REVIEW OF SUBMISSIONS ON THE COST OF DEBT

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CONTENTS

EXECUTIVE SUMMARY

In its recent Rate of Return Guidelines, the AER proposed switching from setting the cost of debt at the prevailing rate at the beginning of the regulatory cycle to setting it in accordance with an annually revised trailing average. In addition the AER proposed the 'QTC method' for transitioning from the old to the new regime. In response, a number of regulated entities have argued that there should be no transitional period. Consequently, the AER has raised a number of questions with me, and my conclusions are as follows.

Firstly, in respect of the efficient financing practices of the benchmark efficient entity (BEE), this would be to maximize shareholder wealth, which is potentially different to the AER's goal of minimizing expected financing costs whilst managing the interest rate and refinancing risks. However, since there is no direct means of assessing which financing policy would achieve either of these subtly different objectives, managers must use judgement and regulators will only be able to rule out some practices as inefficient, leaving a set of policies that it cannot differentiate between unless they are willing to use the observed practices of firms as a guide to what is efficient.

Secondly, in respect of how efficient financing practices vary with the regulatory regime, the efficient strategy under the on-the-day regime is to borrow for ten years, stagger the borrowing, and enter interest rate swap contracts to match the base rate incurred to that allowed by the regulator. Under the trailing average regime, the efficient strategy differs only in not engaging in these swap contracts. Finally, under the AER's proposed transitional regime, the efficient strategy is to either desist from entering into any new swap contracts or to enter new swap contracts that convert the floating rate on existing debt to a fixed rate over the remaining life of the debt.

Thirdly, in respect of other factors that might affect the efficient financing practices of a BEE, neither the size of its debt portfolio nor having a regulatory cycle that matches that of other regulated businesses nor the cost and availability of interest rate swap contracts for such a firm nor having regulatory determinations that occurred during the GFC would cause the financing practice of such a firm to deviate from that described in the previous paragraph.

Fourthly, in respect of arguments presented by the AER in support of its proposed transitional regime, I agree with three of these arguments. Firstly, in respect of the base rate component of the cost of debt, the AER's proposed transitional regime will minimize potential mismatches between the allowed and incurred rates of the BEE over the transitional period. Secondly, in respect of the debt risk premium (DRP) component of the cost of debt, the AER's proposed transitional regime avoids potential windfall gains or losses to service providers and customers. Thirdly, and again in relation to the DRP component of the cost of debt, the AER's proposed transitional regime avoids the use of historical DRP data and this is desirable because the data is contentious.

Fifthly, in respect of whether the impact on the BEE of the AER's proposed transitional arrangements is very similar to that which would have occurred had the AER continued to employ the on-the-day regime, I consider that is very similar in present value terms.

Sixthly, and in respect of why the efficient financing practices of the BEE (privately-owned energy networks) may differ from that of government-owned networks, four possible reasons exist. Firstly, borrowing via another (government) entity may shield the businesses from normal market signals. Secondly, these businesses may face low bankruptcy and refinancing risk, because the inability to meet debt payments is more likely to result in support from shareholders or the government-owned intermediary through which debt finance is obtained. Thirdly, these businesses may have been historically less aware of the full potential of the swaps market. Finally, these businesses are each part of a much larger portfolio of assets held by their state government owners and decisions made may therefore reflect the natural hedges available within these portfolios.

Seventhly, my views on the AER's proposed transitional process are as follows. The AER is subject to the legal requirement to set the allowed cost of debt commensurate with the efficient costs incurred by a BEE, and this is equivalent to the net present value (NPV) = 0 principle. A policy of immediately adopting a new regime only when the one-off impact is favourable to the BEE but not otherwise would necessarily violate this NPV = 0 principle. Alternatively, a policy of immediately adopting a new regime in all cases would expose the BEE to potentially very large risks, thereby discouraging investment. It would also expose the BEE to the possibility of an adverse shock so large as to threaten its financial viability, which would either lead to regulatory relief in such cases (and hence violation of the NPV =

0 principle) or the possibility of a supply disruption. In addition, even if the policy of immediately adopting a regime change regardless of the one-off impact on the BEE were rigorously followed, the upside and downside from such a policy might not be symmetric, in which case the NPV = 0 principle would still be violated. These disadvantages are all so substantial that the only viable regulatory policy would be to neutralize the one-off effects of regime changes, possibly through a transitional regime, or at least to do so when the effects in *either* direction are substantial.

In respect of the base rate component of the cost of debt, the regime change in question here would cause a BEE to change its behavior, thereby temporarily leaving it with costs arising from its behavior under the previous regime. Under such circumstances, immediately applying the new regime would lead to a BEE over recovering its incurred costs by up to $4b over the next nine years. By contrast, the AER's proposed transitional regime largely neutralizes this. Since the one-off effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour applying the AER's proposed transitional regime to the base rate component of the cost of debt.

In respect of the DRP component of the cost of debt, the regime change in question here would not cause a BEE to change its behavior. However, under the previous on-the-day regime, DRP shocks could give rise to substantial differences between the allowed DRP and that incurred and the accumulated effects could be substantial for many years. Averaged over different regulatory reset dates, these accumulated differences would be initially negative, then positive, and eventually tail away to zero. Immediate adoption of the new regime at a time when the accumulated effect was positive or negative would prevent these accumulated gains or losses from being gradually eroded away and they would instead be retained by the BEE; this would be a 'windfall' benefit or loss to the investors in the BEE. In this particular case, the new regime has been adopted at a time when these one-off effects are at their most extreme and immediate adoption would give rise to a $2.3b windfall benefit to the investors in the BEE. Equivalently expressed, adopting the new regime at this time leads to double counting of the DRP results from the high DRP years (2008-2015) and therefore benefiting the average BEE. By contrast, the AER's proposed transitional regime largely neutralizes this outcome not only for the average BEE (with averaging over different regulatory reset dates) but also for individual BEEs with different regulatory reset dates. So, again, since the one-off effect is large and the AER's proposed transitional regime largely neutralizes it, I

therefore favour applying the AER's proposed transitional regime to the DRP component of the cost of debt.

Finally, the AER's proposed approach protects the AER from either consumers or investors in these businesses believing that the AER's choice of the timing for the regime change is a prejudicial act towards them, and it obviates the need to collect contentious historical DRP data.

1.   Introduction

In its recent draft decision on the cost of debt, the AER has proposed switching from setting the cost of debt at the prevailing rate at the beginning of the regulatory cycle to setting it in accordance with an annually revised trailing average.   In addition the AER proposed the 'QTC method' for transitioning from the old to the new regime.   In response, a number of regulated entities have raised various arguments, and the AER has therefore posed a set of questions for me to consider (see Appendix 1).   This paper seeks to address these questions.

2.   The Financing Practice of a Benchmark Efficient Entity

The AER argues that the efficient financing practice of a benchmark efficient entity (BEE) would be to minimize (expected) financing costs whilst managing refinancing risk and interest rate risk.   The usual practice in financial economics is to assume that firms seek to maximize shareholder wealth, and therefore to maximize firm value net of any consequential cash inflows or outflows.   In respect of financing practices associated with a given level of debt, this will involve making decisions that optimally trade off expected financing costs against risks (where optimal means that yielding the greatest firm value), and the relevant risks are interest rate risks and refinancing risks.   By contrast, the AER's goal of minimizing expected financing costs whilst managing the interest rate and refinancing risks appears to involve minimizing expected financing costs subject to interest rate and refinancing risks not exceeding some level.   This objective is potentially different to that of maximizing shareholder wealth.   However, this distinction is moot because there is no direct means of assessing which financing policy would achieve either of these two subtly different objectives.   Consequently, judgement must be used by management.   In addition, the most that regulators will be able to do is to rule out some practices as inefficient, leaving a set of policies that it cannot differentiate between unless they are willing to use the observed practices of firms as a guide to what is efficient.

In summary, the efficient financing practice of a BEE would be to maximize shareholder wealth, which is potentially different to the AER's goal of minimizing expected financing costs whilst managing the interest rate and refinancing risks.   However, since there is no direct means of assessing which financing policy would achieve either of these subtly different objectives, managers must use judgement and regulators will only be able to rule out

some practices as inefficient, leaving a set of policies that it cannot differentiate between unless they are willing to use the observed practices of firms as a guide to what is efficient.

3. Efficient Financing Practices Under Various Regulatory Regimes

Until mid 2014, regulated businesses were subject to the on-the-day regime. From mid 2014, they are subject to a transitional regime for ten years, after which they will be subject to a trailing average regime. For each of these three regulatory regimes, the efficient financing strategy of a BEE may differ. Furthermore, the contentious aspects of financing strategy (those that have been subject to significant debate) are the use of staggering, the term of the debt, and the possible recourse to interest rate swaps. These issues are now examined.

In respect of the on-the-day regime, this involves the regulator periodically (typically five yearly) resetting both the base component of the cost of debt and the debt risk premium (DRP) in accordance with the rates prevailing at the reset dates. In response, a firm could align the issuance and maturity of its debt with the regulatory cycle and thereby avoid any interest rate risk. However, all debt would then mature at the same point, thereby exposing the firm to substantial refinancing risk. An alternative approach would be to borrow for a suitably long period and stagger the debt so as to reduce refinancing risk to a low level. Without additional steps, this would expose the firm to significant interest rate risk arising from the mismatch between the allowed cost of debt being based on the rate prevailing at the beginning of the regulatory cycle whilst the firm pays the trailing average rate. A third option would be to stagger the debt as just described and also approximately hedge the interest rate risk on the base rate component of the cost of debt by using interest rate swap contracts to align the base rate component incurred by the firm with the regulatory cycle.[1] It is generally accepted that firms subject to the on-the-day regime engage in staggering of their debt because they consider refinancing risk to be a greater threat than interest rate risk. Thus, on this empirical basis, it is efficient for the BEE to stagger their debt and this precludes the first option above.

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[1] This involves borrowing at the fixed rate, immediately swapping this into floating rate debt, and then (at the beginning of each regulatory cycle) swapping the floating rate debt into fixed rate debt that aligns with the regulatory cycle. Equivalently, one would borrow at a floating rate and then undertake the second set of swap contracts just noted. Hereafter, I assume that the first option is adopted. In addition, it would not be possible to also hedge the DRP component because the credit default swap (CDS) market is insufficiently liquid at the present time to permit hedging on the required scale.

Turning now to the term for which firms borrow, and given that staggering is efficient, there is no merit in choosing a debt term that matches the regulatory cycle. Longer debt terms further reduce refinancing risk, but raise the expected cost of debt. Consequently, again, there is a trade-off and it is generally accepted that regulated firms borrow for about ten years. So, again, on this empirical basis, it is efficient for the BEE to do so. Finally, in respect of a BEE using interest rate swap contracts, given that firms borrow for ten years (on average) and the regulatory cycle is typically five years, the effect of a BEE using these swaps is to effectively convert the base rate component of its cost of debt from ten to five years, to incur the transactions costs of the swaps, and to significantly reduce interest rate risk (as shown in Appendix 2). Furthermore, as argued by Lally (2014a, pp. 26-27), the first of these consequences (converting the base rate component of the cost of debt from ten to five years) reduces expected interest costs (because the ten year base rate is generally higher than the five year rate) and this more than compensates for the transactions costs of the swaps. Consequently, because they lower expected costs and reduce risk, it is desirable to undertake the swap contracts. Furthermore, as noted by Lally (2014a, page 26), it is the general practice of private-sector regulated firms to do so. Accordingly, it can be judged to be efficient practice. Thus, in respect of the on-the-day regime, the BEE borrows for ten years, staggers the borrowing, and undertakes interest rate swap contracts to approximately align the base rate component of its cost of debt with the regulatory cycle. This corresponds to the third option above.

In respect of the trailing average regime, this involves the regulator annually resetting both the base rate and DRP components of the cost of debt in accordance with the ten-year trailing average. Since this regulatory policy has not yet been adopted, there is no empirical evidence to draw upon in assessing the efficient response by firms. However, in the face of such a regulatory regime, firms that borrow for ten years, stagger their debt, and do not engage in interest rate swap contracts will thereby closely match their incurred cost of debt to that allowed, i.e., a natural hedge is achieved. Accordingly, this financing policy by such firms could reasonably be judged to be efficient. Furthermore, this conclusion seems to be generally accepted amongst parties to these debates.

Finally, in respect of the proposed transitional regime, this progressively shifts from the on-the-day regime to the trailing average over the course of ten years. As above, since this regulatory policy has not yet been fully adopted, there is no empirical evidence to draw upon

in assessing the efficient response by firms. However, since the efficient practice under the old regime was to borrow for ten years and stagger the borrowing, and both behaviours are also efficient under the new regime, it would be efficient to act in the same way during the transitional period. The situation is less clear in respect of the use of interest rate swap contracts. As described above, their use was efficient under the old regime and will not be efficient under the new regime. This suggests that the BEE will not enter into any new contracts of this type once the old regime ceases but the BEE will still be left with the consequences of swap contracts entered into earlier, in order to convert the fixed-rate debt that was borrowed into floating-rate debt, and these consequences persist for up to ten years. Without a transitional regime, Lally (2014a, section 2.1) shows that there would then be a significant mismatch between the allowed and incurred costs of a BEE and that this can be significantly alleviated by the transitional regime proposed by the AER. If this transitional regime were adopted, Lally (ibid) also shows that the BEE might obtain more favourable outcomes for itself by entering into alternative hedging arrangements over the transitional period and the best of these possibilities involves entering into swap contracts that convert each of their existing floating rate obligations into a fixed rate obligation over its remaining life. Both courses of action (entering these swaps or desisting from entering any new swap contracts) could be viewed as efficient. This is an example of the point raised earlier in section 2: regulators may only be able to rule out some behaviours as inefficient rather than identifying a single efficient strategy.

In summary, under the on-the-day regime, the efficient strategy is to borrow for ten years, stagger the borrowing, and enter interest rate swap contracts to match the base rate incurred to that allowed by the regulator. Under the trailing average regime, the efficient strategy differs only in not engaging in these swap contracts. Finally, under the proposed transitional regime, the efficient strategy is to either desist from entering into any new swap contracts or to enter new swap contracts that convert the floating rate on existing debt to a fixed rate over the remaining life of the debt.

4. Efficient Financing Practices Under Other Circumstances

In addition to the regulatory regime, the efficient financing strategy of a BEE may depend upon a number of other factors. Assuming the same risk as that of the NSW/ACT service providers, and leaving aside the issue of their being government-owned, the first of these

additional factors is the size of the BEE's debt portfolio. Under the on-the-day regime, a BEE would engage in interest rate swap contracts to align the base rate component of its cost of debt with the regulatory allowance, and seek to do so over the same period used by the regulator to set the allowed risk-free rate. However, as the size of its debt portfolio increases, the volume of swap contracts increases and this lessens the ability of the BEE to undertake the swap contracts regime within the regulatory reassessment window without suffering from significant adverse pricing effects. Consequently, the BEE may have to transact the swap contracts over a longer period, with the result that the hedge is imperfect.

The second of these additional factors is the possibility that the date at which the BEE's regulatory cycle finishes coincides with that of other regulated businesses. In this event, multiple regulated businesses will be seeking to undertake the same type of swap contracts at the same time, thereby aggravating the problem just described. However, the longest period claimed by any party to be necessary to address this problem is 91 business days (UBS, 2015, pp. 2-4). Using the even longer period of five months, Appendix 2 shows that the risk resulting from undertaking the swaps over such a period would be considerably less than that from not undertaking any such transactions. Consequently, these two additional factors do not change the efficient financing strategy of a BEE under the on-the-day regime.

The third of these additional factors is the cost and availability of hedging instruments for a BEE similar in risk to the NSW/ACT service providers. There do not appear to be any particular features of these service providers that markedly elevate their risk relative to other regulated energy network businesses, nor has this ever been asserted by any party. Thus, as with other regulated energy network businesses, BEEs with risk matching the NSW/ACT service providers would be able to undertake interest rate swap contracts and would face similar transactions costs. Thus the cost and availability of hedging contracts for BEEs with risk matching that of the NSW/ACT service providers does not alter the financing strategy of a BEE under the on-the-day regime.

The fourth of these additional factors is the timing of the regulatory determination and in particular determinations that occurred during the GFC. These would be subject to lower liquidity in the interest rate swap markets, which would lengthen the period around the regulatory window that would be required to undertake the requisite transactions (or the cost of doing so in the form of an adverse price paid), thereby increasing the risk from imperfect

hedging operations. However, the longest period claimed by any party to be necessary to address this problem is 91 business days (UBS, 2015, pp. 2-4). Using the even longer period of five months, Appendix 2 shows that the risk resulting from undertaking the swaps over such a period would be considerably less than that from not undertaking any such transactions. Consequently, this additional factor does not change the efficient financing strategy of a BEE under the on-the-day regime.

In summary, and in respect of a privately-owned BEE with risk matching that of the NSW/ACT service providers, neither the size of its debt portfolio nor having a regulatory cycle that matches that of other regulated businesses nor the cost and availability of interest rate swap contracts for such a firm nor having regulatory determinations that occurred during the GFC would cause the financing practice of such a firm to deviate from that described in the previous section.

5. Review of the AER's Arguments for a Transitional Regime

The AER has concluded that a transitional regime should be adopted for several reasons. Firstly, in respect of the base rate component of the cost of debt, the AER (2014, Attachment 3, section 3.4.2) considers that its proposed transitional regime will minimize potential mismatches between the allowed and incurred rates of the BEE over the transitional period. This issue is examined in detail in section 8. As argued there, any significant one-off effects from regime changes should be neutralized, the effect here is significant, and the AER's proposed transitional regime neutralizes it. Accordingly, I favour the AER's proposed transitional regime for the base rate component of the cost of debt.

Secondly, in respect of the DRP component of the cost of debt, the AER (2014, Attachment 3, section 3.4.2) considers that its proposed transitional regime avoids potential windfall gains or losses to service providers and customers. This issue is examined in detail in section 8. As argued there, any significant one-off effects from regime changes should be neutralized, the effect here is significant, and the AER's proposed transitional regime neutralizes it. Accordingly, I favour the AER's proposed transitional regime for the DRP component of the cost of debt.

Thirdly, and in respect of the DRP component of the cost of debt, the AER (2014, Attachment 3, section 3.4.2) notes that its proposed transitional regime avoids the use of historical DRP data and argues that this is desirable because the data is contentious. As argued in Lally (2014a, section 2.3), there is no DRP index available at the present time with a ten year history up to mid 2014 because the RBA index only goes back to January 2005 and the BFV index ceased in May 2014; so, a combination of indexes would be required. Furthermore, there has been considerable variation in the results from four such indexes since early 2007, most particularly in early 2009; this variation complicates the process of choosing estimates for that historical period. So, in respect of the DRP, I agree with the AER's third argument.

Fourthly, and in respect of the entire cost of debt, the AER (2014, Attachment 3, section 3.4.2) considers that its proposed transitional regime maintains the expected average price level whilst reducing price volatility. These are valid observations about the trailing average regime relative to the on-the-day regime. However, the issue here is the merits of the transitional regime. In making decisions about a transitional regime, the important consideration is that the NPV = 0 principle should be satisfied or approximately so. As argued in section 8, the AER's proposed transitional process satisfies the NPV = 0 principle. If there were a range of alternative transitional processes that each satisfied the NPV = 0 principle, one might then choose between them on the basis of average price level and volatility. However this opportunity is not apparent. So, the issue of expected average price level and volatility is moot. Furthermore, even if it were not, there is considerable difficulty in defining volatility; as discussed in Lally (2014a, section 2.2), volatility could be defined in terms of consumers' incomes net of committed expenditures or in terms of prices, and in either case could be defined relative to actual values or values relative to the expected path.

Fifthly, and again in respect of the entire cost of debt, the AER (2014, Attachment 3, section 3.4.2) considers that its proposed transitional regime reduces the potential for opportunistic behavior by stakeholders, i.e., transitional processes discourage firms from seeking a change in regulatory regime (such as a switch from the on-the-day regime to a trailing average or vice versa) so as to maximize their revenues, because the transitional process erodes the gains that would be available if a proposed method yielded higher future revenues than the existing method. As argued in Lally (2014a, section 2.4), such an argument has some merit as a general rule, and on both sides: discouraging firms from opportunistic behavior and

discouraging regulators from acting in response to 'political pressure'. However, it would also have the disadvantage of blunting the impact of changes that do merit immediate adoption, whether proposed by firms or regulators; so, it dilutes the good and bad equally. In any event, since such a general rule has not (yet) been adopted by the AER, the relevant issue here is whether a transitional regime should be applied in the current situation and this rests upon other arguments examined here.

Lastly, and in respect of applying the same transitional regime to all service providers, the AER (2014, Attachment 3, section 3.4.2) considers that doing so is consistent with the AER's adoption of a single BEE definition (a pure play, Australian, regulated energy network business). However I do not think this definition of a BEE requires application of the same transitional regime to all firms. The issue of differential treatment of firms during the transitional period has been examined in Lally (2014a, section 4) and two arguments for doing so were examined there. The first of these arguments is that large firms face greater difficulty in undertaking interest rate swap contracts, it was therefore inefficient for them to have done so, and therefore that transitional arrangements in respect of the base rate component of the cost of debt are unwarranted for such firms. However, as discussed in Lally (ibid), it was still efficient for large firms to have undertaken these swap contracts and therefore the argument is not valid. The second argument is that regulated activities are subject to different cycles, that this causes differences in the windfall gains obtained from (or losses incurred in) adoption of a new regime without a transitional process, and therefore that different transitional arrangements are required for different regulated activities. However, as discussed in Lally (ibid), doing so would establish a very undesirable precedent, the optimal transitional regime for each possible regulatory cycle is not obvious (and therefore considerable debate would be provoked once the principle of uniform treatment was abandoned), and the corporate groups to which regulated businesses belong are typically involved in a range of different regulated activities with different cycle commencement dates (which would push businesses towards the typical over-recovery outcome of about 1.3% of debt value, and therefore undercut the merit from differential treatment across individual businesses). In view of these points, I do not favour differential treatment of businesses according to the timing of their regulatory cycles. Thus, I support the AER's view that the same transitional regime should be applied to all regulated businesses but not for the reason favoured by the AER.

In summary, the AER presents a number of arguments in support of its proposed transitional regime. I agree with three of these arguments. Firstly, in respect of the base rate component of the cost of debt, the AER's proposed transitional regime will minimize potential mismatches between the allowed and incurred rates of the BEE over the transitional period. Secondly, in respect of the DRP component of the cost of debt, the AER's proposed transitional regime avoids potential windfall gains or losses to service providers and customers. Thirdly, and again in relation to the DRP component of the cost of debt, the AER's proposed transitional regime avoids the use of historical DRP data and this is desirable because the data is contentious. In respect of the first two arguments, both are deducible from a much more general principle: any significant one-off effects from regime changes should be neutralized, the effect here is significant, and the AER's proposed transitional regime does so.

6. The Impact of the Proposed Transitional Arrangements

The AER argues that, in relation to existing debt, the impact on the BEE from its proposed transitional arrangements is not, in principle, different to the impact on the BEE if the AER had continued to adopt the on-the-day approach. In respect of the base rate component of the cost of debt, continued adoption of the on-the-day approach would have led to rate resetting every five years in accordance with the prevailing rate whilst the BEE would have experienced similar costs due to its use of interest rate swap contracts. Thus, the net impact on the BEE would have been zero. By contrast, as discussed in Lally (2014a, section 2.1), if regulated business do not engage in further swap contracts over the transitional period, the AER's proposed transitional regime would lead to something between under compensation of 0.4% per year and over compensation of up to 0.6% per year (on average), depending upon the path for interest rates over the transitional period. Alternatively, if firms entered into new swaps (of which the best option would be to convert each of their existing floating rate obligations into a fixed rate obligation over its remaining life), the result of the AER's transitional arrangements would be over compensation averaging 0.23% per year over the transitional period (Lally, 2014a, section 2.1). These possible outcomes are sufficiently close to zero to say that the net impact on the BEE would be approximately zero. Thus, in relation to the base rate component of the cost of debt, the BEE experiences a net impact over the transitional period that is very similar to that which would have been experienced had there not been a regime change.

In relation to the DRP component of the cost of debt, continued adoption of the on-the-day regime would have led to net results (allowed rates less incurred DRPs) ranging from a gain of 4.5% to a loss of 1.5% (in present value terms), depending upon the year in which the regulatory cycle ends, as a result of the GFC (see Lally, 2014a, Table 4). The average was 1.3%. Immediate adoption of the new regime would have raised results in all cases, with a range from 0.9% to 6.6% and an average of 3.4%. By contrast, the AER's proposed transitional regime would yield net results that are almost identical to those from continued adoption of the on-the-day regime. Thus, in relation to the DRP component of the cost of debt, the BEE experiences a net impact over the transitional period that is very similar to that which would have been experienced had there not been a regime change.

In summary, in respect of existing debt, the impact on the BEE of the AER's proposed transitional arrangements is very similar to that which would have occurred had the AER continued to employ the on-the-day regime. Thus I agree with the AER on this point.

7. Efficient Financing Practices and Ownership

The AER (2014, pp. 290-292) has argued that the efficient financing practices of the BEE (privately-owned energy networks) may differ from that of government-owned networks. The reasons given are fivefold. Firstly, borrowing via another (government) entity may shield the businesses from normal market signals. Secondly, these businesses may face low bankruptcy and refinancing risk, i.e., the inability to meet debt payments is more likely to result in support from shareholders or the government-owned intermediary through which debt finance is obtained (such as the QTC). Thirdly, these businesses may have been historically less aware of the full potential of the swaps market. Fourthly, these businesses are each part of a much larger portfolio of assets held by their state government owners and decisions made may therefore reflect the natural hedges available within these portfolios. Thus, the risk reduction available from interest rate swap contracts may be less. However, since the BEE is by definition a pure-play regulated energy network business, such behavior cannot be relevant to it. Fifthly, for these businesses, the supplier of debt capital is also the shareholder, debt strategies that switch risk between these two parties are therefore of no consequence, and this would change behavior relative to the BEE.

In respect of the first four reasons, these appear in Lally (2014a, pp. 28-29) and I therefore support them. Additional evidence on this matter comes from NSW Treasury (2014b, pp. 1-2), in which they refer to government businesses having very high levels of short-term debt (under 12 months) because the DRP charged by TCorp for such short-term debt was below that of longer-term debt. Furthermore, NSW Treasury was so concerned at the refinancing risk resulting from this that it equalized the DRP rates in order to discourage the businesses from acting in this way. All of this suggests that NSW Treasury considered that the government businesses were indifferent to refinancing risk. If this is true, and NSW Treasury would be in a good position to judge, this would contribute to explaining why these businesses did not use swaps (the rationale for using swaps being to mitigate adverse effects resulting from staggering and borrowing long-term so as to minimize refinancing risk). Accordingly, their failure to use swaps does not provide a rationale for applying a different regulatory regime to them.

However, in respect of the fifth explanation, the shareholder (the state government) does not supply the debt capital; it instead acts (via the QTC, NSW Treasury Corp, etc) as a conduit through which debt finance is raised from the private sector. However, the state government does bear the risk of default by these businesses, for which it charges a fee akin to the DRP charged by lenders. Thus, some of the actions taken by these government businesses would simply shift risk from themselves to their owner rather than to lenders. This point is already captured within the second and fourth points above.

In summary, the efficient financing practices of the BEE (privately-owned energy networks) may differ from that of government-owned networks for four possible reasons. Firstly, borrowing via another (government) entity may shield the businesses from normal market signals. Secondly, these businesses may face low bankruptcy and refinancing risk, i.e., the inability to meet debt payments is more likely to result in support from shareholders or the government-owned intermediary through which debt finance is obtained (such as the QTC). Thirdly, these businesses may have been historically less aware of the full potential of the swaps market. Fourthly, these businesses are each part of a much larger portfolio of assets held by their state government owners and decisions made may therefore reflect the natural hedges available within these portfolios.

8. Overall Judgement

8.1 The Legal Framework

I now consider whether the AER's proposed transitional process is reasonable. This involves consideration of whether any sort of transitional process is warranted as well as the merits of the AER's particular version. Addressing both points requires appropriate criteria. Since the AER operates within the legal framework of the National Electricity Rules, I commence by considering relevant features of these Rules. Only one feature of them relates specifically to transitional processes, being the requirement in clause 6.5.2 (k) (4) of the Rules for the AER to have regard to "any impacts…on a benchmark efficient entity that could arise as a result of changing the methodology that is used to estimate the return on debt…". Clearly the AER's proposed transitional process meets this test but many alternatives would also meet it.

A number of other features of the Rules have general application, but they provide much more guidance in determining the appropriate regulatory approach. Clause 6.5.2 (c) of the Rules requires that the allowed rate of return "…for a Distribution Network Service Provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the Distribution Network Service Provider…". In addition, clause 6.5.2 (k) (1) of the Rules requires that in estimating the allowed return on debt the AER have regard to the "..desirability of minimizing any difference between the return on debt and the return on debt of a benchmark efficient entity..". The latter requirement looks like a weaker version of the requirement in clause 6.5.2 (c), because it uses the word "desirability" rather than "is to be". However, unlike the requirement in clause 6.5.2 (c), it relates specifically to the cost of debt rather than financing costs in general. Thus the possibility of an allowed cost of debt differing from that incurred by the BEE seems to be envisaged, in the interests of obtaining an allowed rate of return that is commensurate with the overall financing costs of a BEE. In plain English, disparities in respect of the cost of debt would seem to be acceptable if they offset disparities in the cost of equity and thereby produce an appropriate overall rate of return. However I do not see circumstances where this would be a sensible approach. So, I interpret the legal requirements in clause 6.5.2 (c) to apply to both the cost of debt and the cost of equity. Thus, in respect of the cost of debt, the allowed rate must be commensurate with the costs of a BEE with a similar degree of risk to that of the service provider.

In summary, the primary legal requirement here is that the allowed cost of debt must be commensurate with the efficient costs of a BEE with a similar degree of risk to that of the service provider.

8.2 The NPV Principle

The legal requirement for the allowed cost of debt to be commensurate with the costs incurred by a BEE is not sufficiently precise to be readily implemented, and therefore requires formalizing. This is obtained through the NPV = 0 principle: the allowed prices or revenues of the regulated business should be such that the present value of the resulting revenues net of opex and taxes must equal the initial investment. Lower revenues than those that satisfy this principle will fail to entice producers to invest and higher revenues constitute the very excess profit that regulation seeks to prevent (Marshal et al, 1981). I consider this economic principle to be equivalent to the primary legal requirement.

I now consider the implications of this principle for the appropriate choice of the cost of debt. To do so, I start with the simplest possible regulatory scenario, in which fixed assets are purchased now, all financing is equity, a revenue cap is set now that yields revenues only in one year, all operating costs are incurred at the same point, the regulatory assets purchased now have a life of one year, there is no risk relating to revenues or operating costs, and there is no differential personal tax treatment across different sources of investment income. In this case the value now of the revenues received in one year (REV_1) net of operating costs (including corporate taxes) paid in one year ($OPEX_1$) is determined by discounted at the *current* one year risk free rate (R_{f01}), and the NPV = 0 principle implies that this value should equal the purchase price of the fixed assets (B_0):[2]

$$B_0 = \frac{REV_1 - OPEX_1}{1 + R_{f01}} \tag{1}$$

It follows from this that the revenues must be as follows:[3]

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[2] If there is uncertainty about revenues or opex, this leads to a risk premium being added to the discount rate, and this does not otherwise affect the analysis.

[3] In this equation, regulatory depreciation equals the cost of the asset (*B*) because the asset life is only one year. When the asset life exceeds one year, as in later examples, depreciation each year is less than the purchase price of the assets.

$$REV_1 = OPEX_1 + B_0 + B_0 R_{f01} \qquad (2)$$

So, the revenues must equal the sum of $OPEX$, the cost of the fixed assets (B_0), and the return on the investment of B_0 at the *current* one year risk free rate R_{f01}. This analysis is a simplified version of that in Schmalensee (1989) and Lally (2004).

To illustrate the application of equation (2), suppose $OPEX_1$ = \$10m, B_0 = \$100m and R_{f01} = .06. It follows from equation (2) that REV_1 must be \$116m. The intuition for this is clear. Investors with \$100m to invest could invest in the current one-year risk free asset at 6% to yield \$106m in one year. Undertaking the regulatory activities and therefore purchasing the regulatory assets is an alternative investment with the same (nil) risk. Thus, undertaking the regulatory activities and therefore purchasing the regulatory assets should also yield a return of 6% on the investment of \$100m, which implies net cash flow of \$106m in one year, and hence revenues of \$116m.

This demonstrates that the risk free rate that should be used is that prevailing at the *beginning* of the regulatory period. The same holds if the asset life exceeds the term of the regulatory cycle, and again the test is that such a process satisfies the NPV = 0 principle. For example, suppose that the regulatory cycle is still one year and the asset life is now four years. So, I start with the situation at the end of the third year (time 3), at which point a revenue cap will be set to yield revenues at time 4 (REV_4). The value at time 3 of the subsequent payoffs from the regulatory assets will be the value at time 3 of these revenues at time 4 net of the operating costs at time 4 ($OPEX_4$), discounted at some rate prevailing at time 3. Since the payoffs at time 4 are certain at time 3, then the appropriate discount rate is the one year risk free rate prevailing at time 3 (R_{f34}). The value at time 3 of the subsequent payoffs from the regulatory assets is then as follows:

$$V_3 = \frac{REV_4 - OPEX_4}{1 + R_{f34}} \qquad (3)$$

Revenues received at time 4 are set at time 3 to cover operating costs at time 4, depreciation for year 4, and the cost of capital at some rate applied to the regulatory book value at time 3

(B_3). If this rate used is the one-year risk free rate prevailing at time 3 (R_{f34}) then these revenues at time 4 will be as follows:

$$REV_4 = OPEX_4 + DEP_4 + B_3 R_{f34} \qquad (4)$$

Since year 4 is the last year, then $DEP_4 = B_3$. Substituting this into equation (4) and then (4) into (3) yields

$$V_3 = \frac{B_3(1 + R_{f34})}{1 + R_{f34}} = B_3 \qquad (5)$$

So, the value at time 3 of the subsequent payoffs on the regulatory assets will equal the regulatory asset book value at time 3 if revenues received at time 4 are set at time 3 using the prevailing one year risk free rate. At time 2, the revenues to be received at time 3 will be set. So, at time 2, the value of the subsequent payoffs on the regulatory assets will be the value at time 2 of the revenues received at time 3 less the operating cost incurred at time 3 plus the value at time 2 of V_3, and V_3 equals B_3 as shown in equation (5), and all of these payoffs at time 3 are known at time 2. So the appropriate discount rate on these payoffs arising at time 3 will be the prevailing one year risk free rate at time 2, and therefore the value at time 2 of the subsequent payoffs on the regulatory assets will be as follows:

$$V_2 = \frac{REV_3 - OPEX_3 + B_3}{1 + R_{f23}} \qquad (6)$$

Paralleling equation (4), the revenues to be received at time 3 will be set at time 2 based upon the one year risk free rate prevailing at time 2 (R_{f23}):

$$REV_3 = OPEX_3 + DEP_3 + B_2 R_{f23} \qquad (7)$$

Also, $DEP_3 = B_2 - B_3$. Substituting this into equation (7) and then (7) into (6) yields

$$V_2 = \frac{B_2(1 + R_{f23})}{1 + R_{f23}} = B_2 \qquad (8)$$

So, the value at time 2 of the subsequent payoffs on the regulatory assets will equal the regulatory asset book value at time 2 if revenues received at times 3 and 4 are each set one year earlier using the prevailing one year risk free rate. By continuing this process back to time 1 and then to the present moment, it can be shown in the same way that $V_1 = B_1$ and then that $V_0 = B_0$. The last equation says that the value now of all future payoffs on the regulatory assets is equal to the purchase price of the assets, i.e., the NPV = 0 principle is satisfied. Thus, in order to satisfy the NPV = 0 principle, the risk-free rate within the cost of equity that is allowed at each regulatory reset must be the prevailing rate for the term of the regulatory cycle.

I now turn to the situation in which debt is present. It is presumed in the earlier analysis that the actions of a regulator do not change the behavior of the BEE, i.e., the regulator chooses a policy that sets the prices or revenues of the BEE so that their present value net of opex equals the initial investment. However, in the presence of debt, there are a range of policies that a BEE might pursue and the regulator's choice of regime might lead the BEE to change its policy, leading to a further change in regulatory action, and so on. Under such conditions, 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 BEE actions that satisfies the NPV = 0 principle; this compatible combination must involve a course of action by a BEE that is feasible in the absence of regulation and a regulatory regime whose imposition would not cause the BEE to change this behavior ("matching" regulatory policy). There may be more than one combination that satisfies this definition.

If the BEE's debt policy were to borrow to match the regulatory cycle, and the regulatory regime were the on-the-day policy, this combination would satisfy the NPV = 0 principle. To illustrate this point, consider the previous scenario in which the regulatory period is one year and the asset life is four years. So, the BEE would borrow for a one-year term with roll-over (and therefore the cost of debt incurred in each year would be the sum of the one year risk free rate and the DRP prevailing at the beginning of the year). In addition, the regulatory regime would involve resetting the revenue cap at the beginning of each year in accordance with the prevailing one-year cost of debt and the prevailing one-year risk-free rate for the cost of equity. I assume that the regulatory leverage ratio is 60%. So, I start with the situation at the end of the third year (time 3), at which point the revenue cap will be set to yield revenues at time 4 (REV_4). Paralleling equation (3), the value at time 3 of the subsequent payoffs to

equity holders from the regulatory assets (S_3) will be the value at time 3 of these revenues at time 4 net of the operating costs at time 4 ($OPEX_4$) and payments to debt holders, discounted at the one year risk free rate prevailing at time 3 (R_{f34}) because the time 4 payoffs are certain:

$$S_3 = \frac{REV_4 - OPEX_4 - .6B_3(1 + R_{f34} + DRP_{34})}{1 + R_{f34}} \tag{9}$$

Paralleling equation (4), revenues received at time 4 are set at time 3 to cover operating costs at time 4, depreciation for year 4, and the prevailing WACC as follows:

$$REV_4 = OPEX_4 + DEP_4 + B_3[.4R_{f34} + .6(R_{f34} + DRP_{34})] \tag{10}$$

Since year 4 is the last year, then $DEP_4 = B_3$. Substituting this into equation (10) and then (10) into (9) yields

$$S_3 = \frac{.4B_3(1 + R_{f34})}{1 + R_{f34}} = .4B_3 \tag{11}$$

So, the value at time 3 of the subsequent payoffs to equity holders on the regulatory assets will equal the regulatory equity book value at time 3 if revenues received at time 4 are set at time 3 using the prevailing one year risk free rate. Continuing back in the same fashion, $S_2 = .4B_2$, and then $S_1 = .4B_1$, and finally $S_0 = .4B_0$. Since the initial debt level (D_0) will be 60% of the initial regulatory book value, with the latter matching the purchase price of the assets, the value at time 0 of the future cash flows (the equity plus debt value) will be as follows:

$$V_0 = S_0 + D_0 = .4B_0 + .6B_0 = B_0 \tag{12}$$

So, the NPV = 0 principle is satisfied. This occurs because the allowed cost of debt for each year matches that incurred by the BEE. To illustrate this, suppose that the regulatory book value in three years is $B_3 = \$10m$, and therefore $DEP_4 = \$10m$. In addition, the opex for year 4 is $OPEX_4 = \$3m$. Also, the prevailing one-year risk free rate and DRP in three years are $R_{f34} = .05$ and $DRP_{34} = .02$. So, following equation (10), the allowed revenue for the last year would be

$$REV_4 = \$3m + \$10m + \$10m[.4(.05) + .6(.05 + .02)] = \$13.62m$$

Substitution into equation (9) then yields

$$S_3 = \frac{\$13.62m - \$3m - .6(\$10m)(1+.05+.02)}{1+.05} = \$4m$$

This matches the regulatory book value of equity in three years ($4m). Continuing back to the present time in the same way, the equity value will also match its regulatory book value, and therefore equation (12) would be satisfied.

However, under the on-the-day regime, the BEE would not borrow to match the regulatory cycle. Due to refinancing risk the BEE would instead borrow for longer than the regulatory period, stagger the debt, and enter interest rate swap contracts to match the risk-free rate component of the cost of debt to the regulatory cycle. Consequently, in respect of the DRP component of the cost of debt, the NPV = 0 requirement will not be satisfied. To illustrate this point, suppose that the BEE borrows for two years with staggering. Thus, at the commencement of a regulatory business, the BEE will borrow 50% of their debt for one year and the rest for two years, with each rolled over for two years upon its maturity. Suppose the DRP is currently 2% for one year debt, this figure is unusually high, and is expected to fall to its long-run average of 1.5% in one year. In addition, the DRP for two-year debt is currently 1.9% and is expected to fall to its long-run average of 1.7% in one year. Under such circumstances, the allowance granted by the regulator for the first year, and expected to be allowed in the second and third years (in accordance with the prevailing two-year DRP), will be as shown below. Also shown are the average rates paid (or expected to be paid) by the BEE in those years.

First Year: Allowed = 1.9%   Paid = .5(2.0%) + .5(1.9%) = 1.95%
Second Year: Allowed = 1.7%   Paid = .5(1.9%) + .5(1.7%) = 1.8%
Third Year: Allowed = 1.7%   Paid = .5(1.7%) + .5(1.7%) = 1.7%

So, during the first year, the average DRP paid by the BEE will exceed the allowance. In the second year, the expected payments also exceed the expected allowance. From year three, an expected match will be achieved. These actual and expected mismatches in the first two years imply that the NPV = 0 principle will not be satisfied. However, Lally (2010,

Appendix 1) demonstrates that the violation of this NPV = 0 principle will be small. Furthermore, the 'match' from year three is merely an expectation. The actual outcome could involve the allowed DRP being more than that paid (or less) because the allowance for a year is the two-year DRP prevailing at the beginning of the year whilst the rate paid is the two-year trailing average. However, any systematic risk associated with such mismatches is in principle compensated for ex-ante through the asset beta, and therefore these possible mismatches would not give rise to a violation of the NPV = 0 principle.

An alternative regulatory regime is the trailing average regime for the entire cost of debt. So, at the commencement of the regulatory business or the incurrence of capex, the allowed rate will be the two-year trailing average whilst the incurred rate will be the prevailing rates on one and two year debt. Thus, again, there could (and probably will be) a mismatch in which case the NPV = 0 principle would be violated. Since capex is ongoing, such mismatches will be ongoing. However, unlike the on-the-day regime, a match in realized outcomes (not just expected outcomes) will be achieved from the beginning of the third year after the commencement of the regulatory business or capex. Furthermore, like the on-the-day regime, these violations of the NPV = 0 principle should also be small because they are limited to the first few years of the project and projects typically have lives of several decades.

In summary, the legal requirement for the allowed cost of debt to be commensurate with the costs of a BEE is formalized through the NPV = 0 principle. In turn, this principle is implemented (or approximately so) at each regulatory reset point through an appropriate regulatory policy. In the absence of debt, the allowed cost of equity (and therefore the risk free rate within it) must be the rate prevailing at the beginning of the regulatory cycle and for a term matching the regulatory cycle. In the presence of debt, the situation is more complicated. Given that firms stagger their debt, regulatory use of the prevailing cost of debt (the on-the-day regime) will not satisfy the NPV = 0 principle due to mismatches between the allowed and incurred costs of debt at the commencement date of the regulatory business. There will also be ongoing mismatches that do not violate the NPV = 0 principle because they are compensated ex-ante through the asset beta. Furthermore, even regulatory use of a trailing average cost of debt will not satisfy the NPV = 0 requirement due to mismatches between the allowed and incurred costs of debt at the commencement date of the regulatory business or any subsequent capex. However, the violations would again be small. Thus, any

regulatory approach to setting the allowed cost of debt *cannot* be assessed by comparing the allowed rate for a particular cycle to that incurred by the firm over that cycle. The assessment must consider the entire life of the assets, to which the NPV = 0 principle applies. This parallels the situation for unregulated businesses, which are also concerned with the entire life of a proposed investment.

8.3 Regime Changes

I now turn to consider regime changes and the appropriate regulatory treatment of these. Immediate adoption of a new regime may give rise to a one-off impact on the net cash flows of the BEE, even when both the old and new regimes satisfy or approximately satisfy the NPV = 0 principle. As with the assessment of a regulatory regime that is consistently followed, the appropriate regulatory policy to apply to regime changes should be determined by reference to the NPV = 0 principle.

At the highest level, regime changes could be dealt with in two possible ways as follows. The first approach would involve immediately adopting the new regime in the event that the one-off effect favours the BEE but to compensate it in some fashion otherwise. This asymmetric policy would violate the NPV = 0 principle. To illustrate this point, suppose regime A consistently adopted satisfies the NPV = 0 principle and regime B is likewise, but a shift from A to B will give rise to either one-off gains or losses to investors in the BEE of \$5b with equal likelihood unless these effects are neutralized by the regulator. Suppose further that the probability of a regime change is 60% and that the regulator will neutralize the effect of any one-off losses being suffered whilst gains will be untouched. In this case, the expected gain to the BEE from this asymmetric regulatory policy would be \$1.5b as follows.

$$E(Gain) = .6[.5(\$5b) + .5(0)] = \$1.5b$$

Since the NPV = 0 principle is a formalization of the legal requirement to allow returns that are commensurate with the costs of a BEE, this policy of immediately adopting a new regime when the one-off effect is favourable to the BEE but not otherwise would violate the legal requirement.

The second possible regulatory approach would be to immediately adopt the new regime, regardless of whether the one-off effect was favourable to the BEE or not. In this case, the BEE would be exposed to a 'roll of the dice' in which even the range of possible outcomes would be unknown. This could discourage new investment. In addition, a future regime change could have a sufficiently adverse one-off impact on the BEE to threaten its financial viability, which would lead the BEE to petition the regulator for relief. If it were granted, this would take us back to the first approach in which the NPV = 0 principle is violated. If relief were not granted, the provision of services to customers might be disrupted and DRPs across the regulated sector would likely rise leading to higher prices across the sector. In addition, even without reversion to the first approach, the one-off gains and losses from immediate adoption of a new regime regardless of the impact on the BEE might not be symmetric, in which case the NPV = 0 principle would still be violated. To illustrate this point, suppose regime A consistently adopted satisfies the NPV = 0 principle and regime B is likewise, but a shift from A to B will cause the BEE to experience either a one-off gain of $5b or a one-off loss of $2b with equal likelihood. Suppose further that the probability of a regime change is 60%. In this case, the expected gain to the BEE from this regulatory policy would be $0.9b as follows:

$$E(Gain) = .6[.5(\$5b) - .5(\$2b)] = \$0.9b$$

Since the NPV = 0 principle is a formalization of the legal requirement to allow returns that are commensurate with the costs of a BEE, this policy of immediately adopting a new regime regardless of whether the one-off impact was favourable to the BEE would still violate the legal requirement.

In summary, immediately adopting a new regime only when the one-off effect is favourable to the BEE but not otherwise would necessarily violate the NPV = 0 principle. Alternatively, the policy of immediately adopting a new regime regardless of whether the one-off impact was favourable or unfavourable would expose the BEE to a 'roll of the dice', with potentially very adverse effects, thereby discouraging investment. It would also expose the BEE to the possibility of an adverse shock so large as to threaten its financial viability, which would lead to either regulatory relief in such cases (and hence violation of the NPV = 0 principle) or the possibility of a supply disruption. In addition, even if the policy of immediately adopting a

regime change regardless of the one-off impact on the BEE were rigorously followed, the upside and downside from this policy might not be symmetric, in which case the NPV = 0 principle would still be violated. These disadvantages are all so substantial that the only viable regulatory policy would be to neutralize the one-off effects of regime changes, possibly through a transitional regime, or at least to do so when the one-off effects in *either* direction are substantial. I now apply this policy to the present situation.

8.4 Regime Changes and the Base Rate

In some cases, a new regime may warrant a change in behavior by the BEE and it may also be temporarily left with costs arising from its behavior under the previous regime. Consequently, immediate application of the new regime would produce a temporary and possibly significant deviation between the allowed cost of debt under the new regime and that incurred by a BEE. Thus, rather than immediate application of the new regime, a better match between the allowed costs and those of a BEE may be obtained by temporary adoption of a different regime, i.e., a transitional regime.

This issue applies to the base rate component of the cost of debt. As argued above, the efficient practice under the old regime was to borrow at a floating rate (or borrow fixed and swap into floating) followed by swapping into a fixed five-year rate at the commencement of the regulatory cycle. Thus, as argued in Lally (2014a, section 2.1), it is likely that the BEE would, upon the introduction of the new trailing average regime at the beginning of a regulatory cycle, have desisted from these swaps and not undertaken any alternative swaps, thereby leaving them with floating rate debt at the time of the regime change that will gradually be replaced by ten-year fixed-rate debt as the floating-rate debt matures. Without transitional arrangements, the BEE would over recover its incurred costs by up to 1% per year over the next nine years ($4b on regulated assets of $44b). This is a substantial and one-off effect. So, in accordance with the policy recommended in the previous section, it ought to be neutralised. As discussed in Lally (2014a, section 2.1), the AER's proposed transitional arrangements will do so by generating allowed costs of debt that approximate these incurred costs and an alternative transitional arrangement would produce an even better approximation but at the expense of greater complexity. So, in respect of the base rate component of the cost of debt, I therefore favour the transitional regime proposed by the AER.

These arguments are premised upon the BEE engaging in interest swap contracts under the old regime, to match the base rate component of its costs to the regulatory cycle, and this premise has been shown to be appropriate (Lally, 2014a, section 4). By contrast, it might be argued that firms that did not enter into such hedging arrangements do not thereby warrant a transitional process. However this would involve regulating individual firms in accordance with how they behaved (did or did not engage in these hedging arrangements) rather than in accordance with the behavior of the BEE (which did hedge). This would be inappropriate because it would subject the customers of a firm to regulation driven in part by the firm's inefficient behavior and it would also incentivize firms to opportunistically change their behavior for the purpose of changing the regulatory regime to which they were subject.

In summary, and in respect of the base rate component of the cost of debt, the regime change causes a BEE to change its behavior, thereby temporarily leaving it with costs arising from its behavior under the previous regime. Under such circumstances, immediately applying the allowed cost of debt under the new regime will lead to a BEE over recovering its incurred costs by up to $4b over the next nine years. By contrast, the AER's proposed transitional arrangements will produce allowed costs of debt that approximate these incurred costs and an alternative transitional arrangement would produce even better results but at the expense of greater complexity. So, the one-off effect of immediately adopting the new regime would be substantial and the AER's proposed transitional regime largely neutralizes it. Since the effect of up to $4b is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour the AER's proposed transitional regime.

8.5 Regime Changes and the DRP

The analysis in the previous section was concerned with a situation in which the regime change warranted a change in the behavior of the BEE. However, in respect of the DRP, the regime change in question here does not change any relevant behavior of the BEE (it will continue to stagger its debt and not hedge the DRP component). Consequently, it might seem that the regime change does not impose any one-off gain or loss upon the BEE, and therefore the appropriate policy would be to immediately adopt the new regime in respect of the DRP. However, under the previous on-the-day regime, DRP shocks gave rise to differences between the allowed DRP and that incurred, the accumulated effects eventually dissipated, but these accumulated effects could be substantial at some points. Consequently, immediate adoption of the new regime at a time when the accumulated effect was positive would

prevent these accumulated gains from being gradually eroded away and they would instead be retained by the BEE; this would be a 'windfall' benefit to investors in the BEE at the expense of their customers. Alternatively, immediate adoption of the new regime at a time when the accumulated effect was negative would constitute a windfall loss to investors in the BEE. Furthermore, at the time the regime change occurred, the BEE was still experiencing the effects of a very dramatic DRP shock arising from the GFC.

To investigate this issue, I draw upon the DRP data presented by Lally (2014a, section 3.1). As shown in Lally (2014a, Table 2), the DRP shock commenced in 2008 and the DRP is expected to revert back to its pre 2008 level by 2016. However, because the BEE is paying a ten-year trailing average DRP, the effect on them will continue until 2025. If a regime shift occurred within this period, the effect on a BEE would depend upon its regulatory cycle reset date and these effects along with the average effect is shown in Lally (2014a, Table 4) for some of these years. Table 1 below shows the effects for a wider set of years, with the first column showing the year in which the regime change commences (immediately for a BEE with a regulatory reset at that point and at the next such opportunity otherwise), the next column the DRP values (actual up to 2015 and forecasted from that point), and the remaining columns showing the accumulated gain or loss up to that point for various regulatory reset dates.

Table 1: The Impact of the Regime Change at Various Times

Year of Change	DRP	2007-11	2008-12	2009-13	2010-14	2011-15	Average
2005	.013	0	0	-0.0019	0	0	-0.0004
2006	.013	0	0	-0.0019	-0.0066	0	-0.0017
2007	.013	0	0	-0.0019	-0.0066	-0.0132	-0.0043
2008	.032	-0.0216	0	-0.0019	-0.0066	-0.0132	-0.0087
2009	.041	-0.0216	0.0627	-0.0019	-0.0066	-0.0132	0.0039
2010	.032	-0.0216	0.0627	0.0953	-0.0066	-0.0132	0.0233
2011	.031	-0.0216	0.0627	0.0953	0.0373	-0.0132	0.0321
2012	.036	-0.0216	0.0627	0.0953	0.0373	0.0190	0.0385
2013	.030	0.0307	0.0627	0.0953	0.0373	0.0190	0.0490
2014	.019	0.0307	0.0824	0.0953	0.0373	0.019	0.0529

2015	.016	0.0307	0.0824	0.0610	0.0373	0.0190	0.0461
2016	.013	0.0307	0.0824	0.0610	-0.0076	0.0190	0.0371
2017	.013	0.0307	0.0824	0.0610	-0.0076	-0.0343	0.0264
2018	.013	-0.0142	0.0824	0.0610	-0.0076	-0.0343	0.0175
2019	.013	-0.0142	0.0482	0.0610	-0.0076	-0.0343	0.0106
2020	.013	-0.0142	0.0482	0.0373	-0.0076	-0.0343	0.0059
2021	.013	-0.0142	0.0482	0.0373	-0.0230	-0.0343	0.0028
2022	.013	-0.0142	0.0482	0.0373	-0.0230	-0.0430	0.0011
2023	.013	-0.0180	0.0482	0.0373	-0.0230	-0.0430	0.0003
2024	.013	-0.0180	0.0470	0.0373	-0.0230	-0.0430	0.0001
2025	.013	-0.0180	0.0470	0.0370	-0.0230	-0.0430	0.0000

To illustrate the meaning of the figures in this table, consider the second column corresponding to a BEE with regulatory resets in 2002, 2007, 2012, etc. If the regime change (to a trailing average) occurred in any year prior to 2008, there would be no accumulated gain or loss because the DRP shock commenced in 2008. However, if the regime change occurred in any of the years 2008-2012, it would take effect for this BEE from 2012, at which point the accumulated result of the DRP shock would be -0.0216 (losses total 2.16% of the debt level). Alternatively, if the regime change occurred in any of the years 2013-2017, it would take effect for this BEE from 2017, at which point the accumulated result of the DRP shock would be 0.0307 (gains total 3.07% of the debt level). Alternatively, if the regime change occurred in any of the years 2018-2022, it would take effect for this BEE from 2022, at which point the accumulated result of the DRP shock would be -0.0142 (losses total 1.42% of the debt level). Across the five possible regulatory reset dates, the average results are shown in the last column of the table. Two features are important. Firstly, if the regime change did not occur, the effect of this DRP shock would have been to have initially inflicted losses on to investors in the 'average' BEE, followed by net gains, which then tail away to zero. Secondly, if a regime change did occur and was immediately adopted, the effect would depend upon the year of the regime change, and would range from an accumulated loss of 0.9% of debt level (for a regime change in 2008) through to an accumulated gain of 5.3% of debt level (for a regime change in 2014). The latter figure equates to about $2.3b across the businesses regulated by the AER (See Lally, 2014a, section 3.1) and is a very substantial sum. Since 2014 is the year in which the regime shift did in fact occur, then the effect of immediately

adopting the new regime would have been a windfall gain of $2.3b to investors in the businesses regulated by the AER.[4]

In addition to the risk faced by even an 'average' BEE, arising from the particular year chosen by the AER to adopt the new regime, the NPV arising from a policy of immediately adopting the new regime would also seem to be positive. This is apparent from the last column of Table 1, in which the average outcome (over all possible dates for a regime change) is 1.6% of debt level. Thus, if a regulatory change were equally likely in all such years, the expected impact would also be 1.6%. This would violate the NPV = 0 principle.

By contrast, as discussed in Lally (2014a, section 3.2), the AER's proposed transitional regime largely neutralizes this one-off impact on the average BEE (with averaging over regulatory reset dates). In addition, it also produces results for BEE with different regulatory reset dates that are almost identical in present value terms to those that would have been attained under the previous regime. In accordance with the policy recommended in section 8.3, I therefore favour the AER's proposed transitional regime.

An equivalent way of viewing this matter arises from the fact that immediately switching to a trailing average regime implies that the DRP results for some years will be doubled counted, once in the course of applying the on-the-day regime and again in applying the trailing average regime. Furthermore, if the regime shift occurs in 2014, this double counting will be particularly beneficial to the BEE because it will lead to double counting the high DRP years. For example, suppose the reset dates for the BEE are 2008, 2013, 2018, etc. Under the on-the-day regime, the BEE would have received DRP allowances of 3.2% in 2008 and 3.0% in 2013, followed by 1.3% in 2018 had the regime change not occurred in 2014 (see Table 1, first two columns). However, as a result of the regime change in 2014, which would take effect for this BEE in 2018, it would receive a DRP allowance at that point of 2.4% in accordance with the trailing average rather than 1.3% in accordance with the previous regime. Thus it receives the benefit of the high DRP years not only during them under the on-the-day regime but once again when the regime shift occurs.

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[4] This analysis is based upon a DRP shock commencing in 2008, because it did occur at this time, and then considering what the effects on a BEE would be depending upon when the regime change occurred. However the same pattern of possible results could have been achieved by fixing the date of the regime change in 2014 and varying the commencement date of the DRP shock.

In summary, under the previous on-the-day regime, DRP shocks could give rise to substantial differences between the allowed DRP and that incurred and the accumulated effects could be substantial for many years. Averaged over different regulatory reset dates, these accumulated differences would be initially negative, then positive, and eventually tail away to zero providing that the previous regime was maintained until these accumulated effects dissipated. Immediate adoption of the new regime at a time when the accumulated effect was positive or negative would prevent these accumulated gains or losses from being gradually eroded away and they would instead be retained by the BEE; this would be a 'windfall' benefit or loss to the investors in the BEE. In this particular case, the new regime was adopted at a time when by chance these one-off effects were at their most extreme and involved a $2.3b windfall benefit to the investors in the BEE. Equivalently expressed, adopting the new regime at this time leads to double counting of the DRP results from the high DRP years (2008-2015) and therefore benefiting the average BEE. By contrast, the AER's proposed transitional regime largely neutralizes this outcome for the average BEE (with averaging over regulatory reset dates). In addition, it also produces results for BEE with different regulatory reset dates that are almost identical in present value terms to those that would have been attained under the previous regime. Since the $2.3b effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour the AER's proposed transitional regime.

8.6 Some Analogies

In formulating an appropriate transitional regime for the DRP, the fundamental issue here is that there is a natural squaring up process under the old regime, immediate adoption of the new regime would interrupt that process, the effect on the BEE could be a substantial windfall gain or loss, and is a substantial windfall gain in the present case. More generally, for any process with a natural squaring up feature over time, the adoption of a new regime should take account of this feature. For example, suppose a tax regime involves taxpayers making tax payments in advance of the determination of the tax liability, based upon a forecast of the tax liability. Under such a regime, the payments made over any period may be more or less than the liability, but this accumulated gain or loss will eventually be offset by a final payment for the period in question, i.e., mismatches arise but they are eventually squared up. Suppose further that the tax regime is changed so that tax payments relating to a period are made at the end of the period, when the liability can be determined. Under the new regime, there will be no mismatches. However, at the point at which the new regime comes into effect, there may be a residual tax liability arising from the previous regime. A

sensible tax authority would not annul that residual liability merely because the regime had changed. Thus, when switching to a new regime, the outstanding consequences of the old regime that would otherwise have been dealt with under the old regime should still be dealt with, possibly through a transitional process.

A further analogy is as follows. Insurance involves the payment of premiums followed in some cases by a payout; so, the premium is paid first and the possible benefits arise later. Suppose a government entity was involved in such a business and the government decided to vacate that business. Naturally, no new insurance contracts would be issued. However, it would be remarkable and inequitable if they also annulled the existing contracts, because they would leave those who had already paid the premiums without the potential benefits. A more sensible approach would be to let the existing contracts run their course. This would be a transitional process, with the same merit as that for the AER's proposed transitional process for the DRP regime change.

8.7 Contrary Arguments

It might be argued that a regulatory process involves setting an allowed cost of debt at each reset point in accordance with currently observable costs on various debt instruments (some of which may have been negotiated at some earlier point), this is forward-looking, the AER's proposed transitional process in respect of the DRP involves looking back at past events, and therefore it is invalid. However, the description of the regulatory process given above is a description of the process for implementing a particular policy. It provides no guidance as to how one should behave in the face of regime changes. Furthermore, as argued earlier, the crucial requirement is to satisfy the NPV = 0 principle and this implies that the only viable regulatory policy is to neutralize the one-off effects of regime changes or at least the effects that are large in either direction.

It might also be argued that the AER's proposed transitional process for the DRP involves them keeping a mental accounting of past gains and losses and then seeking to square it up in the next regulatory period, which is inappropriate. However, I do not consider that the AER is engaged in squaring up. I consider that they are merely allowing a squaring up process that is inherent in the previous regime (as described in section 8.5) to continue to operate for a few more years rather than interrupting it at a point in time that is by chance extraordinarily favourable to investors in the BEE, at the expense of their customers.

It might also be argued that the AER's proposed transitional process for the DRP creates regulatory risk. I disagree. Without such a process, investors in the BEE could face a large windfall gain or loss resulting from the next regime change, i.e., they would be exposed to a 'roll of the dice'. This is risk. So, the AER's proposed actions are risk-reducing rather than risk creating.

It might also be argued that the uncertainty about the size of any accumulated DRP gains or losses over any given period under the on-the-day regime is a risk that the BEE was compensated for ex-ante through their equity beta. However the risk issue here is not the size of these accumulated gains or losses per se but the risk of a regime change that might bring that accumulation process to a premature end and at a point that was particularly favourable or unfavourable to the BEE; this regulatory risk is not compensated ex-ante through the equity beta.

It might also be argued that the BEE is exposed to some risks (unsystematic risks) that can't be compensated via beta, such as weather-related risks, that compensation is not warranted precisely because such risks can be diversified away by investors, and risks arising from regulatory regime changes are simply one example of this. However, regulatory risks are fundamentally different to weather-related risks. Historical experience of weather gives firms a good understanding of future risks and the weather is driven by laws of nature that are indifferent to their impact on a regulated business. By contrast, in the absence of a policy of protecting the BEE from the one-off impact of regime changes, investors in the BEE would be exposed to regulatory whim or even the possibility of regulators choosing the timing of regulatory changes so as to inflict losses upon them. Investors in the BEE should be protected against such risks.

8.8 Further Arguments for a Transitional Process

Table 1 reveals that, in the event of immediately adopting the new regime, the timing of the regime change has a significant effect upon the BEE. Since the AER chooses the timing of any regime change, then immediate adoption of the new regime would significantly expose investors in the BEE to the AER's choice. In the present case, the AER's choice has been most favourable to investors in the businesses. However, the timing of such changes is largely arbitrary and therefore potentially exposes the AER to the suggestion from either

consumers or investors in the businesses that it had acted in a prejudicial fashion towards them. This exposure is eliminated by the AER's transitional process, because (as noted before) it produces outcomes that closely correspond to those that would have been obtained under the old regime.

A further potential argument for a transitional process arises from the possibility that immediate adoption of the new regime requires the use of historical data, the historical data is unavailable or contentious, and the use of a transitional regime obviates the need for historical data. As discussed in Lally (2014a, section 2.3), this point applies to the DRP because the new regime requires the use of historical DRP data and some of that data is highly contentious. This point also favours the AER's proposed transitional regime. However, this should not be considered a substantial point because the historical data is merely contentious rather than unavailable.

8.9 Summary

The AER is subject to the legal requirement to set the allowed cost of debt commensurate with the costs incurred by a BEE, and this is equivalent to the NPV = 0 principle. A policy of immediately adopting a new regime only when the one-off impact is favourable to the BEE but not otherwise would necessarily violate this NPV = 0 principle. Alternatively, a policy of immediately adopting a new regime in all cases would expose the BEE to potentially very large risks, thereby discouraging investment. It would also expose the BEE to the possibility of an adverse shocks so large as to threaten its financial viability, which would either lead to regulatory relief in such cases (and hence violation of the NPV = 0 principle) or the possibility of a supply disruption. In addition, even if the policy of immediately adopting a regime change regardless of the one-off impact on the BEE were rigorously followed, the upside and downside from the policy might not be symmetric, in which case the NPV = 0 principle would still be violated. These disadvantages are all so substantial that the only viable regulatory policy would be to neutralize the one-off effects of regime changes, possibly through a transitional regime, or at least to do so when the effects in *either* direction are substantial.

In respect of the base rate component of the cost of debt, the regime change in question here would cause a BEE to change its behavior, thereby temporarily leaving it with costs arising from its behavior under the previous regime. Under such circumstances, immediately

applying the new regime would lead to a BEE over recovering its incurred costs by up to $4b over the next nine years. By contrast, the AER's proposed transitional regime largely neutralizes this one-off effect. Since the effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour applying the AER's proposed transitional regime to the base rate component of the cost of debt.

In respect of the DRP component of the cost of debt, the regime change in question here would not cause a BEE to change its behavior. However, under the previous on-the-day regime, DRP shocks could give rise to substantial differences between the allowed DRP and that incurred and the accumulated effects could be substantial for many years. Averaged over different regulatory reset dates, these accumulated differences would be initially negative, then positive, and eventually tail away to zero providing the old regime were maintained until the accumulated effect dissipated. Immediate adoption of the new regime at a time when the accumulated effect was positive or negative would prevent these accumulated gains or losses from being gradually eroded away and they would instead be retained by the BEE; this would be a 'windfall' benefit or loss to the investors in the BEE. In this particular case, the new regime has been adopted at a time when these effects are at their most extreme and immediate adoption would give rise to a $2.3b windfall benefit to the investors in the BEE. Equivalently expressed, adopting the new regime at this time leads to double counting of the DRP results from the high DRP years (2008-2015) and therefore benefiting the average BEE. By contrast, the AER's proposed transitional regime largely neutralizes this one-off outcome not only for the average BEE (with averaging over different regulatory reset dates) but also for individual BEEs with different regulatory reset dates. So, again, since the one-off effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour applying the AER's proposed transitional regime to the DRP component of the cost of debt.

Finally, the AER's proposed approach protects the AER from either consumers or investors in these businesses believing that the AER's choice of the timing for the regime change is a prejudicial act towards them, and it obviates the need to collect contentious historical DRP data.

9. Review of Submissions

9.1 UBS (for TransGrid)

UBS (2015, pp. 1-5) argues that the NSW businesses should not have attempted in 2008-2009 to have hedged the base rate component of the cost of debt associated with the 2009-2014 regulatory period, based upon a consideration of circumstances in 2008-2009. However, this implies that a hedging decision could have been made in 2008-2009 and this is not correct; in addition to actions taken in 2009, the hedge requires actions at the earlier times at which the borrowing that was in force in 2009 was undertaken (to borrow at a floating rate or enter swaps that convert fixed to float), this borrowing occurred up to ten years prior to 2009, and therefore the decision to hedge could not have been made in 2009. The most that could have been done in 2009 was to not undertake the second leg of the hedging process, and this is a quite different decision to that of electing not to hedge at all. Thus UBS appear to have misunderstood a fundamental feature of these hedging transactions.

UBS (2015, page 2) also argues that the regulatory averaging period for TransGrid for 2009-2014 was retrospectively set (by the Australian Competition Tribunal: ACT) several months after the commencement of the regulatory period, which would have made it impossible for TransGrid to have undertaken the appropriate hedging actions. However, this delay was contrary to the AER's normal policy of using a period shortly before the beginning of the regulatory cycle in question and arose because TransGrid did not seek to use swaps (and sought a much earlier averaging period), it appealed to the ACT, and hence the delay (see Meehan, 2015, paras 2.1-2.2, 4.1-4.3). If TransGrid had sought to use swaps, it would not have acted in this way and it could reasonably have presumed that the AER would abide by its normal policy.

UBS (2015, pp. 2-4) also argues that the regulatory window (of up to 40 business days) wasn't wide enough to allow the swapping to be done within it by TransGrid and other business with the same reset date, that extending the period of the transactions to a feasible period (91 business days) would expose the businesses to material risk ($819m at two standard deviations), that no compensation was provided by the AER for this risk, and the low risk alternative was not to use swaps. However, UBS does not provide any analysis on the risk of not swapping and is therefore not in a position to conclude that the lower risk course of action was to not engage in swaps. Appendix 2 examines this question and concludes that engaging in swap contracts (even when transacted over a five month period)

reduces the risk arising from the mismatch between the on-the-day allowance and the incurred costs of debt, it eliminates most of that risk, and most of the remaining risk arises from the mismatch between the prevailing DRP allowed and the trailing average that is incurred. This rebuts UBS's claim.

UBS (2015, page 2) argues that the 2009 swaps would have required 91 business days to transact because swap turnover at that time was $6b per day, about 15% of which was for swaps of at least five years ($900m), which implies that up to $200m more per day could have been transacted without exhausting market liquidity. Since the average notional debt over the 2009-2014 period for all regulated entities with TransGrid's reset date was $18.2b, then 91 days would have been required to deal with the swap transactions of $18.2b. However, UBS implies that the relevant subsection of the swap market was that for swaps of at least five years but the natural subsection should instead be for some symmetric and narrow band around five years (such as 3-7 years) because supply in this band would be sufficiently flexible to accommodate additional demand for swaps of exactly five years. Using the 3-7 year band, the percentage of swaps within it is now 24% rather than 15%. Furthermore, UBS notes that by 2012 daily volume had risen to $50b but UBS subtracts out all but $8.75b of this on the grounds that the rest was not corporate related hedging, being inter-bank etc (UBS, 2015, page 4). However, UBS performs no such subtraction in 2009 nor would such a subtraction be sensible because the ability of a market to absorb more demand from a particular subset of demand without a material price impact depends on the aggregate size of the market rather than the size of the demand subset (because suppliers do not care where demand comes from). Similarly, the ability of the Sydney housing market to absorb more demand from immigrants without a material price impact depends upon the aggregate size of that market rather than the size of demand from immigrants. None of these points imply that UBS's figure of $200m per day is wrong but they do raise concerns about their judgement.

UBS's (2015, page 2) belief that the swaps would require 91 business days to transact in 2009 also rests in part on the assumption that the total hedging requirements of the businesses in 2009 were $18.2b, corresponding to the average debt of the businesses over the 2009-2014 period. However the relevant figure is the debt outstanding in 2009 ($13b) because any increase in borrowing in the following five years would require swap contracts at the time of

borrowing and also in 2014 rather than in 2009. So, rather than 91 business days being required to effect the swaps, it falls to 66 business days for this reason alone.

UBS (2015, pp. 4-5) also argues that hedging the risk-free rate component would only be a partial hedge because the DRP component couldn't be hedged (pp. 4-5). This point implies (reasonably) that the risk assessment should be conducted for the entire cost of debt rather than only the risk-free rate component. Appendix 2 examines this question and concludes that hedging the risk-free rate component significantly reduces risk associated with the entire cost of debt.

UBS (2015, page 5) also argues that the costs of debt allowed for various businesses by the AER in 2014 under the on-the-day approach are less than the contemporaneous trailing average costs faced by these businesses. However, in assuming that the BEE pays the trailing average risk-free rate, UBS implicitly assumes that no swaps were undertaken (because swaps would convert the trailing average risk-free rate paid into the rate prevailing at the beginning of the regulatory cycle). Since this assumption is unjustified, it undercuts the value of the comparisons at least in respect of the risk-free rate component. In respect of the DRP component of the comparisons, the appropriate period for comparison spans the entire GFC-induced spike in the DRP rather than just in 2014, and consideration of this longer period supports use of the AER's proposed transitional regime (see section 8.5).

UBS (2015, page 6) also argues that the transactions costs of the NSW service providers' debt are about 0.38%. This bears on the question of whether the use of interest rate swap contracts is efficient. Four components are mentioned by UBS. The first is the transactions costs of cross-currency swaps (0.18%), which are not relevant to the question of whether interest rate swap contracts are efficient. The second component is the transaction costs of the swap contracts (0.05%). This component has already been acknowledged but at a cost of about 0.10% rather than 0.05% (Lally, 2014a, page 27). So, the lower figure provided by UBS strengthens the conclusion that swaps are efficient. The third component reflects timing differences between the cost of debt allowed by the AER (based upon Bloomberg and RBA data) and the swap contracts engaged in by businesses (0.09%), and arises because the exact dates of the data used by the RBA and Bloomberg are not disclosed. However the derivation of this figure is not explained by UBS and, in any event, it is not a cost but a risk from engaging in swap contracts, which must be compared with the risk from not engaging in

swaps. This comparison has been done in Appendix 2 and reveals that the risk from undertaking swaps is much less than from not doing so. Finally, the fourth component reflects risk arising from entering the swap contracts over a different period to that used by the regulator in setting the allowed cost of debt (0.06%). As with the third component, the derivation of this figure is not explained by UBS and, in any event, it is not a cost but a risk from engaging in swap contracts, which must be compared with the risk from not engaging in swaps. This comparison has been done in Appendix 2 and reveals that the risk from undertaking swaps is much less than from not doing so. So, of these four components, one is irrelevant to the issue of whether it is efficient to engage in swap contracts, two relate to risk and have been addressed in the risk comparison shown in Appendix 2, and one is the transactions costs of the swaps that have already been recognized in determining that swaps were efficient.

9.2 Frontier (*for TransGrid*)

Frontier (2015, section 3.5) argues that the AER's proposed transitional process for the DRP involves them keeping a mental accounting of past gains and losses and then seeking to square it up in the next regulatory period, which is inappropriate. I do not agree. The on-the-day regime gave rise to accumulated gains and losses that reverse over time. However the regime change brought that process to a premature end, and at a time when the accumulated position (of about $2.3b) was very large. Consistent with my view that the large one-off effects of regime change should be neutralized, and that the AER's proposed transitional process does so, I therefore support it.

Frontier (2015, section 3.5) also notes that clause 6.5.2 (c) of the NER requires that the rate of return should be commensurate with the costs of a BEE and argues that this precludes consideration of windfall gains or losses in prior regulatory periods. However, as discussed in section 8.2, the legal requirement cited is equivalent to the NPV = 0 principle (which is also forward-looking) and as discussed in section 8.3 this implies that the only viable regulatory policy is to neutralize the temporary effects of at least regime changes with large effects in either direction. Doing so may require, at the time of the regime change, consideration of earlier events.

Frontier (2015, section 3.6) argues the AER's proposed transitional process for the DRP involves a clawback of past gains, notes that Lally (2014a, pp. 21-22) argues otherwise, and

therefore questions what a clawback would look like if this was not an example of it. In response to this question, suppose that freak weather generated a favourable outcome for a business and the regulator then set the allowed rate of return at the next reset point so as to offset this earlier favourable event. This would be clawback. Alternatively, suppose that a government entity was involved in an insurance business and the government decided to vacate that business. Naturally, no new insurance contracts would be issued. However, annulling the existing liabilities under the existing contracts would leave those who had already paid the premiums without the potential benefits. This would be inequitable because the subsequent obligations are a consequence of receiving the premiums; the good news (premiums) is followed by the bad news (payouts). Thus, if a court determined that the liabilities could not be annulled, it would not be clawing back the earlier premiums but simply preserving the integrity of a package deal, involving premiums first and payouts later. In my view, the proposed transitional regime is akin to the insurance example rather than the weather example. The windfall DRP gains made by firms under the old regime in the early stages of the GFC spike are part of a package and the rest of the package is the subsequent windfall losses, i.e., the subsequent losses are an inevitable consequence of the earlier gains. Thus, if the regulatory regime changes, the package should not be cut up so as to leave the firms with the windfall gains but exempt them from the subsequent losses. By contrast, there is no resemblance with the weather example, because favourable weather conditions today do not lead to offsetting bad conditions at some point in the future.

Frontier (2015, para 114) argues that the AER's proposed transitional regime creates risk and discourages investment. I disagree. Without such a transitional process, regulated businesses could reasonably be concerned that, at some future time, the regulator might again change the regime and it might change it at a time that was particularly unfavourable to them. Without the expectation that the regulator would seek to neutralize this effect, businesses would face risk. So, the AER's proposed actions are risk-reducing rather than risk creating. Accordingly, they encourage investment.

Frontier (2015, para 115) argues that even if the AER's proposed transitional regime for the DRP were adopted there would be significant practical difficulties in implementing it. The first alleged difficulty is that, if the DRP rose again during the transitional period, it would aggravate the windfall gain in which case the proposed transitional regime would fail to achieve its objective of mitigating the windfall gains. Frontier do not provide any analysis of

this issue. By contrast, CEG (2015, section 5.5) do analyse this issue and I therefore defer treatment of it to my review of CEG's work in section 9.6.

Frontier (2015, para 115) also raises the question of how far back in time one should go in order to assess the windfall gains. The windfall gains in question are those accumulated up until the point at which the regime changes (mid 2014), and arise from the analysis in Lally (2014a, section 3.1). This analysis is premised upon the DRP being stable at about 1.3% prior to 2007 and, since all parties accept that the BEE uses ten-year debt, stability would need to have prevailed over the period 1998-2007. As shown in CEG (2014a, Figure 1), this is the case. The behavior of the DRP prior to 1998 would not affect the analysis and therefore is irrelevant.

Frontier (2015, para 115) also argue that the previous on-the-day regime contained a natural hedge between the DRP (allowances are too large during a crisis because the prevailing value is used rather than the trailing average) and the MRP (allowances are too low during a crisis because the prevailing value is high but regulators underestimate it by placing high weight on historical averages). However, this is an argument in support of retaining the old regime rather than against the transitional regime proposed by the AER. In fact, since the proposed transitional regime effectively prolongs the tenure of the old regime (which has the desirable feature identified by Frontier), the point raised by Frontier is an argument in support of the transitional regime.

Frontier (2015, section 3.7) argues that the AEMC (2012, page 76) views transitional arrangements purely as a means of allowing businesses to unwind any financial arrangements entered into under the previous regime, which is incompatible with the motives underlying the AER's proposed transitional arrangements for the DRP. However, at this point in its report, the AEMC merely summarized the views of Professor Gray, who is the author of the Frontier report. So, Professor Gray is citing himself. The views of the AEMC (ibid, page 216) are far less restrictive and are not inconsistent with the motives underlying the AER's proposed transitional arrangements for the DRP.

Frontier (2015, section 4.2.2) argues that the choice of using or not using swaps under the old regime varied according to firm size and ownership, and implies that these choices must therefore have been efficient. However, whilst efficiency might be presumed in the absence

of any contrary information, the fact that firms entering into swap contracts would lower their expected base rate costs and markedly reduce their exposure to base rate shocks relative to not entering these swap contracts establishes a prima facie case for the use of swap contracts being efficient. Thus, in the absence of a contrary argument, the failure of some businesses (largely the government-owned ones) to use swaps implies that they were inefficient or that there was some feature of their activities that invalidated such reasoning in their case. One such possibility is that, being government-owned, they were part of a large portfolio of assets that embodied many natural hedges, which obviated the need to engage in swaps so as to reduce interest rate risk for individual businesses. However, if this is true (and Frontier do hint at it by suggesting that the QTC concentrated the debt maturities of the QLD regulated businesses around the regulatory reset dates because they could compensate for this refinancing risk through other borrowing for the QLD government), it is not efficient behavior for a BEE because the benchmark firm is by definition only engaged in regulated energy network activities and not the wider activities financed by government borrowings.

Frontier (2015, section 4.2.5) offers three specific criticisms of the argument that swaps reduce both risk and expected base rate interest costs, and therefore are efficient. The first is that larger businesses could only transact the swaps over a longer period than the window used by the AER to set the allowed rate under the old regime, and this reduces the benefits of hedging. However, it is not sufficient to demonstrate that the benefits are lower. It is necessary to demonstrate that the benefits disappear and Frontier fail to do so. By contrast, the analysis in Appendix 2 demonstrates that, even with the swaps spread out over a period of five months, the swaps significantly reduce risk relative to not using swaps. Frontier also claim that, even when spreading the swap contracts over a protracted period at the rate of $300m per day for more than three months, that the sheer size of this series of transactions would cause prices to be shaded against the businesses and this reduces the benefits from hedging. However, this is not a matter on which Frontier can claim any expertise. By contrast, Westpac (2014) from whom the $300m figure is drawn claim that $300m could be transacted over 73 consecutive business days without affecting pricing. Finally, Frontier claims that larger businesses couldn't borrow all of their debt in the form of floating-rate debt and would therefore require a pair of swap contracts to hedge the base rate component under the old regime (ten-year fixed to floating followed by floating to five-year fixed), thereby raising the cost of the swaps. However, the estimates of the transactions costs of the swaps that I have provided, and which underlie my conclusion that the swaps were efficient, allow

for the transactions costs of both legs (Lally, 2014a, page 27). For example, the transactions costs of 0.09% sourced from Jemena (2013, page 22) covers both legs because it involves swapping from ten-year fixed to five-year fixed rather than ten-year floating to five-year fixed.

Frontier (2015, pp. 35-36) assesses and rejects some possible explanations presented by the AER (2014, pp. 291-292) for the government-owned businesses failing to use swap contracts. One such possible explanation is that the government-owned businesses are part of a portfolio of assets held by their owners, which gives rise to various natural hedges that might obviate the risk reduction from engaging in the swaps. In response, Frontier argues that government ownership does not undercut the benefit from "keeping financing costs to the minimum possible level". However the point concerning government ownership is that it might undercut the risk reductions from using swaps rather than expected cost savings. So, Frontier's response is not relevant to the argument. Furthermore, Frontier (2015, section 2.2) clearly accepts that the financing decisions made by firms involve a trade-off between risks and expected costs because they specifically refer to such trade-offs.

Another possible explanation is that the government-owned businesses did not understand the full potential of the swaps market. In response, Frontier argues that TransGrid considered the possibility of using swaps, and refers to the statement submitted by one of TransGrid's senior management (Meehan, 2015) in support of this. I address this in the next section and do not consider that he even offers comprehensible reasons for rejecting the use of swaps. Furthermore, at no point does he compare the costs and risks of using swaps with the consequences of not doing so, and a sensible decision cannot be made without such a comparison. The same holds for another member of TransGrid's senior management (Thiow, 2015), as discussed in the section 9.4.   All of this supports the suggestion that the government-owned businesses do not understand the full potential of the swaps market.

9.3 Meehan (for TransGrid)
Meehan (2015, para 3.17) claims that TransGrid could not have entered swaps shortly before mid 2009 at a reasonable cost, and earlier describes these costs as "transition costs, execution risks, and the uncertainty created by the GFC." However, Meehan provides no clarification on these matters, let alone any evidence in support of them. Furthermore, at no point does he compare the costs and benefits of using swaps with those of not doing so, and a sensible

decision cannot be made without such a comparison. Furthermore, material the AER received in confidence from TransGrid supports the use of swaps. [commercial-in-confidence text omitted]

9.4 Thiow (*for TransGrid*)

Thiow (2015, paras 3.4, 4.2 and 4.3) notes that TransGrid has never used swap contracts and whilst acknowledging that they reduce risk justifies not using them on the grounds that there are transactions costs, counterparty risks, and an inability to hedge the required volume of debt within the regulatory window. However, counterparty risks are trivial (because the intermediary bears the risk in return for a fee and the intermediary would have to fail for TransGrid to suffer) and the other two points have been previously addressed; the transactions costs are less than the expected savings in interest costs, and the inability to hedge all of the debt within the regulatory window is dealt with by widening the period over which the swaps are entered into (with the resulting risk still being much less than not swapping at all as shown in Appendix 2). Furthermore, he fails to note that swaps reduce average interest costs, which suggests that he does not appreciate this point. Furthermore, at no point does he compare the costs and benefits of using swaps with those of not doing so, and a sensible decision cannot be made without such a comparison. It is also interesting to see from para 6.3 of Annexure BT-2 to Thiow's Statement that TransGrid engages in speculation (switching between nominal and inflation-linked debt, and between short-term debt and long-term debt depending upon market conditions), and engaging in such speculation would preclude the use of swaps for hedging in the manner under discussion here. Thus, an additional reason for TransGrid not using swaps is its desire to speculate, but this is not efficient behavior and therefore would not warrant a regulator granting the firm a different allowed cost of debt.

9.5 HoustonKemp (*for TransGrid*)

Houston Kemp (hereafter HK: 2015, pp. 11-12) argues that a business that used swaps under the previous on-the-day regime would not then have an incentive to minimize its total cost of debt (and instead would seek to minimize only its DRP), and this is inconsistent with the AER's belief that the BEE should seek to minimize its debt financing costs. I think this is completely pedantic. Regulated businesses are subject to a regulatory regime and any attempt to optimize anything (including minimizing financing costs) is subject to the restrictions imposed by the regulatory regime. Pedantry aside, the use of swaps is not forced

upon a business and HK argues anyway that businesses wouldn't act in this way because it would be inefficient. Furthermore, HK's argument does not bear on either of the relevant issues here: whether it was efficient for businesses to use swaps under the previous regime and whether the AER's proposed transitional process is appropriate.

HK (2015, pp. 12-13) claims that the businesses that didn't use swaps under the previous regime have the lowest costs of debt over the period 2009-2013 and this vindicates their strategy. However this result would simply be the consequence of the particular pattern of base rates that prevailed over this 2009-2013 period and for up to ten years prior to it for those whose didn't hedge. Similarly, had the on-the-day regime persisted, those who hedged would have faced a lower base rate in 2014 than those who did not because the five-year base rate in 2014 was below the ten-year trailing average ten-year base rate at that point, but this would not vindicate the hedging strategy. A proper assessment of this issue would require a longer period; those who used swaps would pay the prevailing five-year base rate, and those who didn't would pay the trailing-average ten-year base rate. Empirically, the ten-year rate has on average been higher than the five-year rate over a long period. So, those who swapped would have lower costs on average over time (as well as facing less risk).

HK (2015, pp. 13-17) argues that larger businesses like TransGrid would have to transact the swaps over a longer period than small businesses, this raises their risk in doing so, and therefore undercuts the value in doing so. However no conclusion can be reached on the merits of hedging without comparing the risk arising from an imperfect hedge by transacting in swaps over a longer period versus not engaging in swaps at all, and HK present no evidence on this question. By contrast, the analysis in Appendix 2 demonstrates that, even with the swaps spread out over a period of five months, the swaps significantly reduce risk relative to not using swaps.

HK (2015, pp. 17-19) argues that the use of swaps under the previous regime was inefficient because it would eliminate the natural hedge (negative correlation) between the base rate and DRP components of the cost of debt. However, negative correlation would not be sufficient to support the conclusion that swapping was inefficient. It would have to be sufficiently negative to cause the risk from not swapping to be less than from swapping, and HK present no evidence on this matter. Furthermore the claim is inconsistent with the fact that private-sector businesses did engage in swaps, and is also inconsistent with the explanation given by

Thiow for TransGrid not using swaps (see previous section). By contrast, the analysis in Appendix 2 demonstrates that, even with the swaps spread out over a period of five months, the swaps significantly reduce risk relative to not using swaps. In addition, swaps reduce expected interest costs. So, they are efficient.

HK (2015, section 3.3.1) argues that transitional arrangements for the DRP are not required because of deficiencies in the historical data, as the RBA historical data alone are sufficient. However, as discussed in Lally (2014a, section 2.3) and as shown in HK's own Table 2, the RBA data commence in January 2005 and therefore do not provide a ten-year history up to the regime change in mid 2014. Furthermore, and again as argued in Lally (2014a, section 2.3), reliance on just the RBA data exposes one to the considerable risk of it being in error during the GFC; at least one of the available DRP series in that period must be significantly in error because they differ so much.

HK (2015, page 21) argues that the AER's proposed transitional arrangements in respect of the DRP constitute a clawback, and therefore violate regulatory requirements to not use past data. These claims have also been raised by Frontier and addressed in section 9.2.

HK (2015, section 3.3.2) argues that transitional arrangements for the DRP are not needed to address a past windfall gain problem because Lally's (2014a, section 3.1) analysis of this issue assumes that the DRP allowance up to mid 2007 matched that paid by firms (1.3%), and this is inconsistent with TransGrid's DRP allowance in 2004 of 0.90% and average incurred DRP over the 2004-2009 period of 2.67%. However, the 2004-2009 period referred to by HK extends beyond mid 2007 and therefore there is no inconsistency between Lally's (2014a) assumption that allowances matched incurred DRPs up to mid 2007 and TransGrid's experience from 2004-2009. Furthermore, HK's claim that the average DRP over the 2004-2009 period was significantly in excess of the 2004 value is again entirely consistent with the data in Lally (2014a, Table 2). Furthermore, TransGrid's allowance of 0.90% in 2004 (ACCC, 2004, pp. 140-143) was subsequently revised to 1.17% (AER, 2005), and it also reflects a credit rating for 'A' bonds (ACCC, 2004, pp. 140-143) whereas Lally's (2014a, Table 2) figure of 1.3% reflected BBB bonds. So, again, there is no inconsistency here. Thus, none of the claims made by HK are inconsistent with the DRP data in Lally (2014a, Table 2), and reproduced in the first two columns of Table 1 above. This latter data reveals that an immediate adoption of the new regime from 2014 had a windfall effect upon the cash

flows of the BEEs, this windfall effect should be neutralized, and the AER's proposed transitional process does so.

HK (2015, section 3.3.2) also argues that TransGrid was under compensated over the 2004-9 period because its allowed DRP in 2004 was 0.90% and the average DRP over the period 2004-2009 was 2.67%; it should have accordingly received over compensation in the 2009-2014 period but this was not considered by Lally (2014a, section 3.1) because he assumes no over or under recovery in the years leading up to 2007. However the first claim is incorrect; under or over recovery requires a comparison of the allowance in 2004 with the average of the trailing averages over each of the years 2004-2009 rather than with the average DRP in those years. Using the data in Lally (2014a, Table 2), the 2004 allowance was 1.3% whilst the average incurred cost over the following five years was only marginally higher at 1.34%. The second claim is also incorrect; Lally (2014a, Table 2) shows an allowed DRP in 2009 of 4.1% and an average incurred cost over the following five years of 2.16% and this over recovery largely explains the accumulated gain of 9.53% up to mid 2014 (Lally, 2014a, Table 3).

HK (2015, section 3.3.2) argues that, if transitional arrangements for the DRP were designed to take account of the past windfall gain problem described by Lally (2014a, section 3), they should also account for under and over compensation back to the beginning of economic regulation. This point has also been raised by Frontier (2015), and addressed in section 9.2 above.

HK (2015, section 3.3.3) argues that Lally's (2014a, section 3) contention that the DRP transitional arrangements produce outcomes that match those that would have prevailed had there been no regime change is false, by presentation of a hypothetical counter example. However, the example involves a DRP prevailing at the time of the regime change of 2.0% less than the trailing average. This differential does not correspond to the situation in mid 2014 (see Lally, 2014a, Table 2) and therefore is not of interest. The analysis in Lally (2014a) relates to the actual DRP experience in the transitional period whereas HK's example does not. Furthermore, HK's example ignores the windfall gains to the business in the lead up to the regime change. By contrast, the analysis in Lally (2014a, Table 3) shows that firms with a mid 2014 cycle end would have gained 4.2% (in PV terms) from the GFC spike without a regime change, 6.6% with a regime change but without a transition, and 4.3% with

a regime change and a transition. So, the transitional regime merely shaves away some of the gains to these businesses.

HK (2015, section 3.4.1) argues that the AER's transitional regime would undercompensate TransGrid for the costs that they will incur using the efficient policy (a ten-year trailing average without hedging), of about 1% of their debt level in the first year. However, this argument simply repeats that in an earlier NERA report and is dealt with in Lally (2014a, page 32).

HK (2015, section 4.1) argues that, in using DRP data where the BVAL seven-year curve is not available, the five-year BVAL curve should not be used because it provides "substantially less insight" into the appropriate cost of debt than the RBA curve, and therefore the RBA curve should be exclusively used. However no explanation for the quoted words is provided by HK. Furthermore, Lally (2014b) reveals that there are substantial differences in the BVAL and RBA methodologies, and therefore considerable mean squared error (MSE) benefits from averaging over results from the two series. HK does not provide any contrary evidence.

9.6 CEG (for ActewAGL)
CEG (2015, section 4.3) argue that the regulatory averaging period for ActewAGL for 2009-2014 was set ex-post and several months before the end of the current regulatory cycle, which would have made it impossible to for them hedge using swaps. However, this argument parallels that by UBS on behalf of TransGrid, and has been addressed in section 9.1.

CEG (2015, section 4.4) argues that the AER's belief that swapping was efficient because it reduced risk and expected interest costs is flawed because the five-year swap rate was higher than the ten-year swap rate during the relevant averaging periods (late 2008) and the transactions costs of the swaps might outweigh the risk reduction from using them. However the difference between the five and ten year swap rates during the regulatory averaging period is irrelevant. The relevant ten-year swap rate is that at the time of the borrowing whilst the relevant five-year swap rate (which displaces the ten-year rate) is that during the subsequent regulatory averaging period (which is up to ten years after the borrowing), and CEG recognize this in their para 58. Furthermore, the firm's decision as to whether or not to engage in swaps must be made at the time of the borrowing (which is up to ten years before

the last regulatory averaging period relating to that debt). Thus, at the time of the borrowing, the firm would have to form an expectation regarding the difference between the prevailing ten-year rate and the five-year rates at a series of future points in time. The best evidence for this is the historical average difference over a period sufficiently long to provide a credible estimate of the expected differential, and doing so suggests that the ten-year rate is expected to be greater by at least 0.25% (see Lally, 2014a, page 27). Furthermore, the transactions costs of the swaps of about 0.10% (Lally, 2014a, page 27) are less than this expected interest rate savings. So, the net expected benefit of the swap is positive and there is also a risk reduction (and even CEG concedes the presence of a risk reduction). Accordingly, undertaking the swaps is unambiguously efficient.

CEG (2014, section 4.4) argues that swapping might be efficient for very highly geared firms because the reduction in bankruptcy risk might outweigh the transactions costs of the swaps. However, as discussed in the previous paragraph, swapping is unambiguously efficient regardless of whether the risk reduction is large or small.

CEG (2015, section 4.5) argues that using swaps was also undesirable because risk would arise from having to spread the swaps over a longer period than the regulatory averaging period. However, it is not sufficient to demonstrate that such risk arises. It is also necessary to demonstrate that the risk is greater than that from not engaging in swaps, and CEG fail to do so. By contrast, the analysis in Appendix 2 demonstrates that, even with the swaps spread out over a period of five months, the swaps significantly reduce risk relative to not using swaps.

CEG (2015, section 4.5) also argue that using swaps was undesirable because it would eliminate a natural hedge between the DRP and the base rate component of the cost of debt. CEG analyse this issue by comparing the risk from swapping with not swapping over the 2004-2014 period using Australian data, and conclude that swapping would have yielded more risk over the 2004-2013 period than swapping. However this analysis has two limitations. Firstly, the data period used spanned only two regulatory cycles and is therefore inferior to the analysis carried out by me in Appendix 2, spanning ten regulatory cycles. Secondly, the analysis carried out by CEG is incorrect because it examines variations between allowed and incurred costs every month as if the allowed rate was reset monthly instead of five yearly. To illustrate this, suppose that the reset dates are mid 2004, mid 2009

and mid 2014. If swaps are not used, the appropriate comparisons are between the allowed rate in mid 2004 (the prevailing rate at that time of 7%) and the incurred rates over the following five years (the trailing averages shown in CEG's orange line) and between the allowed rate in mid 2009 (the prevailing rate at that time of 9%) and the incurred rates over the following five years. Similarly, if swaps are used, the same process is followed except that the incurred costs are the sum of the five-year swap rate and the trailing average DRP (shown by CEG's yellow line). For each of these two policies followed by the firm, the standard deviation should be estimated and a comparison made. The process could be repeated for other reset dates, and averages taken over the resulting standard deviations. However, CEG do not act in this way and their calculations therefore fail to reflect the actual situation faced by a firm following each of the two possible strategies. By contrast, the analysis carried out by me in Appendix 2 does reflect this. Furthermore, even for businesses that had not earlier undertaken the first leg of these transactions (swapping fixed into floating at the time of borrowing) and therefore the second leg (swapping floating into fixed to match the regulatory cycle) would not have been sensible, such businesses could still have commenced the process for any rollovers (and capex), and therefore gradually shifted towards swapping on all of their debt.

CEG (2015, para 59) also argues that using swaps was undesirable because the AER did not provide compensation for the associated transactions costs. However, as discussed in Lally (2014a, page 31), swapping is efficient even if the regulator does not provide this compensation because the reduction in expected interest costs more than compensates for the transactions costs of the swaps.

CEG (2015, section 4.6) argues that the evidence presented by the AER in support of private-sector firms using swaps is inconclusive. However further evidence in support of the AER's claim appears in Lally (2014a, page 26), from the AER, NERA and SFG.

CEG (2015, paras 93-94) notes that clause 6.5.2 (c) of the NEL requires that the allowed rate of return be commensurate with the efficient financing costs of a BEE, argues that this requirement is prospective in nature, and that this rules out the AER's consideration of past events (the 'windfall gain') in favouring its transitional regime for the DRP. However, as discussed in section 8.2, the legal requirement cited is equivalent to the NPV = 0 principle (which is also forward-looking). Furthermore, as discussed in section 8.3, this NPV = 0

principle implies that the only viable regulatory policy is to neutralize the one-off effects of regime changes or at least the one-off effects that are large in either direction, and the AER's proposed transitional regime does so. Doing so may require, at the time of the regime change, consideration of earlier events.

CEG (2015, paras 95-97) argues that the AER's approach to the DRP windfall gain issue involves recovery of past windfall gains and this distorts incentives because a business will not know ex ante whether compensation given will be subsequently deemed excessive and therefore removed. However the important moment at which incentives matter is at the time investment is undertaken and appropriate incentives at this point requires that the NPV = 0 principle is observed. As argued in the previous paragraph, this requires neutralizing the one-off effects of regime changes and the AER's proposed transitional regime does so. Furthermore, doing so reduces risk to the BEE even if these one-off effects are as likely to be positive as negative and therefore don't violate the NPV = 0 principle; in effect, without neutralization of these one-off effects, the BEE faces a roll of the dice that could be highly unfavourable to it.

CEG (2015, para 98) argues that the AER's approach to the DRP windfall gain issue involves the same transitional process for all firms and therefore some firms (those with cycles beginning in 2007, 2010, and 2011) will be subject to losses "greater than any estimated past over compensation". However, this claim is false; as shown in Lally (2014a, Table 4), the (small) losses for these firms result from the previous regulatory regime, not from the transitional process. Furthermore, as shown in the same table, the results for all firms from using the proposed transitional process are almost identical to those that would have occurred had the previous regime been maintained.

CEG (2015, paras 99-101) argues that, given the AER's approach to the DRP windfall gain, it ought to favour a different transitional process for each firm. However, the contrary arguments appear in Lally (2014a, pp. 29-30) and CEG do not address any of them.

CEG (2015, para 102) argues that, if transitional arrangements for the DRP are warranted so as to take account of the past windfall gain arising from the GFC, they should also account for earlier under and over compensation. However, this point has also been raised by

Frontier and has been dealt with in section 9.2. In short, consideration of the behavior of the DRP prior to the GFC would not affect the analysis and therefore is irrelevant.

CEG (2015, paras 104-105) argues that the analysis of windfall gains in Lally (2014a, section 3.1) assumes that businesses with regulatory cycles commencing in mid 2009 received DRP compensation of 4.1% but the compensation granted to the NSW businesses was in fact 2.03%, being the cost of debt compensation of 8.82% (based upon an averaging period of 18.8.2008 to 5.9.2008) net of the contemporaneous five-year swap rate of 6.79%. However, the DRP results presented in Lally (2014a, Table 2) are drawn from a CEG report in which the DRP is defined relative to the ten-year CGS rather than the five-year swap rate and therefore derivation of a DRP from an allowed cost of debt would have to deduct the ten-year CGS. Over the period 18.8.2008 to 5.9.2008, this is 5.75% (data from the RBA), yielding an implied DRP of 3.08%. Furthermore, since this implied DRP is for 27.8.2008 (the mid-point of the averaging period), it would have to be compared to the DRP value in Lally's Table 2 for the same point in time and interpolating over the values of 3.2% for mid 2008 and 4.1% for mid 2009 yields a figure of 3.34% for 27.8.2008. This figure differs from CEG's implied DRP of 3.08% by only 0.26% rather than the difference of 2.03% claimed by CEG.

CEG (2015, section 5.3.2) analyses the windfall gain issue for businesses with cycles commencing in mid 2005, mid 2009, etc and this suggests that the accumulated windfall up to mid 2014 was -4.2% rather than the figure of 9.53% in Lally (2014a, Table 2). However, the details of CEG's analysis are insufficiently clear to check it at all points. Nevertheless, CEG's analysis incorporates within it the alleged DRP compensation of 2.03% for the 2009-2014 period referred to in the previous paragraph and therefore inherits all of the errors in that analysis as described. Furthermore, the figure of -4.2% includes an allowance of 0.30% for swap costs but these have no relevance to the DRP component of the cost of debt (they relate only to the base rate component).

CEG (2015, section 5.3.3) argues that the analysis of windfall gains in Lally (2014a, section 3.1) assumes that businesses with regulatory cycles commencing in mid 2009 received DRP compensation of 4.1% but the compensation granted to ActewAGL was either 0.99% or 3.44%, being the cost of debt allowance of 7.78% (based upon an averaging period of 2.2.2009 to 27.2.2009) net of the five-year swap rate of 6.79% for ActewAGL's proposed averaging period or the five-year swap rate for the actual averaging period used by the AER

of 4.34%. However, the averaging period proposed by ActewAGL is irrelevant; any base rate deducted from the allowed cost of debt of 7.78% must be for the same averaging period as that underlying the allowed cost of debt to produce a meaningful DRP estimate. Furthermore, the DRP figures presented in Lally (2014a, Table 2) are drawn from a CEG report in which the DRP is defined relative to the ten-year CGS rather than the five-year swap rate and therefore derivation of a DRP from an allowed cost of debt would have to deduct the ten-year CGS. Over the AER's averaging period from 2.2.2009 to 27.2.2009, this is 4.25% (data from the RBA), yielding an implied DRP of 3.53%. Furthermore, since this implied DRP is for 14.2.2009 (the mid-point of the averaging period), it would have to be compared to the DRP value in Lally (2014a, Table 2) for the same point in time; interpolating over the values of 3.2% for mid 2008 and 4.1% for mid 2009 yields a figure of 3.76% for 14.2.2009. This figure differs from CEG's implied DRP of 3.53% by only 0.23% rather than the difference of either 3.11% or 0.66% claimed by CEG.

CEG (2015, section 5.4) refers to Lally's (2014a, page 36) analysis of Ausgrid's DRP compensation versus cost incurred (which concludes that there is little difference in the first year of the transitional regime), argues that this analysis is inadequate because it considers only the first year of the transitional period rather than the entire ten years, and also that consideration of the entire transitional period reveals that under compensation will occur. However, as discussed in Lally (2014a, pp. 35-36), the appropriate period to examine must start with the GFC-induced spike in the DRP rather than just the ten-year transitional period to the new regime, and consideration of this longer period supports use of the AER's proposed transitional regime. Lally's (2014a, page 36) analysis of the first year result for Ausgrid was undertaken purely to illustrate an error in Ausgrid's submission.

CEG (2015, section 5.4.2) argues that an assessment of the situation for ActewAGL during the ten years of the transitional regime also reveals under compensation. However, as discussed in the previous paragraph, the appropriate period to examine must start with the GFC-induced spike in the DRP rather than just the ten-year transitional period to the new regime, and consideration of this longer period supports use of the AER's proposed transitional regime.

CEG (2015, section 5.5) argues that Lally's (2014a, section 3.1) analysis of the windfall gain issue presumes that the DRP subsides back to its pre-GFC level over the course of the

transitional period and it may not do so. For example, if the DRP spikes to 3.5% in 2018 and then subsides to 1.5% at the rate of 0.5% per year, businesses with cycles beginning in 2008, 2013, etc will experience a further windfall of 6.36% over the transitional period rather than mitigation of the windfall of 8.24% received up till the transition begins. However, Lally's present value analysis appropriately uses *expectations* of the DRP path from 2014 and the assumed reversion of the DRP back to its pre GFC level is appropriate because the DRP is a mean-reverting process. Naturally, actual outcomes may be more or less than the expectation, but this does not undercut the validity of the expectations at the time they were formed. Furthermore, CEG has selected the most extreme counter example, by assuming a DRP shock in the same year in which a regulatory reset occurs (2018). The key points in Lally's (2014a, section 3) analysis are threefold: the impact of a DRP shock on the average BEE (with averaging over the possible reset dates) that is regulated in accordance with the earlier regime is approximately neutral providing the regime remains in force for several years after the shock, that switching to the new regime coupled with the proposed transitional regime will produce similar results to the old regime over that transitional period, and that immediate switching to the new regime may not have this feature. This is shown in Lally (2014a, Table 4), in which he presents the present value (in 2007) of the net cash flow effects of the DRP shock induced by the GFC, under the three regulatory regimes just described. The average results (across possible regulatory reset dates) are reproduced in the first row of Table 2 below. CEG notes that this analysis presumes that there is no future (expected) DRP shock before the full effects of the GFC shock have dissipated. This is a reasonable assumption. However the results would be similar even if this were not the case. For example, the third row of Table 2 reruns Lally's (2014a, Table 4) analysis subject to adding an expected DRP shock of the type described by CEG (commencing in 2018). The second row reruns the analysis with the additional shock commencing instead in 2017, and the fourth row reruns it with the additional shock commencing instead in 2019. The last row averages over the three preceding rows. In all cases, the present value effect of these shocks are favourable but they are much more favourable with immediate adoption of the new regime (in 2014) than with continuation of the old regime, and adoption of the transitional regime produces results similar to those from continuation of the old regime. Thus, CEG's example does not undercut anything in the analysis in Lally (2014a, Table 4).

CEG (2015, section 5.6) argues that immediate adoption of the new regime will ensure that the allowed DRP matches the costs incurred by a BEE from that point and this is consistent

with the NPV = 0 principle. However, by definition, this NPV = 0 principle applies to the cash flows of an investment over its entire life and therefore must be applied from the commencement date of the new investment rather than part-way through its life. Thus the fact that a new regime (adopted immediately from a point part-way through the life of an asset) yields DRP allowances from that point that match the costs of a DRP does not imply that it satisfies the NPV = 0 principle. As discussed in section 8.3 above, if the regulatory regime is changed part-way through the life of an asset, the only viable regulatory policy is to neutralize the one-off temporary effects of regime changes or at least those effects that are large in either direction.

Table 2: Present Value of Cash Flow Effects from GFC and Later DRP Shocks

Shock	Old Regime	New: No Trans	New: Trans
GFC Shock Only	1.3%	3.4%	1.3%
GFC Shock and 2017 Shock	1.7%	3.4%	2.4%
GFC Shock and 2018 Shock	1.7%	3.4%	2.3%
GFC Shock and 2019 Shock	1.7%	3.4%	1.3%
Average	1.7%	3.4%	1.9%

CEG (2015, para 158) argues that immediate adoption (from 2014) of a trailing average is feasible, with equal weight on the two indexes that the AER favours (RBA and BVAL) going forwards. However, neither index is available back to mid 2004, which would be required in adopting a trailing average from mid 2014.

CEG (2015, para 158) argues that, although there are significant differences in DRP estimates from different series during the GFC, such a situation is likely to recur in the future and therefore past differences are not an impediment to immediately applying a trailing average. However, the GFC has given rise to the most severe DRP shock in the entire Moody's US DRP series for BBB bonds (from 1953-2014), reaching 6.01% in December 2008, and the contemporaneous figure for Australia was over 9% in the RBA index (CEG, 2014a, Figure 1). A shock of this magnitude may never recur.

CEG (2015, section 6.1) argues that problems associated with different DRP estimates across providers will be more severe for the proposed transitional regime than without it, because the latter benefits from random errors that tend to offset. However, this argument has been raised previously by CEG, and responded to by Lally (2014a, page 34), but CEG fails to address these points.

CEG (2015, section 6.1) argues that, although there are significant differences in DRP estimates from different series during the GFC, these almost perfectly offset. In particular, the BVAL/BFV (spliced together) and RBA series differ on average by only 0.21% over the period 2005-2014. By comparison, the BVAL and RBA series currently (Dec 2014) differ by 0.38%, and therefore use of the transitional regime is more exposed to differences in DRP estimates across providers than is immediate adoption of the trailing average. However, the first result occurs because the RBA index exceeds the BVAL/BFV index at some points and is less at others (CEG, 2014a, Figure 1), with approximate netting out over the period 2005-2014. Thus, the historical average taken in 2014 for the previous ten years is almost invariant to the choice of index. However, as one moves forward in time, and takes a historical average over (say) the period 2010-2020, the same may not be true. Furthermore, even over the period 2005-2014, the RBA and BFV/BVAL series differ dramatically at many points, ranging from the RBA exceeding the BFV by 5.5% in early 2009 to the BFV exceeding the RBA by 2% in early 2011 (CEG, ibid). Such differences raise the possibility that (for example) the RBA was correct at points when it was the higher series whilst the BFV was correct at points when it was the higher series. Thus, using either series consistently over this historical period (or even an average at each point) would underestimate the true DRP. If it were necessary to make some choice about these series, averaging would be better as argued in Lally (2014b). However, even better would be to avoid the issue altogether by adopting the AER's proposed transitional process, which does not require this highly problematic historical data.

CEG (2015, para 163) argues that much of the justification for the AER's adoption of a transitional regime for the DRP rests upon Lally's (2014a, section 3) use of past DRP data to demonstrate the presence of windfall gains, and it is inconsistent to do so whilst claiming that imperfections in past data are a barrier to immediate adoption of a trailing average. However, the conclusions reached in Lally (2014a, section 3) about windfall gains are insensitive to moderate errors in the data that are used. By contrast, *any* errors in past data that are used in

implementing a trailing average affect the DRP allowances dollar for dollar. Thus, there is no inconsistency of the type claimed by CEG.

CEG (2015, section 6.4) argues that, even if the BEE did hedge using swaps as argued by the AER, the termination of the on-the-day regime would have led them at the termination point to undertake a set of swaps to convert their outstanding debt (whose base rate components would all be at floating rate) into fixed rate debt for the remainder of the term of each bond. Consequently the cost of debt allowances required to match their incurred costs over the following ten years would be the trailing average for the DRP, an equally weighted average over the current risk-free spot rates for 1, 2, etc year contracts, and progressive replacement of these latter rates by ten year rates as the bonds mature. However, nothing in this argument addresses the AER's argument for a transitional regime for the DRP. In respect of the risk-free rate component, the allowed cost proposed by CEG corresponds to that incurred by the BEE as shown in equation (4) of Lally (2014a). In that paper, Lally assumes that the regulator adopts the AER's proposed transitional regime and considers two possible course of action by the BEE: desist from further hedging arrangements at the termination date of the old regime (leading to average results over the following ten years of something between under compensation of 0.40% per year and overcompensation of 0.60%), or entering the new swap arrangements as described above by CEG (leading to overcompensation averaging 0.23% over the following ten years). By contrast, if the regulator follows CEG's proposal and the BEE acts in the same way, there would be a perfect match. However, we do not know if the BEE would have done so. Furthermore, since CEG's proposed regulatory policy was not announced by the AER at the termination date of the old regime and may never be chosen by the AER, the BEE would not have been prompted to adopt it at the termination date. Thus, firms may not have adopted it in which case the regulatory compensation would accord with equations (4) in Lally (2014a) whilst the actual behavior of firms would correspond to equations (1) in that paper. The difference (incurred − allowed) would then be as follows:

Year 1: $.9R_{f0,1} - .1(R_{f0,1} + R_{f0,2} + ... + R_{f0,9})$

Year 2: $.8R_{f1,2} - .1(R_{f0,2} + ... + R_{f0,9})$

…….

Year 9: $.1(R_{f8,9} - R_{f0,9})$

The average outcome (over the nine years) depends upon the future course of one-year interest rates. Considering the two extreme cases in Lally (2014a, section 2.1), involving these one-year interest rates not changing and quickly reverting back to the pre-GFC level, the average outcome for the BEE could be as much as under compensation of 0.60% per year to over compensation of 0.30% per year. These four possible combinations of regulatory policy and BEE behavior are summarized in Table 3 below.

Table 3: Results From Various Combinations of Regulatory and BEE Policy

Regulatory Policy	BEE Policy	Average Outcome
AER Transitional policy	No new swaps	-0.40% to 0.60%
AER Transitional Policy	New Swaps	0.23%
CEG Transitional Policy	No New Swaps	-0.60% to 0.30%
CEG Transitional Policy	New Swaps	0

For the reasons given above, I think it more likely that the BEE would *not* have entered such new swap contracts than that they would have. If so, the average outcome distributions would be as shown in the first and third rows of Table 3; these are close to zero under both the AER's and CEG's proposed regulatory policies (with the BEE being slightly better off under the AER's proposed transitional regime). In view of all this, I don't see a good case for the AER changing its proposed scheme.

CEG (2015, section 8) argues that an estimate of ActewAGL's credit rating is no more than BBB, with the maximum value attained using the AER's estimates for costs and allowed revenues. CEG do not explain the purpose of this exercise but it is presumably intended to demonstrate that the revenues allowed by the AER are too low to be consistent with the BBB+ credit rating favoured by the AER for businesses of this type. However, with the exception of the leverage assessments, the process that CEG has undertaken is highly subjective and a minimum requirement for such an exercise to be credible would be that the party carrying it out was both independent and experienced in such work. Clearly, CEG do not satisfy either requirement. Consequently, I do not think CEG's analysis warrants further consideration.

9.7 ActewAGL Revised Regulatory Proposal

ActewAGL (2015, page 473) argues that the previous regulatory approach is irrelevant to the definition of a BEE, and therefore there are no grounds for transitional arrangements. However clause 6.5.2 (k) (4) of the National Electricity Rules requires the AER to have regard to "any impacts…on a benchmark efficient entity that could arise as a result of changing the methodology that is used to estimate the return on debt…". This clause clearly implies that the previous regulatory approach should be considered by the AER, and this supports the use of a transitional regime.

ActewAGL (2015, page 476) notes that it has no debt and therefore transitional arrangements are unnecessary. However, the individual circumstances of a business are irrelevant to the definition of a BEE.

9.8 NSW Treasury

NSW Treasury (2014a, page 1) claims that it is NSW Government policy to charge government-owned businesses a cost of debt that matches that of a comparable private sector business. However, NSW Treasury (2014b, pp. 1-2) states that the DRP charged is now uniform across the term for which a business borrows, that this was done because the businesses adopted very high levels of short-term debt when the short-term DRP was lower, and that NSW Treasury was very concerned at the refinancing risk resulting from this. All of this suggests that NSW Treasury considered that the government businesses paid little heed to refinancing risk. If this is true, and NSW Treasury would be in a good position to judge, this would contribute to explaining why these businesses did not use swaps (the rationale for using swaps being to mitigate the adverse effects resulting from staggering and borrowing long-term so as to minimize refinancing risk). Accordingly, the failure by these businesses to use swaps does not provide a rationale for applying a different regulatory regime to them.

9.9 Ausgrid Revised Regulatory Proposal

Ausgrid (2015, page 179) argues that the AER's proposed transitional process delays the imposition of the best approach (the trailing average), and therefore is unwarranted. However, this claim does not address the arguments for a transition: to neutralize the one-off effect arising from the regime change and therefore to both produce results that accord with the NPV = 0 principle and protect the BEE from regulatory risk.

Ausgrid (2015, page 179) argues that the AER's proposed transitional process is premised upon conditions applying to a hypothetical entity that is in a different position to Ausgrid, and is therefore irrelevant to Ausgrid. However, as discussed in section 8.1, the relevant circumstances are those of the BEE and therefore the particular circumstances of Ausgrid are irrelevant to the extent that they differ from that of the BEE.

Ausgrid (2015, page 180) argues that the AER may need to consider more than one BEE and it should do so because it was not efficient for large firms to enter into swaps. However, Ausgrid fails to respond to the contrary arguments on this matter in Lally (2014a, section 4) to the effect that it was still efficient for the large firms to enter into swaps.

Ausgrid (2015, page 182) argues that the AER's proposed transitional regime would undercompensate them for the costs that they do incur under the efficient policy (a ten-year trailing average without hedging), of about 1% of their debt level in the first few years. Similar arguments have been previously presented by Ausgrid and critiqued by Lally (2014a, pp. 35-36). Ausgrid (2015) does not respond to these points.

Ausgrid (2015, pp. 83-84) argues that it could not have undertaken the swaps in the maximum regulatory window of 40 business days and use of a longer period would have provided a poor hedge. However, these claims have been dealt with in section 9.1 above.

Ausgrid (2015, pp. 184-185) argues that its regulatory averaging period for 2009-2014 was retrospectively set (by the ACT) several months after the commencement of the regulatory period, which made it impossible for it to have undertaken the appropriate hedging actions. However, the same argument has been presented by UBS and dealt with in section 9.1 above.

Ausgrid (2015, page 185) rejects the contention in Lally (2014a, page 28) that it might not have used swaps because it borrowed via the NSW Treasury and was therefore partially shielded from market signals, on the grounds that its cost of debt was set by the NSW Treasury to match a comparable private sector entity. However, as discussed in the previous section, the charges from NSW Treasury purposely do not match those of a comparable private sector entity, because the government-owned businesses seem to pay little heed to refinancing risk, and this might explain why they have not used swaps.

Ausgrid (2015, page 186) rejects the contention in Lally (2014a, page 28) that government-owned entities did not use swaps because they were less aware of the full potential of the swaps markets, on the grounds that the Group CFO of Networks NSW (De Lorenz) provides contrary evidence. However, the explanations given by De Lorenz for not using swaps (as discussed in the next section) reinforce my suspicion that the government-owned businesses were not and still are not aware of the full potential of the swaps market.

Ausgrid (2015, page 187) argues that the RBA data should be used to estimate the DRP because it is independent and highly reliable. However, as argued in Lally (2014b, section 2.2), the substantial variations in DRP estimates across the RBA, Bloomberg and CBA Spectrum reveals that at least one of them is significantly in error at times, it is unclear which of them is better, and averaging over the first two mitigates this problem. Ausgrid fail to respond to this argument.

9.10 De Lorenz

De Lorenz (2015, para 22) argues that NNSW did not enter into swap contracts because doing so would lead to a "higher cost of debt". However, as pointed out in Lally (2014a, section 4), the use of swap contracts would substitute the five-year base rate component of the cost of debt for the ten-year rate, the former is expected to be lower, and therefore *expected* interest costs would be lower (even after allowing for the transactions costs of the swaps). De Lorenz can reasonably be presumed to have read that paper, but he does not comment upon this point, suggesting that the argument presented there is correct.

De Lorenz (2015, para 25) argues that, whilst the use of swaps could mitigate one source of risk (interest rate risk), it exposes the firm to five others: counterparty risk, "correlation risk" (because the DRP provides a natural hedge against base rate risk), "liquidity risk", "basis risk" (the swap is an imperfect hedge to the risk-free rate), and "swap regulation risk" (because swap markets are undergoing significant review). However, De Lorenz provides no analysis on the significance of these issues and, in respect of the last one, not even an explanation of its meaning. Furthermore, in respect of "liquidity risk" (presumably the risk that the swaps could not be undertaken in the required volumes at acceptable prices, as discussed in his para 32), this matter has been addressed in Lally (2014a, section 4) and yet De Lorenz again fails to comment on the specific matters there. In respect of counterparty

risk, this is borne by the intermediary in return for a fee that is included in the transactions costs of the swaps (as noted by Jemena, 2013, pp. 21-22), and therefore the only risk is that of the intermediary (a bank) failing. I am not aware of any such failures in Australia in recent times. In respect of correlation risk, this matter has been examined in Appendix 2 and risk is considerably less from swapping than not swapping, even when the swaps require five months to transact. Finally, in respect of basis risk, the analysis in Appendix 2 also shows that this does not change the conclusion that risk is considerably less from swapping than not swapping.

9.11 Endeavour Energy

Endeavour Energy (2015, page 10) argues that the use of swapping arrangements to match the allowed base rate to that incurred would involve "high" transactions costs. These allegedly high costs appear to be the basis for rejecting these swapping arrangements. However, no comparison is made between the costs and benefits of swapping and not swapping. So, again, this reinforces my suspicion that the government-owned businesses are less aware of the full potential of the swaps market.

10. Conclusions

In response to the questions posed by the AER, my conclusions are as follows. Firstly, in respect of the efficient financing practices of the BEE, this would be to maximize shareholder wealth, which is potentially different to the AER's goal of minimizing expected financing costs whilst managing the interest rate and refinancing risks. However, since there is no direct means of assessing which financing policy would achieve either of these subtly different objectives, managers must use judgement and regulators will only be able to rule out some practices as inefficient, leaving a set of policies that it cannot differentiate between unless they are willing to use the observed practices of firms as a guide to what is efficient.

Secondly, in respect of how efficient financing practices vary with the regulatory regime, In summary, the efficient strategy under the on-the-day regime is to borrow for ten years, stagger the borrowing, and enter interest rate swap contracts to match the base rate incurred to that allowed by the regulator. Under the trailing average regime, the efficient strategy differs only in not engaging in these swap contracts. Finally, under the AER's proposed transitional regime, the efficient strategy is to either desist from entering into any new swap

contracts or to enter new swap contracts that convert the floating rate on existing debt to a fixed rate over the remaining life of the debt.

Thirdly, in respect of other factors that might affect the efficient financing practices of a BEE, neither the size of its debt portfolio nor having a regulatory cycle that matches that of other regulated businesses nor the cost and availability of interest rate swap contracts for such a firm nor having regulatory determinations that occurred during the GFC would cause the financing practice of such a firm to deviate from that described in the previous paragraph.

Fourthly, in respect of arguments presented by the AER in support of its proposed transitional regime, I agree with three of these arguments. Firstly, in respect of the base rate component of the cost of debt, the AER's proposed transitional regime will minimize potential mismatches between the allowed and incurred rates of the BEE over the transitional period. Secondly, in respect of the DRP component of the cost of debt, the AER's proposed transitional regime avoids potential windfall gains or losses to service providers and customers. Thirdly, and again in relation to the DRP component of the cost of debt, the AER's proposed transitional regime avoids the use of historical DRP data and this is desirable because the data is contentious.

Fifthly, in respect of whether the impact on the BEE of the AER's proposed transitional arrangements is very similar to that which would have occurred had the AER continued to employ the on-the-day regime, I consider that is very similar in present value terms.

Sixthly, and in respect of why the efficient financing practices of the BEE (privately-owned energy networks) may differ from that of government-owned networks, four possible reasons exist. Firstly, borrowing via another (government) entity may shield the businesses from normal market signals. Secondly, these businesses may face low bankruptcy and refinancing risk, because the inability to meet debt payments is more likely to result in support from shareholders or the government-owned intermediary through which debt finance is obtained. Thirdly, these businesses may have been historically less aware of the full potential of the swaps market. Finally, these businesses are each part of a much larger portfolio of assets held by their state government owners and decisions made may therefore reflect the natural hedges available within these portfolios.

Seventhly, my views on the AER's proposed transitional process are as follows. The AER is subject to the legal requirement to set the allowed cost of debt commensurate with the costs incurred by a BEE, and this is equivalent to the NPV = 0 principle. A policy of immediately adopting a new regime only when the one-off impact is favourable to the BEE but not otherwise would necessarily violate this NPV = 0 principle. Alternatively, a policy of immediately adopting a new regime in all cases would expose the BEE to potentially very large risks, thereby discouraging investment. It would also expose the BEE to the possibility of an adverse shock so large as to threaten its financial viability, which would either lead to regulatory relief in such cases (and hence violation of the NPV = 0 principle) or the possibility of a supply disruption. In addition, even if the policy of immediately adopting a regime change regardless of the one-off impact on the BEE were rigorously followed, the upside and downside from such a policy might not be symmetric, in which case the NPV = 0 principle would still be violated. These disadvantages are all so substantial that the only viable regulatory policy would be to neutralize the one-off effects of regime changes, possibly through a transitional regime, or at least to do so when the effects in *either* direction are substantial.

In respect of the base rate component of the cost of debt, the regime change in question here would cause a BEE to change its behavior, thereby temporarily leaving it with costs arising from its behavior under the previous regime. Under such circumstances, immediately applying the new regime would lead to a BEE over recovering its incurred costs by up to $4b over the next nine years. By contrast, the AER's proposed transitional regime largely neutralizes this. Since the one-off effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour applying the AER's proposed transitional regime to the base rate component of the cost of debt.

In respect of the DRP component of the cost of debt, the regime change in question here would not cause a BEE to change its behavior. However, under the previous on-the-day regime, DRP shocks could give rise to substantial differences between the allowed DRP and that incurred and the accumulated effects could be substantial for many years. Averaged over different regulatory reset dates, these accumulated differences would be initially negative, then positive, and eventually tail away to zero. Immediate adoption of the new regime at a time when the accumulated effect was positive or negative would prevent these accumulated gains or losses from being gradually eroded away and they would instead be retained by the

BEE; this would be a 'windfall' benefit or loss to the investors in the BEE. In this particular case, the new regime has been adopted at a time when these one-off effects are at their most extreme and immediate adoption would give rise to a $2.3b windfall benefit to the investors in the BEE. Equivalently expressed, adopting the new regime at this time leads to double counting of the DRP results from the high DRP years (2008-2015) and therefore benefiting the average BEE. By contrast, the AER's proposed transitional regime largely neutralizes this outcome not only for the average BEE (with averaging over different regulatory reset dates) but also for individual BEEs with different regulatory reset dates. So, again, since the one-off effect is large and the AER's proposed transitional regime largely neutralizes it, I therefore favour applying the AER's proposed transitional regime to the DRP component of the cost of debt.

Finally, the AER's proposed approach protects the AER from either consumers or investors in these businesses believing that the AER's choice of the timing for the regime change is a prejudicial act towards them, and it obviates the need to collect contentious historical DRP data.

APPENDIX 1: Terms of Reference

Part one

1. The AER considered the efficient financing practices of a benchmark efficient entity would be to minimise its financing costs over the life of its assets while managing refinancing risk and interest rate risk[5]. The AER seeks a critical review of this view on efficient financing practices.

2. The AER seeks a critical review of the efficient debt financing practices the AER considered a benchmark efficient entity would undertake under the following regulatory approaches:

   - The on-the-day approach

   - The trailing average approach; and

   - A transition between the on-the-day approach and the trailing average approach (based on the transition path the AER proposed in the rate of return guideline)[6].

   The averaging periods for these regulatory approaches are set out in table 2 of attachment 1.

   Question (2) should be answered from the perspective of a benchmark efficient entity. The AER defines a benchmark efficient entity as a pure play, regulated energy network business operating within Australia.

3. Advise on whether the consultant's advice on the efficient financing practices under the three listed regulatory approaches in question (2) differs for a benchmark efficient entity with a similar degree of risk as each of the NSW/ACT service providers. The consultant's advice should engage with the following matters, in particular, and any other matters the consultant considers relevant:

   a. The debt portfolio size of a benchmark efficient entity with a similar degree of risk as each of the NSW/ACT service providers (see table 1 in attachment 2)

   b. The cost and availability of hedging instruments to a benchmark efficient entity with a similar degree of risk as each of the NSW/ACT service providers

   c. The similar timing of the NSW/ACT service providers' regulatory determination with the timing of the regulatory determinations of other service providers

   d. The timing of the NSW/ACT service providers' 2009–14 regulatory determination in the context of the global financial crisis (GFC).

   In answering question (3), the consultant should assume that the benchmark efficient entity is privately-owned and operates as an independent network.

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[5] The AER defined refinancing risk as 'The risk that the benchmark efficient entity would not be able to efficiently finance its debt at a given point in time. This may be because the debt instruments that it seeks are not available to it; or because they are expensive'. The AER defined interest rate risk as 'The risk resulting from a potential mismatch between the allowed return on debt and the actual return on debt of a benchmark efficient entity'. AER, *TransGrid draft decision*, November 2014, p.3-106.

[6] AER, *Better regulation–Rate of return guideline*, November 2014, pp.19-20.

4. Critically review the reasons for the AER's position in the November 2014 draft decisions with respect to:

   a. A transition on the risk free rate component—being because a transition minimises the potential mismatch between the allowed return on debt and the actual return on debt of the benchmark efficient entity, as it transitions its financing practices.

   b. A transition on the debt risk premium (DRP) component—because a transition avoids potential windfall gains or losses to service providers or consumers from changing the regulatory regime

   c. Other reasons for a transition on both the risk free rate and DRP components— because:

      i. A transition maintains the same expected average price level while decreasing price volatility over time

      ii. A transition reduces the potential for opportunistic behaviour from stakeholders, and

      iii. Applying the same transitional arrangements for all service providers is consistent with the AER's adoption of a single benchmark efficient entity definition.

5. Critically review the AER's position in the November 2014 draft decisions that, in relation to existing debt, the impact on the benchmark efficient entity from the AER's transitional arrangements is not, in principle, different to the impact on the benchmark efficient entity if the AER had continued to adopt the on-the-day approach. The chosen risk management strategies that service providers adopted in the past in relation to their financing arrangements are therefore left to run to their natural conclusion and the service providers will keep any benefits or wear any detriments that flow from those choices.

6. Critically review the AER's position in the November 2014 draft decisions on why the efficient financing practices of a privately-owned energy network may differ from the efficient financing practices of a government-owned network.[7]

7. Based on the answers to questions (1) to (6), and any other considerations the consultant finds relevant, advise on whether, in the consultant's opinion, it is reasonable to apply the AER's debt transition path in the rate of return guideline to the NSW/ACT service providers' 2014–19 regulatory determinations.

   The consultant's advice on question (7) should engage with:

   a. The allowed rate of return objective in the National Electricity Rules—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 regulated services.

   b. The following factors in the National Electricity Rules that the AER must have regard to:

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[7]   AER, *TransGrid draft decision*, November 2014, attachment 3, pp.290-292.

i. The desirability of minimising any difference between the allowed return on debt and the actual return on debt of a benchmark efficient entity with a similar degree of risk as the NSW/ACT service providers

ii. Any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity with a similar degree of risk as the NSW/ACT service providers) that could arise as a result of the AER changing the methodology that is used to estimate the return on debt from the 2009–14 period to the 2014–19 period

c. The following revenue and pricing principle in the National Electricity Law—a service provider should be provided with a reasonable opportunity to recover at least the efficient costs it incurs in the provision of regulated services.

Part two

8. Critically evaluate the service providers revised proposals, including consultants reports and other attachments, with respect to the matters set out in Part one.

APPENDIX 2: The Comparative Risks of Hedging and Not Hedging

This Appendix examines the question of whether, under the on-the-day regime, there would have been more or less risk to a business from not engaging in interest rate swap contracts versus doing so, with the swapping conducted over a five month period around the regulatory reset date to allow for the high volume of transactions of this kind. Under the on-the-day regime, a business would receive an allowed cost of debt over a regulatory cycle equal to the sum of the prevailing ten-year risk-free rates and DRPs averaged over a short window shortly before the beginning of the regulatory cycle. Assuming a one-month window, this allowed rate would be as follows:

$$k(All) = R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} \tag{13}$$

If a business did not engage in these swaps, the incurred cost (of staggered fixed-rate ten-year debt) would be the sum of the ten-year trailing averages of the ten-year risk-free rate and the DRP:

$$k(Paid) = R_{f10}^{TA} + DRP_{10}^{TA}$$

The risk incurred from not engaging in these swaps is then the standard deviation of the difference between this allowance and this incurred cost:

$$SD(All - Paid) = SD\left(R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} - R_{f10}^{TA} - DRP_{10}^{TA} \right) \tag{14}$$

By contrast, if the business does engage in these swaps, the incurred cost (of the five-year risk-free rate prevailing at the beginning of the regulatory cycle plus the staggered ten-year DRP) would be the sum of the prevailing five-year risk-free rate (averaged over the regulatory reset month, the two months before, and the two months after) and the ten-year trailing average of the ten-year DRP:[8]

$$k(Paid) = R_{f5}^{OTD(5)} + DRP_{10}^{TA}$$

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[8] This assumes that the five and ten-year swap rates match the corresponding risk-free rates, and this matter will be discussed later in this Appendix.

The risk incurred from engaging in these swaps is then the standard deviation of the difference between the allowance shown in equation (13) and this incurred cost:

$$SD(All - Paid) = SD\left(R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} - R_{f5}^{OTD(5)} - DRP_{10}^{TA}\right) \qquad (15)$$

To estimate the standard deviations in equations (14) and (15), it is necessary to use some time-series data over a period sufficiently long to produce a reasonably accurate estimate. This would require several decades of data and therefore precludes Australian data because there is no DRP series sufficiently long. I therefore draw upon US data, and in particular the US treasury constant maturity series for five and ten year bonds and the DRP series for BBB bonds, which are all available from April 1953 to January 2015.[9] This data has also been used by the QTC (2014) to draw conclusions about appropriate regulatory policy in Australia. Furthermore, CEG (2014b, paras 181-190) has also used long-term US data of this type to draw conclusions about appropriate regulatory policy in New Zealand. Since both equations (14) and (15) each require a ten-year trailing average, the monthly differences shown in these equations are determined from March 1963 to January 2015. To replicate the outcomes under a five-year regulatory cycle, the outcomes from equation (14) are determined for each month from March 1963 to January 2015, with the allowed rate reset every five years, and the standard deviation is then determined. Since the result here could be influenced by the arbitrary choice of March 1963 as the first reset date, the analysis is repeated for four different initial reset dates: March 1964, March 1965, March 1966, and March 1967. The five standard deviations resulting from this are then averaged, yielding 1.49%. The same process is followed for equation (15), yielding 0.82%. Thus, risk is markedly less from engaging in these swaps (even when a five-month period is used to undertake them) than not engaging in them.

To assist in understanding the sources of risk, one could estimate the standard deviation of (15) subject to the swaps being undertaken in the same month as the regulatory reset, as follows:

$$SD(All - Paid) = SD\left(R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} - R_{f5}^{OTD(1)} - DRP_{10}^{TA}\right) \qquad (16)$$

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[9] The three series are drawn from the FRED data, which is available on the website of the US Federal Reserve Bank of St Louis (http://research.stlouisfed.org/fred2/).

The result here is marginally higher at 0.87%. Even here, the regulator allows the ten-year risk-free rate whilst regulated businesses pay the five-year rate and this is an additional source of risk. If the regulator allowed the prevailing five-year risk-free rate then the equation would be as follows:

$$SD(All-Paid) = SD\left(R_{f5}^{OTD(1)} + DRP_{10}^{OTD(1)} - R_{f5}^{OTD(1)} - DRP_{10}^{TA}\right) \qquad (17)$$

The result here is 0.64% and is due solely to the difference between the prevailing DRP allowed by the regulator and the trailing average incurred by the business. These results are summarized in Table 4 below. They reveal that the DRP mismatch in isolation gives rise to a standard deviation of 0.64%, rising to 0.87% if risk arising from the risk-free rate is added to this (assuming the regulator allows a ten-year risk-free rate using a window of one month and the firm enters swaps over a period of one month), falling slightly to 0.82% if the firm requires five months to enter the swap contracts, and then dramatically rising to 1.49% if the firm does not engage in swaps. So, engaging in swaps markedly reduces risk and the inability to transact the swaps in a one-month period has no material impact on this.

Table 4: The Standard Deviations from Various Policies by Firms and the Regulator

On-the-day Regulatory Policy	Firm Policy	Std Dev
Allow 5 yr Rf and 10 yr DRP	Enter swaps over 1 mth	0.64%
Allow 10 yr Rf and 10 yr DRP	Enter swaps over 1 mth	0.87%
Allow 10 yr Rf and 10 yr DRP	Enter swaps over 5 mths	0.82%
Allow 10 yr Rf and 10 yr DRP	Do not use swaps	1.49%

This analysis assumes that the five and ten year swap rates are identical to the corresponding risk-free rates. However, this is not the case and therefore requires adjustments to the base rates paid in equations (15), (16) and (17). For example, equation (16) should be

$$SD(All-Paid) = SD\left(R_{f10}^{OTD(1)} + DRP_{10}^{OTD(1)} - R_{f10}^{OTD(1)} + SWAP_{10}^{OTD(1)} - SWAP_{5}^{OTD(1)} - DRP_{10}^{TA}\right)$$

Unfortunately, swap rate data is available from FRED only since July 2000. So, the substitution shown in the last equation is made only from July 2000 and otherwise equation (16) applies. The result of doing so is that the standard deviation of (16) falls slightly from 0.87% to 0.83%. This slightly raises the benefit from using swaps compared to not using them.

In summary, when a regulator uses an on-the-day policy with a one month window for setting the allowed rate, the use of interest rate swaps reduces the mismatch between the on-the-day allowance and the incurred costs of debt. Furthermore, whether firms can transact the swaps in the one-month period assumed to be used by regulators to set the allowed rate or the longer period of five months has no material impact on the results. The one month regulatory window assumed for setting the allowed rate is at the lower limit. Had the window been as much as two months, based upon the results above, it would have had no material impact on the results.

REFERENCES

ACCC, 2004. *NSW and ACT Transmission Network Revenue Cap TransGrid 2004-05 to 2008-09* (www.aer.gov.au).

ActewAGL, 2015. *Revised Regulatory Proposal*, submission to the AER (www.aer.gov.au).

AEMC, 2012. *Rule Change* (www.aemc.gov.au).

AER, 2004. *TransGrid 2004/05 – 2008/09 Revenue Cap*: *Application by TransGrid for Revocation and Substitution* (www.aer.gov.au).

____ 2014. *Draft Decision TransGrid Transmission Determination 2015-16 to 2017-18 Attachment 3*: *Rate of Return* (www.aer.gov.au).

Ausgrid, 2015. *Revised Regulatory Proposal 1 July 2014 to 30 June 2019*, submission to the AER (www.aer.gov.au).

CEG, 2014a. *Debt Transition Consistent with the NER and NEL*, report prepared for the NSW DNSPs (www.aer.gov.au).

____ 2014b. *Review of Lally and Oxera Reports on the Cost of Capital*, report prepared for Chorus (www.comcom.govt.nz).

____ 2015. *Efficient Debt Financing Costs*, report prepared for ActewAGL (www.aer.gov.au).

De Lorenz, 2015. *Statement of Justin De Lorenz, Group CFO, Networks NSW*, submission to the AER (www.aer.gov.au).

Endeavour Energy, 2015. *Board Policy*: *Finance Management*, submission to the AER (www.aer.gov.au).

Frontier Economics Ltd, 2015. *TransGrid Cost of Debt Transition*, report prepared for TransGrid (www.aer.gov.au).

HoustonKemp, 2015. *Response to the Draft Decision on the Return on Debt Allowance*, report prepared for TransGrid (www.aer.gov.au).

Jemena, 2013. *Rate of Return Guidelines-Consultation Paper, Submission from Jemena Limited to the AER*, submission to the AER (www.aer.gov.au).

Lally, M., 2004, Regulation and the Choice of the Risk Free Rate, *Accounting Research Journal*, vol. 17 (1), pp. 18-23.

_____ 2010. *The Appropriate Term for the Risk Free Rate and the Debt Margin*, report prepared for the QCA (www.qca.org.au).

_____ 2014a. *Transitional Arrangements for the Cost of Debt*, report prepared for the AER (www.aer.gov.au).

_____ 2014b, *Implementation Issues for the Cost of Debt*, report prepared for the AER.

Marshal, W., Yawitz, J. and Greenberg, E., 1981, 'Optimal Regulation Under Uncertainty', *The Journal of Finance*, vol. 36, pp. 909-22.

Meehan, A., 2015, *Statement on the Development of TransGrid's Debt Management Policy*, report submitted to the AER on behalf of TransGrid.

NSW Treasury, 2014a. *Government Guarantee Fee Policy tpp 14-03* (www.treasury.nsw.gov.au).

_____ 2014b. *Treasury Circular NSW TC 14/08*: *Government Guarantee Fee Policy* (www.treasury.nsw.gov.au).

QTC, 2014. *Trailing Average Cost of Debt Draft Decision*: *Updated Submission to the QCA October 2014*, submission to the QCA (www.qca.org.au).

Schmalensee, R., 1989, 'An Expository Note on Depreciation and Profitability Under Rate-of-Return Regulation', *Journal of Regulatory Economics*, vol. 1, pp. 293-298.

SFG, 2012. *Rule Change Proposals Relating to the Debt Component of the Regulated Rate of Return*, report prepared for AEMC (www.aemc.gov.au).

Thiow, B., 2015. *Statement of Bon Thiow*, submitted to the AER on behalf of TransGrid.

TransGrid, 2014. *Revenue Proposal 2014/15 – 2018/19*, submission to the AER (www.aer.gov.au).

UBS, 2015. *Analysis of Liquidity of Interest Rate Swaps*, report prepared for TransGrid.

Westpac, 2014, *Liquidity of the Interest Rate Swap Market*, report prepared for Transgrid (www.aer.gov.au).