Cost of debt consistent with the NGR and NGL, Tom Hird, CEG Consulting November 2014

Appendix 9.2

27 November 2014

Response to the ERA's Draft Decision on required amendments to the Access Arrangement for the Mid-West and South-West Gas Distribution System

Connecting WA to natural gas

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Cost of debt consistent with the NGR and NGL

Dr. Tom Hird

November 2014

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Executive summary

1. Rule 87(3) of National Gas Rules (NGR) defines the allowed rate of return objective as:

   > *The allowed rate of return objective is that the rate of return for a 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 service provider in respect of the provision of reference services (the allowed rate of return objective).*

2. It appears to be common ground between the Economic Regulation Authority of Western Australia (ERA), the ERA's advisor Professor Martin Lally and myself, that the benchmark efficient entity referred to in section 87(3) of the NGR would, in order to manage refinance risk, issue staggered debt with a maturity of 10 years and, therefore, would have financing costs that reflected a trailing average of debt costs over the period that the debt issuance has been staggered (10 years).

3. It is also common ground that, if the benchmark efficient entity is assumed to have entered into hedging contracts using swaps to reset its base rate of interest every five years, its trailing average cost of debt could be altered in a manner that gives rise to a 'hybrid' cost of debt. This is a hybrid of a trailing average debt risk premium (DRP) and a prevailing base rate of interest that its debt related costs would equal:

   $$Costs = Swap^{5}_{t=o} + DRP^{10}_{TA}\ \text{rel. to swaps} + Trans.costs \qquad (1)$$

   Where:

   $Swap^{5}_{t=0}$ = the 5 year swap rate prevailing at the beginning of the regulatory period (t=0);

   DRP^{10}_{TA} rel. to swaps= $Corp.Yield^{10}_{TA} - Swap^{10}_{TA}$;

   $Corp.Yield^{10}_{TA}$ = the trailing average of 10 year corporate debt yields;

   $Swap^{10}_{TA}$ = the trailing average of 10 year swap rates; and

   $Trans.costs$ = the transaction costs of the strategy – including the transaction costs associated with the relevant swap contracts.

4. Alternatively, if the benchmark efficient entity is not assumed to have entered into any such swap contracts its cost of debt would simply be the 10 year trailing average yield on 10 year corporate debt plus transaction costs (not including swap transaction costs).

5. However, the ERA's proposed approach to compensating for the cost of debt departs, potentially very materially, from the cost of debt associated with either of these approaches. It essentially proposes to compensate for the cost of debt based on whichever of the two formulae below gives the lowest value:

$$ERA\ allowance\ (a) =$$

$$CGS^{5}_{t=0} + DRP^{10}_{Annually\ reset}\ rel.to\ CGS + Trans.costs\ incl.swap\ costs \qquad (2)$$

Where: $DRP^{10}_{Annually\ reset}\ rel.to\ CGS = Corp.Yield^{10}_{t} - CGS^{10}_{t}$ measured at the beginning of each year 't' of the regulatory period.

$$ERA\ allowance\ (b) =$$

$$Corp.Yield^{10}_{t=0} + Trans.costs\ excl.swap\ costs \qquad (3)$$

6. In equation (2) the ERA adopts a formula that looks, superficially, like the costs of a benchmark efficient entity that uses swap contracts (equation 1). However, it differs in two important respects:

   - first, it uses a prevailing DRP estimated at the beginning of each regulatory year rather than a historical average DRP; and
   - second, the base rate used is Commonwealth Government Securities (CGS) yields – rather than the swap rates that a benchmark efficient entity would actually use to engage in the relevant hedging strategy.

7. In equation (3) the ERA again adopts a formula that is similar in structure to the formula that describes the cost of debt for a benchmark efficient entity that does not enter into swaps. However, the ERA's formula differs because it compensates for the prevailing cost of debt at the beginning of the regulatory period rather than the trailing average cost of corporate debt.

8. Separately, and in combination, the above departures from the costs that a benchmark efficient entity would actually incur are significant. This departure from replicability is despite the ERA seemingly accepting that replicability is important when it defends the replicability of its use of a prevailing risk free rate:[1]

> *The application of a 5 year risk free rate and an allowance for costs associated with interest rate swap contracts (see paragraph 917 for the latter) replicates the efficient financing costs of a benchmark efficient entity operating in a competitive market. The benchmark efficient entity*

[1] ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, pp.67-68.

> *may manage refinancing risk by issuing longer term debt, but may hedge the underlying base rate by entering into 5 year swaps.*[2]
>
> *The Authority notes that this lack of replicability is predicated on the idea that the firm is unable to hedge its existing portfolio of staggered debt to reflect exactly the return on debt estimated through the on-the-day approach. The implied view is that the regulated firm must issue all of its debt in the averaging period, just prior to the regulatory period.*
>
> *However, the Authority considers that regulated firms may issue debt at any time, and may hedge the risk free rate by undertaking interest rate swaps, in order to convert to the rate that reflects the prevailing on-the-day rate adopted as the regulatory return on debt.*

9. Moreover, the reasons provided for the ERA's departures, either by the ERA or by its advisor Professor Lally, are either non-existent or invalid.

10. On the issue of annual resets versus a trailing average DRP, Figure 1 below shows the RBA's estimate of the DRP on 10 year debt and the trailing average associated with that.[3] It also illustrates the past DRP decisions made by the ERA for the Mid-West and South-West Gas Distribution System. The DRPs up to October 2014 are based on actual data. After October 2014, I have projected the DRPs out into the future by assuming that the RBA's estimate of the 10 year BBB yields remain constant (at October 2014 levels), but that CGS yields move as predicted by the shape of the yield curve at the time of writing. This results in a gradual downward trend in DRP back to the same levels estimated in 2005.

[2] ERA, *Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System*, 14 October 2014 (hereafter "ERA draft decision"), p. 150

[3] I assume that the DRP prior to December 2001 was the same as its value in December 2001 since fair value information is not available from Bloomberg prior to that time.

Figure 1: Prevailing and trailing average DRP based on RBA BBB data

Source: Bloomberg, ERA, CEG analysis

11. The following observations are pertinent:

    - the difference between the prevailing and trailing average DRP as at October 2014 was 0.56%;
    - this difference is projected to steadily rise to a peak of 1.32% in December 2017 before gradually falling; however
    - the gap is still substantial over the next 10 years – and remains above 0.5% in November 2024.

12. The scenario modelled above clearly illustrates that there is currently a very significant difference between the trailing average DRP and the prevailing DRP. Further, it shows that a difference between these series is projected to remain over the next 10 years. Obviously this is only one possible path for the two series. However, it is an entirely plausible path and I note that the assumption that the prevailing DRP trends down to a historical average level is also employed in Lally's advice to the ERA.[4]

4 Lally, M., *The cost of debt*, 10 October 2014 (hereafter "Lally report"), Appendix 1, pp. 25-28.

13. In this context, I now address the justification provided by the ERA and Lally for adopting a regime that has the potential to so significantly undercompensate for the efficient costs of a benchmark efficient entity.

    - the draft decision argues that annual resets of the DRP to reflect the prevailing DRP are desirable because it mimics the conditions in competitive markets. I consider that this argument is: a) factually incorrect as a description of the operation of competitive markets; b) irrelevant (even if factually correct). I discuss this in section 4.2.1 of this report;
    - Lally (but not the ERA draft decision) argues that resetting DRP annually based on the prevailing DRP promotes efficient investment decisions and that this justifies a departure from compensation based on the efficient finance costs of the benchmark efficient entity. In my view this conclusion cannot be drawn based on the regulatory framework in Western Australia. Moreover, in other reports Lally himself has stated that a weighted trailing average (where the weights applied to each year reflect the magnitude of historical capex in that year) provides the correct incentives for investment. I discuss this in section 4.2.2 of this report; and
    - Lally (but not the ERA draft decision) argues that resetting DRP annually based on the prevailing DRP will likely result in a 'trivial' departure from the costs that a benchmark efficient entity would incur over the life of its assets. However, Lally does not provide empirical evidence supporting this claim. Consistent with Figure 1 above, I demonstrate that this is not correct in section 4.2.3. However, even if it were correct, there is no valid reason to deliberately set out to depart from compensating efficient costs. Therefore, the possibility of adopting another method that approximates the correct method does not provide support for the former over the latter.

14. My March 2014 report criticised the ERA's use of CGS yields rather than swap yields in its cost of debt allowance.[5] However, neither the ERA's draft decision nor Lally's advice contests or responds to these points. The ERA simply assumes again that *"the risk free rate can be entirely hedged by firms"* without reference to the fact that this view is contested. Given the lack of any response to those points I can only repeat them – which I do in section 4.4.

15. The other key component of the ERA's methodology that makes it impossible to replicate is that the ERA proposes to compare the outcomes of two entirely different debt management strategies and to choose whichever gives rise to the lowest estimate of the cost of debt. That is, it seeks to compare the costs associated with a debt management strategy where the business has previously entered into swap contracts to hedge its base rate of interest to a strategy where it has not done so. The ERA then proposes to select whichever is lower.

5 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, pp. 76-81

16. The problem with this approach is that these two debt management strategies are mutually exclusive. A business that is in a position to implement one cannot simultaneously be in a position to implement the other. This is akin to regulating the price of a taxi fare based on whatever was lower: the cost of running an LPG engine or the cost of petrol engine. The obvious problem with this is that once a taxi owner has committed to one type of engine it cannot costlessly switch to another. Compensating for costs 'as if' it could do so will result in prices that are below the efficient costs of taxi owners (and prices below the level that would be set in a competitive market).

17. In my view, the problems identified above mean that the ERA's proposed methodology for compensating for the cost of debt are inconsistent with the requirements of Rule 87(3).

18. In my view, Rule 87(3) requires that the cost of debt be estimated based on the cost of implementing a well-defined debt management policy that is efficient and consistent with a policy that a benchmark efficient entity would undertake. I agree with Lally that there are two debt management strategies that are consistent with Rule 87(3):[6]

> *… only two possible debt strategies for a business are viable, and each has a matching regulatory policy such that the combination satisfies the NPV = 0 principle. The first involves borrowing long-term and staggering the borrowing to ensure that only a small proportion of the debt would mature in any one year; this reduces refinancing risk to a minimal level. The matching regulatory policy would be for the allowed cost of debt to be set in accordance with the trailing average cost (for a term matching that for benchmark firms). The second debt strategy additionally involves the use of interest rate swap contracts (relating to the risk-free rate component of the cost of debt). The matching regulatory policy would be for the allowed risk free rate within the cost of debt to be set in accordance with the rate prevailing at the beginning of the regulatory cycle (for a term equal to the cycle) whilst the DRP would be set in accordance with the trailing average (for a term matching the borrowing term for benchmark firms).*

19. I disagree with Lally that there is any valid reason to depart from compensation based on one of these two viable debt management strategies. Based on RBA data I estimate that applying these methodologies as at October 2014 would result in a cost of debt estimate (excluding transaction costs) of around:

    - 5.58% which is estimated as: the annualised 5 year swap rate for October 2014 derived from the RBA's publication (3.19%); plus the trailing average 10 year

[6] Lally report, pp. 10-11

annualised and extrapolated spread to swap calculated between January 2005 and October 2014 (2.39%).

- 7.93%, being the trailing average 10 year annualised RBA swap rate (5.54%) plus the trailing average 10 year annualised spread to swap calculated between January 2005 and October 2014 (2.39%).

20. In my view, the choice between these two estimates depends on whether the benchmark efficient entity can be assumed to have used swaps to hedge its base rate of interest exposure or not. If it can be assumed to have done so the lower estimate is appropriate. If not, the higher estimate is appropriate. In this regard I note that the AER has stated that:[7]

> *In practice, we observe that most privately–owned businesses typically manage their interest rate risk by entering into interest rate swap contracts in order to 'lock in' the base rate at the time of the determination. This is consistent with Jemena's submission:*
>
> > *NSPs typically use swap transaction to hedge interest rate exposure for the duration of the regulatory period…and issue timing and market choice to manage risks in the DRP component.*

21. I note that a primary barrier to using swaps in the manner described is the potential for the attempt to lock in a large quantity of swap contracts at the beginning of the regulatory period to move the market against the business – given that swap contracts must be entered into with a value equal to 60% of the RAB. However, I note that the RAB for the Mid-West and South-West Gas Distribution System is relatively small compared to most other regulated energy businesses and much smaller relative to the largest such businesses.[8] Thus, this barrier to efficiently entering into swaps will be relatively low for the owner of the Mid-West and South-West Gas Distribution System vis-à-vis other regulated businesses. On this basis it can be assumed that entering into such contracts would be more likely to be efficient for the benchmark efficient owner of the Mid-West and South-West Gas Distribution System.

22. Using the same RBA data source, I estimate that the ERA's estimate under equations (2)/(3) above would be 5.25%/5.75% excluding transaction costs.

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7 AER, *Explanatory Statement: Rate of Return Guideline*, December 2013, p. 107

8 ATCO's RAB is around $1 billion (ERA draft decision, Table 40). By contrast, Ausgrid's RAB is around $14 billion (Ausgrid, *Regulatory Proposal: 1 July 2014 to 30 June 2019*, 30 May 2014, Table 9).

1 Introduction

23. My name is Tom Hird, and I have a Ph.D. in Economics from Monash University and over 20 years' experience as a professional economist.

24. I have been engaged by ATCO Gas to prepare an expert report which reviews the ERA's methodology in its draft decision for calculating the return on debt, and my opinion of the methodology for calculating the return on debt which best accords to the requirements of the NGR. The detailed terms of reference is attached to this report at Appendix E below.

25. I acknowledge that I have read, understood and complied with the Federal Court of Australia's Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia". I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld. I have been provided with a copy of the Federal Court of Australia's Guidelines for Expert Witnesses in Proceeding in the Federal Court of Australia, and confirm that this report has been prepared in accordance with those Guidelines.

26. I have been assisted in the preparation of this report by Daniel Young, Johanna Hansson, Annabel Wilton and Johnathan Wongsosaputro in CEG's Sydney office. However, the opinions set out in this report are my own.

Thomas Nicholas Hird

26 November 2014

2 Defining a debt management strategy consistent with the NGR and NGL

27. I have previously set out my views[9] on the requirements of the NGR and the National Gas Law (NGL) in relation to defining and costing an efficient debt management strategy. I still hold the views expressed in that report but, for convenience, I summarise them here.

28. I consider that, in order to be consistent with the NGR and NGL, the cost of debt allowance must be:

- replicable in the sense that it is based on a well-defined debt management strategy;
- based on a debt management strategy which is efficient in the sense that it reflects a prudent strategy that minimises the expected (risk adjusted) costs of financing. In order to achieve this, the benchmark strategy should be based, as far as possible, on observed behaviour of regulated businesses (where it can be assumed that regulated business have an incentive to behave efficiently); and
- estimated based on the best available data.

2.1 Promoting the ARORO

29. Rule 87(3) of the NGR sets out the allowed rate of return objective (ARORO):

> *The allowed rate of return objective is that the rate of return for a 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 service provider in respect of the provision of reference services (the allowed rate of return objective).*

30. In my view, there are two distinct steps involved in estimating the return on debt (cost of debt) for any entity – including the 'benchmark efficient entity' envisaged in the ARORO. The basis for this conclusion is the view that, before one can embark on an estimation process, one must define what it is that is being estimated. To define what is being estimated, it is necessary to:

- define a financing strategy for a *"benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services"*; and
- estimate the *"efficient financing costs"* of implementing that strategy.

9 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014

31. The second step cannot proceed without the first step.

32. Once a benchmark efficient debt management strategy is defined, the next step is to estimate the financing costs associated with that strategy. This step requires collection and analysis of financial market price/yield information relevant to determining the costs incurred in implementing the benchmark efficient financing strategy at the relevant times. This step focuses on data collection, interpretation and manipulation, to arrive at an estimate of the costs of implementing the benchmark efficient strategy defined in the first step. Relevant decisions that must be made are:

    - whether and how to use third party estimates of the yields on broad categories of corporate debt. This might include Bloomberg and RBA published estimates of the yields on bonds of particular maturities/credit ratings;
    - whether and how to use third party estimates of the yield on specific debt instruments (e.g., a specific bond issued company "X", another bond issued by company "Y", etc.); and
    - what sources for these data should be used and what, if any, differential weighting should be applied to the data sources.

33. The ARORO envisages that:

    - it is possible to define a *"benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services"*;
    - *"efficient financing costs"* for that entity can be estimated; and
    - the service provider should receive compensation that is *"commensurate"* with this.

34. In the context of setting the allowed cost of debt, I consider that this requires:

    - a benchmark efficient debt financing strategy to be defined;
    - the costs of efficiently implementing that strategy to be estimated; and
    - compensation commensurate with this to be provided to the service provider.

35. In my view, the definition of a benchmark efficient financing strategy must be such that it would be possible for a benchmark efficient entity to undertake that strategy. This does not necessarily mean that a specific regulated entity must actually implement or be able to implement that strategy, or that it must be the most efficient strategy for that entity. However, it must be conceivable that this strategy would be efficient for a benchmark entity facing the same risks.

36. By way of specific examples:

- if it is not possible to issue 100 year debt, or it is known to be prohibitively expensive to attempt to do so, then issuing 100 year debt should not be included in the definition of a benchmark efficient debt financing strategy;
- if it is inefficient to refinance 100% of all debt each year then the assumption of 100% refinancing each year should not form part of the definition of benchmark efficient debt financing strategy; and
- if it is impossible to trade certain derivative contracts, or if it is known to be prohibitively costly to do so, then the trading of such derivative contracts should not be included in the definition of benchmark efficient debt financing strategy.

37. To define and cost a debt management strategy that includes one or more activities that are inefficient, even for the benchmark efficient entity, would, in my view, be inconsistent with attempting to estimate compensation that "*is commensurate with the efficient financing costs of a benchmark efficient entity*".

38. The Australian Energy Market Commission's (AEMC) Final Rule Determination suggests that it envisaged its Rule change would require that the regulator clearly define a benchmark debt financing strategy and then estimate the costs of implementing that strategy:[10]

> *While the Commission considers that allowing the regulator to estimate the return on debt component of the rate of return using a broad range of methods represents an improvement to the current approach, it is a separate issue from that of benchmark specification and measurement.* ***A historical trailing average approach still requires the regulator to define a benchmark and use appropriate data sources to measure it. Arguably, it is even more important that the benchmark is defined very clearly and can be measured, because it needs to be estimated periodically in the future***. [Emphasis added.]

Similarly, the AEMC clearly envisaged that the definition of an efficient benchmark entity would include a definition of that benchmark entity's efficient debt financing strategy:[11]

> *The first factor in the rule requires the regulator to have regard to the characteristics of a benchmark service provider and how this influences assumptions about* ***its efficient debt management strategy***. [Emphasis added.]

[10] AEMC, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, 29 November 2012, p. 90

[11] AEMC, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, 29 November 2012, p. 84

2.2 Promoting the NGO and consistency with the RPP

39. The National Gas Objective (NGO) as set out in the NGL is:

> *"to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."*

40. The NGO and the revenue and pricing principles (RPP) in the NGL apply more broadly than to just the cost of debt and equity funding. However, in my view, the requirements set out in the NGL are consistent with my interpretation that the NGR requires an estimate of the allowed return on debt to be based on an estimate of the cost of following a benchmark efficient debt financing strategy.

41. In my view, if the allowance for the return on debt is based on a benchmark financing strategy consistent with what a benchmark efficient entity would undertake, then the regulated entity will:

- have appropriate incentives to invest and maintain its assets in a manner that promotes the NGO;
- have *"a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services"* - consistent with (2)(a) of the RPP;
- be provided with effective incentives in order to promote economic efficiency – consistent with (3) of the RPP;
- have tariffs that allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service – consistent with (5) of the RPP; and
- have appropriate incentives to invest in the network - consistent with (6) of the RPP.

42. Similarly, setting tariffs to reflect the cost of debt associated with a benchmark efficient debt financing strategy is consistent with promoting efficient utilisation of gas networks by customers. In fact, in my view, achieving the allowed rate of return objective is an important foundation for achieving the NGO and the RPP.

43. Only if the cost of debt allowance is set consistent with a well-defined benchmark efficient debt management strategy can a business attempt to replicate that strategy such that its own efficient costs are commensurate with the allowance. If a business cannot do this because the cost of debt allowance is not based on well-defined debt management strategy, then a gap between the allowed and achievable cost of debt can be created. The effect of this gap can be to:

- weaken incentives to invest and maintain its assets in a manner that fails to promote the NGO;
- deny *"a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services"* - inconsistent with (2)(a) of the RPP;
- weaken incentives for efficient investment and thereby fail to promote economic efficiency – inconsistent with (3) of the RPP;
- result in tariffs that do not allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service – inconsistent with (5) of the RPP; and
- fail to provide appropriate incentives to invest in the network - inconsistent with (6) of the RPP.

44. Consistent with the above, it is my view that promotion of the ARORO also promotes the NGO and helps achieve consistency with the RPP.

3 Replicable debt management strategies

45. The ERA, Lally and I all agree that a benchmark efficient debt management strategy for a regulated energy distribution business involves the staggered issuance of 10 year debt.[12] We also agree that it is:

    - *possible* for a business to use interest rate swaps to alter its base rate of interest exposure on its staggered debt portfolio to the length of the regulatory period;
    - *impossible* (or infeasible) for a business to alter the DRP that a business pays on its staggered debt portfolio.

46. In the context of these agreed facts, it follows that there are two candidates for a replicable debt management strategy, namely:

    a. staggered issuance of 10 year debt with no swap contract overlay; or

    b. staggered issuance of 10 year debt with a swap contract overlay.

47. I refer to the strategy described in point 'a.' as a 'simple trailing average' approach. This is because, without any swap overlay, the cost of debt associated with this strategy is simply the trailing average of the (10 year) cost of debt over the period (10 years) the business is assumed to have staggered its issuance.

48. The nature of the swap contract overlay that forms part of strategy "b." could conceivably take many forms. However, the form envisioned by the ERA is one designed in order to reset base interest costs at the beginning of each regulatory period for the length of the regulatory period (5 years). I refer to the strategy described in point "b." above as a 'hybrid' strategy. This is a reflection of the fact that, as discussed in section 3.1 immediately below, following this strategy gives rise to a cost of debt that is a combination of:

    - 'on the day' 5 year base rate of interest (determined by the level of 5 year swap rates at the beginning of the regulatory period); plus

[12] This is consistent with the ERA's own data collected and reported in the rate of return guideline process and my own empirical data collected and reported in: CEG, *Debt strategies of utility business,* June 2013 and also my 11 November 2013 letter to Warwick Anderson of AER reporting on the audited term of debt for all privately owned energy businesses it regulated. On the basis of the evidence that suggests that all regulated energy businesses have staggered debt portfolios and an average term of 10 years and, on the basis of the logic set out in my March 2014 report for ATCO that businesses observed practice should be assumed to be efficient – especially if it is a universally adopted practice, then I conclude that a staggered debt portfolio with a maturity of around 10 years is a benchmark efficient strategy for the owner of the Mid-West and South-West Gas Distribution System.

- a trailing average DRP measured over the period (10 years) the business is assumed to have staggered its issuance (where this is measured as the difference between the 10 year cost of debt in each year of the trailing average less the 10 year swap rate).

49. The debt management strategies identified above are also identified by Lally as the only two possible debt strategies that are 'viable' and goes onto spell out the matching regulatory policy:[13]

> *Thus, only two possible debt strategies for a business are viable, and each has a matching regulatory policy such that the combination satisfies the NPV = 0 principle. The first involves borrowing long-term and staggering the borrowing to ensure that only a small proportion of the debt would mature in any one year; this reduces refinancing risk to a minimal level. The matching regulatory policy would be for the allowed cost of debt to be set in accordance with the trailing average cost (for a term matching that for benchmark firms). The second debt strategy additionally involves the use of interest rate swap contracts (relating to the risk-free rate component of the cost of debt). The matching regulatory policy would be for the allowed risk free rate within the cost of debt to be set in accordance with the rate prevailing at the beginning of the regulatory cycle (for a term equal to the cycle) whilst the DRP would be set in accordance with the trailing average (for a term matching the borrowing term for benchmark firms).*

3.1 Choosing between replicable debt management strategies

50. In section 2, I reach the conclusion that benchmark efficient debt financing costs must, at a minimum, be based on the costs of a debt management strategy that a business can implement (i.e., is replicable). However, there are many debt management strategies that are replicable. Two such policies are set out above (and described in more detail below). A regulator could adopt either of these policies and, at least in the long run, after a firm had sufficient time to adjust its own policies, this could be replicated. Lally makes the same observation in relation to achieving the 'NPV=0' principle which is includes a requirement for replicability.[14]

> *"...the NPV = 0 principle should be viewed not simply as a regulatory policy that gives rise to NPV = 0 but a compatible combination of regulatory policy and firm actions that satisfies the NPV = 0 principle; this compatible combination must involve a course of action by a firm that*

[13] Lally report, pp. 10-11

[14] Lally, M., *The cost of debt*, 27 August 2014, p. 8

is feasible in the absence of regulation and a regulatory policy whose imposition would not cause the firm to change this behavior ("matching" regulatory policy)."

51. The hybrid strategy (staggered debt issuance with a swap overlay) is the strategy that the ERA uses to justify why its adoption of a 5 year risk free rate can be consistent with acceptance of the fact that it is efficient to issue 10 year debt. The ERA states:[15]

The application of a 5 year risk free rate and an allowance for costs associated with interest rate swap contracts (see paragraph 917 for the latter) replicates the efficient financing costs of a benchmark efficient entity operating in a competitive market. The benchmark efficient entity may manage refinancing risk by issuing longer term debt, but may hedge the underlying base rate by entering into 5 year swaps.[16]

52. This is consistent with the ERA's views expressed in its Rate of Return Guidelines that:[17]

The on-the-day approach has been criticised on the grounds that it somehow does not allow firms to establish a debt portfolio with maturities that are staggered over time in order to avoid 'refinancing risk' (staggering is also known as debt laddering). Hence, stakeholders have argued that the approach is not replicable. The Authority considers that this view is incorrect.

The Authority notes that this lack of replicability is predicated on the idea that the firm is unable to hedge its existing portfolio of staggered debt to reflect exactly the return on debt estimated through the on-the-day approach. The implied view is that the regulated firm must issue all of its debt in the averaging period, just prior to the regulatory period.

However, the Authority considers that regulated firms may issue debt at any time, and may hedge the risk free rate by undertaking interest rate swaps, in order to convert to the rate that reflects the prevailing on-the-day rate adopted as the regulatory return on debt.

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15 ERA draft decision, p. 150

16 It is unclear to me what the ERA means by "replicates the efficient financing costs of a benchmark efficient entity operating **in a competitive market**". The benchmark entity is one that has the same similar degree of risk as that which applies to the service provider in respect of the provision of reference services. The reference services are not provided in a competitive market (which is why the ERA is regulating their price). It is not clear to me why the ERA is hypothesising the benchmark efficient entity operating in a competitive market.

17 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, pp. 67-68.

> *The Authority has not been presented with concrete evidence of impediments to hedging the risk free rate, through the use of interest rate swaps.*

53. In the above passages the ERA appears to argue that the hybrid debt management strategy is an efficient response to the ERA's adoption of an 'on the day' approach to setting the cost of debt. This same sentiment has been expressed by the AER which stated in its Rate of Return Guideline:[18]

> *In section 7.3.3 we considered what would constitute the efficient debt financing practices of the benchmark efficient entity under the current 'on the day' approach. We considered it likely that holding a debt portfolio with staggered maturity dates and using swaps to hedge interest rate exposure for the duration of a regulatory control period would constitute such an efficient debt financing practice.*

54. In section 7.3.3 of its Rate of Return Guideline referred to by the AER in the quote above, the AER states:[19]

> *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 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.*

55. On the assumption, seemingly shared by the AER and the ERA, that the benchmark efficient entity should be assumed to have issued staggered debt but, given the application of an 'on the day' approach by regulators under the old Rules, it should also be assumed to have fixed its interest rates up until the end of the end of each regulatory period, I consider that the hybrid approach is the appropriate basis for compensating for the efficiently incurred costs of debt.

56. However, this does not mean that the hybrid debt management strategy must forever more be the basis on which the cost of debt is compensated. The ARORO does not, in my view, simply require that compensation be based on a replicable debt management strategy but also requires that it be based on an efficient debt management strategy.

57. Notwithstanding the ERA's previously stated view that implementing a swap overlay is efficient, it may change its view in the future and conclude that a simple

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18 AER, *Explanatory Statement: Rate of Return Guideline*, December 2013, p. 121.

19 AER, *Explanatory Statement: Rate of Return Guideline*, December 2013, p. 107.

trailing average is more efficient. This would align its views with those of the AER, Ofgem and US regulators. However, it would not be appropriate to assume that a benchmark efficient entity could transition overnight from the hybrid debt management strategy to a simple trailing average. Rather, a replicable transition path between the hybrid and the trailing average would need to be defined.

58. A benchmark efficient entity cannot simply switch between debt management strategies from one year to the next. For example, if a benchmark efficient entity is implementing the hybrid debt management policy then its base interest costs will reflect prevailing swap rates (or, at least, the rates prevailing at the beginning of the regulatory period). A benchmark efficient entity could transition its costs to a simple trailing average in the manner set out in Appendix C. However, this transition path would take ten years.

59. The ERA's draft decision is in error when it assumes a business can costlessly switch between the hybrid approach and an approach that has no swap contracts – as discussed in section 4.3.1 below.

3.2 Mechanics of the hybrid cost of debt strategy

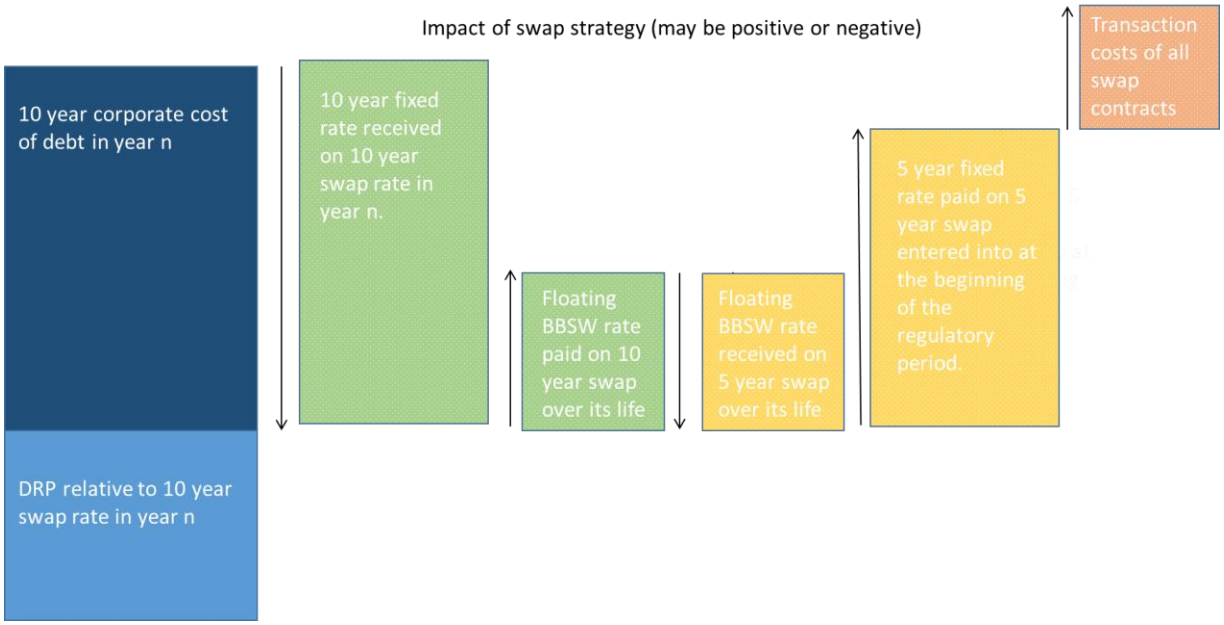
60. It is useful to describe the mechanics of the swap strategy underpinning the hybrid approach. Under the hybrid approach the business will enter into swap contracts in order to:

- fix its base interest rates in the current regulatory period based on the swap rates that prevailed at the beginning of the current regulatory period; and
- have its base interest rate exposure purely floating at the end of that regulatory period (beginning of the next regulatory period); which
- facilitates its ability to repeat the process in the first dot point for the next regulatory period.

61. It is important to note that this strategy, once entered into, cannot be instantaneously unwound. As per the second dot point above, in order to use swap rates to fix interest rates for a regulatory period a business must have arranged its affairs over the previous 10 years so that 100% of the base rate of interest will be floating rate exposure at the beginning of the regulatory period.

62. This mechanics of this strategy is described Figure 2 below.

Figure 2: Mechanics of swap strategy underpinning hybrid



63. Moving from left to right in the above graphic describes the mechanics of the swap strategy underpinning the hybrid debt management strategy as it relates to the costs associated with a single bond issued in year "n".

- First, the firm issues a 10 year bond with a yield that is represented by the height of the first column (the sum of both the light and dark blue components of that column).
- Second, the firm immediately enters into a 10 year swap contract (the components of which are the green coloured columns in the above figure) under which it:
  - is paid the 10 year fixed swap rate prevailing at that time (the business receives this same (fixed) rate over the 10 year life of the swap contract – which is also the life of the bond). (The difference between the 10 year fixed swap rate and the yield on the corporate bond is, for future reference, how the light blue "DRP relative to 10 year swap rate in year n" is calculated);
  - must pay its counterparty the floating 3 month bank bill swap rate (BBSW) over the next 10 years. This is described as a 'floating rate' because the BBSW rate varies through time and the firm must make quarterly payments to the counterparty at a rate equal to whatever the prevailing 3 month BBSW rate is at that time.

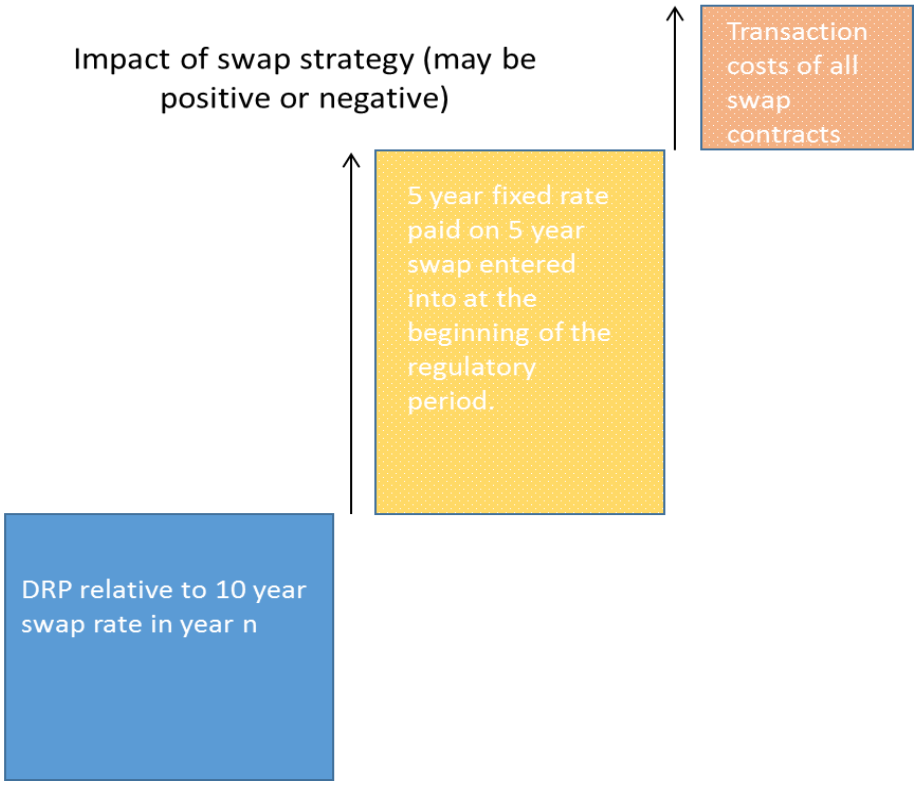
- Third, the firm enters into a 5 year swap contract (the two components of which are coloured yellow in the above figure) at the beginning of the regulatory period under which it:
  - must pay the 5 year fixed swap rate prevailing at that time (the business receives this same (fixed) rate over the 5 year life of the swap contract – which is also the life of the regulatory period);
  - is paid by its counterparty the floating 3 month bank bill swap rate (BBSW) over the next 5 years.
- The final (orange) column on the chart shows the impact of the transaction costs associated with two sets of swap contracts.

64. It is useful to make the following observations about the above mechanics.

- The middle two green and yellow floating BBSW rate amounts 'cancel out' so these have no net effect on the costs of the strategy.
- The DRP on the bond at the time of issuance (measured relative to 10 year swap rates) is not altered and is payable every year over the life of the bond. It is, in some sense, the base fixed rate cost of the debt upon which the net effect of the swap contracts is added.
- The third step is undertaken to hedge not just already existing bond/swap combinations created in steps 1 and 2 but also to hedge bond/swap combinations expected to be created over the course of the regulatory period. Consider a 10 year bond issued at the end of the third year of a regulatory period - with the proceeds used to refinance a bond of equivalent value that is maturing at that time. At the beginning of the regulatory period the business will have entered into a 5 year (pay fixed/receive floating) swap that hedged:
  - the 3 years of floating rate exposure on the old (already existing) bond/swap combination maturing at the end of year 3; and
  - the 2 years of floating rate exposure on the new bond/swap combination that will be issued/entered into at the end of year 3.
- The impact of the all of these steps may be to raise or lower the total cost of debt. It will depend on the shape of swap yield curves, the movements in swap rates between bond issue date and the beginning of the regulatory period and also the level of transaction costs associated with the swaps.

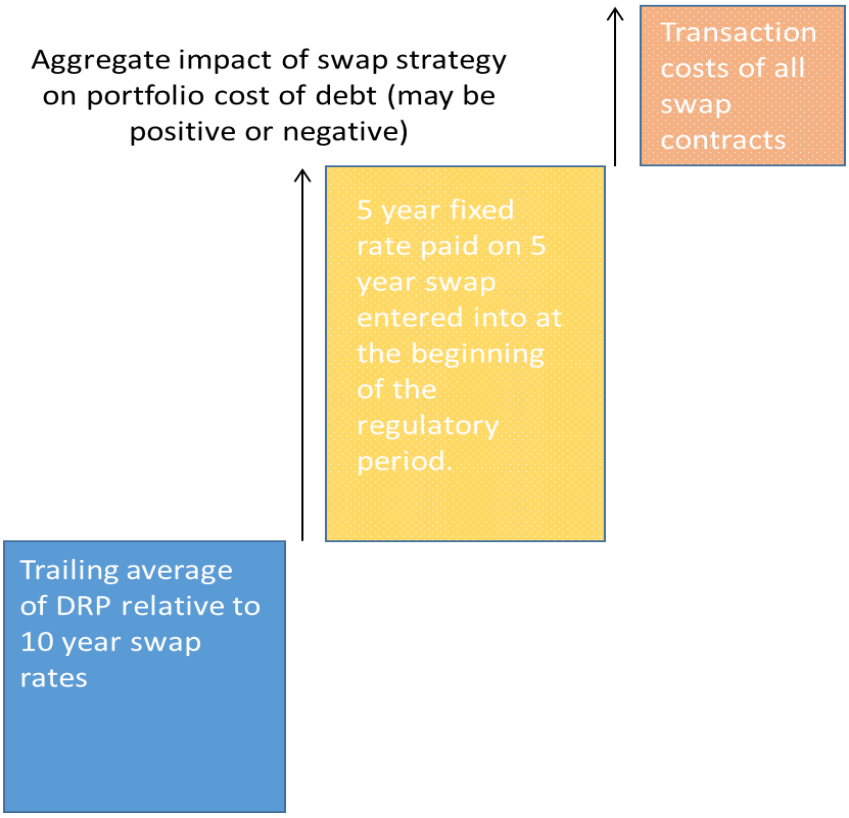
65. Figure 2 includes a number of elements that 'cancel out' across the entire strategy. In particular, the two floating rate payments underpinning each swap cancel out. In addition, the 10 year fixed swap rate received over the life of the bond effectively cancels out an equal amount of the 10 year yield on the bond. Figure 3 below shows a simplified version of Figure 2 with the elements that cancel out excluded.

Figure 3: Simplified mechanics of swap strategy underpinning hybrid



66. Figure 2 and Figure 3 depicts the impact of the swap strategy on a single bond. However, the impact on the swap strategy applied to each bond in the staggered debt portfolio is simply the sum of these. This is illustrated in Figure 4 below. The difference between Figure 3 and Figure 4 is simply that a trailing average DRP replaces the DRP on the single bond in Figure 3.

Figure 4: Aggregate cost of debt under the hybrid approach



67. In order to be an effective way of hedging to the regulatory allowance, the swap contracts must be undertaken in the same period that the regulator uses to set the cost of debt allowance and must only last for as long as that cost of debt allowance will be paid (in past ERA and AER practice this is the 5 year regulatory period). Only then will the business's interest rate exposure be purely floating at the beginning of the next regulatory period – enabling it to once more enter into 5 year fixed swaps to turn that floating rate exposure into a fixed rate exposure in the same market conditions that the regulator uses to determine the fixed cost of debt.

3.3 The simple trailing average strategy

68. Under the simple trailing average strategy the business does not enter into a swap overlay strategy and, therefore, the cost of maintain a staggered portfolio of 10 year debt is simply the trailing average of the cost of corporate debt over the last 10 years.

3.4 Indicative costings associated with these strategies

69. Based on RBA data I estimate that applying these methodologies as at October 2014 would result in a cost of debt estimate (excluding transaction costs) of around:

- 5.58% which is estimated as: the annualised 5 year swap rate for October 2014 derived from the RBA's publication (3.19%);[20] plus the trailing average 10 year annualised and extrapolated spread to swap calculated between January 2005 and October 2014 (2.39%).[21]
- 7.93%, being the trailing average 10 year annualised RBA swap rate (5.54%)[22] plus the trailing average 10 year annualised spread to swap calculated between January 2005 and October 2014 (2.39%).

70. In my view, the choice between these two estimates depends on whether the benchmark efficient entity can be assumed to have used swaps to hedge its base rate of interest exposure or not. If it can be assumed to have done so the lower estimate is appropriate. If not, the higher estimate is appropriate.

71. The positions taken in the ERA draft decision (and the AER Rate of Return Guideline) summarised in section 3.1 above strongly suggest that the ERA (and AER) are of the view that a benchmark efficient entity in ATCO's position would have used swaps. If correct, it follows that the lower estimate is appropriate.

72. In this regard, the AER has also stated that:[23]

> *In practice, we observe that most privately–owned businesses typically manage their interest rate risk by entering into interest rate swap contracts in order to 'lock in' the base rate at the time of the determination. This is consistent with Jemena's submission:*

---

20 RBA, *Aggregate Measures of Australian Corporate Bond Spreads and Yields – F3*. The semi-annual 5 year swap rate is calculated as the amount in column W (Non-financial corporate BBB-rated bonds – Yield – 5 year) less the amount in column AA (Non-financial corporate BBB-rated bonds – Spread to swap – 5 year). If this value is x% in a given month then the annualised value is $(1+x\%/2)^2-1$.

21 The semi-annual 10 year spread to swap is provided in column AC (Non-financial corporate BBB-rated bonds – Spread to swap – 10 year). The annualised value of the DRP is calculated as the annualised value of the 10 year yield in column Y (Non-financial corporate BBB-rated bonds – Yield – 10 year) less the annualised value of the 5 year swap rate (described in footnote 21 immediately above). This spread to swap is calculated at 10 years using extrapolation based on the best fit slope of the spread to swap curve extended forwards from the 10 year target maturity observation as described in Appendix A.

22 Calculated in the same manner as the annualised five year swap rate but referencing columns Y (Non-financial corporate BBB-rated bonds – Yield – 10 year) and AC (Non-financial corporate BBB-rated bonds – Spread to swap – 10 year).

23 AER, *Explanatory Statement: Rate of Return Guideline*, December 2013, p. 107

> *NSPs typically use swap transaction to hedge interest rate exposure for the duration of the regulatory period…and issue timing and market choice to manage risks in the DRP component.*

73. I note that a primary barrier to efficiently using swaps in the manner described is the potential for the attempt to lock in a large quantity of swap contracts at the beginning of the regulatory period to move the market against the business (given that the benchmark entity would need to enter into swap contracts with a value equal to 60% of the RAB). However, I note that the RAB for the Mid-West and South-West Gas Distribution System is relatively small compared to most other regulated energy businesses and much smaller relative to the largest such businesses.[24] Thus, this barrier to efficiently entering into swaps will be relatively low for the owner of the Mid-West and South-West Gas Distribution System vis-à-vis other regulated businesses.

74. It can therefore be assumed that entering into such contracts would be more likely to be efficient for the benchmark efficient owner of the Mid-West and South-West Gas Distribution System than for other regulated businesses.

75. By contrast, I estimate that the ERA's allowance for the cost of debt (excluding transaction costs) would be 5.25% adopting the 5 year CGS yield as the base rate and 5.75% using the 10 year CGS yield as the base rate. As above, these estimates are derived using the RAB corporate debt publication.[25]

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[24] ATCO's RAB is around $1 billion (ERA draft decision, Table 40). By contrast, Ausgrid's RAB is around $14 billion (Ausgrid, *Regulatory Proposal: 1 July 2014 to 30 June 2019*, 30 May 2014, Table 9).

[25] In October 2014, I find the extrapolated 10 year annualised spread to swap from RBA to be 2.00%. The 10 year annualised swap rate is 3.75% and the 10 year annualised CGS rate is 3.37%. I therefore calculate an extrapolated 10 year spread to CGS of 2.38%.

- Adding annualised 5 year CGS of 2.87% gives 5.25%.
- Adding annualised 10 year CGS of 3.37% gives 5.75%.

4 Assessment of the ERA methodology against the NGR and NGL

76. In my view the ERA's methodology for arriving at an estimate of the cost of debt is inconsistent with the requirements of the NGR and the NGL. A key reason for this conclusion is that the ERA has not attempted to adopt an estimation methodology that is derived from, or otherwise consistent with, a well-defined debt management strategy. As a result, the methodology is incapable of giving rise to an allowance that is commensurate with the efficient debt financing costs of a benchmark efficient entity.

4.1 The ERA's methodology

77. The ERA's draft decision provides some modifications to the approach set out in the rate of return guidelines. In my view, some of these modifications, such as the adoption of a 10 year term of debt issuance assumption, move the ERA's methodology towards compliance with the NGR and NGL. Other changes, such as the proposed 'switching' between mutually exclusive debt management strategies, move away from compliance with the NGR and NGL. Moreover, the retention of the assumption of annual updating of the DRP to reflect prevailing market conditions continues to cause the ERA's methodology to be inconsistent with the requirements of the NGR and the NGL.

78. The ERA's proposed approach in the draft decision is to compensate for the cost of debt each year based on:[26]

    a. The 5 year CGS yield at the beginning of the regulatory **period**; plus

    b. The cost of issuing 10 year debt for each regulatory **year**; less

    c. The 10 year CGS yield[27] for each regulatory **year**; plus

    d. For each **year** whichever is the lower of:

        i. 10-5 year CGS 'term spread' (i.e. 10 year CGS yield less 5 year CGS yield); or

[26] This description abstracts from the ERA's proposed 'guide rails' and other 'smoothing mechanisms' which are discussed later (i.e., implicitly assumes that they will be implemented in a present value neutral manner).

[27] The ERA actually does this in two steps – estimating the spread between 10 year corporate debt and 10 year interest rate swaps and then adding the spread between 10 year interest rate swaps and 10 year CGS.

ii. 10 to 5 year swap costs (which it provisionally puts at 16bp based on QCA precedent).

79. Consequently, there are two different calculations that the ERA is proposing to undertake (a-c plus d(i) and a-c plus d(ii)) and to choose the lower of the two.

80. Step a. is the same as in the ERA guidelines. The continued use of 5 year CGS in this step rather than the 5 year swap rate involves an implicit rejection of the advice in my March 2014 report for ATCO. In that report I advised that, if an 'on the day' approach to estimating the base rate of interest at the beginning of each regulatory period were to be retained, then the ERA should, consistent with a feasible interest rate hedging strategy, use the 5 year swap rate not the 5 year CGS rate.[28] This is also consistent with the advice of Chairmont Consulting to the ERA which is that the relevant base rate is the swap rate not the CGS rate.[29]

81. Steps b. to d. involve the estimation of a DRP that will be added to the 5 year swap rate. The adoption of a 10 year term in steps b. and c. is consistent with the advice in my March 2014 report that the benchmark efficient debt management strategy involves issuing 10 year debt.[30]

82. However, the retention of annually resetting DRP during the regulatory period equal to the prevailing DRP is inconsistent with the DRP that would actually be paid by a benchmark efficient entity managing debt in financial markets (as accepted by the ERA and Lally). I have previously indicated that this was not replicable and that the ERA should adopt, or implement a transition to, a trailing average cost of debt (at least for the DRP component of the cost of debt).[31]

83. Step d. involves a further, and quite radical, departure from the ERA's rate of return guideline. In step d. the ERA proposes to choose whichever of step d(i). or d(ii) gives the lowest cost of debt at the time. This further dramatically exacerbates the non-replicability of the ERA's approach for reasons set out in section 4.3 below.

84. There are, therefore, three key areas where the ERA's approach is not replicable by a benchmark efficient entity. These are:

- annual updates to the DRP for the entire portfolio;
- the cycling between two mutually exclusive debt management strategies; and

28 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, pp. 76-81

29 Chairmont Consulting, *Cost of Debt Comparative Analysis*, 5 November 2013, p. 5

30 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, section 3.2, Appendix B and Appendix C

31 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, Appendix D and Appendix G

- the assumption that businesses can use CGS (rather than swaps) to alter their base rate of interest.

85. I discuss each of these in turn below. In addition, despite adopting a 10 year term assumption the ERA has signalled that it may revisit this assumption in favour of a 5 year term assumption should conditions in the credit default market "return to more normal conditions". If the Commission were actually to implement this change then it would, in my view, be a further error. This is discussed in section 4.5 below.

4.2 Annual updates of the DRP

86. The ERA relies on the fact that a business can implement the hybrid debt management policy in order to justify the use of a prevailing risk free rate (as discussed in section 3.1 above). Specifically, the ERA defends the replicability of its use of a prevailing risk free rate on the basis:[32]

> *The application of a 5 year risk free rate and an allowance for costs associated with interest rate swap contracts (see paragraph 917 for the latter) replicates the efficient financing costs of a benchmark efficient entity operating in a competitive market. The benchmark efficient entity may manage refinancing risk by issuing longer term debt, but may hedge the underlying base rate by entering into 5 year swaps.*[33]
>
> *The Authority notes that this lack of replicability is predicated on the idea that the firm is unable to hedge its existing portfolio of staggered debt to reflect exactly the return on debt estimated through the on-the-day approach. The implied view is that the regulated firm must issue all of its debt in the averaging period, just prior to the regulatory period.*
>
> *However, the Authority considers that regulated firms may issue debt at any time, and may hedge the risk free rate by undertaking interest rate swaps, in order to convert to the rate that reflects the prevailing on-the-day rate adopted as the regulatory return on debt.*

87. However, the ERA does not seek to set a DRP component of the cost of debt that is also replicable. It is common ground for all submitters that a staggered debt issuance is efficient and that the DRP associated with a staggered debt issuance strategy is a trailing average of the DRP over the period that the debt issuance has been staggered. As the ERA's adviser, Chairmont Consulting, states:[34]

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32 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, pp.67-68.

33 ERA draft decision, p. 150

34 Chairmont Consulting, *Cost of Debt Comparative Analysis*, 5 November 2013, p. 27

DRP cannot be hedged. The regulatory cost of debt calculation must recognise that DRP cannot be effectively hedged because of the lack of liquid derivatives.

88. However, notwithstanding this the ERA does not propose to compensate based on an estimate of the efficiently incurred (trailing average) DRP. Instead, each year the ERA proposes to compensate solely based on the DRP prevailing at the beginning of that regulatory year. The justification given for using the prevailing DRP each year despite an efficient firm's costs being based on a trailing average are as follows:

- Resetting the DRP each year is desirable because it mimics the conditions found in competitive markets; and
- Resetting the DRP each year based on the prevailing DRP is required in order to give the regulated business the appropriate incentives to invest.

4.2.1 Resetting the DRP each year mimics conditions found in competitive markets

89. In section 3.4.2 of my March 2014 report for ATCO I was critical of the ERA's prior reasoning in favour of annual resetting of the DRP. In essence, the ERA rate of return guidelines argued against compensating on the basis of replicable debt management strategy because this would confer an artificial advantage of regulated firms relative to firms in unregulated businesses – which the ERA argued could not hedge their debt costs against their revenues.

90. The ERA draft decision repeats the same sentiments.[35]

The Authority does not accept ATCO's contention that this sets up a requirement for the regulated entity to update the cost of debt every year. As noted in the Rate of Return Guidelines, the cost of debt and the debt risk premium fluctuate for most firms in the economy on a daily basis. The Authority notes that, contrary to ATCO's consultant CEG's arguments, competitive firms do not refinance every day in order to avoid mismatch timing risk associated with daily fluctuating rates.[458] Nor would a regulated firm necessarily choose to refinance yearly in response to the annual update as, like other firms in the economy, it will be seeking to trade off refinancing risk with interest rate risk, among other things. However, the annual update approach will align the cost of debt for the regulated firm more closely with prevailing (fluctuating) rates, and with the finance costs faced by non-regulated firms, thereby reducing a potential economic distortion, improving economic efficiency.

35 ERA draft decision, p. 203

91. In the above quote the ERA attributes to me a view that I do not hold and did not express in the report that the ERA references. Specifically, I did not argue that competitive firms refinance everyday nor did the logic of my position suggest that we should observe them doing so. The ERA says that I have argued that firms facing fluctuating interest rates will refinance their debt every day in order to avoid mismatch timing risk associated with those daily fluctuations. The reference that the ERA provides in relation to this assertion is page 23 of my March 2014 report. However, on that page the argument that I make is:

> *The only circumstance in which an entity could align the DRP it pays with the ERA's proposed annual update to the DRP is if the entity relies solely on one year maturity debt (i.e., rolls over 100% of its debt each year). That is, implicitly, the ERA's implied benchmark efficient debt management strategy could be described as follows:*
>
> - *the benchmark efficient entity finances itself solely with 1 year bonds refinanced at the beginning of each regulatory year; and*
> - *the entity enters into swap contracts to lengthen the base rate exposure for its portfolio from 1 to 5 years (reset at the beginning of each regulatory period).*

92. In the next paragraph of my report I explain that this policy would result in a sub-investment grade credit rating because it would create (inefficiently) high costs associated with refinance risk. In short, I stated the opposite position to that which the ERA attributes to me – that firms will not refinance their debt using very short maturities because doing so would be inefficient. Notably, Lally makes precisely the same observations in his advice to the ERA:[36]

> *Since the ERAWA allows a DRP that reflects the rate prevailing at the beginning of each year, and firms pay the trailing average DRP, this combination of firm and regulatory policy does not satisfy the NPV = 0 principle. There is a debt policy that could be combined with this regulatory policy to satisfy the NPV = 0 principle,* ***involving borrowing annually for a one-year term*** *and using interest rate swap contracts to convert the risk-free rate component of the succession of one-year bonds into five-year debt,* ***but the resulting refinancing risk makes it unviable.*** [Emphasis added.]

93. The last sentence of the quote from the ERA repeats the view that its annual update to the DRP will *"… align the cost of debt for the regulated firm more closely with prevailing (fluctuating) rates, and with the finance costs faced by non-regulated firms, thereby reducing a potential economic distortion, improving economic efficiency*".

[36] Lally report, p. 11

94. The evidence I previously presented in section 3.4.2 and Appendix E of my March 2014 report for ATCO remains the valid response to such claims. I have extracted one part of that evidence below.[37]

> *The ERA seems to believe that in unregulated infrastructure industries prices reflect prevailing finance costs – as if the assets were 100% funded at prevailing rates. This is simply not true. The services of many unregulated infrastructure assets (e.g., uncovered gas pipelines, commercial real estate toll roads etc.) and are sold to customers on the basis of long term contracts – the prices in which do not vary based on annual variations in the level of interest rates etc.*
>
> *Even in industries where prices are reset hourly based on supply and demand these prices do not reflect short term (annual or longer) variability in interest rates. For example, oil prices are continually reset and are volatile. However, supply is a function of investments with very long lead times and these investments, once sunk, continue to produce until 'the well is empty'.[38] Volatility in annual interest costs will have little or no effect on the supply in the oil market. If anything, higher interest rates will act to suppress demand and reduce prices rather than the opposite.*
>
> *The ERA has the incorrect notion that it should set prices for gas distribution based on the prevailing cost of debt finance because this is what happens in unregulated industries. This is wrong on two counts. First, it is not what happens in other industries. Second, even if it was, that would not be a basis for imposing this feature on ATCO and its customers (and in so doing departing from Rule 87(3)).*

95. In my view the ERA's position does not reflect how prices are set outside regulated industries. The ERA is justifying its annual update of the DRP on the basis that revenues/prices received by unregulated firms fluctuate annually (or daily) with movements in interest rates. This is simply not the case.

- Many, if not most, non-regulated infrastructure investments are undertaken in the presence of long term contracts (typically negotiated prior to investment) that are akin to compensating based on a trailing average cost of debt. That is, the contract will specify a revenue/price path that is expected to recover the investors' actual costs (which will not be based on the assumption that actual costs move one for one with annual fluctuations in interest rates).
- Moreover, where investment proceeds without a long-term contract market forces do not create a scenario where revenues/prices fluctuate one for one with

37 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, pp. 87-88.

38 Or, more correctly, marginal extraction costs exceed marginal prices.

prevailing interest rates.[39] As discussed above, short term fluctuations in interest rates are more likely to cause short term prices to move in the opposite direction (to the extent demand in the economy is inversely related to the level of interest rates). Sustained increases in interest rates over an extended period can be expected to raise prices, especially for capital intensive services, but this is precisely what will be delivered by a trailing average in these conditions.

96. Even if it were the case that unregulated prices did fluctuate with short term interest rate fluctuations in the way that the ERA suggests, there would be no advantage (and there would be a positive disadvantage) to, via annual DRP updating, forcing that volatility onto investors and customers of regulated infrastructure. In this regard I repeat the advice from page 29 of my March 2014 report.

> *This logic is simply wrong as a matter of economics. The fact that a 'portfolio approach' (also described as a 'trailing average') would lead to lower costs is precisely why it should be adopted as the relevant efficient benchmark. Inexplicably, the ERA turns a virtue into a vice.*
>
> *To the extent that it is within the ERA's power to lower the risks, and therefore the costs, of service providers then the ERA should adopt that practice and, in doing so, it would promote economic efficiency.*
>
> *This would result in a cost reduction due to regulatory innovation that is just as valuable to society as a technological innovation of another kind. No economist would argue against the introduction of a technological innovation that lowered costs for industry "X" just because this would lower their costs relative to other industries who cannot have this technological innovation applied to them. Such a cost reduction does not involve a 'subsidy' nor does it create a 'distortion'. Such a cost reduction is clearly welfare enhancing 'progress' and is the primary engine of economic growth in the economy.[25]*
>
> *[Footnote 25]*
>
> *The argument made by the ERA is that it should not adopt a policy that would reduce risks and costs for regulated businesses because this cost reduction is not available to other businesses. Applying this same logic elsewhere would lead to equally absurd results. For example, it would imply that the innovation in the use of pesticides for apple orchards created an 'economic distortion' because the opportunities created were*

[39] The ERA seems to have in mind some form of 'perfectly contestable' unregulated industry where prices are set based on the costs of 'overnight' entry and exit by potential competitors. Such industries, to the extent that they exist anywhere in the economy are not the norm – and certainly don't exist in markets for large sunk infrastructure assets. Moreover, even if they did exist the relevant interest rate would be the cost of new debt at that time – not the DRP at that time plus a 5 year CGS yield estimated some time in the previous 5 years.

not available to gas pipeline investors. Gas pipeline owners are made no worse off if apple producers can innovate and reduce costs – in fact they are made better off to the extent that the price of apples fall as a result (as gas pipeline owners are also consumers). Similarly, apple orchardists are made no worse off if gas pipeline owners' risks and costs fall – in fact they are made better off to the extent that the price delivered gas falls (as are all direct and indirect consumers of energy from gas).

4.2.2 Resetting the DRP each year improves investment decisions

97. The ERA's draft decision does not explicitly state that resetting the entire DRP on the debt portfolio will improve the efficiency of investment decisions. However, the draft decision does refer back to the Rate of Return Guidelines[40] which did make that claim. In addition, the ERA also includes a quote from Lally which argues that annual resetting of the DRP will "*send superior signals to firms contemplating capex*"[41] relative to setting the DRP once every 5 years.

98. I addressed the ERA's argument in the rate of return guideline process in Appendix E of my March 2014 report for ATCO. I reproduce below a relevant extract.

…the ERA seems to be saying that annual updating is required to ensure that a regulated entity's allowance for new investment reflects their actual cost of new debt – in order to ensure that they have the correct incentives to undertake this new investment. In particular, the ERA seems to be concerned that if the allowance for the cost of debt in a particular year is higher/lower than the true cost of debt facing the entity then it will have an incentive to bias operational decisions in favour too much/too little capital intensity.

This logic, while having a plausible intuition to it, is fatally flawed. First, the nature of the regulatory regime is that, within the regulatory period, businesses do not receive an additional allowance for the cost of debt the more they invest (and vice versa). The ERA's annual update to the cost of debt will be applied to the RAB that was forecast to apply in that year at the beginning of the regulatory period.

The first time that a regulated business will receive any additional allowance for the cost of debt based on higher investment (and vice versa) will be at the beginning of the next regulatory period – and that will be based on the ERA's future risk free rate and DRP estimates. Consequently, the interest rates that feed into the allowance that is provided in the year an investment is made is irrelevant to a business's incentives to invest in

40 ERA draft decision, para 902

41 ERA draft decision, p. 203

that year. Rather, it is the expected future interest rates that will apply in the next and subsequent regulatory periods over the assets life that matter. There is no reason that an entity will expect a different level of cost of debt allowance in future regulatory periods as a result of having their cost of debt allowance updated in this regulatory period.

Secondly, the correct solution to the alleged problem would not be annual updating of the entire RAB allowance for the prevailing cost of debt. The correct solution would be to have different cost of debt allowances for different parts of the RAB depending on when those assets were invested. That is, the correct solution would be a weighted trailing average cost of debt where the weights in the trailing average are determined by the amount of investment (and refinancing of investment) in any given year. This will ensure that a business will expect to recover the efficient debt financing costs associated with its investment. Annual updating of the DRP, even though the DRP the entity pays is fixed for the life of the loan taken to finance the investment, does not ensure an expectation of efficient cost recovery. In fact, it creates the potential for precisely the kind of problem that the ERA appears to think it corrects.

Finally, actual incentives to invest in maintaining existing regulated networks are not solely, or even primarily, driven by a comparison of the entity's actual cost of debt with the expected allowed cost of debt. Rather, they are driven by the need to keep the service in operation and to meet safety and other quality of service standards. It will be economic to make such investments, and avoid the potential costs of service interruptions etc., even if the allowed cost of capital is temporarily below the actual cost of capital.

99. The ERA has not responded to this critique in the draft decision. It simply states:[42]

The merits of annually updating the debt risk premium were set out in the Rate of Return Guidelines. Those findings are supported by the recent Lally advice.

100. In this response the ERA appears to have rejected the validity or importance of my critique above. It is not possible for me to assess the basis of its position because no justification has been provided. However, because the ERA refers to Lally's advice, albeit somewhat obliquely and without elaboration. An approach to discerning the basis for the ERA's rejection is to refer back to any analysis made by Lally.

[42] ERA draft decision, para 902

4.2.2.1 Lally's position

101. Lally accepts that the financing costs of the benchmark efficient entity will be based on a trailing average DRP.[43]

> *The benchmark firm could reasonably be equated with Australian utilities, for which the average debt term from issuance is about ten years (CEG, 2013, pp. 9-10; PwC, 2013, pp. 10-11), and therefore the DRP incurred by the benchmark firm is a ten-year trailing average of the ten year DRP.*

102. However, Lally proposes an interpretation of 'commensurate with' in the ARORO to mean:[44]

> *"...no more than that the allowed rate should closely correspond on average to the rate incurred by an efficient benchmark entity over the life of the assets..."*

103. Lally argues for a deliberate departure from attempting to actually estimate and compensate based on the financing costs of the benchmark efficient entity (trailing average DRP) in any given regulatory periods because "*satisfying the NPV = 0 principle is only one of many considerations in choosing a regulatory policy*"[45] and in Lally's view annual resetting of the DRP will better promote efficient investment decisions. However, as I discuss in section 4.2.2.3 below, Lally has elsewhere expressed the view that a weighted trailing average best promotes investment incentives while also achieving the NPV=0 principle.

4.2.2.2 Capex incentives and the regulatory DRP

104. Lally addresses capex incentives in two separate places in his report:

- two paragraphs starting at the bottom of page 15 and ending at the top of page 16; and
- on pages 19 and 20.

105. This provides, in my view, a very brief and insubstantial discussion of investment incentives given that Lally relies on this analysis to recommend a departure from compensating based on the best estimate of the benchmark efficient entity's financing costs over the regulatory period.

106. Lally argues that a trailing average DRP will commonly be different to the prevailing DRP and that, therefore, a business undertaking capex in a given year will be

43 Lally report, pp. 11-12

44 Lally report, p. 22

45 Lally report, p. 3

deterred from investing (if the trailing average is below the prevailing level) or will be incentivised to over invest (if the trailing average is above the prevailing level). Lally's observations are capable of drawing a reader to conclude, wrongly, that annual resetting of the DRP will give the appropriate incentives because the business will be compensated based on the prevailing DRP at the time the investment is undertaken. However, Lally does not explicitly state that this is the case and, in other reports, Lally has advised that a weighted trailing average will give the appropriate incentives – as discussed in section 4.2.2.3 below.

107. It is relatively straightforward to see why annual resetting of the DRP to fully reflect prevailing rates does not ensure an incentive to invest. The allowed cost of debt will play a role in providing capex incentives in a very simple way. Consider a single incremental investment in a 40 year asset financed with 10 year debt. 10 year debt is raised at the time of the investment. It must then be refinanced three times over the life of the asset.[46] Clearly, the investor's DRP associated with that investment will be:

    a. the DRP at the time it is made and this DRP will be unchanged over the life of the initial bond (10 years); and

    b. the DRP prevailing at the time the debt is refinanced 10 years later which will also remain fixed for 10 years and so on.

108. An investor will have an incentive to make the investment if they *expect* the regulatory DRP over the next 40 years to match their actual DRP.

109. The question at hand is whether annually updating the DRP (so that only the prevailing DRP is applied in each regulatory year) will ensure that investors expect to earn a regulatory DRP equal to their actual DRP on a new investment. The answer to this question is clearly "no". (This is true even putting aside the facts discussed in the next section which demonstrate that it is only the DRP in subsequent regulatory periods that play *any* role in incentives to invest.)

110. On average, the allowed cost of debt during the year an investment is made would only be earned for an average of 6 months.[47] Under the ERA approach it would then be reset in the next year (and every year thereafter). On a long lived infrastructure asset of, say, 40 years, the allowed return in the first 6 months is of trivial importance compared to the expected allowed return over the remaining 39.5 years.

111. Consider investments being appraised in a period when the DRP is expected to fall. Updating the prevailing DRP each year will discourage investments to be made

46 The amount of refinance will diminish over time if there is return of capital and if it is assumed that a constant gearing is maintained.

47 Assuming that investments occur evenly throughout the year.

because investors will expect the compensation that they receive will fall below their actual DRP (which will be set at the time of investment for the next 10 years).

112. What matters to investors is an expectation that, on average over the life of the assets, they will receive a regulatory DRP that is consistent with their actual DRP. Annual updating of the DRP does not ensure that this is the case. However, this expectation can be ensured via the adoption of a trailing average DRP. Consider a firm refinancing 10% of its regulatory asset base in a given year. The firm will know that the DRP associated with its investment in that year will enter the trailing average with a 10% weight and will remain in the trailing average for the next 10 years with that same weight (i.e., the period it will be paying the DRP on 10 year debt issued in that year). The operation of a trailing average provides the appropriate level of compensation that the firm requires for an investment in that year. This is in stark contrast to annual updates of the DRP which provide the 'right'[48] level of compensation on that debt for around 6 months and could ultimately provide any level of compensation in the future and certainly a level of compensation which is significantly different from actual costs.

113. If the capital expenditure program is such that there is not a smooth 10% refinancing of the RAB each year then a weighted trailing average could be used to give the same effect. This is discussed in section 4.2.2.3 below.

4.2.2.3 Lally does not address a weighted trailing average

114. Lally does not address at all my statement at page 84 of my March 2014 report for ATCO that:

> *...the correct solution to the alleged problem would not be annual updating of the entire RAB allowance for the prevailing cost of debt. The correct solution would be to have different cost of debt allowances for different parts of the RAB depending on when those assets were invested.* ***That is, the correct solution would be a weighted trailing average cost of debt where the weights in the trailing average are determined by the amount of investment (and refinancing of investment) in any given year.*** *This will ensure that a business will expect to recover the efficient debt financing costs associated with its investment. Annual updating of the DRP, even though the DRP the entity pays is fixed for the life of the loan taken to finance the investment, does not ensure an expectation of efficient cost recovery. In fact, it creates the potential for precisely the kind of problem that the ERA appears to think it corrects.*

[48] And, by definition, the wrong level of compensation on debt raised earlier at different rates.

115. The omission of any discussion of this point is notable given that, elsewhere, Lally has recognised that a weighted trailing average DRP would solve the problems he is alleging exists with a simple trailing average DRP.[49]

> *Fourthly, if a trailing average regime is adopted for either the DRP or the entire cost of debt, application of the trailing average to both new debt to support capex and new debt arising from new entrants to an industry as well as existing debt has the disadvantage of discouraging capex and new entrants when the prevailing cost of debt is above the trailing average and improperly encouraging them when the prevailing cost of debt is below the trailing average. These problems can be eliminated by applying the prevailing rate to both new debt arising from capex and new entrants, and then gradually adjusting the rate towards the trailing average in the manner proposed by the QTC, but this adds to the complexity of the trailing average regime.*

116. Lally makes the same observation in another paper which discusses the use of a trailing average DRP:[50]

> *These problems could be addressed by applying the prevailing rate to new debt arising from both capex and new entrants, and then gradually adjusting the rate towards the trailing average. Furthermore, the QTC (2013b, section 2) demonstrates how this might be undertaken. However this adds to the complexity of the regime, and therefore to the ease with which it can be understood.*

117. Although I raised this issue in my own advice which he was asked to review, Lally did not provide the same advice on this issue to the ERA. However, on the basis of his advice to the Queensland Competition Authority and the New Zealand Commerce Commission it would appear that Lally agrees with me that the solution to a perceived problem of an uneven capital expenditure program is a weighted trailing average, and not an annual update to the full DRP to reflect prevailing market conditions.

118. In reports for the Queensland Competition Authority and the New Zealand Commission Commission quoted above, Lally considers that this comes with a downside in the form of "added complexity". However, this "added complexity" is, in reality, a very simple adding up problem which is no more complicated (and actually less complicated) than other aspects of building block models (such as the

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49 Lally, *The Trailing Average Cost of Debt*, March 2014, p. 4.

50 Lally, *Review Of Submissions on the Cost Of Debt and the TAMRP for UCLL and UBA Services*, June 2014

PTRM). Indeed, Appendix B of the QTC (Queensland Treasury Corporation) report that Lally refers to above steps through how this can be done.[51]

119. This is important because in Lally's report for the ERA he states: [52]

> *Furthermore, even if the wording of rule 87(3) were interpreted to mean close correspondence between the allowed and incurred costs over even short periods, CEG's preferred policy of a trailing average DRP would fail that test for intra-cycle capex (as discussed earlier in this section); in that case, none of the policies under discussion would satisfy rule 87(3).*

120. Lally is stating here that if Rule 87(3) is interpreted in the manner suggested by me (which is that efficient financing costs should be based on the costs of an efficient debt management strategy) then:

- it does require a trailing average concept to be used; but
- this comes with negative consequences for "intra cycle" capex incentives; therefore
- 87(3), as interpreted by me, cannot be satisfied (or at least not without negative consequences for capex incentives).

121. Putting aside the disagreement I have Lally with regarding investment incentives under simple trailing average vs annual updates, Lally does not advice the ERA of the solution to the purported problem with a simple trailing average – namely a weighted trailing average. Instead, Lally invites the reader, assuming that they accept his position on annual updating and capex incentives, to conclude that 87(3) should not be interpreted in the way that I have.

122. However, consistent with Lally's advice to other regulators it would appear that Lally is of the view that a close correspondence between the allowed and incurred costs over even short periods such as a regulatory cycle can be achieved via the adoption of a weighted trailing average DRP. This will more closely align regulatory compensation with actual the actual trailing average DRP incurred by a firm and, hence, will better promote investment incentives. However, it should be noted that this would require an Excel spreadsheet to be developed within the regulator's cost model to calculate the weights. The addition of this Excel spreadsheet will add to the complexity of the model and therefore to the ease with which it can be understood. However, it need not be more complex than other components of the regulatory cost model (such as the modelling of tax, depreciation, RAB roll forward etc.).

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51 QTC, *Submission to the Draft Rate of Return Guideline*, October 2013.

52 Lally, *The Trailing Average Cost of Debt*, March 2014, p. 22

123. Calculating a weighted trailing average DRP is not complex to model on a forward-looking basis. Suppose that an initial RAB of a regulated business consists of 10 year debt staggered so as to expire evenly across a 10 year period. That is, the starting position is a simple trailing average. However, let the business have a significant net capital expenditure requirement in a given year such that the RAB will grow. This simply means that the weight of that year in future trailing averages should be higher.

124. If the business finances the increase in the RAB with debt that is, on average, 10 year maturity but is itself staggered[53] then a smoothly staggered refinance profile will continue to be maintained in the future.

- the DRP on financing (and refinancing) the pre-existing RAB is simply the trailing average 10 year cost of debt over the last 10 years; and
- the cost of debt on each 'vintage' of *change in RAB* from the pre-existing level is modelled as a transition from the initial staggered debt raising (of, say, 6 to 14 years maturity) at the time of the change in RAB back to a trailing average 10 year cost of debt (the same as the pre-existing RAB). The transition is straightforward to model - as each tranche of the staggered (initial 6-14 year) debt expires and is replaced with 10 year debt. At which point that tranche of change in RAB can simply be treated the same as the pre-existing RAB.

125. The weighted trailing average cost of debt in any year is then simply the average across the cost of debt for the RAB and subsequent changes in RAB, weighted by the associated RAB amount.

4.2.2.4 Lally misstates the way the regulatory regime operates

126. When Lally first introduces the issue of investment incentives the extent of his analysis of those incentives is encapsulated in the sentence below.[54]

> *If the regulator uses the DRP at the beginning of the cycle, and the prevailing DRP is above that at the beginning of the cycle, firms may defer capex; if the prevailing DRP is above [sic] that at the beginning of the cycle, firms may undertake capex that is inefficient.*

127. In this passage, and the numerical example that follows it, Lally proceeds 'as if' the regulated firm receives compensation for the cost of debt based on its actual capex during each regulatory year. My understanding is that this is not the case (as I outlined in my critique of the ERA's logic set out in the explanatory statement to the Rate of Return Guidelines – reproduced above). The standard mechanics of

53 For example, the business finances the increase in the RAB with debt ranging from 6 to 14 year debt.

54 Lally, M., *The Cost of Debt*, 27 August 2014, p. 15

regulatory arrangements are such that the cost of debt estimate in a given year is applied to the forecast RAB, which depends on the capex forecast to occur in that year not the actual capex in that year. The relevant forecast is made prior to the beginning of the regulatory period.[55]

128. It follows that the cost of debt allowance in the year a capex decision is being made will have no direct impact on the incentive to make that capex. Whatever the cost of debt allowance is, it will be applied to the same (forecast) RAB - irrespective of how much or how little capex that the firm spends in that year. This is because the forecast RAB in the regulatory cost model is not updated based the actual amount of capex during the regulatory period. This design of the regulatory arrangements gives a business an incentive to spend as little capex as is possible, subject to meeting safety and reliability standards, and is a key element the incentive regulation framework.

129. This means that incentives for investment:

- do not depend on the regulatory allowance for the cost of debt *at the time an investment decision is taken*; but
- do depend on the *expected* regulatory allowance in *future* regulatory periods. This is because it is only in future regulatory periods that actual expenditure will enter the RAB against which the cost of debt allowance is applied.

130. Annually resetting the DRP to be equal to the prevailing rate has no benefit in encouraging marginal investment decisions. What is important for investment decisions in year "n" is not the allowed rate of return in year "n" but the expected allowed rate of return in subsequent regulatory periods over the life of the investment.

131. Lally addresses the above points on pages 19 and 20 – after he has already concluded that annual resetting of the DRP promotes efficient investment. On page 19 Lally accepts the validity of the position that I outline but qualifies them on the basis that:[56]

> *CEG (2014, paras 294-302) argues that the failure to adopt annual DRP resetting does not pervert capex incentives because additional capex will not receive any additional cost of capital compensation until the beginning of the next regulatory cycle, at which point the prevailing DRP will be received under either annual or cycle beginning DRP resetting. Instead,*

55 This is my understanding of the approach set out in the ERA's Gas Access Arrangement Guideline, 10 March 2014. In particular, I note that the RAB roll-forward provisions set out at paragraph 163 are consistent with my interpretation in that no attempt is made to claw back the present value of any gains/losses accruing within the regulatory period due to the fact that the business has incurred lower/higher than forecast capital expenditure.

56 Lally, M., *The Cost of Debt*, 27 August 2014, p. 19

> *CEG argues that incentives relate to compensation over the entire life of the asset. These arguments relate to the possibility of the firm undertaking* ***unscheduled capex*** *during the cycle, and the claim that there is no cost of capital compensation until the beginning of the next regulatory cycle is not true in respect of* ***some electricity investments****. For example, ERAWA (2014, section 7.3) explicitly provides for ex-post cost of capital compensation for some unscheduled investments from the time of the capex, including the cost of capital. If compensation is based upon the DRP at the beginning of the cycle rather than the current DRP, this capex may be deferred by firms until the end of the current cycle (up to five years). In addition, CEG's argument does not address the possibility of* ***scheduled intra-cycle capex*** *being deferred by firms because the DRP prevailing at the scheduled time of the capex is below the compensation offered when the DRP is reset at the beginning of the cycle (up to five years before).*

132. The distinction that Lally draws between "unscheduled capex" and "scheduled intra-cycle capex" is unfounded. The logic and arguments that I presented and which Lally is critiquing apply to the full set of all capex.

133. It is possible that by "unscheduled capex" Lally means capex that is higher than was forecast at the beginning of the regulatory period and by "scheduled intra-cycle capex" Lally means forecast capex. However, this is not a meaningful distinction in the context of my analysis. My point is that the level of actual capex (whether it is above or below the forecast level) does not affect revenues during the regulatory period it occurs. Therefore, resetting the allowance for the cost of debt each year of a regulatory period to reflect prevailing rates will not have any effect on the incentive to invest during that regulatory period. A rational business will focus only on the expected return allowed in future regulatory periods.

134. Lally suggests that my criticisms might apply with less force in the electricity transmission and distribution sector. However, this is not relevant to the current context of regulation of gas distribution.

4.2.2.5 Lally mischaracterisations

135. Lally states:[57]

> ***Remarkably****, CEG finishes its discussion of this issue by* ***acknowledging*** *that the allowed cost of capital under a trailing average (or DRP resetting at cycle beginning) would in a case like the above be "temporarily below the actual cost of capital" and therefore invokes quality of service standards to explain why a firm would not be discouraged from undertaking capex at the contemplated time under such*

57 Lally, M., *The Cost of Debt*, 27 August 2014, p. 20

> *conditions (CEG, 2014, para 302). This would seem to constitute a clear acceptance of the incentive problem regarding capex when the DRP is not reset annually.*
>
> ***Notwithstanding this acceptance of the incentive problem at the time capex is contemplated …*** [Emphasis added.]

136. In my report I stated:

> *Finally, actual incentives to invest in maintaining existing regulated networks are not solely, or even primarily, driven by a comparison of the entity's actual cost of debt with the* ***expected*** *allowed cost of debt. Rather, they are driven by the need to keep the service in operation and to meet safety and other quality of service standards. It will be economic to make such investments, and avoid the potential costs of service interruptions etc.,* ***even if*** *the allowed cost of capital is temporarily below the actual cost of capital.* [Emphasis added.]

137. Contrary to Lally's assertions, this passage did not acknowledge that the allowed cost of capital under a trailing average would be "temporarily below the actual cost of capital" in the scenario Lally hypothesises. My paragraph is consistent with my view, clearly stated in preceding paragraphs, that it is the allowed cost of debt *expected* in future regulatory periods that defines the impact of the allowed cost of debt on incentives to invest. The last sentence of this paragraph simply states the obvious that, *even if* (for whatever reason) it was the case that expected future regulatory cost of capital were below investors required return they may still invest in order to avoid other costs that might result from underinvestment. This paragraph does not 'acknowledge' or 'accept' the veracity of 'the incentive problem at the time capex is contemplated'.

4.2.3 Resetting the DRP each year is inconsistent with the NPV=0 principle

138. The ERA makes repeated reference to achieving the "NPV=0" principle as an objective of its decision making:[58]

> *The Authority maintains its view set in the Rate of Return Guidelines that the 'NPV=0' present value principle is an important consideration for determining its approach to estimating both the return on equity and the cost of debt.*

139. Lally has advised the ERA that the only way that the NPV=0 principle can be achieved is if a trailing average DRP is adopted (given that it is impossible to alter

[58] ERA draft decision, p. 204. See also pp. 149, 188, 199, 202 and 414.

the term of DRP and given that staggered debt issuance is efficient). Three separate quotes below illustrate this advice:[59]

> *Whether one engages in annual updating or updating only at the beginning of each regulatory cycle, one cannot perfectly satisfy the NPV = 0 principle because firms are paying the trailing average DRP (due to staggering their borrowing and the inability to hedge the difference) and it is not viable for them to act otherwise.*
>
> *Satisfying the NPV = 0 principle would require use of a ten-year trailing average of that DRP…*
>
> *Since the ERAWA allows a DRP that reflects the rate prevailing at the beginning of each year, and firms pay the trailing average DRP, this combination of firm and regulatory policy does not satisfy the NPV = 0 principle.*

140. I concur with Lally's views quoted above.

141. However, Lally advises the ERA that satisfying the NPV=0 principle is only one of many considerations in choosing regulatory policy and that the NPV=0 principle can be approximated over time by annual updating of the DRP (provided a 10 year DRP is used).[60] The primary 'other consideration' that Lally refers to is capex incentives (which I discuss in section 4.2.2 above). Lally essentially justifies a departure from the NPV=0 principle because this is necessary to promote investment incentives.[61]

142. Lally further asserts that annual resetting of the DRP will result in a 'trivial' departure from the NPV=0 principle.

> *"Applying these criteria to the issue of updating the DRP annually or only at the beginning of the cycle, both approaches fail to satisfy the NPV = 0 principle, but only trivially providing that the ten-year DRP is used…"*[62]

143. This claim is repeated several times by Lally in his report.[63] However, the empirical justification for this claim is not at all clear. Lally provides in Appendix 1 an

59 Lally report, p. 14, 13 and 3 respectively.

60 Lally report, p. 3

61 As set out in section 4.2.2, I disagree with Lally's conclusion that resetting the DRP each year gives rise to better incentives than a simple trailing average and, even Lally agrees, that a weighted trailing average gives rise to better incentives.

62 Lally report, p. 24

63 Lally report, pp. 18, 21 and 24

empirical analysis which he claims shows 'bankruptcy risk' is not raised significantly by the adoption of annual resetting of DRP rather than a trailing average DRP.

144. I consider that the numbers used by Lally in Appendix 1 are problematic. However, even putting these problems aside, the analysis in Lally's Appendix 1 does not demonstrate a trivial departure from the NPV=0 principle. The analysis is focussed on bankruptcy risk – which is not the same as whether the NPV=0 principle is approximated. Lally's conclusion in that appendix is as follows:[64]

> *In summary, regardless of whether the regulator resets the DRP annually or at the beginning of the regulatory cycle, there will be years under some regulatory cycles in which* ***the allowed DRP is significantly below the trailing average paid by the firm****. However this is cushioned by the cash flow arising from the allowed cost of equity (which is negatively correlated with the DRP), accumulated profits from earlier favourable discrepancies between the allowed and incurred DRPs, and other activities by the firm (including regulated activities subject to different cycles). The effect of these cushions is that the adverse DRP shocks would not generate a significant risk of bankruptcy.* [Emphasis added.]

145. In this passage, Lally concludes that in some periods the difference between the allowed DRP and the actual DRP paid, based on the trailing average DRP, will be "significant". Lally estimates that the largest difference in his sample is a 2.75% (trailing average) DRP paid by the firm in a scenario where the firm receives a prevailing DRP of 1.3%.[65] This means that the departure from the NPV=0 principle will be equally "significant".

146. However, Lally argues that when the allowed DRP is materially below the actual (trailing average DRP) the risk free rate and the cost of equity tends (in Lally's sample) to be higher than usual – meaning that the firm can absorb the resulting cash-flow losses without a significant increase in bankruptcy risk. This may, or may not be, a valid observation when substantiating the impact on bankruptcy risk of departures from the NPV=0 principle but it is not a basis to conclude that a departure from the NPV=0 principle is 'trivial'.

147. Indeed, a regulator may be able to permanently set the DRP at 70% of the actual DRP and the regulated business may be able permanently to absorb that loss in lower equity returns (dividends) without going bankrupt. However, this does not mean the departure from the NPV=0 principle is trivial.

148. Moreover, I note that Lally does not use the term 'trivial' to describe the impact on bankruptcy risk in Appendix I. This term is only used in the body of the report to

64 Lally report, p. 28

65 Lally report, p. 27

describe the empirical results he presents. He does, however, use the term 'not trivial' to describe one of the modelled shocks that results from not adopting a trailing average:66

> *…the highest bankruptcy risk occurs when these values coincide, which they do in 2017. The result is an adverse cash flow of $0.87 (the DRP differential on $60 of debt), which reduces the NCF of the business by 23%.* ***This is not a trivial shock****.* [Emphasis added.]

149. Lally does not explain how he gets from this conclusion in Appendix I to his conclusions in the body of the report that the impact of not adopting a trailing average DRP is "trivial" on both bankruptcy risk and the achievement of the NPV=0 objective.

150. Moreover, Lally uses an idiosyncratic data set in his Appendix 1 – which he describes as an amalgam of annual DRP values reported by the AER seemingly for years 2005 to 2011 and QCA estimates for the period 2000-2013. Specifically, Lally states:[67]

> *I have therefore drawn upon the Bloomberg BBB ten-year series from 2005-2011 (AER, 2011, Figure A.6) supplemented with data for regulated utilities provided by the QCA for the period 2000-2013, as shown in Lally (2014, Table 1) and reproduced in the first two columns of Table 1 below.*

151. I examined the reference to Lally 2014 for a description and further source of the QCA data used but was unable to find a reference or the actual numbers clearly reported. Rather, Lally once more states:[68]

> *I have drawn upon the Bloomberg BBB ten-year series from 2005-2011 (AER, 2011, Figure A.6) supplemented with data for regulated utilities provided by the QCA for the period 2000-2013.*

152. There is no reference provided to a QCA document or report and nor is there any QCA publication listed on page 52 of that report.

153. By contrast, in Figure 5 below I show the RBA's estimate of the DRP on 10 year debt and the trailing average associated with that.[69] I also illustrate the past DRP

66 Lally report, p. 27

67 Lally report, p. 26

68 Lally, *The Trailing Average Cost of Debt*, 19 March 2014, p. 21

69 Where the trailing average requires data prior to January 2005 (the first date on which RBA data is available) I use the Bloomberg BBB fair value curve. Prior to December 2001 (when Bloomberg data is first available) I assume that the DRP was the same as its value in December 2001. The Bloomberg and RBA DRP is also extrapolated to 10 years using the methodology described in Appendix A.

decisions made by the ERA for the Mid-West and South-West Gas Distribution System (all DRPs are in spread to CGS form for the purposes of like for like comparison). The DRPs up to October 2014 are actual DRP. However, I have projected the DRP's out into the future by assuming that the RBA's estimate of the 10 year BBB yields remains constant at October 2014 levels but that CGS yields move as predicted by the shape of the yield curve at the time of writing. This results in a gradual downward trend in DRP back to the same levels estimated in 2005.

Figure 5: Prevailing and trailing average DRP based on RBA BBB data

Source: RBA data, CEG analysis

154. The following observations are pertinent:

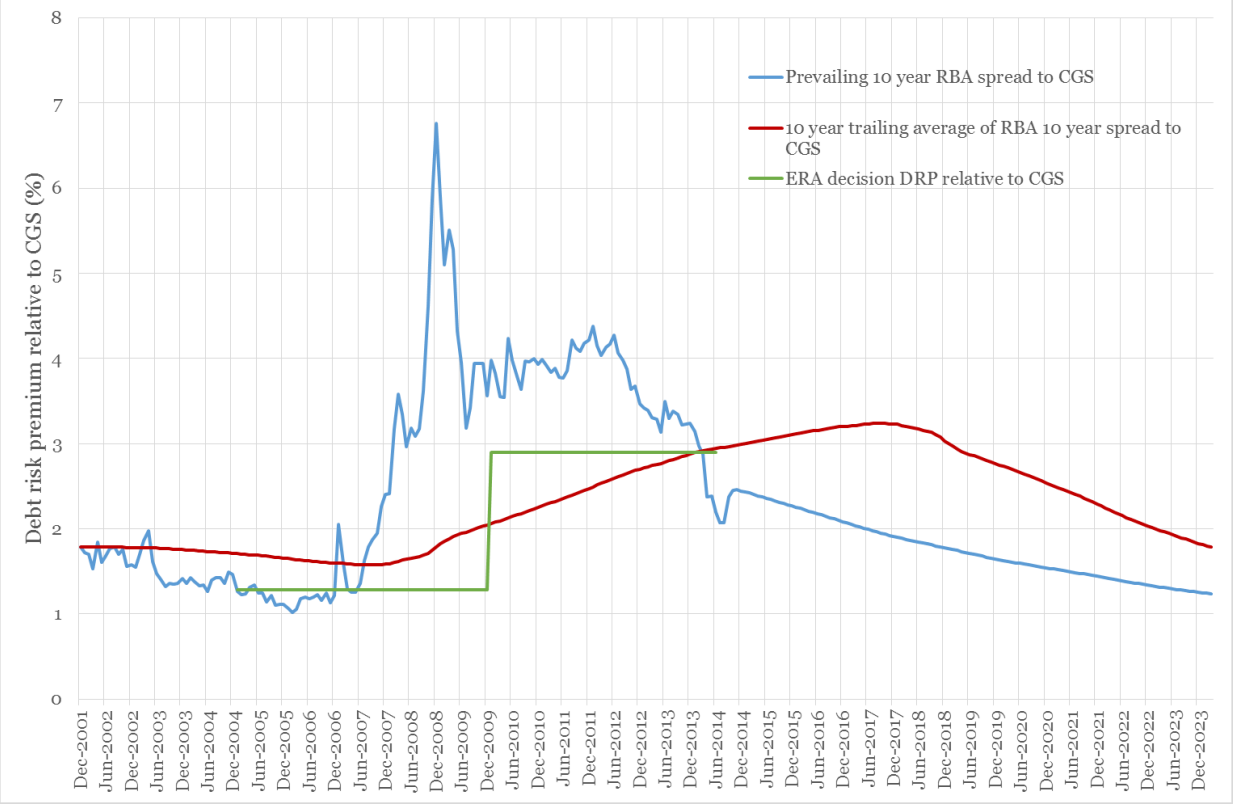
- the difference between the prevailing and trailing average DRP as at October 2014 was 0.56%;
- this is projected to steadily rise to a peak of 1.32% in December 2017 before gradually closing;
- however, the gap is still substantial over the subsequent 10 years – and remains above 0.5% in November 2024.

155. Moreover, looking backwards in time to earlier regulatory periods it is apparent that the Mid-West and South-West Gas Distribution System's allowed DRP has, on

average, been below the trailing average DRP over the last ten years. Therefore, it cannot be argued that "*accumulated profits from earlier favourable discrepancies between the allowed and incurred DRPs*" are relevant in the current context as Lally seems to suggest that they might be.[70]

156. I also note that this analysis does not depend on the use of the RBA BBB data series. When I apply the same methodology but take an average of the RBA and Bloomberg BBB DRPs extrapolated 10 years I get the results shown in Figure 5. This shows a slightly larger projected gap between trailing average and prevailing DRPs (reaching a peak of 1.33% rather than 1.32%).

Figure 6: Prevailing and trailing average DRP based on average of RBA and Bloomberg BBB data



Source: Bloomberg and RBA data, CEG analysis

[70] Lally report, p. 28

4.3 Cycling between mutually exclusive debt management strategies

157. It is useful to repeat the ERA's proposed approach to estimating the cost of debt as set out at paragraph 78 above. The ERA's proposed approach is to compensate for the cost of debt each year based on:[71]

    a. The 5 year CGS yield at the beginning of the regulatory **period**; plus

    b. The cost of issuing 10 year debt for each regulatory **year**; less

    c. The 10 year CGS yield[72] for each regulatory **year**; plus

    d. For each **year** whichever is the lower of:

        i. 10-5 year CGS 'term spread' (i.e. 10 year CGS yield less 5 year CGS yield); or

        ii. 10 to 5 year swap costs (which it provisionally puts at 16bp based on QCA precedent).

158. The focus of this section is on step d. There are two different calculations that the ERA is proposing to undertake (a-c plus d(i) and a-c plus d(ii)) and to choose the lower of the two. The ERA describes this approach in the following way: [73]

> *The Authority will review the relative costs of the two approaches prior to the final decision, and select the lowest cost option available at that time. The Authority views this comparison of expected swap costs to the expected term spread as a key step in determining the regulated rate of return. The comparison is consistent with the steps that would be taken in any efficient industry debt management practice.*

159. The ERA is unclear as to whether it proposes to perform this comparison:

- every year; or
- once at the beginning of the regulatory period and:
    - if the expected term spread is less than the transaction costs associated with swaps then the cost of debt will be set based on the 10 year cost of debt

---

71 This description abstracts from the ERA's proposed 'guide rails' and other 'smoothing mechanisms' which are discussed later (i.e., implicitly assumes that they will be implemented in a present value neutral manner).

72 The ERA actually does this in two steps – estimating the spread between 10 year corporate debt and 10 year interest rate swaps and then adding the spread between 10 year interest rate swaps and 10 year CGS.

73 ERA draft decision, p. 201

at that time and will be locked in for the next 5 years (i.e., there is no future comparison and no DRP updating during that period); or

- if the expected term spread is greater than the transaction costs associated with swaps then the cost of debt will be set based on the 5 year risk free rate plus the 10 year DRP plus swap transaction costs and the 5 year risk free rate is 'locked in' and the DRP annually updated each year of the regulatory period.[74]

160. In what follows I examine the implications for replicability under either approach.

4.3.1 If the ERA makes this comparison every year

161. If the ERA makes this comparison every year then the resulting allowance is not replicable because it involves switching between two mutually inconsistent debt management strategies. In order to lock in a 5 year risk free rate at the beginning of the regulatory period the business must commit to a swap strategy that does just that – locks in the 5 year risk free rate. As a result, it must commit to incurring the transaction costs associated with that strategy and it must accept the base interest rate it has locked in.

162. If, in the middle of the regulatory period, the ERA determines that a lower cost of debt can be achieved by locking in the 10 year cost of debt the business cannot costlessly undo the swap contracts. It cannot avoid the transaction costs it has already incurred and it cannot costlessly convert its base rate exposure from the 5 year rate applying at the beginning of the regulatory period to the 10 year rate applying in that particular year. Moreover, if the ERA then decides in the following year to set compensation based on the 5 year base rate the business cannot costlessly convert its debt exposure back to be consistent with this.

4.3.2 If the ERA makes this comparison once at the beginning of each regulatory period

163. Alternatively, it may be that the ERA is proposing to perform the comparison only at the beginning of the regulatory period and for the comparison at that time to lock in one or the other approach over the regulatory period.

164. This is not replicable for the same reasons as discussed above. In order for a business to have the option to implement a swap strategy that locks in the five year rate for five years, its base rate exposure must be 100% floating at the beginning of the year. That is, in order to have the option of 'locking in' the 5 year risk free rate at the beginning of the regulatory period, a business must have already entered into

74 Or, more precisely, revenues are adjusted in the next regulatory period to deliver the same present value compensation would have occurred if the DRP was annually updated (see section 4.6 below for discussion of the ERA's proposed mechanism in this regard).

historical swap contracts that give rise to a 100% floating base rate exposure at the beginning of the regulatory period (see section 3.2 above). It cannot avoid the transaction costs incurred in entering those swap contracts.

165. Moreover, the business must enter into a further set of swap contracts – even if the ERA decides that the 'efficient' outcome is not to enter into swaps (even if it decides that the costs in "d(i)" are less than the costs in "d(ii)"). In that circumstance the ERA will simply compensate based on the 10 year cost of debt prevailing at the beginning of the regulatory period. In order for a business to hedge its base rate of interest (which is 100% floating prior to the ERA making its decision) the business would need to take out a 10 year swap contract (pay fixed and receive floating).

166. Consequently, it would incur all of the transaction costs that the ERA is assuming can be avoided in the calculation of costs under step "d(i)". The only way these swap costs can be avoided is if the business commits to a strategy that never uses swaps. In which case, its costs will be based solely on the 10 year cost of debt (and, in reality, the trailing average of such costs).

167. However, if a business avoids these transaction costs associated with swaps it will not have a floating rate exposure at the beginning of the regulatory period. Consequently, it cannot then use swaps in order to lock in the prevailing 5 year base interest exposure at the beginning of the regulatory period if the ERA determines that that is the 'least cost' outcome.

168. In proposing the comparison and the choice of the 'least cost' option, ERA is incorrectly assuming that an efficient business can be in a position to implement two mutually exclusive debt management strategies at the same time. They are mutually exclusive in the sense that having adopted one strategy in the past it is not possible to implement the other without a period of transition (a 10 year period of transition if 10 year debt is issued).

169. The ERA is proposing to choose between two different debt management strategies (one using swaps and one not using swaps) depending on which one gives the lower cost of debt today (i.e., at the beginning of the regulatory period) despite the fact that a business would need to have 'locked into' one or the other strategy well before today. Consequently, not only is this aspect of the ERA's decision not replicable, it will also clearly underestimate the business' actual cost of debt over time. That is, an efficient business can at best break even (if the ERA always chose the same strategy and if the business happened to adopt that strategy) but will expect to lose (i.e., at some point the ERA will compensate based on a different strategy which has lower costs at that time).

170. Moreover, the ERA's approach would necessarily be inconsistent across regulatory periods. For example, compensating within "regulatory period n" on the basis of a business issuing 10 year debt without a swap overlay at the beginning of that period but then, 5 years later, in "regulatory period n+1", ignoring the fact that, if the

business had done this, they would still have the same cost of debt as in period n. That is, if a business locks in a 10 year cost of debt at the beginning of a 5 year regulatory period without a swap overlay then it will still have the same cost of debt locked in for the next regulatory period.

4.3.3 Application of this step in the draft decision

171. The ERA estimates the expected term spread to be 33bp.[75] This is lower than the actual term credit spread which can be derived from the RBA publication of 47bp prevailing in the period the ERA used for its indicative costings [76]

172. In order to estimate swap transaction costs the ERA references a report by Evans and Peck for the QCA in 2013 which would imply a 16 bppa transaction costs associated with swaps.[77] The ERA seemingly endorses the Evans and Peck methodology in that it states that it is "*…of the view that a similar, but more up to date analysis that includes all costs involved in a benchmark swap must be undertaken..*"[78] However, the ERA goes onto state:[79]

> *However, the Authority is still working to develop a robust, up to date estimate of the swaps cost approach.*
>
> *For the purposes of this draft decision the Authority will therefore adopt the expected term spread in place of the swap costs approach.*

173. The logic for the adoption of what the ERA calls "the expected term spread" is not obvious to me. The ERA has provided an estimate of the expected term spread that is double its (albeit) preliminary estimate of the costs of swap transactions. Nonetheless, the ERA chooses the cost of debt associated with the higher of these.

174. Unless the ERA expects its estimate of swap transaction costs to be more than double those implied by Evans and Peck, the ERA's draft decision gives rise to a potentially misleading indication of the level of compensation its methodology will actually deliver. For example, if the ERA confirmed its preliminary estimate of 16 bppa for the costs of swaps then application of its actual methodology would, as I understand its approach, result in an allowance that was around 47 bppa - 16 bppa = 31 bppa lower than reported in the draft decision.

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75 ERA draft decision, p. 419

76 RBA, *F3 Aggregate Measures Of Australian Corporate Bond Spreads And Yields: Non-Financial Corporate (Nfc) Bonds*. The last day of August 2014 is closest to the ERA's 7 September observation for estimating the five year risk free rate of 2.95% (see draft decision, p. 202).

77 Evans and Peck, *SEQ Retail Water Price Review*, 4 February 2013

78 ERA draft decision, p. 419

79 ERA draft decision, p. 419

4.4 Use of CGS rather than swaps

175. The hybrid debt management strategy (explained in 3.2) results in a total portfolio cost of debt that is equal to:

$$Costs = Swap^{5}_{Prevailing} + Corp.Yield^{10}_{TA} - Swap^{10}_{TA} + Trans.costs \quad (1)$$

where

$Swap^{5}_{Prevailing}$= the 5 year swap rate prevailing at the beginning of the regulatory period;

$Corp.Yield^{10}_{TA}$ = the trailing average of 10 year corporate debt yields; and

$Swap^{10}_{TA}$ = the trailing average of 10 year swap rates.

176. However, the ERA's proposed allowance (in the scenario where it determines to assume swap contracts are undertaken is given by:

$$Costs = CGS^{5}_{Prevailing} + Corp.Yield^{10}_{Prevailing} - CGS^{10}_{Prevailing} + Trans.costs \quad (2)$$

177. In the above formula the ERA has substituted yields on CGS for swap rates. (The ERA has also made all rates in the formula prevailing – but I have discussed the implications of this already.

178. The ERA does not justify the use of CGS rather than swap yields in its construction of the cost of debt. It is common ground between the ERA and its own experts that swap contracts are used to hedge interest rate risk and, therefore, the best estimate of the costs of such hedging is to use the rates that would actually be contracted (swap rates).[80]

179. The ERA acknowledges that it is assuming that the benchmark efficient debt management strategy is to trade in swaps, the effect of which is that the cost of debt would be determined by swap rates not CGS rates. Indeed, the ERA explicitly states that it will compensate for the transaction costs associated with entering into swaps.[81]

180. The ERA presents its cost of debt 'build up' 'as if' it is using swap rates but the nature of its construction is that these cancel out. Specifically, consider the columns in Figure 31 of the draft decision reproduced below.

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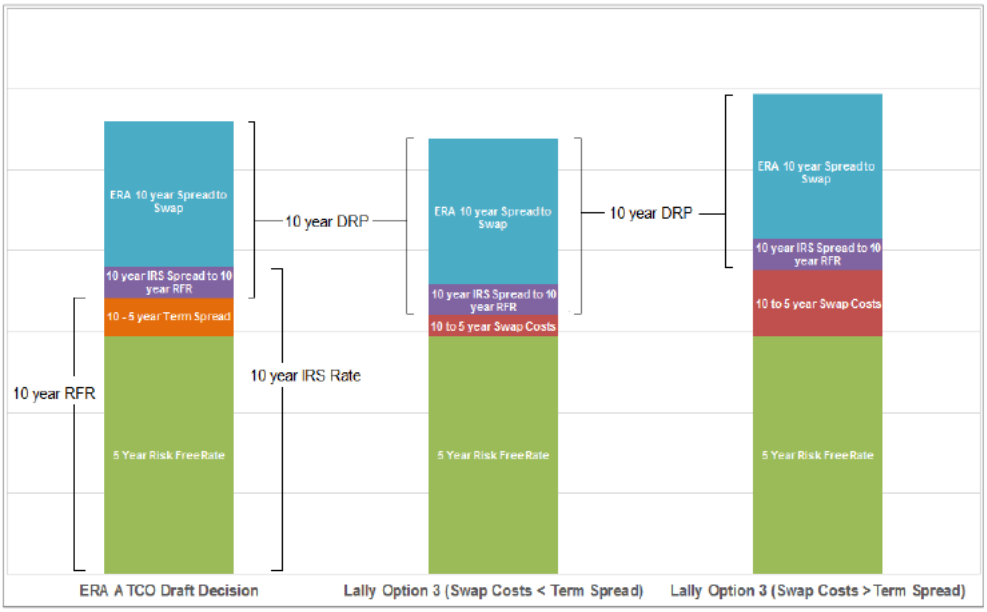
80 See: Chairmont Consulting, *Cost of Debt Comparative Analysis*, 5 November 2013, p. 5; and Lally, M., *The Cost of Debt*, 27 August 2014, p. 13

81 ERA draft report, p. 187

Figure 31 Decomposition of the Cost of Debt under the 'Term Spread' and 'Swaps' Approaches to determining the Regulated Debt Risk Premium

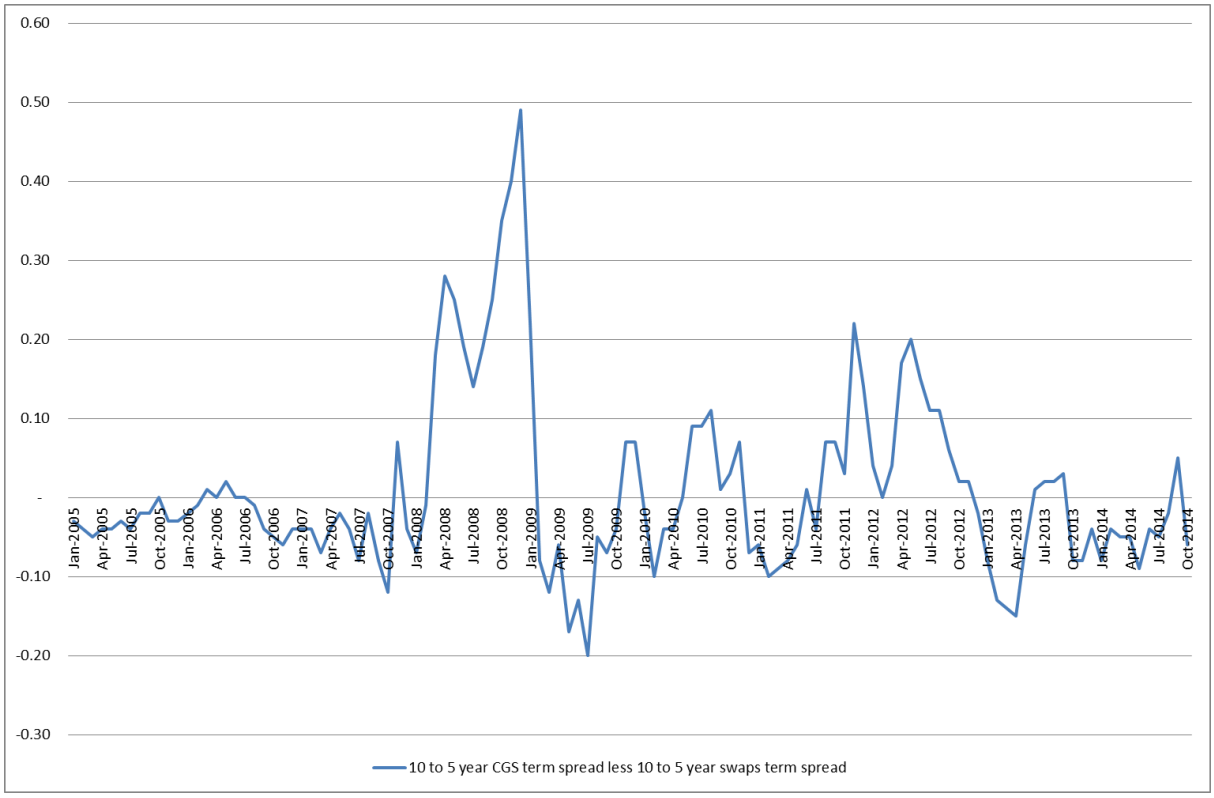


Source: Economic Regulation Authority

181. In this figure there is a light blue component which is the spread between 10 year corporate debt and 10 year swap rates. This is a component that forms part of the cost of debt using swaps (as per the hybrid debt management strategy). The ERA adds to this the purple component which is the spread between 10 year swaps and 10 year CGS. The effect of this is that the 10 year swap rate cancels out and the ERA actually allows the spread between 10 year debt and 10 year CGS. It is purely semantic or presentational to show the spread between 10 year corporate debt and 10 year swaps in the construction of the above cost of debt allowances.

182. If the difference between 10 and 5 year swap rates was always the same as the difference between 10 and 5 year CGS rates then this difference would not be numerically important. However, this is not generally the case and commonly the difference between them is significant. This is illustrated in Figure 7 below.

Figure 7: Difference in 5 to 10 year term spreads between CGS and swaps



Source: RBA data, CEG analysis

183. Figure 7 illustrates that the difference in term spread between CGS and swaps has been as high at 0.5% and is commonly (23% of the time) outside the range plus or minus 0.1%. It follows that failure to use swap rates when estimating the costs of a hedging strategy that uses swaps can lead to significant under or over estimation of costs.[82] This analysis sets aside the impact of the other difference in the ERA's formula to the actual costs of a hedging strategy – that in the hybrid cost of debt only the 5 year rate is prevailing and the 10 year base rate is a trailing average.

4.5 Flagged potential to depart from a 10 year term

184. An important element of any debt financing strategy that must be established is the term of the debt that the entity issues under the benchmark financing strategy. In my March report I concluded that the ERA's proposed approach in the rate of return guidelines to estimating the benchmark term based on the *remaining term* of a debt issued by regulated and other businesses was inappropriate. I further stated that:

82 A positive figure in the above graph means that the CGS term spread (10 year CGS less 5 year CGS yields) is larger than the swap term spread. Because, under the hybrid, the term spread is essentially deducted from the 10 year cost of debt, this means that using CGS would lead to the cost of debt being underestimated when the line in the above chart is above zero (and vice versa).

> *In Appendix C, I also review statements by the ERA to the effect that its approach is consistent with advice from Associate Professor Lally …. I find that these claims are also incorrect and rest on the same fundamental error described above.*

185. The ERA's draft decision departs from the rate of return guidelines in that it now incorporates an assumption that the benchmark debt management strategy involves the issuance of 10 year debt (rather than an assumed maturity of around 5 years).

186. However, the logic underpinning the ERA's decision is unclear and in my view certain aspects of it are problematic. In particular, the ERA draft decision states:[83]

> *ATCO submitted that use of term at issuance, rather than average remaining term to maturity determined by the Authority, is supported by the analysis of Lally, analysis by its consultant CEG, and also the AER. On this basis, ATCO proposed a term of debt of 10 years.* [421] [Emphasis in original]
>
> *The Authority engaged Lally to clarify this issue. Lally's advice makes clear that, absent credit default swaps, the Authority should estimate the debt risk premium based on the average term at issuance.*[422] *The Authority notes that analysis in the Rate of Return Guidelines would support a term at issuance for the benchmark efficient entity of around 10 years.* [423]
>
> *Therefore, the Authority accepts that it is appropriate to adopt the 10 year term for its estimate of the debt risk premium.*
>
> [422] *M. Lally, The Cost of Debt, 27 August 2014, p. 13.*

187. The ERA later states:[84]

> *Given the current absence of a liquid Credit Default Swaps market in Australia, and consistent with Lally's option 3, the Authority is of the view that the term of the debt risk premium needs to be set at 10 years (see paragraph 832).* [448]
>
> [448] *The Authority will reassess the conditions for this CDS market in future decisions. Should this market return to more normal conditions, then the term for estimating the spread to swap would be revised to 5 years in order to be consistent with the term of the risk-free rate and the 'NPV = 0' present value principle.*

188. From the draft decision itself it is not possible to easily discern the reason for the change in regulatory policy. The ERA does not explain the issues involved and why

83 ERA draft decision, p. 189

84 ERA draft decision, p. 199

it has adopted a 10 year term for the DRP. Rather, the ERA defers to Lally for clarification of his views.

189. On the page of Lally's report cited by the ERA Lally makes the following statement:85

> *…the cost of debt will be for the term corresponding to the firm's borrowing policy. Thus, if the firm's policy is to borrow for ten years (on average over different types of debt), then the firm should estimate the prevailing cost of debt (and therefore the DRP) for ten year bonds.*

190. This logic is consistent with the logic that I have previously set out. Namely, that if regulated businesses are observed to borrow at a term of 10 years then this should be presumed to be the efficient practice and a 10 year term at issuance should be incorporated into the benchmark efficient debt management practice to be costed.

191. However, the ERA's statements at paragraph 883 and footnote 448 suggest that it would nonetheless adopt a 5 year term for debt issuance if it was satisfied that the credit default swap (CDS) market would allow a business to alter its DRP exposure from 10 to 5 years. Indeed, in footnote 448 the ERA suggests that this is the 'normal' state of affairs for the CDS market.

192. I make a number of observations in response to this.

193. First, there is a presumption in the ERA decision that, if it were possible, trading in a company's own CDS would form part of a benchmark efficient debt management strategy. This is unfounded. Even if it was possible, as the ERA envisages, for a business to issue 10 year debt and trade in CDS to alter the DRP on that debt from a 10 year term to a 5 year term this does not imply that it would be efficient to do so.

194. In my view it would not be efficient for a regulated business to trade in CDS on its own debt. CDS is simply default insurance on debt. The kind of strategy that the ERA is envisioning happening would involve buying default insurance on its own 10 year debt and then selling default insurance on its own 5 year debt. Even ignoring the moral hazard issues that arise from buying insurance against events over which you have some control (such as default on your debt) there would be significant transaction costs associated with such trading. The ERA provides no explanation for why it believes incurring those costs would be efficient and I do not believe that there are any valid reasons to conclude that they would be.

195. Second, the one rationale that the ERA does provide is that such trading would be necessary "*…in order to be consistent with the term of the risk-free rate and the 'NPV = 0' present value principle*". This is not correct – as explained in section 5 of Appendix C of my March 2014 report for ATCO:

85 Lally, M., *The Cost of Debt*, 27 August 2014, p. 13

> *… even if Lally's analysis is accepted as correct, setting the maturity of the DRP at 10 years need not result in a deviation from the NPV=0 principle as expressed by Lally. This is only the case if the DRP is reset once every five years based on prevailing conditions as was the requirement under the old Rules – and which Lally implicitly assumed in arriving at his conclusion.*
>
> ***If, however, the DRP is set based on a trailing average basis then this will not result in a deviation from the NPV=0 principle because the cost of debt allowance will be equal to the actual cost of debt for a firm issuing 10 year debt on a staggered basis****….*
>
> *That is, so long as the cost of debt allowance is equal to the actual cost of debt the NPV=0 principle is satisfied. Of course, this requires the regulator to set a cost of debt allowance that is actually replicable. The NPV=0 allowance and replicability are the same thing.* ***Once this is recognised, the ERA's clearly stated position that it does not wish to set a cost of debt allowance that can be replicated is equivalent to saying that it does not wish to achieve the NPV=0 principle.***[86] [Emphasis added]

196. Lally's recent advice to the ERA confirms precisely this point. On the same page that the ERA references in footnote 422, Lally states:

> *In respect of regulated firms, and as discussed in section 3, the regulator must choose a regulatory policy and this involves choosing a DRP term.* ***Satisfying the NPV = 0 principle would require use of a ten-year trailing average of that DRP,*** *but a close approximation can be achieved when using the prevailing DRP so long as that DRP is for a term matching the term for which benchmark firms borrow (about ten years).*[87] [Emphasis added.]

197. Notwithstanding my and Lally's advice, the ERA draft decision still proceeds as if adopting a 5 year term for the cost of debt is a necessary condition for achieving the NPV=0 principle. This is not the case. In fact, the exact opposite is the case. The ERA's attempt to 'shoehorn' a 10 year staggered debt issuance strategy (which is efficient) into a context where it adopts the prevailing yield on 5 year CGS gives rise to a departure from the achievement of the NPV=0 principle.

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86 CEG, *Cost of debt consistent with the NGR and NGL*, March 2014, p. 73

87 Lally, M., *The Cost of Debt*, 27 August 2014, p. 13

198. The draft decision presupposes that adopting a debt term equal to the length of the regulatory period *must* be part of the solution to a problem when, in reality, the actual solution to the problem posed is the adoption of a trailing average DRP.

4.6 The ERA's carry forward and "Guiderails" approach to setting the DRP

199. The ERA appears to be concerned about the revenue volatility that is created by applying annual updates to the entire DRP. In this context the ERA proposes that, despite its desire to reset the DRP based on the prevailing rate each year, it will not pass this on in tariffs during the year. Rather, it will set a single DRP based on the rate prevailing at the beginning of the regulatory period and then 'keep track' of the difference between this and the DRP that it actually would have set during the regulatory period had it actually updated the DRP annually.[88]

200. The impact of this difference on allowed revenues will then be carried forward in 'present value' terms to the beginning of the next regulatory period – at which point the appropriate adjustments will be made to revenues in that period to make the business/customers pay back any over/under recovery of revenues that would have existed if the ERA had annually updated the DRP.

201. In effect, customers and the business must lend/deposit money to the other party in regulatory period 1 to be paid back in regulatory period 2. For example, if the DRP falls in the first regulatory period relative to the level at the beginning of that period then the business is effectively taking deposits from customers in the first regulatory period which then need to be paid back in the second period. Alternatively, if the DRP rises in the first regulatory period relative to the level at the beginning of that period then the business is effectively lending to customers in the first regulatory period a loan which is then called back in the second period. (Of course, there is no guarantee that the customers who took the loan are the same customers who pay it back.)

202. However, the ERA is not satisfied that the above approach will adequately smooth out revenues and, in addition, places restrictions on the level that the initial DRP can be set at – no lower/higher than 100bppa/300bppa. It appears to be the ERA's belief that, if the prevailing DRP was outside these levels at the beginning of the regulatory period it would mean revert to a level between 100 and 300bppa over the regulatory period.

203. I make the following observations about this idiosyncratic structuring of the regulatory regime:

88 ERA draft decision, Appendix 7

- in order for this scheme to operate in the way described the ERA must bind its future decisions to honour not only the letter but also the spirit of any detailed description of its approach;
- the draft decision does not provide a detailed description of its approach. For example, it does not specify how the present value adjustment will be made to carry values through time (including what discount rate will be used or how it will be calculated);
- the operation of the 100/300bppa guiderails offers the ERA a 'lever' which it could use to permanently (or at least for an extended period) defer compensation to the business. This could be done simply by setting the top guiderail at a level that was below, or even at, the average expected prevailing DRP. The effect would be that the under-recovery in one regulatory period, when passed onto the next regulatory period, triggered the top guiderail, giving rise to more under-recovery in that period and so on and so on;
- as already described, the scheme involves a loan being taken from/given to customers in the first regulatory period and then being paid back to/by a potentially materially different set of customers (customers in regulatory period 2); and
- a trailing average DRP naturally delivers low volatility in prices as a result of variability in the prevailing DRP. The ERA's approach appears to involve the introduction of considerable complexity and uncertainty in order to achieve what a trailing average would achieve automatically.

5 Estimating the corporate BBB yield/spread to swap

5.1 Sourcing historical BBB cost of debt/spread to swap estimates

204. There are currently two sources of potential third party fair value estimates of the cost of debt for BBB rated corporates that also go back historically in the order of 10 years. These are yield curves published by Bloomberg and the RBA. Bloomberg publishes a BBB fair value yield curve[89] that has been available since 2001 but not always at the 10 year maturity. The RBA publishes a yield for a 'target maturity' of 10 years that has been available since January 2005. Bloomberg has recently introduced an alternative methodology for estimating BBB yields (its BVAL yield curves) but these have only been backdated to mid-2010. Bloomberg has, in May 2014, also ceased to publish its BFV curve in favour of its BVAL curve.

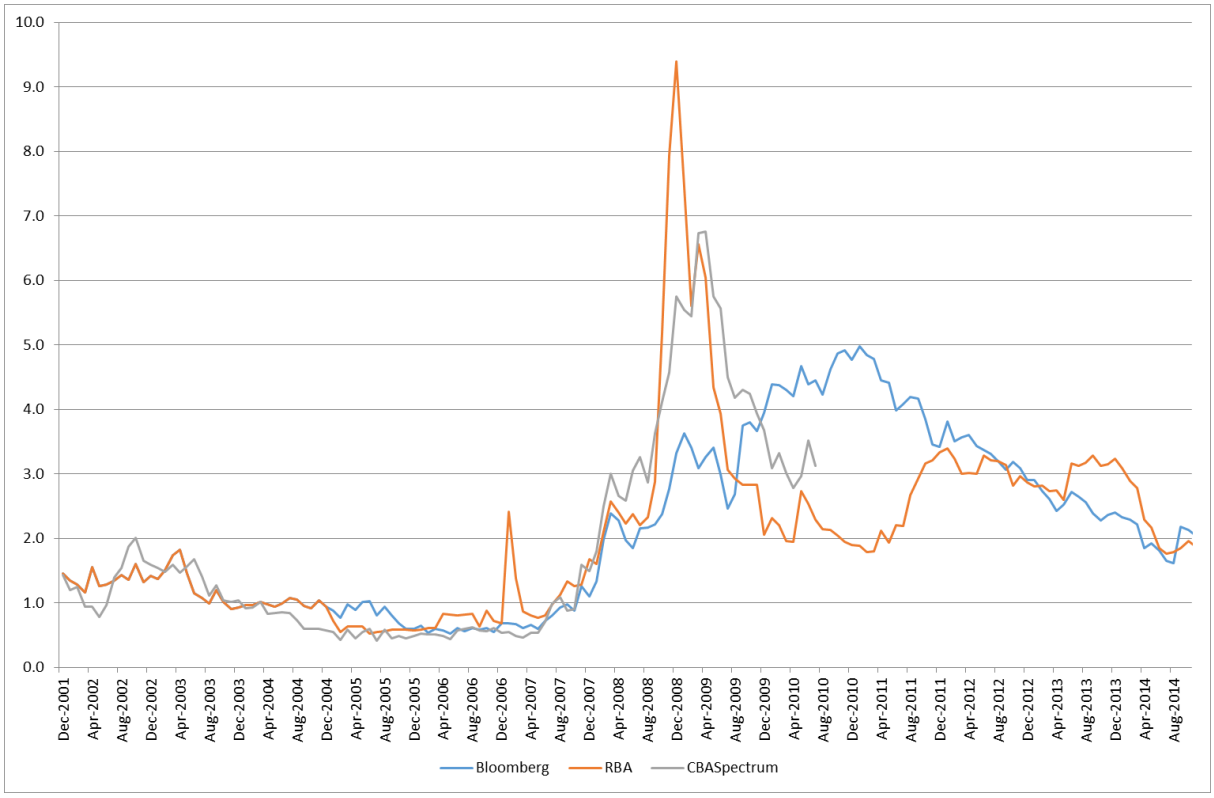
205. Historically there also exists the potential to have regard to fair value curves published by CBASpectrum. The CBASpectrum curve is not currently available, having been discontinued in mid-2010. However, CBASpectrum estimates are a potential reference point against which to compare the behaviour of the other curves.

206. Figure 8 below shows a time series for each of these curves.[90]

89 The historical Bloomberg yields have been extracted from Bloomberg using the Bloomberg Fair Value (BFV) curve identifiers for domestic AUD BBB-rated bonds. It should be noted that on the 1st of May 2014 this BFV curve was discontinued, and it has since been populated with the values associated with the corresponding BVAL curve. As such, our time series consists of BFV values until the 1st of May 2014, and BVAL values after the 1st of May 2014.

90 Both the Bloomberg BBB and RBA series are, where necessary, extrapolated to 10 years using the methodology set out in Appendix A.

Figure 8: RBA, CBASpectrum and Bloomberg



Source: RBA, Bloomberg, CBASpectrum and CEG analysis

207. It is possible to make some observations about the performance of each of these curves by asking whether it has behaved:

- as one would expect over the last decade; and
- in a manner consistent with the other estimates of the cost of BBB debt.

208. Over the last decade we have had two periods of what can reasonably be referred to as 'financial crisis'. The first relates to the period of late 2008 and early 2009 the intensity of which was at its peak following the bankruptcy of Lehman Brothers in September 2008 and the subsequent nadir of global stock markets in March 2009. The second distinct period of financial crisis relates to the period of heightened perceived risk of European sovereign government default and potential exit from the Euro currency area. This period dates from late 2011 to late 2012 and had its epicentre in June/July of 2012 – a period described by the RBA Governor Glen Stevens as follows:[91]

[91] RBA Governor Glenn Stevens statement to the House of Representatives Standing Committee on Economics,24 August 2012.

> *But, as we said at the last hearing, sorting out the problems in the euro area is likely to be a long, slow process, with occasional setbacks and periodic bouts of heightened anxiety. We saw one such bout of anxiety in the middle of this year, when financial markets displayed increasing nervousness about the finances of the Spanish banking system and the Spanish sovereign. The general increase in risk aversion saw yields on bonds issued by some European sovereigns spike higher, while those for Germany, the UK and the US declined to record lows. This 'flight to safety' also saw market yields on Australian government debt decline to the lowest levels since Federation.*

209. The RBA BBB curve has responded to each of these crises in the manner expected – increasing substantially. In doing so it has followed more or less the pattern of the CBASpectrum fair value estimate where both were published concurrently (although the RBA series peaked in December 2008 earlier and higher than the CBASpectrum series).

210. The RBA curve also behaved in a manner consistent with that of the Bloomberg and CBASpectrum curves prior to late 2008.[92] Subsequent to the financial crisis of 2008/09 the RBA and CBASpectrum estimates fell as expected – although further than would have been suggested by having regard to all bonds including floating rate bonds.[93] The CBASpectrum curve was discontinued in mid-2010, but the RBA curve responded to the European sovereign debt crisis in the expected manner – rising materially in late 2011 and the first half of 2012 before falling again (perhaps partly because it fell too low prior to that).

211. By contrast, the spread implied by the Bloomberg fair value curvefailed to rise in the 2008/09 crisis. This is, in my view, a significant failure of the curve to act in accordance with expectations. Naturally, having failed to rise the curve also failed to fall materially after the worse of the 2008/09 crisis.

212. The RBA makes similar observations:[94]

---

92 In January 2007 the RBA spread to CGS rose dramatically (to around 2.5%) then fell dramatically the following month and this was not consistent with the Bloomberg or the CBASpectrum curve. It appears likely that this was the result of the temporary existence of a high yielding 8+ year maturity bond in the RBA dataset in that month. The 7 and 10 year spreads show the same magnitude jump but not the 5 year or 3 year spread. The number of bonds in the 8-12 maturity range jumps from 1 to 3 in January 2007 and then drops to 2 in February 2007. There is only 1 bond in the 6 to 8 year maturity in January 2007.

93 In this period I estimated that the Bloomberg and CBASpectrum curves were low relative to observations of yields on long dated floating rate bonds as set out, for example, in CEG, *Testing the accuracy of Bloomberg vs CBASpectrum Fair Value Estimates,* A report for Country Energy, January 2010.

94 Arsov,, I., Brooks, M. and Kosev, M. "New Measures of Australian Corporate Credit Spreads", *RBA Bulletin*, December 2013, p. 24

> *The Bloomberg Australian dollar fair value curve appears to be overly smooth between early 2009 and late 2010. These measures did not increase as much as could be expected in early 2009, given that the global financial crisis was at its most severe at that time, and as was observed in other measures of Australian and foreign corporate bond spreads. Moreover, the Bloomberg spread measures remained elevated for an extended period of time between early 2009 and 2010, while credit spreads globally declined sharply following the introduction of extraordinary policy measures; this was especially true of BBB-rated bond spreads.*

213. The AER has also drawn similar conclusions:[95]

> *There is evidence to suggest that the behaviour of the Bloomberg fair value estimates since the onset of the GFC is somewhat counterintuitive. The extrapolated 10 year DRP derived from Bloomberg is currently nearing all time highs. The spread between Bloomberg's seven and 10 year, AAA rated fair value estimates—which is used by the AER to extrapolate Bloomberg's seven year, BBB rated fair value estimates—also remains at near historical highs. This implies that prevailing conditions in debt markets are more risky now than during the GFC. This is counterintuitive, as substantial evidence indicates that debt market conditions have improved significantly.*

214. The RBA also compares its BBB estimates over the 2008/09 crisis period with the Bloomberg United States BBB BFV curve and find that the United Staates Bloomberg curve is more similar to the Australian RBA curve than to the Australian Bloomberg curve.

215. On the above basis I consider that the RBA fair value curve is the best third party source that can be relied on to estimate a cost of 10 year BBB debt over the historical 10 year period at the time of writing. However, I note that because the first RBA estimate is only available for January 2005 there will not be a full 10 years of historical data available until December 2014. However, I consider that it is reasonable to simply use the Bloomberg series prior to January 2005 – noting that this does not cover the period of its anomalous behaviour in 2008/09.

216. Finally, it is worth noting that even though the RBA and Bloomberg estimates differ materially through some periods in the last 10 years these differences tend to cancel each other out – with the RBA estimates being higher in some periods and the Bloomberg estimates higher in other periods. The net difference over the period January 2005 to October 2014 is only 6 basis points – with the Bloomberg average being higher. Similarly, over the period they were contemporaneously published

95 AER, *Final Decision: Envestra Ltd Access arrangement proposal for the Qld gas network, 1 July 2011 – 30 June 2016*, June 2011, p. 50

the RBA and CBASpectrum BBB series differ on average by only 1bp - with the CBASpectrum average being higher. It is also the case that the difference between the curves as at 31 October was only 14bp (with Bloomberg being higher).

217. This suggests the selection of the RBA curve is:

- robust in the sense that the trailing average spread to swap is not significantly affected by the choice of independent third party provider; and
- conservative, in the sense that the RBA curve alone results in a lower average than the use of any other combination of the three curves.

5.2 ERA draft decision

218. The ERA's draft decision rejects ATCO's proposal to estimate the DRP based on the RBA's estimates of credit spreads. The ERA identifies three concerns that it considers means that the RBA estimates would not be *"the best means to deliver on the allowed rate of return objective"*:[96]

a. The effective tenor of the RBA's 10 year DRP is 8.6 years and therefore is not consistent with its preferred term of 10 years for the DRP.

b. The RBA's estimates are only available for the BBB and A credit rating bands. These bands may not be consistent with regulatory requirements.

c. The RBA's estimates are only reported for a single day each month. This is "less than ideal" because normal practice is to use an average over a number of trading days.

219. Instead of the RBA's estimates of DRP, the ERA instead applies its own preferred methodology. This is the simple average of three alternative estimates of 10 year DRP, being:[97]

- the Gaussian kernel;
- the Nelson-Siegel methodology; and
- the Nelson-Siegel-Svensson methodology.

220. Although the ERA applies the Gaussian kernel methodology as one of the three methods that it relies upon for its preferred estimate, it applies this method to a different sample set than the RBA does. Table 1 below sets out a comparison of the

96 ERA draft decision, p. 192

97 ERA draft decision, pp. 195-197

RBA's criteria to for forming a BBB rated bond sample and the dataset relied upon by the ERA's analysis of DRP.[98]

Table 1: Comparison of RBA and ERA datasets

Characteristic	RBA dataset	ERA dataset
Credit rating	BBB-, BBB and BBB+ with Standard & Poor's	BBB-, BBB and BBB+ with Standard & Poor's
Sector	Non-financial	Non-financial
Coupon type	Fixed only	Fixed and floating
Redemption	Bullet bonds and bonds with embedded options	Bullet bonds and bonds with embedded options
Remaining term to maturity	At least 1 year	At least 2 years
Amount at issuance	More than A$100 million	No restriction
Currency	AUD, USD, EUR	AUD, USD, EUR, GBP
Yields reported	On the day	At least 50% over an averaging period

5.2.1 Rejection of the RBA debt risk premium estimates

221. The ERA's reasons for rejecting reliance upon the RBA's estimates of DRPdo not establish that its own methodology is preferable.

222. The ERA notes that the RBA's 10 year DRPestimate has an effective tenor of 8.6 years which is not consistent with its preferred term of 10 years. However, the ERA's own Gaussian kernel methodology, which attracts a one third weight in its preferred DRP, has an effective tenor of only 8.4 years. The criticism of the RBA's Gaussian kernel estimates apply equally to the ERA's estimates.[99]

223. The ERA rejects the RBA's DRPestimates on the basis that only BBB and A credit rating bands are available. However, its own preferred estimate relies upon bonds drawn from exactly the same BBB rating band used by the RBA's BBB DRP estimates. This criticism of the RBA's estimates applies equally to the ERA's estimates.

224. The ERA considers that the RBA's practice of reporting DRPon a single day each month is "less than ideal" and this provides a further ground for preferring its own approach. I note that the RBA provides an estimate of the 10 year BBB cost of debt and the 10 year BBB spread to swap (which are the data points of primary interest)

98 ERA draft decision, pp. 190, 197

99 The maturity bias is characteristic of the Gaussian kernel methodology given the current unavailability of a significant population of bonds with remaining terms to maturity above 10 years. I discuss in Appendix A how to best address this bias.

on the last day of every month. It would be a simple matter to interpolate between the three month end values that straddle any 40 day period should an estimate specific to a 40 day period be required.[100] However, as noted in sections 3 and 4 there is no viable/implementable efficient debt management strategy the costing of which requires an estimate of the DRP over a period shorter than 10 years (let alone 40 days). The criticism of the RBA data source is, in my view, unreasonable on its own terms and those terms are themselves unreasonable (i.e., in requiring a very short period for the measurement of the BBB 10 year spread to swap when in reality a benchmark efficient entity would be paying a 10 year trailing average of the BBB 10 year spread to swap).

225. I further note that the hybrid debt management strategy requires an estimate of the prevailing 5 year swap rate at the beginning of the regulatory period and that a business may want to spread the period it enters into swap contracts over more than one day. In which case, the business may prefer the regulator adopt an averaging period of several days or even weeks for this purpose. However, estimates of the prevailing 5 year swap rate are available on a daily basis from a number of sources including Bloomberg. There nothing to prevent consecutive daily estimates being derived from such sources.

5.3 Replicating the ERA's debt risk premium estimates

226. I have made significant efforts to replicate and understand the ERA's estimates of DRP.

227. For instance, there are two clearly stated differences between the ERA's methodology (when using the Gaussian kernel) and the methodology applied by the RBA in its Bulletin paper. These differences relate to the different criteria applied by the ERA in selecting its bond sample and in not using the conversion factor in its cross currency swap calculation. However, accounting for these differences does not fully explain the difference between the ERA's estimates of 10 year DRP using the Gaussian kernel and the results that I estimate the RBA would have achieved over the same period.

228. Based on this investigation, I believe that the ERA may have made a series of errors in calculating and describing its estimates of DRP. These errors include:

- not converting foreign currency issue amounts into Australian dollars to weight bonds in applying the Gaussian kernel methodology;
- not excluding duplicate bonds from its dataset;

[100] Of course, it would also be open to any party to replicate the RBA's methodology over a specific averaging period to arrive at daily figures.

- implementing a simplified version of a cross-currency swap that does not apply the conversion factor;
- using a 7 day averaging period when in its draft decision the ERA also states that it is using a 40 day averaging period;
- including bonds that have a country of risk *or* a country of domicile as Australia when it claims that only bonds with country of risk as Australia have been included.

229. Furthermore, I note that in some areas I have not been able to replicate input data sourced by the ERA from Bloomberg, including:

- yields on interest rate swaps; and
- spreads to swap reported for bonds.

230. Sourcing correct estimates of these values are fundamental to generating a reliable estimate of the DRP. I note that there are a number of sources and methods through which such data could be obtained from Bloomberg. Even considering the range of values that might be generated through these options, I am unable to account for the ERA's estimates of these variables. The ERA has not sought to explain the precise source or method for obtaining its data other than to say that they originate from Bloomberg.

231. In our view, this is inadequate and does not allow a third party to replicate and check the ERA's methodology. By contrast, I have in the past been able to review and closely replicate the sources of data used and reported by the AER when it examines DRP issues and I also have been able to closely replicate the RBA's 31 August BBB yield/spread estimates based on the methodology set out in the RBA Bulletin article.[101]

232. I consider the lack of clear explanation of the ERA's data is problematic, especially given the errors that I consider that the ERA has made in calculating and describing its estimates of the DRP. It would greatly promote transparency of regulation of the ERA were to provide clearer descriptions of its calculations and detailed workings to allow for replication.

5.3.1 ERA's bond sample

233. I am unable to fully replicate the selection of the ERA's bond sample. The selection of the sample is not well described in the ERA's draft decision.

[101] See for example Table 2 below.

5.3.1.1 Duplicate bonds

234. The ERA does not appear to have excluded duplicate bonds in forming its bond sample. There are 102 bonds in its sample, whereas I have been able to source:

- 87 bonds where duplicate bonds are 'consolidated' in the Bloomberg search function; and
- 107 bonds where duplicate bonds are not consolidated.

235. On this basis, I consider that the ERA has likely not consolidated duplicate bonds in its search.

236. In producing its estimates of DRP, the RBA notes that it excludes duplicate bond issues in its bond sample. That is, where the same bond is listed twice in Bloomberg because it is covered by two different regulatory regimes:[102]

> *Where a US dollar-denominated bond line had both 144A and Regulation S series, the latter were omitted to avoid duplication, as these are effectively the same bond but issued under different regimes, reducing the sample by 77 securities. A further seven securities were excluded because of other forms of duplication.*

237. I consider that this is an appropriate step.

5.3.1.2 Country of risk

238. In its draft decision, the ERA states that it determines the country that a bond is issued within by using the "country of risk" field within Bloomberg.[103]

239. However, based on the bonds that the ERA discloses at Appendix 5 as being included in its sample, I note that it has included bonds that have:

- a "country of risk" of Australia; or
- a "country of domicile" of Australia.

240. For example the Holcim Finance Australia Pty Ltd bond at number 12 on the list disclosed at Appendix 5 has a country of domicile of Australia but a country of risk of Switzerland. This is not consistent with the ERA's explanation of its methodology for selecting the bond sample.

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[102] Arsov,, I., Brooks, M. and Kosev, M. "New Measures of Australian Corporate Credit Spreads", *RBA Bulletin*, December 2013, p. 17

[103] ERA draft decision, p. 197 and Appendix 5

5.3.2 ERA's spread to swap estimates

241. I am not able to replicate the ERA's spread to swap estimates on individual bonds.

5.3.2.1 Cross currency swap calculation

242. The ERA does not provide specific information on how it accounts for hedging costs in performing the cross currency swap calculation that would allow for this to be replicated. However, the ERA states that it performs the cross currency swap calculation by accounting as follows:[104]

> *The Authority accounts for the cross-currency basis swap and the interest rate swap, as per the RBA's method, but not the conversion factor. The cross-currency basis swap is generally the most significant hedging cost.*

243. There is no basis provided for excluding a step of the cross currency swap calculation. The ERA cites the RBA which notes that the cross-currency basis swap is *"generally the most significant hedging cost"*.[105] This does not establish that the effect of the conversion factor is itself insignificant or negligible. Indeed, it is not.

244. Although I am unable to replicate the ERA's source of data, I note that on my own estimates of cross currency swap the effect of the conversion factor on the Australian dollar spreads to swap is not insignificant as assumed by the ERA. Over both the 40 day period to 31 July 2014 and the 7 day period to 9 September 2014 referred to by the ERA in its draft decision, the average effect of excluding the conversion factor is to reduce the Australian dollar spread to swap for foreign currency bonds by approximately 9-10 basis points. The effect is greater for longer maturity bonds, such that the 10 year spread to swap estimate under the Gaussian kernel methodology is reduced by approximately 10-11 basis points by this omission.

245. I consider that the ERA has made a material error in not applying the conversion factor. It has not stated or provided evidence that the conversion factor described by the RBA in its Bulletin article[106] should not be performed as part of the cross currency swap methodology. The effect of not performing this step of the calculation is significant on individual bond spreads and particularly on the 10 year estimate of spread to swap in Australian dollar terms, resulting in the ERA's estimates at 10 years being biased downwards.

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104 ERA draft decision, p. 198

105 Arsov,, I., Brooks, M. and Kosev, M. "New Measures of Australian Corporate Credit Spreads", *RBA Bulletin*, December 2013, p. 25

106 Arsov,, I., Brooks, M. and Kosev, M. "New Measures of Australian Corporate Credit Spreads", *RBA Bulletin*, December 2013, p. 25

5.3.2.2 *ERA's averaging period is not correctly described*

246. Table 48 of the ERA's draft decision sets out its estimates at 3, 5, 7 and 10 years maturity under each of its three proposed approaches. The title of this table describes its contents as "40 trading day average as at 31 July 2014".[107]

247. This appears to not be an accurate description of the contents of Table 48. Later in its draft decision, the ERA states that the contents of Table 48 are indicative and *"based on the most recent 7 trading day average ending on 9 September 2014 (the final decision estimate will be based on the 40 day average, for the period agreed with ATCO)."*[108]

248. This latter description is also consistent with the labelling in the table at Appendix 5 which denotes a *"Spread to Swap with Cross Currency Conversion (7 Day Average in bp)"*. [109]

5.3.2.3 *Replication of the ERA's data in Appendix 5*

249. The ERA does not clearly describe how it has obtained its data from Bloomberg. I am not able to replicate the spread to swap data that it reports in Appendix 5 of its draft decision.

250. There are reasons why the ERA may have achieved different spread to swap estimates to mine. For instance:

- there are a number of sources within Bloomberg that pricing information can be obtained from. The RBA's paper refers to BVAL and BGN.[110] There is no reference in the entirety of the ERA's draft decision as to which pricing source it prefers to source its Bloomberg data from;
- there may be a number of methods by which spreads to swap can be obtained, such as:
  - directly sourcing spreads to swap from Bloomberg;
  - directly sourcing option-adjusted spreads to swap from Bloomberg (which is the RBA's method);
  - directly sourcing yields from Bloomberg and using interpolated swap rates to calculate spreads to swap; and

107 ERA draft decision, p. 199

108 ERA draft decision, p. 201

109 ERA draft decision, p. 412

110 Arsov,, I., Brooks, M. and Kosev, M. "New Measures of Australian Corporate Credit Spreads", *RBA Bulletin*, December 2013, p. 18

- doing any of the above using prices sourced from Bloomberg with the use of override formulae.

The ERA's draft decision does not describe how it obtained its spread to swap data.

251. I have tried a variety of alternatives to attempt to replicate the ERA's spread to swap data but have not been successful. I consider that a robust methodology would clearly set out the sources and methods for obtaining data so it is transparent and can be reviewed by third parties. The ERA's methodology does not do this.

252. When I perform a bond by bond comparison following RBA methodology,[111] except I follow the ERA in not applying the conversion factor to the cross currency swaps, I estimate spreads to swap that are, on average, 6 basis points lower than the ERA's estimates. This represents a difference that is not explained by the ERA's draft decision. If the conversion factor is applied to the cross currency swaps then this increases the spreads and reduces the difference to about 1 basis point on average. I note that there is considerable variation in these differences, and they are greatest for the bonds at long maturities.

253. This lack of transparency manifests itself further in an unexplained data point included by the ERA, described as bond 98 issued by Caltex in Appendix 5. The ERA describes this as having a spread to swap of 450.00 basis points. I am unable to find any observed price information within Bloomberg for this bond during either the 40 day period ending 31 July 2014 or the 7 day period ending 9 September 2014.

254. I note that the inclusion of the Caltex bond has negligible effect on the 10 year estimate of spread to swap calculated using the Gaussian kernel methodology because its maturity of 23 years is very far from the target of 10 years. However, it would be expected to have a significant effect on the level and shape of the Nelson-Siegel and Nelson-Siegel-Svensson curves because it is one of only a small number of bonds with reported spreads at such a long maturity.

255. For complete transparency I include at Appendix D to this report a list of bonds indicating:

- whether they are in the ERA's dataset and whether I consider that they meet the criteria set by either the ERA or the RBA to be included in those datasets; and
- my estimates of the spread to swap over the 7 working days to 9 September 2014, as well as the ERA's estimates of spread to swap published at Appendix 5 of its draft decision.

[111] Using OAS adjusted spreads and using BVAL as the primary data source and BGN where BVAL is not available.

5.3.3 Estimating the 10 year spread to swap

256. The ERA estimates three measures of 10 year spread to swap, based on:

- a Gaussian kernel methodology;
- a Nelson-Siegel methodology; and
- a Nelson-Siegel-Svensson methodology.

257. Given the information provided by the ERA at Appendix 5 of its draft decision, I have been able to replicate its estimate of 10 year spread to swap using the Gaussian kernel methodology. However, I can only replicate this if I erroneously do not convert foreign currency issues amounts into Australian dollars.

258. I have also attempted to replicate the ERA's estimates of Nelson-Siegel and Nelson-Siegel-Svensson spread to swap curves based on the data that it provides at Appendix 5. However, I have not been able to replicate these results.

5.3.3.1 ERA does not convert issue amounts into Australian dollars

259. The Gaussian kernel methodology as applied by both the ERA and the RBA weights each bond observation by its issue size. To correctly weight bonds issued in different currencies it is necessary to convert issue amounts into a common currency. The RBA addresses this by converting bond issue amounts into Australian dollar terms using exchange rates at the time of issue. I consider that this is an appropriate approach to dealing with weighting.

260. The ERA does not do this and instead incorrectly weights bonds based on unconverted foreign currency amounts:

- Appendix 5 of the ERA's draft decision incorrectly labels issue amounts as "Amount (A$)" when the amounts listed for foreign currency bonds are not converted into Australian dollars;
- given the bond spread data provided by the ERA in Appendix 5, I am only able to replicate its Gaussian kernel estimates if I weight by unconverted foreign currency issue amounts. If I convert these into Australian dollar terms I do not achieve the ERA's estimates.

5.3.4 Estimating the 10 year cost of debt

261. The final step to estimating the 10 year cost of debt is to add 10 year swap rates to the 10 year spread to swap estimate.

262. However, I am not able to replicate the 10 year swap rates reported by the ERA. The ERA states that over the 7 day period to 9 September 2014, the average 10 year

interest rate swap is 3.417%.[112] The ERA does not explain what source it used to obtain this information from Bloomberg.

263. Over the same 7 day period, I used the "ADSWAP10 Curncy" field within Bloomberg to obtain an average 10 year interest rate swap yield of 3.826% in unannualised terms. This cannot be reconciled with the ERA's estimate.

5.3.5 Quantifying the differences between ERA and RBA Gaussian kernel

264. Table 2 below sets out some of the key differences between the ERA's estimates of the 10 year DRPusing a Gaussian kernel methodology and estimates based on our replication of the RBA's methodology over the same period.

Table 2: Differences between ERA and replicated RBA Gaussian kernel estimates of spread to swap

	3 year	5 year	7 year	10 year
ERA estimates	**1.38**	**1.48**	**1.70**	**1.88**
Express foreign currency issue amounts in Australian dollars	1.38	1.48	1.69	1.85
Removal of Caltex spread estimate	1.38	1.48	1.69	1.85
Using OAS data with a first preference of BVAL and 2nd preference of BGN	1.31	1.39	1.58	1.69
Using conversion factors	1.34	1.43	1.64	1.79
Bond sampling differences	1.34	1.45	1.66	1.79
Exclude GBP	1.34	1.45	1.66	1.77
Country of incorporation Australia	1.36	1.46	1.69	1.79
Fixed only	1.34	1.45	1.72	1.82
Min A$100m	1.34	1.46	1.72	1.82
Change of due date to 1-year time to maturity	1.33	1.46	1.72	1.82
Exclude duplicates	1.34	1.44	1.64	1.70
Change of search date to 29 Aug 2014 (i.e: last date of issue)	1.34	1.44	1.64	1.71
Change of timeframe to single day spread to swap	1.33	1.42	1.61	1.67
RBA's actual 31 August estimate	1.32	1.40	1.59	1.67

Source: ERA, Bloomberg, CEG analysis
Note: Data sourced over 7 days to 9 September 2014

265. The first three rows of the above table use the data provided by the ERA at Appendix 5 of the draft decision. It can be seen that using the Australian dollar issue size in the weighting formula results in 3bp reduction in the estimated spread

[112] ERA draft decision, p. 201

to swap at 10 years. Removal of the Caltex bond makes no material difference (given its 23 year maturity is so far above 10 years it receives little weight under the Gaussian kernel).

266. A much more significant impact can be seen at the fourth row where I substitute my own Bloomberg data for the ERA's data in Appendix 5. This results in a 16bp reduction. This is then largely offset when I apply the RBA's conversion factor which increases the 10 year spread estimate by 10bp. Subsequent changes have only minor impacts until the fourth last row where the exclusion of duplicate bonds results in 12bp reduction in the 10 year spread to swap estimate. The next two rows show the impact of adopting the search date as at 29 August (i.e., immediately prior to the RBA's own estimate for 31 of August 2014) and the impact of adopting a single day for the estimate (31 August 2014). This results in replication of the RBA's 10 year spread to swap to two decimal places. The 3, 5 and 7 year numbers are also very replicated to within 2bp.

267. I note that I was not able to replicate the ERA's sample. The ERA found 102 bonds matching its criteria. I found 111, of which 4 had already been called and were removed from the sample. The row denoted "bond sampling differences" and all rows beneath it take into account the inclusion of the other five bonds.

268. This does not ultimately affect my replication of the RBA's sample, since the RBA excludes callable bonds. I have achieved very close replication of the RBA's sample, as suggested by Table 3 below.

Table 3: Replication of the RBA's bond sample

Number of bonds	1 to 4 years	4 to 6 years	6 to 8 years	8 to 12 years
RBA replication sample	20	21	17	10
RBA's actual sample	19	22	17	10

Source: RBA, CEG

5.3.6 Nelson-Siegel and Nelson-Siegel-Svensson

269. The ERA did not specify the details of its methodology for curve fitting. For both Nelson-Siegel and Nelson-Siegel-Svensson curve-fitting, I relied on the solver function in Excel to minimise the sum of squared errors between the fitted values and the bond spread observations. This function requires starting values as inputs. I used the multistart function combined with sense-checking to develop starting values.

270. I have tried to replicate the ERA's Nelson-Siegel and Nelson-Siegel-Svensson results by fitting curves to the spreads published by the ERA for the sample of bonds

published by the ERA.113 I have not been able to replicate the results published in its draft report.114

271. The Nelson-Siegel parametric form is:

$$y_t(\tau) = \beta_{0t} + \beta_{1t}\frac{1-\exp(-\lambda\tau)}{\lambda\tau} + \beta_{2t}\left(\frac{1-\exp(-\lambda\tau)}{\lambda\tau} - \exp(-\lambda\tau)\right)$$

272. Svensson's 1994 paper which introduced the extension to Nelson-Siegel curve fitting gives the following parametric form for the Nelson-Siegel-Svensson yield curve.115

$$y(\tau) = \beta_1 + \beta_2\left[\frac{1-\exp(-\tau/\lambda_1)}{\tau/\lambda_1}\right] + \beta_3\left[\frac{1-\exp(-\tau/\lambda_1)}{\tau/\lambda_1} - \exp(-\tau/\lambda_1)\right] + \beta_4\left[\frac{1-\exp(-\tau/\lambda_2)}{\tau/\lambda_2} - \exp(-\tau/\lambda_2)\right].$$

273. In its draft report, the ERA states that the Nelson-Siegel-Svensson curve fitting methodology involves fitting the following parametric form:

$$\hat{y}(\tau) = \beta_0 + \beta_1\frac{1-e^{-\tau\lambda_1}/\lambda_1\tau}{\lambda_1\tau} + \beta_2\left[1-e^{-\tau\lambda_1}/\lambda_1\tau - e^{-\tau\lambda_1}\right] + \beta_3\left[1-e^{-\tau\lambda_2}/\lambda_2\tau - e^{-\tau\lambda_2}\right]$$

274. The ERA cites in support of this formulation a paper that does not appear to refer to Nelson-Siegel-Svensson curve fitting.116 The parametric form in the ERA report is quite different to the form published in the literature and has the undesirable property of converging towards negative infinity as the term approaches zero.

275. I have attempted to implement both the formula reported by the ERA and the Nelson-Siegel-Svensson introduced by Svensson but have not been able to replicate the results published in the ERA's draft report.117

113 ERA draft report, p. 411

114 ERA draft report, p. 199

115 See Svensson, L., *Estimating and interpreting forward interest rates: Sweden 1992-1994*, Institute for International Economic Studies, 1994.

116 Dahlquist, M. & Svensson, L., *Estimating the term structure of interest rates with simple and complex functional forms: Nelson & Siegel vs. Longstaff & Schwartz,* Institute for International Economic Studies, 1994.

117 ERA draft report, p. 199

276. Table 4 shows the spreads to swap I fitted for 3, 5, 7 and 10 year terms using Nelson-Siegel and both forms of Nelson-Siegel-Svensson on the set of spreads published by the ERA in Appendix 5 of its draft decision. For all curve-fitting methods, the 10-year spreads to swap I estimated is higher than the 10-year estimates fitted by the ERA.

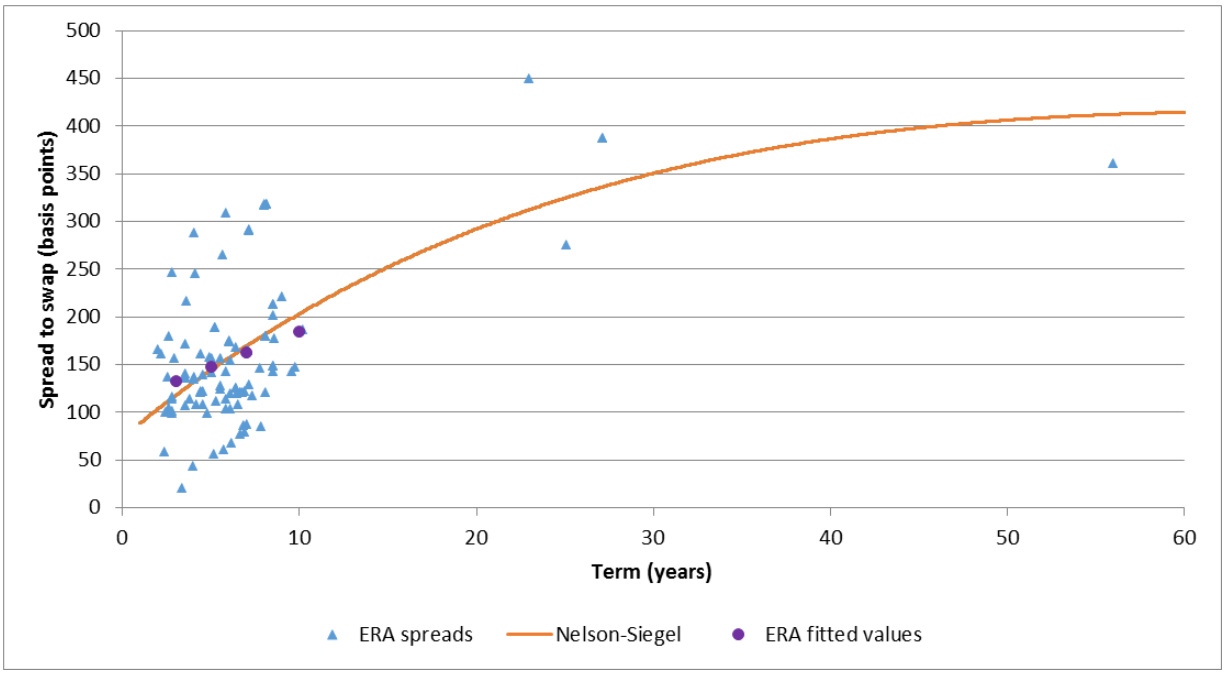
Table 4: Fitted spreads to swap

Term (years)	Nelson-Siegel		Nelson-Siegel-Svensson		
	ERA results	CEG replication	ERA results	CEG replication - ERA form	CEG replication - Literature form
3	1.329	1.176	1.315	1.277	1.176
5	1.479	1.444	1.516	1.338	1.444
7	1.628	1.693	1.600	1.643	1.693
10	1.849	2.034	1.660	2.148	2.033

Source: ERA draft report and Bloomberg, CEG analysis

277. Figure 9 shows the spreads published by the ERA, the Nelson-Siegel curve I fit to this data and the fitted values published by the ERA. The 10-year spread to swap I estimated was higher than the Nelson-Siegel estimate published by the ERA.

Figure 9: Fitted Nelson-Siegel spread curve

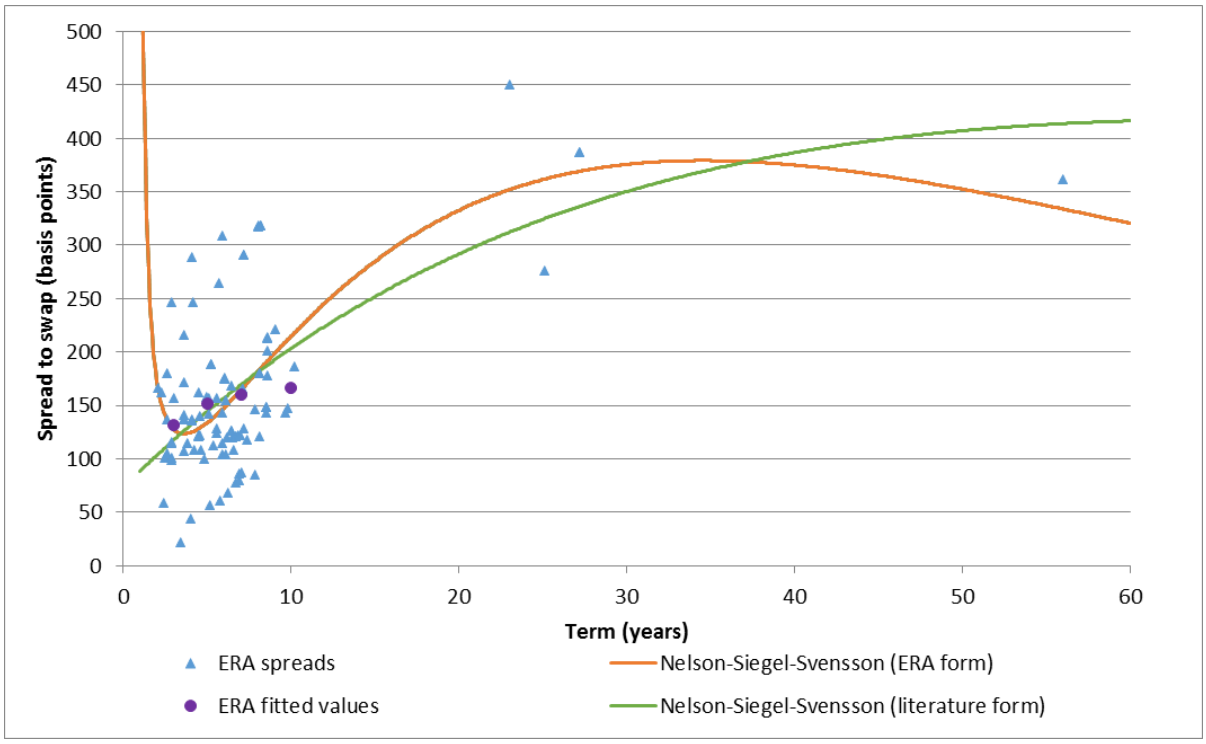


Source: ERA draft report and Bloomberg, CEG analysis

278. Figure 10 shows the spreads published by the ERA, the curves I fit to this data based on Nelson-Siegel-Svensson – one based on the ERA's form, one based on the form

published in the literature - and the fitted values published by the ERA. The 10-year spreads to swap I estimated were higher for both forms than the value published by the ERA. It is clear from Figure 10 that the trend of the curve between the ERA values does not fit the shape of the data at terms longer than ten years.

Figure 10: Fitted Nelson-Siegel-Svensson spread curve



Source: ERA draft report and Bloomberg, CEG analysis

279. In its draft report, the ERA did not specify whether it applied constraints to the curve fitting. In the analysis presented above, I applied constraints to the parameters forcing spreads to be positive for all terms. For Nelson-Siegel-Svensson curve-fitting I also constrained decay factors (λ) to be strictly positive.

280. While maintaining the constraint on the decay factors,[118] I fitted curves free of all other constraints and still was unable to replicate the ERA's fitted swap values. For Nelson-Siegel-Svensson analysis, our fitted curves were the same whether constraints were applied or not. For Nelson-Siegel analysis, the curve was different without constraints however the 10-year fitted spread to swap was still higher than the ERA's as shown in Table 5 below.

[118] I was unable to solve for sensible parameter values when non-positive values for the decay factors were allowed.

Table 5: Fitted spreads to swap - Nelson-Siegel - unconstrained

Term (years)	ERA results	CEG replication – unconstrained	CEG replication - constrained
3	1.329	1.169	1.176
5	1.479	1.439	1.444
7	1.628	1.693	1.693
10	1.849	2.048	2.034

Source: ERA draft report and Bloomberg, CEG analysis

281. Since it is clear in Figure 10 that the trend of the ERA's Nelson-Siegel-Svensson estimates does not fit the shape of the data at terms longer than ten years, I considered the possibility that the ERA excluded some long-term bonds in their analysis. First I excluded the 56-year bond from the sample and found that for all three curves, the 10-year fitted value is still higher than the ERA's.

Table 6: Fitted spreads to swap - excluding longest-term bond

Term (years)	Nelson-Siegel		Nelson-Siegel-Svensson		
	ERA results	CEG replication	ERA results	CEG replication - ERA form	CEG replication - Literature form
3	1.329	1.329	1.315	1.283	1.200
5	1.479	1.370	1.516	1.335	1.436
7	1.628	1.606	1.600	1.637	1.666
10	1.849	2.074	1.660	2.140	2.001

Source: ERA draft report and Bloomberg, CEG analysis

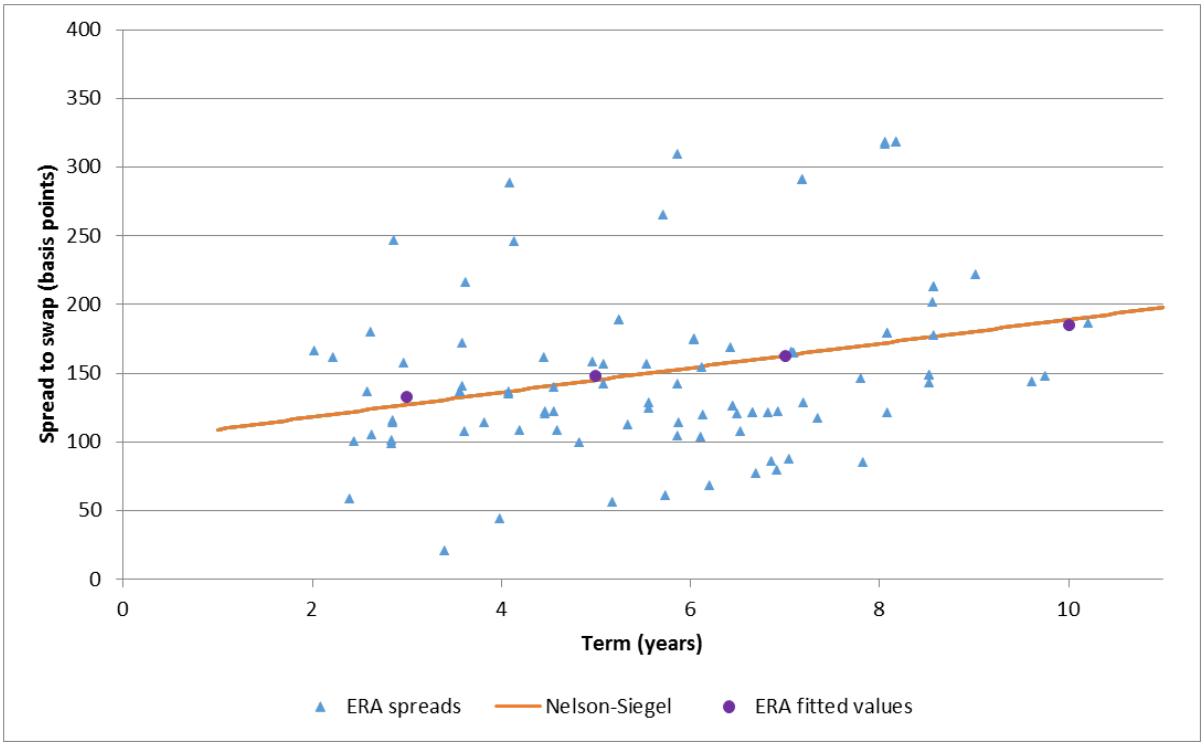
282. I also performed curve-fitting excluding the five bonds which had terms over 23 years. Table 7 presents my fitted spreads when these five bonds are excluded. Figure 11 shows that the Nelson-Siegel curve fitted to this limited sample gives similar results to the ERA's fitted values. Figure 12 shows that both forms of Nelson-Siegel-Svensson curve-fitting still result in 10-year fitted spreads to swap that are higher than the ERA's fitted values.

Table 7: Fitted spreads to swap - excluding long term bonds

Term (years)	Nelson-Siegel		Nelson-Siegel-Svensson		
	ERA results	CEG replication	ERA results	CEG replication - ERA form	CEG replication - Literature form
3	1.329	1.271	1.315	1.292	1.254
5	1.479	1.451	1.516	1.329	1.457
7	1.628	1.628	1.600	1.625	1.626
10	1.849	1.892	1.660	2.123	1.830

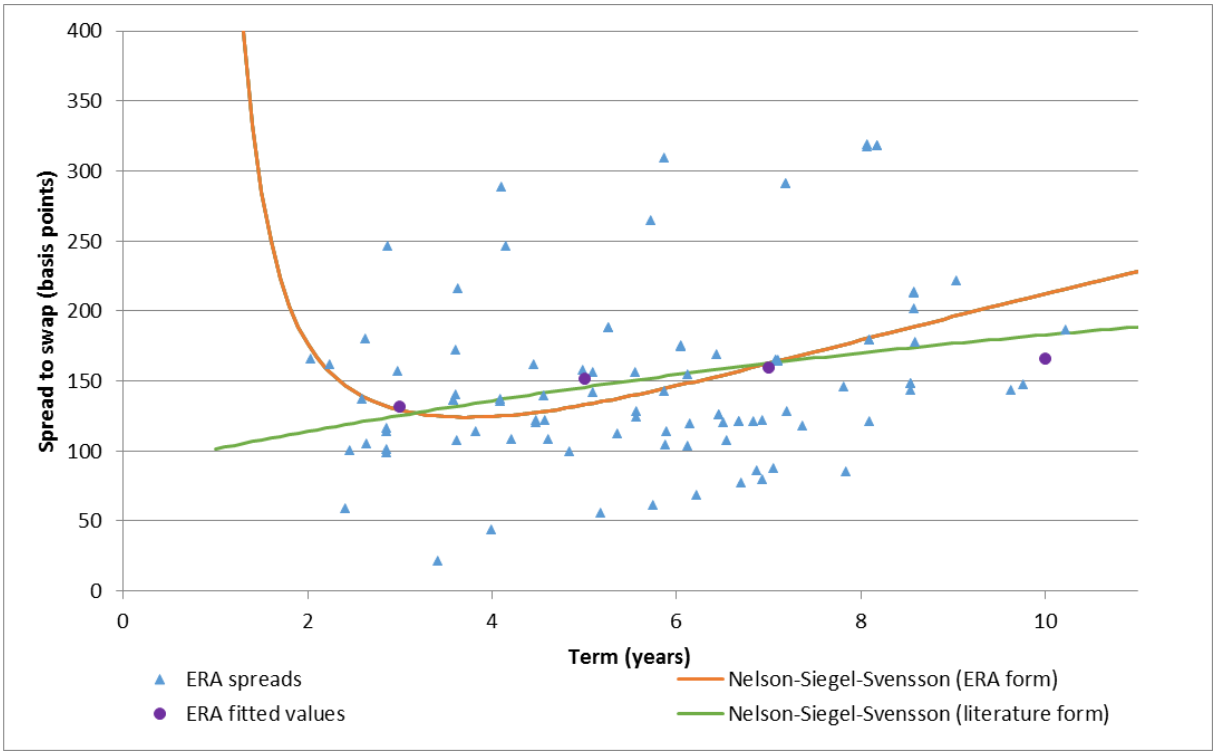
Source: ERA draft report and Bloomberg, CEG analysis

Figure 11: Fitted Nelson-Siegel spread curve – excluding long-term bonds



Source: ERA draft report and Bloomberg, CEG analysis

Figure 12: Fitted Nelson-Siegel-Svensson spread curve – excluding long-term bonds



Source: ERA draft report and Bloomberg, CEG analysis

6 Summary of conclusions

283. This section sets out my conclusions, directly responding to the questions that I have been asked in the terms of reference. The terms of reference are attached to this report at Appendix E below.

6.1 The risk free rate

284. Unlike the cost of equity, an estimate of "the risk free rate" is not an input into the cost of debt estimate. The risk free rate is an input into the CAPM and a different level of the risk free rate will affect the estimated cost of equity.[119] That is, an estimate of the risk free rate is required to implement the CAPM. By contrast, an estimate of the "the risk free rate" is not an input into the cost of debt estimate (Rd). It is not necessary to define a risk free rate in order to estimate the cost of debt.

285. If the debt management strategy involves the staggered issuance of 10 year debt without any swap overlay then the cost of debt is estimated directly as the 10 year trailing average yield on 10 year corporate debt. It is not necessary to estimate the "risk free rate" in order to arrive at the estimate of the cost of debt – this is simply estimated directly.

286. Of course, one can 'hypothesise' a risk free rate and use that to mechanically divide the cost of debt into the risk free rate and the DRP (where DRP is equal to the cost of debt less that risk free rate). With the DRP defined in this way the level of the risk free rate does not affect the cost of debt estimate (Rd) because a higher/lower risk free rate is perfectly offset by a lower/higher DRP. This is because the cost of debt is estimated first and the risk free rate is superimposed on this.

287. However, to the extent that there is any implied risk free rate that is 'consistent' with a given debt management strategy, then it is intuitive that the risk free rate will have a 'term' that is the same as the term of the debt issuance. In particular, if a business efficiently issues staggered 10 year debt, as the ERA now concedes, the term of the risk free rate that underpins the associated cost of debt will be 10 years.

288. That is, the debt issuance strategy can be thought of as creating a fundamental 'base level' cost of debt. Any changes to this base level cost of debt associated with a swap contract overlay (or any other derivative overlay) can be thought of as an 'add on' to the fundamental base level of the cost of debt that derives from the firm's issuance strategy.

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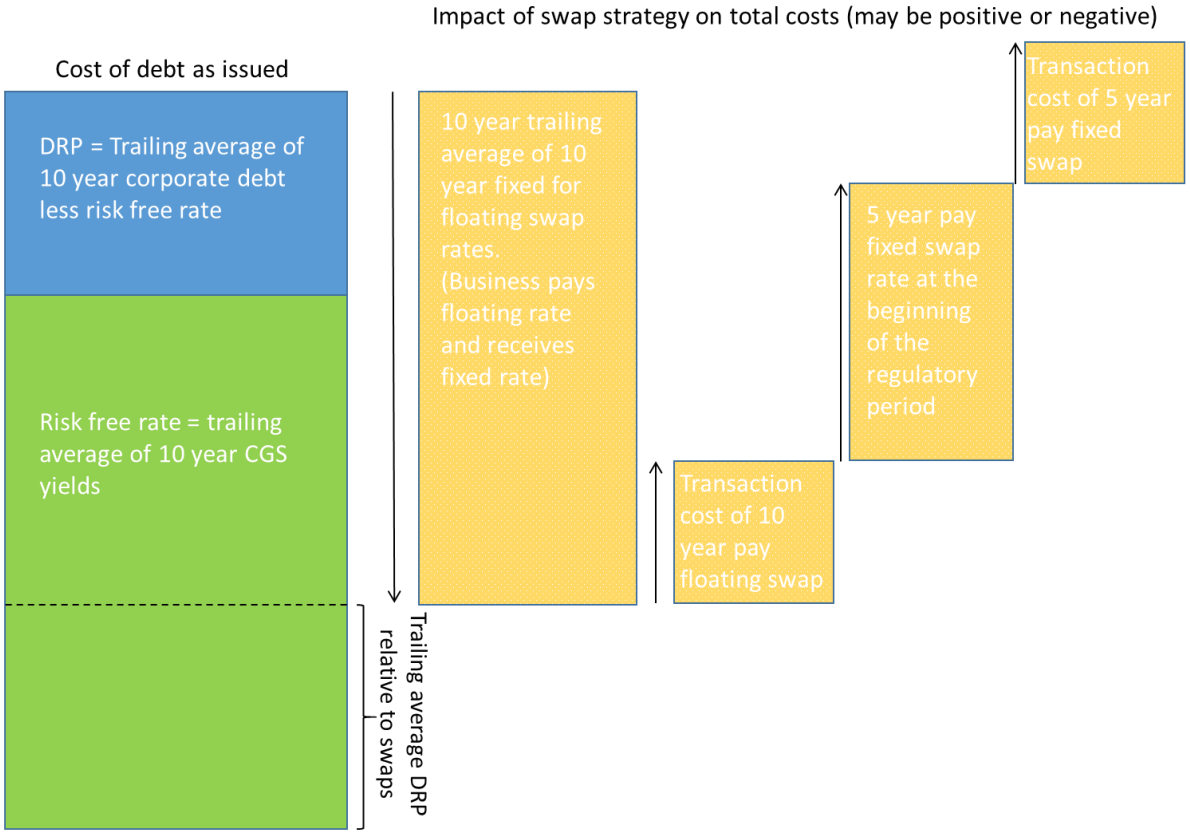
119 Unless the equity beta is 1.0 in which case the estimated risk free rate simply cancels out in the CAPM formula: $Re=RFR+ (R^{market}-RFR)$.

289. Consider the following representation of the cost of debt associated with what I define as the 'hybrid' debt management strategy described in section 3.2 (staggered issuance of 10 year debt with a swap contract overlay to reset base interest exposure at the beginning of each 5 year regulatory period).

Figure 13: Representation of the cost of debt at the beginning of the regulatory period assuming issuance of 10 year debt and the hybrid debt management strategy



290. Under this representation the cost of debt is built up as the trailing average cost of debt comprised of a trailing average risk free rate (proxied by Commonwealth Government Security (CGS) yields) plus a trailing average DRP relative to CGS. However, if a swap strategy is entered into, the net impact of that swap portfolio on the cost of debt (the yellow shaded boxes) must be added or subtracted to the base

level cost of debt (noting that the impact of the swap portfolio might be to raise or reduce the cost of debt relative to the base level).[120]

291. The DRP measured relative to the 10 year risk free rate (CGS) plays no role in the final estimate of the cost of debt. By contrast, the DRP measured relative to the 10 year swap rate does play a role in the final estimate of the cost of debt. Of course, the swap rate is not a risk free rate but, rather, is a rate of return determined between risky counterparties to a derivative contract.[121] It is therefore important to understand that, even though I use the terminology 'debt risk premium relative to swaps' in this report – this is not a debt risk premium measured relative to a riskless asset (i.e., it is a risk premium measured relative to another asset of lower, but not zero, risk). In any event, I note that the debt risk premium measured relative to swaps is still calculated relative to swaps with the same term as the debt at the time of issuance.

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[120] The yellow shaded box comprises the transaction costs associated with entering into a series of swap contracts plus the direct impact of those swap contracts. The direct impact of those swap contracts are that:

- at the time each ten year debt is issued, the business agrees to pay a third party a floating 3 month interest rate for a period of 10 years on the same amount of debt that has just been issued. In return the third party agrees to pay the business a fixed rate over the same 10 year period (the 10 year swap rate). Therefore, this swap agreement adds a floating interest rate exposure to the business's expenditures over the next ten years and adds a fixed rate exposure to the business's revenues over the same period;
- at the time each regulatory period commences, the business agrees with a third party to receive a 3 month floating rate payment over the length of the regulatory period (assumed to be 5 years) on an amount that is equal to the total size of the business's debt portfolio (which is simply the sum of all previous debt issues over the last 10 years). In return, the business agrees to pay a fixed rate over the same 5 year period.

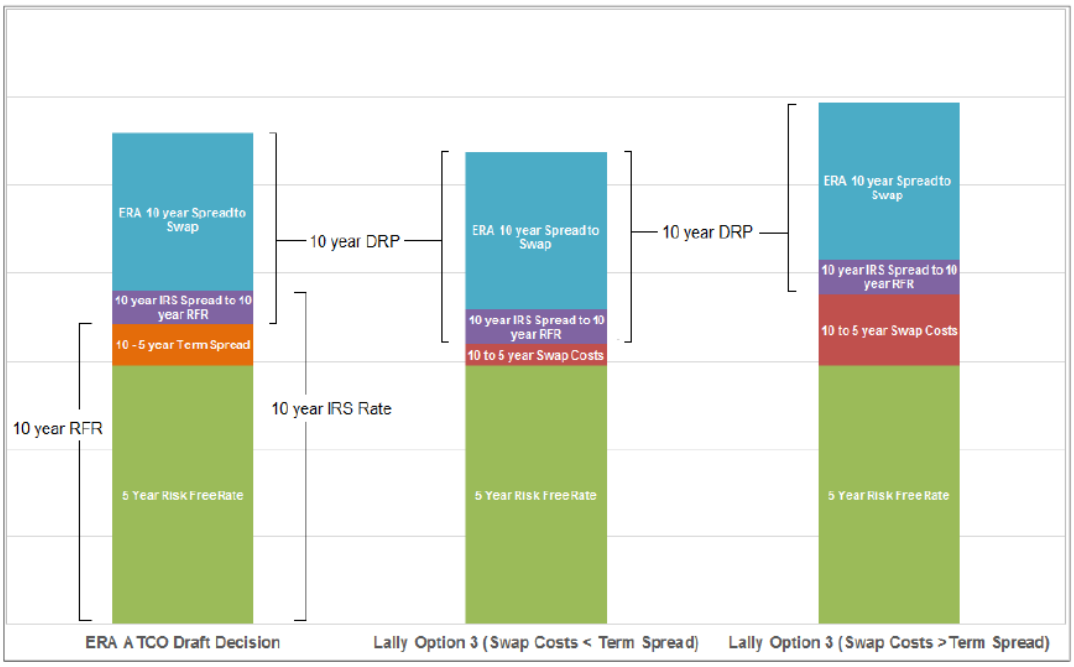
The net effect of these two agreements is that the floating rate amounts 'cancel out'. That is, the business pays the 3 month floating rate under the first swap contract but receives the 3 month floating rate under the second swap contract. The remaining impact of these contracts is that the business pays the prevailing 5 year fixed rate at the beginning of the regulatory period but receives the (trailing) average of the 10 year fixed rates associated with the swaps that it entered into historically each time it raised 10 year debt.

[121] The counterparties to the swap contract are the business itself (this case the gas pipeline provider) and commonly a bank (where the bank will generally hedge their exposure with the opposite side of a swap contract with another party). The swap rate itself is relatively low risk compared to corporate debt issued by a counterparty to the contract because no capital exchanges hands the beginning of the contract. However, there is default risk because, over the course of the contract, interest rates can move against one of the parties and if that party defaults the other party will lose the value of the hedge.

6.1.1 How has the ERA approached the issue?

292. The ERA appears to fall into error by attempting to derive the cost of debt under a 'hybrid' debt management strategy relative to a 5 year CGS yield. This can be seen in Figure 31 of the draft decision (reproduced below).

Figure 31 Decomposition of the Cost of Debt under the 'Term Spread' and 'Swaps' Approaches to determining the Regulated Debt Risk Premium



Source: Economic Regulation Authority

293. In the first column, which the ERA attempts to implement in paragraphs 893-894, the ERA proposes to compensate based on the prevailing 10 year cost of debt.[122] In doing so ERA has underestimated the 10 year swap rate in paragraph 894.[123]

294. It is, however, arbitrary and, ultimately meaningless, to associate a prevailing 10 year cost of debt estimate with a 5 year risk free rate estimate. That is, the decomposition of the 10 year risk free rate (which is illustrated on the left of the first bar chart) into a 5 year risk free rate plus a 10-5 year term spread has no economic justification.

122 Notwithstanding that the ERA proposes to use a historical average estimate of the term spread in paragraph 20 of Appendix 6, this does not enter its calculations in para 894.

123 The ERA uses a 3.417% swap rate – which is around 40bp too low and is closer to the 5 year swap rate. I discuss this issue in section 5.3.4 above.

295. In this scenario the firm is assumed to have a simple debt management strategy of issuing 10 year debt with no other swap transaction overlay. If any risk free rate is to be associated with this strategy it should be a 10 year risk free rate – i.e., consistent with the term of the debt being issued. As discussed above, it is mathematically possible to associate any risk free rate with a cost of debt estimate without affecting the resulting estimate of the cost of debt.[124] This is precisely what the ERA does in paragraph 895 where the ERA defines the DRP as the 10 year cost of debt less the 5 year risk free rate. However, the resulting DRP estimate is not an economically meaningful concept – anymore than had the ERA used a 15 year risk free rate in the same formula.

296. In the final two columns the ERA falls into a calculation error in attempting to build up the cost of debt based on a 5 year CGS yield as the risk free rate. The ERA's logic in support of the approach underlying these two columns is the implementation of a hybrid debt management strategy. However, as discussed in section 4.2 and 4.4 there are two errors in the calculation as an implementation of the hybrid debt management strategy. The first error is that a trailing average of the 10 year spread to swap is not being used. However, for the purpose of this section, the key error is that the hybrid debt management strategy does not involve any trading in CGS yields.

297. Nonetheless, the ERA attempts to shoehorn its estimate of the risk free rate (based on 5 year CGS) into the hybrid debt management strategy. The result is that its estimate will further depart from the true costs of the hybrid debt management strategy whenever the shape of the swap yield curve is not identical to the shape of the CGS yield curve – which, as discussed in section 4.4, is commonly the case.

6.1.2 Summary of answer

298. There is no need to define a 'risk free rate' in order to estimate the cost of debt – either under a hybrid or simple trailing average debt management strategy. However, to the extent one felt the need to hypothesise an implied risk free rate then it would be the CGS yield with the same term of the debt issuance. However, this estimate would play no role in influencing the cost of debt estimate because businesses do not issue or trade in CGS as a part of their debt management strategy. It is, therefore, unnecessary to define data to be used or the period of assessment because there is no need to estimate a risk free rate.

[124] This is because the DRP is defined simply as "Rd-RFR" – in which case the RFR simply cancels out when the DRP is added to the RFR

6.2 DRP

299. The questions put to me separate discussion of the "risk free rate" and the "DRP" implying that these are the only elements to the cost of debt. This is not the case. As already discussed, the risk free rate does not form part of any debt management strategy. Moreover, the swap rate (of which I am not asked) does form part of the hybrid debt management strategy. In answering these questions I also discuss the source of the swap rates necessary to estimate the cost of the hybrid debt management strategy.

300. If the debt management strategy being costed is the simple trailing average then there is no need to estimate a DRP. However, if the debt management strategy is the hybrid then it is necessary to estimate a trailing average DRP measured relative to swap rates. The term at which this is estimated depends on the assumed period over which debt issuance/maturity is staggered. It is common ground that a 10 year term is efficient. This means that the DRP must be estimated at the trailing average of the spread between 10 year corporate debt and 10 year swap rates.

301. With the exceptions of swap transaction costs, the information required to estimate the components of the hybrid cost of debt illustrated in Figure 13 can be derived from the RBA's F3 publication as follows:

- The 10 year trailing average of the 10 year cost of corporate debt (the sum of the green and blue)[125] components can be derived by taking a trailing average of the figures in column Y ("Non-financial corporate BBB-rated bonds – Yield – 10 year");
- The impact of a swap portfolio (yellow component) on the cost of debt can be estimated as:
  - the *prevailing* 5 year swap rate which is, for the relevant month, the value in column W ("Non-financial corporate BBB-rated bonds – Yield – 5 year") less the value in column AA ("Non-financial corporate BBB-rated bonds – Spread to swap – 5 year") with the latter value converted into percentage terms by dividing by 100; less
  - the 10 year trailing average 10 year swap rate which is the trailing average of the values in column Y ("Non-financial corporate BBB-rated bonds – Yield – 10 year") less the trailing average of the values in column AC ("Non-

[125] The individual components can also be derived from the RBA sheet. The trailing average DRP (blue) can be estimated by taking a trailing average of the figures in column AG ("Non-financial corporate BBB-rated bonds – Spread to CGS – 10 year") divided by 100 to convert the published value from basis points to percentage terms. The trailing average 10 year CGS yield is simply calculated at the trailing average of values in column Y ("Non-financial corporate BBB-rated bonds – Yield – 10 year") less the trailing average of the values in column AG ("Non-financial corporate BBB-rated bonds – Spread to CGS – 10 year") with the latter converted to percentage terms.

financial corporate BBB-rated bonds – Spread to swap – 10 year") with the latter value converted into percentage terms by dividing by 100.

302. The source of the data necessary for the simple trailing average cost of debt is set out in the first dot point above.

303. The same inputs can also be estimated using data from Bloomberg. However, Bloomberg's estimates of the cost of BBB corporate debt will sometimes differ to the RBA's historically. However, on average they are very close as discussed in section 5.1

304. It should be noted that the RBA and Bloomberg's spread to swap estimates are commonly for an effective tenor that is less than 10 years. Adjusting for this will modestly affect the above calculations as discussed in Appendix A.

6.2.1 How has the ERA approached the issue?

305. The ERA has determined to set the cost of debt based on the 5 year risk free (CGS) rate prevailing at the beginning of the regulatory period plus an estimate of the DRP. However, the ERA's DRP is not measured as the cost of debt associated with a specific well-defined (replicable) debt management strategy less the 5 year CGS rate. Consequently, the summation of the ERA's risk free rate and the ERA's DRP does not result in a cost of debt allowance that is consistent with the debt financing costs that would be incurred by a benchmark efficient entity (i.e., an entity that would have to adopt a specific debt management strategy).

306. As set out in section 3, if the benchmark efficient entity issues 10 year debt at staggered intervals and:

- **does not** enter into any swap contracts to reset its base rate of interest at the beginning of the regulatory period then its cost of debt will be:
  - a trailing average of the yield on the10 year corporate debt it has issued over the preceding 10 years; plus
  - the transaction costs of debt issuance.
- **does** enter into any swap contracts to reset its base rate of interest at the beginning of the regulatory period then its cost of debt will be given by:
  - a trailing average of the DRP on the 10 year corporate debt it has issued over the preceding 10 years relative to the then contemporaneous 10 year swap rate; plus
  - the prevailing 5 year swap rate at the beginning of the regulatory period; plus
  - transaction costs of both debt issuance and swap contracts.

307. As set out in section 4 the ERA's approach fails to replicate the costs associated with either one of these strategies. Throughout most of the draft decision (and all of the explanatory statement to the rate of return guidelines) the ERA's explanation of its approach that it is attempting to compensate on the basis that the benchmark efficient entity does undertake a swap strategy (at least that is how the draft decision justifies the adoption of a 5 year term for the risk free rate despite accepting that the staggered issuance of 10 year debt is efficient). However, the ERA draft decision also introduces the concept of the regulator choosing between compensating based on a debt management strategy that does/does not include swap strategy (as discussed in section 4.3).

308. In this context, if the ERA did choose to compensate based on the existence of swap contracts used to reset base interest rates it is the departure from the hybrid debt management strategy that are most relevant in an assessment of the ERA's methodology against the cost of debt associated with a well-defined replicable debt management strategy. These departures are documented in section 4 and are summarised as:

- defining the DRP relative to 5 year CGS yields instead of 10 year swap yields (as discussed in section 4.4); and
- annually resetting the DRP at prevailing rates instead of adopting a trailing average of historical DRPs relative to 10 year swaps (as discussed in section 4.2).

309. If the ERA chose instead to compensate on the basis of no swap contracts then it is the departure from the simple trailing average cost of debt that is most relevant in an assessment of the ERA's methodology against the cost of debt associated with a well-defined replicable debt management strategy. This departure involves the use of an estimate of the prevailing yield on 10 year debt instead of the trailing average yield on 10 year debt.

310. Moreover, simply by setting itself up to choose between the 'lowest cost' of these two strategies (with/without swap contracts to reset base interest costs) the ERA is establishing an impossible level of assumed efficiency. This is because these two debt management strategies are mutually exclusive.

311. As set out in section 3.2, the swap strategy associated with resetting the base rate of interest at the beginning of the regulatory period must be entered into at the time each debt instrument is issued (i.e., at each point over the preceding 10 years that debt issuance has been staggered). Once entered into, that strategy will define the cost of debt for the entity. As discussed in section 4.3, it is not possible for the entity to have a cost of debt that does not include the transaction costs of swaps. Similarly, if an entity has not previously entered into a swap strategy it is impossible for them to reset their base interest rate exposure to a 5 year term at the beginning of the regulatory period.

312. By proposing to choose between two mutually exclusive debt management strategies the ERA creates a further dimension of non-replicability in its allowance.

313. As set out in section 2 I consider that Rule 87 requires that compensation be based on the costs of implementing a well-defined debt management strategy. For the reasons set out in section 4, and particularly section 4.2, I do not consider that the ERA's proposed departure from this principle is justified by any other valid considerations.

314. Consistent with the above I consider that compliance with Rule 87 requires the estimation of the cost of debt based on the cost of implementing a well-defined debt management strategy that is efficient and consistent with a policy that a benchmark efficient entity would undertake. I agree with Lally that there are two such debt management strategies and I consider that these are consistent with Rule 87(3):

> *… only two possible debt strategies for a business are viable, and each has a matching regulatory policy such that the combination satisfies the NPV = 0 principle. The first involves borrowing long-term and staggering the borrowing to ensure that only a small proportion of the debt would mature in any one year; this reduces refinancing risk to a minimal level. The matching regulatory policy would be for the allowed cost of debt to be set in accordance with the trailing average cost (for a term matching that for benchmark firms). The second debt strategy additionally involves the use of interest rate swap contracts (relating to the risk-free rate component of the cost of debt). The matching regulatory policy would be for the allowed risk free rate within the cost of debt to be set in accordance with the rate prevailing at the beginning of the regulatory cycle (for a term equal to the cycle) whilst the DRP would be set in accordance with the trailing average (for a term matching the borrowing term for benchmark firms).*[126]

315. I disagree with Lally that there is any valid reason to depart from compensation based on one of these two viable debt management strategies. In my view, the choice between these two estimates depends on whether the benchmark efficient entity can be assumed to have used swaps to hedge its base rate of interest exposure or not.

6.3 Materiality of errors in terms of promotion of the NGO

316. In section 3 I set out why I consider that achieving the ARORO requires the cost of debt allowance to reflect the costs associated with a well-defined debt management strategy that a benchmark efficient entity could be expected to undertake. I also set

[126] Lally report, pp. 10-11

out why I considered that promoting the ARORO in this way was necessary to also promote the NGO and lead to outcomes consistent with the RPP.

317. The ERA has not proposed to set the cost of debt based on a well-defined debt management strategy. Instead, it has proposed a methodology that is not replicable for a number of reasons. The result is that the cost of debt allowance provided by the ERA has the potential to significantly depart from any estimate of the cost of debt finance that a benchmark efficient entity would incur. This is illustrated in Figure 5 and Figure 6 which illustrate such a plausible scenario – where the cost of debt allowed by the ERA is permanently and materially below the efficient cost of debt over the next decade.

318. Correcting this error would materially improve the achievement of the ARORO and, consequently, the NGO and the RPP. On this basis I consider that correcting this error (by compensating based on a well-defined debt management strategy that a benchmark efficient entity could reasonably be assumed to undertake) would materially promote the NGO and would be preferable to the ERA's approach in that regard.

Appendix A Extrapolation of RBA and Bloomberg curves to 10 years

319. Where the maximum effective tenor of the RBA or Bloomberg fair value curve is less than 10 years the spread to swap estimate has been extrapolated to 10 years using the following process:

    a. taking the spread to swap at each effective tenor on the fair value curve;

    b. calculating a slope for the spread to swap curve from "a." using simple linear regression (ie, ordinary least squares with an intercept and slope coefficient) across all points of 1 year of maturity and above;

    c. multiplying the slope estimated in point "b." by the difference between 10 years and the longest (effective) tenor published by the data provider; and

    d. adding the amount calculated in point "c." to the spread to swap associated with the longest (effective) tenor published by the data provider.

A.1 Calculating annualised spreads to swap

320. The RBA publishes both spread to swap and yield measures for corporate bonds. However, these are expressed in semi-annual terms. In order to express spreads to swap that can be appropriately added to annualised swap yields to get an annualised cost of debt:

    - I calculate the implied semi-annual swap rate used by the RBA at each tenor as the yield less the spread to swap;
    - I annualise both the implied swap rates and the corporate yields from semi-annual terms into annualised terms; and
    - I calculate the annualised spread to swap for each tenor as the annualised yield less the annualised swap rate.

321. Bloomberg reports its fair value curves in yield terms only and not as spreads to swap. To calculate the fair value spreads to swap:

    - I source Bloomberg's fair value yield estimates (described in section 5 above);
    - I source Bloomberg's estimates of swap rate at each of these maturities using ADSWAP;[127]
    - I annualise both the fair value yield estimates and the swap yields; and

[127] Eg, ADSWAP1 Curncy as the 1 year swap rate, ADSWAP10 Curncy as the 10 year swap rate.

- I calculate the annualised spread to swap for each tenor as the annualised yield less the annualised swap rate.

A.2 Extrapolating spreads to swap

322. The above process is illustrated below using RBA data from 31 October 2014.

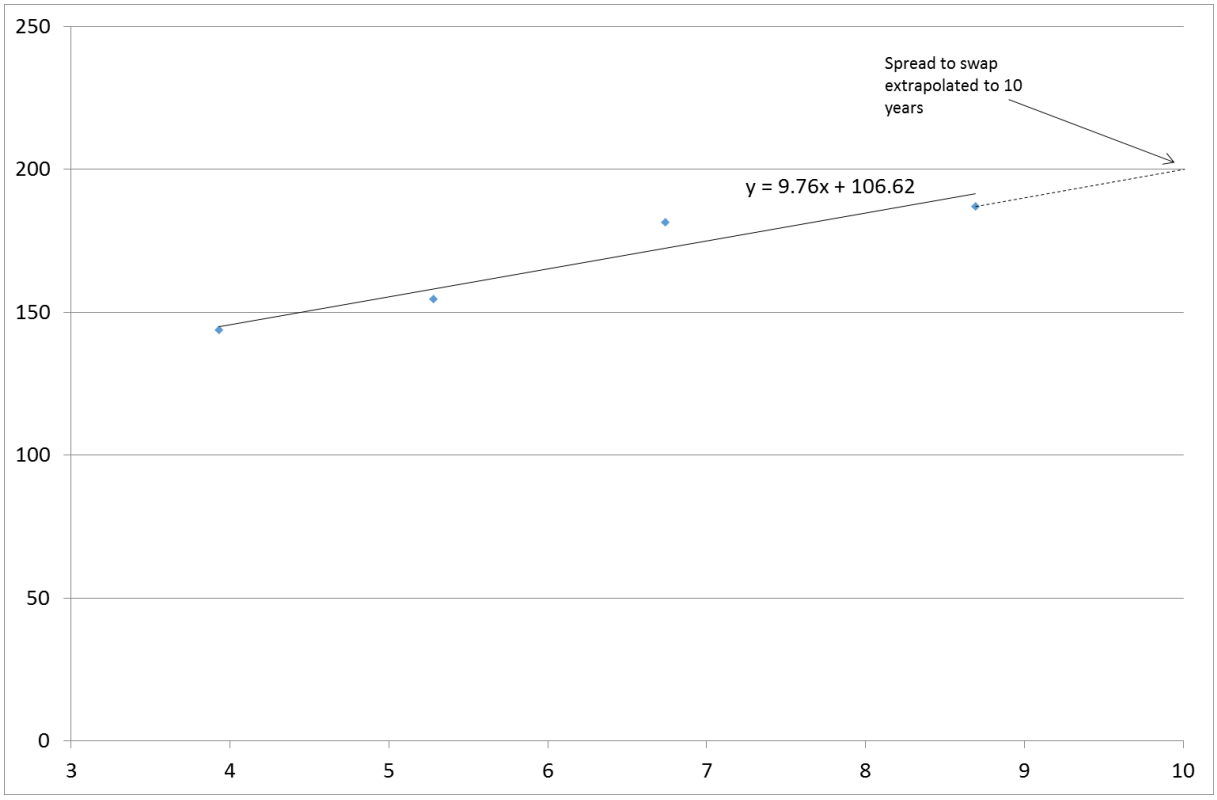
Table 8: Extrapolation of RBA 31 October spread to swap to 10 years

Target tenor (years)	3	5	7	10
Effective tenor (years)	3.93	5.28	6.74	8.69
Spread to swap (bppa)	141.26	151.56	177.76	182.76
Yield (%)	4.23	4.68	5.21	5.51
Implied swap rate (%)	2.82	3.16	3.43	3.68
Annualised yield (%)	4.27	4.73	5.28	5.59
Annualised swap rate (%)	2.84	3.19	3.46	3.72
Annualised spread to swap (bppa)	143.75	154.53	181.60	186.96

Calculations	
Slope (spread to swap vs effective tenor)	9.76bppa per year
Incremental impact of extrapolation (bppa)	12.78 (=9.76*(10-8.69)
Spread to swap extrapolated to 10 years bppa	199.74

323. The estimation of the 9.76 bppa per year slope in the first row of the 'calculations' section of the table can be illustrated graphically as the slope of the line of best fit of the data points in Figure 14 (dark line). The use of this slope to extrapolate the spread to swap out to 10 years is shown graphically by the dotted line extending out from the right most data point.

Figure 14: Extrapolation of RBA spread to swap on 31 October 2014



Source: RBA data, CEG analysis

324. I note that this approach has the advantage of being an extrapolation method that can be applied to any fair value curve based only on the information in that fair value curve and not on any other information. This makes it an effective extrapolation method that can be used historically and also can be sufficiently simply specified to allow it to be applies prospectively.

325. I note that attempting extrapolate the RBA curve by simply increasing the target maturity until the effective maturity is equal to 10 years will generally be inappropriate because the lack of comprehensive data above a 10 year maturity makes the Gaussian kernel unstable at target maturities in excess of 10 years.[128]

[128] For example, using the data in Appendix 5 of the ERA draft decision the target maturity would have to be around 15.9 years in order to result in an effective tenor of 10 years. However, at this target tenor the closest bond is the APT bond with an actual maturity of 10.2 years. The next closest in the other direction is the Caltex bond with a maturity of 23 years. That is, the target tenor would need to be located at a point where there is no nearby data. The effective of which is that the weighting scheme in the Gaussian kernel takes on arbitrary properties. For example, the APT bond will receive a weight of 48% in the Gaussian kernel.

Appendix B Updating within and between regulatory periods

B.1 Updating the DRP in the hybrid model within the regulatory period

326. Under the hybrid debt management strategy the trailing average DRP will vary through time as new debt is issued and old debt expires. This must be reflected in a change in the compensation for the cost of debt allowed in each regulatory year. I understand that ATCO will update its prices on a calendar year basis.

327. In this context, a straight forward approach would be to set the DRP for each regulatory year based on the 10 year trailing average DRP estimated as at, say, 30 September in the preceding year. 30 September is suggested in the expectation that this would allow sufficient time for the DRP to be estimated and the necessary cost modelling to be performed to update prices for 1 January of the following year. (If this is not the case then an earlier date could be chosen). For example, the DRP to be applied in calendar year 2015 would be the average DRP over the preceding 10 years from 1 October 2004 to 30 September 2014.

328. In my view, every historical observation of the DRP from the relevant source should, at least initially, be included in the trailing average DRP. This avoids any potential for, or claims of, 'cherry-picking' high/low DRP periods from a particular year. Using RBA BBB data this would mean that every monthly observation would be included – so the 10 year trailing average would be an average of 120 monthly observations. Alternatively, if the Bloomberg data source was used then every day that Bloomberg published its BBB curve would be used.

329. Prospectively, it may be that a business knows that it expects to raise debt in a particular month, or set of months, of the year. In my view, the business should have the flexibility to nominate this period in advance to the regulator and the DRP measured in that specific period should form part of the trailing average DRP rather than the DRP measured across all 12 months.

330. For example, it may be that ATCO expects to raise debt in July 2016 or August 2016. In which, case, it would need to nominate (in advance) that this period be used to set the DRP that will be estimated for the 12 months from 1 October 2015 to 30 September 2016 (assuming 30 September is adopted as the cut off period for estimating a new DRP as discussed above).

331. Once estimated the DRP for this period would receive a 10% weight[129] in the trailing average DRP used to estimate the cost of debt in regulatory (calendar) years 2017 to 2026.

332. The annual updating of the trailing average DRP can be expressed formulaically as follows:

$$\text{TA DRP}_n = \frac{1}{10}\sum_{t=\text{n}-10}^{\text{n}-1} DRP_t$$

where:

- TA DRP_n refers to the trailing average DRP to be used in cost modelling allowed revenues in calendar year *n;*
- DRP_t refers to the estimated DRP estimated during the averaging period specified by ATCO that fall within the 12 months ending 30 September in calendar year *t*, estimated as the 10 year cost of debt less the yield on 10 year interest rate swaps; and
- equal weights of one tenth apply to each element of the trailing average (alternatively if a weighted trailing average is adopted then weights specific to each of the 10 years would need to be computed consistent with the discussion in section 4.2.2.3).

Estimates of DRP_t represent simple averages of the estimates within the averaging period that falls within (or across all) of the 12 months ending 30 September in calendar year *t*. If only month end values are being used (as per the RBA's current publication) then linear interpolation can be used to estimate the daily DRPs over the period.

333. Application of this formulae means that the trailing average DRP estimated for:

- **2014** will be the simple average of all DRP estimates 1 October 2003 to 30 September 2013 (which is the same as giving 10% to each 12 month period ending 30 September within the preceding 12 years)
- **2015** will be:
  - 90% weight given to the simple average of all DRP estimates from 1 October 2004 to 30 September 2013 (that is the year ending 30 September 2004 is dropped from the trailing average); plus

[129] Or, if a weighted trailing average was used some other weight determined in a manner consistent with the RAB raised in that period.

- 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2013 to 30 September 2014 (this effectively 'replaces' the year ending 30 September 2004 in the trailing average);

- **2016** will be:
  - 80% weight given to the simple average of all DRP estimates from 1 October 2005 to 30 September 2013 (now the year ending 30 September 2005 is dropped from the trailing average); plus
  - 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2013 to 30 September 2014; and
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2014 to 30 September 2015;
- **2017** will be:
  - 70% weight given to the simple average of all DRP estimates from 1 October 2006 to 30 September 2013; plus
  - 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 O1 October 2013 to 30 September 2014; and
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2014 to 30 September 2015;
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2015 to 30 September 2016;
- **2018** will be:
  - 60% weight given to the simple average of all DRP estimates from 1 October 2007 to 30 September 2013 plus:
  - 50% weight given to the simple average of all DRP estimates from 1 October 2008 to 30 September 2013 plus:
  - 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2013 to 30 September 2014; and
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2014 to 30 September 2015;
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2015 to 30 September 2016;
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2016 to 30 September 2017.

- **2019** will be:
  - 50% weight given to the simple average of all DRP estimates from 1 October 2008 to 30 September 2013 plus:
  - 10% weight given to the DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2013 to 30 September 2014; and
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2014 to 30 September 2015;
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2015 to 30 September 2016;
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2016 to 30 September 2017.
  - 10% weight given to DRP estimated during ATCO's proposed averaging period falling within the 12 months 1 October 2017 to 30 September 2018.
- And so on into the next regulatory period.

334. For the absence of doubt the last 6 months of 2014 have the same trailing average DRP applied as would have been estimated for the whole of 2013 - notwithstanding that the first 6 months of 2013 are not covered by the same averaging period.

335. I also note that the RBA BBB series only extends back to 30 January 2005. This means that there are only 105 monthly observations as at 30 September 2013 – which is 15 months less than 10 years. Even if it was determined that sole reliance on the RBA data series was appropriate where that series was published, it would be necessary to rely on another published series for the missing data. In my view, the Bloomberg BBB series provides a reasonable basis for extending the RBA BBB series backwards in time over these 15 months. When I do this, applying the extrapolation technique described in Appendix A to both the RBA and Bloomberg series, I estimate the DRP values set out in the table below. Consistent with this, I estimate the trailing average DRP for the 10 years ending 30 September 2013 (using RBA data where it is available and Bloomberg where it is not available) to be 2.34%.[130]

[130] This figure needs to be added to the relevant fixed swap rate expressed on a semi-annual basis and the resulting sum (=x%) annualised using the formula annualised cost of debt = $(1+x\%/2)^2 - 1$.

Table 9: Extrapolated month end DRP values

Date	Bloomberg	RBA	Date	Bloomberg	RBA
Oct-2003	1.0162	1.0162	May-2009	3.4043	4.4611
Nov-2009	0.9009	0.9009	Jun-2009	2.9875	4.0526
Dec-2003	0.9260	0.9260	Jul-2009	2.4555	3.1599
Jan-2004	0.9623	0.9623	Aug-2009	2.6763	3.0187
Feb-2004	0.9591	0.9591	Sep-2009	3.7526	2.9179
Mar-2004	1.0158	1.0158	Oct-2009	3.7982	2.9169
Apr-2004	0.9806	0.9806	Nov-2009	3.6666	2.9155
May-2004	0.9364	0.9364	Dec-2009	3.9498	2.1155
Jun-2004	0.9873	0.9873	Jan-2010	4.3934	2.3840
Jul-2004	1.0787	1.0787	Feb-2010	4.3702	2.2715
Aug-2004	1.0476	1.0476	Mar-2010	4.3001	2.0186
Sep-2004	0.9493	0.9493	Apr-2010	4.2067	2.0004
Oct-2004	0.9193	0.9193	May-2010	4.6745	2.8166
Nov-2004	1.0349	1.0349	Jun-2010	4.3871	2.6023
Dec-2004	0.9442	0.9442	Jul-2010	4.4449	2.3574
Jan-2005	0.8785	0.7359	Aug-2010	4.2255	2.1974
Feb-2005	0.7704	0.5693	Sep-2010	4.6190	2.1867
Mar-2005	0.9822	0.6555	Oct-2010	4.8609	2.1067
Apr-2005	0.8930	0.6454	Nov-2010	4.9147	2.0016
May-2005	1.0135	0.6520	Dec-2010	4.7729	1.9498
Jun-2005	1.0296	0.5429	Jan-2011	4.9813	1.9439
Jul-2005	0.8033	0.5644	Feb-2011	4.8387	1.8398
Aug-2005	0.9385	0.5783	Mar-2011	4.7783	1.8556
Sep-2005	0.8040	0.5976	Apr-2011	4.4506	2.1843
Oct-2005	0.6822	0.6007	May-2011	4.4154	1.9925
Nov-2005	0.5905	0.6044	Jun-2011	3.9768	2.2736
Dec-2005	0.5898	0.5855	Jul-2011	4.0750	2.2498
Jan-2006	0.6393	0.5945	Aug-2011	4.1921	2.7377
Feb-2006	0.5372	0.6280	Sep-2011	4.1617	2.9936
Mar-2006	0.5944	0.6221	Oct-2011	3.8493	3.2385
Apr-2006	0.5740	0.8543	Nov-2011	3.4544	3.2830
May-2006	0.5255	0.8389	Dec-2011	3.4187	3.4131
Jun-2006	0.6053	0.8309	Jan-2012	3.8087	3.4772
Jul-2006	0.5586	0.8486	Feb-2012	3.5101	3.3152
Aug-2006	0.6072	0.8498	Mar-2012	3.5638	3.0701
Sep-2006	0.5794	0.6526	Apr-2012	3.5986	3.0856
Oct-2006	0.6063	0.9034	May-2012	3.4282	3.0587
Nov-2006	0.5454	0.7361	Jun-2012	3.3640	3.3475
Dec-2006	0.6789	0.7049	Jul-2012	3.3124	3.2776
Jan-2007	0.6827	2.4872	Aug-2012	3.1992	3.2548
Feb-2007	0.6751	1.4228	Sep-2012	3.0641	3.1963
Mar-2007	0.6054	0.8922	Oct-2012	3.1910	2.8641

Apr-2007	0.6595	0.8323	Nov-2012	3.0916	3.0156
May-2007	0.5932	0.7915	Dec-2012	2.9035	2.9222
Jun-2007	0.7240	0.8364	Jan-2013	2.9075	2.8553
Jul-2007	0.8048	1.0152	Feb-2013	2.7252	2.8682
Aug-2007	0.9218	1.1639	Mar-2013	2.6076	2.7893
Sep-2007	0.9796	1.3739	Apr-2013	2.4232	2.7948
Oct-2007	0.8750	1.2990	May-2013	2.5164	2.6429
Nov-2007	1.2617	1.3319	Jun-2013	2.7189	3.2284
Dec-2007	1.0949	1.7336	Jul-2013	2.6470	3.1879
Jan-2008	1.3333	1.6550	Aug-2013	2.5629	3.2446
Feb-2008	1.9843	2.1791	Sep-2013	2.3826	3.3584
Mar-2008	2.3889	2.6657	Oct-2013	2.2764	3.1970
Apr-2008	2.2789	2.4802	Nov-2013	2.3616	3.2268
May-2008	1.9683	2.3053	Dec-2013	2.4023	3.3124
Jun-2008	1.8535	2.4666	Jan-2014	2.3292	3.1581
Jul-2008	2.1537	2.2772	Feb-2014	2.2896	2.9510
Aug-2008	2.1655	2.4037	Mar-2014	2.2188	2.8417
Sep-2008	2.2200	2.9633	Apr-2014	1.8530	2.3458
Oct-2008	2.3781	5.3374	May-2014	1.9172	2.2141
Nov-2008	2.7683	8.1410	Jun-2014	1.8161	1.8869
Dec-2008	3.3254	9.5985	Jul-2014	1.6544	1.7953
Jan-2009	3.6279	7.6121	Aug-2014	1.6091	1.8159
Feb-2009	3.4103	5.7397	Sep-2014	2.1827	1.8892
Mar-2009	3.0903	6.7266	Oct-2014	2.1321	1.9974
Apr-2009	3.2560	6.1944			

Source: RBA, Bloomberg data, CEG analysis

B.2 Updating the cost of debt across regulatory periods

336. Consistent with the logic expressed throughout this report, the cost of debt within the July 2014 to December 2019 regulatory period must be compensated based on a well-defined debt management strategy for a benchmark efficient firm. That strategy could conceivably be the hybrid or the trailing average cost of debt or a transition from the hybrid to a trailing average cost of debt as discussed in Appendix C. Whatever it is, it will determine the starting point for any efficient debt management strategy that can be pursued in the subsequent regulatory period. In particular:

- If the hybrid debt management strategy is defined as the benchmark efficient strategy in this regulatory period then, at the beginning of the next regulatory period, the benchmark efficient entity will have a 100% floating base rate of interest and will have to pay the prevailing swap rates at that time on its entire debt portfolio. The definition of the benchmark efficient entity in that regulatory period must take this starting point into account.

- If the trailing average cost of debt (or a transition to it) is defined as the benchmark efficient strategy for July 2014 to December 2019, then a benchmark efficient entity will not have any floating rate debt at the beginning of the next regulatory period and will be paying historical average interest rates on its debt. The definition of the benchmark efficient entity in that regulatory period must take this starting point into account.

337. For this reason, once a benchmark efficient debt management strategy is defined the regulator should either:

- continue to apply that strategy to estimate the cost of debt in future regulatory periods; or
- define a replicable transition from that strategy to another strategy – much as I do in Appendix C when describing how a benchmark efficient entity would transition from a hybrid debt management strategy to a trailing average debt management strategy.

Appendix C Transition from hybrid to simple trailing average

338. Consistent with the ERA and AER logic set out in section 3.1, it may be determined that the hybrid debt management strategy was the most efficient debt management strategy under the previous access arrangement (and the previous Rules) but that a trailing average of the full cost of debt (i.e., no swap contract overlay) was determined to be the long run efficient debt management strategy. In which case, consistent with the discussion in Appendix B, then a transition would be required.

339. The nature of that transition would reflect how a benchmark efficient entity with base interest costs that are 100% floating rate at the beginning of the regulatory period would transition to a trailing average exposure. A simple way to do so would be to set an allowance based on an assumed strategy of, instead of fixing all of that floating rate exposure for 5 years as per a continuation of the hybrid strategy, entering into 10 different fixed rate swap contracts:

    - 10% at one year maturity;
    - 10% at two year maturity;
    - …
    - 10% at 10 year maturity.

340. Having done this the firm would have effectively created a synthetic trailing average cost of debt that is equal to the average of:

    - The DRP on 10 year debt from 10 years ago plus the one year swap rate today;
    - The DRP on 10 year debt from 9 years ago plus the 2 year swap rate today;
    - …
    - The DRP on 10 year debt from the most recent year plus the 10 year swap rate today.

341. This could then be rolled forward in precisely the same way that a trailing average would – dropping the 'oldest' year[131] of the trailing average and replacing it with the most recent year.

[131] The first 'year' to be dropped would be the year based on the DRP on 10 year debt from 10 years ago plus the one year swap rate at the beginning of the regulatory period

Appendix D Debt risk premium datasets

Table 10: Comparison of debt risk premium datasets over 7 days to 9 September 2014

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
Premier Finance Trust Australi	0.97	AUD		124.35	486,000,000	486,000,000			
New Terminal Financing Co Pty	1.02	AUD		114.32	285,000,000	285,000,000			
Asciano Ltd	1.04	USD		72.67	400,000,000	421,540,731			In
Asciano Ltd	1.04	USD		72.67	400,000,000	421,540,731			
Santos Finance Ltd	1.04	AUD		117.12	100,000,000	100,000,000			In
Jemena Ltd	1.04	USD		108.11	150,000,000	220,945,647			
Jemena Ltd	1.04	USD		108.51	150,000,000	220,945,647			In
DBNGP Finance Co Pty Ltd	1.05	AUD		158.38	425,000,000	425,000,000			
DBNGP Finance Co Pty Ltd	1.05	AUD		138.46	150,000,000	150,000,000			In
Australian Gas Networks Vic 3	1.10	AUD		94.89	45,000,000	45,000,000			
Leighton Finance Ltd	1.10	USD		194.70	90,000,000	136,013,299			In
Powercor Australia LLC	1.18	AUD		86.28	200,000,000	200,000,000			
Powercor Australia LLC	1.19	AUD		65.19	150,000,000	150,000,000			
EnergyAustralia Finance Pty Lt	1.19	AUD			50,000,000	50,000,000			
Sydney Airport Finance Co Pty	1.20	AUD		135.39	300,000,000	300,000,000			
Incitec Pivot Ltd	1.24	USD		79.23	500,000,000	508,698,749			In
Incitec Pivot Ltd	1.24	USD		79.36	500,000,000	508,698,749			
DUET Group	1.60	USD		253.73	200,000,000	277,238,703			In
DUET Group	1.60	USD		253.73	200,000,000	277,238,703			
Brisbane Airport Corp Pty Ltd	1.81	AUD		171.14	400,000,000	400,000,000			

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
New Terminal Financing Co Pty	2.03	AUD	166.22	168.63	100,000,000	100,000,000	In	In	In
New Terminal Financing Co Pty	2.03	AUD		127.40	165,000,000	165,000,000		In	
AusNet Electricity Services Pt	2.23	USD	161.89	152.49	100,000,000	124,254,473	In		
Coca-Cola Amatil Ltd	2.40	AUD	58.78	57.48	250,000,000	250,000,000	In	In	In
SGSP Australia Assets Pty Ltd	2.45	AUD	100.73	100.69	400,000,000	400,000,000	In	In	In
DUET Group	2.59	AUD	136.97	140.56	265,000,000	265,000,000	In	In	In
DBNGP Finance Co Pty Ltd	2.63	AUD	180.52	186.17	275,000,000	275,000,000	In	In	
Powercor Australia LLC	2.63	AUD	105.35	105.02	200,000,000	200,000,000	In	In	
CitiPower I Pty Ltd	2.85	AUD	99.02	100.64	300,000,000	300,000,000	In	In	
CitiPower I Pty Ltd	2.85	AUD	101.21	101.33	275,000,000	275,000,000	In	In	
Crown Group Finance Ltd	2.86	AUD	114.32	114.01	300,000,000	300,000,000	In	In	In
Holcim Finance Australia Pty L	2.86	AUD	116.28	121.55	250,000,000	250,000,000	In	In	In
Leighton Finance USA Pty Ltd	2.86	USD	246.58	231.73	145,000,000	165,129,256	In	In	In
Premier Finance Trust Australi	2.98	AUD	157.32	156.81	190,000,000	190,000,000	In	In	In
Coca-Cola Amatil Ltd	3.41	AUD	21.42	26.67	100,000,000	100,000,000	In	In	In
Asciano Ltd	3.58	USD	136.7	128.78	750,000,000	716,400,802	In	In	In
Asciano Ltd	3.58	USD	136.82	128.88	750,000,000	716,400,802	In		
Jemena Ltd	3.60	USD	172.28	141.57	150,000,000	231,267,345	In		
Jemena Ltd	3.60	USD	140.65	138.66	150,000,000	231,267,345	In	In	In
Brambles Ltd	3.61	EUR	107.88	87.14	500,000,000	677,690,431	In	In	
DBNGP Finance Co Pty Ltd	3.63	AUD	216.42	224.89	325,000,000	325,000,000	In	In	
Sydney Airport Finance Co Pty	3.82	AUD	114.48	121.22	100,000,000	100,000,000	In	In	In
Coca-Cola Amatil Ltd	3.99	AUD	43.99	45.83	200,000,000	200,000,000	In	In	In
Origin Energy Ltd	4.08	USD	135.36	126.41	800,000,000	847,008,999	In		
Origin Energy Ltd	4.08	USD	136.98	126.23	800,000,000	847,008,999	In	In	In

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
Leighton Finance Ltd	4.10	USD	288.75	267.85	79,000,000	119,389,451	In	In	In
Adani Abbot Point Terminal Pty	4.15	AUD	246.26	250.78	500,000,000	500,000,000	In	In	In
Caltex Australia Ltd	4.21	AUD	108.86	114.34	150,000,000	150,000,000	In	In	In
Incitec Pivot Ltd	4.45	AUD	162.07	164.71	200,000,000	200,000,000	In	In	In
Woodside Petroleum Ltd	4.47	USD	121.96	113.51	600,000,000	940,733,772	In	In	In
Woodside Petroleum Ltd	4.47	USD	120.74	113.38	600,000,000	940,733,772	In		
CitiPower I Pty Ltd	4.56	AUD	139.8	133.27	150,000,000	150,000,000	In	In	
Holcim Finance Australia Pty L	4.57	AUD	122.29	133.86	200,000,000	200,000,000	In	In	In
Amcor Ltd/Australia	4.60	EUR	108.41	91.75	550,000,000	777,055,665	In	In	In
Brisbane Airport Corp Pty Ltd	4.83	AUD	99.56	104.89	200,000,000	200,000,000	In	In	In
Broadcast Australia Finance Pt	4.83	AUD			450,000,000	450,000,000			
Premier Finance Trust Australi	4.97	AUD	158.29	158.28	190,000,000	190,000,000	In	In	In
Origin Energy Ltd	5.09	EUR	142.42	120.43	500,000,000	629,722,922	In	In	In
DBNGP Finance Co Pty Ltd	5.09	AUD	156.59	154.75	300,000,000	300,000,000	In	In	In
Coca-Cola Amatil Ltd	5.18	AUD	56.2	59.71	150,000,000	150,000,000	In	In	In
Incitec Pivot Ltd	5.25	USD	188.72	169.87	800,000,000	872,790,748	In	In	
Incitec Pivot Ltd	5.25	USD	188.72	169.87	800,000,000	872,790,748	In	In	
Barrick PD Australia Finance P	5.35	USD	112.54	112.70	400,000,000	456,673,136	In	In	In
Barrick PD Australia Finance P	5.35	USD			400,000,000	436,442,990			
Barrick PD Australia Finance P	5.35	USD			400,000,000	436,442,990			
SGSP Australia Assets Pty Ltd	5.54	AUD	156.61	149.13	150,000,000	150,000,000	In	In	
Brambles USA Inc	5.56	USD	128.61	115.86	500,000,000	545,137,375	In	In	
Brambles USA Inc	5.56	USD	124.68	115.86	500,000,000	545,137,375	In	In	
Adani Abbot Point Terminal Pty	5.72	AUD	265.1	268.11	100,000,000	100,000,000	In	In	In
Coca-Cola Amatil Ltd	5.74	AUD	61.18	62.03	205,000,000	205,000,000	In	In	In

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
Leighton Finance USA Pty Ltd	5.86	USD	309.43	289.89	115,000,000	130,964,583	In	In	In
APT Pipelines Ltd	5.87	AUD	142.76	153.17	300,000,000	300,000,000	In	In	In
Perth Airport Pty Ltd	5.87	AUD	104.44	108.12	150,000,000	150,000,000	In	In	In
QPH Finance Co Pty Ltd	5.89	AUD	114.38	118.53	300,000,000	300,000,000	In	In	In
Asciano Ltd	6.04	USD	175.51	164.50	600,000,000	632,311,097	In	In	In
Asciano Ltd	6.04	USD	174.59	164.31	600,000,000	632,311,097	In		
Brisbane Airport Corp Pty Ltd	6.12	AUD	103.85	107.99	350,000,000	350,000,000	In	In	In
Origin Energy Ltd	6.12	EUR	154.53	132.22	750,000,000	950,209,046	In	In	In
Aurizon Network Pty Ltd	6.14	AUD	119.93	123.25	525,000,000	525,000,000	In	In	In
Sydney Airport Finance Co Pty	6.20	AUD		292.30	535,000,000	535,000,000		In	In
Coca-Cola Amatil Ltd	6.21	AUD	68.68	70.14	100,000,000	100,000,000	In	In	In
SGSP Australia Assets Pty Ltd	6.43	GBP	168.96	153.55	250,000,000	399,297,237	In	In	
Sydney Airport Finance Co Pty	6.46	USD	126.04	119.57	500,000,000	508,905,852	In		
Sydney Airport Finance Co Pty	6.46	USD	126.02	119.57	500,000,000	508,905,852	In	In	In
SGSP Australia Assets Pty Ltd	6.51	AUD	120.34	123.47	350,000,000	350,000,000	In	In	In
Perth Airport Pty Ltd	6.54	AUD	108.13	112.30	400,000,000	400,000,000	In	In	In
Woodside Petroleum Ltd	6.67	USD	121.31	111.53	700,000,000	645,935,222	In	In	In
Woodside Petroleum Ltd	6.67	USD	121.2	111.43	700,000,000	645,935,222	In		
Coca-Cola Amatil Ltd	6.70	AUD	77.36	78.77	100,000,000	100,000,000	In	In	In
QPH Finance Co Pty Ltd	6.83	AUD	121.74	123.25	200,000,000	200,000,000	In	In	In
Coca-Cola Amatil Ltd	6.87	AUD	86.29	86.20	45,000,000	45,000,000	In	In	
Coca-Cola Amatil Ltd	6.92	AUD	79.92	80.66	100,000,000	100,000,000	In	In	In
Powercor Australia LLC	6.93	AUD	122.28	119.59	300,000,000	300,000,000	In	In	
Coca-Cola Amatil Ltd	7.05	AUD	87.48	87.16	30,000,000	30,000,000	In	In	
Origin Energy Ltd	7.07	EUR	165.14	139.77	800,000,000	1,149,590,458	In		

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
Origin Energy Ltd	7.07	EUR	165.35	139.77	800,000,000	1,149,590,458	In	In	In
Origin Energy Ltd	7.10	USD	165.13	154.74	500,000,000	483,558,994	In	In	In
Origin Energy Ltd	7.10	USD	164.77	154.70	500,000,000	483,558,994	In		
Newcrest Finance Pty Ltd	7.18	USD	291.43	277.69	750,000,000	736,883,474	In		
Newcrest Finance Pty Ltd	7.18	USD	291.1	277.69	750,000,000	736,883,474	In	In	In
Sydney Airport Finance Co Pty	7.20	AUD	128.83	123.36	200,000,000	200,000,000	In	In	
Powercor Australia LLC	7.36	AUD	117.87	116.44	630,000,000	630,000,000	In	In	
SGSP Australia Assets Pty Ltd	7.81	EUR	146.45	125.61	500,000,000	725,794,745	In	In	In
Coca-Cola Amatil Ltd	7.84	AUD	85.28	86.01	30,000,000	30,000,000	In	In	
Newcrest Finance Pty Ltd	8.06	USD	317.15	302.81	750,000,000	723,868,352	In		
Newcrest Finance Pty Ltd	8.06	USD	318.79	302.91	750,000,000	723,868,352	In	In	In
APT Pipelines Ltd	8.09	USD	179.76	167.53	750,000,000	730,709,275	In		
APT Pipelines Ltd	8.09	USD	179.7	167.51	750,000,000	730,709,275	In	In	In
Sydney Airport Finance Co Pty	8.09	AUD	121.61	117.71	750,000,000	750,000,000	In	In	
Leighton Finance USA Pty Ltd	8.18	USD	318.25	300.67	500,000,000	479,156,684	In		
Leighton Finance USA Pty Ltd	8.18	USD	318.58	300.72	500,000,000	479,156,684	In	In	In
Sydney Airport Finance Co Pty	8.53	USD	148.58	138.80	825,000,000	803,701,900	In	In	In
Sydney Airport Finance Co Pty	8.53	USD	148.78	138.99	825,000,000	803,701,900	In		
Amcor Ltd/Australia	8.53	EUR	143.53	123.49	300,000,000	373,087,924	In	In	In
Origin Energy Ltd	8.57	EUR	201.81	181.61	150,000,000	187,758,167	In	In	In
Asciano Ltd	8.57	USD	213.4	201.89	250,000,000	238,800,267	In	In	In
Asciano Ltd	8.57	USD	213.5	201.90	250,000,000	238,800,267	In		
SGSP Australia Assets Pty Ltd	8.58	USD	177.71	165.90	500,000,000	489,955,904	In	In	In
Asciano Ltd	9.03	GBP	221.71	203.35	300,000,000	509,614,731	In	In	
Sydney Airport Finance Co Pty	9.62	EUR	143.64	120.75	700,000,000	1,041,046,996	In	In	In

Bond	Years to Maturity	Currency	ERA Spread to swap	CEG spread to swap	Amount (Foreign)	Amount (AUD)	ERA sample	Replication of ERA sample	Replication of RBA sample
Brambles Finance Ltd	9.76	EUR	147.84	121.67	500,000,000	718,803,910	In	In	In
APT Pipelines Ltd	10.21	GBP	186.79	169.97	350,000,000	536,004,166	In	In	
Sydney Airport Finance Co Pty	16.20	AUD		278.11	300,000,000	300,000,000		In	In
Caltex Australia Ltd	23.02	AUD	450		550,000,000	550,000,000	In	*No data	
Barrick PD Australia Finance P	25.10	USD	275.84	256.51	834,000,000	952,163,489	In	In	In
Barrick PD Australia Finance P	25.10	USD		257.82	850,000,000	927,441,353		In	In
Barrick PD Australia Finance P	25.10	USD		257.82	850,000,000	927,441,353			
Newcrest Finance Pty Ltd	27.18	USD	387.41	352.06	500,000,000	491,255,649	In		
Newcrest Finance Pty Ltd	27.18	USD	387.17	351.60	500,000,000	491,255,649	In	In	In
Newcrest Finance Pty Ltd	27.18	USD			250,000,000	241,289,451			
Santos Finance Ltd	56.04	EUR	361.21	258.52	1,000,000,000	1,401,148,942	In	In	

Source: Bloomberg and RBA data, CEG analysis

Appendix E Terms of reference

342. Provided separately.

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Email: roxanne.smith@jws.com.au
Our Ref: B1299
Your Ref:
Doc ID: 66276470.1

24 November 2014

Dr Tom Hird
Competition Economist Group
Suite 201
111 Harrington Street
SYDNEY NSW 2000

Dear Sir

ATCO Gas Australia Pty Ltd – ERA Price Determination

We act for ATCO Gas Australia Pty Ltd (**ATCO Gas**) in relation to the Economic Regulation Authority's (**ERA**) review of the Gas Access Arrangement for ATCO Gas under the National Gas Law and Rules for the period July 2014 to December 2019.

As you are aware, on 14 October 2014 the ERA published its Draft Decision on ATCO Gas' Access Arrangement Revision Proposal. ATCO Gas wishes to engage you to prepare an expert report in connection with the ERA's Draft Decision.

This letter sets out the matters which ATCO Gas wishes you to address in your report and the requirements with which the report must comply.

Terms of Reference – review of methodology and result estimated by ERA in relation to the return on debt

Legal Framework

The terms and conditions upon which ATCO Gas provides access to its gas network are subject to five yearly reviews by the ERA. The ERA undertakes that review by considering the terms and conditions proposed against criteria set out in the National Gas Law and National Gas Rules.

Rule 76 of the National Gas Rules provides that the total revenue for each regulatory year is determined using a building block approach, which building blocks include a return on the projected capital base and depreciation on the projected capital base.

Rule 87 provides for the determination of a rate of return on the projected capital base. The amended Rule 87 now in force requires a rate of return to be determined on a *nominal* vanilla basis. Rule 87 now requires that the allowed rate of return be determined such that it achieves the "allowed rate of return objective", being:

> "*…that the rate of return for a 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 applied to the service provider in respect of the provision of reference services.*"

Rule 87(5) requires that in determining the allowed rate of return, regard must be had to, "*inter alia, relevant estimation methods, financial models, market data and other evidence*".

The return on debt is to be estimated such that it contributes to the allowed rate of return objective. The return on debt may be estimated such that it is the same for each regulatory year of the access arrangement period, or such that it differs from year to year (Rule 87(9)).

Rules 87(10) and (11) set out other important considerations for the estimating the return on debt.

Rule 74(2) requires a forecast or estimate to be arrived at on a reasonable basis and that it represent the best forecast or estimate possible in the circumstances.

As you are aware, Rule 87(13) also provides for the making of rate of return guidelines. The ERA published its Final Rate of Return Guidelines on 16 December 2013.

Also relevant is the overarching requirement that the ERA must, in performing or exercising its economic regulatory function or power, perform or exercise that function or power in a manner that will, or is likely to, contribute to the achievement of the national gas objective (**NGO**).

The NGO is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

You should also have regard to the Revenue and Pricing Principles (**RPP**) in section 24 of the National Gas Law.

In preparing your report you should consider the relevant sections of the National Gas Rules and Law, the ERA's Rate of Return Guidelines and Explanatory Statement and the Draft Decision.

Return on Debt – approach and methodology adopted by the ERA in the Draft Decision

In its Draft Decision, the ERA has, in broad terms, adopted the following approach to the return on debt:

1 Subject to various adjustments it proposes to make, the ERA appears to have essentially maintained its position that a 5 year term for the risk free rate should be used, which is said to be consistent with the 'present value principle' and with investors' horizons with regard to regulated assets.[1]

[1] Draft Decision, paragraph 824, as adjusted in a number of respects as set out in paragraphs 883-885 and in Appendix 6 to the Draft Decision.

2 In respect of the debt risk premium (**DRP**) the ERA has changed its approach from the Guidelines as follows:

(a) The ERA now accepts that, given the inability of a regulated business to hedge the DRP component of the cost of debt, a 10 year term is appropriate to estimate the DRP.

(b) The ERA proposes to derive the DRP from a revised bond yield approach which:

(i) extends the bond yield approach to include Australian corporate bonds in both domestic and foreign currencies and exclude bonds issued by financial sectors; and

(ii) estimates the credit 'spread to swap' for each bond (converting to AUD terms);

(iii) estimates a credit spread to swap yield curve applying the Gaussian Kernel, the Nelson-Siegel and the Nelson-Siegel-Svensson techniques; and

(iv) uses the simple average of these three yield curves to arrive at an estimate of the 10 year spread to swap.[2]

(c) The ERA proposes to continue to apply an annual update of the DRP.[3]

Opinion

In this context ATCO Gas wishes to engage you to prepare an expert report which addresses the following:

1 Your opinion of the ERA's methodology in the Draft Decision for calculating the return on debt, and the estimate arising therefrom, including the following components of that methodology:

(a) the risk free rate, including:

(i) the debt term to be used to calculate the risk free rate;

(ii) the data to be relied upon; and

(iii) the period of assessment;

(b) the DRP, including:

(i) the term of the DRP;

(ii) the data to be relied upon; and

(iii) the period of assessment; and

(c) the annual updating of the DRP,

and, in particular, as to whether (and why or why not) the ERA's methodology:

(d) complies with Rule 87; and/or

(e) achieves the allowed rate of return objective.

2 Having regard to the ERA's determination in the Draft Decision regarding the return on debt, your opinion as to the methodology (or alternative methodologies) for

[2] See Draft Decision, paragraphs 873 to 875 and following.
[3] See Draft Decision, paragraphs 897 to 911. See also Appendices 6 and 7.

calculating the return on debt which best accords with the Rules referred to above, including:

(a) an explanation of all of the relevant components of that methodology(s);

(b) your opinion on any comments made by the ERA on that methodology(s) or components of that methodology(s) in the Draft Decision; and

(c) why you consider that methodology(s) complies with Rule 87;

(d) why, in particular, you consider that the methodology(s) reflects efficient financing strategies and therefore the costs of a benchmark efficient entity with a similar degree of risk as that which applies to ATCO Gas; and

(e) why you consider that methodology(s) best achieves the allowed rate of return objective.

Contribution to the achievement of the NGO

One of the issues for the ERA is whether, where there are two or more overall decisions that could be made as to approval of ATCO Gas Australia Pty Ltd's (**ATCO Gas**) proposed revised access arrangement, to make the one that the regulator is satisfied will or is likely to contribute to the achievement of the national gas objective[4] to the greatest degree.

On any merits review of the Final Decision before the Australian Competition Tribunal, one of the issues for the Tribunal would be whether a fresh decision correcting errors that might have been made by the ERA would be materially preferable to the ERA's decision in making a contribution to the achievement of the NGO.[5]

In the light of the above, in addition to the topics you have been asked to deal with above please include in your Report the following matters:

1 On the assumption that the errors (if any) in the Draft Decision which you identify in your Report are repeated in the Final Decision, would you please in your Report make an assessment of whether, either separately or collectively,[6] those errors if corrected would, or would be likely to, result in a materially preferable designated NGO decision as regards the relevant topic.

2 In doing this work, and if you make an affirmative assessment, please provide the basis upon which you make the assessment that the result will, or will likely, be materially preferable.

3 In doing so, in particular would you please include in your Report the following:[7]

(a) a consideration of how the constituent components of those parts of the decision which you have been asked to consider interrelate with each other and with the matters you have raised as errors (and which may therefore be grounds for review);

(b) how you have taken account of the revenue and pricing principles;[8] and

(c) in assessing the extent of the contribution of the correction(s) you identify in your Reports to the achievement of the national gas objective, your

[4] As set out in s 23 of the National Gas Law.
[5] As that term is defined in s 259(4a)(c) of the National Gas Law.
[6] See s 246(1a) of the National Gas Law.
[7] Which the Tribunal itself is required under s 259(4b) of the National Gas Law to have regard to when assessing whether a result will be, or will be likely to be, materially preferable.
[8] As set out in s 24 of the National Gas Law.

consideration of the decision as a whole in respect of the topics you have reviewed. We note that section 23 of the National Gas Law provides:

> "*The objective of this Law is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.*"

In relation to question 3 above, we stress that this is not an exhaustive list and that any other matter that may be relevant under the Law should be taken into account (the opening words of s 259(4b) make this clear). If you are in doubt about whether a matter may or may not be relevant in this regard, please include your consideration of it in your Reports. In particular, you should take into account any other matter you reasonably consider material and relevant and should indicate the relevant matter or matters which informs your opinions on the "materially preferable" issue.

Further, in relation to questions 1-3 above, please note that[9] the following matters do not, in themselves, determine the question about whether a materially preferable decision exists, namely:

4 the establishment of a ground for review under section 246(1), that is, whether there is error or are errors;

5 consequences for, or impacts on, the average annual regulated revenue of a covered pipeline service provider; or

6 that the amount that is specified in or derived from the decision exceeds the threshold amount required for the granting of leave (under section 249(2)).

Use of Report

It is intended that your report will be submitted by ATCO Gas to the ERA with its response to the Draft Decision. The report may be provided by the ERA to its own advisers. The report must be expressed so that it may be relied upon both by ATCO Gas and by the ERA.

The ERA may ask queries in respect of the report and you will be required to assist in answering these queries. The ERA may choose to interview you and if so, you will be required to participate in any such interviews.

The report will be reviewed by ATCO Gas' legal advisers and will be used by them to provide legal advice as to its respective rights and obligations under the National Gas Law and National Gas Rules.

If ATCO Gas was to challenge any decision ultimately made by the ERA, that appeal will be made to the Australian Competition Tribunal and your report will be considered by the Tribunal. ATCO Gas may also seek review by a court and the report would be subject to consideration by such court. You should therefore be conscious that the report may be used in the resolution of a dispute between the ERA and ATCO Gas. Due to this, the report will need to comply with the Federal Court requirements for expert reports, which are outlined below.

[9] Under s 259(4b) of the National Gas Law.

Timeframe

ATCO Gas's response to the Draft Decision must be submitted by **25 November 2014**. Your report will need to be finalised by **24 November 2014**.

Compliance with the Code of Conduct for Expert Witnesses

Attached is a copy of the Federal Court's Practice Note CM 7, entitled "*Expert Witnesses in Proceedings in the Federal Court of Australia*", which comprises the guidelines for expert witnesses in the Federal Court of Australia (**Expert Witness Guidelines**).

Please read and familiarise yourself with the Expert Witness Guidelines and comply with them at all times in the course of your engagement by the Gas Businesses.

In particular, your report should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Expert Witness Guidelines.

Your report must also:

7 contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;

8 identify the questions that the expert has been asked to address;

9 set out separately each of the factual findings or assumptions on which the expert's opinion is based;

10 set out each of the expert's opinions separately from the factual findings or assumptions;

11 set out the reasons for each of the expert's opinions; and

12 otherwise comply with the Expert Witness Guidelines.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

It is also a requirement that the report be signed by the expert and include a declaration that "*[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report*".

Please also attach a copy of these terms of reference to the report.

Terms of Engagement

Your contract for the provision of the report will be directly with ATCO Gas. You should forward ATCO Gas any terms you propose govern that contract as well as your fee proposal.

Please sign a counterpart of this letter and return it to us to confirm your acceptance of the engagement.

Yours faithfully

Johnson Winter & Slattery

Enc: Federal Court of Australia Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia"

……
Signed and acknowledged by Dr Tom Hird

Date ……

Enc: **Federal Court of Australia Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia"**

.....

Signed and acknowledged by Dr Tom Hird

Date 26/11/14