt risk premium key statistics for 20 business days to 14 September 2019

Issuer Name	S&P Rating	Currency	Issuance Size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-annual)
APT Pipelines Ltd	BBB	EUR	\$1,009	15/07/2030	9.84	2.73
APT Pipelines Ltd	BBB	USD	\$731	11/10/2022	2.08	1.40
APT Pipelines Ltd	BBB	USD	\$1,396	23/03/2025	4.53	1.75
APT Pipelines Ltd	BBB	GBP	\$1,154	22/03/2030	9.52	2.77
APT Pipelines Ltd	BBB	USD	\$1,114	15/07/2027	6.84	2.36
APT Pipelines Ltd	BBB	GBP	\$746	18/07/2031	10.84	2.80
APT Pipelines Ltd	BBB	EUR	\$905	22/03/2027	6.52	2.11
APT Pipelines Ltd	BBB	AUD	\$200	20/10/2023	3.10	1.34
APT Pipelines Ltd	BBB	GBP	\$536	26/11/2024	4.20	1.44
APT Pipelines Ltd	BBB	USD	\$381	23/03/2035	14.53	3.61
Amcor Finance USA Inc	BBB	USD	\$941	28/04/2026	5.62	1.63
Amcor Finance USA Inc	BBB	USD	\$792	15/05/2028	7.67	2.22
Amcor Finance USA Inc	BBB	USD	\$854	28/04/2026	5.62	1.63
Amcor Finance USA Inc	BBB	USD	\$787	28/04/2026	5.62	2.11
Amcor Finance USA Inc	BBB	USD	\$669	15/05/2028	7.67	2.77
Amcor Pty Ltd	BBB	EUR	\$373	22/03/2023	2.52	1.16
Amcor UK Finance PLC	BBB	EUR	\$816	23/06/2027	6.78	1.87
AusNet Services Holdings Pty Ltd	BBB	USD	\$490	17/03/2076	55.51	2.54
Ausgrid Finance Pty Ltd	BBB	AUD	\$750	5/02/2027	6.39	1.90
Ausgrid Finance Pty Ltd	BBB	AUD	\$250	5/02/2024	3.39	1.29
Ausgrid Finance Pty Ltd	BBB	EUR	\$1,042	30/07/2025	4.88	1.31
Ausgrid Finance Pty Ltd	BBB	USD	\$668	1/08/2028	7.88	2.59
Ausgrid Finance Pty Ltd	BBB	USD	\$668	1/05/2023	2.63	1.25
Boral Finance Pty Ltd	BBB	USD	\$651	1/05/2028	7.63	2.87
Boral Finance Pty Ltd	BBB	USD	\$586	1/11/2022	2.13	2.09



Issuer Name	S&P Rating	Currency	Issuance Size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-annual)
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$600	30/12/2030	10.29	4.15
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$250	30/06/2026	5.79	3.14
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$350	24/04/2025	4.61	2.82
CIMIC Finance USA Pty Ltd	BBB	USD	\$479	13/11/2022	2.16	5.30
DBNGP Finance Co Pty Ltd	BBB	AUD	\$350	28/05/2025	4.71	1.70
DBNGP Finance Co Pty Ltd	BBB	AUD	\$125	28/09/2023	3.04	1.40
Incitec Pivot Finance LLC	BBB	USD	\$503	3/08/2027	6.89	3.10
Incitec Pivot Ltd	BBB	AUD	\$450	18/03/2026	5.51	2.77
Newcastle Coal Infrastructure Group Pty Ltd	BBB	USD	\$638	29/09/2027	7.04	4.42
Newcrest Finance Pty Ltd	BBB	USD	\$1,007	13/05/2030	9.66	2.42
Newcrest Finance Pty Ltd	BBB	USD	\$775	13/05/2050	29.66	3.90
Newcrest Finance Pty Ltd	BBB	USD	\$491	15/11/2041	21.17	4.25
Newcrest Finance Pty Ltd	BBB	USD	\$724	1/10/2022	2.05	1.43
Origin Energy Finance Ltd	BBB	EUR	\$968	17/09/2029	9.01	2.47
Origin Energy Finance Ltd	BBB	AUD	\$300	11/11/2027	7.16	2.29
Origin Energy Finance Ltd	BBB	EUR	\$188	5/04/2023	2.56	2.18
QPH Finance Co Pty Ltd	BBB	AUD	\$300	29/01/2031	10.38	2.59
QPH Finance Co Pty Ltd	BBB	AUD	\$200	29/07/2027	6.88	2.11
QPH Finance Co Pty Ltd	BBB	AUD	\$250	7/06/2023	2.73	1.40
Transurban Queensland Finance Pty Ltd	BBB	USD	\$647	19/04/2028	7.60	3.18
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	16/12/2024	4.26	1.62
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	12/10/2023	3.08	1.63
Woolworths Group Ltd	BBB	AUD	\$600	20/05/2030	9.68	2.09
Woolworths Group Ltd	BBB	AUD	\$400	20/05/2025	4.68	1.22
Woolworths Group Ltd	BBB	AUD	\$400	23/04/2024	3.61	1.04

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