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Reference: Second 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 30 October 2020 (the Second Period). This letter provides our estimate of the DRP for the Second 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 October has been excluded from the sample as it was Labour Day in NSW. Additionally, the 12th of October has been excluded from the sample as it was Columbus 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 the first and second of October 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

Under the Wholesale Electricity Market Rules, the ERA is responsible for reviewing the Market Procedure for the calculation of the BRCP at least once every five years. The ERA released the draft procedure change proposal on 15 September 2020. This memorandum has been prepared using the guidance in the draft procedure change.⁵

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. On the basis of the Draft Procedure Change, PwC has adopted the ERA's 2020 amendment to the 'Bond Yield Approach' and the associated Microsoft Excel modelling tool which was finalised on 6 October 2020.⁶ The ERA's 2020 amendment was implemented to account for changes in product packages provided by the ERA's financial data provider. A more detailed explanation 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.

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

⁵ Procedure change proposal: Calculation of benchmark reserve capacity price <https://www.erawa.com.au/cproot/21445/2/Review-of-BRCP-market-procedure-2020---BRCP-procedure-change-proposal---Approved-for-publishing.pdf>

⁶ See Page 24 Procedure change proposal: Calculation of benchmark reserve capacity price <https://www.erawa.com.au/cproot/21445/2/Review-of-BRCP-market-procedure-2020---BRCP-procedure-change-proposal---Approved-for-publishing.pdf> and Gas Rate of Return Guidelines <https://www.erawa.com.au/gas/gas-access/guidelines/gas-rate-of-return-guidelines>



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.

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 Tables 1 and 2 (next page), we estimated a DRP of 201 basis points for the First Period, and **204 basis points for the Second Period 2020** applying a modified version of the ERA's 'Bond Yield Approach' to estimating a DRP. For the Second Period 2020 we estimated a ten year BBB yield of 2.84 per cent, and when applied to a Commonwealth Government Security (CGS) 10 year yield of 0.80 per cent, we estimate the DRP of 204 basis points.

The ERA's 'Bond Yield Approach' for regulated gas businesses applies a sample of bonds with a credit rating of BBB+.⁷ 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
- 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 44 bonds for the First Period.⁸

For the First Period 2020 we began with a sample of 67 bonds and removed 17 bonds with duplicate features for a sample of 50. For the Second Period 2020, we began with a sample of 56 bonds and removed 12 duplicate bonds for a sample of 44.

Compared with the First Period 2020, the bond sample in the Second Period 2020 reduced by six bonds. Five of these were Amcor Finance USA bonds whose country of risk shifted from Australia to the US between Period 1 and Period 2 2020. Two additional bonds had a maturity of

⁷ ERA, *Final Rate of Return Guidelines - Meeting the requirements of the National Gas Rules*, 18 December 2018

⁸ Beginning with a sample of 56 bonds, we removed 12 bonds with duplicate features using the Bloomberg SRCH 'consolidate duplicate bonds' feature per ERA guidance.



less than two years as at 30 October.⁹ Finally, a new bond meeting the benchmark sample criteria was issued by AusNet (ZO5261581) on 6 October. The net outcome is a reduction of six bonds from the First Period.

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

- Gaussian Kernel methodology (GS)
- Nelson-Siegel methodology (NS)
- Nelson-Siegel Svensson methodology (NSS).

The DRP values estimated by applying GS, NS and NSS methodologies are averaged to estimate the final DRP for the First Period 2020 (as shown in Table 1) and the Second Period 2020 (as shown in Table 2).

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.

Table 2 - Summary of DRP estimates using the ERA’s ‘Bond Yield Approach’, restricted to bonds with a BBB credit rating – 20 business days to 30 October 2020 (basis points)

Methodology	DRP	Average DRP	Difference
Gaussian Kernel	191		-13
Nelson-Siegel	204	204	0
Nelson-Siegel Svensson	217		13

*Note: Figures may not sum due to rounding.

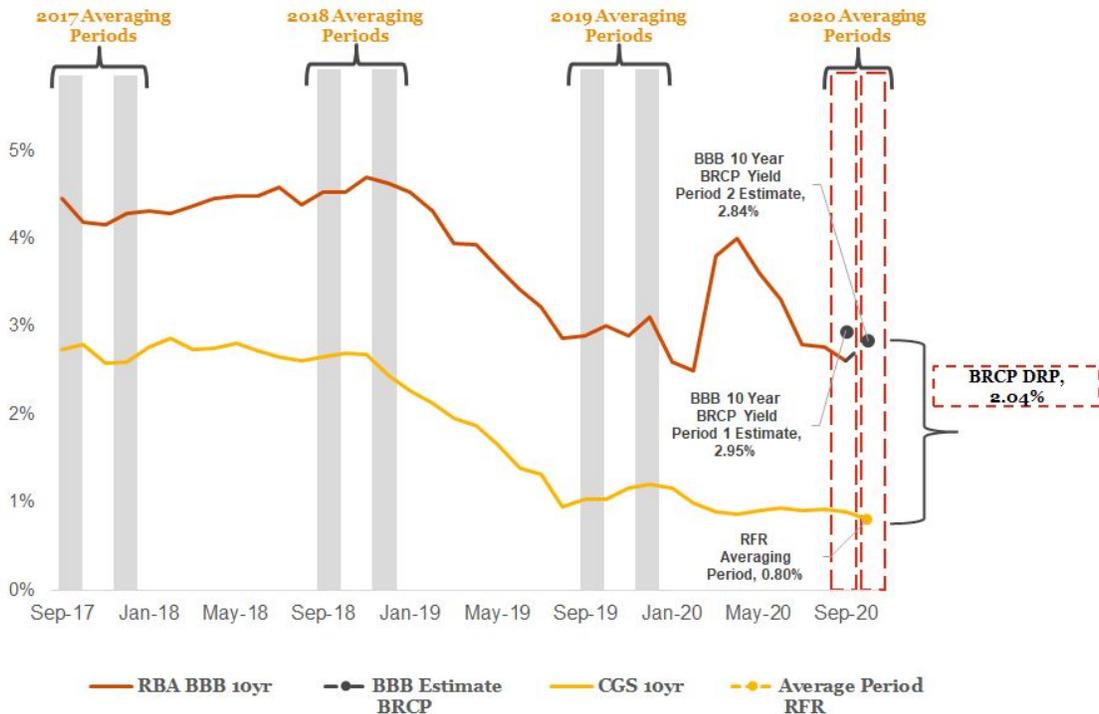
⁹ The two bonds from First Period sample with a maturity less than two years as at 30 October were EJ3784331 (Newcrest Finance) and EJ3906165 (APT Pipelines)



Between the First and Second Periods for 2020 there have been material shifts in both the RFR and the BBB cost of debt. The RFR moved from 0.94 per cent in the First Period to 0.80 per cent in the Second Period, a reduction of 14 basis points. The BBB cost of debt moved from 2.95 per cent in the First Period 1 to 2.84 per cent in the Second Period, a reduction of 11 basis points. The net result is a 3 basis point increase in the DRP relative to the First Period.

In Figure 1 we plotted the ten year CGS yield (yellow) and the RBA BBB 10 year bond yield (orange). It also shows the First and Second Period BRCP BBB yield estimates (grey dots) and the averaging period RFR (yellow dot). The chart shows that the RFR has remained quite stable since the 2019 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



a



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

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

As noted in our First Period 2020 memo, the period between February 2020 and June 2020 is of particular interest. The spread between the CGS and BBB yields almost doubled from 153 basis points in February 2020 to 295 basis points in March, a 142 basis point increase. It subsequently peaked in April with a spread of 318 basis points 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.¹⁰ 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'.¹¹

The result was that the DRP, represented by 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 a narrowing of the spread between the RBA's BBB estimates and the CGS RFR (173 basis points as at September 2020), which is now below the average monthly DRP of 196 basis points since September 2017. However, as observed by the RBA in the November Statement on Monetary Policy, it is higher than the spread observed in early 2020, before the full effects of COVID-19 were observed in financial markets.¹²

The BRCP BBB cost of debt estimate at 2.84 per cent is higher than the RBA's September BBB yield estimate, but is a significant decrease on the RBA's observed yields in the March to May

¹⁰ 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>

¹¹ 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>

¹² Reserve Bank of Australia, Statement on Monetary Policy; November 2020, Domestic Financial Conditions, Available at: <https://www.rba.gov.au/publications/smp/2020/nov/pdf/04-domestic-financial-conditions.pdf>

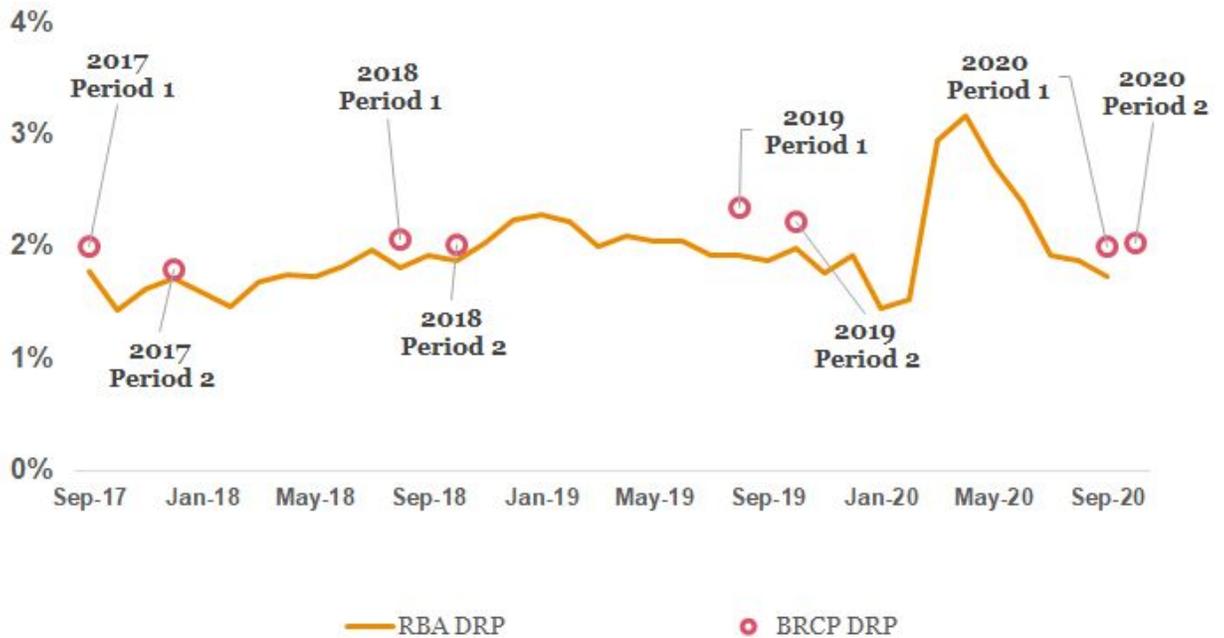


2020 periods. This appears to reflect a trend return to levels consistent with pre-COVID-19 market conditions.

The Second Period DRP estimate of 204 basis points is 31 basis points higher than the RBA’s available September figures. This differential is partially attributable to the October averaging period RFR being around 10 basis points lower than the September average RFR. Additionally, the RBA applies only the Gaussian Kernel (GK) methodology on a sample of bonds ranging from BBB+ to BBB-.¹³

In Figure 2 we show the RBA’s inferred DRP (orange line) and compare it to historic BRCP estimates (pink dots).

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

¹³ When the Second Period 2020 GK estimate of 2.71 per cent is applied to the September average RFR of 0.90 per cent the resulting DRP of 181 basis points is only 8 basis points higher than the RBAs DRP.



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".

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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).¹⁴ 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.

In October 2020 the ERA released an addendum to the 2018 explanatory statement which amended its method for estimating the debt risk premium to account for changes in product packages provided by its financial data provider. This method and the associated Microsoft Excel modelling tool have been adopted for the calculation of the DRP as of Period 2 2020.¹⁵

A detailed exposition of the precise process of the ‘Bond Yield Approach’ is provided in the Goldfields Decision and the 2020 Addendum to the Explanatory Statement.

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.¹⁶

¹⁴ 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>

¹⁵ See Gas Rate of Return Guidelines, Addendum to Explanatory Statement, ‘Updating DRP using Excel version 3’, <https://www.erawa.com.au/gas/gas-access/guidelines/gas-rate-of-return-guidelines>

¹⁶ We have removed duplicate bonds in accordance with advice from the ERA. 12 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 3 – Debt risk premium key statistics for 20 business days to 30 October 2020

Issuer Name	S&P Rating	Currency	Issuance Size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-annual)
Boral Finance Pty Ltd	BBB	USD	\$586	1/11/2022	2.00	1.98
CIMIC Finance USA Pty Ltd	BBB *-	USD	\$479	13/11/2022	2.04	4.63
Amcor Pty Ltd	BBB	EUR	\$373	22/03/2023	2.39	0.92
Origin Energy Finance Ltd	BBB	EUR	\$188	5/04/2023	2.43	1.99
Ausgrid Finance Pty Ltd	BBB	USD	\$668	1/05/2023	2.50	1.28
QPH Finance Co Pty Ltd	BBB	AUD	\$250	7/06/2023	2.60	1.35
DBNGP Finance Co Pty Ltd	BBB	AUD	\$125	28/09/2023	2.91	1.34
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	12/10/2023	2.95	1.59
APT Pipelines Ltd	BBB	AUD	\$200	20/10/2023	2.97	1.29
Ausgrid Finance Pty Ltd	BBB	AUD	\$250	5/02/2024	3.26	1.29
Woolworths Group Ltd	BBB	AUD	\$400	23/04/2024	3.48	0.95
APT Pipelines Ltd	BBB	GBP	\$536	26/11/2024	4.07	1.21
Transurban Queensland Finance Pty Ltd	BBB	AUD	\$200	16/12/2024	4.13	1.63
APT Pipelines Ltd	BBB	USD	\$1,396	23/03/2025	4.40	1.64
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$350	24/04/2025	4.48	3.00
Woolworths Group Ltd	BBB	AUD	\$400	20/05/2025	4.56	1.09
DBNGP Finance Co Pty Ltd	BBB	AUD	\$350	28/05/2025	4.58	1.69
Ausgrid Finance Pty Ltd	BBB	EUR	\$1,042	30/07/2025	4.75	1.13
Incitec Pivot Ltd	BBB	AUD	\$450	18/03/2026	5.38	2.76
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$250	30/06/2026	5.67	3.06
Ausgrid Finance Pty Ltd	BBB	AUD	\$750	5/02/2027	6.26	1.81
APT Pipelines Ltd	BBB	EUR	\$905	22/03/2027	6.39	1.62
Amcor UK Finance PLC	BBB	EUR	\$816	23/06/2027	6.65	1.57
APT Pipelines Ltd	BBB	USD	\$1,114	15/07/2027	6.71	2.25
QPH Finance Co Pty Ltd	BBB	AUD	\$200	29/07/2027	6.75	2.04



Issuer Name	S&P Rating	Currency	Issuance Size (\$m AUD)	Maturity	Term to maturity	Average yield (Semi-annual)
Incitec Pivot Finance LLC	BBB	USD	\$503	3/08/2027	6.76	3.01
Newcastle Coal Infrastructure Group Pty Ltd	BBB	USD	\$638	29/09/2027	6.91	4.57
Origin Energy Finance Ltd	BBB	AUD	\$300	11/11/2027	7.03	2.22
Transurban Queensland Finance Pty Ltd	BBB	USD	\$647	19/04/2028	7.47	3.00
Boral Finance Pty Ltd	BBB	USD	\$651	1/05/2028	7.50	3.25
Ausgrid Finance Pty Ltd	BBB	USD	\$668	1/08/2028	7.75	2.33
Origin Energy Finance Ltd	BBB	EUR	\$968	17/09/2029	8.88	2.55
APT Pipelines Ltd	BBB	GBP	\$1,154	22/03/2030	9.39	2.62
Newcrest Finance Pty Ltd	BBB	USD	\$1,007	13/05/2030	9.54	2.33
Woolworths Group Ltd	BBB	AUD	\$600	20/05/2030	9.56	2.05
APT Pipelines Ltd	BBB	EUR	\$1,009	15/07/2030	9.71	2.32
Brisbane Airport Corp Pty Ltd	BBB	AUD	\$600	30/12/2030	10.17	4.14
QPH Finance Co Pty Ltd	BBB	AUD	\$300	29/01/2031	10.25	2.57
APT Pipelines Ltd	BBB	GBP	\$746	18/07/2031	10.72	2.67
APT Pipelines Ltd	BBB	USD	\$381	23/03/2035	14.40	3.29
Newcrest Finance Pty Ltd	BBB	USD	\$491	15/11/2041	21.04	4.11
Newcrest Finance Pty Ltd	BBB	USD	\$775	13/05/2050	29.54	3.72
AusNet Services Holdings Pty Ltd	BBB	USD	\$490	17/03/2076	55.38	2.49
AusNet Services Holdings Pty Ltd	BBB	AUD	\$650	6/10/2080	59.93	3.21

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