Jemena Electricity Networks (Vic) Ltd

2016-20 Electricity Distribution Price Review Regulatory Proposal

Attachment 9-14

SFG - Report on return on debt transition

Public

30 April 2015

Return on debt transition arrangements under the NGR and NER

Report for Jemena Gas Networks, Jemena Electricity Networks, CitiPower, Powercor and United Energy.

27 February 2015

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Context

1. SFG Consulting (**SFG**) has been retained by Jemena Gas Networks (**JGN**), Jemena Electricity Networks, CitiPower, Powercor and United Energy to provide our views on a range of issues relating to the transition between methods for determining the allowed return on debt in the Australian regulatory setting.

2. Under the previous National Gas Rules (**NGR**) and National Electricity Rules (**NER**) the Australian Energy Regulator (**AER**) set the allowed return on debt using the *rate on the day* approach – the average yield on benchmark debt over the relevant rate-setting period close to the beginning of the regulatory control period. Under the current Rules, the AER proposes to set the allowed return on debt using the *trailing average* approach – the average yield on benchmark debt over the 10-year period immediately prior to the regulatory control period. The AER proposes to transition from one approach to the other over a 10-year transition period. SFG has been engaged to consider a range of issues relating to the proposed transition arrangements that have been raised in:

    a) The AER's recent draft decisions. This report cites relevant passages from the JGN Draft Decision (Draft Decision: Jemena Gas Networks (NSW) Ltd Access Arrangement 2015-20, Attachment 3: Rate of Return) noting that the same or similar passages are contained in the AER's other recent draft decisions;[1] and

    b) The Lally report commissioned by the AER: Lally, M. (2014), *Transitional arrangements for the cost of debt*, 24 November.

Preparation of this report

3. This report has been authored by Professor Stephen Gray, Professor of Finance at the UQ Business School, University of Queensland and Director of SFG Consulting, a specialist economics and corporate finance consultancy. I have Honours degrees in Commerce and Law from the University of Queensland and a PhD in financial economics from Stanford University. I teach graduate level courses with a focus on cost of capital issues, I have published widely in high-level academic journals, and I have more than 15 years' experience advising regulators, government agencies and regulated businesses on cost of capital issues. I have previously served as board risk management advisor to a company in the energy sector and I was the principal advisor to the Australian Energy Markets Commission (AEMC) on cost of capital issues (including the allowed return on debt) during its 2012 rule change process.

4. My opinions set out in this report are based on the specialist knowledge acquired from my training and experience set out above.

5. I have read, understood and complied with the Federal Court of Australia Practice Note CM7 *Expert Witnesses in Proceedings in the Federal Court of Australia.*

6. A copy of my curriculum vitae and my instructions are attached as appendices to this report.

Summary of conclusions

7. My main conclusions are set out below.

[1] For TransGrid, Ausgrid, Endeavour Energy, Essential Energy and ActewAGL.

Debt management strategies under the previous Rules

8. Under the previous Rules:

    a. Private sector service providers adopted what has become known as the *hybrid* debt management practice.[2] This involves issuing long-term floating rate debt and then using interest rate swaps to fix the rate at the beginning of each regulatory control period;[3] and

    b. Large state-owned service providers adopted the *fixed-rate staggered maturity strategy*. This involves issuing fixed rate debt on a staggered maturity cycle.[4]

9. The AER has concluded that the hybrid strategy was the only efficient debt management strategy under the previous Rules – for all service providers irrespective of their particular characteristics.[5] I have been instructed to consider transition arrangements for the case of a benchmark efficient entity that had adopted the hybrid approach under the previous Rules – in accordance with the AER's conclusion on this issue.

Debt management strategies under the new Rules

10. The new Rules state that the regulator may set the allowed return on debt on the basis of (a) the rate on the day approach,[6] (b) the trailing average approach, or (c) the hybrid approach.[7] The AER has concluded that the benchmark efficient firm will adopt the trailing average (fixed-rate staggered maturity) approach under the current Rules.[8]

11. If the regulator adopts the trailing average approach and the service provider adopts the fixed-rate staggered maturity debt management strategy, there will be an effective match between the allowed return on debt and the firm's actual debt service cost.

Two components of the return on debt

12. There are two components of the return that a service provider must pay to its lenders: a base risk-free rate and a debt risk premium (**DRP**). Service providers also bear costs relating to the issuance of debt and any swap contracts or other derivatives that are used as part of the debt management strategy. A service provider that had been adopting the hybrid approach under the previous Rules would enter the forthcoming regulatory period with:

    a. A floating risk-free rate component;[9] and

    b. A debt risk premium component that already reflects the 10-year trailing average.

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[2] As I explain in the body of this report, this approach is also known as the CKI approach as it was adopted by service providers that are partially owned by the CKI group. It was also adopted by other privately owned networks such as JGN, JEN, and United Energy.

[3] JGN Draft Decision, Attachment 3, pp. 113-114. The AER's other recent draft decisions contain similar provisions.

[4] As I explain in the body of the report, some large service providers issued staggered 10-year debt very much consistent with the proposed trailing average approach whereas others issued debt with shorter maturities. None of the larger service providers made material use of interest rate swaps.

[5] AER Rate of Return Guideline, Explanatory Statement, pp. 113-114.

[6] This is the regulatory approach that was adopted under the previous Rules, whereby the allowed return on debt was set to the relevant yield at the beginning of each regulatory period.

[7] NGR 87(10); NER 6.5.2(j); NER 6A.6.2(j).

[8] AER Rate of Return Guideline, Explanatory Statement, p. 102.

[9] Under the hybrid approach, the base "risk-free" rate that is locked in at the beginning of each regulatory period is the interest rate swap rate, which is not perfectly free of risk. Rather, it reflects the (very small) risk of a large commercial bank. However, the point here is that there is a generic base component that is common across borrowers and a premium (DRP) for the risk associated with the particular borrower in question.

13. Under the hybrid approach, the firm is assumed to issue floating rate debt[10] on a 10-year staggered maturity cycle, and to use swap contracts to fix the base rate at the beginning of each regulatory period. Consequently, the service provider will begin each regulatory period with a floating base rate and a 10-year trailing average DRP (set when the firm progressively issued its debt over the previous ten years).

Implications for transition arrangements

14. The AER has determined that:

    a) Under the previous Rules, the efficient benchmark entity would have adopted the hybrid debt management approach; and

    b) Under the new Rules, the efficient benchmark entity would adopt the trailing average debt management approach.

15. Given these AER determinations, if the goal is to set the regulatory allowance for the forthcoming regulatory period in order to match the efficient financing costs of the benchmark efficient entity:

    a. A transition period would be appropriate for the risk-free rate component as it would take 10 years for a service provider with floating rate debt to transition to the trailing average debt management approach that the AER considers to be the efficient benchmark under its new approach to determining the return on debt allowance; and

    b. No transition period would be appropriate for the DRP component, as moving directly to a 10-year trailing average would result in an immediate match between the efficient DRP and the regulatory allowance for the DRP, both of which would be based on a 10-year trailing average.

The AER's position

16. The AER's position is that:

    a. The trailing average should not be immediately applied to the risk-free rate component of the cost of debt because the only efficient debt management practice under the previous Rules was the hybrid approach. If the AER moved directly to a trailing average on this component then, for the forthcoming regulatory period, there would be a *mis-match* between the regulatory allowance (average over the last ten years) and the actual cost of the efficient service provider (spot rate at the beginning of the regulatory period); and

    b. Immediate application of a trailing average to the DRP component would result in a *match* between the regulatory allowance and the actual cost of the efficient service provider over the forthcoming regulatory period (both reflecting the 10-year average). However, the usual regulatory objective of matching the regulatory allowance to the efficient cost over the forthcoming regulatory period is over-ridden in this case. In particular, over the forthcoming regulatory period the regulatory allowance should be set so that the service provider under-recovers relative to the efficient cost – in order to balance out a perceived over-recovery in the prior regulatory period, termed a "windfall gain" by the AER.

[10] Or, as explained in the body of the report, to issue fixed rate debt and "convert" it into floating rate debt using interest rate swap contracts.

Windfall gains and losses in relation to the DRP

17. Lally (2014) and the AER define a "windfall gain" or loss to occur whenever there is a mis-match between the regulatory allowance for the return on debt and the benchmark return on debt (i.e., the return on debt that would be incurred by a firm following what the AER considered to be the efficient debt management strategy).

18. Under the previous Rules, there was no implementable debt management strategy that could be employed to replicate the rate on the day regulatory allowance.[11] Consequently, there was inevitably a mis-match between the regulatory allowance and the cost of debt from whatever was considered to be the efficient strategy. This mis-match could be positive or negative, like other benchmarks such as operating expenses or demand, and could change direction from year to year as market conditions change.

No windfall gain on the DRP if no transition

19. If the AER immediately implements the trailing average approach (with no transition) for the DRP component, there will be no windfall gain for service providers, irrespective of whether they implemented the hybrid or fixed-rate staggered maturity debt management strategies under the previous Rules. This is because an immediate implementation of the trailing average approach would result in a match between:

    a. The regulatory allowance for the DRP (which would immediately reflect the 10-year trailing average); and

    b. The efficient cost of the DRP borne by the service provider (which currently reflects the 10-year trailing average).

The relevance of past mis-matches

20. Lally (2014) and the AER propose that service providers received a windfall gain in relation to the cost of debt in the most recent regulatory period and should therefore be made to incur a windfall loss in the forthcoming regulatory period – before moving to the new regime where there will be no further windfall gains or losses.

21. By contrast, it is my view that it is not appropriate for a regulator to keep a mental accounting of what it considers to be any windfall gains or losses from past regulatory determinations, and to then seek to "square the ledger" in the current determination. The reasons for this conclusion are:

    a. The new Rules state that for each determination the allowed rate of return must be commensurate with the efficient financing costs of a benchmark efficient entity. The Rules do not provide for an exception in cases where the regulator considers that it should set the allowed return to be *different* from the efficient financing costs of a benchmark efficient entity in order to square up the regulator's assessment of any windfall gains or losses from prior regulatory periods. Indeed, the Rules specifically refer to:

[11] This is because the regulatory allowance was based on the interest rate at the beginning of each regulatory period. Matching this regulatory allowance would have required the service provider to issue *all* of its debt requirements right at the beginning of each regulatory period. Even if the service provider was able to do this, there would still be a mis-match in the sense that the regulatory allowance is based on 10-year debt and regulatory periods are only five years in length.

> …the desirability of minimising any difference between the return on debt [allowed by the regulator] and the return on debt of [incurred by] a benchmark efficient entity.[12]

b. Ex post "claw backs" or "square ups" of the type that is proposed in this case create a level of regulatory risk and are counter to incentive-based regulation. That is, ex post adjustments that are applied to actions that were taken by regulated firms years before the ex post adjustment was even contemplated are a form of regulatory risk.[13] Also, it is counter to incentive-based regulation to *introduce* an ex post adjustment mechanism *after* a regulated firm has benefitted or lost from operating in a way that the regulator itself considers to be efficient.[14] Moreover, in circumstances where investors do not know, at the time of committing capital, which "windfall" gains or losses the regulator might seek to balance up in future determinations, or how the regulator may seek to apply any balancing up, they will perceive additional risk and require higher returns as compensation.

c. There is no transparent means of determining the quantum of prior mis-matches that are to be clawed back or trued up. How is the purported prior windfall gain or loss to be quantified? Over how many past regulatory periods should the tally be kept? Should the square up be limited to mis-matches relating to the cost of debt, or should all possible sources of mis-match between the regulatory allowance and the efficient costs of the benchmark firm be considered? How does the regulator know that its proposed actions will "square up" the correct amount, and not more or less, than the running tally of prior mis-matches? Given that the AER cannot know ex ante that its proposed transition arrangements will serve to perfectly square up the perceived past windfall gains (which have not been quantified), it seems likely that further adjustments will be required in the future to square up any remaining balance at the end of the transition period. Finally, in its recent draft decisions, the AER has simply asserted that a windfall has occurred and that its proposed transition arrangements will properly redress it – the AER has provided no calculations in this regard.

d. The clawing back (or squaring up or balancing out) of perceived windfall gains or losses in the prior regulatory determination in relation to the return on debt assumes that any such windfall gains or losses have not already been balanced out by other features of the determination.

e. The AEMC did not allow for possible transitional arrangements as a means of clawing back (or squaring up) past gains or losses. Rather, the AEMC stated that the purpose of transitional arrangements is to allow service providers to unwind any financial arrangements that might have been reasonably and efficiently put in place under the previous Rules. My advice to the AEMC on this issue did not contemplate that transitional arrangements would be used to square up perceived past windfall gains or losses.

f. No "squaring up" across regulatory determinations is applied to any other WACC parameter. For example, there is no suggestion that the method for estimating the required return on equity should be altered if the regulator considers that its regulatory

[12] NGR 87 (11)(a); NER 6.5.2(k)(1); NER 6A.6.2(k)(1).
[13] Regulated firms generally locked in the debt risk premium over the last ten years.
[14] The AER concludes that it was efficient for regulated firms to have locked in the debt risk premium over the last ten years and that regulated firms benefited from that efficient practice over the last regulatory period. The AER now proposes to introduce an ex post adjustment mechanism to recover some of those benefits.

allowance in past determinations may have (ex post) exceeded the benchmark efficient cost.

Final conclusion

22. I consider the case where:

    a) The hybrid debt management approach is considered to be the debt management approach adopted by the benchmark efficient entity under the previous Rules; and

    b) The trailing average debt management approach is considered to be the debt management approach adopted by the benchmark efficient entity under the new Rules.

23. In this case:

    a) The base risk-free rate component should be the subject of a 10-year transition; and

    b) The DRP component should be immediately based on a 10-year trailing average with no transition period.

24. Only the transition arrangements set out above would result in a match between the allowed return on debt and the cost of debt finance incurred by the efficient benchmark entity pursuing what the AER considers to be the efficient debt management strategy.

2. Debt management practices

Overview

25. In practice, infrastructure assets such as gas and electricity networks are partially financed by equity and partially financed by debt. Shareholders provide equity capital and take an ownership interest in the firm. They receive a return in the form of dividends[15] and/or capital gains. Debt holders (lenders) provide debt capital (loans) to the firm. They receive interest payments during the life of the loan and repayment of the loan amount at the expiry of the loan period.

26. The AER's Rate of Return Guideline provides that the benchmark efficient entity should be considered to raise 40% of its financing requirements in the form of equity and 60% in the form of debt. The proportion of debt financing is also known as "leverage" or "gearing." The AER's Guideline and recent draft decisions adopt 60% gearing for all energy network businesses, so I have adopted 60% gearing throughout this report.[16]

27. Given that the firm has decided on a total quantity of debt finance, it must then determine how that debt finance is to be issued and managed. The issues that the firm must decide upon include the following:

    a. Whether to issue short-term debt (e.g., 1-year maturity) or long-term debt (e.g., 10-year maturity), or a mixture of the two;

    b. Whether to issue fixed-rate or floating rate debt or a mixture of the two;

    c. Whether to use swap contracts or some other derivative, in the context of the regulatory regime, to manage interest rate risk;

    d. Whether to issue debt denominated in Australian dollars or foreign currencies, or a mixture of the two; and

    e. Whether to stagger debt maturities, as a method of managing refinancing and/or interest rate risk, or whether to align debt maturities.

28. In the remainder of this section of the report I explain each of the issues set out in the list above and consider how an efficient entity with particular characteristics may evaluate each of them in light of the circumstances that may prevail when making decisions about the structuring of a debt portfolio. I begin by considering each issue for firms generally, then I turn to the specific case of a regulated infrastructure service provider.

Issues to be considered when constructing a debt portfolio

Background and terminology

29. In a debt or loan agreement the borrower is known as the issuer of the debt – a firm borrows by *issuing* debt.

30. Under a standard loan agreement, the issuer agrees to make a series of regular *coupon payments* to the holder of the debt and to make a *face value* payment when the debt matures. It is common for the coupon payments to be made semi-annually. For example, a firm might issue a bond with a $100 face value, 10-year maturity, and a fixed coupon rate of 7% with coupons paid semi-annually. For this

[15] Where the firm has paid corporate tax in Australia, dividends may also have imputation tax credits attached to them. To the extent that these credits are valued by investors, they provide another form of return.
[16] AER Rate of Return Guideline, p. 9; JGN Draft Decision, Attachment 3, p. 6.

bond, the firm would be required to pay a coupon of $3.50 every six months[17] during the life of the bond plus a $100 face value payment when the bond matures at the end of its 10-year life.

31. The return on debt consists of two components – a base risk-free rate and a debt risk premium (**DRP**). The base risk-free rate is the rate that the market would require from lending to a borrower that presents negligible risk of being unable to service the debt in full. The DRP is a premium to compensate the lender for risks including, for example, the risk that the particular borrower might default or be downgraded such that the market value of the debt falls. Other things being equal, the more likely the lender is to default, the higher the DRP required by lenders.

Term of debt

32. The first issue the firm has to consider is whether it will issue short-term debt (e.g., 1-year maturity) or long-term debt (e.g., 10-year maturity).

33. In deciding upon this issue, the firm will trade off interest costs on the one hand against *issuance costs* and *interest rate risk* and *refinancing risk* on the other. On average, long-term debt requires the firm to pay a higher interest rate than shorter term debt. Offsetting this additional interest cost are debt issuance costs, which are largely fixed for each issuance. If the firm issues 10-year debt every ten years, rather than one-year debt every year, it will incur less issuance costs.

34. When selecting the term of debt, a very important consideration is interest rate and refinancing risk. When a firm's debt matures it needs to be refinanced – replaced with new debt. From time to time, debt markets are such that refinancing is difficult or impossible. For example, there were periods during the global financial crisis and European debt crisis where debt markets were effectively closed for weeks at a time. During these periods, lenders were so concerned about the state of financial markets that they were simply unwilling to lend.[18] During other periods, lenders are willing to lend, but only at high rates of interest. Refinancing risk refers to the risk that the firm's debt matures during a period when debt markets are effectively closed and interest rate risk refers to the risk that the firm will have to pay a higher (or lower) than expected interest rate on its borrowings.

35. One method of mitigating refinancing risk is to issue longer-term debt. For example, a firm might issue 10-year debt and begin the process of refinancing after nine years. If the debt can be refinanced at a reasonable rate, the firm would proceed. If debt markets are effectively closed the firm can wait until the market reopens. In this example, the firm has a full year to refinance its debt and debt markets have never been effectively closed for that long.

36. Issuing long-term debt also serves to mitigate interest rate risk. In the example above, debt markets may not be closed when the firm begins to consider refinancing its debt, but interest rates may be very high. Again, the firm has some time to wait for markets to recover before it must refinance. Such discretion is not open to a firm that has issued one-year debt, for example.

37. It is common for infrastructure service providers to issue long-term debt to mitigate refinancing risk. This is because infrastructure businesses tend to be highly geared and to have fixed assets with long lives. In the event that such a firm has difficulties refinancing, it does not have the option of selling a portion of its assets or of materially reducing costs (a large proportion of which are fixed). Since the consequences of refinancing difficulties are likely to be relatively severe for such a firm, the tendency is to take steps to mitigate refinancing risk – by issuing long-term debt. Infrastructure businesses also

[17] The annual coupon would be $7 = 7% × $100, paid in two equal instalments.
[18] See for example, Crotty (2009) and Siegel, Wright and Filatochev (2011).

tend to be highly geared, and consequently relatively more exposed to the risk that interest rates will be higher than expected. Again, issuing long-term debt can help to mitigate this risk.

38. In its Rate of Return Guideline, the AER concluded that the conceptual and empirical evidence supported the adoption of a ten-year term of debt for the benchmark efficient entity.[19]

Fixed or floating rate debt

39. Debt can be issued to have a fixed coupon rate or a floating rate that resets periodically.

40. For fixed-rate debt, the coupon rate is fixed for the life of the debt, as illustrated in the example in Paragraph 30 above.

41. By contrast, for floating rate debt the coupon resets periodically based on some objective reference rate. For example, a firm might issue a bond with $100 face value, 10-year maturity, and a floating coupon rate that resets every quarter to the bank bill swap rate plus 2%. In this case, the reference rate is the bank bill swap rate which is a market-determined rate that is published daily. It is an accepted and objectively verifiable rate that is commonly used as a reference rate for floating rate debt in the Australian market. The 2% premium is a margin for risk – recognising that the risk of the particular borrower warrants a premium that is not reflected in the base bank bill swap rate. Suppose, for example, that the bank bill swap rate at the end of a particular quarter is 4%. The interest to be paid at the end of the subsequent quarter would be:

$$\frac{(4\% + 2\%) \times 100}{4} = 1.50 .$$

42. At the end of the next quarter, the bank bill swap rate might have risen to 5%, in which case the interest to be paid at the end of the subsequent quarter would be:

$$\frac{(5\% + 2\%) \times 100}{4} = 1.75 .$$

43. That is, at the end of each quarter the interest rate is set for the following quarter. At the beginning of each quarter, the floating interest rate resets and the borrower knows what the end-of-quarter interest payment will be.[20]

44. A firm might issue fixed-rate debt or floating rate debt or some combination of the two. The factors that the firm would consider include the relative demand in the market for fixed-rate and floating rate debt and, for the case of regulated service providers, whether the firm intends to employ a debt management strategy that combines floating rate debt with interest rate swaps under the particular regulatory regime (as explained below). In cases where a firm prefers to issue floating rate debt but where there is more market demand for fixed rate debt, the firm can issue fixed rate debt and "convert" it into floating rate debt using interest rate swap contracts, as explained below.

45. In its recent draft decisions, the AER concludes that, under the previous Rules, the private sector service providers tended to issue floating rate debt[21] and that this was the efficient approach under

[19] AER Rate of Return Guideline, Explanatory Statement, p. 136.
[20] In practice, different loan agreements have different technical terms (such as "day count conventions") that may result in the interest calculation being slightly different from those shown in this example. However, nothing turns on this. My point here is simply that, for a floating rate loan, the interest rate will re-set periodically during the life of the loan.
[21] Or to issue fixed rate debt and "convert" it into floating rate debt, as described below.

the previous Rules.[22] The AER also concludes that, under the new Rules, the efficient debt financing practice of regulated businesses will correspond to its trailing average allowance, which is based on the staggered issuance of fixed-rate debt.[23]

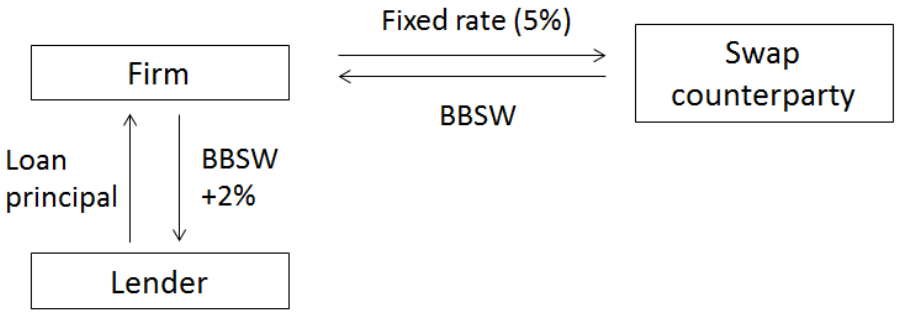
Fixing floating rate debt with swap contracts

46. If a firm issues floating rate debt, it runs the risk that the reference rate (e.g., the bank bill swap rate) might increase materially during the life of the loan. This risk can be hedged using a financial instrument known as an *interest rate swap*. An interest rate swap is a contract between the borrower and a third party (usually a financial institution) whereby the borrower "swaps" the floating rate payments they are required to make on the floating rate debt they have issued for fixed payments over the life of the debt. The swap contract effectively converts floating rate debt into fixed rate debt.

47. An example of a swap arrangement is illustrated in Figure 1 below. This figure shows the firm borrowing at a floating rate, committing to make payments of the bank bill swap rate (**BBSW**) plus a premium for risk of say 2%. The firm then contracts with a swap counterparty to pay a fixed rate (say 5%) and receive the bank bill swap rate. The net position is that the firm pays the fixed swap rate of 5% plus the debt risk premium of 2%. That is, the base rate component of the total cost of debt (5%) is locked in at the time the firm enters the swap contract and the debt risk premium (2%) is locked in at the time when the firm first issues the floating rate debt. This is known as a fixed-for-floating interest rate swap because the firm makes fixed payments and receives floating payments.

48. I discuss below how interest rates swaps can be used by regulated infrastructure firms, and how they were used as part of what the AER considers to be the efficient debt management approach[24] under the previous Rules.

Figure 1: Example of floating rate debt and interest rate swaps

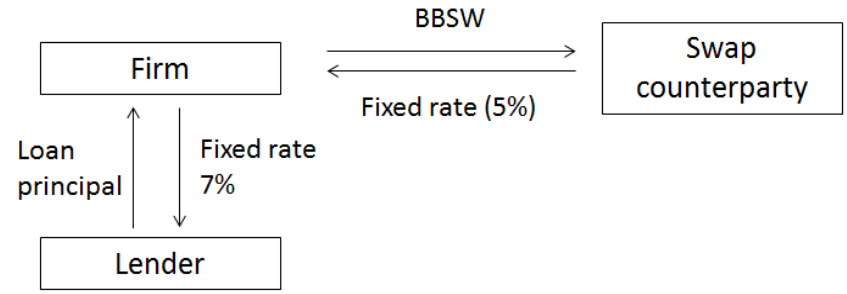


Source: SFG

49. A firm can also use interest rate swaps in the reverse direction. In some cases, a firm will want to issue floating rate debt when the market demand is for fixed rate debt. In this case, the firm can issue fixed rate debt and take the opposite side of the swap contract relative to the illustration above. This combination is illustrated in Figure 2 below, which shows the firm issuing fixed rate debt at 7% (which incorporates a margin for the risk that the firm might default) and then entering a swap that involves the firm paying the floating bank bill rate each quarter and receiving the fixed rate. The net position is that the firm pays the floating bank bill rate plus a risk margin of 2%. This is known as a floating-for-fixed interest rate swap because the firm makes floating payments and receives fixed payments.

[22] See for example, TransGrid Draft Decision, Attachment 3, p. 291.
[23] AER Rate of Return Guideline, Explanatory Statement, p. 12.
[24] See for example, TransGrid Draft Decision, Attachment 3, p. 291.

Figure 2: Conversion of fixed-rate debt into floating rate debt using interest rate swaps



Source: SFG

50. I explain below how some regulated firms have used interest rate swaps in this way as part of their debt management strategies.

Australian dollar or foreign currency debt, hedged or not

51. If debt is issued in Australian dollars (usually where the lender is also an Australian entity) all coupon payments and the face value payment at the end of the loan are set in Australian dollars. It is also possible for an Australian firm to issue debt in a foreign currency, in which case the coupon and face value payments will be denominated in that foreign currency.

52. Issuing debt in a foreign currency exposes the firm to foreign exchange risk – if the Australian dollar depreciates during the life of the loan, the Australian dollar cost of servicing the debt will increase, and vice versa. Consider, for example, an Australian firm that issues debt in US dollars (USD) where that debt requires coupon payments of $4 USD every six months. That debt might have been issued at a time when the exchange rate was such that each USD cost one Australian dollar (AUD). Thus, the coupons would each require a payment of $4 AUD. Now suppose that the Australian dollar depreciates such that each US dollar costs $1.20 AUD. Each coupon now costs $4.80 AUD. In this case, the Australian borrower bears the risk of the Australian dollar depreciating during the life of the loan – in which case the loan will become more expensive in Australian dollar terms. Of course, the reverse (AUD appreciation) is also possible, in which case the Australian borrower would benefit from the change in the exchange rate.

53. The foreign exchange risk that is embedded into debt that is issued in a foreign currency can be hedged using foreign exchange or cross-currency swaps. Foreign exchange swaps operate in a similar manner to interest rate swaps – the borrower would effectively swap their obligation to make foreign currency coupon payments into an obligation to pay set Australian dollar coupon payments. Most foreign currency debt raised by Australian firms is swapped back into Australian dollars. UBS (2015) explain how this is done and document the costs that are involved.[25]

54. Australian firms issue foreign currency debt when they perceive international markets as being deeper and more able to accommodate their borrowing needs at an attractive price.[26]

[25] UBS (2015), pp. 11-13.
[26] See UBS (2015) for a discussion of this point.

Staggering or aligning debt maturity dates

55. The final choice that must be made by a firm that issues debt is whether to stagger or align the maturity dates of its various loan agreements. It is much more common for firms to stagger their debt maturity dates to mitigate refinancing risk and interest rate risk. As set out above, a firm may issue 10% of its debt requirements each year in the form of 10-year debt. In this case, only 10% of the firm's debt would mature in each year. Thus, even if there is a problem with refinancing it would pertain only to a small proportion of the firm's debt. That is, each year only 10% of the firm's debt would be exposed to the risk that debt markets were effectively closed or that interest rates were much higher than expected.

56. The combination of issuing long-term debt with staggered maturity dates is a common and effective means of mitigating refinancing and interest rate risk. This approach provides the firm with a long period over which to refinance (enabling the firm to refinance at a time when market conditions are relatively favourable) and it exposes only a small proportion of the firm's debt to refinancing requirements each year.

Efficient debt management practice

Definition of efficient practice

57. The AER's Rate of Return Guideline sets out a definition for the efficient debt management strategy of the benchmark efficient entity:

> …we interpret 'the efficient financing costs of a benchmark efficient entity' as financing costs resulting from the benchmark efficient entity minimising the expected present value of its financing costs over the life of its assets.[27]

58. In my view it is reasonable to consider that efficient service providers would be seeking to minimise the expected present value of its financing costs in the sense that the service provider would weigh up considerations such as the rate of interest (long-term debt is, on average, more expensive than short-term debt), refinancing and interest rate risk (for example, the firm would bear a very large cost if it was unable to refinance on reasonable terms during a financial crisis), and transaction costs (for example, there are fixed costs associated with every debt issuance and with hedging activities). Indeed, all firms that issue debt finance weigh up these considerations in determining the debt management strategy that is most efficient given their particular characteristics and circumstances.

The efficient practice of a regulated infrastructure service provider under the previous Rules

Approaches employed by service providers under the previous Rules

59. Prior to the November 2012 amendments to the NER, the regulatory allowance in relation to the return on debt was determined using what has become known as the *rate on the day* approach. Under this approach, the regulator would estimate the required return on debt at the beginning of each regulatory period and apply that return to the total amount of debt financing.

60. Suppose, for example, the firm in question has a regulated asset base of $1,000 and (regulatory) gearing of 60%, in which case there is $600 of debt finance. Suppose also that the regulator has determined that the benchmark efficient entity would have a BBB+ credit rating and would issue debt with 10-years to maturity. The regulator would then estimate the yield on 10-year BBB+ debt at the

[27] AER Rate of Return Guideline, Explanatory Statement, p. 103.

beginning of each regulatory determination.[28] Suppose the regulator determined that the 10-year BBB+ yield was 8%. The regulatory allowance for the return on debt would then be \$600 × 8% = \$48 per year.

61. Under the rate on the day approach that the AER adopted under the previous Rules, it was impossible for service providers to replicate the regulatory benchmark. There was no implementable financing strategy that could replicate the regulatory benchmark. In this regard, the AER notes that:

> The on-the-day approach did not match any particular viable financing practice for the benchmark efficient entity.[29]

62. As a result, a range of different financing strategies were adopted by different service providers. The most common strategies[30] were:

    a. **"Trailing average" or "fixed-rate staggered maturity" approach**: A number of service providers adopted the approach of issuing fixed-rate debt on a staggered maturity cycle.[31] This is the approach that is generally adopted by unregulated infrastructure service providers, as set out above. It is also the same approach that the AER now considers would be adopted by the benchmark efficient entity under the current Rules; and

    b. **"Hybrid" approach**: A number of service providers adopted the strategy of issuing floating rate debt (or fixed rate debt converted to floating rate debt using interest rate swaps) on a staggered maturity cycle and using interest rate swaps to fix the rate at the beginning of each regulatory period.[32] This is the approach that the AER considers to have been the efficient approach under the previous Rules.

63. Under the hybrid approach, the service provider would issue approximately 10% of its total debt requirements each year in the form of 10-year floating rate debt (or 10-year fixed-rate debt swapped to floating). This would commit the firm to debt service costs that consisted of a floating base rate that changed from quarter to quarter (usually set according to the bank bill swap rate) plus a fixed debt risk premium that is determined when the debt is first issued and which is fixed for the life of the loan.

64. At the beginning of the regulatory period (during the rate setting period) the firm would enter 5-year interest rate swap contracts in relation to its entire debt financing requirements. These swaps would commit the firm to pay a fixed rate for the next five years, while receiving floating rate payments (which would simply be passed through to the lenders of the floating rate debt or the counterparty to the pay fixed receive floating interest rate swaps). Thus, the firm has effectively converted its floating rate commitments to the five-year fixed rate at the beginning of the regulatory period.

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[28] This would be done over the course of a 10- to 40-day "averaging period" or "rate-setting period" close to the beginning of the regulatory period.

[29] JGN Draft Decision, Attachment 3, p. 113.

[30] The strategies adopted by service providers under the previous Rules are summarised in the SFG (2012) report for the AEMC.

[31] The AER accepts that the NSW network service providers in fact adopted this strategy under the previous Rules. See, for example, the TransGrid Draft Decision, p. 114.

[32] This approach is also known as the CKI approach during the AEMC rule determination consultation because it is the approach that was adopted by the service providers that are partially owned by CKI: namely SA Power Networks, CitiPower and Powercor. The AER accepts that private sector service providers generally adopted the hybrid approach under the previous Rules. See, for example, the TransGrid Draft Decision, Attachment 3, p. 291.

65. Note that the firm's debt risk premium is fixed at the time the floating rate debt was initially issued. Consequently, for 10% of the firm's debt the DRP was fixed according to market conditions nine years ago, for another 10% of the firm's debt the DRP was fixed according to market conditions eight years ago, and so on.

66. Under the hybrid method:

    a. There was an effective match between the regulatory allowance for the base risk-free rate and the firm's actual cost – both were set to the fixed rate at the beginning of the regulatory period;[33] and

    b. There was a mis-match between the regulatory allowance for the DRP (which was set at the beginning of the regulatory period) and the firm's actual cost (which was set 10% per year over the previous ten years).

67. At the end of the five-year regulatory period, the five-year swaps expire and the firm is again left with (unhedged) floating rate debt. At this point, the firm will enter into another round of five-year swaps at the beginning of the next regulatory period, and the cycle continues.

68. As an alternative to issuing 10-year floating rate debt, the firm could issue 10-year fixed-rate debt and enter into 10-year floating-for-fixed interest rate swaps, as described above. That is, the firm issues 10-year fixed-rate debt and at the same time enters into 10-year floating-for-fixed swaps. At the beginning of the regulatory period the firm enters 5-year fixed-for-floating interest rate swaps to fix the base rate for the duration of the regulatory period. At the end of the regulatory period the 5-year swaps will expire, but the 10-year swaps will remain in effect.

The AER's views about the efficient approach under the previous Rules

69. In its recent draft decisions, the AER sets out what it considers to be the single efficient debt management strategy under the previous Rules as follows:

> We consider an efficient financing practice of the benchmark efficient entity under the on-the-day approach [i.e., under the previous Rules] would have been to borrow long term and stagger the borrowing so that only a small proportion of the debt matured each year. We consider the benchmark efficient entity would have combined this practice with interest rate swap contracts to match the risk free rate component of its return on debt to the on-the-day rate.[418] Specifically, we consider an efficient financing practice would have been:
>
> • to borrow long term (10 year) debt and stagger the borrowing so that only a small proportion (around 10 per cent) of the debt matured each year
>
> • to borrow using floating rate debt (or to borrow fixed rate debt and convert this to floating rate debt using fixed-to-floating interest rate swaps at the time of issuing the debt and which extended for the term of the debt, being 10 years), and
>
> • to enter into floating-to-fixed interest rate swaps at, or around, the time of the service provider's averaging period and which extended for the term of the access arrangement period, being typically 5 years).[34]

[33] The match here is close, but not perfect. This is because there may be a difference between the 10-year government bond yield (which the AER used as the base rate in its regulatory allowance) and the 5-year swap rate (which the firm is able to lock in via swap contracts).

[34] JGN Draft Decision, Attachment 3, pp. 113-114.

70. The AER further correctly notes that under this approach:

> This financing strategy would have resulted in the risk free rate component of the benchmark efficient entity's actual return on debt matching the on-the-day rate, while the debt risk premium component each year would reflect the historical average of the debt risk premiums over the previous 10 years.[35]

71. In summary:

    a. The AER has determined that it considers the hybrid approach to be the efficient debt management approach under the previous Rules;

    b. The private sector service providers generally considered that approach to be efficient, given their characteristics and circumstances, and implemented that approach; and

    c. Under that approach, the firm will enter the forthcoming regulatory period with a floating risk-free rate component and a DRP component that reflects the 10-year trailing average.

The efficient practice of a regulated infrastructure service provider under the current Rules

72. The new Rules state that the regulator may set the allowed return on debt on the basis of (a) the rate on the day approach,[36] (b) the trailing average approach, or (c) the hybrid approach.[37] In its rate of return Guideline, the AER has indicated that it will adopt the *trailing average approach* for determining the allowed return on debt under the current Rules. Under this approach, the allowed return on debt is set according to an average of the AER's estimate of the required return on debt over each of the last ten years. This approach has broad support from service providers and energy users.[38]

73. In this regard, the AER has stated that:

> We consider that holding a portfolio of debt with staggered maturity dates is likely an efficient debt financing practice of the benchmark efficient entity operating under the trailing average portfolio approach.
>
> We consider that the regulatory return on debt allowance under the trailing average portfolio approach is, therefore, commensurate with the efficient debt financing costs of the benchmark efficient entity.[39]

74. If the regulator adopts the trailing average approach and the service provider adopts the trailing average debt management strategy, there will be an effective match between the allowed return on debt and the efficient debt service cost.

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[35] AER Rate of Return Guideline, Explanatory Statement, p. 114.
[36] This is the regulatory approach that was adopted under the previous Rules, whereby the allowed return on debt was set to the relevant yield at the beginning of each regulatory period.
[37] NGR 87(10); NER 6.5.2(j); NER 6A.6.2(j).
[38] Although I note that Jemena Gas Networks have submitted that the hybrid approach is the most efficient debt management approach for a service provider with its characteristics and in its circumstances. For example, see the Jemena submission to the AER's Rate of Return Guideline process at http://www.aer.gov.au/sites/default/files/Jemena%2C%20Submission%20to% 20 draft%20AER%20rate%20of%20return%20guideline%20-%2011%20Oct%202013.pdf.
[39] AER Rate of Return Guideline, Explanatory Statement, p. 102.

75. The AER has concluded that the benchmark efficient entity will adopt the fixed-rate staggered maturity approach under the current Rules.

The AER's assessment of the efficient practice of the benchmark efficient entity

76. In summary, the AER has concluded that:

    a) Under the previous Rules, the benchmark efficient entity would have employed the hybrid approach; and

    b) Under the new Rules, the benchmark efficient entity would employ the trailing average approach.

77. To convert from one debt management approach to another, a service provider that enters the forthcoming regulatory period with floating rate debt (or fixed rate debt that has been effectively converted into floating rate debt) would have to enter a series of swap contracts. In particular, at the start of the forthcoming regulatory period, the service provider would fix 10% of their debt requirements at the one-year swap rate, another 10% at the two-year swap rate and so on. As these swaps roll off, the debt would be replaced by 10-year fixed-rate debt, so that the fixed rate staggered portfolio would be in place after ten years. Actual service providers are likely to employ variations around this strategy, taking into account their own particular circumstances.

78. As I explain further in the following section, under this approach:

    a) It takes 10 years before the base risk-free rate[40] is set to a 10-year trailing average; and

    b) The DRP reflects a 10-year trailing average throughout the whole process – every year the firm replaces the 10-year debt that matures with new 10-year debt.

[40] Under the trailing average approach, the benchmark efficient firm is considered to issue debt on a 10-year rolling cycle. The return on each debt issuance is the sum of a base risk-free rate and a DRP. It is, of course, open to service providers to pursue whatever debt management strategy they choose. Some may elect to issue debt in a more concentrated manner (i.e., relative to 10% every year) and use swaps to "convert" that debt into a series of ten 10-year fixed rate obligations. This strategy would involve a swap base rate for the service providers that adopted it. However, it is only the efficient benchmark that is relevant to this point.

3. Windfall gains and losses and transition arrangements

Risk-free rate and DRP components of the cost of debt

Return on debt components under different debt management strategies

79. As set out in Paragraph 36 above, the return on debt consists of two components – a base risk-free rate and a debt risk premium. Under the hybrid approach, which the AER considers to be the efficient approach under the previous Rules, the regulated firm issues 10-year floating rate debt[41] over a 10-year cycle and then uses interest rate swaps to fix the base risk-free rate at the beginning of each regulatory period. Consequently, the DRP is set when the debt is issued and the base risk-free rate is set to the prevailing rate at the beginning of each regulatory period. This is summarised in Table 1 below.

Table 1: Return on debt components under the hybrid approach

Approach	Risk-free rate	DRP
Hybrid approach	Set at the spot rate at the beginning of each regulatory period.	Fixed at the average level over the last 10 years when the debt was issued.

Note: This table considers the two components of the rate of return on debt. It does not consider other costs of the debt management strategy such as issuance costs and the costs of executing swaps or other derivatives.
Under the hybrid approach the base rate is a swap rate, which is not technically 100% risk-free. However, the point here is simply that there is a generic base rate and rating-specific DRP.

Return on debt components and regulatory allowance under the previous Rules

80. As set out above, under the previous Rules the regulatory allowance for the return on debt was set according to the rate-on-the-day at the beginning of each regulatory period. As summarised in Table 2 below, under this regulatory approach:

    a. For the risk-free rate component, there is a match between the regulatory allowance and the actual (efficient) cost under the hybrid approach (both are based on the spot rate); and

    b. For the DRP component, the regulatory allowance (which was based on the spot rate) does not match the hybrid debt management strategy (which is based on a 10-year average).

Table 2: Return on debt components under the hybrid approach vs. rate-on-the-day regulatory allowance

Approach	Risk-free rate	DRP
Hybrid approach	Set at the spot rate at the beginning of each regulatory period.	Fixed at the average level over the last 10 years when the debt was issued.
Regulatory allowance under the rate-on-the-day approach	Set at the spot rate at the beginning of each regulatory period.	Set at the spot rate at the beginning of each regulatory period.

Note: This table considers the two components of the rate of return on debt. It does not consider other costs of the debt management strategy such as issuance costs and the costs of executing swaps or other derivatives.
Under the hybrid approach the base rate is a swap rate, which is not technically 100% risk-free. However, the point here is simply that there is a generic base rate and rating-specific DRP.

[41] Or 10-year fixed-rate debt, converted into floating rate debt by 10-year fixed-for-floating interest rate swaps.

Return on debt components if there is no transition

81. The AER's trailing average approach assumes that the benchmark efficient service provider will adopt a corresponding fixed-rate staggered maturity approach. It sets the risk-free rate and DRP components to the 10-year historical average, as shown in Table 3 below.

Table 3: Return on debt components under the hybrid approach vs. trailing average regulatory allowance

Approach	Risk-free rate	DRP
Hybrid approach	Set at the spot rate at the beginning of each regulatory period.	Fixed at the average level over the last 10 years when the debt was issued.
Regulatory allowance under the trailing average approach	Fixed at the average level over the last 10 years when the debt was issued.	Fixed at the average level over the last 10 years when the debt was issued.

Note: This table considers the two components of the rate of return on debt. It does not consider other costs of the debt management strategy such as issuance costs and the costs of executing swaps or other derivatives.
Under the hybrid approach the base rate is a swap rate, which is not technically 100% risk-free. However, the point here is simply that there is a generic base rate and rating-specific DRP.

82. In summary, if the service provider has been efficiently employing the hybrid approach under the previous Rules, and if the AER were to implement the trailing average approach immediately, with no transition arrangements:

    a. The regulatory allowance for the risk-free rate *would not* match the actual efficient cost; and

    b. The regulatory allowance for the DRP *would* match the service provider's actual efficient cost.

Transition arrangements in relation to the risk-free rate component of the cost of debt

83. In relation to the risk-free rate component, a service provider that had been employing the hybrid approach under the previous Rules would enter the forthcoming regulatory period with floating rate debt.[42] It would take the service provider ten years to put in place a staggered portfolio of fixed-rate debt to match the new trailing average regulatory benchmark. As the floating rate debt matures (10% per year for the next 10 years), the service provider could replace it with fixed-rate debt. Thus, after one year 10% of the service provider's debt would be compatible with the new trailing average benchmark, after two years 20% would be compatible and so on. Applying the proposed transition arrangements to the risk-free rate component would result in a match between the regulatory allowance and the service provider's efficient costs.[43]

84. If the service provider had adopted the hybrid approach under the previous Rules, and if there were no transition arrangements in relation to the risk-free rate component, there would be a mis-match between the regulatory allowance and the service provider's efficient costs because:

[42] Or with fixed-rate debt that had been effectively converted into floating rate debt with swap contracts.
[43] That is, the costs incurred by a service provider efficiently applying this approach. To execute this transition, a benchmark efficient service provider who enters the forthcoming regulatory period with floating rate debt (or fixed rate debt that has been effectively converted into floating rate debt) would have to enter a series of swap contracts. In particular, at the start of the forthcoming regulatory period, the service provider would fix 10% of their debt requirements at the one-year swap rate, another 10% at the two-year swap rate and so on. As these swaps roll off, the debt would be replaced by 10-year fixed-rate debt, so that the fixed rate staggered portfolio would be in place after ten years. Actual service providers are likely to employ variations around this strategy, taking into account their own particular circumstances.

a. The regulatory allowance would be based on the 10-year historical average risk-free rate; and

b. The service provider's costs would be based on the current spot risk-free rate as the service provider enters the forthcoming regulatory period with floating rate debt.

85. This mis-match would result in either under- or over-recovery of the efficient costs, depending on the pattern of risk-free rates over the 10 years prior to the next regulatory period. There is nothing that a service provider could do to manage such a risk – it is not possible for a service provider to go back and retrospectively lock in the risk-free rates that were in effect over the previous 10 years. Moreover, the service provider would be in this position as a result of managing their debt portfolio under the previous Rules in a manner that the AER considers to be efficient.

86. During the AEMC rule change process a number of service providers proposed that transition arrangements should be put in place for precisely the reason set out above. By contrast, the Energy Users Rule Change Committee submitted that no transition arrangements should be applied. In my advice to the AEMC on this issue, I stated that:

> Under the current Rules [now the previous Rules], many regulated businesses have adopted debt management strategies that effectively lock in the base interest rate at the time of their determination. Those businesses are no longer exposed to historical base interest rates. Under the EURCC proposal, an historical average of the base interest rate would apply from the time of the next determination for each business. In this case, it would be impossible for the business to match its debt service payments to the allowed return on debt. This is because it is impossible for a business to go back and lock in rates that applied some time ago.[44]

87. That is, a service provider that had employed a debt management approach under the previous Rules that was efficient in light of that service provider's characteristics and circumstances should be put in a position where there is a match between the regulatory allowance and the efficient debt service costs. Any mis-match would result in either under- or over-compensation over the forthcoming regulatory period, which would seem to be inconsistent with the allowed rate of return objective under the new Rules.

88. This is consistent with the AER's position that if it moved directly to a trailing average on the risk-free rate component then, for the forthcoming regulatory period, there would be a mis-match between the regulatory allowance (average over the last ten years) and the actual cost of the efficient service provider (spot rate at the beginning of the regulatory period). Such a mis-match should be clear from Table 3 above. This provides the rationale for a transition (rather than immediate adoption of the trailing average approach) in relation to the risk-free rate component.

Transition arrangements in relation to the DRP component of the cost of debt

89. In its recent draft decisions, the AER states that its position is that the immediate application of a trailing average to the DRP component would result in a match between the regulatory allowance and the actual cost of the efficient service provider over the forthcoming regulatory period, as set out in Table 3 above.[45] However, the AER's position is that the usual regulatory objective of matching the regulatory allowance to the efficient cost over the forthcoming regulatory period is over-ridden in this case. In particular, the AER's position is that over the forthcoming regulatory period the regulatory

[44] SFG (2012), p. 45.
[45] AER Rate of Return Guideline, Explanatory Statement, p. 114; TransGrid Draft Decision, Attachment 3, p.107.

allowance should be set so that the service provider under-recovers relative to the efficient cost – in order to balance out a perceived over-recovery in the prior regulatory period.

90. In the remainder of this section, I consider the various aspects of the AER's position on transition arrangements in relation to the DRP component of the return on debt.

The concept of a windfall gain or loss in relation to the DRP component of the return on debt

91. As noted above, under the rate on the day approach that the AER adopted under the previous Rules, it was impossible for service providers to replicate the regulatory allowance. The AER has noted that there was no implementable financing strategy that could replicate the regulatory allowance:

> The on-the-day approach did not match any particular viable financing practice for the benchmark efficient entity. [46]

92. Consequently, there is an inevitable mis-match between the regulatory allowance for the return on debt and the benchmark cost of debt (i.e., the cost of debt that would be incurred by a firm following what the AER considered to be the efficient debt management strategy). Depending on current and past market conditions, that mis-match may result in the benchmark efficient entity being over- or under-compensated, relative to the regulator's benchmark, in any particular regulatory period. That is, the allowed return may be higher or lower than the actual cost of debt that would have been incurred by a firm following what the regulator considered to be the efficient debt management practice.[47]

93. In relation to the regulatory allowance for the return on debt, Lally (2014, p. 17) implicitly defines a "windfall gain" in terms of the debt risk premium only. He assumes that, under the previous Rules, the firm would have adopted the hybrid debt management approach if it was operating efficiently, in which case there would have been an effective match between the regulatory allowance and the actual cost of debt in relation to the base risk-free rate, but not in relation to the DRP.[48] He then defines a windfall gain to have occurred where the allowed debt risk premium exceeds the debt risk premium that would have been incurred by a firm adopting the hybrid approach, which he considers to be the efficient approach for all service providers irrespective of their particular characteristics. That is, Lally's definition of a windfall gain is an ex post one – he says that the outcome over the last 5-year regulatory period turned out to be an allowed DRP that was higher than the DRP that would actually have been incurred by the benchmark efficient entity. When the regulatory allowance was set (at the beginning of the last regulatory period), it was impossible to know in advance whether it might turn out to be above or below the DRP that would actually have been incurred by the benchmark efficient entity. That is, the benchmark efficient entity was subjected to the risk that the allowed DRP might not match the incurred DRP and Lally (2014) defines the outcome of that mis-match to be a windfall gain or loss, depending on the ex post outcome. Although I question whether the realised outcome of such a risky scenario can be properly described as a "windfall," I adopt that terminology

[46] For example, JGN Draft Decision, Attachment 3, p. 113.

[47] The issue here is that it was impossible for any service provider to replicate the regulatory allowance – even if the service provider was following exactly what the AER considered to be the benchmark efficient strategy. This is because the regulatory allowance did not correspond to any implementable financing strategy. A separate issue is that service providers are not bound to follow what the regulator considers to be the efficient strategy. This separate issue is not important to the point at hand, where the regulator is concerned only about the benchmark efficient entity.

[48] The assumption that the efficient firm would have adopted the hybrid approach is made on the basis that the benchmark efficient firm would have regard to the incentives created by the regulatory regime when designing its debt management strategy, that the hybrid approach is the preferred strategy under the incentives created by the previous Rules, and that the benchmark efficient firm would have been able to implement the hybrid strategy.

throughout this report so that the key conceptual points are not confused by differences in terminology.

94. Symmetrically, Lally (2014) defines a windfall loss to occur where the allowed debt risk premium is less than the debt risk premium that would have been incurred by a firm adopting the hybrid approach.

95. Lally (2014, p. 24) also states that windfall gains and losses violate what he calls the "NPV=0 principle." Lally notes that the NPV=0 terminology is "an alternative way of expressing the problem of windfall gains" and that "mitigating the windfall gain…can be equivalently expressed as producing results that better conform to the NPV=0 principle." I adopt the terminology of windfall gains and losses throughout this report, noting that the concepts are identical if expressed in terms of an "NPV=0 principle."

96. In this regard I note that the Revenue and Pricing Principles require that:

> A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs.[49]

and that the service provider will recover the efficient cost of debt if:

a. The allowed return on debt is not materially higher than the efficient cost of debt; and

b. The allowed return on debt is not materially lower than the efficient cost of debt.

97. Where the allowed return on debt is equal to the efficient cost of debt, the firm is compensated for the efficient cost of debt and customers pay no more than what is required to cover the efficient cost of debt.

No DRP transition means no DRP windfall

98. For a firm that has adopted the hybrid approach under the previous Rules, the DRP has been locked in progressively over the last 10 years when the firm issued debt. Consequently, as of today, the DRP component of the firm's actual efficient cost of debt is equal to the 10-year trailing average. It is also relevant that the AER has deemed the hybrid approach to be the benchmark efficient strategy under the previous Rules.

99. If, under the current Rules, the AER moves immediately to a 10-year trailing average for the DRP component of the return on debt there would be no windfall gain in relation to the DRP. This is because, over the forthcoming regulatory period (as set out in Table 3 above) there would be a match between:

a. The allowed DRP – which would be set according to the 10-year trailing average; and

b. The DRP that would be incurred by a benchmark firm that has adopted what the AER considers to have been the efficient debt management strategy – also set according to the 10-year trailing average.

100. In summary, if, in its current decision, the AER were to set the DRP component of the return on debt using a 10-year trailing average with no transition period, there would be no windfall gain or loss over the forthcoming regulatory period – the allowed return would match the efficient debt service cost in relation to the DRP component. This matching in relation to the DRP, between the trailing

[49] NGL 24(2); NEL 7A(2).

average approach and the actual debt service cost, is apparent in the "DRP" column of Table 3 above.

101. In my view, the analysis in relation to the DRP could stop at this point. Setting the allowed return on debt using the trailing average approach, with no transition period, would represent fair compensation in the forthcoming regulatory period for the DRP component of the debt service cost under what the AER has deemed to be the efficient strategy. Thus, the service provider would receive fair compensation (no more and no less) from the immediate application of the trailing average approach for determining the DRP. The concept of the regulator allowing fair compensation for the efficient financing costs of the benchmark efficient entity has support in the allowed rate of return objective in the 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 reference services.[50]

102. As discussed in some detail below, there is no dispute in Lally (2014) or the AER's recent draft decisions over the proposition that the service provider would receive no windfall gain in relation to the DRP over any future regulatory period if the AER were to implement the trailing average approach immediately with no transition – because there would be a match between the regulatory benchmark assumption and the efficient cost under the efficient strategy that was employed by the service provider (and which the AER deems to have been efficient). Rather, Lally (2014)[51] and the recent draft decisions[52] argue that part of the regulator's role is to "square up" any perceived windfall gains (i.e., mismatches between the allowed return on debt and the cost of debt under the hybrid debt management strategy) from past regulatory periods.

The relevance of past windfall gains and losses

103. Lally (2014) notes that under the previous rules there was an inevitable mis-match between the return on debt allowed by the regulator and the actual debt service cost incurred by the regulated firm. The allowed return on debt was set using the on the day approach applied to 10-year debt. It is impossible (and imprudent and inefficient) for regulated firms (other than very small firms) to issue 100% of their debt financing requirements at the beginning of each regulatory period.[53] And even if the regulated firm was able to issue all of its debt requirements at a point in time, there would still be a mis-match in that the allowed return is based on the 10-year yield whereas the regulator will re-set the regulatory allowance every five years. Thus, even if the regulated firm did issue all of its debt in the form of 10-year bonds at the beginning of a regulatory period to match the regulatory allowance, there would then be a mis-match for the subsequent regulatory period, when the firm's debt remains on foot and the regulatory allowance is updated.[54]

104. Consequently, in every regulatory period under the previous AER approach there was inevitably a difference between the regulatory allowance and whatever was considered to be the efficient debt management practice – because it was impossible to match the regulatory allowance with *any* debt

[50] NGR 87(2)(3); NER 6.5.2(c); NER 6A.6.2(c).
[51] Lally (2014), p. 25.
[52] For example, JGN Draft Decision, Attachment 3, pp. 116-119.
[53] I understand that no networks outside of Tasmania have employed a strategy that even approximates the issuance of all debt financing requirements at the beginning of each regulatory period. The Tasmanian networks have never had total debt financing requirements that exceed even $1 billion (AER State of the Energy Market, 2014).
[54] That is, at the end of the first five-year regulatory period the firm would have fixed-rate debt that matures five years hence. The fixed rate would have been locked in five years prior and would almost certainly differ from the allowed return set for the second five-year regulatory period.

management strategy. Whatever debt management strategy the regulated business employed, it would receive what Lally defines to be a windfall gain in some regulatory periods and it would sustain a windfall loss in other regulatory periods.

105. Lally (2014) proposes that service providers received a "windfall gain" in relation to the DRP component of the cost of debt in the most recent regulatory period and should therefore be made to incur a windfall loss in the forthcoming regulatory period – before moving to the new regime where there will be no further windfall gains or losses:

> …during this favorable window for the firm, if the regulator switches immediately to a trailing average (from which point the DRP allowed will match that incurred), this accumulated benefit will be retained by the firm rather than gradually eroded away and this 'windfall' benefit to the firm comes at the expense of its customers. This problem could be avoided by deferring any switch to a trailing average until the current DRP spike has fully subsided. An alternative approach would be to use a transitional process because it proxies for deferral of the switch.[55]

106. That is, Lally (2014) suggests that, under the previous regulatory approach, a period of windfall gain is likely to be followed by a period of windfall loss and that the previous regulatory approach should be maintained to force the service provider to incur a windfall loss that serves to balance out the windfall gain that it might have obtained in the previous regulatory period. He notes that a transition period acts as a proxy for such a deferral.

107. This raises the key question of whether it is appropriate for a regulator to keep a mental accounting of what it considers to be any windfall gains or losses from past regulatory determinations, and to then seek to "square the ledger" in the current determination.[56] Dr Lally holds a well-known view that such squaring up from one determination to the next is appropriate. For example, the QCA comments on a report it commissioned from Dr Lally as follows:

> Dr Lally considers that the critical feature of compensation is that it should be provided over the life of the regulatory assets rather than over each regulatory cycle within the life of the assets. As a result, while a regulator's estimation process might yield a biased estimate of a parameter (e.g. the market risk premium) under certain economic conditions, the more relevant consideration is the accuracy of the method over the life of the regulated assets. In other words, a method for estimating the market risk premium should not be rejected simply because it is biased under certain economic conditions (Lally, 2012b: 13).[57]

108. That is, the Lally rationale is couched in terms of windfall losses in some periods offsetting windfall gains in other periods, producing an NPV=0 outcome over the life of the asset. In my view, the goal should be to set the allowed return on the basis of the efficient costs of the benchmark efficient entity in every regulatory period, rather than having negative deviations in some periods that might offset positive deviations in other periods.

[55] Lally (2014), p. 17.
[56] In this subsection I deal with the conceptual point about "squaring the ledger." In subsequent sections, I consider implementation issues. For example, even if it was appropriate for the regulator to seek to square up unintentional windfall gains from the prior period with intentional windfall losses in forthcoming periods, there would seem to be no way for the regulator to know when the ledger had finally been squared.
[57] QCA MRP Discussion Paper, pp. 16-17.

109. In this regard, the AEMC's view is that the regulator should not seek to offset a perceived windfall gain in one determination by imposing a windfall loss in the next, but rather the regulator should seek to provide an appropriate regulatory allowance for each determination:

> If the allowed rate of return is not determined with regard to the prevailing market conditions, it will either be above or below the return that is required by capital market investors **at the time of the determination**. The Commission was of the view that neither of these outcomes is efficient nor in the long term interest of energy consumers.[58]

110. My view is consistent with that expressed by the AEMC – the best regulatory approach is one in which the regulator seeks to set a fair regulatory allowance at every determination, and that the regulator should not have regard to its assessment of what it considers to be the running balance of any windfall gains or losses from past determinations.

111. Moreover, I note that the allowed rate of return objective requires that:

> …the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.[59]

112. In particular, the allowed rate of return objective provides for the regulator setting the allowed return to be commensurate with the efficient financing costs of a benchmark efficient entity. It does not provide for an exception in cases where the regulator considers that it should set the allowed return to be different from the efficient financing costs of a benchmark efficient entity in order to square up what it considers to be windfall gains or losses from prior regulatory periods.

113. Moreover, it would be effectively impossible for a regulator to keep a running balance of amounts of under- and over-compensation over various different regulatory periods over the course of the life of an asset. This is because the composition of assets in the regulatory asset base is constantly changing over time as new assets are introduced and existing assets are depreciated or retired. Also, when a new asset is purchased, the regulator cannot even know for certain how long it will be retained by the firm, in which case the regulator would not know how long a period will be available to square up any under-or over-compensation early in the life of the asset. In my view, a materially better approach is for the regulator to seek to allow an appropriate return that is commensurate with the efficient financing costs in every regulatory period.

Clawbacks or squaring up?

114. Lally (2014) recognises his proposed deferral of the AER's new efficient approach to determining the allowed return on debt might be interpreted as a clawback of benefits from past regulatory periods, but he rejects that interpretation as follows:

> It might be argued that the transitional process would involve 'clawing back' past gains. I think that 'clawing back' relates to a situation in which gains have arisen from a past event, that past event will not give rise to future consequences that will naturally erode those gains, and the transitional process does erode the gains. However, in the present situation, the gains have arisen from a DRP spike and the natural reversion in the DRP back to its earlier level would erode these gains back to zero. Switching to a trailing

[58] AEMC Rule Change Final Determination, p.44, emphasis added.
[59] NGR 87(2)(3); NER 6.5.2(c); NER 6A.6.2(c).

> average in mid-stream without a transitional regime locks in the accumulated gains up to that point. So, the use of a transitional regime to prevent this does not constitute a claw back. It instead constitutes a process that mimics the erosion in the gains for the businesses that would have occurred naturally under the earlier regime.[60]

115. However, in my view, the Lally approach represents the textbook example of a clawback from prior regulatory periods. Lally (2014) proposes that service providers have received a windfall benefit in the prior regulatory period, and therefore it should be made to suffer a windfall loss in the current regulatory period before we move to the new efficient regulatory approach where there will no longer be any windfall gains or losses. If this is not a clawback, it is difficult to imagine that anything could possibly amount to a clawback.

116. In my view, the passage from Lally (2014) that is set out above is not, in any sense, an argument about whether or not the proposed deferral of the new efficient approach for determining the allowed return on debt amounts to a clawback. Rather, Lally is arguing that what is obviously a clawback is in fact a reasonable clawback that "would have occurred naturally under the earlier regime."

117. It is my view that, from an economic perspective, it is very dangerous to select which regulatory approach should be applied in order to "balance out" or "square up" perceived benefits or losses from prior regulatory periods. In the case at hand, there is widespread agreement that the previous regulatory approach for determining the allowed return on debt was inefficient and did not match the actual cost of debt from any implementable strategy. There is also widespread agreement that the proposed new regulatory approach will result in the allowed return on debt being commensurate with the efficient debt service costs. Thus, the question is whether what is widely regarded to be a substandard approach should be maintained in preference to what is widely regarded as a superior and more efficient approach. The only reason that has been presented for maintaining the previous substandard approach is to act as a mechanism for squaring up perceived problems previously caused by that very approach.

118. In this regard, the AEMC has included in the Rules a number of factors to be considered when estimating the return on debt including:

> …the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective.[61]

119. The Rules do not refer to the deliberate maintenance of a *difference* between the allowed return on debt and the return on debt of a benchmark efficient entity in order to rectify the regulator's perception of windfall gains or losses from prior regulatory periods. By contrast, they specifically refer to the desirability of *matching* the allowed return on debt to the cost of debt borne by the benchmark efficient entity.

120. In my view, having identified that there are problems with the previous approach, and that the new approach will produce more efficient outcomes, the previous approach should not be maintained simply to claw back perceived gains that may have been accrued over the previous regulatory period under the previous regime.[62] From an economic perspective, the ex post clawing back of gains accrued during one regulatory period creates regulatory risk and uncertainty and interferes with the

[60] Lally (2014), pp. 21-22.
[61] NGR 87 (11)(a); NER 6.5.2(k)(1); NER 6A.6.2(k)(1).
[62] This is particularly the case where the regulator has not quantified the amount of the "windfall" to be squared up or specified the period over which past windfalls should be assessed or the period over which any squaring up should be conducted.

incentive for the regulated business to operate efficiently. These problems are exacerbated when the means of clawing back prior gains is the continued application of a regulatory approach that is widely regarded as being substandard and in need of change. In circumstances where investors do not know, at the time of committing capital, which "windfall" gains or losses the regulator might seek to balance up in future determinations, or how the regulator may seek to apply any balancing up, they will perceive additional risk and require higher returns as compensation.

121. Moreover, even if it was decided that the previous approach should be maintained in some form to claw back (or "square up" or "balance out") past gains, there are a number of problems with the application of that approach, as follows:

    a. In its recent draft decisions, the AER has simply asserted that a windfall has occurred and that its proposed transition arrangements will properly redress it. There has been no proper quantification of the past windfall and no demonstration that the proposed transition will properly redress it.

       Lally (2014) provides some generic calculations based on some broad assumptions and concludes that service providers generally benefitted from a windfall gain over the last regulatory period. However, the recent draft decisions contain no specific quantification of past windfalls for the firms that are the subject of those determinations and no calculations to show that the proposed transition arrangements will square up any past windfall.

       Indeed, the key point is that it is impossible to know what effect the proposed transition arrangement will have because that depends on future debt yields that cannot be known in advance. Even if there was a windfall in the past regulatory period, and even if the regulator had quantified it, the regulator could not know whether the proposed transition arrangement would offset it.

    b. Another point to consider is what happens if debt risk premiums rise sharply prior to the next regulatory period. The Lally (2014) argument is that a spike in debt risk premiums prior to the previous regulatory period resulted in what Lally defines to be a windfall gain over that period. If that occurred again prior to the next regulatory period it would presumably result in another windfall gain. In that case, maintaining the previous regulatory approach (in full or in part) would exacerbate the gains that the Lally approach is seeking to claw back. This would presumably mean that the introduction of the new efficient approach would need to be further delayed – until we had a sufficient number of regulatory periods occurring in conditions appropriate for facilitating the appropriate amount of claw back.

    c. It is not clear for how long the regulator should maintain its mental accounting of prior windfall gains and losses. Should the introduction of the new efficient approach be deferred so as to offset the regulator's assessment of windfall gains or losses over the past regulatory period only, or over the past two regulatory periods, or over a longer horizon? In this regard, Lally (2014) contends that a regulatory period in which the regulated firm receives a windfall benefit is likely to be preceded by one in which the firm has suffered a windfall loss:

       > …the DRP spike will first induce a DRP shortfall, then an excess.[63]

[63] Lally (2014), p. 17.

Thus, the amount of any gain to be clawed back depends on how many prior regulatory periods are included in the regulator's mental accounting. That is, any windfall gain that may have accrued in the prior regulatory period may have already been squared up by shortfalls in prior regulatory periods. Keeping a running balance of yet to be squared up excesses or shortfalls is a complex task that would vary materially depending on the starting point that was adopted.

Moreover, under the AER's proposed transition arrangements, service providers are likely to incur losses over the next two regulatory periods. Presumably these losses, plus shortfalls in the second to last regulatory period would all have to be balanced against any assessment of a windfall gain that might have occurred in the regulatory period that has just completed.

d. The clawing back (or squaring up or balancing out) of perceived windfall gains in the prior regulatory determination in relation to the return on debt assumes that any such windfall gains have not already been balanced out by other features of the determination.[64] In this regard, the SFG (2012) report to the AEMC noted that the AER's implementation under the previous Rules may have provided somewhat of a natural hedge.

   In periods where investors are requiring higher risk premiums on debt investments in the benchmark firm, they will also be requiring higher equity risk premiums in the same benchmark firm. However, the AER's approach has been to use an essentially fixed MRP in its allowed return on equity.[65] Thus, in "crisis" periods where risk premiums are at elevated levels, the AER would allow a high DRP (that may exceed the DRP that was locked in when the firm issued the debt), but on the equity side the MRP is likely to have been set below the premiums that are required by investors. The converse would be likely to occur in bull market periods. Thus, the AER's implementation under the previous Rules may have already provided somewhat of a natural hedge.[66]

122. In summary, even if one accepts that a service provider obtained a windfall gain in relation to the DRP component of the allowed return on debt in its prior regulatory period and that it is appropriate to claw back (or square up) that gain with a windfall loss over the current regulatory period, it is not at all clear that adopting the AER's proposed transition period would serve to claw back (or square up) the appropriate amount of prior gains.

The purpose of transition arrangements

123. Lally (2014) is quite clear about the fact that, in his view, the role of the transition arrangements is to impose a windfall loss on the service provider in the forthcoming regulatory period in order to square up his perception of a windfall gain over the previous regulatory period:

> Without a transitional regime, there would be no mis-match after the regime change but there would be a windfall gain to businesses up to the time of the regime change. By contrast, the proposed transitional process mitigates the windfall gains but necessarily leads to a mis-match between the allowed and incurred costs after the regime change.[67]

[64] This is in addition to the possibility in the previous paragraph that any windfall may have already been offset to some degree in prior regulatory periods.
[65] The MRP adopted by the AER has never varied outside of a 0.5% range – through bull market periods of rapid economic expansion and through periods of severe financial crisis.
[66] See SFG (2012), paragraphs 177-178.
[67] Lally (2014), p. 25.

124. By contrast, the AEMC did not allow for possible transitional arrangements as a means of clawing back (or squaring up) past gains or losses. Rather, the AEMC stated that the purpose of transitional arrangements is to allow service providers to unwind any financial arrangements that might have been put in place under the previous Rules. That is, the purpose of the transitional arrangements are to allow a service provider who had adopted one debt management strategy under the previous Rules to transition to a new debt management strategy under the new Rules:

> Service providers are likely to have entered into financial arrangements to mitigate their risk given the current approach to estimating the return on debt. Therefore, any change in approach could lead to some service providers gaining extra revenue or losing revenue as a result of unwinding those financial arrangements. Gains or losses of revenue of this type from changes in regulatory arrangements could be perceived by investors as increasing regulatory risk, and thereby lead investors to seek a higher rate of return. SFG therefore recommend that consideration be given to transitional arrangements when changing the approach to estimating the return on debt.[68]

125. The AEMC's guidance makes no mention at all of using transition arrangements to claw back (or square up) the regulator's perception of gains or losses relating to prior regulatory periods. By contrast, the Rules require that, when estimating the return on debt, regard must be had to, among other things:

> …the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective.[69]

Summary and conclusions

126. In my view, the decision-maker is required to address the following questions:

Should the regulator be seeking to adopt an approach whereby the benchmark efficient entity is fairly compensated for its efficient debt service costs?

127. In my view, at every determination the regulator should strive to set the allowed return on debt to fairly compensate the firm for the efficient debt service costs over that regulatory period. By contrast, Lally (2014) and the AER propose that it is appropriate for a regulator to deliberately under-compensate the regulated firm for its efficient debt service costs in order to redress perceived over-compensation that it deems to have occurred in prior regulatory determinations.[70]

128. My view is that in every determination the regulator should seek to fairly compensate the regulated firm for the efficient costs incurred over that regulatory period – without regard to what may or may not have occurred in prior regulatory periods. In particular, the allowed rate of return objective provides for the regulator setting the allowed return (including the return on debt) to be commensurate with the efficient financing costs of a benchmark efficient entity. It does not provide for an exception in cases where the regulator considers that it should set the allowed return to be different from the efficient financing costs of a benchmark efficient entity in order to square up windfall gains or losses from prior regulatory periods.

[68] AEMC Final Determination, p. 76.
[69] NGR 87 (11)(a); NER 6.5.2(k)(1); NER 6A.6.2(k)(1).
[70] In particular, in the regulatory period that is just concluding.

In the absence of any transition arrangements, would the benchmark efficient entity obtain a windfall gain in relation to the DRP?

129. There appears to be no dispute between the AER and the private sector service providers that, under the previous Rules, the efficient debt management approach for those service providers was the hybrid approach. There is also no dispute about the proposition that, under the hybrid approach:

> …the debt risk premium component each year would reflect the historical average of the debt risk premiums over the previous 10 years.[71]

130. Consequently, if, for the DRP component of the cost of debt, the AER implements the trailing average approach immediately, with no transition period, there will be an immediate match between the allowed DRP and the efficient DRP borne by the private sector service providers.

131. In the absence of any transition arrangements, the private sector service providers will receive a regulatory allowance for the DRP that matches the efficient DRP. The service providers would receive no windfall gain over the forthcoming regulatory period in relation to the DRP.

[71] AER Rate of Return Guideline, Explanatory Statement, p. 114.

4. Specific points raised in the recent draft decisions

Transition, mis-match and windfall gains

132. In its recent draft decisions, the AER claims that:

> Commencing the trailing average with a period of transition contributes towards the achievement of the rate of return objective because it minimises the potential mismatch between the allowed and actual return on debt of the benchmark efficient entity, while also avoiding windfall gains or losses to service providers or consumers from changing the regulatory approach to the return on debt. For these reasons, it also provides service providers with a reasonable opportunity to recover at least their efficient debt financing costs.[72]

133. In my view, this statement is erroneous in at least two respects.

134. First, the proposed transition does *not* "minimise the potential mismatch between the allowed return and actual return on debt of the benchmark efficient entity" at all. The proposed transition minimises the potential mismatch between the allowed return on debt and what the AER considers to be the efficient cost of debt only for the risk-free rate component of the cost of debt. By contrast, the proposed transition embeds a clear mismatch in relation to the DRP component of the cost of debt. Applying the transition to the DRP component is entirely inconsistent with the AER's own assumption that the benchmark efficient entity would have issued debt in equal proportions over each of the previous 10 years, locking in the debt risk premiums that were present in the market at the time that debt was issued.

135. The AER itself is clear about this point later in its draft decisions. For instance, the AER states that:

> We adopt the same transitional arrangements for both the risk free rate and debt risk premium components of the return on debt. However, our reasons for adopting transitional arrangements differ for these two components. [73]

136. The AER goes on to note that the proposed transition minimises the potential mismatch in relation to the risk-free rate component only:

> We have adopted a transition on the risk free rate component because a transition minimises the potential mismatch between the allowed return on debt and the actual return on debt of the benchmark efficient entity. [74]

137. The AER then goes on to list entirely different reasons for applying a transition to the DRP component, which I address below.[75] Moreover, the section in the draft decisions that is titled *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* refers exclusively to the risk-free rate component of the return on debt.

[72] JGN Draft Decision, Attachment 3, p. 112.
[73] JGN Draft Decision, Attachment 3, p. 112.
[74] JGN Draft Decision, Attachment 3, p. 112.
[75] JGN Draft Decision, Attachment 3, pp. 112-113.

138. In summary, it is erroneous for the AER to claim that its proposed transition "minimises the potential mismatch between the allowed and actual return on debt of the benchmark efficient entity." Rather, the proposed transition deliberately embeds a mismatch in relation to the DRP, where that mismatch will persist for the duration of the 10-year transition period.

139. The second problem with the AER's claim above is that the proposed transition clearly does not have the effect of "avoiding windfall gains or losses to service providers or consumers." Rather, the primary purpose of the proposed transition is to deliberately *impose* a windfall loss on the regulated business to claw back (or "balance out") what the AER considers to have been a windfall gain in the prior regulatory period.

140. That is, when the AER states that it is "avoiding windfall gains or losses" what it means is that it is deliberately imposing a windfall loss on the business in the current regulatory determination to "square up" what the AER considers to have been a windfall gain in the prior regulatory period.

141. Lally (2014), in his advice to the AER is very clear about this point:

> Without a transitional regime, there would be no mis-match after the regime change but there would be a windfall gain to businesses up to the time of the regime change. By contrast, the proposed transitional process mitigates the windfall gains but necessarily leads to a mis-match between the allowed and incurred costs after the regime change.[76]

142. As set out in the previous section of this report, even if it was appropriate for the AER to impose a windfall loss in the forthcoming regulatory period to square up a perceived windfall gain in the previous period:

    a) The AER has performed no calculations to ensure that the imposed windfall loss and the perceived windfall gain will, in fact, offset; and

    b) The AER has not considered whether there may be windfall gains or losses from previous regulatory periods that should also be considered in any squaring up calculations.

143. That is, even if it is open to the AER to seek to square up its perception of windfall gains and losses from past regulatory periods, there is no evidence to suggest that the AER's proposed transition arrangements will in fact achieve that objective.

Other reasons proposed for transition arrangements

Primary reason is the claw back of perceived past windfall gains

144. As set out above, Lally (2014) is clear about the fact that the primary reason for imposing transition arrangements is to claw back (or square up) perceived windfall gains from the previous regulatory period. The AER's recent draft decisions set out some additional reasons, each of which is addressed below.

The availability of historical data

145. The AER expresses some concerns about the availability of the historical data that would be required in the absence of a transition in relation to the return on debt.[77] If the trailing average approach is

[76] Lally (2014), p. 25.
[77] JGN Draft Decision, Attachment 3, pp. 120-122.

applied with no transition, ten years of historical return on debt estimates would be required immediately. I note that bond yield data is now available from the RBA back to January 2005 and has been available from Bloomberg over the required 10 year period. I also note that over that entire 10-year period, Australian regulators (including the AER) have been estimating the required return on debt for electricity network service providers and have always been able to settle on what they considered to be an appropriate estimate to two decimal places. The data and estimates that have formed the basis of past regulatory determinations remain available for the AER's use today. In my view, the AER's concerns about the availability of historical data are overstated.

146. In any event, the availability of data should not drive the regulatory practice. In my view, the regulator should determine what must be estimated according to the Rules and then construct the best possible estimate from the data that is available. In my view, it would be an error for a regulator to determine what is to be estimated on the basis of what data is most easily available, rather than on the basis of what the Rules require.

Opportunistic behaviour by service providers

147. The AER states that its proposed transition "reduces the potential for opportunistic behaviour from stakeholders."[78] On this point, the AER seems to have in mind a scenario in which service providers are able to opportunistically switch back and forth between the rate on the day and trailing average approaches at each determination:

> …service providers could seek to adopt the on-the-day regulatory approach when the prevailing return on debt is high; and the trailing average approach (with no transition) when the prevailing return on debt is low.[79]

148. However, the AER has already determined that the trailing average approach will be adopted for every service provider and to my knowledge every service provider has accepted and endorsed that approach. That is, no service provider has proposed that they should be able to switch approaches opportunistically at each determination and in any event it is the AER that selects the regulatory approach, not the service provider. Thus, the AER appears to be addressing a problem that does not currently exist and that cannot ever exist. In my view, none of this discussion has any relevance at all to the questions of whether or not a transition should be applied.

149. Also, it should be remembered that the trailing average approach is the result of a rule change proposal made by the Energy Users Rule Change Committee (**EURCC**). The EURCC proposed that the rate on the day approach should be changed to a trailing average approach with no transition arrangements, and throughout the AEMC's rule change consultation period EURCC representatives maintained that no transition arrangements should be applied.[80]

Price stability and efficient prices

150. In its recent draft decisions, the AER notes that its proposed trailing average approach is likely to produce prices for consumers that have the same average level over the long run, but which are less volatile from determination to determination:

[78] JGN Draft Decision, Attachment 3, p. 122.
[79] JGN Draft Decision, Attachment 3, p. 122.
[80] EURCC (2011), p. 43. Note that the EURCC proposed that the allowed return on debt should be (immediately) based on a 5-year benchmark, with a consequential 5-year trailing average.

> The on-the-day approach or the trailing average portfolio approach can be expected to result in a different allowed return on debt for any particular access arrangement period. …The difference is that the on-the-day approach would lead to relatively higher price volatility for a given average price level, whereas the trailing average portfolio approach would lead to relatively lower price volatility, for the same average price level.[81]

151. The AER also notes that the Consumer Challenge Panel is of the view that having efficient prices (i.e., prices that properly reflect the efficient financing costs of the benchmark efficient entity) is more important than having stable prices:

> …during the current determination process, the consumer challenge panel was clear that efficient price levels were more important than reducing volatility.[82]

152. I agree that having efficient prices is important (indeed it is a requirement of the Rules[83]) and that the trailing average approach will provide more stable prices with the same mean. Thus, prices should be set so that they reflect the efficient costs of a benchmark efficient entity that implements the trailing average approach as quickly as possible.

153. As set out above, the AER considers that the benchmark efficient entity adopted the hybrid debt management approach under the previous Rules and will adopt the trailing average debt management approach under the new Rules.

154. In this case, the price that reflects the efficient costs of the benchmark efficient entity[84] is one in which:

    a) The base risk-free rate component is the subject of a 10-year transition; and

    b) The DRP component is immediately based on a 10-year trailing average with no transition period.

155. A price set in this manner reflects the costs that the AER considers to be efficient. A price set in any other way is, by definition, inefficient.

156. This brings us to the question of whether the objective of price stability should override the objective of price efficiency. As set out above, the Consumer Challenge Panel has advised the AER that it should not. I agree that the allowed return should reflect the efficient financing costs of the benchmark efficient entity. In its recent draft decisions, the AER notes that its proposed transition arrangement "provides price stability over the medium to long term, in line with the progressive introduction of the trailing average."[85] That is, relative to the efficient price path set out in Paragraph 154 above, the AER's proposed transition results in more volatility in the short term. This is because the AER's proposed transition delays the adoption of the (low volatility) trailing average approach for the DRP. Thus, the AER's proposed transition produces prices that are:

[81] JGN Draft Decision, Attachment 3, p. 121.
[82] JGN Draft Decision, Attachment 3, p. 122.
[83] NGR 87(2)(3); NER 6.5.2(c); NER 6A.6.2(c).
[84] Which, according to the AER, would have been adopting the hybrid approach under the previous Rules and will move to the trailing average approach under the new Rules.
[85] JGN Draft Decision, Attachment 3, p. 122.

a) Inefficient, in that the allowed return will not be consistent with the efficient financing costs of a benchmark efficient entity adopting the debt management strategies that the AER itself has declared to be the efficient strategies; and

b) More volatile than the efficient price path.

Efficient prices every regulatory period, or on average?

157. As set out above, the AER's contention is that it should set an inefficient price for the forthcoming regulatory period in order to redress what it says is a windfall gain in past regulatory periods. In particular, the AER says that it should be concerned with the allowed return over the life of the regulated asset, rather than with setting an efficient price for each regulatory period.[86] In my view, there are a number of problems with an approach whereby a regulator sets inefficient prices for individual regulatory periods on the basis that they might "average out" over the life of the asset:

a) Such an approach would allow the regulator to set any price it liked for a particular regulatory period on the basis that things will all balance out over the long run;

b) There is not a single asset with a single life over which some grand average can be taken, but rather an ever changing RAB with some assets being retired and depreciated and new assets being introduced; and

c) There is not a single investor who holds the single asset for its whole life, but rather a flow of investors who provide capital to the firm for a period. Investors would not want to run the risk that their period of investment might happen to coincide with a period of under-compensation designed to square up perceived windfalls from prior periods.

158. In my view, a better approach is for the regulator to seek to set an efficient price, reflecting the efficient financing costs of the benchmark efficient entity in every regulatory period – not simply on average over the long-run. I consider this to be consistent with the allowed rate of return objective:

> …the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.[87]

[86] JGN Draft Decision, Attachment 3, p. 122.
[87] NGR 87(2)(3); NER 6.5.2(c); NER 6A.6.2(c).

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Appendix 1: Instructions

Expert Terms of Reference

Return on debt transition

Jemena Gas Networks
2015-20 Access Arrangement Review

AA15-570-0074

Version C – 25 February 2015

Contact Person

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Version	Status	Date	Prepared	Checked	Authorised
A	Draft	6/01/15	E Grace-Webb		
B	Draft	8/01/15	E Grace-Webb	G+T	
C	Final	25/01/15	E Grace-Webb		E Grace-Webb

Contents

1 Background

Jemena Gas Networks (**JGN**) is the major gas distribution service provider in New South Wales (**NSW**). JGN owns more than 25,000 kilometres of natural gas distribution system, delivering approximately 100 petajoules of natural gas to over one million homes, businesses and large industrial consumers across NSW.

JGN submitted its revised Access Arrangement proposal (**proposal**) with supporting information for the consideration of the Australian Energy Regulator (**AER**) on 30 June 2014. The revised access arrangement will cover the period 1 July 2015 to 30 June 2020 (July to June financial years). The AER published its draft decision on this proposal on 27 November 2014. JGN must submit any additions or other amendments to its proposal by 27 February 2015.

As with all of its economic regulatory functions and powers, when assessing JGN's revised Access Arrangement under the National Gas Rules and the National Gas Law, the AER is required to do so in a manner that will or is likely to contribute to the achievement of the National Gas Objective, which is:

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

For electricity networks, the AER must assess regulatory proposals under the National Electricity Rules and the National Electricity Law in a manner that will or is likely to achieve the National Electricity Objective, as stated in section 7 of the National Electricity Law.

Where there are two or more possible decisions in relation to JGN's revised Access Arrangement that will or are likely to contribute to the achievement of the National Gas Objective, the AER is required to make the decision that the AER is satisfied will or is likely to contribute to the achievement of the National Gas Objective to the greatest degree.

The AER must also take into account the revenue and pricing principles in the National Gas Law and in the National Electricity Law when assessing AA. The revenue and pricing principles include the following:

> "(2) A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in—
>
> a) providing reference services; and
>
> b) complying with a regulatory obligation or requirement or making a regulatory payment.
>
> (3) A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes—
>
> (a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services…

[…]

(5) A reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.

(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services."

The equivalent National Electricity Law is in section 7A.

Some of the key rules that are relevant to an access arrangement and its assessment are set out below.

Rule 74 of the National Gas Rules, relating generally to forecasts and estimates, states:

(1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.

(2) A forecast or estimate:

(a) must be arrived at on a reasonable basis; and

(b) must represent the best forecast or estimate possible in the circumstances.

Rule 91(1) of the National Gas Rules:

Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

Rule 87 of the National Gas Rules, relating to the allowed rate of return, states:

(1) Subject to rule 82(3), the return on the projected capital base for each regulatory year of the access arrangement period is to be calculated by applying a rate of return that is determined in accordance with this rule 87 (the allowed rate of return).

(2) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.

(3) The allowed rate of return objective is that the rate of return for a service provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).

(4) Subject to subrule (2), the allowed rate of return for a regulatory year is to be:

(a) a weighted average of the return on equity for the access arrangement period in which that regulatory year occurs (as estimated under subrule (6)) and the return on debt for that regulatory year (as estimated under subrule (8)); and

(b) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in rule 87A.

(5) In determining the allowed rate of return, regard must be had to:

(a) relevant estimation methods, financial models, market data and other evidence;

(b) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(c) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

[Subrules (6)–(7) omitted].

Return on debt

(8) The return on debt for a regulatory year is to be estimated such that it contributes to the achievement of the allowed rate of return objective.

(9) The return on debt may be estimated using a methodology which results in either:

(a) the return on debt for each regulatory year in the access arrangement period being the same; or

(b) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the access arrangement period.

(10) Subject to subrule (8), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:

(a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's decision on the access arrangement for that access arrangement period is made;

(b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the access arrangement period; or

(c) some combination of the returns referred to in subrules (a) and (b).

(11) In estimating the return on debt under subrule (8), regard must be had to the following factors:

(a) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

(b) the interrelationship between the return on equity and the return on debt;

(c) the incentives that the return on debt may provide in relation to capital expenditure over the access arrangement period, including as to the timing of any capital expenditure; and

(d) any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one access arrangement period to the next.

(12) If the return on debt is to be estimated using a methodology of the type referred to in subrule (9)(b) then a resulting change to the service provider's total revenue must be effected through the automatic application of a formula that is specified in the decision on the access arrangement for that access arrangement period..

[Subrules (13)–(19) omitted].

The equivalent National Electricity Rules are in chapter 6A.6.2.

In its Rate of Return Guideline, the AER indicated a desire to move to a trailing average methodology for estimating the return on debt. The AER proposed to estimate the allowed return on debt using a trailing average portfolio approach following the completion of a transitional arrangement period.[1] The AER also set out a method for transitioning to the trailing average method over time.

In its draft decision on JGN's proposal, the AER adopts the methodology for estimating the return on debt set out in its Rate of Return Guideline. The AER proposes to estimate the return on debt for the forthcoming access arrangement period using a methodology which provides for a transition to the trailing average approach.

Accordingly, the independent opinion of SFG, as a suitably qualified independent expert (**Expert**), is sought on the appropriate methodology for estimating the return on debt component of the rate of return, in a way that that complies with the requirements of the National Gas Law and Rules and the National Electricity Law and Rules, including as highlighted above. JGN seeks this report on behalf of itself, and Jemena Electricity Networks and United Energy.

[1] AER Rate of Return Guideline, p 19.

2 Scope of Work

The Expert will provide an opinion report that:

1. Reviews and, where appropriate responds to matters raised in the draft decision on transitioning to the trailing average return on debt approach, including (but not limited to):

   (a) any impacts on the benchmark efficient entity that could arise as a result of changing the methodology for determining the return on debt allowance from an on-the-day approach to a trailing average approach;

   (b) any practical problems with using historical data to implement such a transition;

   (c) whether such a transition creates more or less price volatility over time or potential for opportunistic behaviour from stakeholders than an alternative transition from the on-the-day approach to the trailing average approach.

2. In light of Expert's opinion on the above matters and any other matters the Expert considers relevant, and having regard to the AER's objective of implementing a trailing average approach in future periods, recommends a method to transition to that average when estimating the return on debt for the forthcoming access arrangement period that best satisfies National Gas and Electricity Rules and Laws.

In preparing the report, the Expert will:

A. assume that the benchmark efficient entity adopted the hybrid approach under the previous rules, as per the AER's draft decision on JGN's proposal;

B. consider the theoretical and empirical support for different return on debt transitions;

C. consider any comments raised by the AER and other regulators on return on debt transition; and

D. use robust methods and data, where relevant.

3 Information to be Considered

The Expert is also expected to consider the following additional information:

- such information that, in Expert's opinion, should be taken into account to address the questions outlined above;
- relevant literature on the rate of return and return on debt;
- the AER's rate of return guideline, including explanatory statements and supporting expert material;
- material submitted to the AER as part of its consultation on the rate of return guideline; and

- previous decisions of the AER, other relevant regulators and the Australian Competition Tribunal on the rate of return and return on debt, and any supporting expert material.

4 Deliverables

At the completion of its review the Expert will provide an independent expert report which:

- is of a professional standard capable of being submitted to the AER;
- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines [2];
- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);
- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;
- summarises JGN's instructions and attaches these term of reference;
- includes an executive summary which highlights key aspects of the Expert's work and conclusions; and
- (without limiting the points above) carefully sets out the facts that the Expert has assumed in putting together his or her report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the items defined in the scope of works (Section 2).

5 Timetable

The Expert will deliver the final report to Jemena Regulation by **27 February 2015**.

6 Terms of Engagement

The terms on which the Expert will be engaged to provide the requested advice shall be:

- as provided in accordance with the Jemena Regulatory Consultancy Services Panel arrangements applicable to the Expert.

[2] Available at: http://www.federalcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

ATTACHMENT 1: FEDERAL COURT PRACTICE NOTE

Practice Note CM 7

EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

Commencement

1. This Practice Note commences on 4 June 2013.

Introduction

2. Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the *Evidence Act 1995* (Cth)).

3. The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[3], and to assist experts to understand in general terms what the Court expects of them. Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1. General Duty to the Court[4]

1.1 An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2 An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3 An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2. The Form of the Expert's Report[5]

2.1 An expert's written report must comply with Rule 23.13 and therefore must

(a) be signed by the expert who prepared the report; and

(b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

(c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

(d) identify the questions that the expert was asked to address; and

(e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

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[3] As to the distinction between expert opinion evidence and expert assistance see *Evans Deakin Pty Ltd v Sebel Furniture Ltd* [2003] FCA 171 per Allsop J at [676].

[4] The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

[5] Rule 23.13.

(f) set out separately from the factual findings or assumptions each of the expert's opinions; and

(g) set out the reasons for each of the expert's opinions; and

(ga) contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[6]; and

(h) comply with the Practice Note.

2.2 At the end of the report the expert should declare that "[the expert] has *made all the inquiries that* [the expert] *believes are desirable and appropriate and that no matters of significance that* [the expert] *regards as relevant have, to* [the expert's] *knowledge, been withheld from the Court*."

2.3 There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4 If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[7].

2.5 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6 The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[8].

3. Experts' Conference

3.1 If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement. If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

J L B ALLSOP
Chief Justice
4 June 2013

[6] See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

[7] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565

[8] The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565-566. See also Ormrod *"Scientific Evidence in Court"* [1968] Crim LR 240

Appendix 2: CV of Prof. Stephen Gray

Stephen F. Gray

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Business School
Brisbane 4072
AUSTRALIA
Office: +61-7-3346 8032
Email: s.gray@business.uq.edu.au

Academic Qualifications

1995 Ph.D. (Finance), Graduate School of Business, Stanford University.
Dissertation Title: Essays in Empirical Finance
Committee Chairman: Ken Singleton
1989 LL.B. (Hons), Bachelor of Laws with Honours, University of Queensland.
1986 B.Com. (Hons), Bachelor of Commerce with Honours, University of Queensland.

Employment History

2000-Present Professor of Finance, UQ Business School, University of Queensland.
1997-2000 Associate Professor of Finance, Department of Commerce, University of Queensland and Research Associate Professor of Finance, Fuqua School of Business, Duke University.
1994-1997 Assistant Professor of Finance, Fuqua School of Business, Duke University.
1990-1993 Research Assistant, Graduate School of Business, Stanford University.
1988-1990 Assistant Professor of Finance, Department of Commerce, University of Queensland.
1987 Specialist Tutor in Finance, Queensland University of Technology.
1986 Teaching Assistant in Finance, Department of Commerce, University of Queensland.

Academic Awards

2006 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
2002 Journal of Financial Economics, All-Star Paper Award, for Modeling the Conditional Distribution of Interest Rates as a Regime-Switching Process, JFE, 1996, 42, 27-62.
2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000 University of Queensland Award for Excellence in Teaching (a University-wide award).
1999 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
1999 KPMG Teaching Prize, Department of Commerce, University of Queensland.
1998 Faculty Teaching Prize (Business, Economics, and Law), University of Queensland.
1991 Jaedicke Fellow in Finance, Doctoral Program, Graduate School of Business, Stanford University.
1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.
1986 University Medal in Commerce, University of Queensland.

Large Grants (over $100, 000)

- Australian Research Council Linkage Grant, 2008—2010, Managing Asymmetry Risk ($320,000), with T. Brailsford, J.Alcock, and Tactical Global Management.
- Intelligent Grid Cluster, Distributed Energy – CSIRO Energy Transformed Flagship Collaboration Cluster Grant, 2008-2010 ($552,000)
- Australian Research Council Research Infrastructure Block Grant, 2007—2008, Australian Financial Information Database ($279,754).
- Australian Research Council Discovery Grant, 2006—2008, Capital Management in a Stochastic Earnings Environment ($270,000).
- Australian Research Council Discovery Grant, 2005—2007, Australian Cost of Equity.
- Australian Research Council Discovery Grant, 2002—2004, Quantification Issues in Corporate Valuation, the Cost of Capital, and Optimal Capital Structure.

- Australian Research Council Strategic Partnership Grant, 1997—2000, Electricity Contracts and Securities in a Deregulated Market: Valuation and Risk Management for Market Participants.

Current Research Interests

Benchmark returns and the cost of capital. Corporate Finance. Capital structure. Real and strategic options and corporate valuation. Financial and credit risk management. Empirical finance and asset pricing.

Publications

Gray, S., I. Harymawan and J. Nowland, (2014), "Political and government connections on corporate boards in Australia: Good for business?" *Australian Journal of Management,* forthcoming.

Brailsford, T., S. Gray and S. Treepongkaruna, (2013), "Explaining the bid-ask spread in the foreign exchange market: A test of alternate models," *Australian Journal of Management,* forthcoming.

Faff, R., S. Gray and M. Poulsen, (2013), "Financial inflexibility and the value premium," *International Review of Finance,* forthcoming.

T. Fitzgerald, S. Gray, J. Hall and R. Jeyaraj, (2013), "Unconstrained estimates of the equity risk premium" *Review of Accounting Studies,* 18, 560-639.

Gray, S. and J. Nowland, (2013), "Is prior director experience valuable?" *Accounting and Finance,* 53, 643-666.

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Parmenter, B, A. Breckenridge, and S. Gray, (2010), 'Economic Analysis of the Government's Recent Mining Tax Proposals', *Economic Papers*: *A Journal of Economics and Policy*, 29(3), September, 279-91.

Gray, S., C. Gaunt and Y. Wu, (2010), "A comparison of alternative bankruptcy prediction models," *Journal of Contemporary Accounting and Economics*, 6, 1, 34-45.

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Gray, S. and J. Hall, (2006), "The Relationship Between Franking Credits and the Market Risk Premium," *Accounting and Finance*, 46(3), 405-428.

Gray, S. and S. Treepongkaruna, (2006), "Are there non-linearities in short-term interest rates?" *Accounting and Finance*, 46(1), 149-167.

Gray, P., S. Gray and T. Roche, (2005), "A Note on the Efficiency in Football Betting Markets: The Economic Significance of Trading Strategies," *Accounting and Finance*, 45(2) 269-281.

Duffie, D., S. Gray and P. Hoang, (2004), "Volatility in Energy Prices. In V. Kaminski," (Ed.), *Managing Energy Price Risk: The New Challenges and Solutions* (3rd ed.). London: Risk Books.

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Gray, S. and R. Whaley, (1999), "Reset Put Options: Valuation, Risk Characteristics, and an Example," *Australian Journal of Management*, 24(1), 1-21.

Bekaert, G. and S. Gray, (1998), "Target Zones and Exchange Rates: An Empirical Investigation," *Journal of International Economics*, 45(1), 1-35.

Gray, S. and R. Whaley, (1997), "Valuing S&P 500 Bear Market Warrants with a Periodic Reset," *Journal of Derivatives*, 5(1), 99-106.

Gray, S. and P. Gray, (1997), "Testing Market Efficiency: Evidence from the NFL Sports Betting Market," *The Journal of Finance*, 52(4), 1725-1737.

Gray, S. (1996), "Modeling the Conditional Distribution of Interest Rates as a Regime- Switching Process," *Journal of Financial Economics*, 42, 27-62.

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Brailsford, T., S. Easton, P.Gray and S. Gray, (1995), "The Efficiency of Australian Football Betting Markets," *Australian Journal of Management*, 20(2), 167-196.

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Gray, S. (1989), "Put Call Parity: An Extension of Boundary Conditions," *Australian Journal of Management*, 14(2), 151-170.

Gray, S. (1988), "The Straddle and the Efficiency of the Australian Exchange Traded Options Market," *Accounting Research Journal*, 1(2), 15-27.

Teaching

Fuqua School of Business, Duke University, Student Evaluations (0-7 scale):

- Financial Management (MBA Core): Average 6.5 over 7 years.
- Advanced Derivatives: Average 6.6 over 4 years.
- Empirical Issues in Asset Pricing: Ph.D. Class

1999, 2006 Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.

UQ Business School, University of Queensland, Student Evaluations (0-7 scale):

- Finance (MBA Core): Average 6.6 over 10 years.
- Corporate Finance Honours: Average 6.9 over 10 years.

2002 Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000 University of Queensland Award for Excellence in Teaching.
1999 Department of Commerce KPMG Teaching Prize, University of Queensland.
1998 Faculty Teaching Prize, Faculty of Business Economics and Law, University of Queensland.
1998 Commendation for Excellence in Teaching, University-wide Teaching Awards, University of Queensland.
1989 Touche Ross Teaching Prize, Department of Commerce, University of Queensland.

Board Positions

2002 - Present: Director, Financial Management Association of Australia Ltd.
2003 - Present: Director, Moreton Bay Boys College Ltd. (Chairman since 2007).
2002 - 2007: External Risk Advisor to Board of Enertrade (Queensland Power Trading Corporation Ltd.)

Consulting

Managing Director, Strategic Finance Group: www.sfgconsulting.com.au.

Consulting interests and specialties, with recent examples, include:

- **Corporate finance**
  - ⇒ **Listed multi-business corporation:** Detailed financial modeling of each business unit, analysis of corporate strategy, estimation of effects of alternate strategies, development of capital allocation framework.

- **Capital management and optimal capital structure**
  - ⇒ **State-owned electricity generator:** Built detailed financial model to analyze effects of increased leverage on cost of capital, entity value, credit rating, and stability of dividends. Debt of $500 million issued.

- **Cost of capital**
  - ⇒ **Cost of Capital in the Public Sector:** Provided advice to a government enterprise on how to estimate an appropriate cost of capital and benchmark return for Government-owned enterprises. Appearance as **expert witness** in legal proceedings that followed a regulatory determination.
  - ⇒ **Expert Witness:** Produced a written report and provided court testimony on issues relating to the cost of capital of a cable TV business.
  - ⇒ **Regulatory Cost of Capital:** Extensive work for regulators and regulated entities on all matters relating to estimation of weighted-average cost of capital.

- **Valuation**

⇒ **Expert Witness:** Produced a written report and provided court testimony. The issue was whether, during a takeover offer, the shares of the bidding firm were affected by a liquidity premium due to its incorporation in the major stock market index.

⇒ **Expert Witness:** Produced a written report and provided court testimony in relation to valuation issues involving an integrated mine and refinery.

- **Capital Raising**
  - ⇒ Produced comprehensive valuation models in the context of capital raisings for a range of businesses in a range of industries including manufacturing, film production, and biotechnology.

- **Asset pricing and empirical finance**
  - ⇒ **Expert Witness:** Produced a written report on whether the client's arbitrage-driven trading strategy caused undue movements in the prices of certain shares.

- **Application of econometric techniques to applied problems in finance**
  - ⇒ **Debt Structure Review:** Provided advice to a large City Council on restructuring their debt portfolio. The issues involved optimisation of a range of performance measures for each business unit in the Council while simultaneously minimizing the volatility of the Council's equity in each business unit.
  - ⇒ **Superannuation Fund Performance Benchmarking:** Conducted an analysis of the techniques used by a large superannuation fund to benchmark its performance against competing funds.

- **Valuation of derivative securities**
  - ⇒ **Stochastic Volatility Models in Interest Rate Futures Markets:** Estimated and implemented a number of models designed to predict volatility in interest rate futures markets.

- **Application of option-pricing techniques to real project evaluation**
  - ⇒ **Real Option Valuation:** Developed a framework for valuing an option on a large office building. Acted as arbitrator between the various parties involved and reached a consensus valuation.
  - ⇒ **Real Option Valuation:** Used real options framework in the valuation of a bio-tech company in the context of an M&A transaction.