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Rate of Return on Debt: Proposal for the 2016 to 2020 Regulatory Period

Attachment to UE Regulatory Proposal

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1. Introduction

United Energy prepared a separate stand-alone document to address the return on equity issues that arose out of the company's regulatory proposal. That submission identified the changing risk profile for electricity distribution businesses. This submission notes that a benchmark efficient entity which is confronted with operating risks, of the type described in UE's return on equity proposal, would be expected to have debt which, though investment grade, is relatively risky.

The AER assumes that the benchmark entity is financed by debt and equity, with the proportions of debt and equity being 60:40[1]. In current circumstances, the benchmark entity would be expected to have a credit rating from Standard and Poor's which is no higher than BBB (flat).

United Energy's submission on the return on equity demonstrates using a number of arguments that the AER's current approach produces results which are below market expectations for the required return on equity. The techniques and practices adopted by the AER are incapable of delivering a return on equity which is commensurate with prevailing conditions in the market for equity funds.

The AER's method for assessing the return on equity would, in all likelihood, have adverse consequences for the cash flows generated by a business in the circumstances of United Energy. If the AER were to apply its past methods in a distribution determination for United Energy, then the business would score less well on the financial ratios that are examined by ratings agencies. If the ratios were scrutinised more closely, then there is every possibility that there would be further downward pressure on UE's existing credit rating.

The AER's method for estimating the cost of debt would, if applied in its present form, contribute further to a reduction, to below sustainable levels, in the financial pressures being placed on the business. The reservations that United Energy harbours for the AER's approach to determining the return on debt are expressed further in the relevant chapters of this report.

This submission is delineated into chapters as follows:

- Section 2.1 discusses the term of debt and establishes the tenor of the benchmark corporate bond.
- Section 2.2 reviews recent analysis of the credit rating of the benchmark entity.
- Section 3 discusses aspects of the debt financing practices of firms which operate in competitive markets. An introduction is provided to the trailing average rate of return on debt.
- In section 4, a number of core questions are posed about debt management strategy. The alternatives available to a benchmark entity can be set out as follows:
  - The business refinances all debt at the beginning of each regulatory period (in which case the "rate on the day" method would be an appropriate means for determining the rate of return on debt for a five-year period); or
  - The business maintains a staggered debt portfolio (that is, it issues new debt and refinances existing debt in a phased and staggered manner), but does not apply an interest rate swap overlay. This is the pure trailing average method; or
  - The business issues new debt and refinances existing debt in a phased and staggered manner, applying an interest rate swap overlay. The interest rate swap overlay means that a certain proportion of the value of the benchmark entity's base rate of interest will be reset at the beginning of each new regulatory period. The approach thus outlined is the hybrid debt management strategy.
- The nature of any transition to a trailing average is described in section 4. UE considers that the first of the debt management strategies described above is demonstrably impractical and inefficient.

[1] AER, Better Regulation, Rate of Return Guideline, December 2013, (pdf version); section 4.3.2, page 9.

Therefore, there is no transition from this debt management strategy to a trailing average that would reflect efficient costs. The second debt management strategy is a trailing average and, therefore, no transition is required to accommodate a change to a trailing average approach. Consequently, the only circumstance in which a transition is appropriate is from the hybrid approach.

- The estimation procedure for the cost of debt is explained in section 5.
- The selection of averaging periods in current and future years is covered in section 6.
- The formula for annual updating the cost of debt is discussed in section 7.
- The process for incorporating the annual update to the cost of debt into regulated prices is discussed in section 8.
- The new issue premium, which is the phenomenon of the under-pricing of corporate debt when newly issued bonds are released on to the market is discussed in section 9.
- The methods that will apply to the annual updating of the cost of debt are described in section 9.
- A description of the debt raising costs and other debt management transaction costs incurred by a benchmark efficient entity is provided in section 10.

The first set of cost of debt reports that were submitted to the AER as part of the consultation on the rate of return guideline provide useful background for all of the matters that are discussed in this submission.[2]

[2] Kanangra Ratings Advisory Services, Howell, D; Credit ratings for regulated energy network services businesses; June 2013.

CEG Competition Economists Group, Hird, T; Energy Networks Association: Debt strategies of utility businesses; June 2013.

CEG Competition Economists Group, Hird, T; Energy Networks Association: Estimating the debt risk premium; June 2013.

PricewaterhouseCoopers Australia, Balchin, J. et al; Energy Networks Association: Debt financing costs; June 2013.

PricewaterhouseCoopers Australia, Balchin, J. et al; Energy Networks Association: Benchmark term of debt assumption; June 2013.

PricewaterhouseCoopers Australia, Balchin, J. et al; Energy Networks Association: Potential impact of the ERA's DRP methodology; June 2013.

CEG Competition Economists Group, Hird, T; Estimating the debt risk premium, (Incorporating CEG notice of errata data 22 August 2013), August 2013.

CEG Competition Economists Group, Hird, T; Energy Networks Association: Addendum – Estimating the debt risk premium; 22nd August 2013.

Jones Day, External Memorandum for the Energy Networks Association, Application of the decision in the Envestra case to the proposals in the Australian Energy Regulator's draft Rate of Return Guideline, reference 580219 – 600001, prepared by Nicolas Taylor and Danielle Mathiesen, 26th September 2013.

PricewaterhouseCoopers Australia, Balchin, J. et al; Responding to AER's criticism of PwC's report on the benchmark term of debt; 2nd October 2013.

CEG Competition Economists Group, Hird, T & Wilton, A; Mechanistic cost of debt extrapolation from 7 to 10 years; October 2013.

CEG Competition Economists Group, Hird, T; Review of Lally and Chairmont Reports; October 2013.

CEG Competition Economists Group, Hird, T; Transition to a trailing average approach; prepared for Ausgrid, Endeavour Energy and Essential Energy, October 2013.

Ronn, E.I. and R.S. Goldberg, Research into the New Issue Premium, and the Applicability of that Research to the Australian Bond Market, a submission prepared for United Energy and Multinet Gas in response to the draft rate of return guidelines of the Australian Energy Regulator, October 2013.

The schedule to this document explains the details of the extrapolation methods that can be used to transform the published results for third party measures of the cost of debt into a benchmark allowance at a ten year tenor.

ESQUANT (2013), The development of yield curves, zero coupon yields, and par value yields for corporate bonds, A report prepared for United Energy and Multinet Gas in response to the AER's draft rate of return guideline, 17th October 2013.

Diamond, N & Brooks, R.B.; A review of measures of Australian corporate credit spreads published by the Reserve Bank of Australia, ESQUANT Statistical Consulting; 19th May 2014.

2. Benchmark term and credit rating

2.1 Tenor of the benchmark debt instrument

During the development of the rate of return guideline, the AER sought information from privately-owned network service providers about the nature of their debt portfolios.[3] The AER posed questions about the amount, type, term and credit ratings of the different debt instruments issued by regulated network service provider. The AER reported that the particular service providers under consideration were comparable to the definition of the benchmark efficient entity, which is a 'pure play' regulated energy network business operating within Australia.[4] The AER performed calculations on the data that it had received and determined that the weighted average term at issuance of the debt portfolio of these service providers was 8.7 years. The AER further observed that service providers were securing bank debt with an average term at issuance of 4.3 years, were issuing Australian bonds with an average term at issuance of 9.6 years, and were issuing offshore bonds with an average term of 9.7 years.

The AER adopted a benchmark term to maturity of ten years in its Rate of Return Guideline[5], and United Energy accepts the AER's decision in that regard.

However, in the recent NSW draft determinations[6] (the NSW draft decisions) the AER has reported that:

> *In summary, we are satisfied that a 10 year term is a reasonable assumption for the benchmark debt term. Though we also consider that, if anything, this assumption is more likely to overstate than understate the debt term of a benchmark efficient entity. This is because the industry average term at issuance is currently less than 10 years, and the benchmark efficient entity may have an incentive to enter into interest rate swaps on its existing debt that would further lower the effective term of that debt.*
>
> *As we stated in the explanatory statement to the Guideline, we will continue to monitor the average debt term at issuance of regulated network service providers against the benchmark term. We may also consider this information when we are assessing proposals for transactions costs or any proposed adjustment to the foundation model estimate of the return on equity. In this draft decision, we consider this information in relation to whether it is necessary to extrapolate the third party data series we have adopted out to the 10 year benchmark debt term. Our consideration of this issue is set out in the extrapolation and interpolation issues section below.*

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3 This has been reported by the AER in the following draft decision: AER; Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015–20, Attachment 3: Rate of return, November 2014; page 129.

4 The AER reported that it had received information from the following network service providers: APA Group, CitiPower, Dampier to Bunbury Natural Gas Pipeline, ElectraNet, Envestra, Jemena, Multinet and United Energy, Powercor, SA Power Networks and SP AusNet.

5 AER; Better Regulation. Rate of Return Guideline; December 2013 (the Guideline) (pdf version) section 6.3.3 page 20.

6 AER, *Draft decision for Ausgrid distribution determination 2015-16 to 2018-19, Overview*; November 2014 (pdf version).

AER, *Draft decision for Directlink determination 2015-16 to 2019-10, Overview*; November 2014 (pdf version).

AER, *Draft decision for Endeavour Energy distribution determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

AER, *Draft decision for Essential Energy distribution determination 2015-16 to 2018-19, Overview;* November 2014 (pdf version).

AER, *Draft decision for Jemena Gas Networks (NSW) Ltd, Access Arrangement, 2015-20, Overview;* November 2014 (pdf version).

AER, *Draft decision for Transgrid transmission determination 2015-16 to 2018-19, Overview*; November 2014 (pdf version).

United Energy does not accept the caveats that have been placed upon the 10 year tenor.

The practice of firms which resemble the benchmark efficient entity is to raise debt with a long-term tenor so as to ameliorate possible refinancing risks. Electricity distribution businesses necessarily invest in assets which have long lives. During the WACC review in 2008 and 2009, a number of regulated businesses submitted evidence in the form of witness statements to demonstrate to the AER that network businesses have a preference for using longer tenor debt.[7]

As has been mentioned, during the more recent process for development of the Rate of Return Guideline, confidential data about debt portfolios was collected from privately-owned regulated network businesses. The data was analysed by the Competition Economists Group which reported that the simple (weighted) average of the term to maturity at issuance of all drawn debt was 11.0 years (10.7 years) for all firms in the original sample, plus ElectraNet (which is unlisted).[8] CEG included bank debt in its calculations, but treated liquid funds and cash as "negative bank debt". Nonetheless, the results were not unduly sensitive to the manner in which cash and cash equivalents were handled.

The AER modified CEG's calculations by:[9]

(a) Assuming some callable debt had a maturity at its first call date;

(b) Ignoring cash and cash equivalents; and

(c) Including debt issued by the following entities: 100% government owned SPIAA (which is the parent of Jemena), and the Dampier to Bunbury Natural Gas Pipeline (which was not originally included by CEG because the business was not regulated by the AER).

Based on these amendments, the AER estimated an 8.7 year weighted average term of debt (the AER did not report the simple average which CEG consistently estimated to be higher than the weighted average).

In respect of the tenor of bonds issued, the AER assessed that the average term at issuance for Australian dollar denominated bonds was 9.7 years, whilst the average term at issuance for offshore bonds was similarly 9.7 years.[10] These values are close to the benchmark tenor of ten years as can be practicably obtained. To achieve an exact match to 10 years at a particular point in time would be unrealistic because the sample of firms was relatively small, and for some entities, debt may have been raised at uneven intervals through time. The corporate treasurers who prepared the witness statements noted previously have attested to some of the practical constraints that may be imposed upon borrowing.

While bank debt is raised at somewhat shorter tenors (i.e. 4.3 years according to the data collected for the Guideline process), bank debt forms a relatively small proportion of the total debt raised by the private businesses. CEG provided reasons as to why bank debt should not be categorised in the same way as the debt raised by bond issuance:

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7 Witness statement of Gregory Damien Meredith, Envestra; 31 January 2009.

Witness statement of Sim Buck Khim, Jemena; undated.

Witness statement of Alistair Watson, SP AusNet; 30 January 2009.

Witness statement of Andrew Noble, Citipower and Powercor; undated.

8 Letter from Dr Tom Hird (Director of CEG) to Mr Warwick Anderson (GM Network Regulation Branch of the AER) dated 11 November 2013.

9 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline*; (**Explanatory Statement**) December 2013, section 8.3.3, page 145.

10 Ibid, Table 8.2, page 143.

> *"These estimates treat all debt in the same way. Specifically, one dollar of short term drawn bank debt is treated equivalently (given the same weight) as $1 of debt raised by bond issuance. In our view this artificially depresses the measure of term below that which we are interested in. Specifically, we are interested in debt used to fund the regulatory asset base (RAB) – which is the debt that is compensated through the cost of debt allowance. However, liquid short term debt is used to fund liquid financial assets in addition to, or instead of, the long term fixed assets in the RAB."*[11]

United Energy contends that bank debt should not be wholly incorporated in the calculations which establish an average tenor for benchmark regulatory purposes. As was explained by CEG, short-term bank debt is used, in part, to fund cash and cash equivalent assets which act as liquid funds for working capital and are necessary for the efficient operation of a firm. The Regulatory Asset Base (RAB) makes no provision for working capital, which is an asset above and beyond the RAB. The Explanatory Statement to the Rate of Return Guideline discusses this matter, however, the explanation provided by the AER involves a series of *non-sequiturs*:[12]

> *"We do not agree with CEG's submission that a portion of short-term debt (bank debt and commercial paper) may be excluded as negative cash. We consider that a cash balance will reflect a number of items, including receivables and the proceeds of asset sales, which are not debt transfers. We understand that short-term debt is primarily used by the businesses to fund new capital expenditure, until such time as a marketable parcel (approximately $500 million) is accumulated that may be refinanced by issuing longer-term (bond) debt. We also understand that businesses try to have enough residual bank debt drawn to maintain competition between a pool of banks in order to provide competitively priced capex facilities. We therefore do not consider that it is appropriate to discount short-term debt by an amount equal to cash and cash equivalents."*

Here the AER is, in essence, repeating CEG's view that cash and cash-equivalents are in the nature of working capital. But rather than drawing CEG's conclusion that the term of debt used to fund working capital should not be included in an estimate of the term of debt used to fund the Regulatory Asset Base (RAB), the AER reaches the opposite conclusion.

United Energy believes that the debt that is used to fund short term working capital requirements should not be included in the calculation of the average tenor of the debt that is used to fund the long-term assets which are a component of the RAB. However, if the AER is to continue its current practice of recording the tenor of short-term borrowings, then, as a matter of consistency, the regulator ought to also expand the definition of the RAB so as to include working capital.

In any event, even with more liquid short-term debt included in the calculations, the average tenor is well above five years and substantially closer to 10 years than to five.

If the AER is to examine transactions costs, then the analysis which it performs should be consistent with the principle established above that debt is raised on a long-term basis, and that the principal source of debt financing for use in funding the regulated asset base is through bond issues with tenors very close to the 10 year benchmark that was adopted by the AER in the Guideline.

The AER, in its draft decisions for NSW, does not explain how there is a conceptual linkage between the tenor of debt and the 'foundation model' for equity (together with adjustments to the foundation model). As such, United Energy opposes the notion that the AER might re-open the matter of the tenor of debt in an attempt to claw back any adjustments to the flawed 'foundation model' for equity.

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11 Letter from Dr Tom Hird (Director of CEG) to Mr Warwick Anderson (GM Network Regulation Branch of the AER) dated 11 November 2013; page 2.

12 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline*; (**Explanatory Statement**) December 2013, page 145.

2.2 Benchmark credit rating

In its Rate of Return Guideline, the AER stated that the credit rating for a benchmark entity should be BBB plus.[13] Furthermore, in its draft decisions for NSW, the AER has rejected CEG's position on the subject of the appropriate credit rating for a benchmark efficient entity.[14] As is explained below, the perspective of United Energy is that the empirical evidence supports a BBB rating across electricity and gas network businesses.

CEG found that in each year from 2009 to late 2013, the median credit rating of energy network service providers was BBB, amid a clear trend of credit rating downgrades across the industry.

The AER seems to suggest that at a particular point in time, the median credit rating had risen to BBB+.[15] However, United Energy considers that with such a very small sample of comparators, there is no merit in taking an 'on the day' credit rating which can oscillate considerably in response to a ratings change for a single firm, and, instead, the credit rating needs to be established over a reasonable period, such as the time interval used by CEG.

Over a five year timeframe, the information before the AER provides sufficient evidence to warrant a departure from the Guideline, and to justify a change in the credit rating to BBB (flat).

In relation to the comparator group that was used to determine the median credit rating, there appears to have been an asymmetry in the regulator's approach. While the AER deleted Ergon Energy Corporation Ltd, on the basis that its credit rating would obviously be influenced by government ownership, the AER formed the view that the comparator set should include both AusNet Services and SGSP Australia Assets Pty Ltd. There is clear evidence that Singaporean Government ownership of the latter two businesses has had a significant effect on the consideration of their credit ratings by credit rating agencies. For example, both companies were placed on negative ratings watch when the Singapore Government proposed to dilute its ownership in 2013.[16]

The AER has also espoused the view that even if it were to consider Singapore Government ownership of AusNet Services and SGSP Australia, a period of time has passed since the dilution of Singapore Government ownership, and there have been some intermediate changes to the credit ratings for SGSP Australia. The AER has therefore formed the view that credit ratings agencies have had time to revise their credit ratings and to absorb the information about government ownership.[17] However, the AER seems to have misunderstood a fundamental issue which is that the continuing effect of Singapore Government ownership is to provide greater comfort to credit ratings agencies about the key issues that are relevant to their consideration of an appropriate credit rating. In particular, the credit ratings that are applied to these companies are not the same as the credit rating that would be assigned to a pure play, regulated energy network business operating within Australia. In its Rate of Return Guideline, the AER identified a pure play, regulated energy network as being the benchmark efficient entity.[18] This proposition about the effects of implicit government support is underpinned by the

13 AER, *Better Regulation, Rate of Return Guideline*, December 2013; (pdf version) section 6.3.3 pages 21 to 22.

14 For example: AER, *Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return,* November 2014, (pdf version), page 3-296.

15 Ibid, page 3-296.

16 Ibid, page 3-296.

17 AER, *Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return,* November 2014, (pdf version), page 3-296.

18 AER, *Better Regulation, Rate of Return Guideline*, December 2013; (pdf version) section 3.3 page 7.

evidence adduced by the AER, which was that the dilution of government ownership exerted a negative effect on the assessment by a ratings agency of the credit rating to be assigned to SGSP Australia.[19]

The AER has asserted that the credit rating of SGSP Australia was downgraded subsequent to the diminution in the share of government ownership, with the result that the business has been unable to maintain an A- credit rating[20]. The AER seems to think that the downgrade from A- provides re-assurance as to the regulator's overall approach. The issue, however, is that government ownership has maintained the credit rating at a level above that which would otherwise have been recorded over the period under consideration. Therefore, the credit rating of the SGSP business is not representative of the credit rating of an efficient private sector network business, which is the standard that informs the definition of a benchmark efficient firm.

The data for the full set of comparators has been compiled by CEG and is presented in the table below for an extended time period from 2002.

19 AER, *Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return,* November 2014, (pdf version), page 3-296.

20 Ibid, page 3-296.

Table 2.1: Credit ratings for energy network businesses from Standard and Poor's

End of year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	MEDIAN over all years	Median over last 5 years
APT Pipelines								BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
ATCO Gas Australian LP										BBB	BBB	A-	A-	BBB	BBB+
DBNGP Trust			BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB-	BBB	BBB	BBB-
DUET Group		BBB	BBB-	BBB-	BBB-	BBB-	BBB	BBB	BBB	BBB	BBB			BBB-	BBB-
ElectraNet Pty Ltd	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB	BBB	BBB	BBB	BBB	BBB+	BBB+	BBB
Energy Partnership (Gas) Pty Ltd		BBB	BBB	BBB	BBB	BBB	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB- / BBB	BBB-
Envestra Ltd	BBB	BBB	BBB	BBB	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	BBB	BBB+	BBB-	BBB-
ETSA Utilities	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Powercor Utilities	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+	A-	A-
SP AusNet Group	A	A	A	A	A	A	A-	A-	A-	A-	A-	A-	A-	A	A-
SPI (Australia) Assets Pty Ltd							A-	A-	A-	A-	A-	BBB+	BBB+	A-	A-
The CitiPower Trust	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	BBB+	BBB+	A-	A-
United Energy Distribution Pty Ltd	A-	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Median	A-	BBB+	BBB / BBB+	BBB / BBB+	BBB / BBB+	BBB / BBB+	BBB+	BBB	BBB	BBB	BBB	BBB / BBB+	BBB+	BBB	BBB

The evidence from Table 2.1 demonstrates that the median credit rating has been below BBB+, other than in 2002, 2003, and 2014. The median credit rating has been BBB across all entities for the longest time period examined and for the last 5 years. When all of the firms that the AER seeks to include are incorporated into the sample, the median credit rating in 2014 was BBB+, however the median actually drops to BBB/BBB+ once the firms with sovereign government ownership are excluded. The government-owned firms are SP AusNet (with an A- credit rating), SPI (A- rated) and Electranet (BBB+ rated).

Moreover, historical credit ratings do not reflect the extremely low equity buffer that would result if the AER's proposed approach to compensation for the cost of equity were to be implemented in current market circumstances. United Energy's concern is that the AER's methodology for establishing the return on equity delivers a depressed return in circumstances in which CGS yields are at unprecedentedly low levels, as is the case at present. Under the AER's foundation model approach, the allowed rate of return on equity diminishes in lock-step with the reduction in CGS yields. The result is that the regulatory arrangements provide a lower equity buffer than would normally be available to a benchmark efficient firm, and consequently debt holders may be exposed to additional risk. Similarly, the AER's proposed transition to a trailing average rate of return on debt will, at prevailing debt risk premiums, under-compensate the benchmark efficient entity which will have to pay a higher trailing average debt risk premium on its efficiently managed, staggered debt portfolio. The under-compensation that is intrinsic to the AER's form of the transition to a trailing average would further compress cash-flow buffers for the benchmark efficient entity.

In addition, a benchmark efficient entity, operating in the circumstances of United Energy, would be obliged to undertake significant capital spending over the next five years (with the regulatory asset base forecast to increase at the rate of between 5 per cent and 10 per cent per annum). The projected increase in the RAB, in conjunction with the aforementioned pressures on the credit metrics for a benchmark efficient entity, will result in material downward pressure on credit ratings.

CEG undertook a "finance-ability" analysis for ActewAGL, considering the impact on the company's credit rating of the AER's recent draft decision.[21] A discussion of the work performed by CEG is presented below in section 2.3. The main conclusion to be drawn was that the highest credit rating that ActewAGL would be able to achieve was BBB. The scenario which delivered the BBB outcome was one in which ActewAGL earned revenues that were consistent with those set by the AER in its draft decision, but, importantly, ActewAGL was also presumed to be in a position to implement the significant cost reductions that had been imposed by the AER.

Further pressure on credit ratings exists due to the uncertainty about the AER's approach to operating cost benchmarking. In its draft decisions for the NSW and ACT businesses, the AER set operating cost allowances which were well below the actual operating costs of the businesses. UE considers that the uncertainty associated with this radical shift in regulatory methodology can be expected to depress credit ratings.

The AER's own analysis presented in the Rate of Return Guideline showed some support for a BBB rating[22], while the expert report from Martin Lally concluded that an industry credit rating in the range of BBB to BBB+ would be appropriate at this time. Lally did not provide a firm endorsement for a BBB+ rating.[23]

UE considers that BBB is the most appropriate credit rating assumption when estimating the return on debt for the benchmark efficient entity for the next regulatory period. The use of a higher credit rating would result in United Energy being inadequately compensated for the efficient financing costs of a benchmark efficient entity facing a similar degree of risk as that which applies to UE in respect of the provision of standard control services. UE would then be confronted with the prospect of being unable to attract sufficient equity funds that are needed to undertake efficient investment.

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21 CEG, Efficient debt financing costs, prepared for ActewAGL by Dr Tom Hird, Competition Economists Group, 19th January 2015.

22 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline*; (Explanatory Statement) December 2013, page 156.

23 AER, Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return, November 2014, (pdf version), pages 3-130 to 3-131.

2.3 CEG analysis of credit ratings undertaken for ActewAGL

CEG undertook an analysis of credit ratings for ActewAGL, drawing upon methods that have been documented by the Moody's Investor Service[24]. In essence, CEG considered how ActewAGL would fare against various financial indicators that are routinely calculated by Moody's, and are also factored into credit rating metrics[25]. CEG sourced data from the AER's draft decision for ActewAGL, and from the post-tax revenue model that was produced for the business by the AER[26].

The Moody's assessment methodology makes use of four principal "grid factors", and a fifth, final adjustment factor. The fifth factor is meant to shift ratings by a notch or two, so as to achieve "structural enhancement". The four main grid factors have reasonably broad coverage, and can be set out as follows:

- Regulatory Environment and Asset Ownership Model
- Scale and Complexity of Capital Programme
- Financial Policy
- Leverage and Coverage

As explained by CEG, a numerical scoring and weighting system applies under each of the four main factors, although the only truly quantitative evaluation category is "leverage and coverage". The fifth factor is capable of giving rise to "upward adjustment of the grid-indicated rating due to structural enhancements that are incorporated in the company's regulatory licence, its corporate structure, or through its financial arrangements".

CEG sought to quantify the sub-factors under "leverage and coverage" using the numerical results from the draft decision PTRM. The "leverage and coverage" sub-factors are built up from financial ratios which make use of variables such as funds from operations, interest coverage, net debt, the regulatory asset base, and so on. The scenarios under which this analysis was undertaken varied according to whether the output from the PTRM was used to measure forecast revenues, costs or both.

- Under the first scenario, the PTRM was used to supply both revenues and costs.
- Under the second scenario, the AER's revenue forecasts from the PTRM were retained, but the costs of debt were taken from a simple trailing average strategy.
- Under the third scenario, the AER's revenue forecasts from the PTRM were again maintained, but the operating costs used were those provided by ActewAGL.
- Under the fourth scenario, the AER's revenue forecasts from the PTRM were maintained, but the operating costs were based on the projections from ActewAGL, while debt servicing costs were estimated on the assumption of a trailing average debt management strategy.

CEG assessed the implied credit ratings under each scenario, but also transformed the outcomes, in terms of ratings (or sub-ratings) into Standard and Poor's equivalents. The implied credit ratings were computed from a weighted average of four financial ratios, and are reported below in Table 2.2.

CEG also worked out the credit ratings that could be inferred from the three qualitative factors (and their constituent sub-factors), making use of the descriptions in the matrices provided by Moody's as part of its

[24] Moody's Investor Service, Rating Methodology: Regulated Electric and Gas Networks, 25th November 2014.

[25] CEG, Efficient debt financing costs, prepared for ActewAGL by Dr Tom Hird, Competition Economists Group, 19th January 2015.

[26] AER, Draft decision, ActewAGL distribution determination, 2015–16 to 2018–19, Attachment 3: Rate of return, November 2014.

ratings methodology documentation[27]. The overall results from a consideration of the four grid factors are summarised below in Table 2.3.

Table 2.2 Implied credit ratings for ActewAGL from credit metrics

Scenario	Implied credit rating
All AER estimates	BBB-
Variation to cost of debt	BB+
Variation to operating costs	BB
Variation to both cost of debt and operating costs	BB-

Source: CEG, Efficient debt financing costs, prepared for ActewAGL by Dr Tom Hird, Competition Economists Group, 19th January 2015; see section 8.2, Table 4. See the "leverage and coverage" factor.

Table 2.3 Implied credit ratings from a consideration of the four factors under four scenarios

Scenario	Implied credit rating
All AER estimates	BBB
Variation to cost of debt	BBB-
Variation to operating costs	BBB-
Variation to both cost of debt and operating costs	BB+

Source: CEG, Efficient debt financing costs, prepared for ActewAGL by Dr Tom Hird, Competition Economists Group, 19th January 2015; see section 8.2, Table 7.

The conclusion to be drawn is that the highest credit rating that can be achieved under the four scenarios that were evaluated by CEG is BBB.

Therefore, the implementation of the AER's approach to the cost of capital, and the AER's method for determining operating expenditure allowances, delivers outcomes which are, at best, commensurate with a BBB credit rating, when an assessment is undertaken using the methodology from a credit ratings agency. On this occasion, the AER's cost of capital method and operating expenditure allowances were applied to a benchmark efficient entity which was presumed to be functioning as a network service provider in the circumstances of ActewAGL.

If the allowances in the AER's PTRM were maintained according to the AER's settings, but the actual costs were replaced with more realistic representations, then the application of the Moody's method was found to produce assessments of the credit rating that were on the cusp of the threshold for investment grade. In the CEG analysis, the more realistic representations of costs were provided by a trailing average approach to the cost of debt and/or the use of the forecasts prepared by ActewAGL for recurrent spending on operations and maintenance. If the trailing average cost of debt was applied in conjunction with ActewAGL's in-house forecasts of costs, then the resulting credit rating was found to be below investment grade.

[27] Moody's Investor Service, Rating Methodology: Regulated Electric and Gas Networks, 25th November 2014.

Accordingly, the AER should reconsider its decision to assign a credit rating of BBB plus to the benchmark efficient entity.

3. Trailing average portfolio approach

The trailing average portfolio approach recognises that, in practice, the benchmark efficient entity's actual cost of debt will be determined by historical rates at the time at which debt is raised. In addition, the method recognises that energy networks do not raise all their debt capital at one time but instead have a phased programme for raising debt in corporate bond markets. In practice, electricity distribution network businesses need to balance a number of considerations when determining how much debt to refinance and when to schedule the refinancing. The factors to take into account include:

- The diversification of debt instruments and maturities.
- Liquidity management.
- Changes in the aggregate amount of debt and equity capital required as new investments are made, contributing to the growth in the RAB, and as ageing assets are depreciated.
- Credit metrics; and
- Market conditions, including access to foreign and domestic markets, and the ability to hedge interest rate movements.

Regulated network businesses will have varying exposure to the factors mentioned above, and will also have different amounts of debt maturing at different points in time. The AER has asserted, in its draft decisions for NSW that a benchmark efficient entity would hold an evenly staggered portfolio of long-term (10 year) debt, with the portfolio structured in such a way that exactly 10 per cent of the debt would be refinanced in each year.[28] The AER has conceived of a stylised approach which would not apply uniformly to every efficient entity. In practice, a benchmark efficient entity would make decisions as to the amount of debt to be refinanced in any given year, with an over-riding objective being the minimisation of debt financing costs. Therefore, the exact amounts of debt that would need to be raised would not exhibit a precisely uniform pattern through time.

Nevertheless, the trailing average portfolio approach is likely to more closely align with the staggered approach to refinancing a debt portfolio than the 'on the day' method, noting that the trailing average method is still a simplification of what actually occurs. The trailing average portfolio approach significantly reduces the risk that the allowed return on debt might be higher or lower than the actual return on debt because the trailing average method does not simply rely on a single observation for the rate of return on debt. Under the on-the-day approach, a business is exposed to uncertainty about whether that single observation is recorded at a high or low point in the interest rate cycle.

United Energy therefore accepts the ten year trailing average portfolio approach set out in the Guideline on the proviso that certain transitional and implementation issues are addressed.

[28] AER, Draft decision for Jemena Gas Networks (NSW) Ltd, Access Arrangement, 2015-20, Overview; November 2014 (pdf version), page 31.

4. Transitional Arrangements

4.1 UE disagrees with the rate of return proposed transition approach

The AER's Rate of Return Guideline proposes the implementation of a trailing average approach for the return on debt, and sets out a method for phasing in the transition from the 'on-the-day' approach to a 10 year trailing average[29]. The AER proposes to transition both the risk-free rate and the debt risk premium components of the return on debt over a ten year period. UE agrees with the adoption of a trailing average approach however the business disagrees with the AER's proposed transition method, and the proposal by UE departs from the Guideline in that respect.

Under the previous regulatory arrangements, the benchmark efficient entity would have had to rely on both luck and judgement to manage the following risks:

- Refinancing risk, i.e. the risk that the business may not be able to borrow at the times at which it needs to either raise new debt or else refinance existing debt. Refinancing risk is affected by conditions in financial markets; and
- The disparities that occur between the interest rates and debt risk premiums that are recorded during an averaging period used for the 'on the day' methodology, and the interest rates and debt risk premiums which were payable in financial markets at the time at which a company's debt was actually raised.

In order to mitigate refinancing risks, a benchmark efficient entity would invariably raise debt progressively over time even though the regulatory framework established a return on debt allowance only once every five years, shortly before the regulatory determination.

In 2009, as part of the consultation on the AER's WACC review, the corporate treasurers of a number of regulated businesses provided witness statements to the AER to explain how it was that under the form of the Rules that were then in place, no business would attempt to raise all of its debt during the limited time interval of a once in five year averaging period. The witness statements were mentioned in section 2.1 of this submission[30]. Instead, all businesses sought to stagger their maturities so as to avoid refinancing risk and then generally undertook hedging transactions so as to control their exposures to interest rate movements in the best possible manner.

There is an active and liquid market for interest rate swaps, with the floating leg of swap transactions typically underpinned by the bank bill swap rate (either BBSW3M or BBSW6M). However, there are fewer instruments available to hedge the debt risk premium, and apparently no instruments which are widely traded in Australia, at present. An underlying rationale for the shift to the trailing average method has been that businesses will then be able to better manage the variability in the debt risk premium component of the cost of debt.

Although there is an actively traded market for interest rate swaps referenced to the prevailing yields on short-term highly rated bank debt, there is no equivalent for generic BBB debt and therefore it is not possible to hedge movements in the debt risk premium. Indeed an ability to better manage volatility in the debt risk premium is one of the principal advantages of ultimately moving to the trailing average method.

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29 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline (Appendices)*; December 2013, (**Guideline Appendices**); section G, page 131.

30 Witness statement of Gregory Damien Meredith, Envestra; 31 January 2009. See paragraphs 5.16, 5.17, 6.4 and 6.5.

Witness statement of Sim Buck Khim, Jemena; undated. See paragraphs 5.19, 5.23 and 5.25.

Witness statement of Alistair Watson, SP AusNet; 30 January 2009. See paragraphs 4.9 to 4.15 and 5.1 to 5.9.

Witness statement of Andrew Noble, Citipower and Powercor; undated. See paragraphs 5.2, 5.4, 7.1 and 7.2.

The impracticability of hedging the debt risk premium has been acknowledged by the AER:[31]

> *As Chairmont Consulting pointed out:*
>
> *For an Australian efficient operator there is no market to effectively, and in a cost efficient manner, hedge their DRP.*
>
> *Therefore the benchmark efficient entity would not [be] able to alleviate all potential mismatch in relation to the debt margin component of the return on debt, unless it issues the entirety of its debt during the averaging period.*

The use of vanilla interest rate swaps will effectively leave the debt risk premium component of the cost of debt unhedged. The AER has argued that a benchmark efficient entity would have hedged using interest swaps under the previous regulatory regime:[32]

> *"Given the observed practices of regulated network businesses and the definition of the benchmark efficient entity, we consider that the following practice is likely to constitute an efficient debt financing practice of the benchmark efficient entity under the current 'on the day' approach:*
>
> *holding a debt portfolio with staggered maturity dates and using swap transactions to hedge interest rate exposure for the duration of a regulatory control period…"*

The reasoning applied by the AER presupposes that the benchmark efficient debt management practice should be construed as being dependent on the regulatory arrangements that existed in the past. This construction presumes that, at least to some degree, regulatory practice guides benchmark efficient practice rather than the benchmark efficient practice guiding regulatory practice.

The finding that a regulated business would hold a debt portfolio with staggered maturity dates and then use swaps to hedge interest rate exposure for the duration of a regulatory control period was restated in other parts of the Explanatory Statement,[33] in the draft decision for Jemena Gas Networks,[34] and in the other regulatory decisions for NSW businesses.

There exists, to some degree, a natural hedge as between the risk free rate and the debt risk premium, and the implication is that businesses may be better placed if they hedge less than 100 per cent of their debt portfolios. Indeed, there is evidence from academic studies, commencing with Longstaff and Schwartz (1995)[35], that credit spreads are inversely related to the base level of interest. In the presence of negative correlation, there are benefits to be gained from leaving a proportion of the base rate of interest unhedged, with the proportion here referring to a fraction, by market value, of the overall debt portfolio. The overall cost of debt allowance is, of course, comprised of both the base rate of interest and the DRP.

In a report prepared for United Energy, CEG (2015b) has explained that an efficient response for a business under the previous, rate on the day approach would have been to maintain a structured debt portfolio, with

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31 AER; *Better Regulation, Explanatory Statement, Rate of Return Guideline*; (**Explanatory Statement**) December 2013, page 105.

32 Ibid, page 107.

33 Ibid, page 121.

34 AER, Draft decision, *Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return*, November 2014, (pdf version), page 3-115.

35 Longstaff, and Schwartz, *A simple approach to valuing risky fixed and floating rate debt*, Journal of Finance, July 1995. According to the authors: "Using Moody's corporate bond yield data, we find that credit spreads are negatively related to interest rates and that durations of risky bonds depend on the correlation with interest rates, (page 789).

debt instruments of different tenors, and to then hedge using swap transactions.[36] However, the optimal proportion of the debt portfolio that would have been hedged would have been less than 100 per cent.

An expert review report obtained by United Energy has also signalled that the full hybrid debt management strategy would not have been the only feasible debt management strategy under the previous regulatory arrangements. Professor Erik Schlogl has stated that other strategies may also have been conceivable, such as minimum variance hedging strategies. Professor Schlogl has therefore suggested that an appropriate response for a business could have been to hedge less than 100 per cent of the value of the debt portfolio.[37]

United Energy acknowledges that the use of interest rate swaps to hedge 100 per cent of the debt portfolio may not have been the optimal response for the benchmark efficient entity in every circumstance. The natural hedge provided by an inverse relationship between the DRP and the base rate of interest may have promoted the use of hedging to less than the full extent possible. Furthermore, larger businesses may, on occasion, have been confronted by liquidity constraints in swap markets. In the past, there have also been instances where there has been uncertainty surrounding the final choice of averaging period that would actually be used by the AER and/or an appeal panel.[38] Therefore, for some businesses, an efficient financing strategy may have involved simply issuing fixed rate debt on a staggered maturity cycle in order to hedge against interest rate movements – with limited or no use of interest rate swaps.

As a result of recent declines in credit spreads over swap rates, the allowed return on debt under the form of the transition to the trailing average that has been set out in the Guideline will be significantly below the required return on debt for the benchmark efficient entity, because of the legacy of embedded debt costs that are being borne by the benchmark entity. The transition method that is favoured by the AER will not result in reasonable estimates of the return on debt for the benchmark efficient entity. If the transition method described in the Rate of Return Guideline were to be implemented, then there would be a mismatch between the allowed return on debt and the required return on debt for the benchmark efficient entity. An estimate of the magnitude of this mismatch is shown in Appendix 2.1 and is in the order of millions of dollars per annum over the regulatory period.

UE submits that the AER should not adopt the Guideline approach to the return on debt transition. Rather, no transition should be applied to the DRP. A transition should only be applied to base rates of interest, for that proportion of the value of the debt portfolio that can reasonably be assumed to have been hedged by the benchmark efficient entity using interest rate swaps.

There are no liquid and cost effective derivative options currently available to assist in the management of risks associated with movements in the debt risk premium. UE could only manage its exposure to movements in its actual, incurred DRP relative to the DRP allowance by varying the timing and quantum of its debt issuance programme.

At the commencement of the forthcoming regulatory period, the efficient financing costs for the benchmark entity will be comprised of:

- Floating base rates of interest for that part of the debt portfolio that can be presumed to have been hedged using interest rate swaps. The base rates of interest will be floating because the five-year tenor interest rate swaps which the business entered into at the commencement of the prior period will have expired; and
- A DRP component that already reflects an historical or trailing average rate.

36 CEG (2015b), The hybrid method for the transition to the trailing average rate of return on debt. Assessment and calculations for United Energy, prepared for United Energy by Dr Tom Hird, Competition Economists Group, April 2015.

37 The AER's JGN draft decision on the cost of debt — a review of the critique by the Competition Economists Group (CEG), Prepared for United Energy and Multinet Gas, Professor Erik Schlogl, 23rd April 2015.

38 UBS, Analysis of Liquidity of Interest Rate Swaps, UBS response to the TransGrid request for interest rate risk analysis following the AER Draft Decision of November 2014, prepared for TransGrid by UBS, January 2015.

The interest rate swap arrangements that will continue into the next regulatory period pertain only to the base rate component of the return on debt and only to that portion of the debt portfolio that can be presumed to have been efficiently hedged using interest rate swaps. The particular tranches of the debt portfolio that were hedged were the components for which a benchmark efficient entity would have been able to manage its exposure to interest rate risk using interest rate swaps. There will be no pre-existing arrangements in relation to the DRP which would need to be accounted for by transitional arrangements, since the benchmark efficient entity would not have been able to manage DRP risk in the same manner. As a result, the DRP component of the required return on debt for the benchmark efficient entity would already reflect a trailing average rate.

As noted above, the rationale for imposing transitional arrangements is to allow for the unwinding of any financial arrangements that were reasonably put in place by the benchmark efficient entity, but which are not consistent with the trailing average approach. The purpose of these transitional arrangements is to minimise the potential mismatch between the allowed return on debt and the cost of debt for a benchmark efficient entity as the latter adjusts its financing practices. The transition arrangements, if there are any, will only be applied to base interest rates. The new hedges will only be used for the particular share of the debt portfolio that can be efficiently hedged using interest rates swaps. There would be no sense in trying to apply transitional arrangements to the DRP because the actual, incurred DRP already represents a trailing average rate.

Depending on the characteristics of the benchmark efficient entity, there may also be a case for not applying a transition to the base rate components of the entire debt portfolio. If the nature of the benchmark efficient entity is such that the entity would not have used any interest rate swaps across its entire debt portfolio under the on-the-day approach, then there would be no sound logic for attempting to apply a transition. For a benchmark efficient entity of this type, the required return on debt for the forthcoming period (comprised of both the base interest rate and DRP components) would already reflect a trailing average. Similarly, if the nature of the benchmark efficient entity is such that it would only have used interest rate swaps across a certain fraction of its debt portfolio under the on-the-day approach, then the appropriate response would be to apply any transition to that fraction of the portfolio base rate.

4.2 UE proposes a hybrid transition approach

UE proposes a hybrid approach which provides for a transition of the base rate component of the cost of debt from an on-the-day approach to a trailing average approach. The transition applies to the base rate component of the cost of debt. The transition is undertaken for the share of value of the overall debt portfolio which can be presumed to have been hedged using interest rate swaps.

For the purpose of this proposal, UE has assumed that 100 per cent of its portfolio would have been hedged using interest rate swaps. However, UE is also seeking expert advice on this matter, and so the estimate of 100 per cent should be treated as provisional.

The interest rate swap strategy that is deemed to occur can be described as follows. During the initial averaging period which occurs in 2015, the benchmark efficient entity will commit to a series of fixed rate swaps with the goal of converting floating rate exposure on all existing debt (under the hybrid strategy) into fixed rate exposure over the remaining life of that debt. The benchmark entity is assumed to have an evenly staggered debt portfolio such that there are 10 tranches of bonds that have been issued, with remaining terms to maturity of between 1 and 10 years. Consequently, the benchmark entity is assumed to enter into a series of ten interest rate swaps, with each applying to 10 per cent of the portfolio, and with the maturity spectrum ranging from 1 to 10 years.

There is no transitional arrangement that is applicable to the debt risk premium. The transitional value for each year is calculated as the sum of:

- The average of swap rates for interest rate swaps that were taken out in the initial averaging period, and that are still in place in the current year (because the particular swaps have not yet matured or expired). The swaps were used to fix base rate exposure on the debt that would have been raised prior to the start of the transition period. The swaps that are still in place in each year would be a

subset of the swap transactions at different tenors that were used by the benchmark efficient entity to hedge against base rate risk during the averaging period, at the commencement of the ten year transition.

- The corresponding historical average debt risk premium for debt that would have been raised prior to the start of the transition period, and that would not yet have matured.
- The transactions costs of engaging in the swap transactions would also be included.

The return on debt for each regulatory year of the regulatory period is to be calculated as follows:

(a) For regulatory (calendar) year 2016: kd2016 = [5.67%].

(b) For regulatory (calendar) year 2017: kd2017 = (0.9 x T2017) + (0.1 x R2017).

(c) For regulatory (calendar) year 2018: kd2018 = (0.8 x T2018) + (0.1 x R2017) + (0.1 x R2018).

(d) For regulatory (calendar) year 2019: kd2019 = (0.7 x T2019) + (0.1 x R2017) + (0.1 x R2018) + (0.1 x R2019).

(e) For regulatory (calendar) year 2020: kd2020 = (0.6 x T2020) + (0.1 x R2017) + (0.1 x R2018) + (0.1 x R2019) + (0.1 x R2020).

Where:

- kd_t is the return on debt for regulatory year t of the regulatory period.

The 'T' values in the formulae shown above represent the transitional return on debt values for each year of the access arrangement period.

T20XX is the cost of debt that feeds into the calculation of kd20XX. T20XX is the transitional cost of debt for transitional debt instruments that have not yet matured in 20XX. The numbers below for T2017 to T2020 are based on the placeholder estimate for the cost of debt that was measured during the 2015 averaging period. These values can be expected to change when the calculations are re-done in respect of another averaging period.

- T2017 is [5.88%] ;
- T2018 is [6.10%];
- T2019 is [6.10%];
- T2020 is [5.94%]; and
- R_t is the annual return on debt observation for each regulatory year t of the regulatory period (other than Calendar Year 2016), calculated in accordance with the methods set out in sections 5.4 to 5.6 of this document.

For example, in year one of the regulatory period, (2016), the transitional value — which is equal to the return on debt in that year — is the sum of:

- The average of the one to ten year swap rates.
- The historical average DRP measured for the years 2006 to 2015; and
- The transactions costs of using swaps (estimated at 23bppa), plus the value of the new issue premium, (estimated at 27bppa).

By the **second** year of the regulatory period, (2017), the one-year swap will have expired and the debt raised in 2006 will have matured. Therefore, the transitional value for that year will reflect the sum of:

- The average of the two to ten year swap rates,
- The historical average DRP for the years 2007 to 2015; and
- The transactions costs of using swaps (estimated at 23bppa), plus the value of the new issue premium, (estimated at 27bppa).

The transitional value for the second year will be given a 90 per cent weighting in the return on debt formula, with a 10 per cent weighting given to the new return on debt observation for that year.

The transitional values for subsequent years are calculated in a similar manner. These transitional values are given a progressively lower weighting through the regulatory period.

By the **third** year of the regulatory period, (2018), the two-year swap will have expired and the debt raised in 2007 will have matured. Therefore, the transitional value for that year will reflect the sum of:

- The average of the three to ten year swap rates,
- The historical average DRP for the years 2008 to 2015; and
- The transactions costs of using swaps (estimated at 23bppa), plus the value of the new issue premium, (estimated at 27bppa).

By the **fourth** year of the regulatory period, (2019), the three-year swap will have expired and the debt raised in 2008 will have matured. Therefore, the transitional value for that year will reflect the sum of:

- The average of the four to ten year swap rates,
- The historical average DRP for the years 2009 to 2015; and
- The transactions costs of using swaps (estimated at 23bppa), plus the value of the new issue premium, (estimated at 27bppa).

By the **fifth** year of the regulatory period, (2020), the four-year swap will have expired and the debt raised in 2009 will have matured. Therefore, the transitional value for that year will reflect the sum of:

- The average of the five to ten year swap rates,
- The historical average DRP for the years 2010 to 2015; and
- The transactions costs of using swaps (estimated at 23bppa), plus the value of the new issue premium, (estimated at 27bppa).

In order to calculate the transitional values, estimates are required of the historical debt risk premiums and of one to ten year swap rates. These estimates (provided by CEG) are set out in Table 4.1 and Table 4.2 below.

Table 4.1: Historical, annual average values for the debt risk premium

Calendar year	Annual average for the value of the debt risk premium (per cent)
2006	0.650%
2007	1.052%
2008	3.005%
2009	3.922%
2010	2.778%

Calendar year	Annual average for the value of the debt risk premium (per cent)
2011	2.814%
2012	3.084%
2013	2.869%
2014	2.051%
2015 (2nd -30th January 2015)*	1.816%

Source: CEG (2015), *Critique of the AER's JGN draft decision on the cost of debt*, Competition Economists Group, Table 18, (first averaging period report). CEG, *The hybrid method for the transition to the trailing average rate of return on debt. Assessment and calculations for United Energy*, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, April 2015; Table 12.

Note: (1) The value of the debt risk premium for calendar year 2015 is based on a placeholder averaging period (from 2nd to 30th January 2015). This amount will be updated once return on debt data for the actual averaging period chosen by United Energy becomes available. The values shown in Table 4.1 have been expressed on a semi-annual basis.

Table 4.2: Historical, annual average values for swap rates

Tenor of swap	Swap rate
1 year	2.618
2 year	2.508
3 year	2.505
4 year	2.534
5 year	2.598
6 year	2.679
7 year	2.759
8 year	2.831
9 year	2.894
10 year	2.954

Source: CEG (2015), *Critique of the AER's JGN draft decision on the cost of debt*, Competition Economists Group, Table 17 (first averaging period report). CEG, *The hybrid method for the transition to the trailing average rate of return on debt. Assessment and calculations for United Energy*, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, April 2015; Table 17.

Note: The swap rates shown are averages, evaluated over the placeholder averaging period (2nd –30th January 2015). The source data has been derived from the Bloomberg ADSWAP series. The values of swap rates will be updated once return on debt data becomes available for United Energy's actual averaging period. The values shown have been expressed on a semi-annual basis.

In addition, the transactions costs of swaps are included, based on estimates compiled by CEG of the cost of entering into swap contracts.[39] CEG has referred to two estimates of the expected cost of entering into swap contracts: An aggregate estimate of 16 basis points, which has been sourced from a report prepared by Evans and Peck for the Queensland Competition Authority, and another estimate of 23 basis points, which has been derived from component figures presented in a recent UBS expert report.

CEG (2015a) has given prominence to the UBS estimate, in part because the UBS numbers have taken account of the transactions costs of issuing debt internationally.[40] CEG has also explained, drawing upon evidence from the UBS report, that the prevailing estimates of the costs of engaging in swap transactions are likely to under-state the trailing average of swap transactions costs. The UBS estimate of 23 basis points per annum is comprised of:

- 5 basis points for credit, capital and execution costs.
- 18 basis points for cross-currency credit, capital and execution costs (on the basis that the most efficient debt management strategy would be to raise large volumes of debt offshore and convert this back to floating rate AUD dollar denominated exposure).

The 23 basis points therefore represents actual fees paid to banks.

United Energy has also included an allowance for the new issue premium, which is the margin that borrowers are obliged to pay when raising debt via corporate bond issuance. The yields on debt in primary issue markets are generally higher than the yields on debt in secondary markets, with the gap between the two described by practitioners as the new issue concession or new issue premium (NIP). The third party estimates of the cost of debt that are published by Bloomberg (though its BVAL curve for BBB rated debt) and the RBA (via the corporate bond spreads in Table F3) are derived from yields in the secondary market. As a result, no allowance has been factored in for the margin over secondary spreads that must be paid to execute a new, benchmark transaction.

A recent report from CEG (2014) concluded that the best estimate of the new issue premium is 27 basis points.[41] An earlier report by Ronn and Golderg also found support for a new issue premium on US dollar bonds issued by Australian corporations.[42] Ronn and Goldberg (2013) examined the new issue premium for US dollar bonds that report trades through the TRACE system. For the subset of bonds that were issued by Australian corporates, Ronn and Goldberg (2013) calculated that the arithmetic mean ratio of the new issue premium to the bond spread at issuance was 10.3 per cent, with the spread having been measured over comparable maturity US Treasuries. United Energy has adopted the CEG estimate of the new issue premium, equivalent to 27bppa.

The transitional values for each year are calculated in Table 4.3 below.

Table 4.3: Transitional return on debt values

Year	Historical average debt risk premium (semi-annual basis)	Average swap rate (semi-annual basis)	Swap transaction costs and NIP (semi annual)	Transitional value (semi-annual basis)	Transitional value (annual effective rate)
2016	2.40%	2.69%	0.50%	5.59%	5.67%

39 CEG (2015a), Critique of the AER's JGN draft decision on the cost of debt, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, April 2015, section 3.4.

40 CEG (2015a), Critique of the AER's JGN draft decision on the cost of debt, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, paragraph 108.

41 CEG, The New Issue Premium, prepared by Dr Tom Hird, Competition Economists Group, October 2014; page 54.

42 Ronn, E.I. and R.S. Goldberg, Research into the New Issue Premium, and the Applicability of that Research to the Australian Bond Market, a submission prepared for United Energy and Multinet Gas in response to the draft rate of return guidelines of the Australian Energy Regulator, October 2013; page 25.

Year	Historical average debt risk premium (semi-annual basis)	Average swap rate (semi-annual basis)	Swap transaction costs and NIP (semi annual)	Transitional value (semi-annual basis)	Transitional value (annual effective rate)
2017	2.60%	2.70%	0.50%	5.79%	5.88%
2018	2.79%	2.72%	0.50%	6.01%	6.10%
2019	2.76%	2.75%	0.50%	6.01%	6.10%
2020	2.57%	2.79%	0.50%	5.85%	5.94%

Source: CEG (2015), *Critique of the AER's JGN draft decision on the cost of debt*, Competition Economists Group, Tables 17 and 18 (first averaging period report). CEG, *The hybrid method for the transition to the trailing average rate of return on debt. Assessment and calculations for United Energy*, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, April 2015; Tables 12 and 17.

1. The historical average debt risk premium (DRP) for 2016 is an arithmetic mean of the values of the DRP for 2006 to 2015, as shown in Table 4.1 above. The historical average DRP for 2017 is an arithmetic mean of the values of the DRP for 2007 to 2015, and so on, through to the results for 2020.

2. The overall average swap rate for 2016 is an arithmetic mean of the swap rates at tenors of one to ten years, shown in Table 4.2 above. The average swap rate for 2017 is an arithmetic mean of the swap rates at tenors of two to ten years, with similar reasoning applied to the calculations for 2018, 2019 and 2020.

As has been mentioned above, the swap rates and the historical average DRP values that have been used in the calculation of the cost of debt for 2015 are based on a placeholder averaging period. Therefore, each of the transitional values will need to be updated once data becomes available for United Energy's actual averaging period.

5. Estimation Procedure

5.1 Background to the use of data sources

On the subject of the choice of data sources from third party providers, the AER recognised, in its draft decision for Ausgrid that neither of the available services uses an ideal data set nor an ideal method for preparation of an estimate of corporate bond spreads or yields.[43] The AER acknowledged that there were advantages and disadvantages associated with each of the data services, but, in the end, the regulator was unable to express an absolute preference for one data source over the other. Accordingly, the AER decided that it would apply an arithmetic average of the results from the extrapolated Bloomberg BBB BVAL curve, and the extrapolated RBA measures of corporate bond spreads.

The AER method of calculating an arithmetic average was given impetus by a theoretical analysis undertaken by Lally which claimed to show that combining two data series would assist in bringing down the mean squared error (MSE).[44] However, Lally assumed that each of the component data series was unbiased.

UE does not consider that the AER's practice of averaging the two services is consistent with the current Rules or the guidance from the Tribunal on how to assess alternative data sources.

Under previous case law, (*ActewAGL*[45]), an average of the two available data sources was endorsed when there was no basis for preferring one service over the other. However, the Tribunal considered that the following tests should be undertaken with a view to selecting the service that might be ranked more highly:

- An examination of the data set used and curve selection methodologies.
- An examination of the past performance of the third party data provider's curves; and
- A contemporaneous comparison of the published benchmark against traded bond data.

The AER made use of a report which provided a comparative analysis of the bond sample selection criteria and curve-fitting methodologies used by the RBA and Bloomberg[46].

As a result of its consideration of the report from the REU, and other material, the AER can make a reasonable claim that it has undertaken the first two of the tests presented in the list bullets. However, the AER was unable to reach a conclusion as to whether one third party data source was superior to the other.[47]

In respect of the third bullet point, the AER did not undertake a contemporaneous comparison of the published benchmark against traded bond data, and indeed rejected a proposal by Jemena Gas Networks (JGN) to perform a contemporaneous comparison. The AER rejected the JGN proposal on the basis that the AER characterized that approach as 'indirect' when compared with a 'direct' examination of the data set used by the services and their curve selection methodologies.

The AER's 'direct'/ 'indirect' distinction is not found in any of the previous Tribunal cases and, in the opinion of United Energy, is ill-conceived. In fact, the purpose behind the selection of a data provider's product is to

43 AER, *Draft decision, Ausgrid distribution determination 2015-16 to 2018-19, Attachment 3: Rate of return*; November 2014 (pdf version), page 3-320.

44 Lally(2014), Implementation Issues for the Cost of Debt, prepared by Dr Martin Lally, Capital Financial Consultants Limited, section 2.2, pages 21-22.

45 *ActewAGL* [2010] ATPR 42-324.

46 ACCC, Regulatory Economic Unit, Return on debt estimation: a review of the alternative third party data series, Report for the AER, August 2014.

47 AER, Draft decision, *Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return*, November 2014, (pdf version), page 3-144.

obtain a benchmark rate of return for debt that is 'commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk'. An examination of the primary market data provides the most direct means of obtaining a commensurate cost, and any reporting service is necessarily at least at one degree of separation from the market because the third party service applies a curve selection and computation exercise.

By way of example, the following are amongst the problems that have arisen in the past:

- The third party data provider in question may at any time cease to publish the series – indeed, at one time the series most commonly used in regulatory decision-making was an indicator yield curve published by the Commonwealth Bank of Australia, namely the 'CBA Spectrum' series. The Bank suspended the publication of the indicator results in 2010; and
- There is an absence of transparency about how the third party performs its calculations, and in the past, flaws have been discovered in the way that the calculations are undertaken after the regulatory decision has been made. For example, flaws in the CBA Spectrum service resulted in the revocation and substitution of several revenue determinations in 2005.

5.2 Selection of data provider

United Energy agrees with the AER that independent third party data series should be used to estimate the return on debt, and that these curves should be extrapolated, where necessary, to the benchmark term to maturity of 10 years. UE has proposed a comparatively straightforward and transparent method for selecting data sources for estimating the return on debt over future averaging periods. The method that has been adopted by UE will apply for each regulatory year at the relevant time. Under the approach, a relevant independent data source will be selected in each regulatory year, and the choice will be made according to which independent data source best fits a sample of observed bond yields.

The technique will involve a contemporaneous comparison of the following variables:

- The observed bond yields and the published third-party "curves".
- The observed bond yields and an average of the figures from the third party curves; and
- The observed bond yields and empirically estimated yield curves and/or par yield curves.

A separate, best fit variable will be calculated. UE's proposed approach involves using the data source that transparently and objectively provides the best estimate of the return on debt for the benchmark efficient entity at any point in time. The available methods and data sources are tested against relevant market evidence, namely the yields for bonds with characteristics that resemble those of the benchmark corporate bond. The attributes in question include term to maturity and credit rating. The primary data on bond yields can be sourced, on subscription, from data providers such as Bloomberg and UBS. The approach is likely to produce the best estimate of the prevailing return on debt at each point in time. Details of the selection process are set out in section 5.3 below.

United Energy's within period estimation method is designed to address the risk that market conditions – and therefore the fit of the pre-determined curve to relevant data – may change during the regulatory period. UE's flexible approach allows for market fluctuations and chooses the best data source for each period using an objective test. The choice of data source could have substantial implications for the return on debt depending upon the particular reference period. Indeed, the data source that is the best fit for the bond yield data may vary from period to period, and in some periods, an average of the data source estimates may produce the best fit. Where a goodness-of-fit test is applied, an average of the available yield curves will be included in the set of yield curves to be assessed. If the average provides the best fit to the observed bond yield data, then it will be used to estimate the prevailing return on debt for that year.

UE does not consider that there is certainty at this juncture as to what data source or data sources will provide an estimate of the return on debt that contributes to the allowed rate of return objective, at least in respect of year two to year five of the regulatory period. There is no single, unambiguously correct method

of determining ahead of any particular averaging period what the best data source will be for the purpose of estimating the allowed rate of return on debt for the distribution business. The answer may change (and, in fact, has changed) over time, as a result of the evolution of techniques for constructing the relevant curves, and because of economic events, and financial market circumstances which affect bond activity and data availability.

The rate of return objective seeks to provide a return that is commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk. There is no means of ascertaining with any certainty which data source will provide better estimates of the required return at any future point in time, or whether an average of the available sources will provide for the best estimate. Such an assessment can only be made at the relevant time based on the available market data.

5.3 Extrapolation of third party estimates

UE agrees with the AER's rate of return guideline that where the yield at a term to maturity of 10 years is not published by the third party data provider, then extrapolation will need to be performed so as to produce a 10-year tenor estimate from the published yields. UE considers that extrapolation should be applied to the spreads over swap or debt risk premiums. However, UE does not agree with the AER's proposed extrapolation method.

Extrapolation is generally applied to the spreads over swap rates, rather than to the spreads over the yields on Commonwealth Government Securities (CGS). The debt risk premium is usually, although not exclusively, identified as being the spread over the yields on CGS.

UE proposes a comparatively straightforward and transparent method for selecting between extrapolation techniques. The extrapolation methods produce yield curves with a term to maturity of 10 years that can be used for estimating the return on debt in future averaging periods, and in future regulatory years. The approach is the same as that applied for selecting between data sources and has been set out in Section 5.5. For each third party data source that does not publish bond yields at a ten year tenor, extrapolation will be applied, drawing upon two alternative, possible methods:

- The method proposed by the AER in its draft decision for JGN's access arrangement;[48] and
- The method recently proposed by SA Power Networks (SAPN).[49]

The test that is set out in Schedule 1 to this document makes a selection between the two extrapolation methods according to whichever of the two delivers an extrapolated "fair value" curve that provides the best fit to observed bond data.

CEG (2015a) undertook an analysis using data from the sample reference period, which covered the time interval from 2nd January 2015 to 30th January 2015. CEG (2015a) tested the performance of the RBA curve, the Bloomberg curve and a simple average of the two curves, using the two alternative extrapolation methods. CEG performed goodness of fit tests based on a methodology proposed by JGN, and also estimated Nelson-Siegel yield curves. An analysis of bond pairs was also undertaken. The results from the three methods were employed to assess which third party estimate would provide the best fit to the observed bond data. For the period from 2nd January 2015 to 30th January 2015, CEG (2015a) concluded that the best third party estimate of the 10 year spread to swap was the average of the RBA and BVAL curves extrapolated according to the SAPN methodology.[50] Further details and an explanation of the data and tests conducted is provided in the accompanying expert report of CEG.

48 AER, Draft decision, Jemena Gas Networks (NSW) Ltd, Access arrangement 2015-20, Attachment 3: Rate of return, November 2014, (pdf version), pages 3-302 to 3-306.

49 SAPN, *Regulatory Proposal 2015-2020*, December 2014, page 339.

50 CEG (2015a), Critique of the AER's JGN draft decision on the cost of debt, prepared by Dr Tom Hird and Daniel Young, Competition Economists Group, April 2015.

5.4 Calculation of the annual return on debt observation

This section describes the procedures that should be appropriately followed as part of annual updating.

(a) The set of Independent Data Sources with relevant data available during the nominated averaging period should be identified as being comprised of all sources of published yield information for corporate bonds. The sources should be used by market practitioners, and should contain information on estimated yields published for corporate bonds in the A and BBB credit rating bands. The data should be available in a tenor range up to at least a seven year term to maturity. The data should also be published for at least one Business Day during the nominated averaging period. For the avoidance of doubt the Independent Data Sources may include:

  (i) The Bloomberg BBB BVAL curve.

  (ii) The RBA aggregate measures of Australian corporate bond spreads and yields, for non-financial corporate bonds. The spreads and yields are published for A-rated and BBB-rated bonds.

  (iii) Estimates of the yield on a 10-year benchmark corporate bond that have been derived using the method of fitting Nelson-Siegel yield curves. The approach to the estimation of yield curves is described in ESQUANT (2013).[51] From the perspective of annual updating of the cost of debt, the yield curve estimates that are produced by ESQUANT (2013), should be regarded as an independent and credible data source. The selection of bonds that are used to prepare yield curves is also described in ESQUANT (2013).

  (iv) Estimates of the yield on a 10-year benchmark corporate bond that are derived by fitting par yield curves to data on bond prices. The regressions which produce par yield curves are discussed in ESQUANT (2013), chapter 5. The selection of the sample data is similarly described in chapter 5.

  (v) Any other sources of published yield information for corporate bonds which are used by market practitioners, to the extent that each of these sources provides yield information for corporate bonds in the A and BBB credit rating bands up to at least a seven year term to maturity, for at least one Business Day during the nominated averaging period.

  (vi) For the avoidance of doubt, the yields on corporate bonds may also be derived by adding to the option-adjusted spreads for the individual bonds, the swap rates that are available at the corresponding terms to maturity.

(b) For each Independent Data Source with relevant data available during the nominated averaging period, estimated yield data is to be sourced for bonds in the A and BBB credit rating bands. The data should be sourced for each available maturity up to ten years, and for each Business Day during the nominated averaging period, by following the steps described below:

  (i) Where the Independent Data Source provides data on estimated yields for the A and BBB credit rating bands, for maturities up to and including ten years for each Business Day of the nominated averaging period, yield estimates for each Business Day are to be directly sourced from the Independent Data Source;

  (ii) Where the Independent Data Source does not provide data on estimated yields for the A and BBB credit rating bands for all Business Days during the nominated averaging period, fair yield estimates for those Business Days for which data is not provided are to be calculated by linear interpolation; and

[51] ESQUANT (2013), The development of yield curves, zero coupon yields, and par value yields for corporate bonds, A report prepared for United Energy and Multinet Gas in response to the AER's draft rate of return guideline, 17th October 2013. Updated versions of this report are also available.

(iii) Where the Independent Data Source does not provide data on the estimated yields for bonds in the A and BBB credit rating bands, at a ten year term to maturity, an estimate of the ten year yield is to be determined in accordance with each of the extrapolation methodologies set out in Appendix Schedule 1 of this document (the SAPN and AER extrapolation methodologies). Where an Independent Data Source has been extrapolated using two different methodologies, each extrapolation is to be treated as a separate Independent Data Source for the purposes of clauses 5.4(c) and 5.5 below.

(iv) An estimate of the yield on a BBB-rated corporate bond at a ten year term to maturity will also be obtained from the estimation of Nelson-Siegel yield curves. The yield data for A-rated bonds will assist in informing the estimates of yield curves. The methods for estimation of yield curves are described in ESQUANT (2013). The yield data for A-rated bonds should not be used for any purpose other than to assist with the parameterisation of yield curves. The results for A-rated bonds should not be employed to form direct estimates of the cost of debt.

(v) An estimate of the cost of debt for a BBB-rated corporate bond at a ten year term to maturity will also be obtained from the estimation of par yield curves. The methodology for par yield curves is described in ESQUANT (2013). Data on "clean" and "dirty" bond prices will be used to support the estimation of par yields. The yield data for A-rated bonds will assist in the parameterisation of par yield curves, as has been described in ESQUANT (2013).

(c) Where there is more than one Independent Data Source with relevant data available during the nominated averaging period:

(i) A simple average of yield estimates from each Independent Data Source will be calculated for each term to maturity up to ten years for which yield estimates are available. This simple average is to be treated as a separate Independent Data Source for the purposes of clause 5.5 below; and

(ii) The difference between the highest and lowest ten year BBB yield estimates from the available Independent Data Sources will be calculated.

(d) The annual return on debt observation for each regulatory year of the regulatory period (other than 2016) is to be calculated as the annualised yield estimate for a BBB-rated corporate bond with a term to maturity of 10 years from the Best Fit Independent Data Source, determined in accordance with clause 5.5 below, averaged over the nominated averaging period for that regulatory year.

(e) The nominated averaging period to be used for the purpose of calculating the annual return on debt observation for each regulatory year of the regulatory period, (other than regulatory year 2016), is to be determined according to the conventions set out in section 6 below.

5.5 Determination of the Best Fit Independent Data Source

(a) The Best Fit Independent Data Source for each nominated averaging period is to be determined as follows:

(i) A sample of bonds is to be formed for the nominated averaging period, comprising all bonds for which there are yield observations available from the Bloomberg subscription service, for each Business Day of the averaging period. The bonds will be those which have the following characteristics:

(A) Issued by an entity or entities domiciled in Australia.

(B) Issued in Australian dollars, United States dollars, Euros or British pounds.

(C) Issued by corporations in any industry, excluding sovereign entities, regional and local government entities, government agencies, supranational entities and government development banks; and

(D) Have a credit rating from Standard & Poor's of BBB-, BBB or BBB+ on the final day of the averaging period.

For the avoidance of doubt, the bond sample is not otherwise limited and includes bonds:

(E) Of any coupon type, including fixed and floating rate bonds.

(F) With and without embedded options, including but not limited to call options, put options and options to convert; and

(G) Of any issue size.

(ii) For each bond in the sample, the average observed yield across the nominated averaging period is to be calculated using data from the Bloomberg BGN or BVAL pricing sources. If data is available from both the BGN and BVAL pricing sources, then the BVAL data is to be preferred. The following adjustments will be made:

(A) For bonds with embedded options, option adjusted yields are to be derived by adding interest rate swaps interpolated to the maturity of the bond to the option adjusted spreads sourced from the Bloomberg BVAL pricing source.

(iii) For bonds issued in United States dollars, Euros or British pounds, yields are to be converted to Australian dollar equivalents by use of interest rate swaps, cross-currency basis swaps, and basis change swaps, applying a methodology that is well accepted within the finance industry. For each Independent Data Source, with relevant data available during the nominated averaging period a sum of the weighted squared differences across all the bonds in the relevant bond sample will be calculated as follows:

(A) For each bond in the relevant bond sample, a corresponding estimated yield at the bond's remaining term to maturity is to be calculated using linear interpolation across Business Days. However, linear interpolation will not need to be applied to the daily yield estimates from Nelson-Siegel yield curves, and from par yield curves.

(B) For each bond in the relevant bond sample, the squared difference between the average observed yield of the bond (sourced in accordance with clause 5.5(a)(ii)) and the corresponding estimated yield from the Independent Data Source (interpolated to produce daily results in accordance with clause 5.5(a)(iii)(A)) is to be calculated.

(C) The squared difference for each bond in the relevant bond sample is to be weighted using a Gaussian kernel with a mean of 10 years and a standard deviation of 1.5 years. For the avoidance of doubt, the weight for each bond i, with a remaining term to maturity denoted by m_i, will be determined using the formula below with m=10 and σ=1.5:

$$w_i = \frac{1}{\sqrt{2\pi}\sigma} e^{-\left(\frac{(m_i - m)^2}{2\sigma^2}\right)}$$

(D) For each Independent Data Source, the sum of the weighted squared differences across all the bonds in the relevant bond sample is to be calculated; and

(iv) The Best Fit Independent Data Source, will be the Independent Data Source (or simple average of yield estimates from each Independent Data Source) with the lowest sum of weighted squared differences.

(v) Notwithstanding the goodness-of-fit tests described in clause 5.5, precedence will be given to the results from Nelson-Siegel yield curves and from par yield curves, because these are the most robust and transparent methods.

(b) For the purposes of applying clause 5.5(a), all yield data is to be sourced on an annualised basis. Where a data source publishes yield estimates or observations for a nominated averaging period on a semi-annual basis, these estimates are to be converted to annualised yields in accordance with the following formula:

$$R_{ia} = \left(1 + \frac{R_{is}}{2}\right)^2 - 1$$

where:

R_{ia} is the annualised yield; and

R_{is} is the semi-annual yield.

Formulaic expression of the curve testing arrangements

For each data service provider, and for a simple average of all of the available data providers:

$$R_t = R_t \text{ of } ITP_y$$

where ITP_y satisfies:

S_{ITP_y} = minimum of all available independent third parties' "S_{ITP_x}", and

$$S_{ITP_x} = \sum_{i=1}^{n} \frac{(B_i - Y_i^{ITP_x})^2}{\sqrt{2\pi} \cdot 1.5} \cdot e^{-\frac{(m_i - 10)^2}{2 \times (1.5)^2}}$$

where:

S_{ITP_x} is the sum of the weighted squared differences between the observed yields in the bond sample and the corresponding, estimated yields from the independent, third party data provider, ITP_x; (with each independent data source taken separately, and, also, considering the arithmetic average of the results from the available independent data service providers).

$B_1, B_2, B_3 \ldots . B_n$ represents the bond sample, and B_i is each bond in the bond sample;

m_i is the remaining term to maturity of bond i; and

$Y_i^{ITP_x}$ is the calculated corresponding yield for bond B_i for the independent third party ITP_x.

An arithmetic average of the estimated yields from Independent Data Sources would only be calculated if it was required.

5.6 Annual return on debt observation where relevant data not available

For any regulatory year of the regulatory period (with the exception of the regulatory year 2016), for which an annual return on debt observation cannot be calculated in accordance with the arrangements set out in clause 5.4 above, for any one of the following reasons:

(a) No Independent Data Sources with relevant data being available during the nominated averaging period; or

(b) No bonds meeting the criteria for compilation of the bond sample, as set out in clause 5.5(a)(i), during the nominated averaging period; or

(c) Bond yield data not being available from the BVAL pricing source during the nominated averaging period.

Then, the annual return on debt observation for that regulatory year will be equal to the annual return on debt observation for the previous regulatory year of the regulatory period.

6. Averaging period selection

6.1 Nomination and notification of averaging periods

United Energy's proposal for the nomination of averaging periods differs from the approach that was set out in the Rate of Return Guideline. The AER's Rate of Return Guideline proposed that UE's averaging periods should be determined before the regulatory control period commenced[52]. In place of the approach set out in the Guideline, UE is putting forward a clear and comparatively straightforward process for the nomination and approval of future averaging periods after the regulatory control period has commenced. The process involves nomination by UE followed by AER review. The process that UE is advocating involves the following steps:

(a) Nomination by United Energy for the return on debt calculation in regulatory year t:

(i) UE must submit an Averaging Period Notice to the AER for the purposes of calculating the annual return on debt observation for each regulatory year of the regulatory period, other than regulatory years 2016 and 2017.

(ii) The Averaging Period Notice must nominate the averaging period to be used for calculating the annual return on debt observation for the regulatory year t. This averaging period will take place in the regulatory year (t-1).

(iii) The Averaging Period Notice must be lodged with the AER at least 50 business days prior to the start of the Year (t-1). In other words, the Averaging Period Notice must be lodged with the AER at least 50 business days prior to the start of the regulatory year in which the nominated averaging period occurs.

(iv) The averaging period must:

(A) Be a period of at least 20 consecutive business days; and

(B) Fall entirely within the regulatory year (t-1) between 1st January and 31st December of that year. The regulatory year (t-1) is the calendar year immediately prior to the year for which the averaging period will be used to calculate the annual return on debt observation.

The arrangement mentioned above will leave sufficient time for calculations of the cost of debt to be performed in advance of the annual pricing proposal process for which that cost of debt estimate will be used as an input. As is explained in section 8 below, the cost of debt estimated for an averaging period in year (t-1) will determine the return on debt for the regulatory year t, but the value will only form an input into the pricing proposal that affects regulatory year t+1 (i.e., with a lag of one year). The annual pricing proposal is meant to be submitted to the AER by 30th September in each year[53].

(b) AER Review of Averaging Period Notice

[52] AER, Better Regulation, Rate of Return Guideline, December 2013, (pdf version); section 8.3.2, page 131.

[53] The relevant Rule is clause 6.18.2 of the National Electricity Rules. Clause 6.18.2(a) (2) stipulates that a distribution network service provider must submit to the AER, at least 3 months before the commencement of the second and each subsequent regulatory year of the regulatory control period, a further pricing proposal (an annual pricing proposal) for the relevant regulatory year.

The Clause was introduced as a result of an AEMC Rule Change, ERC0161. The final Rule includes an obligation on DNSPs to submit their annual pricing proposal at least three months prior to the commencement of the relevant regulatory year. See:

AEMC 2014, Distribution Network Pricing Arrangements, Rule Determination, 27 November 2014, Sydney.

(i) Within 20 business days of UE submitting an Averaging Period Notice, the AER must notify UE of its determination as to whether it agrees to the nominated averaging period.

(ii) The AER must not withhold agreement to the nominated averaging period unless either:

(A) The Averaging Period Notice does not comply with either of clauses 6.1(a)(ii) or 6.1(a)(iii); or

(B) The nominated averaging period is inconsistent with the requirements of clause 6.1(a)(iv) above.

(c) If the AER does not make a determination within the 20 business days referenced above in clause 6.1(b)(i), then the AER will be taken to have agreed to the nominated averaging period.

(d) If UE does not submit an Averaging Period Notice, as provided for in clause 6.1(a) above, then the averaging period will be the first 20 Business Days of the regulatory year immediately prior to the regulatory year in respect of which the averaging period is to be used to calculate the annual return on debt observation.

The AER will be able to substantively assess the proposed averaging period with no interference from the annual tariff variation process and the AER's review would, in fact, be a 'compliance check'. The process under United Energy's proposal would only involve three simple steps:

(a) An email message from United Energy to AER staff proposing a period.

(b) AER staff doing a 'compliance check' of the proposed period against the clear and objective criteria set out in section 6.1(a) above. The compliance check does not require any exercise of discretion or judgment; and

(c) An email or letter from the AER to United Energy which notifies the business of the AER's approval of the proposal, if the criteria have been satisfied.

Accordingly, United Energy's proposal (like that of the AER) involves averaging periods being nominated in advance of the relevant time intervals actually occurring.

UE's approach is consistent with the allowed rate of return objective in the Rules.[54] It is also far superior in terms of promoting efficient debt management practices. The proposal by UE has the following attributes:

- Provides real flexibility for distribution businesses to align the averaging periods with times when re-financing is required, thereby ensuring that the re-financing is done efficiently.
- Reduces the risk of the averaging periods, which are commercially sensitive, becoming known.
- Provides greater certainty and reduced risk of mismatch between efficient financing costs and the allowed return on debt.
- Provides no opportunity for the distribution network service provider (DNSP) to engage in gaming. The proposal also does not create the conditions whereby a DNSP would be insulated from the consequences of making incorrect forecasts about the periods as to when debt ought to be refinanced. As such, the arrangements for nomination that UE has put forward in section 6.1(a) would be expected to deliver unbiased outcomes; and
- The approach proposed by UE is consistent with the requirement that changes in total revenue resulting from annual updates should be effected through the automatic application of a formula.

The process that has been set out in section 6.1(a) above relates to averaging periods that will be used assess the rate of return on debt that is applicable to the 2018, 2019 and 2020 regulatory years. The method for estimating the rate of return on debt should be consistent with the method that has been

[54] Clause 6.5.2(c) of the National Electricity Rules.

described in this proposal. Accordingly, the approval by the AER of the annual pricing proposal for each of those regulatory years will be predicated on the following conditions being satisfied:

- A calculation having been performed of the rate of return on debt for the relevant regulatory year. In the nomenclature used earlier, in section 4.2, UE would need to have calculated R2018, or R2019, or R2020, depending upon the applicable year.
- A calculation having been performed for the trailing average rate of return on debt. In other words, UE would need to have evaluated the variable kd_t, which is the return on debt for regulatory year t of the regulatory period.
- The resulting effect on the annual revenue requirement for the regulatory year t would also have to have been assessed, so that an X-factor could be produced for use in the annual pricing proposal.[55]

Therefore, if the AER determines that UE has not calculated the prevailing rate of return on debt in, and updated trailing average return on debt and annual revenue requirement for, the relevant regulatory year for the purposes of UE's pricing proposal for that year, then the AER can exercise its existing powers under clause 6.18.8(b) of the NER. Those existing powers mean that the AER can instruct UE to amend its pricing proposal after making the corrections that the AER deems necessary. Alternatively, the AER can itself make the necessary amendments.

6.2 UE's proposal reduces risk of mismatch

In order to calculate a trailing average rate of return on debt, multiple averaging periods are needed at different points in time in the future. There can, therefore, be a significant lapse of time between the date when an averaging period is nominated, and the date when that period actually occurs. The potential time lag is significantly greater than the gaps of timing that were recorded under the previous on-the-day approach. There is, therefore, a heightened risk of forecast error. By the time an averaging period comes around, the managers of a benchmark efficient entity may find that there has been a change in aspects of the entity's debt portfolio which need to be managed. Conditions in financial markets may also turn out to be very different from those anticipated. By way of example, information currently available may indicate that an averaging period, which was chosen four years' earlier, might now be likely to fall within a time interval that is associated with financial market dislocation. In those circumstances, the managers of the benchmark entity may make a strategic decision to either bring forward or postpone a debt (re-)financing programme or debt related derivative transaction. However, the degree of flexibility that is available to managers to vary the timing of such transactions may be severely curtailed if management is bound by the dates of an averaging period that was set several years' prior. There is therefore a further risk of a mismatch occurring as between efficient finance costs and the allowed return on debt. Efficient financing costs are, of course, described in the Rules in conjunction with the allowed rate of return objective.[56]

The longer is the time lag between averaging period nomination and occurrence, then the poorer will be the quality of the information that is available to a distributor to help guide the choice of the future reference period. For instance, there will be a greater degree of uncertainty about the applicable conditions in financial markets, about the debt instruments that are available, and about the borrowing requirements of the business which will be governed by the timing of capital expenditure. A likely outcome is that the benchmark entity would end up in a position of not being able to raise debt cost effectively, or of having to forestall borrowing. Alternatively, the benchmark entity could find that it was unable to find an adequate number of counterparties with which to engage in hedging transactions. All of these outcomes are sub-optimal.

The reason that businesses are given an opportunity to nominate future averaging periods is so that they can align their actual debt costs with the return on debt allowance by managing their borrowing and hedging arrangements (where such arrangements are in place) around the averaging periods. To undertake hedging

[55] See clause 6.18.8(1)(a) of the NER which conditions AER approval of a pricing proposal on the compliance of that proposal with any applicable distribution determination.

[56] Clause 6.5.2(c) of the National Electricity Rules.

represents sound business practice, because the benchmark entity will then have less exposure to interest rate risk. A number of lenders also impose covenants in their lending agreements which stipulate that a certain proportion of the value of debt must be hedged.

Under the previous "rate-on-the-day" approach for setting the return on debt, there was a limited passage of time from the date when an averaging period was set by a business in consultation with the AER, and the dates when the averaging period actually occurred. The applicable time interval was, at most, one year. However, under the new approach the gap could be up to five years.

Although the AER's approach provides flexibility with respect to the chosen length of the averaging period — with the Guideline allowing periods to vary in length between 10 consecutive business days and twelve months — this flexibility is not of the kind which, prospectively, expedites or facilitates financing arrangements. That is because few businesses would want to undertake hedging over a timeframe which was as long as twelve months.

The approach posited by UE will give the business a degree of latitude so as to better align the timing of future averaging periods with the requirements for debt management and hedging during the proposed reference periods. If the nomination process can take place later, then United Energy, or a benchmark entity in UE's circumstances, will be better informed about the value of debt that needs to be refinanced, or about the extent of additional hedging that is warranted. Therefore, choosing an appropriately timed averaging period will assist in the implementation of efficient debt management practices.

If a binding commitment is made to an averaging period too far in advance, (perhaps five years in advance), then there is a greater risk of disharmony between the averaging period that is locked in and the period that a progressively better informed benchmark entity might otherwise choose for the re-financing of debt, or for further engagement in the swaps market. There would be an incompatibility between the regulatory return on debt, as assessed during the averaging period, and the actual cost of debt incurred by the benchmark entity. Alternatively, the benchmark entity might find that it has to hedge sub-optimally.

In summary, therefore:

The circumstances surrounding the benchmark firm involve uncertainty and unpredictability. There are typically variations from forecast in capital expenditure needs because of the variability in sales and in peak demand, and because replacement requirements cannot be readily ascertained. Additional obligations for safety can also arise in an unknown way. The experience of UE is that the timing and value of future capital spending cannot be forecast perfectly in advance of a forthcoming regulatory period. There is therefore a margin of uncertainty about debt financing needs. Even when the redemption dates of existing debt are known, the exact timing of refinancing of that debt will depend upon market conditions in the timeframe close to the maturity dates. The obligations imposed by credit rating agencies may also evolve over time.

The amount of debt that will need to be raised, and the timing of new debt issues cannot therefore be accurately foreshadowed in advance of a forthcoming regulatory period. Economic growth, technological advances, and developments in financial markets are further relevant considerations.

United Energy aims to devise debt refinancing programmes and hedging strategies which will synchronise well with the trailing average return on debt calculation. To fulfil the objective of operating in parallel with the trailing average rate of return benchmark, the business needs the flexibility to nominate averaging periods at times which are not too distant from the commencement date of those periods so that the business can take full account of the following variables:

- Changes in market conditions—including changes in market sentiment and the products available for efficient debt management, and
- The exigencies of debt refinancing and the issuance of new debt. Capital expenditure needs may vary, and ratings agencies such as Standard and Poor's (S&P) will set new parameters or guidelines, including in relation to early refinancing.

In view of the uncertainty around future spending and when refinancing will need to occur over the course of the next regulatory period, there would be little merit in making early pre-commitments to averaging periods

for times well into the future. To lock in averaging periods at an unreasonably early date may lead to inefficient practices being applied for debt management and hedging. Consumers would ultimately bear the costs of these activities, and the incentive properties of the regulatory regime would be undermined.

Accordingly, UE considers that the AER's specification for averaging periods for the rate of return on debt is inconsistent with the rate of return objective. The approach proposed by United Energy, which is to nominate averaging periods over the course of the regulatory control period, will allow for better harmonisation between the regulatory allowance for debt, and the actual, efficient costs of debt that are incurred. The UE method will therefore be more likely to satisfy the allowed rate of return objective.

6.3 UE's proposal is consistent with automatic application

The relevant rule requirement can be set out as follows:

> *"If the return on debt is to be estimated using a methodology of the type referred to in paragraph (i)(2) then a resulting change to the Distribution Network Service Provider's annual revenue requirement must be effected through the automatic application of a formula that is specified in the distribution determination."*[57]

UE does not consider that all of the relevant averaging periods must be nominated in advance, in order to achieve conformance with the particular Rule.

- The annual revenue requirement is updated through a formula. As is apparent from the paragraph above, the formula that is specified under the rules is one which gives effect to the changes in total revenue, in a context in which the return on debt might vary between years. There is no requirement for future averaging periods to be nominated in advance of the commencement of the regulatory period, in order for the calculation of the return on debt for each year to take place in a manner that will permit any resulting change to total revenue to occur through the automatic application of a formula. In other words, the early and up-front nomination of reference periods is not a necessary pre-condition to be satisfied for the formulaic updating of a distributor's annual revenue requirement.
- The averaging period simply determines the time interval over which one of the inputs into the trailing average rate of return on debt should be estimated. Provided that the reference period is nominated in advance of it occurring, and that the period also pre-dates by a sufficient margin the time when the resulting change to total revenue should occur, then there is no reason to believe that the selection of an averaging period in this manner would impede the updating of total revenue through the application of a formula.
- The calculation process that has been suggested by United Energy is automatic. For a calculation process to be automatic, there is no requirement for all of the inputs into that calculation (or for the measurement periods of those inputs) to be pre-determined. The method that the AER has put forward to estimate the cost of debt, as set out in the draft decisions, also depends upon inputs which are currently unknown and which will need to be determined at the relevant times.[58] By way of example, the availability or non-availability, in future averaging periods, of third party cost of debt measures (fair value curves) is currently unknown.
- The rate of return on debt proposal from United Energy does set out automatic formulae for updating of the return on debt. The trailing average calculation, presented in section 4.2 of this document, is one such formula. The post-tax revenue model (PTRM) provides the mechanism for consequential changes to total revenue, and for the associated revisions to weighted average tariffs. The PTRM also provides a broad classification of tariffs. The averaging period nomination process only affects one input into the process for updating the return on debt. That input is simply the measurement

[57] National Electricity Rules, Clause 6.5.2(l).

[58] AER, *Draft decision, Ausgrid distribution determination 2015-16 to 2018-19, Attachment 3: Rate of return*; November 2014 (pdf version).

period. Therefore, on the strength of the foregoing analysis and reasoning, a clear inference which can be drawn is that the Rule requirement for the automatic updating of total revenue does not, in any way, preclude UE's proposed scheme for the nomination of averaging periods.

6.4 Conclusion

UE considers that its proposed nomination process is preferable to the AER's method and will contribute to the achievement of the rate of return objective. The approach taken by the regulator involves the unnecessary pre-determination of all future averaging periods.

7. Annual Update Formula

Rule 6.5.2(l) requires that if the debt allowance is to differ within the regulatory period from one year to the next:[59]

"… then a resulting change to the Distribution Network Service Provider's annual revenue requirement must be effected through the automatic application of a formula that is specified in the distribution determination."

For each of the four years from 2017 to 2020, the annual revenue requirement will be updated by adjusting the return on capital building block for that year as follows:

$\Delta RocBlock_t = \Delta cod \times 60\% \times oRAB_t$

Where:

$\Delta RocBlock_t$ is the Adjustment to the return on capital building block in regulatory year t;

Δcod is the change in the trailing average cost of debt in regulatory year t determined in accordance with the process set out in section 4 of this proposal, relative to the cost of debt for that year applied by the AER in making its distribution determination; and

$oRAB_t$ is the opening RAB in year t set out in the distribution determination.

Note: The 60% represents the gearing ratio assumed for the benchmark firm.

For clarity, in addition to the formula required under Rule 6.5.2(l), we have also included other formulae to describe other aspects of our proposal. The schedule to this document provides the formulae for extrapolation of the independent third party cost of debt estimates to 10 years. Section 5 above provides the formulae for testing and selecting between the various services. The formulae to then be used for each of the years of the regulatory period are as follows:

The return on debt for each regulatory year of the regulatory period is to be calculated as follows:

for Calendar Year 2016: $kd_{2016} = 5.67\%$;

for Calendar Year 2017: $kd_{2017} = (0.9 \times T2017) + (0.1 \times R2017)$;

for Calendar Year 2018: $kd_{2018} = (0.8 \times T2018) + (0.1 \times R2017) + (0.1 \times R2018)$;

for Calendar Year 2019: $kd_{2019} = (0.7 \times T2019) + (0.1 \times R2017) + (0.1 \times R2018) + (0.1 \times R2019)$;

for Calendar Year 2020: $kd_{2020} = (0.6 \times T2020) + (0.1 \times R2017) + (0.1 \times R2018) + (0.1 \times R2019) + (0.1 \times R2020)$,

where:

- kd_t is the return on debt for Calendar Year t of the regulatory period;
- T20XX represents the average cost of debt associated with debt instruments (including debt hedging instruments) that determined the value of kd_{2016}, and which will not have reached maturity by the end of (20XX-1). By way of example, T2017 is the average cost of debt associated with bonds, and associated hedging instruments, that are assumed to have been issued over the nine years from 2007 to 2015 inclusive. The numbers below for T2017 to T2020 make use of the placeholder estimate for the cost of debt in 2016, which was obtained for a January 2015 reference period; therefore, the numbers are expected to change.
- T2017 is 5.88%;
- T2018 is 6.10%;
- T2019 is 6.10%;
- T2020 is 5.94%; and
- R_t is the annual return on debt observation for each regulatory year t (measured in an averaging period falling in year (t-1)) of the regulatory period, (other than regulatory year 2016), calculated according to the methodology set out above.

[59] National Electricity Rules, Clause 6.5.2(l).

8. Notification about the annual return on debt observation and update to X factors

UE is proposing to set X factors within the initial regulatory determination that will be applied for the first two regulatory years (2016 and 2017). Annual updates for the cost of debt will only be applied by re-running the PTRM (in the context of the annual pricing proposal process) for regulatory years 2018, 2019 and 2020. As is explained in section 8.2, UE does not propose to update the PTRM with the cost of debt estimate for 2017 (kd2017) until setting regulated revenues for 2018 (and so on). This means that the cost of debt estimate for each regulatory year after 2016 is applied with a one year lag. As a consequence, and as set out in section 8.3, there is a need for a 'true up' at the end of the regulatory period because the cost of debt for the last regulatory year (kd2020) will not, at that stage, have been used to set prices.

The reason for imposing a one year lag arises out of a requirement to conform to a timetable in order to submit each year's annual pricing proposal by 30th September. An amount of time is needed to estimate the cost of debt after an averaging period has finished, while the AER itself will need some time to consider the estimate and then make a determination. Therefore, the deadline of 30th September would effectively mean that UE could only ever nominate an averaging period in the first half of the regulatory year. The business would be precluded from selecting reference periods in the second half of the year, and that restriction would unreasonably impair UE's debt management practices.

The one year lag permits UE to nominate an averaging period in the second half of a regulatory year while still allowing sufficient time for the cost of debt from that averaging period to be estimated and agreed prior to the annual pricing proposal process in relation to which the cost of debt figure will be used as an input into the PTRM. For example, UE could nominate an averaging period of November 2016 for the estimation of kd2017. Clearly, the November dates are too late for the pricing process for 2017 (in respect of which UE must submit its pricing proposal by 30th September 2016). However, since UE is proposing to first use kd2017 to set prices in regulatory year 2018, there is ample time for UE to measure the cost of debt in a November 2016 averaging period and for the AER to make a determination on this value prior to 30th September 2017 (which is when UE submits its pricing proposal for regulatory year 2018).

8.1 Notification and AER determination of the annual return on debt observation

This section sets out the process for UE informing the AER of its estimate of the cost of debt for a regulatory year and the AER's consideration of this estimate, and then ultimate determination.

(a) By 1st May in regulatory year t, the distributor must notify the AER of its calculation of the annual return on debt observation, kd_t for that regulatory year. The return on debt observation uses an averaging period from regulatory year (t-1).

(b) The notification to the AER of United Energy's calculation of the annual return on debt observation is to take the form of a written statement which specifies:

  (i) the annual return on debt observation; and

  (ii) the basis for calculation of the annual return on debt observation.

(c) Within 40 Business Days of United Energy notifying the AER of its calculation of the annual return on debt observation, the AER must notify United Energy of its determination as to whether it considers the calculation is consistent with clause 5.4 or clause 5.6, as relevant. The AER's notification under this clause must specify:

  (i) whether the AER approves United Energy's calculation of the annual return on debt observation; and

  (ii) where the AER does not approve United Energy's calculation:

    A. the AER's reasons for withholding approval for United Energy's calculation of the annual return on debt observation; and

B. the AER's calculation of the annual return on debt observation, which it considers to be consistent with clause 5.4 or clause 5.6, as relevant.

(d) The AER must not withhold approval for United Energy's calculation of the annual return on debt observation, unless the calculation is inconsistent with clause 5.3 and clause 5.6.

(e) Subject to clause 8.1(f):

(i) the period in clause 8.1(c)(c) may be extended (by giving written notice to United Energy) to account for the time taken by the AER to obtain information from United Energy, obtain expert advice or consult about the notification;

(ii) if the AER is satisfied that the making of a determination pursuant to clause 8.1(c) involves issues of such complexity or difficulty that the time limit fixed by clause 8.1(c), as extended by clause 8.1(e)(i) above, should be further extended, the AER may extend that time limit by a further period, provided that it has given written notice to United Energy of that extension not later than 10 Business Days before the expiry of that time limit.

(f) Notwithstanding clause 8.1(e), there is an absolute time limit of 90 Business Days from the date of United Energy's notification under clause 8.1(a) for the AER to make a determination pursuant to clause 8.1(c).

(g) If the AER does not make a determination within the time limit fixed by clause 8.1(c) (if relevant, as extended by clause 8.1(e) or clause 8.1(f)), then the AER is taken to have approved United Energy's calculation of the annual return on debt observation.

8.2 Update to X-factors for the nominal return on debt

This section sets out how UE proposes to reflect annual updates to the cost of debt in resetting the X factor in annual price resetting. As noted previously, this involves the cost of debt being updated only in the last three years of the regulatory determination.

(a) Following a determination of the AER in relation to the annual return on debt observation for any of the regulatory years 2017, 2018 or 2019, United Energy must use the annual return on debt observation that is approved or specified in the determination to update X factors in accordance with this clause.

(b) X factors for the last three regulatory years (2018, 2019, and 2020) of the regulatory period will be updated as follows:

(i) following a determination in relation to the annual return on debt observation for regulatory year 2017, the X factor for regulatory year 2018 will be updated by recalculating the return on debt for regulatory year 2017 in accordance with clause 4.2(b) and replacing the return on debt for regulatory year 2017 and each subsequent regulatory year of the regulatory period in the PTRM with this recalculated value;

(ii) following a determination in relation to the annual return on debt observation for regulatory year 2018, the X factor for regulatory year 2019 will be updated by recalculating the return on debt for regulatory year 2018 in accordance with clause 4.2(c) and replacing the return on debt for regulatory year 2018 and each subsequent regulatory year of the regulatory period in the PTRM with this recalculated value;

(iii) following a determination in relation to the annual return on debt observation for regulatory year 2019, the X factor for regulatory year 2020 will be updated by recalculating the return on debt for regulatory year 2019 in accordance with clause 4.2(d) and replacing the return on debt for regulatory year 2019 and each subsequent regulatory year of regulatory period in the PTRM with this recalculated value.

(c) Updating of X factors under this clause must be designed to re-equalise (in terms of present values):

(i) forecast revenue over the regulatory period, taking account of the actual revenues earned for those regulatory years that have already occurred; and

(ii) the total costs over the regulatory period.

(d) Where the X factor for a regulatory year has been updated in accordance with this clause, this updated X factor must be applied for the purposes of varying regulated revenues and prices for that regulatory year.

(e) For the absence of doubt, the fact that this section does not include specification of a mechanism to update the X factor for deviations between actual and previously forecast inflation does not mean that UE does not propose such a mechanism. As has been mentioned in the company's main regulatory proposal, UE considers that amendments to the way in which the PTRM treats inflation and the nominal cost of debt should be made pursuant to clause 6.4.1(b) of the NER. Should these amendments not be made then United Energy reserves its position to potentially make compensatory adjustments as part of its revised rate of return proposal.

8.3 True up for return on debt in last Calendar Year of the Access Arrangement Period

(a) This section sets out how United Energy proposes to properly account for the lags in the use of cost of debt estimates when determining X-factors. The cost of debt for the last regulatory year (kd2020) will not have been applied to set regulated revenues during the regulatory period. In order to correct for this timing issue, a "true up" will be needed with any over/under recovery used to adjust regulated revenues in the next regulatory period. The need for a true up arises to the extent that kd2019 is different to kd2020; noting that the former is used as a placeholder for the latter when setting prices in 2020. The magnitude of any such adjustment is likely to be relatively small given that, under the trailing average approach, kd2019 should not be materially different to kd2020. The "true up" mechanism essentially runs the PTRM again to set a hypothetical X factor for 2020 using the estimated value of kd2020 (holding revenues for all prior years constant at the levels determined in annual pricing reviews). The *ex post* true-up (or "actualisation") defines the amount of revenue that would have been determined in 2020 if the value for kd2020 had been available for use for the regulatory year 2020. The *ex post* true-up revenue is then compared with the dollar value of revenue that was actually determined for 2020, an amount that was calculated under the assumption that kd2020 equalled kd2019 (also holding revenues for all prior years constant at the levels determined in annual price reviews).

(b) Following a determination of the AER in relation to the annual return on debt observation for regulatory year 2020, the return on debt for regulatory year 2020 will be recalculated in accordance with clause 4.2(e), and a revenue true up amount will be calculated as the difference between the present value of revenues in 2020 calculated using the PTRM with the return on debt for the 2020 regulatory year in the PTRM being set equal to the return on debt for regulatory year:

(i) 2020, recalculated in accordance with clause 4.2(e); and

(ii) 2019, calculated in accordance with clause 4.2(d).

(c) The revenue true up amount calculated in accordance with this clause must be added to the present value of Total Revenue to be recovered in the next regulatory period. For this purpose, the revenue true up amount must be expressed in equivalent terms to the present value of Total Revenue for the next access arrangement period.

(d) Present value amounts are to be calculated under this clause by applying a pre-tax real weighted average cost of capital, calculated in accordance with the PTRM.

9. New issue premium

The proposed sources of debt data (i.e. the RBA and Bloomberg series) are observations of the secondary debt market – that is the market in which debt issued in the past, but which has not yet reached maturity, is sold from one bond holder to another[60]. Alternatives to the RBA and Bloomberg series were identified in the AEMC Rule change[61] and Guideline[62] processes but these sources are also derived from the secondary market.

In contrast, when network businesses raise debt, this is done by issuing new bonds to bond holders in the primary bond market. There are a number of differences between the primary and secondary bond markets. For example, the quantum of debt that is the subject of an issue is much greater than the later secondary trade in bonds with only a small proportion (if any) re-traded each business day.

The yields on debt in primary issue markets are generally higher than the yields on debt in secondary markets, with the gap between the two described by practitioners as the new issue concession, or new issue premium (NIP). The AER has to-date not provided compensation for the margin over secondary spreads that must be paid to execute a new, benchmark transaction.

The new issue premium is a positive value, on average, for reasons that have been identified in the literature, including market liquidity constraints, and asymmetric information as between borrowers and lenders.

CEG has prepared a report which sets out an analysis that describes the extent of the new issue premium.[63] The new issue premium is calculated by recording the changes in yields from the date of issuance, relative to the changes in yields of a bond market index. Both the Bloomberg BBB BVAL "fair value curve" and the RBA BBB "fair value curve" have been computed using Bloomberg data on raw bond yields. The two third party indicator series are constructed from secondary market yields.

CEG's report notes that economic logic suggests that compensation for the return on debt should be based on the cost of issuing debt into primary (issuance) markets. The reason is that the primary issuance market determines the actual yield paid by an issuer on the debt that has been raised. Furthermore, the Rules lend support to this interpretation. The allowed rate of return objective states:

"The allowed rate of return objective is that the rate of return for a Distribution Network Service Provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the Distribution Network Service Provider in respect of the provision of standard control services (the allowed rate of return objective)."[64]

CEG reported that the best estimate of the new issue premium that was relevant to a benchmark debt management strategy of issuing 10 year BBB rated debt was 27 basis points.[65]

Other contemporary studies have reached findings that are consistent with those derived by CEG. In particular, Ronn and Goldberg (2013) reported a new issue premium of approximately 22.5 basis points in

60 The Reserve Bank of Australia publishes its indicators of corporate bond spreads and yields as Table F3. Bloomberg produces daily estimates of the Bloomberg BVAL curve for BBB rated debt.

61 For example, see SFG Consulting, *Rule change proposals relating to the debt component of the regulated rate of return*, Report for the AEMC, 21 August 2012, Table 2, page 13.

62 AER; Better Regulation, Explanatory Statement, Rate of Return Guideline; December 2013, (Explanatory Statement) page 126 (pdf version).

63 CEG, The New Issue Premium, prepared by Dr Tom Hird, Competition Economists Group, October 2014.

64 National Electricity Rules, Version 71 **(the Rules)**, Rule 6.5.2(c).

65 CEG, The New Issue Premium, prepared by Dr Tom Hird, Competition Economists Group, October 2014; page 54.

the positive direction, after analysing a sample of 1,494 non-finance, investment grade bond issues that were brought to market over the period from 2008 to January 2012.[66]

The Guideline did not explicitly determine whether or not a new issue premium should be included in the cost of capital allowance and, on one view, to now consider and include an additional allowance to account for the new issue premium is not a departure from any explicit provision of the Guideline. On the other hand, an argument could be mounted that to provide an additional increment for the new issue premium is a departure by addition, and to the extent that this is the case, the proposal by United Energy departs from the Guideline.

66 Ronn, E.I. and Goldberg, R.S; *Quantifying and Explaining the New-Issue Premium in the Post-Glass–Steagall Corporate Bond Market*; The Journal of Fixed Income, Vol. 23 No. 1, 2013, page 48.

10. Debt raising costs

A number of NSW distribution businesses have already identified that the process of raising debt, or of issuing new debt, results in significant transaction costs being incurred by the borrower. The regulatory framework should therefore provide adequate compensation for debt-raising transactions costs.[67]

Incenta has investigated the market data on debt raising transaction costs and has found that the benchmark efficient debt raising costs for Australian corporate entities are comprised of the following components:[68]

- Costs of issuing bonds; this broad category of costs is comprised of arrangement fees, bond master programme costs, legal fees, credit rating fees, annual surveillance fees, up-front issuance fees, registration charges, and the out-of-pocket costs incurred by agents.
- Costs of establishing and maintaining bank debt facilities that are required to meet Standard & Poor's liquidity requirements, and to maintain an investment grade credit rating. Regulated businesses may need to reply upon bank facilities in the event that the bond markets are unable to provide sufficient tenor or volume; and
- The costs imposed by a requirement of Standard & Poor's that businesses should re-finance maturing debt at least three months' ahead of the anticipated maturity dates.

The point about early refinancing is that the borrower addresses its refinancing risk by undertaking the new bond issue 3 months ahead of the scheduled maturity date for existing bonds. As issuers of bonds do not customarily have early redemption / repayment rights under the bonds, the issuer would be required to place the proceeds of the new bond issue on deposit until the old bonds mature. At maturity of the old bonds, the cash from the new bond issue is applied to repay the maturing bonds.

For Standard and Poor's, the minimum period for early refinancing is three months. However, a well-managed benchmark entity might also be eager to maintain a more significant overlap between debt issues of approximately six months.

The AER already has material before it which provides evidence to support the case of refinancing with a six month overlap so as to ensure that the business continues to meet Standard & Poor's conditions of maintaining an investment grade credit rating. The AER should re-consider the previous signed statements which were received from:

- Andrew Noble, Senior Treasury Analyst at CitiPower and Powercor;[69] and
- Gregory Damien Meredith, Treasurer at Envestra.[70]

Andrew Noble noted that Citipower and Powercor's shared liquidity policy required the businesses to have refinancing arrangements in place at least six months prior to maturity, which he considered was relatively prudent for a regulated business. The six months was also acceptable to the ratings agencies.[71]

Gregory Meredith stated that while six months in advance used to be the accepted term to arrange refinancing, equity markets now required businesses to refinance maturities 12 months to two years out.

67 See Ausgrid, *Regulatory Proposal 1 July 2014 to 30 June 2019* (30 May 2014), page 78.

68 See Incenta *Debt raising transaction costs – updated report*– Jemena Gas Networks (NSW) Ltd, 27 February 2015, page 6.

69 Witness statement of Andrew Noble, Citipower and Powercor; undated, 31 January 2009;

70 Witness statement of Gregory Damien Meredith, Envestra; 31 January 2009.

71 Witness statement of Andrew Noble; Citipower and Powercor; undated, 31 January 2009.

Gregory also confirmed that credit rating agencies wanted businesses to have everything refinanced at least six months prior to maturity to mitigate refinancing risk.[72]

United Energy notes that Balchin et al have also considered each of these types of costs, adopting the AER's characterisation of these costs as direct (establishment fees, legal fees, etc.) and indirect financing costs (early financing costs and commitment fees associated with the maintenance of liquidity reserves).[73] In dismissing the AER's previous finding that indirect fees double counted the existing allowance provided through the direct debt raising cost allowance,[74] Balchin found that a benchmark efficient network business should be entitled to recover both types of costs as 'the indirect costs associated with early refinancing and the direct costs of debt financing are separate costs that do not overlap'.[75]

10.1 Estimates of debt-raising costs for United Energy

Incenta has evaluated the debt-raising costs for a benchmark business with United Energy's characteristics. The methods that were applied by Incenta have been extensively tested, and have also been amended recently in response to the AER's draft decisions for regulated businesses in NSW. Incenta has provided estimates of the direct, "levelised" debt-raising costs which have been expressed in terms of basis points per annum on regulatory debt. The reference to "levelised" essentially means that a form of discounting has been applied. The components of debt-raising costs have been summarised as follows:

- 9.1 basis points per annum for the costs of issuing the bonds in respect of an assumed debt portfolio of $1,242 million. This estimate of the value of UE's debt is based on the benchmark gearing ratio of 60 per cent, and the projected value of the regulatory asset base, in 2016, of $2,070 million;
- 7.8 basis points per annum to establish and maintain bank facilities that are required to meet the liquidity criteria which have been set out by Standard and Poor's in a proprietary report[76]. The fulfilment of the criteria condition is a necessary condition for the maintenance of an investment grade credit rating; and
- 3.1 basis points per annum to meet the estimated costs of re-financing debt at least three months before the debt matures. The costs of early re-financing are equivalent to the expenses that might be incurred in maintaining a liquidity reserve. Standard and Poor's stipulates that debt issuers with an investment grade credit rating should re-finance bonds three months ahead of expiry[77].

The summation of the components described above provides an estimate of debt raising transaction costs of 20.0 basis points per annum, to be applied to the regulatory value of debt. Incenta has explained that the "levelisation" occurs by calculating the net present value (NPV) of transactions' costs over the regulatory period, and then dividing by the NPV of the Regulatory Asset Base values determined for the same period. The nominal vanilla WACC of 7.38 per cent that UE has proposed was used in the calculations.

The method for estimating the benchmark, debt-issuing transactions' cost allowance draws in part on an approach that was described by the Allen Consulting Group (ACG) in a report prepared for the Australian

72 Witness statement of Gregory Damien Meredith; 31 January 2009, page 7.

73 PricewaterhouseCoopers Australia, Balchin, J, et al.; Debt financing costs, prepared for the Energy Networks Association, June 2013; page 12.

74 See AER, *South Australia distribution determination 2010-11 to 2014-15*; May 2010, page 384 (pdf version).

75 PricewaterhouseCoopers Australia, Balchin, J, et al.; *Debt financing costs,* prepared for the Energy Networks Association, June 2013; page 13.

76 Standard & Poor's (2014), *Methodology and Assumptions: Liquidity Descriptors for Global Corporate Issuers*, discussed in:

Incenta (2015), Report on debt-raising transaction costs, prepared for United Energy by Incenta Economic Consulting, March 2015; section 4.2.1

77 Incenta (2015), Report on debt-raising transaction costs, prepared for United Energy by Incenta Economic Consulting, March 2015; section 4.3.

Competition and Consumer Commission[78]. Incenta has progressively refined the detailed implementation of the method. Furthermore, in a report prepared for the Energy Networks Association, (ENA), in June 2013, PWC demonstrated that it had sourced significant new data on the components of bond issuance transactions' costs[79].

Table 10.1: Total debt raising transaction costs

	2016	2017	2018	2019	2020
Debt raising transaction costs ($M, Real 2015)	1.1	1.2	1.3	1.4	1.5
Liquidity – commitment fee ($M, Real 2015)	1.2	1.2	1.1	1.1	0.9
3 month ahead financing costs ($M, Real 2015)	0.4	0.4	0.4	0.5	0.4
Total debt raising transaction costs ($M, Real 2015)	2.7	2.9	2.9	3.1	2.8
Debt raising transaction costs (bppa)	9.1	9.1	9.1	9.1	9.1
Liquidity – commitment fee (bppa)	9.4	9.1	7.8	7.0	5.6
3 month ahead financing costs (bppa)	3.5	3.3	2.8	3.5	2.4
Total debt raising transaction costs (bppa)	22.0	21.4	19.7	19.6	17.1
Levelised debt raising transaction costs (bppa)	20.0				

Source: Report on debt-raising transaction costs, prepared for United Energy by Incenta Economic Consulting, March 2015; see Table 11. Note that the year-by-year results for debt-raising costs shown here will not coincide exactly with the year-by-year estimates of debt-raising costs that are produced by the post-tax revenue model. This is because the PTRM starts off with a single input value, being the levelised debt-raising transaction costs, reported above in basis points per annum. The PTRM does not use the profile of the expenditures over five years that was developed by Incenta.

In the post-tax revenue model, the debt-raising transaction costs for United Energy are shown to increase monotonically over time. That is because the PTRM applies a single number for "levelised" debt-raising transaction costs (measured in basis points) to each of the prospective years of the regulatory period. The growth in the regulatory asset base causes debt raising costs to increase. In contrast, in the preparatory analysis undertaken by Incenta, certain components of the costs are presumed to be incurred closer to the start of the regulatory period. Thus, in the table above, the distribution of liquidity commitment fees and 3-month ahead financing costs is skewed towards the early years of the regulatory period.

[78] ACG (December, 2004), Debt and equity raising transaction costs, Report to the Australian Competition and Consumer Commission, prepared by the Allen Consulting Group.

[79] PWC (2013), Debt financing costs, prepared for the Energy Networks Association by PWC, June 2013.

A1. Schedule 1 - Implementation of extrapolation methodologies

This appendix describes the implementation of the AER and the SAPN extrapolation methodologies, both for:

- Estimating daily 10 year spreads to swap associated with extrapolating RBA yields and the Bloomberg BVAL fair value curve; and
- Estimating daily spreads for all tenors associated with RBA spreads and the Bloomberg BVAL fair values, extrapolated under either methodology, for the purpose of conducting tests of the fair value curves over the averaging period.

This appendix describes the calculation of a daily series. In each case, to generate an estimate for a proposed averaging period (such as the first averaging period) the final step is to calculate a simple average of the daily observations of spread over the days covered by the averaging period.

Where we refer to effective tenors associated with published RBA spreads or yields we refer to the effective tenors published by the RBA associated with BBB yield and spread estimates.

A1.1 Implementation of AER extrapolation methodology[80]

A1.1.1 Extrapolation of the RBA curve

(a) The RBA BBB spread curve for target tenors up to 10 years is calculated based on bond data sourced from the final working day on each month ("month-end date"). At each month-end date, the RBA yield at an effective tenor of 10 years is calculated as:

$$Yield_{10}{}^{RBA\ AER} = Yield_{10}{}^{RBA} + (10 - Tenor_{10}) * \frac{(Spread_{10} - Spread_7)}{(Tenor_{10} - Tenor_7)} \text{ (Eqn. A)}$$

Where:

– $\mathrm{Yield}_{10}{}^{\mathrm{RBA\ AER}}$ is the extrapolated yield at the effective 10 year tenor using the AER methodology;

– $\mathrm{Yield}_{10}{}^{\mathrm{RBA}}$ is the RBA's estimated yield at target 10 year tenor;

– Spread_{10} is the RBA's estimated spread to swap at the target 10 year tenor;

– Spread_7 is the RBA's estimated spread to swap at the target 7 year tenor;

– Tenor_{10} is the effective tenor associated with the RBA's estimated spread to swap at the target 10 year tenor; and

– Tenor_7 is the effective tenor associated with the RBA's estimated spread to swap at the target 7 year tenor.

(b) Calculate a daily series of RBA 10 year yields between month-end dates by:

(i) Calculating spreads to CGS at each month-end date as $Yield_{10}{}^{RBA\ AER}$ less interpolated CGS yields at 10 years' term to maturity.

(ii) Calculating a daily series of spreads to CGS between month-end date spreads to CGS using the following formula:

[80] AER (November 2014) Draft decision Jemena Gas Networks (NSW) Ltd Access arrangement 2015-20, Attachment 3: Rate of return, pp. 3-319 to 3-320.

$$\text{Spread to CGS}_{\text{d}} = \text{Spread to CGS}_{\text{D}_1} + (\text{d} - \text{D}_1) * \frac{(\text{Spread to CGS}_{\text{D}_2} - \text{Spread to CGS}_{\text{D}_1})}{(\text{D}_2 - \text{D}_1)} \text{ (Eqn. B)}$$

Where:

– d is the date for which the spread to CGS is being calculated;

– D_1 is the month-end date immediately prior to date d; and

– D_2 is the month-end date immediately subsequent to date d; and

(iii) Calculate a daily series for ${Yield_{10}}^{RBA\ AER}$ as the daily spread to CGS calculated in step (ii) above plus a daily series of interpolated 10 year yields on CGS.

(c) Finally, we calculate a daily series for ${Spread\ to\ swap_{10}}^{RBA\ AER}$ as the daily yield series calculated in step (b)(iii) above less a daily series of 10 year interest rate swap yields sourced from Bloomberg using ticker code ADSWAP10 Currency.

A1.2 Construction of the RBA curve

The previous section describes the calculation of a daily series for a 10 year RBA yields using the AER's extrapolation methodology. However, an entire RBA daily spread to swap curve must be calculated in order to estimate the weighted sum of squared differences between this curve and observed bond data. The RBA only reports yield and spread to swap data at month-end dates.

Consistent with the approach described in section A1.1.1, we estimate daily series of the spread to swap from the yield reported by the RBA at each target tenor t by:

(a) Calculating month-end spreads to CGS for each target tenor t as the RBA's published yield at that target tenor less CGS yields interpolated to the effective tenors associated with that target tenor t.

(b) Calculating daily spreads to CGS for each target tenor t by linearly interpolating between month-end spreads to CGS calculated above using equation B.

(c) Calculating daily estimates of the effective tenor for each target tenor t by linearly interpolating between month-end effective tenors reported by the RBA;

(d) Calculating a daily yield series for each target tenor t as the daily spreads to CGS calculated above plus a daily series of CGS yields interpolated to the effective tenor associated with that target tenor t (as calculated on a daily basis above).

(e) Calculating a daily series of spreads to swap for each target tenor t as the daily yield series calculated above less the Bloomberg estimate of swap rates for that target tenor t, using ADSWAP3 Currency, ADSWAP5 Currency, ADSWAP7 Currency and ADSWAP10 Currency or other estimates of swap rates sourced from Bloomberg consistent with the target tenor t.

A1.3 Extrapolation of the BVAL curve

(a) Bloomberg's BVAL fair value curve does not currently report yields at a tenor of 10 years. The AER's proposed method for extrapolating the Bloomberg BVAL curve from its longest tenor T years to 10 years is:

$$\text{Yield}_{10}{}^{\text{BVAL AER}} = \text{Yield}_{\text{T}}{}^{\text{BVAL}} + \left(\text{Yield}_{10}{}^{\text{RBA AER}} - \text{Yield}_{\text{T}}{}^{\text{RBA AER}}\right)$$

Where:

– T is the longest available tenor of 10 years or less at which the Bloomberg BVAL curve reports fair value yields. Over United Energy's first averaging period T is equal to 7;

– $Yield_T^{BVAL}$ is the Bloomberg BVAL fair value yield for tenor T; and

– $Yield_T^{RBA\ AER}$ is the RBA BBB yield estimate for effective tenor T consistent with the AER's approach to extrapolating RBA yields to 10 years.

(b) Section A1.1.1 describes the AER's methodology for calculating a daily series of extrapolated 10 year RBA yield and spread to swap estimates. $Yield_T^{RBA\ AER}$ is calculated at each month-end using the following formula to extrapolate or interpolate an RBA yield at effective tenor T:

$$\text{Yield}_\text{T}^{\text{RBA AER}} = \text{Yield}_\text{T}^{\text{RBA}} + (\text{T} - \text{Tenor}_\text{T}) * \frac{\left(\text{Spread}_{\text{T}_\text{high}} - \text{Spread}_{\text{T}_\text{low}}\right)}{\left(\text{Tenor}_{\text{T}_\text{high}} - \text{Tenor}_{\text{T}_\text{low}}\right)} \text{(Eqn. C)}$$

Where:

– T is the longest available tenor of 10 years or less at which the Bloomberg BVAL curve reports fair value yields. Over United Energy's first averaging period T is equal to 7;

– T_{low} is the target tenor associated with the highest effective tenor available from RBA data that is lower than T. If no effective tenor is lower than T then T_{low} is the lowest target tenor from RBA data. Notwithstanding the above, if T is greater than all RBA effective tenors then T_{low} is equal to the second highest effective tenor available from RBA data;

– T_{high} is the target tenor associated with the lowest effective tenor available for RBA data that is higher than T. If no effective tenor is higher than T then T_{high} is equal to the highest target tenor from RBA data. Notwithstanding this, if T is less than all RBA effective tenors then T_{high} is equal to the second lowest effective tenor available from RBA data;

– $Yield_T^{RBA}$ is the yield reported by the RBA for target tenor T;[81]

– $Tenor_T$ is the effective tenor associated with target tenor T;

– $Spread_{T_{high}}$ is the RBA's estimated spread to swap at target tenor T_{high};

– $Spread_{T_{low}}$ is the RBA's estimated spread to swap at target tenor T_{low};

– $Tenor_{T_{high}}$ is the effective tenor associated with target tenor T_{high}; and

– $\text{Tenor}_{\text{T}_\text{low}}$ is the effective tenor associated with target tenor T_low.

(c) We estimate the increase in yield that extrapolates the Bloomberg BVAL curve from T years to 10 years at each month-end date based on the slope of the RBA curve as:

$$\text{Yield}_{10}^{\text{RBA AER}} - \text{Yield}_\text{T}^{\text{RBA AER}}$$

[81] Over United Energy's first averaging period, the longest available tenor of 10 years or less at which the Bloomberg BVAL curve reports fair value yields, T , is therefore equal to seven. The RBA publishes yield and spread estimates for a 7-year target tenor. If, during another period, T is a target tenor for which the RBA does not publish yield and spread estimates, use the following formula in place of Equation C:

$$Yield_T^{RBA\ AER} = Swap_T + Spread_{T_{low}}^{\ \ RBA} + \left(T - Tenor_{T_{low}}\right) * \frac{(Spread_{T_{high}} - Spread_{T_{low}})}{(Tenor_{T_{high}} - Tenor_{T_{low}})}$$

Where terms are defined as in section A1.3d and:

- Swap_T is the T year swap rate sourced from Bloomberg using ADSWAP Curncy; and
- $Spread_{T_{low}}^{\ \ RBA}$ is the spread reported by the RBA for target tenor T_{low}.

(d) A daily series for this increase in yield is calculated by using linear interpolation between $Yield_{10}^{RBA\ AER} - Yield_{T}^{RBA\ AER}$ calculated at each month-end, consistent with the interpolation methodology for spreads shown at equation B above.

(e) We estimate a daily series for the Bloomberg BVAL 10 year extrapolated yield as the Bloomberg BVAL yield at T years plus the daily series of increases in yields calculated at steps (c) and (d) above.

A1.4 Construction of the BVAL curve

(a) An entire BVAL BBB fair value curve must be used to estimate the weighted sum of squared differences between this curve and observed bond data. This curve is constructed as:

(i) the BVAL BBB fair value yields for maturities from 1 year to T years; and

(ii) the extrapolated BVAL BBB fair value yield for 10 years as calculated above.

(b) We calculate a daily series for the Bloomberg BVAL BBB fair value spreads to swap as the yield estimates calculated above less swap yields sourced from Bloomberg using the ADSWAP ticker series (i.e., ADSWAP1 Currency, ADSWAP2 Currency, etc).

A1.5 Implementation of SAPN extrapolation methodology

A1.5.1 Extrapolation of the RBA curve

(a) The 10 year extrapolated yield for the RBA curves on each publication date is estimated as:

$$Yield_{10}^{RBA\ SAPN} = Yield_{10}^{RBA} + (10 - Tenor_{10}) * Slope \quad \text{(Eqn. D)}$$

Where:

– $Yield_{10}^{RBA}$ is the RBA's estimated yield at target 10 year tenor;

– $Slope$ is the slope coefficient of the RBA's spread to swap estimates against the associated estimates of effective tenor using simple least squares regression; and

– $Tenor_{10}$ is the effective tenor associated with the RBA's estimated spread to swap at the target 10 year tenor.

(b) In order to derive a daily series for yields and spreads to swap based on the SAPN extrapolation methodology follow the process described in step (a), step (b) and step (c) above substituting $Yield_{10}^{RBA\ SAPN}$ where $Yield_{10}^{RBA\ AER}$ is mentioned.

A1.5.2 Extrapolation of the BVAL curve

(a) A BVAL spread to swap curve is calculated as BVAL yields less Bloomberg estimates of swap rates sourced using ADSWAP Currency.

(b) The BVAL curve is extrapolated from its longest available tenor of 10 years or less, T, to 10 years using the following formula:

$$Spread_{10}^{BVAL\ SAPN} = Spread_{T} + (10 - T) * Slope \quad \text{(Eqn. E)}$$

Where:

– $Spread_{10}^{BVAL\ SAPN}$ is the 10 year extrapolated BVAL spread using the SAPN methodology;

– T is the longest available tenor of 10 years or less at which the Bloomberg BVAL curve reports fair value yields. Over United Energy's first averaging period T is equal to 7;

- $Spread_T$ is the T year spread to swap calculated in step (a) above; and
- $Slope$ is the slope coefficient of the Bloomberg BVAL spread to swap estimates against tenor using simple least squares regression, where:
  - Spreads to swap are calculated as described in step (a) above; and
  - Regression is applied to estimates at tenors of one year or greater for which the BVAL curve is published.

A2. Extent of the mismatch: AER transition versus more plausible hybrid form of the transition

If the AER transition is adopted, and the benchmark entity follows the hybrid transition, then there is a clear mismatch between the return on debt allowance and the efficient financing costs of that entity. Applying current data, the extent of this mismatch is material. If a forecast of United Energy's regulatory asset base is employed, then the value of the mismatch will be approximately $47 million over the 2016 to 2020 regulatory period.

Table 10.2: The extent of the mismatch in compensation when the AER transition has been adopted

	Transitional values			**Value of mismatch**		
Year	Hybrid transition (including NIP and swap costs). "A"	AER transition (assuming NIP of 27bp allowed but not including swap costs). "B"	Mismatch %. "C" (=A-B)	Weight in transition. "D"	Estimated opening RAB. "E"	Return on debt mismatch =C*D*0.6*E
2016	5.67%	5.10%	0.57%	100%	2,070	7.04
2017	5.88%	5.10%	0.78%	90%	2,244	9.39
2018	6.10%	5.10%	1.00%	80%	2,420	11.60
2019	6.10%	5.10%	1.00%	70%	2,591	10.87
2020	5.94%	5.10%	0.84%	60%	2,754	8.29
2021	5.94%	5.10%	0.83%	50%	2,901	7.24
2022	5.90%	5.10%	0.80%	40%	2,811	5.37
2023	5.72%	5.10%	0.61%	30%	2,723	3.01
2024	5.43%	5.10%	0.33%	20%	2,639	1.03
2025	5.34%	5.10%	0.24%	10%	2,560	0.36
Total over 2016 to 2020						**47.19**

Transitional values ("A") are as per Table 4.3. AER transition ("B") is based on the cost of debt estimate in 2015 inclusive of 27bp in NIP. Opening RAB values "E" are taken from row 474 of the Assets tab in the UE distribution PTRM DUOS.