Attachment 10.1

Rate of Return

2016/17 to 2020/21 Access Arrangement Information

Australian Gas Networks

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1   Introduction

Australian Gas Networks Limited (AGN) requires capital to invest in the South Australian natural gas distribution network. These funds are provided by our owners (through equity) and lenders (through debt). Both owners and lenders require a fair and reasonable return on the funds they provide to AGN.

A key factor in promoting the long term interests of consumers is for the rate of return to be set to attract sufficient capital to undertake efficient investment, consistent with the National Gas Objective (NGO) and the Revenue and Pricing Principles (RPP). The NGO and the RPP are both set out in the National Gas Law (NGL).

The National Gas Rules (NGR) relating to the determination of the rate of return underwent significant changes in 2012 (referred to as the 2012 rule changes). The amended Rule 87 provides clear guidance on how the rate of return is to be estimated.

For the reasons set out in this chapter, AGN believes that the Australian Energy Regulator's (AER's) approach to estimating the rate of return, as set out in its Rate of Return Guideline and in recent Decisions[1] (the 2015 Decisions) does not meet the requirements of the NGR and is not consistent with the achievement of the NGO or the RPP. This attachment explains:

- why the AER's approach to estimating the cost of equity and the cost of debt, as applied in the AER Rate of Return Guideline and the recent 2015 Decisions, does not comply with the relevant Rules and the NGL and should be departed from; and

- the evidence supporting AGN's approach and why it does meet the requirements of the NGR and NGL and should be accepted.

AGN has relied upon the following reports in respect of the return on equity:

- SFG Consulting (June 2014) – The Required Return on Equity for Regulated Gas and Electricity Network Businesses (Attachment 10.3);

- SFG Consulting (February 2015) – The Required Return on Equity for the Benchmark Efficient Entity (Attachment 10.4);

- SFG Consulting (March 2015) – The Foundation Model Approach of the Australian Energy Regulator to Estimating the Cost of Equity (Attachment 10.5);

- SFG Consulting (February 2015) – Using the Fama-French Model to Estimate the Required Return on Equity (Attachment 10.6);

- SFG Consulting (February 2015) – Share prices, the Dividend Discount Model and the Cost of Equity for the Market and a Benchmark Energy Network (Attachment 10.7);

- SFG Consulting (May 2014) – Equity beta, Report for Jemena Gas Networks, ActewAGL and Networks NSW (Attachment 10.7A);

- SFG Consulting (February 2015) – Beta and the Black Capital Asset Pricing Model (Attachment 10.8);

- NERA (February 2015) – Historical Estimates of the Market Risk Premium (Attachment 10.9);

- NERA (March 2015) – Review of the Literature in Support of the Sharpe-Lintner CAPM, the Black CAPM and the Fama-French Three-Factor Model (Attachment 10.10);

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[1]   AER Final Decisions for TransGrid, Networks NSW, ActewAGL, TasNetworks and Directlink and Preliminary Decisions for Energex, Ergon Energy and SA Power Networks, published 30 April 2015, as well as Final Decision for Jemena Gas Networks (NSW) published 3 June 2015.

- Incenta Economic Consulting (February 2015) – Further Update on the Required Return on Equity from Independent Expert Reports (Attachment 10.11);

- NERA (February 2015) – Empirical Performance of the Sharpe-Lintner and Black CAPM (Attachment 10.12);

- Frontier Economics (June 2015) – Review of the AER's Conceptual Analysis for Equity Beta (Attachment 10.13);

- Frontier Economics (June 2015) – An Updated Estimate of the Required Return on Equity, Report prepared for Australian Gas Networks (Attachment 10.14);

- Letter from Grant Samuel & Associates Pty Limited (Grant Samuel) to the Directors of Transgrid, 12 January 2015 (Attachment 10.15);

- Frontier Economics (June 2015) – Key Issues in Estimating the Return on Equity for the Benchmark Efficient Entity June 2015 (Attachment 10.16);

- NERA (June 2015) – The Cost of Equity: Response to the AER's Final Decision for the NSW and ACT Electricity Distributors and for Jemena Gas Networks (Attachment 10.17);

- NERA (June 2015) – Further Assessment of the Historical MRP: Response to the AER's Final Decisions for NSW and ACT Electricity Distributors (Attachment 10.18);

- Witness statement of Dr Robert Malko (June 2015) –a leading regulatory professional in the United States (U.S.) (Attachment 10.19);

- Witness statement of Ronald L Knect, June 2015 (Attachment 10.20); and

- Incenta Economic Consulting – Debt Raising Transaction Costs – Updated Report – Jemena, February 2015 (Attachment 10.21).

AGN has relied upon the following expert reports in respect of the return on debt:

- CEG (June 2015) – The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt, Assessment and Calculations for AGN (Attachment 10.22);

- CEG (June 2015) – Efficient Use of Interest Rate Swaps to Manage Interest Rate Risk (Attachment 10.23); and

- CEG (October 2014) – The New Issue Premium (Attachment 10.24).

2   Requirements of the National Gas Rules

The AER's determination of the rate of return must be made in accordance with the new rate of return requirements that are set out in Rules 87(1) to 87(12) of the NGR, the NGO and the RPP.

As noted in Chapter 1, the overarching requirements on the AER in estimating the rate of return pursuant to Rule 87 of the NGR are to:

- perform its regulatory functions in a manner that will or is likely to contribute to the achievement of the NGO, being 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;[2]

- where there are two or more possible decisions open to the AER that will contribute to the achievement of the NGO, the AER must make the decision that it is satisfied will or is likely to contribute to the achievement of the NGO to the greatest degree;[3]

- take into account the RPP, being relevantly: [4]

  o that a service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services and complying with a regulatory obligation or requirement or making a regulatory payment.

  o 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 efficient investment in, or in connection with, a pipeline with which the service provider provides reference services, the efficient provision of pipeline services and the efficient use of the pipeline;

  o 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;

  o 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; and

  o regard should be had to the economic costs and risks of the potential for under and over utilisation of a pipeline with which a service provider providers pipeline services.

2.1   2012 Rule Changes

The rate of return rules underwent significant changes in 2012.[5] The amendments to the rate of return framework followed a detailed review by the Australian Energy Market Commission (AEMC) of the objectives in setting the rate of return. Critically, the AEMC considered the effectiveness of the previous rate of return framework in achieving the overall objective (in the old rule 87(1)), the NGO and the RPP.

The AEMC formed the view that while the previous structure of Rule 87 provided considerable discretion and flexibility and was intended to focus on obtaining a good overall estimate of the rate of return, the flexibility in the framework did not appear to have been taken advantage of in practice. The AEMC was particularly concerned about the formulaic approach to rate of return estimates that had developed in regulatory practice and the interpretation of the old Rule 87 by the Tribunal in support of that approach.

The AEMC said:

> "Moreover, recent decisions of the Tribunal have interpreted the NGR rate of return framework to apply in such a way as to reduce the range of information that can be used in estimating the rate of return. Such application could lead to the adoption of relatively

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2   NGL s28(1)(a).

3   NGL s28(1)(b)(iii).

4   NGL s24(2).

5   AEMC Rule Determination, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012, 29 November 2012 (AEMC Rule Determination).

formulaic approaches to determining the rate of return rather than focusing on the overall estimate."[6]

The AEMC's conclusion was that without amendment, the rate of return rules would not likely deliver outcomes that best meet the NGO and the RPP and that a new rate of return framework was needed. Accordingly, the amended Rule 87 reflects a significant shift in the approach to setting the required rate of return. The key features of the new rate of return framework are summarised in this section.

2.1.1 Allowed Rate of Return Objective

The new Rule 87(2) requires the allowed rate of return to be determined such that it achieves the allowed rate of return objective (ARORO), being:

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

In making the rule changes in 2012, the AEMC noted the primary objective of the allowed rate of return is to provide service providers with a return on capital that reflects efficient financing costs, allowing the service provider to attract the necessary investment capital to maintain a reliable energy supply while minimising the cost to consumers.

The AEMC highlighted that there was a need to bring the focus of the rate of return estimate in the rules back to the NGO and the RPP, and therefore included the ARORO:

> *"In order to meet the NEO and the NGO, this objective reflected the need for the rate of return to "correspond to" the efficient financing costs of a benchmark efficient entity being one with similar circumstances and degree of risk to the service provider."*[7]

2.1.2 Having Regard to Relevant Estimation Methods, Models, Market data and Evidence

One of the most significant additions to the rate of return framework is Rule 87(5)(a). The new sub-rule requires that in determining the allowed rate of return, regard must be had to relevant estimation methods, financial models, market data and other evidence.

The AEMC's basis for inclusion of this sub-rule was that achieving the ARORO, the NGO and the RPP requires the best possible estimate of the benchmark efficient financing costs. This can only be achieved when the estimation process is of the highest quality. The AEMC said:

> *"The final rule provides the regulator with sufficient discretion on the methodology for estimating the required return on equity and debt components but also requires the consideration of a range of estimation methods, financial models, market data and other information so that the best estimate of the rate of return can be obtained overall that achieves the rate of return objective.[8]"*

> *and*

> *"Achieving the NEO, the NGO, and the RPP requires the best possible estimate of the benchmark efficient financing costs. The Commission stated that this can only be achieved when the estimation process is of the highest possible quality. The draft rule determination stated that this meant that a range of estimation methods, financial models, market data and*

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[6]   AEMC Rule Determination, page 41.

[7]   AEMC Rule Determination, page 43. The final drafting of the ARORO requires the rate of return to be commensurate with efficient financing costs (rule 87(3)).

[8]   AEMC Rule Determination, page 8.

other evidence must be considered. At the same time, the regulator requires discretion to give appropriate weight to all the evidence and analytical techniques considered.[9]"

Importantly, the AEMC noted the application and interpretation of the previous Rule 87 (including the use of the Sharpe Lintner CAPM alone to determine the cost of equity):

"presupposes the ability of a single model, by itself, to achieve all that is required by the objective. The Commission is of the view that any relevant evidence on estimation methods, including that from a range of financial models, should be considered to determine whether the overall rate of return objective is satisfied."[10]

The AEMC concluded no one method can be relied upon in isolation to estimate an allowed return on capital that best reflects benchmark efficient financing costs.[11]

2.2 Other Relevant Rules

Rule 74(2) of the NGR provides that estimates must be arrived at on a reasonable basis and represent the best forecast or estimate possible in the circumstances.

Subject to compliance with the ARORO, Rule 87(4) of the NGR provides that the rate of return is required to be a weighted average of the return on equity and return on debt on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits.

In respect of the estimate of the cost of equity, Rule 87(6) of the NGR also requires the cost of equity to be estimated such that it contributes to the achievement of the ARORO.

Regard must also be had to prevailing conditions in the market for equity funds (NGR 87(7)). The AEMC noted this reflects the importance of estimating a return on equity that is sufficient to allow efficient investment in, and efficient use of, the relevant services.[12]

Specific principles for the return on debt are set out in Rules 87(8) through to 87(12) of the NGR which also state the return on debt must be estimated such that it contributes to achievement of the ARORO.

The return on debt methodology 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 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; or

c. some combination of the returns referred to in (a) and (b). (Rule 87(10)).

In addition, the following specific considerations in setting the return on debt must be taken into account:

a. the desirability of minimising any differences between the return on debt and the return on debt of a benchmark efficient entity referred to in the ARORO;

b. the inter-relationship between the return on equity and the return on debt;

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[9] AEMC Rule Determination, page 43.

[10] AEMC Rule Determination, page 48.

[11] AEMC Rule Determination, page 49.

[12] AEMC Rule Determination, page 69.

a. 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

b. any impacts (including in relation to the costs of servicing debt across access arrangement periods) on a benchmark efficient entity referred to in the ARORO 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.[13]

2.3   Application of the New Rate of Return Framework

The new rate of return rules are clear insofar as they require the AER to have regard to relevant estimation methods, models, market data and evidence when it comes to estimating the allowed rate of return. To do otherwise will not produce the best estimate of the rate of return that achieves the ARORO, the NGO and RPP.

As expressly stated by the AEMC, the new framework was designed to require consideration of more models, methods and evidence in order to produce the best estimate that meets the overarching requirements of the NGO and RPP when compared to the formulaic approach that had developed under the previous framework.

As can be seen from the above extracts of the AEMC's Rule Determination, the AEMC specifically recognised and acted upon the need to move away from a formulaic approach to the estimate of the rate of return, in particular the reliance on the SL CAPM to estimate the cost of equity. The AEMC recognised the need to have balance between ensuring that the regulator has regard to all relevant estimation models, methods and evidence, with the need to allow flexibility as to what that consideration would include.[14]

3   Cost of Equity

3.1   AER Guidelines and Recent Decisions

The AER published Rate of Return Guidelines pursuant to Rule 87(18) of the NGR on 17 December 2013 (Guidelines). It is not mandatory for the AER or AGN to follow the Guidelines, but if the AER makes a decision that is not in accordance with the Guidelines, it must state the reasons for departing from the Guidelines.[15]

The AER has also recently published Final Decisions in respect of TransGrid, Ausgrid, Endeavour Energy and Essential Energy, ActewAGL, TasNetworks, Directlink and Jenema Gas Networks (NSW) (JGN) and Preliminary decisions for Energex, Ergon Energy and SA Power Networks[16] (the AER's 2015 Decisions) The AER's overall framework for determining the cost of equity set out in the Guidelines has largely been applied in the AER's 2015 Decisions.

The AER's approach is to estimate the cost of equity using a six stage process referred to as the "foundation model approach", which is depicted in Figure 10.1[17]:
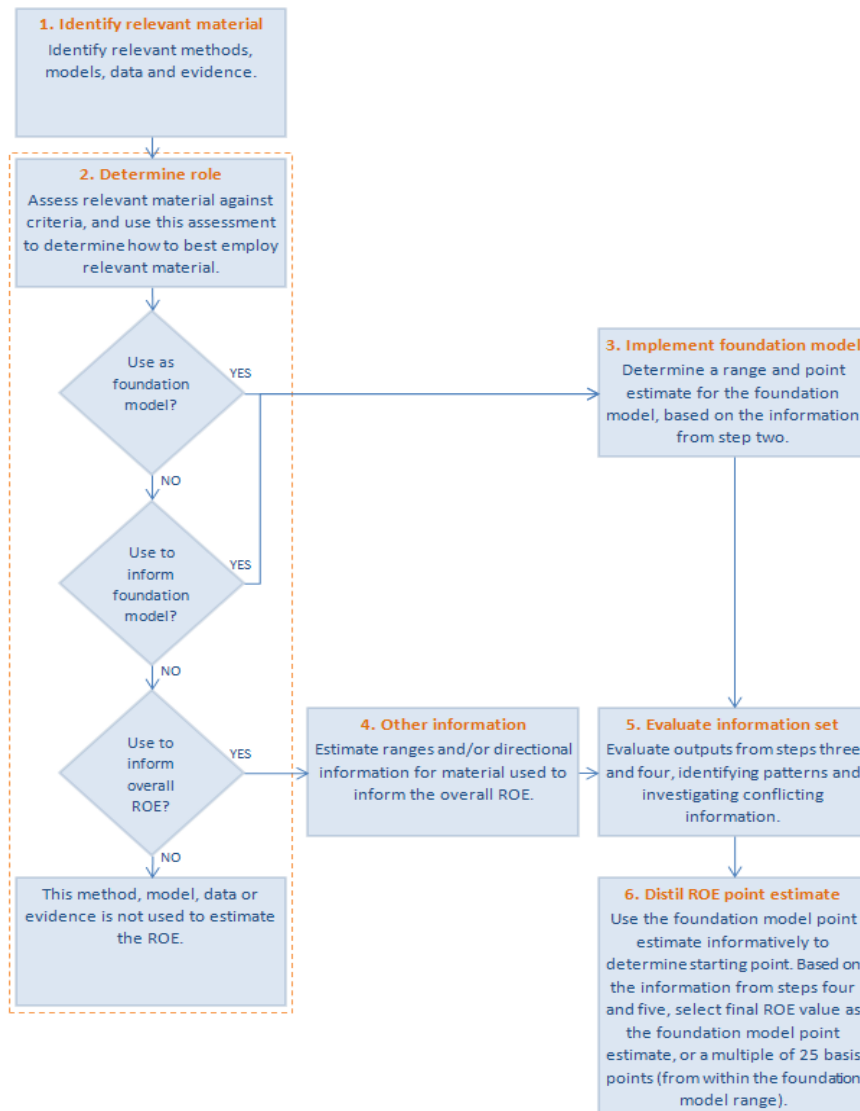
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[13]   NGR 87(11).

[14]   AEMC Rule Determination, page 57.

[15]   NGR 87(18).

[16]   All published on 30 April 2015, except for JGN Final Decision published on 3 June 2015.

[17]   TransGrid Draft Decision, 3-13, SAPN Preliminary Decision, 3-25.

FIGURE 1: AER'S FOUNDATION MODEL APPROACH

In stages 1 and 2 of the AER's approach to estimating the return on equity, the AER identifies what it considers to be "relevant material" and the role that material should play. The AER has developed its own criteria for assessing the "relevant material" and uses that criteria to decide:

- whether a model should be used as a foundation model;

- whether the relevant material should be used to inform the foundation model; or

- whether the material should be used to inform the overall return on equity estimate.[18]

However, in constructing the six stage process, the AER pre-determines that there will be one foundation model used exclusively to determine the cost of equity, before having tested all of the "relevant" models and information against its own criteria. The AER then relegates the use of any other relevant models and information to having, at best, an indirect role in the implementation of the foundation model or the overall return on equity estimate. In doing so, the AER gives no significant role to other models or evidence which it accepts are "relevant" to its task of estimating the return on equity that contributes to the achievement of the ARORO, having regard to prevailing conditions in the market for equity funds.

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18   AER flowchart of the approach to estimating the expected return on equity - SAPN Preliminary Decision 3-25, JGN Final Decision, 3-26.

The AER's assumption that there is one model that, by itself, produces an estimate sufficient to meet the ARORO, RPP and NGO is in stark contrast to the AEMC's basis for amending the rate of return rules and in particular, including Rule 87(5).

3.2   Stage 1 – Relevant Models

In the AER's 2015 Decisions, the AER accepts that each of the following five models is relevant information for the purposes of Rule 87(5)(a):[19]

- Sharpe Lintner CAPM (SL CAPM);

- Black CAPM;

- Fama French three factor model;

- Dividend Growth Model (DGM); and

- Non-standard (Wright) CAPM.

Each of these models is explained by SFG Consulting in its report "The required return on equity for regulated gas and electricity network businesses, June 2014 (Attachment 10.3) and in the AER's 2015 Decisions (e.g. – Appendix A to Attachment 3 of the SAPN Preliminary Decisions). AGN agrees that these models are "relevant" for the purposes of estimating a return on equity that complies with the NGR (although AGN considers that the Wright approach should be used when estimating the MRP rather than informing the return on equity (see Section 3.11)).

3.3   Stage 2 – Application of the AER's Criteria

In Stage 2, the five models identified as relevant in Stage 1 are considered by the AER against criteria developed by the AER in Stage 2 in order to determine the role, if any, that each model will play. The criteria developed by the AER in Stage 2 against which each model is assessed are:[20]

- Is the model reflective of economic and finance principles and market information?

- Is the model fit for purpose?

- Is the model implemented in accordance with good industry practice?

- Is the model based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in input estimation and which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale?

- Where market data or other information is used, is the information credible and verifiable, comparable and timely and clearly sourced?

- Is the model sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate?

The AER's framework results in a model either passing or failing the above criteria, the purpose of which is to determine whether or not the model should be used as the foundation model for estimating the return on equity, or in some other way, or not at all.

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[19]   JGN Final Decision 3-42, 43.

[20]   SAPN Preliminary Decision and JGN Final Decision tables 3-6, 3-7, 3-8, 3-9 and 3-10.

This concept of a "foundation model", the stage 2 criteria and threshold testing is not in any way reflective of the Rules. What Rule 87(5)(a) requires is that once the models are accepted as "relevant" the AER must have regard to them in determining, in this case, the return on equity.

"Having *regard to*" is a well understood concept in administrative decision making. What the Rules require is that the AER have regard to the relevant models as fundamental elements in making its determination on the return on equity, and to consider the models properly in the context of performing its statutory duty.[21] In this context, and for the reasons set out in this Section 3, AGN submits that the AER must give each relevant model a fundamental and direct role in the estimation of the return on equity.

AGN accepts that it is open to the AER, in having regard to the models, to consider what weight should be given to the relevant models. However, the result of the application of the AER's Stage 2 criteria is not to have regard to each of the relevant models in the sense of giving them fundamental weight, but rather to determine which model should be used as the foundation model, with other models given either an indirect or no role in the determination of the return on equity. On any reading, the requirement to "have regard to" relevant models in Rule 87(5)(a) of the NGR cannot be met by considering and then dismissing a relevant model (such as the Fama French model) without even calculating or considering the results it delivers.

The new rules for the setting of equity returns were intended to broaden the inputs that the AER used when setting the return on equity and enable an allowance to be set that better reflected prevailing market conditions. However, there is no change of substance to the AER's approach, which continues to rely exclusively on the SL-CAPM as a 'foundation model' to derive its return on equity estimate.

3.4   SL CAPM

Having considered the relevant models against its Stage 2 criteria, the AER decides that the SL CAPM is the superior model and should be used as the foundation model in determining the required return on equity. The result of this finding is that the AER continues to apply its mechanistic approach using the SL CAPM that it applied before the rate of return rules were extensively amended. This is despite the deliberate changes made to the rules by the AEMC to move away from a mechanical and narrow approach to the estimation of the rate of return, which the AEMC considered would not give rise to the best estimate that achieves the ARORO, the NGO and the RPP.

The central reasons for the AER's decision to use the SL CAPM as the foundation model is that it best meets the AER's assessment criteria and is superior to all other models for estimating the return on equity.[22] The bases for the AER conclusions are that:

- the SL CAPM is widely used for estimating the expected return on equity for regulated companies, including by academics, market practitioners, and other regulators;

- the SL CAPM is relatively easy to implement;

- other relevant material can be used to inform the SL CAPM parameter estimates, which may mitigate limitations of the model;

- the SL CAPM can be used to provide a range of estimates and a point estimate;

- there is no compelling evidence that the return on equity estimate from the SL CAPM will be downward biased given the AER's selection of input parameters; and

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[21]   Re Dr Ken Michael; ex parte *EPIC Energy (WA) Nominees Pty Ltd & Anor* [2002] WASCA 231 *Singh v Minister for Immigration and Multicultural* Affairs (2001) 109 FCR 152 [54] – [58], ACCC *v LeeLee Pty Ltd* [1999] FCA 1121, [81]-[84], Mansfield J.

[22]   SAPN Preliminary Decision, 3-58.

- the AER does not consider the alternative return on equity estimates provided by the service providers demonstrate the return on equity is too low.[23]

However, the AER has made a number of critical errors in assessing the SL CAPM against its Stage 2 criteria. In particular, the above reasoning shows that the AER has failed to have any regard to the weaknesses in the SL CAPM, which its own experts accept exist.[24] The limitations of the SL CAPM have been well recognised in the literature and are presented in a number of reports submitted to the AER.[25]

In a report dated June 2014 in support of a number of proposals by service providers to the AER, SFG Consulting provided evidence of the large body of empirical work on the weaknesses in the SL CAPM. Critically, SFG concluded that the outcome of three seminal papers testing the empirical performance of the SL CAPM reached the same conclusion, being to reject the SL CAPM on the basis that:

> *"… in the observable data, the relationship between estimated betas and observed stock return:*
>
> - *Has an intercept that is economically and statistically significantly above the intercept that is implied by the Sharpe Lintner CAPM; and*
>
> - *Has a slope that is economically and statistically significantly less than the slope that is implied by the Sharpe Lintner CAPM."*[26]

SFG Consulting state that the results continue to hold in more recent data and that analysis of more than 70 years of historical stock data has not led to the initial results being overturned.[27]

Since the SFG Consulting report a number of Service Providers, including AGN, commissioned a report from NERA (February 2015) which tested the empirical performance of the SL CAPM.[28] In that report NERA concludes that there is evidence of downward bias in the SL CAPM and that it significantly underestimates the returns generated by low-beta portfolios and overestimates the returns generated by high beta portfolios.

NERA's tests resulted in statistically significant evidence of bias in the SL CAPM, as applied by the AER, and concluded that relying on the SL CAPM to the exclusion of other asset pricing models will produce a materially worse estimate of the cost of equity in terms of bias than an approach that combines estimates with the models not similarly affected by bias, such as the Black CAPM.[29]

NERA has also responded to the AER's 2015 Decisions regarding its February 2015 report and the 2015 reports by Handley and Partington and Satchell prepared for the AER.[30] NERA confirms the view expressed in its February 2015 report that estimates of the return required on equity using the SL CAPM, or in particular the SL CAPM as applied by the AER, do not represent the best forecasts possible and will not satisfy Rule 74(2) of the NGR.[31]

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[23] SAPN Preliminary Decision 3-59, JGN Final Decision 3-62.

[24] McKenzie and Partington: *Report to the AER- Part A, Return on Equity*, October 2014, page 9.

[25] See NERA: *Empirical Performance of SL CAPM and Black CAPMs*, February 2015. Provided as Attachment 10.12 to this AAI and NERA *Review of the literature in support of the SL CAPM*, March 2015. Provided as Attachment 10.10 to this AAI.

[26] SFG: *The required return on equity for regulated gas and electricity network businesses*, 6 June 2014, at page 25. Provided as Attachment 10.3 to this AAI.

[27] Ibid.

[28] NERA, *Empirical Performance of Sharpe Lintner and Black CAPMs*, February 2015, Provided as Attachment 10.12 to this AAI.

[29] NERA, page 59.

[30] NERA, *The cost of equity: Response to the AER's Final Decisions for the NSW and ACT Electricity Distributors, and for Jenema Gas Networks,* June 2015. Provided as Attachment 10.17 to this AAI.

[31] Section 2.1.

In a further report of March 2015, SFG Consulting considered the AER's foundation model approach as set out in the November 2014 Draft Decision for Jemena Gas Networks. In that report, SFG Consulting considered further the two empirical limitations of the SL CAPM, being:

1. that low beta stocks earn higher returns than predicted by the SL CAPM; and

2. high book to market stock returns earn higher returns than predicted by the SL CAPM.[32]

SFG Consulting identify that the AER's approach to dealing with the first empirical limitation of the SL CAPM is to choose an equity beta estimate of 0.7, being the upper end of the AER's range for beta. However, this is nonsensical because there is no relationship between the development of the AER's equity beta range and any adjustment to account for the returns to low beta stocks.[33]

The AER gave no material consideration to the second empirical limitation of the SL CAPM identified by SFG Consulting.

Despite the depth of evidence before it of the limitations of the SL CAPM, in its 2015 Decisions the AER did not change its approach and maintains that the SL CAPM fully meets it criteria, is superior to other models and should be solely used as the foundation model.

AGN does not object to the use of the SL-CAPM concurrently blended with the estimation of other relevant (and arguably superior) models when establishing an allowed rate of return for equity. However, given the weaknesses of the SL CAPM, AGN does not consider the best estimate that complies with the NGR and NGL can be derived from an approach of:

•   elevating the SL-CAPM to being the 'foundation model' and constraining the contribution of other models; and

•   solely using an Ibbotson inspired implementation of the SL-CAPM (which assumes the MRP remains unchanged while interest rates vary) with a very short averaging period for the risk free rate.

Market practitioners also well recognise the limitations of the SL CAPM. Grant Samuel explains that real world valuations need to be informed by a range of additional material to over-come the significant limitations of solely relying on a plain or SL CAPM:

> *"[O]ur approach … is to form an overall judgment as to a reasonable discount rate rather than mechanistically applying a formula. The fact is that, particularly in some market circumstances, the CAPM produces a result that is not commercially realistic. When this occurs it is necessary and appropriate to step away from the methodology and use alternative sources of information to provide insight as to what is, after all, an unobservable number that can only be inferred. In our view, Envestra was clearly a case in point.*
>
> *In using the Envestra report, the AER seems to be to trying to co-opt the parameters that we used for calculating the initial CAPM based rate to bolster its own case while trying to find ways to justify not having to recognise the fact that for the valuation of Envestra Limited's assets, we actually selected a different rate (i.e. 6.5-7.0% or, more correctly 6.5-8.0%, rather than 5.9-6.5%)."*[34]

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[32]   SFG Consulting: The Foundation Model Approach of the Australian Energy Regulator to estimating the cost of equity, 27 March 2015, paragraph 22. Provided as Attachment 10.5 to this AAI.

[33]   Ibid 55.

[34]   Grant Samuel: *Letter to the Directors of Transgrid,* 12 January 2015. Provided as Attachment 10.15 to this AAI.

As Frontier Economics' report illustrates, despite evidence from the Reserve Bank of Australia (RBA) that rates in equity markets have not fallen, the AER's adherence to the SL CAPM foundation model is delivering erroneous downward projections for fair returns:[35]

FIGURE 2: GOVERNMENT BOND YIELDS AND THE AER'S ALLOWED RETURN ON EQUITY
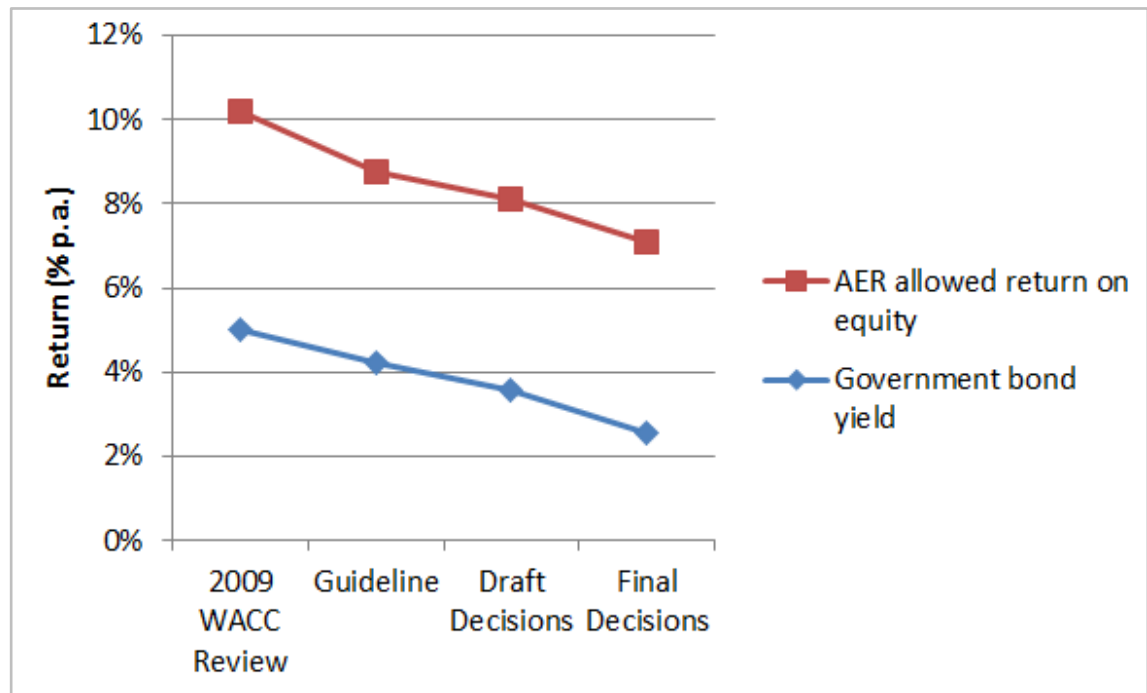
Source: AER decisions.

Frontier Economics summarises as follows:

> *"The AER's approach of setting the allowed return on equity by adding a fixed premium to the government bond yield is the same as its approach under the previous Rules. This approach produces the same outcomes as under the previous Rules – the allowed return on equity is a lucky dip for regulated firms that depends entirely on the level of government bond yields over 20 days at the beginning of their regulatory period."[36]*

The foundation model approach imposes restrictive constraints that effectively deprive other evidence from affecting or contributing to the allowed rate of return. Not only does the functional form of the SL-CAPM restrict how this other information is being used, the AER's approach of ranking the information as primary or secondary information and then giving the primary information a dominant role also ensures that the result does not deviate from a 'business as usual' consideration of only the SL CAPM.

In support of the SL-CAPM's use as the foundation model for determining the allowed rate of return for equity, the AER has stated that:

> *"We consider there is overwhelming evidence that the SL CAPM is the current standard bearer for estimating expected equity returns."*

It is noteworthy that Handley's 2015 report for the AER seems to avoid giving any support to the SL-CAPM as an accurate way of establishing a commensurate market return. There is no explicit support for the use

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[35] Frontier Economics: *Key issues in estimating the return on equity for the benchmark efficient entity*, Figure 4, page 63. Provided as Attachment 10.16 to this AAI.

[36] Frontier Economics: *Key issues in estimating the return on equity for the benchmark efficient entity*; June 2015 paragraph 114. Provided as Attachment 10.16 to this AAI.

of the SL-CAPM in the report and Handley accepts that the SL CAPM is subject to "well-known" low beta and book to market biases and that evidence of these biases is "nothing new".

AGN supports using the combined strength of multiple models, including even the AER's preferred 'standard bearing' SL-CAPM, despite the fact that it has been shown to deliver less accurate results than the other models. AGN however considers that, where all the measures are imperfect, the benefits of diversity, reflected in the multi-model approach, are strong.

AGN considers that the well documented and accepted limitations of the SL CAPM mean that the model cannot be used alone to estimate the best estimate of the return on equity that complies with the NGR. The SL CAPM estimate (properly calculated using the parameters set out in AGN's proposal in Section 8.2 below) should be blended with similar estimates from other relevant models as proposed in the multi model approach.

3.4.1 US Practice – Acknowledgment of the Limitations of the SL CAPM

The allowed rate of return used in Australia effectively codifies long standing United States case law:

> "[T]he return to the equity owner should be commensurate with the returns on investments in other enterprises having corresponding risks."[37]

In doing so, the same US case law also includes the requirement in the Australian revenue and pricing principles concerning the necessity for the business to have a reasonable opportunity to recover its efficient costs:

> "That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."[38]

In the U.S. there is a history of applying a multi model approach acknowledging the inherent risks of relying solely on one model. In the past, sole reliance was placed on the DGM or Discounted Cash Flow (DCF) model but it has never been the case that a mainstream U.S. approach was to solely rely on the SL CAPM. Malko explains how the SL CAPM began to be introduced in the U.S:

> "In particular, when base interest rates were high, there was a concern (legitimate in my view) that the DGM did not, at the time, adequately reflect the increased returns that equity investors expected to receive and this led some regulators to start to have regard to the capital asset pricing models concurrently with the DGM or DCF."[39]

Of the SL CAPM, he notes[40]:

> "In my opinion:
>
> The Sharpe CAPM has important strengths, including:
>
> - It incorporates a first principals concept of risk and return.
>
> - It is an interest-rate sensitive model that complements a stock price sensitive model.
>
> - It is simple.
>
> The Sharpe CAPM model has important limitations, including:

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[37]   *Federal Power Commission v Hope Gas Co 320 US 591 (1944) at 603.*

[38]   Ibid.

[39]   Statement of Dr J Robert Malko, paragraph 3.8. Provided as Attachment 10.19 to this AAI.

[40]   Ibid, paragraphs 4.3-4.5.

- *It is a single factor (beta) model and it does not incorporate other factors that finance literature demonstrates are known to affect equity returns.*

- *The model suffers from a theoretical limitation in that it assumes that investors can borrow and lend at the risk free rate which is not the case. Due to the simple mathematical specification of the model, the effect of this implausible assumption is that it under-estimates the returns for investments of below average risk and over-estimates the returns for investments of above average risk.*

- *Empirical work shows that there are limitations associated with its ability to explain past stock price movements and equally its predictive capabilities both associated with the theoretical limitations mentioned above and more generally."*

Reflecting these weaknesses, Malko notes that even when the SL CAPM is used in conjunction with the traditional DGM method, the contemporary approach is to make adjustments to account for the significant limitations of the SL CAPM:

"I have observed that during the recent past (10 years or less), financial analysts have attempted to address some of the shortcomings of the Sharpe CAPM by:

- *using the Empirical CAPM (discussed below);*

- *making an adjustment by adding the small size risk premium. This premium reflects that small companies have higher returns on average than larger companies (which is also relevant to the discussion of the Fama French model below);*

- *applying the Hamada adjustment for a leveraged beta. This adjustment reflects a changing capital structure. For example, if a utility's current or planned capital structure reflects an increased debt level and debt percentage, then the leveraged beta is increased to reflect the increased financial risk. To make the Hamada adjustment, a comparison of the capital structure of a specific utility to a comparable group is undertaken and appropriate mathematical models are applied."*

3.5 Addressing the Downward Bias for Low Beta Stocks in the SL CAPM

SFG Consulting and NERA have consistently explained that the SL CAPM has a low beta bias. This is not surprising because the model relies on a wholly unrealistic assumption that investors can borrow and lend at the risk free rate. NERA states[41] that:

"The data indicate that there is a negative rather than a positive relation between returns and estimates of beta. As a result, the evidence indicates that the SL CAPM significantly underestimates the returns generated by low-beta portfolios and overestimates the returns generated by high-beta portfolios. In other words, the model has a low-beta bias. The extent to which the SL CAPM underestimates returns to low-beta portfolios is both statistically and economically significant.

As an example, we estimate that the lowest-beta portfolio of the 10 portfolios that we construct to have a beta of 0.54 – marginally below the midpoint of the AER's range for the equity beta of a regulated energy utility of 0.4 to 0.7. Our in-sample results suggest that the SL CAPM underestimates the return to the portfolio by 4.90 per cent per annum."[42]

As Malko's report explains, there are two paths that can be followed to get to the bottom of why and how the SL CAPM under-estimates the return for low beta stocks and both paths lead to the same place.

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[41] NERA; *Empirical Performance of the Sharpe-Lintner and Black CAPM*, February 2015, page 2. Provided as Attachment 10.12 to this AAI.

[42] Ibid.

The first path is to consider the theoretical considerations to identify the problem, propose a solution and then test it empirically. The AER's initial discussion paper for the Rate of Return Guidelines articulated a firm preference for approaches with a sound theoretical explanation rather than an empirical one. SFG and NERA have explained how the Black CAPM relaxes the unrealistic assumption of the SL CAPM that investors can borrow and lend at the risk free rate. When this theoretical improvement is made and the model is implemented, the effect is to raise the intercept (i.e. the return on a risk free assets) and flatten the curve depicting the returns related to risk.

In the United States, regulators have been content to take another path, focusing on empirical observations that the SL CAPM under rewards low beta stocks and making adjustments to reconcile the SL CAPM with the observed results. Malko[43] explains that:

> I have been asked to comment on the correctness or otherwise of the statement in the Australian Energy Regulator's (AER) Final Decision, ActewAGL distribution determination 2015-16 to 2018 -19 - Attachment 3 - Rate of Return document:

> "There is little evidence that other regulators, academics or market practitioners use the Black CAPM to estimate the return on equity. In particular, regulators rarely have recourse to the Black CAPM" at page 3-256.

> As I have explained above, although there is little explicit reference to the Black CAPM, in practice the use in the U.S. of the Empirical CAPM by financial analysts both within and outside energy regulatory processes is essentially to the same effect."

Malko[44] explains how the regulators give effect to the Empirical CAPM (an adjusted SL CAPM which specifically recognises that the observed risk return relationship or trade off is more flat than predicted by the SL CAPM) as follows:

> "The regulators who have been presented with Empirical CAPM evidence have considered it along with evidence from the DGM and Sharpe CAPM. The results from all these approaches have been recorded in the decisions and the selection of a particular figure has been made following that consideration."

The following are examples of regulatory processes in which models with a higher intercept and flatter curve have been considered[45]:

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[43]   Statement of Dr J Rosza Malko, paragraph 6.4-6.5. Provided as Attachment 10.19 to this AAI.

[44]   Ibid, paragraph 5.5.

[45] Copies of these cases are included in Attachment 10.25 to this AAI- Secondary Supporting Material- Rate of Return

TABLE 1: USE MADE BY REGULATORS OF THE ZERO-BETA AND EMPIRICAL CAPM

Regulator	Industry	Application	Citation
New York Public Service Commission, 2009	Electricity distribution	50/50 weighting. "Traditional" CAPM/zero-beta CAPM paragraph 56.	Proceeding on Motion of the 2009 Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service; Petition for Approval, Pursuant to Public Service Law, Section 113(2), of a Proposed Allocation of Certain Tax Refunds between Consolidated Edison Company of New York, Inc. and Ratepayers 2009 N.Y. PUC LEXIS 507[46]
New York Public Service Commission, 2007	Gas distribution	50/50 weighting. Average of traditional CAPM results and zero beta CAPM result paragraph 20.	Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service 2007 N.Y. PUC LEXIS 449; 262 P.U.R. 4th 233.[47]
New York Public Service Commission, 2006	Gas and electricity distribution	50/50 weighting. Average of traditional CAPM result and zero beta CAPM result paragraph 19. NB: this decision changed the weighting from 75/25 to 50/50, the previously accepted weighting following the approach in the Generic Finance case.	Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service; Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service 2006 N.Y. PUC LEXIS 227; 251 P.U.R. 4th 20.[48]
Oregon Public Utility Commission, 2001	Electricity distribution	Zero-beta is used to identify contrast with S-L "as beta decreases, the cost of equity decreases by less than the Sharpe-Lintner CAPM model suggests.	In the matter of PacifiCorp's Proposal to Restructure and Reprise its Services in Accordance with the provisions of SB 1149. 2001 Ore. PUC LEXIS 418; 212 P.U.R. 4th 379.[49]
		This is important, …, because it means the costs of equity for utilities with betas of less than 1 are closer to the cost of equity for an average risk stock than is shown by the Sharpe-Lintner CAPM model. Under this model, the required return for the risk-free asset is expected to be higher than the return on Treasury bills." Paragraph 20 "While the results in this case cast further doubt on the validity of Staff's CAPM methodology, we do not believe that CAPM should be rejected in its entirety. We continue to believe that, in certain cases, CAPM analyses may provide a useful and reliable addition to the DCF results for determining cost of equity." Paragraph 23. CAPM given no weight, DCF preferred.	

[46]   Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service; Petition for Approval, Pursuant to Public Service Law, Section 113(2), of a Proposed Allocation of Certain Tax Refunds between Consolidated Edison Company of New York, Inc. and Ratepayers 2009 N.Y. PUC LEXIS 507.

[47]   Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of National Fuel Gas Distribution Corporation for Gas Service 2007 N.Y. PUC LEXIS 449; 262 P.U.R. 4th 233.

[48]   Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service; Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service 2006 N.Y. PUC LEXIS 227; 251 P.U.R. 4th 20.

[49]   In the matter of PacifiCorp's Proposal to Restructure and Re-price its Services in Accordance with the provisions of SB 1149. 2001 Ore. PUC LEXIS 418; 212 P.U.R. 4th 379.

An empirical inspired correction is sufficient for the United States regulators. The theoretical explanation of what the Empirical CAPM does is that it corrects for the unrealistic assumption concerning the ability for investors to borrow and lend at the risk free rate (that underpins the SL CAPM), as does the Black CAPM.

In summary, whether the Black CAPM or an Empirical CAPM nomenclature is used, the estimated return on equity for AGN should give weight to a capital asset pricing model that raises the intercept and flattens the risk-return curve relative to the SL CAPM. As set out in more detail below, by including the Black CAPM, SFG Consulting's multi-model approach does this appropriately and AGN considers that to be the appropriate approach to take.

3.6   Black CAPM

In its November 2014 Draft Decisions, the AER assessed the Black CAPM against its Stage 2 criteria and determined that:

> "Empirical estimates of the return on equity from the Black CAPM are not suitable for any use for the following key reasons:
>
> * the model is not empirically reliable
>
> * the model is not widely used to estimate the return on equity by equity investors, academics or regulators.[50] "

The AER's reasons for not using the Black CAPM in setting the return on equity are repeated in its 2015 Decisions.[51] The consequence is the AER does not even calculate a return on equity estimate from the Black CAPM. It is difficult to see how a model could be properly considered without ever estimating it. The AER relies on reports from McKenzie and Partington and Handley in respect of the rejection of the Black CAPM for the purposes of estimating the return on equity.[52]

3.7   Empirical Reliability of the Black CAPM

The AER considers the empirical implementation of the Black CAPM to be unreliable because the estimate of the zero beta premium necessary for the Black CAPM is unreliable. It appears to form this view because different approaches for estimating the zero beta premium produce different results.[53]

The AER has been provided with a number of different estimates of the zero beta premium by CEG, NERA and SFG. However, rather than considering the different estimates of that parameter and the merits of them, the AER rejects the Black CAPM because of the difficulty in estimation. The AER does not reject any particular estimate of the zero beta premium because it considers it to be unreliable or implausible.

SFG Consulting has explained the basis for its zero beta premium estimate, the difference to other estimates and why it is relevant for estimating the cost of equity using the Black CAPM. The SFG estimate of the zero beta premium accounts for the empirical fact that stocks with low beta estimates earn higher returns relative to that predicted by the SL CAPM. The AER does not test the robustness or reliability of SFG's proposed value for the zero beta premium.

The AER accepts however that the Black CAPM is a model which is relevant to its regulatory task. The difficulty in estimating a zero beta premium cannot logically result in rejection of the Black CAPM for the purposes of estimating the return on equity. The rejection of the Black CAPM appears to stem from the AER's desire to use only one model as the "foundation model" to estimate the return on equity.

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[50]   TransGrid Draft Decision 3-84.

[51]   SAPN Preliminary Decision, 3-73.

[52]   TransGrid Draft Decisions 3-86 to 87, JGN Final Decision 3-74 - 3-77.

[53]   SFG Consulting: *Beta and the Black Capital Asset Pricing Model*, 13 February 2015, paragraph 60. Provided as Attachment 10.8 to this AAI.

In a report prepared for a number of service providers, NERA considered the empirical performance of the Black CAPM. In that report NERA note that both the Black CAPM and the SL CAPM have been widely used by finance academics over the last 50 years.[54] The results of both in sample and out of sample tests of the Black CAPM found that:

- in respect of the in sample tests, there was little evidence of bias in the Black CAPM; and

- in respect of out of sample tests again there was little evidence of bias in the Black CAPM.[55]

NERA found that the Black CAPM has performed better than the SL CAPM and that there is statistically significant evidence of bias in the SL CAPM and little evidence of bias in the Black CAPM.[56]

3.8 Use of the Black CAPM in Practice

The AER says that the Black CAPM is not widely used to estimate the return on equity by equity investors, academics or regulators.[57] This criteria should not be of itself determinative of whether a model is relevant or should play a role in the estimate of the return on equity.

In any event SFG Consulting has provided evidence that the use of the Black CAPM is not as rare as the AER suggests. This is because the structure of the Black CAPM and SL CAPM formula is the same and both models require the same estimates of the equity beta and the required return on the market. The only difference is whether one inserts an estimate of the contemporaneous risk free rate (SL CAPM) or something greater than the contemporaneous risk free rate (Black CAPM) as the incept term.[58]

SFG also note it is common for experts in valuing companies to use an approach more consistent with the Black CAPM.[59] As set out above, US regulatory cases also use the Empirical CAPM, being more consistent with the Black CAPM than the SL CAPM.[60] Therefore, the AER's contention that the Black CAPM is not widely used in practice is a concern of form over substance.

In any event, a lack of use of the model in this context does not deem it to be unfit for the purposes of estimating the return on equity under the NGR. The AER concludes that the Black CAPM is sufficiently relevant and reliable to be used to inform its estimate of the equity beta for use in the SL CAPM, but not to estimate the required return on equity.

3.9 Fama French Three Factor Model

While the AER accepts that the Fama French Three Factor Model is relevant, it does not rely on the model to inform the estimate of the return on equity nor does it use it in any cross-check of other models. That is, although the AER accepts the model is a relevant model, it makes no use whatsoever of the model. The AER says:

> "We do not consider the FFM based return on equity estimates put forward by the NSPs and their consultants provides material that alone, or in combination with other material, is useful for our regulatory task."[61]

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[54] NERA: *Empirical Performance of SL and Black CAPMs*, February 2015. Page I. Provided as Attachment 10.12 to this AAI.

[55] Ibid pages 55 to 59.

[56] Ibid.

[57] TransGrid Draft Decision 3-84. JGN Final Decision 3-75.

[58] SFG Consulting: *Beta and the Black Capital Asset Pricing Model,* paragraph 69. Provided as Attachment 10.8 to this AAI.

[59] Ibid paragraph 70.

[60] Ibid paragraph 70.

[61] TransGrid Draft Decision 3-78, SAPN Preliminary Decision 3-66.

The AER provides four key reasons for not using the model:

- it does not appear sufficiently robust and is sensitive to different estimation period and methodologies;

- it is not clearly estimating ex-ante required returns;

- it suffers a lack of theoretical foundation which might explain the instability of parameter estimates; and

- it is relatively complex to implement.

In a report prepared for various service providers in response to the AER's Draft Decisions published in November 2014, SFG Consulting sets out why the AER's reasons for dismissing the Fama French Three Factor Model (FFM) are without basis. SFG Consulting's responses to the AER's key reasons are:

- The AER's concerns that estimates from the FFM can vary across different estimation periods and techniques also applies to other models that require the estimation of parameters. For example, the AER's own estimates for equity beta vary materially over time and across estimation methods. Further, the fact that some estimates of the FFM produce inconsistent results is not a basis for dismissing all estimates and deciding that the FFM should not have any role in the estimation of the required return on equity.[62] In SFG Consulting's view, the appropriate task is to consider the robustness and reliability of the best available estimates of each model, including the FFM. However the AER does not get to the point of weighing up different estimates of the FFM because it disregards it before calculating any estimates at all.[63]

- The purpose of the FFM is the same as the purpose of the SL CAPM, being to explain the cross-section of stock returns. The key difference between the two models is that the predictions from the FFM have been shown to be more closely associated with stock returns. SFG Consulting accepts and agrees with the AER that it is theoretically possible that the superior empirical performance of recent decades might not continue into the future. However, it is impossible to guarantee any historically observed relationship will continue to be observed into the future and this cannot provide the basis for a complete rejection of a relevant model.[64]

- The FFM was originally motivated by the poor empirical performance of the SL CAPM. Fama and French identified that the SL CAPM did not work and set about developing a model that did. Since that time theoretical justification for the FFM has been developed. The empirical performance of the FFM is superior to the SL CAPM and it provides superior fit to the observable data, including in Australia. The theoretical rationale for the FFM is set out in previous reports by SFG Consulting[65] but neither the AER nor its consultants have engaged in detail with that report or explained what better theoretical foundation the FFM would need to have before it could be accepted as a model to be used in the estimate of the required return on equity.

- The FFM can be estimated in exactly the same way as the SL CAPM. Both require betas to be estimated using regression analysis and factor premiums to be estimated using historical returns data. The SL CAPM is a special case of the FFM. A relevant financial model that is capable of contributing to the ARORO should not be disregarded on the basis it is relatively complex to implement.[66]

Despite this evidence, the AER's 2015 Decisions still give no weight at all to the Fama French model. Handley again seeks to justify the AER's approach by asserting that the rate of return is concerned only

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[62] SFG Consulting *Using the Fama French model to estimate the required return on equity*, 13 February 2015, paragraphs 50 to 64. Provided as Attachment 10.6 to this AAI.

[63] Ibid paragraph 60.

[64] Ibid paragraphs 65 to 71.

[65] Ibid paragraphs 72 to 79.

[66] Ibid paragraphs 80 to 87.

with variables that are unequivocally proved to be ways to quantify risk and not with a more general search for a commensurate return:

> "[E]mpirical evidence of a value effect is not sufficient on its own to justify a claim for additional compensation relative to the Sharpe-CAPM.
>
> The key point is that we do not have a clear understanding of what the value effect represents. This uncertainty is critically important in the current context because it means that the value effect does not necessarily reflect risk, whereas the allowed rate of return objective is clear that risk is the key determinant of the rate of return."

Partington takes a different tack, by observing that work has been published suggesting that there are even better ways to model equity returns than the Fama French Three Factor Model and suggesting that no departure from the SL CAPM should be made until this science has ceased to make any further advances.

These thresholds put the use of relevant models too high. If the Fama French Model performs better than the SL CAPM, there is no logical reason why it should be disregarded and if an even better model emerges, that should also be used.

Empirical studies in the US and Australia have confirmed that:

> "The Fama-French model has the advantage of providing an unambiguously better fit to the data than the Sharpe-Lintner CAPM."[67]

This model, in relation to which a Nobel prize[68] has been awarded, is newer than the other two CAPM models. A model that behaves strongly in quantifying the market rate of return is ideal for setting a commensurate rate of return and should not be excluded on the basis that there is some argument as to whether or not its parameters are solely a measure of risk.

Despite being the newer model, since the turn of the century the Fama French Three Factor model has been part of the evidence in a number of state regulatory proceedings in the United States, including[69]:

1. Before the Massachusetts Department of Telecommunications,[70] Mr Hunt (an expert witness) cites the Fama French study as demonstrating the relationship between company size and stock returns.

2. Before the California Public Utilities Commission,[71] Mr Hunt (an expert witness), used the Fama French Three Factor model and calculated a cost of equity of 14.0 percent in September 2005; using the CAPM, Mr Hunt calculated a cost of equity of 12.55 percent. In this proceeding, the Fama French Three Factor model returned a result that was 145 basis points above that from the CAPM.

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[67] SFG Consulting; *The required return on equity for regulated gas and electricity network business*, Report for Jemena Gas Networks, ActewAGL, Distribution, Ergon, Transend and SA Power Networks; 6 June 2014, page 9. Provided as Attachment 10.3 to this AAI.

[68] Eugene Fama is the 2013 recipient of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel the Nobel Prize in Economics), Eugene F. Fama- French". *Nobelprize.org.* Nobel Media AB 2014. Web. 15 Mar 2015. <http://www.nobelprize.org/nobel_prizes/economic-sciencesllaureatesl20 131fama-facts.html >

[69] Copies of relevant cases are included in Attachment 10.25 to this AAI- Secondary Supporting Material- Rate of Return

[70] Moul, Paul R., 'Direct Testimony of Paul R. Moul, Managing Consultant, P. Moul & Associates, Concerning Cost of Equity,' Commonwealth of Massachusetts Department of Telecommunications and Energy, October 17, 2005 page 50.

[71] Application of Pacific Gas and Electric Company for Authority to Establish Its Authorized Rate of Return on Common Equity for Electric Utility Generation and Distribution Operations and Gas Distribution for Test Year 2006. (U 39 M); Application of Southern California Edison Company (U 338-E) for Authorized Capital Structure, Rate of Return on Common Equity, Embedded Cost of Debt and Preferred Stock, and Overall Rate of Return for Utility Operations for 2006; Application of San Diego Gas & Electric Company (U 902-M) for Authority to: (i) Increase its Authorized Return on Common Equity, (ii) Adjust its Authorized Capital Structure, (iii) Adjust its Authorized Embedded Costs of Debt and Preferred Stock, (iv) Increase its Overall Rate of Return, and (v) Revise its Electric Distribution and Gas Rates Accordingly, and for Related Substantive and Procedural Relief2005 Cal. PUC LEXIS 537; 245 P.U.R.4th 442.

3. Before the Delaware Public Service Commissioner[72], Artesian Water Company led evidence that included Fama French model results.[73] The Commissioner accepted that evidence without reservation.

4. Mr Ronald Knecht (an expert witness for the Nevada Public Utilities Commission)[74] proposed a return on equity of 10.28 per cent which was calculated as an arithmetic mean of four components. He applied two discounted cash flow (DCF) estimates, a 2CAPM/FF3F model average, and one risk premium estimate. A hearing was held before the Public Utilities Commission of Nevada in April 2006. Mr Knecht stated that this approach was superior to relying only on the average of DCF models, because the CAPM, FF3F, and "capital appreciation and income" (CA + I risk premium) methods used basic cost of capital input data differently from the DCF models. The overall result for the 2CAPM/FF3F was reported to be 10.13 per cent. The outcome of 10.13 per cent was comprised of a result from the CAPM with a "Value Line" beta of 10.45 per cent, a result from the CAPM using an Ibbotson beta (with size adjustment) of 8.25 per cent, and a result from the Fama French Three Factor model of 11.63 per cent. The evidence was considered by the Public Utilities Commission of Nevada in April 2006.

5. On a separate occasion, in July 2007, Mr Knecht acted on behalf of the Nevada Public Utilities Commission[75] and again used the Fama French Three Factor Model to assess the rate of return on equity. He obtained a result for an average energy utility of 11.39 per cent. The average of two CAPM methods and the FF3F model was 11.13 per cent. On both of these occasions, the Nevada Public Utilities Commission accepted Mr Knecht's Fama-French evidence without reservation. [76]

6. On another occasion in December 2014, Mt Knecht gave expert evidence (which included results from the Fama French model) before the California Public Utilities Commission. Whilst the Commission observed that the Fama French model had previously been rejected by the California Public Utilities Commission, the Commission recognised that the Fama French model has "gained great currency in investment practice".[77]

7. Mr Hayes an expert from San Diego Gas & Electric used the FFM model in his testimony before the California Public Utilities Commission in May 2007.[78] Hayes calculated a return on equity of 13.89 per cent using the FFM, with a value of 11.73 per cent obtained using the CAPM.

In his testimony before the Californian Public Utilities Commission Gary Hayes noted:

> *"[T]he California Public Utilities Commissioner Bohn stated after the January 2007 cost-of-capital workshop: The commission should remain open to receiving evidence from new additional models should parties wish to provide such. We should always welcome new and better tools and ways of tackling problems."*
>
> *…*

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[72] In the matter of the application of Artesian Water Company, Inc: for an increase in water rates 2003 Del PSG LEXIS 51.

[73] In the matter of the application of Artesian Water Company, Inc: for an increase in water rates 2003 Del PSG LEXIS 51 at [8] .

[74] Application of Sierra Pacific Power Company for authority to increase its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto; Application of Sierra Pacific Power Company for approval of new and revised depreciation rates for electric operations based on its 2005 depreciation study, 2006 Nev. PUC LEXIS 91 at [63].

[75] Application of NEVADA POWER COMPANY for authority to increase its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto. 2007 WL 2171450 (Nev. P.U.C.).

[76] See Application of NEVADA POWER COMPANY for authority to increase its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly thereto. 2007 WL 2171450 (Nev. P.U .C.) at [1 02]; and see Application of Sierra Pacific Power Company for authority to increase its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto; Application of Sierra Pacific Power Company for approval of new and revised depreciation rates for electric operations based on its 2005 depreciation study, 2006 Nev. PUC LEXIS 91 at [63].

[77] Application of Southern California Edison Company (U338E) for Authority to Establish Its Authorized Cost of Capital for Utility Operations for 2013 and to Reset the Annual Cost of Capital Adjustment Mechanism 2014 Cal. PUC LEXIS 622 at [7], citing Application of Southern California Edison Company (U338E) for Authorized Cost of Capital for Utility Operations for 2008; and Related Matters 2007 Cal. PUC LEXIS 593 at [5.2.5].

[78] Testimony of Garry G Hayes on behalf of San Diego Gas and Electric before the California Public Utilities Commission 2007, page 19.

"First, the FF model is not a new, untested formula dropping in from academia. It has behind it a solid track record of research and has been the topic of extensive debate ... Nowadays, the FF model is used routinely by financial economists as they research investments, returns, and relative performance, as it is a useful tool with which to interpret return data on a wide number of asset types ... Use of the FF model is not limited to just the halls of the academy; it has expanded into the investing world as well . .... Other professional practitioners have begun to utilize the FF model. Valuation experts now add FF results to fairness opinions issued in mergers-and acquisitions transactions. Noteworthy is the Delaware courts' acceptance - and in one case, utilization- of FF evidence in asset-valuation disputes .... From the perspective of the everyday ROE analyst, the FF model is very accessible ... . Aside from its three California appearances, the FF method has also made its debut in Massachusetts and Nevada .... The Commissioner asked [the witness] whether FF is more accurate or useful than old standards. Accuracy, when measured as an equation's ability to predict returns (called R2 by statisticians) is improved by the FF factors ... Therein lies the model's usefulness as a cross check on its sibling, the CAPM."[79]*

The Nevada State Controller, Ronald L. Knecht is an experienced former energy regulator who has consistently used the Fama French model in his work states:

"While there is still some apprehension about the use of the FF3F Model it has been recognised in at least three states, Massachusetts, Delaware and Nevada, when used in conjunction with other models to produce an arithmetic mean as an estimate. This approach ensures that factors that are ignored by one model are adequately addressed. Because the FF3F model is fairly new relative to other models I am not aware of any jurisdiction that has endorsed it exclusively or adopted allowed rates of return based expressly on it. Instead, the tradition in the United States is for regulatory decisions to review (or even just list) all the evidence in the record and then, subjectively balancing the merits and results of all of it, to arrive at a final conclusion as either a range of reasonableness or a point estimate.[80]*

In his witness statement enclosed with this submission, Mr Ronald Knecht sets out a summary of the testimony he has given in regulatory hearings in relation to the Fama French three factor model, as well as other speaking and teaching related experience endorsing the model as a "standard and useful tool for estimating the cost of common equity when used with a suite of other models".[81]

The cases and witness evidence noted above show that increasingly more use is being made of the Fama French Three Factor Model as a source of additional data, and in a multi model context in the US.

However the AER's 2015 Decisions continue to take the approach that although the Fama French model is "relevant", it should play no part whatsoever in the establishment of the allowed rate of return. In AGN's submission, the AER's rejection of the model is unfounded.

If the Fama French Three Factor model is wholly excluded from the analysis, then there will be no other model that specifically addresses the downward bias for value stocks. As SFG Consulting notes:

"Our view is that if the Fama-French model is not given any consideration by the AER, then the estimated cost of equity will be understated. If we were to rely solely upon the Sharpe-Lintner CAPM, populated with a regression-based estimate of beta, we would adopt a

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[79]   Testimony of Garry G Hayes on behalf of San Diego Gas and Electric before the California Public Utilities Commission 2007, page 12-15.

[80]   Statement of Ronald L Knecht, 19 June 2015. Provided as Attachment 10.20 to this AAI.

[81]   Statement of Ronald L Knecht, section 5. Provided as Attachment 10.20 to this AAI.

second-best solution, because we would ignore the empirical evidence that the HML factor proxies for risk."[82]

For the reasons identified above and in the SFG and Frontier Economics expert reports relied upon by AGN, it is incorrect to determine that the Fama French Model, being a relevant model, has no role to play whatsoever in the estimation of the return on the cost of equity.

3.10   Dividend Discount Model

The AER uses its own dividend discount model to estimate the MRP for use within the SL CAPM. However, the AER in its 2015 Decisions remains of the view that dividend discount model (here called DGM) based empirical estimates of the return on equity are not suitable for any regulatory use for the following reasons:

- the models are not robust given they are highly sensitive to input assumptions in relation to the short term and long term growth rates of dividends. This makes the models highly sensitive to potential error in inputs;

- the models are highly sensitive to changes in the risk free interest rate; and

- the models might generate volatile and conflicting results.[83]

SFG Consulting points out why the concerns of the AER in relation to the use of DGMs to estimate the return on equity are not well founded. In particular:

- Like all financial models the DGM requires a number of parameters to be estimated and the final estimate is sensitive to the estimates that are inserted for each parameter. The same applies to the SL CAPM. The sensitivity does not justify disregarding DGM estimates for the purposes of estimating the required return on equity. The AER considers DGM estimates to be relevant and robust enough for estimating the MRP, but not for the purposes of estimating the required return on equity.[84]

- Reasonable specifications of the DGM produce estimates of the overall required return on equity that are more stable than the risk free rates. That is, these estimates imply a risk premium that tends to partially offset changes in the risk free rates, so that the estimate of the overall required return does not rise and fall one for one with changes in the risk free rate.[85] The AER makes this point in its Guideline materials.[86]

- The fact that some DGM specifications are internally inconsistent, produce volatile and implausible results, is not a logical reason for rejecting the use of *all* DGM estimates in estimating the return on equity. The SFG DGM estimates of the return on equity are internally consistent and reliable. The AER's task ought to be to assess the specifications in the model which do produce consistent and plausible results rather than disregarding the use of any version of the DGM at all.[87]

Handley's report on which the AER relies said in relation to the DGM:

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[82]   SFG Consulting; The Fama-French Model; Report for Jemena Gas Networks, ActewAGL, Ergon, Transend, TransGrid and SA Power Networks; 13 May 2014, page 3. Provided as Attachment 10.6 to this AAI.

[83]   TransGrid Draft Decision 3-90. JGN Final Decision 3-78 – 3-80.

[84]   SFG Consulting: *The Required Return on Equity for Benchmark Efficient Entity* February 2015, paragraphs 62 to 64. Provided as Attachment 10.4 to this AAI.

[85]   Ibid paragraph 65.

[86]   AER Rate of Return Guidelines Explanatory Statement, page 66.

[87]   SFG Consulting: *The Required Return on Equity for a Benchmark Efficient Entity* February 2015, paragraph 67 to 70. Provided as Attachment 10.4 to this AAI.

> *"the regulatory environment involving an aggregate regulatory asset base measured in the tens of billions of dollars is not an appropriate setting to trial a new model whose widespread use and acceptance is yet to be established."*

This statement effectively advances the proposition that a national energy regulator should never move away from the sum total of its own specific experience, in which case improvements could never be adopted. Such an approach would be contrary to Rule 87(5) of the NGR requiring regard to be had all relevant information in seeking to set an allowance that is commensurate with the efficient financing costs of the benchmark efficient entity.

In any event, a discussion of economic models used for economic regulation of energy network businesses would logically begin before the SL-CAPM began to be used at a time when only the U.S. was engaged in the use of economic models to establish permitted returns for energy networks. The first model to be used for this purpose was the DGM in the U.S. where it continues to be regarded as the most tried and true of methods for establishing a market based return on equity. As Malko explains:

> *"The dividend growth model (DGM), also the discounted cash flow (DCF), is based upon the works of Irving Fisher and John Williams in the 1930s and was introduced for estimating the cost of common equity for regulated energy utilities by state regulatory authorities during the 1960s and early 1970s. Professor Myron J. Gordon is frequently recognized to be the "pioneer" or "father" of the DCF model for application in estimating the cost of common equity for a regulated energy utility. .... Its adoption constituted a significant advance in the science of what constitutes a fair market reflective rate of return. This model is still considered and almost universally used, alone or in a multi-model approach (as I discuss further below), by almost all energy regulators in the U.S."[88]*

In dismissing the DGM or DCF for use in directly estimating the cost of equity for benchmark businesses in this country, the AER has stated that:

> *"We also considered that the sensitivity of DGMs to input assumptions would limit our ability to use a DGM as the foundation model. For example estimates of simple DGMs (such as those previously proposed by CEG) have provided implausible estimates of the returns on equity for the benchmark efficient entity. For example, in the Guideline we found that simple DGMs generate average returns on equity for energy infrastructure businesses over an extended period that significant exceeded the average return on equity for the market. This did not make sense as the systematic risk of network businesses is less than the overall market."[89]*

However, Malko advises that these potential difficulties are much exaggerated. Having reviewed the AER's reasons for not using DGM estimates in the return on equity he responds as follows:

> *In response, I would make the following observations:*
>
> *Certainly the DGM is sensitive to its input assumptions and if it would be inappropriately implemented, it could deliver implausible results. In this regard, I see no difference between this and other models. If inappropriate inputs are used, any of the models can produce implausible results.*
>
> *It is common in U.S. regulatory determination processes for there to be debate between businesses, customers and the regulators concerning which inputs to use but these debates occur with a context in which expert testimony has regard to whether the inputs used deliver*

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88   Statement of Dr J Robert Malko, paragraph 3.1-3.2. Provided as Attachment 10.19 to this AAI.

89   AER SAPN Preliminary Decision 3-257.

plausible results and decision making is guided by a body of court and regulatory precedent.[90]

Overall, the wide acceptance and use of the DGM in the U.S. demonstrates that this model is sufficiently robust for it to be useful in economic regulatory decision making in Australia.

The AER also asserts that there may be issues that are specific to Australia as to why the DGM is inappropriate and in that regard it is appropriate to consider the views of Australian experts. In its previous papers rejecting the use of the DGM, the AER asserted that a Grant Samuel report valuing Envestra Limited provided support for several key features of the AER's approach.

However, Grant Samuel explains its very significant disagreement with the AER's equity analysis. In particular, before turning specifically to the merits of using the DGM, Grant Samuel explains why it is important in their work to look beyond the SL-CAPM:

"In this case, it seems that the AER's approach has been to avoid changing its existing (single) formula "foundation model" and proceed on the basis that as long as it can show that the model is widely used and the individual inputs can be justified, there is no need to concern itself with whether or not the final output is commercially realistic."[91]

Grant Samuel expresses frustration that the AER applies 'double standards' when rejecting the use of the DGM to directly estimate the cost of equity and concurrently resolving to adhere primarily to the SL-CAPM. Grant Samuel states:

"The DGM, in its simplest form, has only two components to estimate – current dividend yield and the long term growth rate for dividends. The current yield is a parameter that can be estimated with a reasonably high level of accuracy, particularly in industries such as infrastructure and utilities. We accept that the question of the long term dividend growth rate becomes the central issue and is subject to a much higher level of uncertainty (including potential bias from sources such as analysts) and we do not dispute the comments by Handley on page 3-61.

However, there is no way in which the issues, uncertainties and sensitivity of outcome are any greater for the DGM than they are with the CAPM which involves two variables subject to significant measurement issues (beta and MRP). The uncertainties attached to MRP estimates in particular are widely known yet are glossed over in the AER's analysis of the relative merits. Section D of Attachment 3 of the Draft Decision contains almost 40 pages discussing the most esoteric aspects of methodologies for calculating beta but in the end the AER's choice of 0.7 is, in reality, an arbitrary selection rather than a direct outcome of the evidence.

Moreover:

- *the plausible beta range nominated by the AER (0.4-0.7) creates a 2 percentage point swing factor for the CAPM-based cost of equity. Its own expert nominated an even wider range (0.3-0.8);*

- *the 40 pages contain little meaningful discussion of issues such as standard errors or stability over time (as opposed to different time periods). Data on these aspects would be important to properly evaluate the overall reliability of the statistics; and*

- *the publication of only averages for individual companies and not the range hides the underlying level of variability in these measures.*

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[90]   Ibid 3.7.1-3.7.3.

[91]   Grant Samuel *letter on the AER's Draft Decision*, 12 January 2015, page 2. Provided as Attachment 10.15 to this AAI.

In short, the claim of superiority for the CAPM is unfounded."[92]

The Grant Samuel letter adds:

"It is also difficult to fathom why the AER states that the DGM is highly sensitive to interest rates but makes no mention of the sensitivity of CAPM to interest rates."[93]

And Grant Samuel points out:

"The AER also seeks to distinguish discount rates for valuations from discount rates for regulatory purposes by the fact that valuations have a perpetuity timeframe (and must reflect expectations of investors over that timeframe) while the regulator sets the return on equity only for the length of that regulatory period (typically five years). We do not believe this distinction is valid. For a start, the AER adopts a 10 year term for its overall rate of return (page 3-25) including a 10 year risk free year rate so if the five year timeframe of the Draft Decision was paramount then its own methodology is inconsistent with the return objective. In any event, it is our view that the relevant period is always a perpetuity, even in the context of a five year regulatory period. The rate of return over the five year period can only be realised if the capital value is sustained at the end of the period. The sustainability of the capital value at the end of year five is in turn dependent on cash flows beyond year five (i.e. the cash flows in perpetuity)." [94]

and finally:

"In our opinion, in examining the CAPM and comparing it to the DGM, the AER has unfairly accentuated the failings of the DGM while, at the same time, it has ignored many real shortcomings in the CAPM."[95]

The evidence shows that the DGM could be regarded as the safest, most tried and true model of all.

Having accepted that DGM models are relevant to the estimation of the return on equity and that it is sufficiently robust to be used to estimate the MRP, the AER ought to estimate a return on equity using that model and then determine what role it plays. It is not proposed by AGN that the return on equity be solely based on DGM estimates or on any single model identified above.

Rather, estimates resulting from the DGM can be compared and weighted with all relevant models according to their relative strengths and weaknesses. This is the approach that is called for by the AEMC and Rule 87 of the NGR. It is the approach that will produce the best estimate of the required return on equity which meets the ARORO, the NGO and the RPP.

3.11   The Wright Approach

AGN does not propose that the Wright approach be used for the purposes of estimating the required return on equity. AGN's proposal, as set out in the reports by SFG Consulting,[96] is that the Wright approach be used when estimating the MRP. The MRP must be estimated for the purposes of the various models AGN proposes to use in its multi model approach for deriving the cost of equity. It must also be estimated for the purposes of the SL CAPM.

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[92]   Page 3.

[93]   Page 3.

[94]   Page 5.

[95]   Page 2.

[96]   SFG Consulting: *The required return on equity for the benchmark efficient entity*, February 2015, pages 28-30. Provided as Attachment 10.4 to this AAI.

The AER does not take into account the Wright approach when estimating the MRP. The AER takes the view that the Wright approach should inform the overall return on equity and refers to it as an alternative implementation of the SL CAPM designed to provide information at the return on equity level.[97] The AER says it uses a range from the Wright SL CAPM specification to inform the overall return on equity.[98]

AGN's submission is that the Wright approach was developed not as an alternative implementation of the SL CAPM, but as an alternative method of estimating the MRP for use in the SL CAPM.[99] This is acknowledged by Associate Professor Handley in a passage quoted in the AER's Draft Decisions of November 2014.[100]

The AER's purported use of the Wright approach to inform the overall return on equity therefore is incorrect. In any event, the AER does not appear to place any real reliance on the range that is derived from the Wright approach.[101] Further submissions in respect of the use of the Wright approach in estimating the MRP and as a cross-check are addressed below in respect of the individual parameter estimates.

4   AER's SL CAPM Parameter Estimates

Step three of the AER's foundation model approach is to implement the SL CAPM foundation model by estimating input parameters for the equity beta, MRP and risk free rate.

The AER's approach to estimating the equity beta and MRP for input into the SL CAPM:

- predetermines a preferred "primary" subset of the relevant evidence which is used to determine an immutable range for the parameter; and

- limits the use of all other relevant evidence to the role of informing the selection of a point estimate from within the primary range.

This process materially increases the effective weight given to the primary evidence and limits the ability of any non-primary evidence to have any effect on the estimate of the parameter.[102]

Frontier Economics state:

> "The AER's consideration of parameter inputs for beta and the market risk premium results from the application of binding constraints, despite the AER's statements to the contrary. Throughout the AER's Guideline process, and since, we have objected to the AER's use of a "primary" subset of the relevant evidence to produce apparently immutable ranges for parameter estimates, with all other relevant evidence relegated to the role of (at most) informing the selection of a point estimate from within the primary range."[103]

AGN submits that the AER's estimates of the equity beta and MRP are not the best estimates for the reasons that follow.

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[97]   TransGrid Draft Decision 3-93, JGN Final Decision 3-83.

[98]   SAPN Preliminary Decision, 3-79.

[99]   SFG Consulting: *The required return on equity for regulated gas and electricity network businesses*, June 2014, page 55. Provided as Attachment 10.3 to this AAI.

[100]   For example TransGrid Draft Decision 3-96. JGN Final Decision 3-90.

[101]   TransGrid Draft Decision 3-93, JGN Final Decision 3-83.

[103]   Frontier Economics: *Key issues in estimating the return on equity for the benchmark efficient entity*, June 2015, section 4. Provided as Attachment 10.16 to this AAI.

4.1   Equity Beta

In its 2015 Decisions the AER adopts an equity beta point estimate of 0.7 from a range of 0.4 to 0.7. The AER says that it is satisfied that an equity beta of 0.7 is reflective of the systematic risk a benchmark efficient entity is exposed to in providing Reference Services.[104] The AER estimated its range for equity beta based on empirical analysis using a set of Australian energy network firms which it considers are reasonably comparable to a benchmark efficient entity. For this analysis it relies on a report from Professor Henry.

The AER believes that the Henry 2014 Report suggests a best empirical equity beta estimate of approximately 0.5.[105] However the AER then says that there are additional considerations it has taken into account to inform its determination of the equity beta point estimate at the top of the range, being 0.7. In particular the AER says it has considered[106]:

- empirical estimates of international energy networks, which produce a range from 0.3 to 1.0; and

- the theoretical principles underpinning the Black CAPM. In particular for firms with an equity beta below 1, the Black CAPM theory may support a higher return on equity than the SL CAPM.

However, the AER then states "We do not consider the theory underlying the Black CAPM warrants a specific uplift or adjustment to the equity beta point estimate".[107]

AGN considers that the AER's range for equity beta of 0.4 to 0.7 is incorrect. Professor Henry does not recommend such a range. Professor Henry concludes, based on his analysis of Australian data only: "*The majority of the evidence presented in this report, across all estimators, firms and portfolios, and all sample periods considered, suggest that the point estimate for β lies in the range point .3 to .8".*[108]

However, this range and the AER's beta estimates rely on domestic comparators only comprising a set of 9 firms, only four of which remain listed. Two of the firms have not been listed since 2006 and one has not been listed since 2007.[109] The AER's sample is not only small but also outdated. The beta estimate at the time a firm delists becomes a permanently determinative observation in the AER's sample.[110] In SFG's opinion, estimates based exclusively on the small sample of domestic comparators are statistically unreliable.[111]

That being the case, a sample of domestic comparators is not sufficient by itself to produce a determinative range for the equity beta of the benchmark efficient entity. AGN considers that a sample which includes international comparators ought to be used to form the primary range. To do otherwise will not result in the best estimate of equity beta. The AER will also be failing to have regard to all relevant evidence of equity beta estimates in estimating its equity beta range and point estimate.

The AER's basis for not including international comparators in establishing its range is that they are not sufficiently comparable to the benchmark efficient entity. In circumstances where the domestic sample is so small, it is clearly preferable to increase the sample by including international businesses. SFG Consulting has given consideration to the comparability of the international businesses included in the

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[104]   TransGrid Draft Decision 3-122, JGN final Decision 3-125.

[105]   Ibid 3-123, JGN Final Decision 3-126.

[106]   SAPN Preliminary Determination, 3-114.

[107]   Transgrid 3-124, SAPN Preliminary Decision 3-114.

[108]   Olan T Henry: *Estimating β an Update*, April 2014 page 63.

[109]   SFG Consulting, Share prices, the dividend discount model and the cost of equity for the market and a benchmark energy network, 18 February 2015**.** paragraph 28. Provided as Attachment 10.7 to this AAI.

[110]   Ibid.

[111]   Ibid paragraph 31.

sample and concluded that the businesses are sufficiently comparable to be used as part of the data set to estimate the equity beta.[112] The AER's recent Decisions do not show otherwise.

As noted, above, the AER makes reference to the theory of the Black CAPM and the estimate produced from that model being above the SL CAPM as a consideration leading to it select a point estimate at the top end of its range, although it does not explicitly link its point estimate of 0.7 to the Black CAPM theory.

The Black CAPM itself does not imply anything about the equity beta that should be used in the SL CAPM. The theory of the Black CAPM is to relax one of the key assumptions in the SL CAPM, being that all investors can borrow or lend as much as they like at the risk free rate. The Black CAPM acknowledges that that assumption may not be true.

The AER acknowledges the limitations of the SL CAPM as indicated by the Black CAPM theory but appears to attempt to address this by picking the top end of its equity beta range rather than allowing the Black CAPM to play any direct role in the estimation of the cost of equity. This approach is arbitrary and illogical. The AER's approach does not address the bias which the AER appears to accept exists in the SL CAPM.

Further, the AER says the Black CAPM "points to" an estimate of equity beta above Henry's work, but does not accept that it has made an adjustment for that reason.[113] However it is characterised, the AER's approach is to limit itself to the top end of its range for equity beta of 0.7, despite the top end of the Henry range being 0.8. There is no reasonable justification or basis for limiting the range to 0.7 when the AER's own empirical evidence (without accepting it is correct) suggests that the top end of the range is in fact 0.8.

If international comparators are taken into account in estimating the equity beta, SFG's evidence is that this would yield an equity beta well above 0.7 and would result in an estimate of 0.82 based on the larger sample.[114] This is the estimate that AGN proposes ought to be used both in the SL CAPM and in the other models used in its multi model approach (where applicable).

In addition, the AER's 2015 Decisions are based in significant part on a report it commissioned from Frontier Economics in 2013. Frontier Economics has now reviewed the use to which its work has been put by the AER and it states:

> *"The fact that the precise relationship between leverage and equity beta is not known with certainty does not mean that the effect of leverage on beta should be disregarded when making comparisons between estimated equity betas. Such an approach would be at odds with accepted finance and regulatory practice.*
>
> *The "financial risks" that we considered in our 2013 report for the AER are not the same as financial leverage and do not substitute for the leverage component of equity beta. The AER appears to have misunderstood this point in our 2013 report."*
>
> *The evidence that the AER presents in relation to US utility betas supports a re-levered equity beta estimate of close to 1. "*
>
> *"There have been developments in the roll-out and adoption of disruptive technologies since our 2013 report. There is more uncertainty about the future of the industry now than there was even two years ago, and it is not unreasonable to think that investors would take this into account when allocating scarce capital to this industry.*
>
> *The AER suggests that any systematic component of disruptive technology risk would be captured in its equity beta estimates. Our view is that this is very unlikely.*

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[112] SFG Consulting, *The required return on equity for regulated gas and electricity network businesses*, June 2014, pages 84 to 85. Provided as Attachment 10.3 to this AAI.

[113] SAPN Preliminary Determination, 3-114.

[114] SFG Consulting: *The required return on equity for the benchmark efficient entity* 25 February 2015, page 35. Provided as Attachment 10.3 to this AAI.

> *The AER suggests that to the extent that the risks are non-systematic in nature, those risks would more appropriately be compensated through regulated cash flows (such as accelerated depreciation of assets). However, notwithstanding that the AER recognises that disruptive technologies may increase the risks faced by NSPs, the AER has made no allowances for these risks either through the rate of return or through regulated cash flows.* "[115]

As clearly evidenced by this additional work, the AER has failed to recognise the effect of a 60% leverage on the beta.

The Frontier Economics report also considers in further detail the impact of disruptive technologies on the risk profile of networks and the continuing developments in those technologies. Such developments arguably impact on the risk profile of gas distributors more than for electricity distributors given natural gas is a fuel of choice (see Chapters 9 and 13). The AER in its recent Decisions has not given adequate consideration to the risks faced by both electricity and gas networks as consequence of such technologies.

4.2   Market Risk Premium

The AER's estimate for MRP for use in the SL CAPM is 6.5%. The AER places primary reliance for this point estimate on historical excess returns. In its November 2014 Draft Decisions, the AER said:

> *"We have assessed historical excess returns against our criteria and find this estimation method has significant value. We are satisfied this is the most robust source of evidence for estimating a 10 year forward looking MRP. This position is consistent with the rate of return guideline (Guideline). Therefore we have the most reliance to this source of information in estimating the MRP.*

And more recently:

> *"We place most reliance on historical excess returns. Therefore, we use this information to determine a baseline estimate of the MRP. We consider 6.0 per cent is, at this time, a reasonable point estimate based on this source of evidence."*
>
> *Under current market conditions we consider historical excess returns produce a MRP estimate of 6% from within a range of 5.1 to 6.5%".*[116]

The AER then arrives at its estimate of 6.5% for the MRP in current market conditions on the basis it has had regard to a range of evidence, including the historical excess returns, dividend growth model estimates, survey evidence and conditioning variables. The AER says it also has regard to recent decisions by Australia regulators.[117] The AER concludes that:

> *"Together, this information indicates that 6.5 per cent reasonably reflects prevailing conditions in the market for equity funds. As such we consider an MRP of 6.5 per cent provides for a return on equity that contributes to achieving the allowed rate of return objectives".*[118]

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[115]   Frontier Economics: *Review of the AER's conceptual analysis for equity beta*, June 2015, paragraphs 10(c)-11(c). Provided as Attachment 10.13 to this AAI.

[116]   TransGrid Draft Decision 3-287. JGN Final Decision, 3-115.

[117]   Ibid 3-116, 3-117, 3-287. JGN Final Decision 3-111.

[118]   Ibid, 3-168, see also JGN Final Decision 3-111.

4.2.1 Historical Excess Returns

The historical excess returns relied upon by the AER have regard to various sampling periods and both arithmetic and geometric average historical excess returns. The AER's range on that basis is 5.1 to 6.5%. However, in analysis provided by the Service Providers to the AER, NERA show why adjustments to the historical data are necessary. The AER rejects the NERA adjustments. Those adjustments and their basis for them are responded to in a further report by NERA of February 2015.[119]

For the reasons set out in NERA's report, AGN is of the view that adjustments to the historical excess returns are necessary. NERA also recommends the use of the arithmetic mean of historical returns only. In its February 2015 Report NERA updated its estimates of the historical excess return (with adjustments) for the period 1883 to 2013 to 6.56%.[120] That estimate has been further updated to the end of 2014. NERA has also made some changes to its data, the net impact of which is to lower NERA's current estimate of the MRP by one basis point to 6.55%.[121]

Even if it was appropriate to use geometric returns, there is no basis for the AER's approach of adding 20 basis points to its geometric estimate and defining the result to be the bottom of the reasonable range for MRP in all possible market conditions;

4.2.2 Dividend Growth Model

The AER also says it has regard to DGM estimates in estimating the MRP, but adopts a different construction to that used by SFG Consulting. The AER's DGM framework derives a much wider range of estimates for the return to the market and MRP. The AER's range, using the period up to the end of March 2015, is 7.4% to 8.6%.[122]

For the reasons set out in the SFG Consulting report, AGN's submission is that the SFG construction of the DGM estimates is preferable. Updated DGM estimates from Professor Gray imply a current MRP of 8.82%.[123]

However, it is noteworthy that even the AER's estimates arising from its construction of the DGM produces a significantly higher MRP range than the current estimate by the AER of 6.5%. The upper range of the AER's MRP estimate in its November 2014 Draft Decisions was 7.8%. In its recent 2015 Decisions, the AER's upper bound has increased to 8.6%.[124] Despite this increase in the upper end of the AER's MRP range, no change is made to the AER's point estimate of 6.5%.

On any view the AER does not appear to have sufficient regard to the outcomes of either SFG Consulting's or its own DGM results in estimating the MRP in prevailing market conditions.

4.2.3 Survey Evidence and Conditioning Variables

The AER also refers to survey evidence and conditioning variables (in particular dividend yields, credit spreads and implied volatilities). There are clearly articulated concerns with survey evidence that have been echoed in Tribunal decisions.[125] In any event the AER does not appear to use the survey evidence in any meaningful way.

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[119] NERA *historical estimates of the market risk premium*, February 2015. Provided as Attachment 10.9 to this AAI.

[120] Ibid.

[121] Further Assessment of the Historical MRP. Response to the AER's Final Decisions for the NSW and ACT Electricity Distributors, June 2015.

[122] JGN Final Decision 3-112.

[123] SFG Consulting; Share Prices, the dividend discount model and the cost of equity for the market and a benchmark energy network February 2015, provided as Attachment 10.7 to this AAI. updated in Frontier Economics: An updated estimate of the required return on equity, Report prepared for Australian Gas Networks June 2015. Provided as Attachment 10.14 to this AAI.

[124] SAPN Preliminary Decision, 3-100, 101.

[125] Application by Envestra Limited (No 2) [2012] A CompT 3.

In relation to conditioning variables, SFG's opinion is that in aggregate these do not provide a signal as to the prevailing market return or the MRP.[126]

AGN considers that neither survey evidence nor conditioning variables should play a role in the estimation of the MRP within the SL CAPM or otherwise.

4.2.4   Relevant MRP Evidence Rejected by the AER

As noted above, one relevant model for estimating the MRP which is not used by the AER is the Wright approach. AGN believes that the Wright approach was in fact developed for estimating the MRP. However the AER has determined that it will not be used for that purpose but rather to inform the overall return on equity. The AER is in error to reject what is a relevant model for estimating MRP and AGN submits that it ought to be given a direct role in that estimate.

The AER considers that independent valuation reports are only relevant to assessing the overall return on equity and does not give such evidence any role in informing the estimate of the MRP. AGN believes that independent valuation reports provide some relevant evidence of the required market return and the MRP, as applied by market practitioners in real world valuations. Some weight to such estimates should be given to the estimate of the MRP. SFG Consulting's approach to estimating the MRP is to give such evidence a 10% weighting in estimating the MRP.

The AER has also not had any regard to the continued fall in risk free rates since the time its Guideline was published. Despite the risk free rate having fallen from 4.1% when the Guideline was published to 2.55% (using the 20 day averaging period ending 6 March 2015) in the AER's recent Decisions, the AER's estimate of MRP of 6.5% has not changed.

Further submissions regarding the use of this relevant information is set out in AGN's proposal below. For the reasons set out in this section, the AER's estimate of the MRP of 6.5% is not the best estimate.

There is no basis for the AER's approach of limiting the MRP to a maximum of 6.5% in the prevailing market conditions, when for conceptual reasons and having regard to market data, it is known that the prevailing MRP is higher than the long run average.

Frontier Economics' charts in the June 2015 report illustrate this point well:

FIGURE 3: AER ESTIMATES OF MRP AS TAKEN FROM THE FRONTIER ECONOMICS REPORT
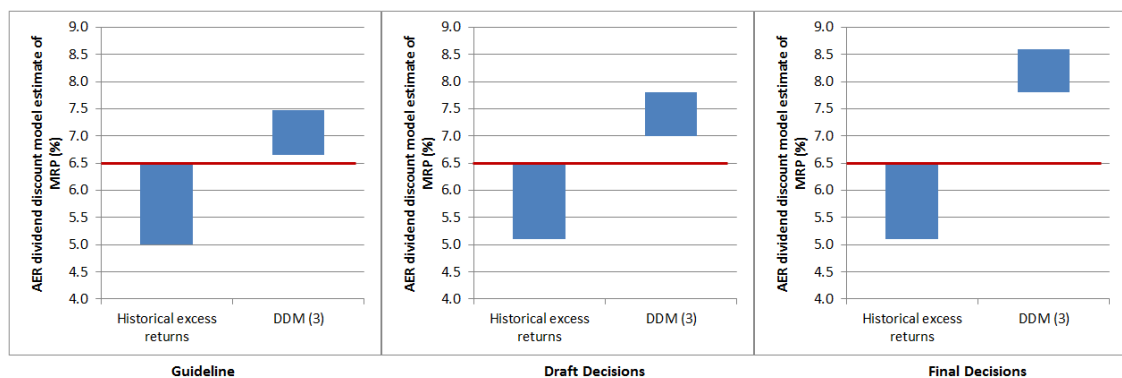
*Source: AER Rate of Return Guideline, AER draft decisions, AER final decisions.*

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[126]   SFG *The Required Return on Equity for the Benchmark Efficient Entity*, February 2015 at paragraph 123. Provided as Attachment 10.4 to this AAI.

5   Prevailing Conditions in the Market for Equity Funds

Rule 87(7) requires that in estimating the return on equity, regard must be had to the prevailing conditions in the market for equity funds.

In a report for Service Providers of February 2015, Incenta Economic Consulting provided an update on the required return on equity from independent expert reports. Incenta's updated analysis of independent expert reports and consideration of the relationship between the required return on the market estimates of independent experts relative to the mechanistic SL CAPM approach applied by the AER is represented in the following figure.

FIGURE 4: REQUIRED RETURN ON THE MARKET (PRE-GAMMA)- INDEPENDENT EXPERT REPORTS VERSUS THE AER
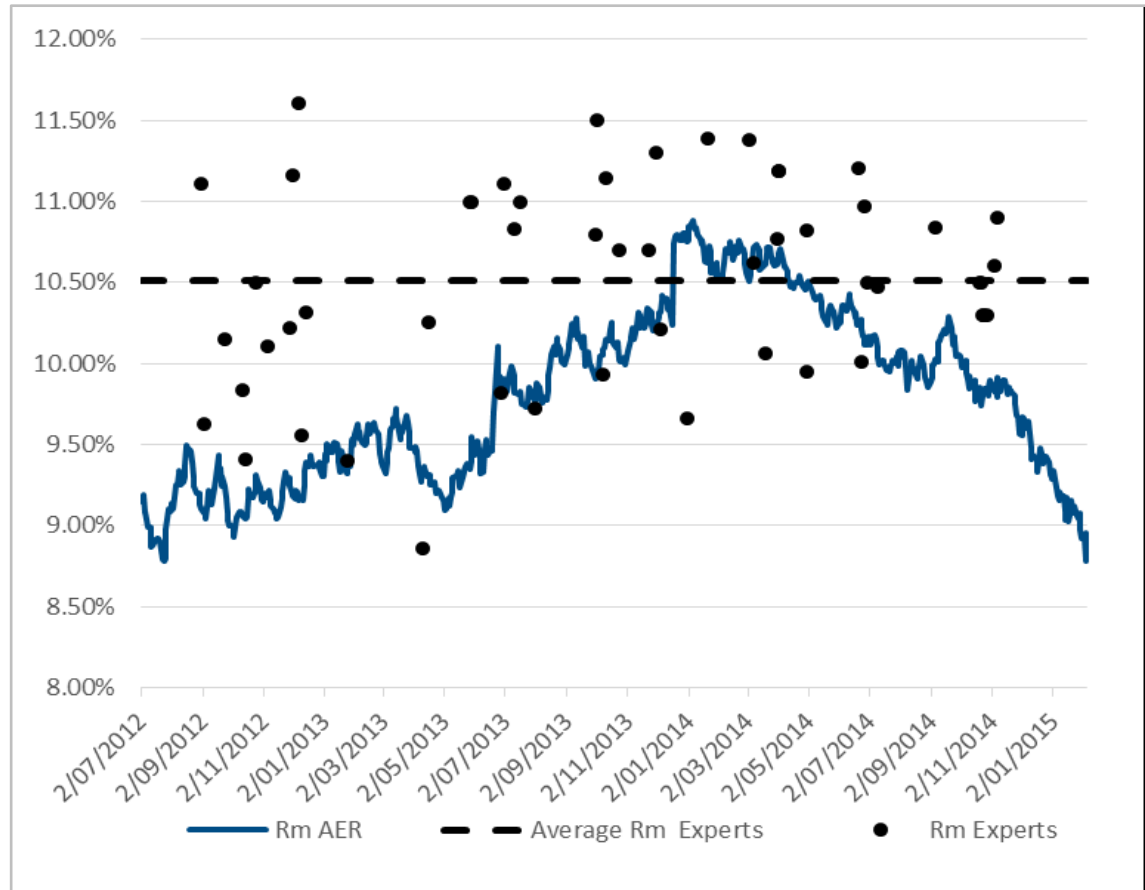
Incenta state that:

> *"The return on the market implied by the AER's mechanistic application of the SL CAPM was materially below the expectations of independent experts late 2012 and early 2013 (when a spot risk free rate was a relatively low 3% to 3.5%), and more recently in late 2014 (when the spot risk free rate again declined to approximately 3.5%). The only time that the market return expected by the AER was approximately equal to that of the independent experts was in the few months after the AER raised its market risk premium estimate from 6% to 6.5%. However even this adjustment to the market risk premium was not sufficient to achieve actual parity between the AER's estimate of the market's expected return and those of the independent experts, since the values reported in figure 4.4 do not make adjustments for imputation credits (either the AER's value needs to be adjusted downwards or the experts values upwards to achieve consistency). In recent months the gap between the*

independent experts' market return expectation and that of the AER has increased again as the spot risk free rate has fallen to approximately 2.5%".[127]

AGN considers that independent expert reports are a relevant source of information of the prevailing conditions in the market for equity funds. The analysis by Incenta shows that the AER's estimates of the required return on the market, particularly in more recent times, is significantly below estimates arising from independent expert reports and therefore prevailing conditions in the market for equity funds.

For these reasons, the AER's approach does not give rise to a cost of equity estimate that is consistent with prevailing conditions in the market for equity funds nor is it commensurate with the efficient financing costs of the benchmark efficient entity as required by the ARORO.

Incenta's opinion is that its findings strongly indicate that if the AER were to continue to apply its mechanistic SL CAPM approach, the resulting estimated rate of return on equity will fall materially short of the required return in the market that is implied by a consideration of independent expert reports, and not be commensurate with the efficient trading costs a benchmark entity will face over the access arrangements period.[128]

There is a further important <u>cyclical</u> reason why the AER's approach is currently delivering record under-estimates of the required return on equity. The AER's adoption of the Ibbotson inspired implementation of the SL CAPM in which a contemporaneous measure of base interest rates is combined with a long run market risk premium – simply stated, mixes apples and oranges. While this effect is cyclical, it is notable that this particular low-point in base interest rates is the lowest since the Second World War.

Recent speeches by the Governor of the Reserve Bank of Australia and his deputy have focused on the phenomenon that while base rates have fallen, market measures on the prevailing equity returns have *not* fallen and instead have remained at almost pre-crises levels:

> *"Unfortunately, … the legacy of the 2008 crisis is yet behind us. From the vantage point of most central banks, the world could hardly, in some respects, look more unusual.[129]*
>
> *Policy rates in the major advanced jurisdictions have been near zero for six years now.*
>
> *[A key] feature that catches one's eye is that, post crisis, the earnings yield on listed companies seems to have remained where it has historically been for a long time, even as the return on safe assets has collapsed to be close to zero (Graph 2). This seems to imply that the equity risk premium observed ex-post has risen even as the risk free rate has fallen and by about an offsetting amount.*
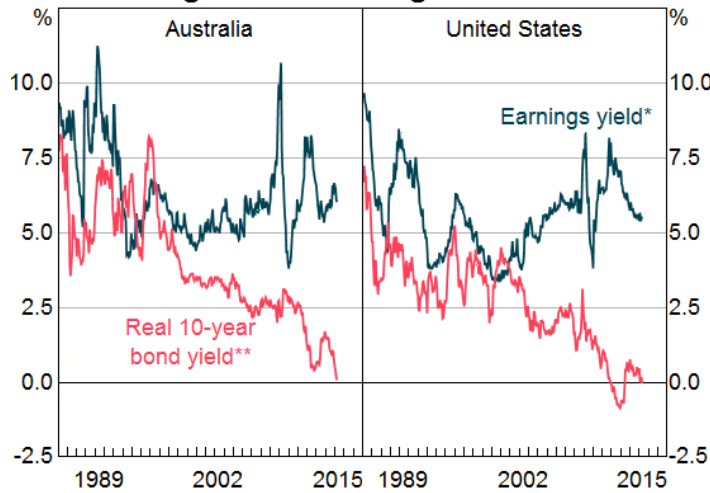
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[127] Incenta Economic Consulting: *Further Update on the Required Return on Equity from Independent Expert Reports* February 2015, pages 34 to 36. Provided as Attachment 10.11 to this AAI.

[128] Ibid, (1) to (2).

[129] RBA: Speech – The world Economy and Australia – Glenn Stevens – New York, USA 21 April 2015.

Graph 2

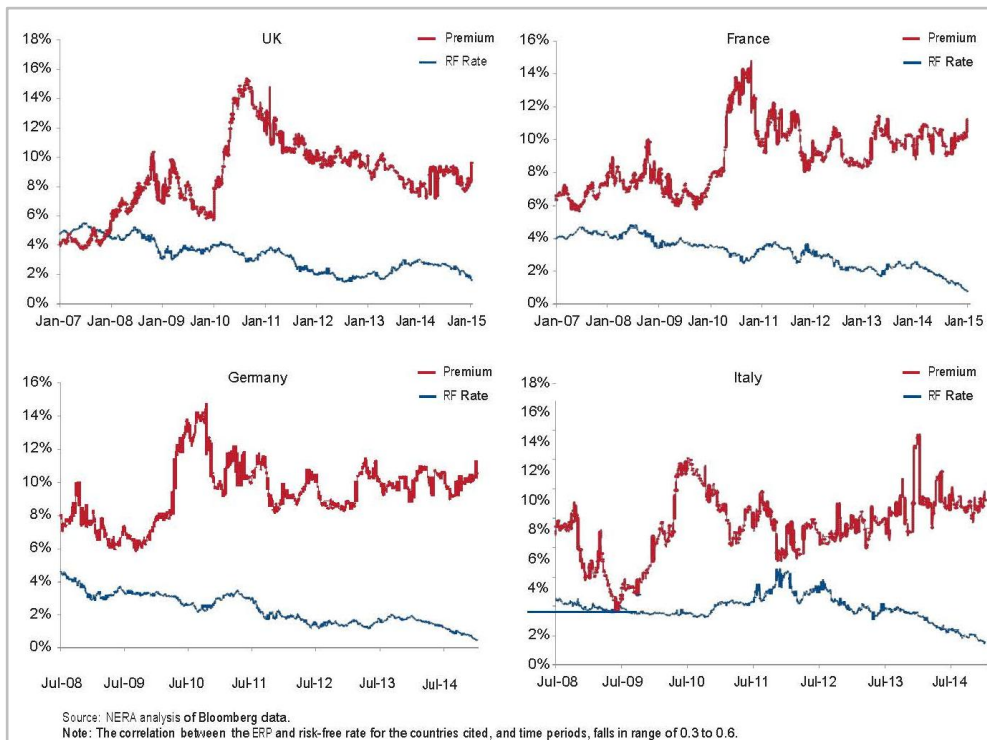**Earnings and Sovereign Bond Yields**

*   Trailing earnings-to-price ratio for the MSCI Australia and S&P 500 indices
** Prior to 1996 for Australia and 2000 for the United States, 10-year sovereign yields are deflated using underlying inflation
Sources: ABS; Bloomberg; Board of Governors of the Federal Reserve System MSCI; RBA; Thomson Reuters; Yieldbroker

[T]he hurdle rates of return that boards of directors apply to investment propositions have not shifted, despite the exceptionally low returns available on low risk assets.

The possibility that, de-facto, the risk premium being required by those who make decisions about real capital investment has risen by the same amount that the riskless rates affected by central banks have fallen may help to explain why we observe a pickup in financial risk taking, but considerably less effect, so far, on 'real economy' risk taking."

The same disjuncture between short and long term inputs is of concern in Europe.

FIGURE 5: RECENT DECLINE IN SOVEREIGN YIELDS

Source: NERA analysis of Bloomberg data.
Note: The correlation between the ERP and risk-free rate for the countries cited, and time periods, falls in range of 0.3 to 0.6.

As we explain below, a multi-model approach does not suffer to anywhere near the same extent from these problems.

Further, as CEG has explained, there is a significant problem with using an un-adjusted CGS return as the proxy for a risk free rate in the current highly unusual prevailing market conditions.

Dr Hird states:

"*The first critical point to note is that the fall in CGS yields cannot be mechanically assumed to have been associated with a fall in the cost of equity. Instead, the cost of equity must be estimated directly and not assumed to fall/rise with CGS yields.*

The pattern of beta for CGS and other government bonds internationally gives rise to two critical implications for the use of CGS yields as the proxy for the risk free rate in CAPM. That is, two adjustments to regulatory practice are required to account for the pattern of observed betas on CGS through time:

- *The prevailing risk free rate must be adjusted upwards from the prevailing nominal CGS yield by around 1.0% to account for the fact that the best estimate of the prevailing nominal CGS beta is materially negative;*

- *The historical average excess returns needs to be adjusted upwards by around 0.7% to account for the fact that historical average betas for CGS (against which excess returns have been measured) were above zero.*"[130]

However, this issue can be addressed with an adjustment:

"*Consequently, if the best estimate of the historical average MRP relative to CGS is 6.0% (AER) or 6.5% (NERA) then the best estimate of the MRP relative to the true (unobservable) zero beta asset is 6.7% to 7.2%. If the historical average asset beta on nominal 10 year CGS is higher than 0.1, then these estimates will in turn be larger as well.*"[131]

This is a further reason to use the multi-model approach. The DGM is better able to cope with this issue and using that model concurrently with the SL-CAPM in a multi-model approach would significantly ameliorate the situation:

"*If the cost of equity is being estimated using a prevailing estimate derived from the dividend growth model (DGM) then a much smaller, or even a zero, adjustment is required to the CGS yield. This is because the DGM will automatically 'pick up' any downward bias in CGS yields in the form of a higher estimated MRP relative to CGS yields.*"[132]

Because the AER relies heavily on a single model rather than taking a blended approach, and because it uses only the simplest of the capital asset price models available, there is a higher likelihood of divergence between the AER's estimates and the return on equity investors require.

In its 2015 Decisions, the AER's return on equity is 7.1%. It is noteworthy that relative to this, the AER's return on equity was:

- 44% higher at the time of its 2009 WACC Review.

- 23% higher at the time of the Rate of Return Guideline.

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[130] CEG: *Measuring risk free rates and expected inflation*; April 2015; paragraphs [75-76]; page 24.

[131] *Ibid*; paragraph [81]; page 25.

[132] *Ibid*; paragraph [82]; page 25.

- 14% higher at the time of its November 2014 Draft Decisions for the same Service Providers.[133]

This volatility is driven by the AER's foundation model approach, does not reflect the prevailing market conditions for equity and is overcome by the use of the multi-model approach proposed by Service Providers.

6   AER's Cross Checks

In its 2015 Decisions the AER develops a return on equity range of 4.6% to 8.6%[134] (using its full beta range), with a point estimate of 7.1%. The AER's equity risk premium range is 2.0% to 6.1%, with a point estimate of 4.55%.

In step 4 of the AER's framework it considers its return on equity estimate against other information. In effect the AER cross checks its estimate against the following:

- Return on equity estimates derived from the Wright approach;

- Independent valuation reports, in particular focussing on the Grant Samuel report for Envestra and estimates from broker reports and other regulators; and[135]

- Return on debt estimates.

6.1   Use of the Wright Approach

As noted above, the Wright approach was developed for the purposes of estimating the MRP and not as an alternative implementation of the SL CAPM.

The AER seeks to cross check its return on equity estimate against the return on equity under the Wright approach using a range for the long term historical average return on the market. Using its equity beta point estimate the return on equity estimate range from the Wright approach is said to be 7.8% to 9.7%.[136] These returns are notably significantly below the returns generated by the same approach in the AER's November 2014 Draft Decisions, but with no material change in market conditions in that short space of time.

Further, the return on equity estimate of 7.1% derived by the AER in its 2015 Decisions (eg – for SAPN and JGN) (8.11% in the November 2014 Draft Decision for TransGrid), is below the bottom of the AER's Wright approach range, being 7.8% (using an equity beta of 0.7).[137]

6.2   Independent Expert Reports

In its November 2014 Draft Decisions, the AER considered independent valuation reports listed in its table 3-20.[138] The AER concludes that its foundation model equity risk premium estimate of 4.55% is within the range of premiums estimated by independent valuers (3.3 to 6.2%).[139]

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[133]   Frontier Economics, *Key issues in estimating the return on equity for the benchmark efficient entity*, June 2015, paragraph 21. Provided as Attachment 10.16 to this AAI.

[134]   SAPN Preliminary Decision 3-120, JGN Final Decision 3-133.

[135]   TransGrid Draft Decision 3-130 to 3-146.

[136]   Ibid.

[137]   Ibid 3-151.

[138]   The recent AER Decisions set out a range for estimates from independent expert reports in Table 3-56.

[139]   JGN Final Decision, 3-133.

The AER forms the view that the Grant Samuel Report for Envestra of 4 March 2014 supports the AER's foundation model estimate.[140] Grant Samuel itself has provided a report noting why the AER has misinterpreted its report for Envestra.[141] In summary Grant Samuel's view is that:

- The AER's interpretation of the Grant Samuel report, and its use to support the AER's own estimates of the equity risk premium, is misleading.

- Grant Samuel did not apply any specific uplift factor (e.g. for specific risk) in its valuation – rather, it formed an overall judgment as to a reasonable discount rate having regard to CAPM outputs, alternative measures such as DGM and other factors. (The CAPM produced a result that was not commercially realistic and it was appropriate to use alternative sources of information to arrive at a cost of equity of 7.8-8.4%.)

- Grant Samuel did not make any adjustment for dividend imputation and there is no "lack of transparency" in this regard as contended by the AER. A dividend imputation adjustment would be required to ensure comparability between Grant Samuel's estimate and the AER's basis of calculation.

- Grant Samuel did not, as contended by the AER, assume an increase in risk free rates over time or use that as a specific basis for an uplift. Grant Samuel only noted the risk of this occurring and, to the extent the risk free rate played any role, it was minor.

- Above-regulation cash flows were not (as suggested by the AER) a factor in Grant Samuel's selection of the risk free rate.

- While the AER contends that its foundation model estimate of 4.55% is consistent with three of the four uplift scenarios referred to in Appendix 3 of Grant Samuel's report, the AER's estimate is only well in the range of one of those scenarios, is right at the bottom of the range in one other scenario, and is outside the range in the other two scenarios.

- The AER has ignored Grant Samuel's overall opinion that the appropriate range for the Envestra WACC was in the range of 6.5-8.0%.

AGN also makes the following points in relation to the AER's misinterpretation of the independent expert reports:

- In all but two of the independent valuation reports listed in the AER's table 3-20, the equity risk premium is at least 5%, being above the AER's 4.55%.

- In a report for the networks by Incenta Economic Consulting, updated analysis of the full sample of 53 independent expert reports, when properly considered, shows that on average the independent experts have assumed a required market wide return of approximately 10.52% between August 2012 and November 2014, during a period of historically low interest rates. This average is 46 basis points higher than the average over the period that is implied by the AER's current methodology using a spot risk free rate and an MRP of 6.5%, before accounting for dividend imputation.[142]

- In addition, Incenta also considered the AER's interpretation of the Grant Samuel Report for AGN. The AER states that the imputation adjusted equity risk premium from the Grant Samuel Report is 4.47%. This appears to be based on the mid point of the Grant Samuel range of SL CAPM values with none of the uplift applied by Grant Samuel attributed to the cost of equity. Incenta identify that the proper construction of the Grant Samuel Report is as follows:

- o Grant Samuel stated that the WACC for regulated energy assets could lie in the range of 6.5% to 8% but conservatively settled on a range of 6.5% to 7%;

- o The WACC calculation assumed a cost of debt of 7% and gearing of 60%, with an MRP of 6%;

- o Incenta note that Grant Samuel has since confirmed no part of its uplift to the WACC calculation was ascribed to the cost of debt;

- o This in turn implies that Grant Samuel estimated a 5.9% equity risk premium (imputation adjusted) which compares to the AER's 4.55% equity risk premium; and

- o The range for the cost of equity implied by Grant Samuel's uplift was 9.47% to 9.57%, with an equity risk premium range of 5.27% to 5.37%. These ranges compare to the AER's cost of equity of 7.1% in its 2015 decisions and equity risk premium of 4.55%. (These ranges are not grossed up for imputation credits which would increase the differential).

In AGN's submission, properly understood, the independent expert valuations and in particular the Grant Samuel valuation does not support the AER's return on equity estimate and in fact shows that the return on equity estimate is not reflective of prevailing conditions in the market for equity funds or commensurate with the benchmark efficient entities' financing costs.

6.3   Broker Reports and Other Regulatory Decisions

In AGN's submission broker reports are not a sufficiently reliable source of evidence in order to be used as a cross check to the AER's return on equity estimate.

In relation to reliance on other regulators' decisions, such decisions cannot be used as direct evidence or as a cross check to support the AER's estimates in circumstances where that process is entirely circular. Past decisions will also not have regard to forward looking prevailing market conditions relevant to AGN's access arrangement review.

When correctly interpreted none of the AER's cross check evidence actually supports its return on equity estimate and the AER's estimate lies below or at the low end of each of its cross checks undertaken in step 4.

7   Summary of Cost of Equity

The AER's approach of using the SL CAPM as the foundation model does not have regard to all available models and evidence as required by Rule 87(5)(a).

The AER approach produces the lowest possible estimate using the same mechanical SL CAPM approach used before the extensive changes to the rate of return rules. Consequently, it does not give rise to the best estimate of the cost of equity as is required to achieve the ARORO, the NGO or the RPP.

The AER approach does not give rise to a cost of equity estimate that is consistent with prevailing conditions in the market for equity funds nor is it commensurate with the efficient financing costs of the benchmark efficient entity as required by the ARORO.

This chapter summarises a wealth of evidence to support the necessity to move away from the sole reliance on the SL CAPM when setting the return on equity. There is extensive support for the use of each of the DGM, Black CAPM and Fama French Three Factor Model concurrently with the SL-CAPM.

Finally, the AER's estimates of the MRP and equity beta used within the SL CAPM are not the best estimates and consequently do not give rise to the best estimates of the return of equity.

8   AGN's Proposal

AGN proposes to have regard to four relevant and well accepted models for estimating the cost of equity, giving each model the following weightings[143].

TABLE 2: ESTIMATES OF THE REQUIRED RETURN ON EQUITY FOR A BENCHMARK EFFICIENT ENTITY

Method	Required Return on Equity	Weighting
Sharpe-Lintner CAPM	9.28%	12.5%
Black CAPM	9.89%	25.0%
Fama-French model	9.88%	37.5%
Dividend discount model	10.29%	25.0%
Weighted average	9.91%	100%

AGN submits, and the AER accepts, that each of these models is relevant to the estimation of the return on equity. That being the case, each of the models should be given a direct role in the estimation of the return on equity.

The estimated required return on equity of 9.91% using the multi model approach results in a cost of equity estimate that is the best estimate and meets the ARORO, the NGO and RRP.

8.1   Multi Model Approach

In the U.S., regulators have long had the discretion to use a range of models and the views of experts from that jurisdiction are therefore persuasive. As Malko explains[144]:

Which models are useful for economic regulatory purposes?

"In my opinion, all of the models discussed above are useful in the determination of allowed return on equity, but each model has both strengths and drawbacks and should not be used alone, nor is any model superior so as to warrant its use as a primary or sole principal model.

In particular, the models can be grouped into two 'families': the DGM on the one hand and all the capital asset pricing models or interest rate sensitive models on the other based on how they explain and predict returns. Both major groupings, and all the variants discussed above, provide useful insights into what returns that risks-adverse investors expect to receive when making investments.

Multiple Model Approaches are Preferable

In my opinion, no one single financial model is sufficient to estimate the rate of return in every economic circumstance. All models suffer a range of theoretical and/or empirical weaknesses of different kinds. If only one model is used, or if one model is given excessive pre-eminent weight, investors' returns will be highly dependent on the extent to which that model's particular weaknesses lead to over- or under-returns. If multiple models are used, then the returns will vary in response to all the weaknesses but to a smaller extent than if one model is used. It also stands to reason that where the weaknesses of different approaches are directionally different, they will to some degree cancel each other out. Additionally, where only one model is used there is insufficient corroborating evidence or ability to cross-check the results. By contrast, the consideration of multiple models enables the decision maker to either become comfortable that different methodologies are

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[143]   Frontier Economics: An updated estimate of the required return on equity, A report for Australian Gas Networks June 2015. Provided as Attachment 10.14 to this AAI.

[144]   Statement of Dr J Robert Malko, paragraphs 8.1-9.2, 9.5. Provided as Attachment 10.19 to this AAI.

corroborative or, where they are not, to question why it is that one or more models may be delivering significant different results at a particular time or in particular economic circumstances. This, in turn, can give an insight into whether results should be adjusted or altering the weighting or influence accorded to particular models and their results.

In my opinion, to ensure the most appropriate decision, it is important to consider the results of several models. In my opinion, using several models helps compensate for the drawbacks in any single model and increases the probability that the appropriate and reasonable range is identified.

I have observed that in the United States regulators and expert financial witnesses generally use multiple methods, at least two, when determining a reasonable range and reasonable point estimate for the cost of common equity for a regulated energy utility."

In his witness statement Mr Knecht agrees that capital asset pricing models should be used together with the DGM and the passage below highlights the need for other models to augment and complement the use of DGM.

> …

> 2   *Using a number of different models is superior to relying on a more limited selection of models. This is because the CAPM, ECAPM, FF3F, and CA+I estimates use basic cost of capital data in a different manner to the DCF models. The CAPM, ECAPM, FF3F and CA+I models extract information from the Cost of Capital data that the DCF models miss – and vice versa. Using multiple models provides additional perspectives and information, yielding a more accurate, reliable, and robust estimate.*

> 3   *Long-term market trends will tend to drive the estimates of one model higher than another for some years and then lower for another stretch of time. This fact justifies both the use of a wide range of models and also the continuation of the same set of models through these variations."*

The Australian regulator should adopt the multi-model approach for the same reasons. Locally, SFG Consulting explains a similar view:

> *"[W]hat the Rules require is an identification of all estimation methods, financial models and other evidence that may be relevant to estimating the return on equity. Following that identification, and assuming that there is more than one information source that is relevant, some weight will need to be ascribed to the information sources or they will somehow need to be combined to produce a point estimate. The Rules do not specify that the Sharpe-Lintner CAPM is to be used unless a model about which there is no debate or potential weaknesses is identified. Each of the information sources, including the Sharpe-Lintner CAPM must be fairly assessed if the estimate of the return on equity is to be arrived at on a reasonable basis and be the best forecast or estimate possible in the circumstances. The evidence supports a finding that the best forecast or estimate is one that is properly informed by estimates from a range of evidence, including the Sharpe-Lintner CAPM, the Black CAPM and the Fama-French model."[145]*

Professor Gray has weighed up and considered the strengths and weaknesses of each of the four models and explained in detail the basis for the weighting set out above.[146] AGN notes that, in any event, the final weighting of the required return on equity estimate is relatively insensitive to the choice of weights. If a

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[145] SFG Consulting: *The foundation model of the Australian Energy regulator to estimating the cost of equity*, March 2015; paragraph 107, page 22. Provided as Attachment 10.5 to this AAI.

[146] Ibid, pages 88 to 91.

simple average was applied instead of the above weightings, the required return on equity estimate would be 9.83%.[147]

For the reasons set out earlier in this chapter and in the reports prepared for Service Providers and submitted by AGN with this proposal, in AGN's submission the multi model approach gives rise to a better estimate of the return on equity than that proposed by the AER and better contributes to the achievement of the ARORO, NGO and RPP. To recap:

- Rule 87(5)(a) requires the AER to have regard to all relevant evidence and models in estimating the required return on equity.

- The AER accepts that the four models proposed to be used by AGN in the multi-model approach are relevant to the estimation of the return on equity.

- All four models proposed to be used by AGN have a sound theoretical basis, have the purpose of estimating the required return on equity as part of estimating the cost of capital, all four models can be implemented in practice and are commonly used.[148]

- The AER's basis for finding that the SL CAPM is the superior model and should be used as the foundation model for estimating the required return on equity is incorrect.

- It is clear on the evidence from SFG Consulting/Frontier Economics and NERA that the SL CAPM suffers from significant limitations that have not been taken into account by the AER and which lead to an underestimate of the return on equity. Further, the other models relied on by AGN either perform better than the SL CAPM or the AER's basis for rejecting them is in error.

- The AEMC amended the rate of return rules because in its view it is necessary to have regard to a range of estimation methods, financial models, market evidence and other data so that the best estimate of the rate of return can be obtained overall in order to achieve the ARORO, NGO and RPP.

- AGN's multi model approach has regard to all relevant models, weighs up their respective strengths and weaknesses and assigns a reasonable weighting to each model to arrive at an estimate for the required return on equity. This approach is superior to the AER's foundation model approach.

- The multi-model approach avoids the problems of the return on equity being driven by falls in the risk free rates which are not reflective of prevailing conditions in the market for equity funds.

Within each model, the best empirical evidence is relied upon to estimate the model parameter such that the best estimate contributing to the achievement of the objectives in the NGR and NGL, and that reflects prevailing market conditions, is achieved.

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[147] Frontier Economics: *An updated estimate of the required return on equity, A report for Australian Gas Networks* June 2015, paragraph 21. Provided as Attachment 10.14 to this AAI.

[148] SFG Consulting: T*he required return on equity for regulated gas and electricity network businesses*, 6 June 2014, page 40. Provided as Attachment 10.3 to this AAI.

8.2 Parameter Estimates

The multi-model approach requires the estimate of the following common parameters:

TABLE 3: PARAMETER ESTIMATES

Parameters	AGN Proposal
Risk free rate -Average of 10 year CGS yields over agreed averaging period	Using a place-marker 20 day averaging period ending on 6 March 2015 gives rise to a risk free rate of 2.55%
Equity beta	0.82
MRP	8.23%

8.2.1 Risk Free Rate and Averaging Period

It is common ground between the AER and AGN that the proxy for the risk free rate is the average 10 year CGS yield over a nominated averaging period. For the purposes of this proposal, AGN uses a place-holder averaging period of 20 business days ending on 6 March 2015 (2.55%). This is the averaging period used by the AER in its recent Decisions.

Confidential Attachment 10.2 nominates AGN's final averaging period for the return on equity.

8.2.2 Equity Beta

In respect of equity beta, for the reasons set out earlier, the AER's approach and estimate of equity beta of 0.7, relying heavily on empirical estimates from domestic firms only, is an underestimate of the equity beta.

For the reasons set out in Professor Gray's reports, given the size of the available sample, the best estimate of the equity beta is derived from a broader sample including international comparators. This gives rise to an estimate for the equity beta of 0.82, based on Professor Gray's analysis.[149]

Professor Gray states that the best available estimate of the equity beta of the efficient benchmark entity is 0.82 and the same estimate should be used in the SL CAPM and the Black CAPM both of which define beta in the same way.[150]

10.8.2.3 MRP

For the reasons set out above the AER's estimate of the MRP of 6.5% and its analysis of the various evidence relied upon to derive that estimate is subject to a number of errors. The AER's estimate does not reflect prevailing conditions in the market for equity funds and will not contribute to the achievement of the ARORO.

The preferable approach is that recommended by Professor Gray, taking into account all relevant evidence on the MRP and applying a weighting to each estimate based on the strengths and weaknesses of each estimation approach. SFG's updated estimate of the MRP is as follows:[151]

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[149]   SFG *Equity Beta* 12 May 2014, Provided as Attachment 10.7A to this AAI. See also SFG Consulting *Beta and the Black Capital Asset Pricing Model* 13 February 2015. Provided as Attachment 10.8 to this AAI.

[150]   Ibid page 35.

[151]   Frontier Economics: An updated estimate of the required return on equity, A report prepared for Australian Gas Networks, June 12015, table 1. Provided as Attachment 10.14 to this AAI.

TABLE 4: ESTIMATION OF MRP

Estimation Method	Market return	MRP	Weighting
Historical excess returns	9.11%	6.56%	20%
Historical real market returns (Wright)	11.64%	9.09%	20%
DGM	11.37%	8.82%	50%
Independent Expert Reports	9.47%	6.92%	10%
Weighted average	10.78%	8.23%	100%

Consistent with the multi-model approach for estimating the return on equity, SFG has considered the strengths and weaknesses of each of the above relevant pieces of evidence of the prevailing MRP. Taking account of those strengths and weaknesses, SFG apply:

- a 50% weighting to the forward looking DGM estimates and 50% weight to approaches based on historical averages;

- equal weight to the Ibbotson and Wright approaches for processing the market return data, those two approaches representing the two ends of the spectrum in relation to that data;

- Apply some weight to the estimate from independent expert reports, noting the estimate to be conservative in that it is not influenced by any uplift factors or adjustments to the historically low risk free rate.

This approach has regard to all relevant models and evidence in estimating the MRP and gives rise to a best estimate of the MRP 8.23%.

9 Conclusion on Cost of Equity

For the reasons set out in this chapter, the AER's approach to the cost of equity (and the parameter estimates it proposes to input into the SL CAPM) does not:

- comply with Rule 87(5)(a);

- provide the best estimate of the cost of equity;

- give rise to an estimate of the cost of equity that meets the ARORO contribute to the achievement of the NGO or have regard to the RPP; and

- have regard to prevailing conditions in the market for equity funds.

AGN's proposal giving rise to a cost of equity estimate of 9.91% should therefore be accepted (and the Guidelines and the AER 2015 decisions should be departed from).

10 Cost of Debt

10.1 Introduction

In order to best meet the ARORO and the NGO, the return on debt component of the weighted average cost of capital must provide a service provider with a sufficient allowance to provide debt-holders with a return commensurate with prevailing market conditions and the risks faced by those debt holders. If the return on debt does not meet this criteria, the result will be:

- an inability to attract the capital necessary to undertake efficient investment;

- a failure to promote efficient operation and use of natural gas services in the long interests of consumers; and

- an inability for the service provider to recover at least its efficient costs, including debt finance costs, as required by the RPP.

10.2   AER's Guidelines and Recent Decisions

In its Guidelines and 2015 Decisions, the AER considered four possible options for determining the return on debt:

1.   Continue the on the day approach (Option 1).

2.   Start with the on the day rate for the first regulatory year and gradually transition to a trailing average approach over 10 years (Option 2).

3.   The hybrid transition which adopts a backward looking trailing average (with no transition) to the debt risk premium (DRP) with a 10-year transition on the base interest rate (Option 3).

4.   Adopt a backwards looking 10 year trailing average cost of debt, with no transition on either the base rate or the DRP (Option 4).[152]

The AER has maintained its approach set out in its Guideline to adopt Option 2 above, which involves a 10-year transition to the trailing average. The transition applies in respect of both the base interest rate and DRP components of the cost of debt.

It is accepted by both the AER and Service Providers that a 10 year trailing average cost of debt reflects an efficient debt management strategy, the question is whether, given the previous "on the day" approach to estimating the return on debt, a transition to the trailing average is necessary and if so, what the transition should be.

The baseline for understanding whether and what sort of transition might be appropriate is to understand the economic effect of the former regulatory approach. Dr Hird describes it as follows:

> "The previous "on-the-day" approach to setting compensation for the cost of debt was flawed, including, in my view, being inconsistent with the newly formulated allowed rate of return objective. It did not reflect the costs of a viable debt management strategy and, every time a regulatory decision was made, a business and its customers were subject to what was, in effect, a roll of the dice."[153]

In its 2015 Decisions the AER reaffirmed its view in previous decisions that an efficient practice of a benchmark firm regulated under the previous "on the day" method would have been to raise long-term debt on a staggered basis and hedge against movements in the base interest rate between the date debt is actually raised and the regulatory averaging period by entering into swap contracts (referred to as the hybrid approach, which is the starting point for the hybrid transition explained in Option 3 above).[154]

AGN agrees that an efficient financing strategy for a benchmark efficient entity, *with a similar degree of risk as that which applies to AGN in respect of the provision of Reference Services*, under the "on the day" approach was to adopt a hybrid approach. The AER has noted AGN's previous statements that this strategy was in fact adopted by AGN under the "on the day" approach and that it had a policy of hedging between 80% and 100% of its base (or floating) interest rate exposure.[155] This means that, at the

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[152]   JGN Final Decision 3-142.

[153]   CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, paragraph 8. Provided as Attachment 10.22 to this AAI.

[154]   JGN Final Decision 3-177.

[155]   TransGrid Draft Decision 3-174.

commencement of the forthcoming Access Arrangement period, the benchmark efficient entity faced with the risks of AGN, will have a:

- floating base rate component – given interest rate swaps against the base interest rate will have expired; and

- a DRP component that already reflects an historical or trailing average rate.

However, for the reasons set out in the CEG report :*Efficient use of interest rate swaps to manage interest rate risk*, June 2015, hedging 100% of the base rate of interest was not necessarily the best way to minimise interest rate risk under the "on the day approach"(this is addressed further in Section 10.9).

Further, AGN accepts that a hedging strategy may not have been efficient for every business and that an alternative financing strategy for some businesses may have been not to enter into swap contracts at all. In the case of businesses unable to efficiently enter into swap contracts, the efficient strategy is likely to have been to simply issue fixed rate debt on a staggered basis. AGN believes that there is likely to have been multiple benchmark efficient approaches and the AEMC recognised there could be more than one efficient benchmark.

However, if it is correct (as the AER contends) that there is only one single benchmark efficient debt management strategy, then the correct single benchmark would reflect a trailing average approach without transition, being the efficient approach that is in fact replicable by all firms, rather than the hybrid methodology replicable by only some firms.

In any event, having accepted the hybrid approach as the benchmark efficient approach under the previous regulatory arrangements, the logical thing to do would be to start any transition to a trailing average approach from that point. However, the AER does not take the hybrid methodology as its starting point for the transition to the trailing average, rather it reverts to its previous "on the day" approach. The AER's Option 2 proposes to set the cost of debt during the regulatory period that, in the words of Dr Hird, "rolls the dice" one last time by starting the regulatory period with another 100% "on the day" allowance that will only progressively be replaced over the next 10 years.[156]

The effect of the AER's Option 2 is to apply a transition in respect of both the base rate and the DRP component of the cost of debt. The reason for imposing a transition in respect of the base rate is premised on the AER's finding that the efficient approach under the "on the day" regime was to enter into swap contracts at the commencement of the previous regulatory period and the need for such arrangements to be unwound while the entity transitions its financing practices in line with the new regulatory approach.[157]

However, the AER and Lally accept that the DRP component of the cost of debt could never be hedged and that in fact the benchmark efficient entity would already have a trailing average DRP: "*For the debt risk premium component, we consider the allowed and actual return on debt of a benchmark efficient entity would have usually differed in each regulatory control period. This is because the DRP component could not have been efficiently hedged to the allowed debt risk premium.*"[158] On any view, the DRP already reflects a trailing average for the benchmark efficient entity. This being the case, both Lally[159] and Chairmont Consulting[160] have advised the AER that a transition is unnecessary for the DRP component.

The AER 's only reason for requiring a transition in respect of the DRP component is based on a belief that businesses received a windfall gain from the "on the day" approach in the last regulatory period and

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[156] CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, Ibid – paragraph 15, 175. Provided as Attachment 10.22 to this AAI.

[157] For example, SAPN Preliminary Decision, 3-157.

[158] SAPN Preliminary Decision, 3-151.

[159] Lally: Transitional Arrangements for the cost of debt, 24 November 2014, 7, 13.

[160] Chairmont Consulting, *Cost of debt: Transitional analysis*, April 2015, page 8-9.

that it is somehow entitled to undercompensate the benchmark efficient entity's cost of debt in the forthcoming regulatory period to offset such a windfall gain.[161]

As CEG note, the AER's justification for a transition is fundamentally that it is appropriate and desirable to design a transition that:

- compensates businesses at less than their prospectively incurred efficient costs; because

- the regime that existed in the past led to them being overcompensated relative to their efficiently incurred costs in the past.

The clearest articulation of this reasoning is found in Professor Lally's report. Lally states:[162]

> "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 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."

Lally is putting forward a premise that the supposed errors (i.e. differences between allowed cost of debt and actual cost of debt) associated with the 'on the day' approach tend to move in cycles – with under-compensation in one regulatory period followed by over-compensation in the next followed by under-compensation etc. A new approach (such as the trailing average approach) can remove this source of over or under-compensation and set compensation equal to efficient costs. However, in Lally's view, if this source of error is removed at a given point in time, it may be that:

- the accumulated level of past over-compensation is materially positive; and

- this would have been offset by prospective under-compensation without the change in regulatory approach.

In effect Lally is arguing that the regulator should adopt a transition "that mimics the erosion in the gains for the businesses that would have occurred naturally under the earlier regime".[163] But there is no explanation of how the AER considers it is able to do this under the NGR (or NER), other than references to Rule 87(11)(d) (addressed in Section 10.3 below).

Rather, the AER's 2015 Decisions argue that the Option 2 transition is necessary and justified by application of the NPV principle. At page [149] of the SAPN Preliminary Decision, the AER summarises Lally's advice on this point as follows:

> "The NPV principle is a fundamental principle of economic regulation. The NPV principle is that the expected present value of a benchmark efficient entity's regulated revenue should reflect the expected present value of its expenditure, plus or minus any efficiency incentive rewards or penalties.[164] In other words, departures from cost recovery are acceptable and

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[161]   See CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015 section 4.3. Provided as Attachment 10.22 to this AAI.

[162]   Lally, M., Transitional Arrangements for the Cost of Debt, 24 November 2014, pp. 21-22.

[163]   Martin Lally, Transitional Arrangements for the Cost of Debt, 24 November 2014, p. 22.

[164]   The NPV principle can be equivalently stated that the present value of a benchmark efficient entity's future regulated cashflows should equal the value of the initial regulatory asset base.

desirable, so long as they are the result of management induced efficiencies or inefficiencies, rather than windfall gains or losses. Windfall gains or losses would result in a service provider being over- or under-compensated for its efficient costs. The building block model which the NER require us to use is based on this principle."

"[T]here is a strong connection between the NPV principle, the allowed rate of return objective and the NEL revenue and pricing principle of providing service providers with a reasonable opportunity to recover at least efficient costs. Lally advised that each of these principles or objectives are equivalent. We therefore consider it is useful to assess the four return on debt approaches for consistency with the NPV principle."

"A contentious issue in the current determinations is the timeframe over which it is appropriate to consider the impact of this change. In particular, in relation to providing a benchmark efficient entity a reasonable opportunity to recover its efficient financing costs, whether it is appropriate to consider the impact on the benchmark efficient entity over the life of its assets. Several service providers submit that the time horizon of our perspective must be confined to the 2014–18 period (for TransGrid) or the 2014–19 period (for ActewAGL, Ausgrid, Endeavour Energy and Essential Energy). Also, they submit that the approach to debt should not be determined by reference to the activities and investments of a benchmark efficient entity beyond the regulatory control period in question. We disagree."

Below we discuss impacts on a benchmark efficient entity that arise from changing the method for estimating the return on debt. We discuss impacts that occur across regulatory control periods, such as over the life of a benchmark efficient entity's regulated assets. We consider the NER require us to do so. The NER refer to 'any' impacts on a benchmark efficient entity as a result of changing the return on debt methodology. The NER then give an example of one impact—the cost of servicing debt across regulatory periods. Accordingly, the NER indicates that it is appropriate to take a perspective across more than one regulatory period."[165]

An efficient benchmark business would have a staggered debt portfolio that includes bonds issued at much higher interest rates than currently prevail. It follows that the allowance set according to the AER's methodology will not cover the efficient costs of the benchmark efficient entity over the next 10 year period until the transition has completely worked its way out of the system.

The AER's Option 2 transition leads to a significant mismatch between the benchmark cost of debt and the actual costs of the benchmark efficient entity facing the risks of AGN.

The mismatch arises because the AER's transition effectively substitutes an "on the day" debt benchmark taken at a time of record low interest rates for the actual efficient costs of a benchmark efficient firm (which the AER has acknowledged would today have long-term debt with staggered maturities reflecting an average of interest rates for debt raised throughout the last 10 years with hedging of the base interest rate). If applied to AGN, the result of the AER's transition is to apply these record low interest rates to the majority of debt throughout the next Access Arrangement period (**AA period**). However we know that interest rates (both base rates and DRP) are lower now than they were over the last 10 years over which debt was issued.

For both legal and economic reasons, AGN submits that the AER's transitional approach to the trailing average under its Option 2 does not comply with the NGR or NGL.

10.3   Inconsistency with the Regulatory Requirements

First, the NPV concept referred to by Lally is not explicitly referred to in name or concept anywhere in the rate of return rules, the NGO or the RPP. Nor are we aware of any Court or Tribunal case that has recognised that the NPV principle is implicit in the requirements of the economic regulatory instruments. In

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[165]   SAPN Preliminary Determination, 3-149.

any event, applying Lally's NPV principle would lead the AER into error where the timeframe over which Lally advocates that the analysis should be undertaken is at odds with the timeframe for decision making required by the NGL and the NGR.

Second, it cannot be that Lally's NPV concept can be simultaneously "equivalent" to both the ARORO and the RPP that requires businesses to be given a reasonable opportunity to recover efficient costs because those two legal standards are distinct and separate considerations. In recognition of the need to foster efficient investments, the RPP sets out a principle that establishes a minimum ability for regulated businesses to have a reasonable opportunity to recover at least its efficient costs. This RPP is to be taken into account by the AER when exercising an economic regulatory function and the only such functions of the AER concern the making of regulatory determinations applying to defined regulatory periods.

The ARORO objective must be satisfied at the time of the regulatory determination for the forthcoming AA period. The allowed rate of return should be commensurate with the efficient financing costs of a benchmark efficient network service provider.

The ARORO targets an efficient debt allowance. This is distinct from the concept that the network business should be provided with *at least* a reasonable opportunity to recover its efficient costs as required by the RPP. In other words, the RPP, which sets out a minimum, cannot be "equivalent to" either the ARORO nor the NPV principle which each establish a target that is neither a minimum nor a maximum.

Further, the NPV principle is said to apply over the life of the regulatory assets. By contrast, the ARORO and the RPP are forward looking concepts which plainly must be applied at the time of the forthcoming regulatory determination in relation to the next AA period, which in this case is the five years commencing on 1 July 2016.

The NGR are written with all the relevant concepts expressed in the present tense to apply on their terms at the time of the determination – not over an extended retrospective period. For example Rule 87(2) provides that:

> *The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.*

Rule 87(3) provides that:

> *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.*

Rule 87(8) provides that:

> *The return on debt for a regulatory year must be estimated such that it contributes to the achievement of the allowed rate of return objective.*

Rules 87(10) and (11) extracted in Section 2.2 above are drafted in similar forward looking terms.

Third, in relation to the AER's reliance on Rule 87(11)(d) that regard be had to impacts that a business may experience when there is a change of regulatory approach:

- As the AER itself notes, the AEMC indicated in respect of this rule that "Its purpose is to allow consideration of transitional strategies so that any significant costs and practical difficulties in moving from one approach to another is taken into account."[166]

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[166] AEMC Final Rule Determination, 29 November 2012, page 85.

- This provision does not provide a general license to bring to account costs or gains or losses over the life of the regulatory assets but rather focuses on the specific impacts of a movement from one regime to another – that is, the costs arising from the change itself.

- This Rule was not inserted in order to enable the AER to "true-up" or "claw back" alleged windfall gains or losses of debt financing costs under other regulatory approaches. Such an approach would be contrary to the achievement of the ARORO, being a clearly forward looking concept, resulting in a deliberate under-recovery of efficient financing costs in the Access Arrangement period. The economic interpretation of the ARORO as a forward looking concept is confirmed by CEG.[167]

- Such an approach would also fail the RPP and NGO by sending inefficient pricing signals and adversely effecting efficient investment in, operation and use of natural gas services for the long term interests of consumers.

Fourth, the Lally approach is inconsistent with the "guarantee" inherent in the CPI-X form of regulation (often referred to as incentive regulation) to the effect that once a regulatory period is passed, subject to any explicitly defined efficiency carry-over incentive, the past revenues and costs cannot be clawed back. This is the fundamental economic principle that would inform the interpretation of how the NGR should apply across periods.

To this end, AGN expects to under-recover revenue in the current AA period by around $57 million relative to the benchmarks set by the AER. This reflects an inability by AGN to achieve the volume and customer number forecasts set by the AER, which has been a recurring issue for the business. For example, AGN has only once achieved the volume benchmarks set by the regulator in respect of our residential customers over the past 16 years (see Chapter 13). Consistent with the structure of incentive regulation, AGN is not able to recover the "lost" revenue in future regulatory periods.

Even if there were a windfall gain to be had, that gain would have occurred in the previous regulatory period and there is no basis on which to reduce a firm's prospective allowance based on past over-recovery.

CPI-X regulation was adopted into Australia from the United Kingdom where it was known as "RPI-X" regulation. This form of regulation was devised by now Professor Littlechild when he was a civil servant in the UK's Royal Treasury working on the privatisation of British Telecom in the mid 1980's.

The distinguishing feature of RPI-X regulation,[168] is that the businesses benchmark revenues and costs are established for the full regulatory period of approximately five years (four at the time Littlechild initially invented the system).[169] There is an incentive for the business to outperform the revenue and cost benchmarks on the basis that this would improve the returns over the regulatory period. Importantly, this form of regulation is premised on the basis that any over/under performance is not reconciled at the start of the next period (as such a process would remove, or substantially lessen, the incentive to improve performance).

Consistent with the application of incentive regulation in Australia, there is no legislative basis to "carry over" alleged windfall gains or losses from any previous regulatory periods when applying the ARORO on a forward looking basis to AGN's forthcoming AA period. Any differences between the regulatory benchmark allowance for financing costs and the costs a service provider may have actually faced over the period of the previous access arrangement are irrelevant to the task of setting an efficient allowance for financing costs of the forthcoming AA period.

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[167]   CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, paragraph 142. Provided as Attachment 10.22 to this AAI.

[168]   That is compared with the main alternatives: rate of return regulation as traditionally used in North America and the other proposal of granting tax incentives for efficiency improvements that was also proposed at the time RPI-X regulation was invented.

[169]   For example, see the interview of Stephen Littlechild by Jean-Michel Glachant on published by the European University Institute on October 7, 2013 and "RPI-X, competition as a rivalrous discovery process, and customer engagement", Littlechild, LSE, London, 31 Mar 2014, provided in Attachment 10.25, Secondary Supporting Material- Rate of Return.

The AER acknowledges that its transition to the trailing average (Option 2) has the result of undercompensating the benchmark efficient entity by preventing it from recovering its efficient financing costs in the forthcoming regulatory period.[170] This is not permissible under any provision of the NGR and results in the cost of debt being estimated in a way that does not contribute to the achievement of the ARORO, does not have regard to the RPP and cannot contribute to the achievement of the NGO.

Finally, we note that the AER's transitional trailing average approach implies such a long transition path that it would span two entire regulatory periods. It is not explained how the AER considers it has jurisdiction now to determine what will occur in the 2021 to 2026 period. The impacts of doing so have not been adequately considered. For instance, in the first year of the AER's second transitionary regulatory period the trailing average will have only just obtained a 40% weighting and it is unclear whether that will be consistent with the requirements of Rule 87(11)(c) of the NGR which requires regard to be had to the "incentives that the return on debt may provide in relation to capital expenditure over the regulatory control period, including as to the timing of any capital expenditure."

10.4   Economic Arguments

As noted above, the AER and its advisors accept that on any view of the efficient debt management strategy in the past, the DRP component for the benchmark efficient entity already reflects a 10 year trailing average and there is no economic basis for a transition in respect of that component. The only justification given by the AER are perceived windfall gains under the "on the day" approach, which the AER attempts to offset by imposing its Option 2 transition.

The CEG Report for AGN finds that, in any event, Lally and the AER have not established that any windfall gain has actually occurred.[171]

Even if they did, the AER's transition under Option 2 results in an under-recovery of the benchmark efficient financing costs over the next AA period, contrary to the requirements of the ARORO, the RPP and the NGO.[172] As CEG points out, the only way the AER's interpretation that its Option 2 contributes to the achievement of the ARORO, while also avoiding windfall gains or losses, is if the AER considers "commensurate" in the ARORO to mean over the sum of both future and past periods. But the AER and Lally both accept that Option 2 creates a prospective mismatch between the allowed and actual costs of debt of a benchmark efficient entity.[173]

Such an interpretation of the ARORO is unworkable and inconsistent with the NGO, because it would allow a regulator to identify retrospectively that its past decisions have overcompensated a Service Provider and to reverse that in future decisions. This would distort incentives because a business would never be certain its return would not be revised at a later date.[174]

10.5   Data Source and Extrapolation Method

A further issue that arises is the data source used to estimate the cost of debt and the extrapolation method that should be used for deriving 10 year benchmarks from the data source.

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[170] Lally acknowledges that in respect of the DRP, there is no mismatch between the costs incurred by the benchmark firm and that allowed by the trailing average after the regime change and no transition would seem to be warranted. Lally: *Transitional Arrangements for the Cost of Debt*, November 2014, page 7,13. Table 3-23 in the AER's SAPN Preliminary Decision identifies that the hybrid transition matches the allowed return on debt with efficient financing cash flows, the AER's option 2 does not.

[171] CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, paragraphs 146-150. Provided as Attachment 10.22 to this AAI.

[172] CEG: The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, paragraph 119. Provided as Attachment 10.22 to this AAI.

[173] CEG, The hybrid method to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, pages 32 to 36. Provided as Attachment 10.22 to this AAI.

[174] Ibid, page 35.

In the AER's 2015 Decisions, the cost of debt is estimated using a simple average of the fair value yield estimates from Bloomberg and the Reserve Bank of Australia (RBA).

In its report for AGN, CEG considers the two third party estimates for the cost of debt and the two extrapolation methods for deriving 10 year benchmarks from data of shorter tenors (the AER's method set out in its recent JGN decision and SA Power Networks methods).

CEG considered which estimates and extrapolation methods best reflect the data by performing goodness of fit tests based on the methodology proposed by JGN.[175] CEG's analysis is set out in section 5 of its report for AGN and concludes:

> "Based on goodness of fit tests, we find that the RBA curve extrapolated according to the SAPN methodology best fits the broadest dataset over the averaging period. (However, we note that there is a small difference in levels between the RBA curve and the BVAL curve where both are extrapolated using the SAPN methodology.) Similarly, the SAPN extrapolation of the BVAL curve provides the best fit to the narrower RBA sample. The only exception is the RBA curves is a slightly better fit to the RBA sample when using the AER extrapolation.
>
> On this basis, I conclude that over the period from 9 February 2015 to 6 March 2015, the best method of extrapolation of the third party estimates to 10 year spread to swap is the SAPN method. When this is done, the BVAL and RBA estimates at 10 years are very similar. The average of these two estimates is 174.2 basis points in semi-annual terms, when added to the prevailing 10 year swap rate of 2.88%, corresponds to a 10 year cost of debt 4.62% in semi-annual terms, or an annualised yield of 4.67%."[176]

In section 7 of the CEG report, CEG gives further consideration to the Bloomberg BBB BVAL curve beyond 7 years (10 year curve) which Bloomberg began reporting in April 2014. To date the AER has not tested the Bloomberg 10 year curve. CEG's key conclusions are:

> "• Bloomberg appears to be basing its BBB BVAL yield curve shape on the shape of the government bond yield curve beyond around 5 years;
>
> • As a matter of theory, this is likely to understate the increase in yields on BBB (as opposed to risk free) debt;
>
> • This is borne out when the BBB BVAL curve is tested against the observed yields on longer dated BBB bonds issued by Australian corporates (both in the BVAL constituents and wider samples of bonds).
>
> On this basis I do not believe that the published Bloomberg 10 year BBB BVAL estimates are robust and I consider that, over the period analysed, sole reliance on the RBA BBB curve to estimate the cost of debt would better serve the ARORO. Absent any change in the facts, I consider that the RBA BBB curve is likely to be superior in this regard in future measurement periods." [177]

On the basis of CEG's advice, AGN's proposal is that testing of the kind undertaken by CEG in its June 2015 report be undertaken in respect of AGN's averaging period for the cost of debt, in order to determine the data source (or sources) and extrapolation method that produces the best fit to the data. This is explained in Section 10.9 below.

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[175] See JGN, 2015-20 Access Arrangement Information Appendix 9.10: Return on debt proposal, 30 June 2014, pp. 24-26, CEG paragraph 185.

[176] CEG: *The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN*, June 2015, section 5.5. Provided as Attachment 10.22 to this AAI.

[177] CEG: *The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN*, June 2015, paragraph 287. Provided as Attachment 10.22 to this AAI.

10.6 New Issue Premium

In its recent Decisions, the AER has acknowledged that:

> *"The effective cost of debt faced by an issuer is related to the yields at which its bonds are issued in the primary market. We estimate our return on debt allowance using third party curves. These provide an estimate of yields on bonds traded on the secondary market."*[178]

There is a systematic difference between these two measures (known as the New Issue Premium) and that, as a result, Service Providers will be undercompensated for the cost of debt under the AER's current approach.

The AER 2015 Decisions rejected the New Issue Premium proposed by the Service Providers. The AER's reasons include (a) conceptual criticisms; (b) comments concerning whether the premium exists in the US and Europe as well as Australia; (c) criticisms of CEG's empirical work (including criticisms that, for example, CEG used a more comprehensive dataset than that used by the RBA or BVAL and did not disaggregate its data between the GFC and other periods); (d) claims that the AER's own estimation procedure for the cost of debt over-compensates service providers in certain respects (i.e. a claimed mismatch in the AER's preferred benchmark credit rating and tenor of debt compared with the data used to establish the benchmark cost) and that in the UK there are allegedly some empirical claims that its system over-compensates the firms within its jurisdiction and some claims of the same in Australia; and (e) limited evidence of other regulators according a new issue premium.

The AER's recent Decisions reject CEG's work on the New Issue Premium adjustment. However, having acknowledged that Service Providers raise debt in primary markets but the AER's estimated costs are drawn from secondary markets, the AER has not undertaken a conceptual or empirical analysis of its own.

AGN's view is that the CEG analysis of the New Issue Premium is robust and more comprehensive than any of the other conceptual or empirical work available at this time. As such it is a preferable basis for making a decision than merely to assume and impose a zero cost for the New Issue Premium. AGN has included 27 basis points in its cost of debt proposal in relation to the New Issue Premium.[179]

10.7 Transaction Costs of Swap Strategy

AGN proposes to include in its cost of debt, transaction costs of entering into and maintaining a swap strategy of 23 basis points.

Maintaining a swap portfolio leads to transaction costs. CEG has considered the recent expert reports on the expected cost of entering into swap contracts, in particular UBS and Evans and Peck estimates of swap transaction costs. CEG forms the view that, because those costs are prevailing estimates (whereas the hybrid debt management strategy required a firm to enter into a historical series of interest rate swaps at the time debt was issued), the estimates from UBS and Evans and Peck should be considered lower bound estimates of the actual transaction costs associated with swaps that form part of the benchmark efficient entity's portfolio.[180]

Similarly, CEG note that the UBS and Evans and Peck estimates will likely under estimate the transaction costs of swap portfolios because they do not include the impact on the traded prices and swap markets.

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[178] SAPN Preliminary Decision Page 3-470.

[179] CEG: *The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN*, June 2015, paragraph 22. Provided as Attachment 10.22 to this AAI.

[180] CEG *the hybrid method for the transition to the trailing average rate of return on debt assessment and calculations for AGN*, June 2015, section 3.4. Provided as Attachment 10.22 to this AAI.

On this basis, CEG conclude that it is reasonable to adopt the upper end of the range defined by the two estimates of the transaction costs associated with swaps.[181]

CEG consider that a conservative estimate of the transaction costs of swaps is 23 basis points.[182] This is included in the calculation of AGN's placeholder cost of debt referred to below.

10.8   Debt Raising Costs

AGN proposes to include debt raising costs of 17.84 basis points per annum in its cost of debt, based on the recommendations of Incenta and CEG[183]. Regulated revenue allowances should account for the significant costs associated with raising debt finance. In February 2015, Incenta prepared a report estimating debt raising costs for JGN in response to the AER's Draft Decision.[184] Incenta estimated benchmark debt raising costs at 17.84 bppa including:

- Transaction costs – 9.0 bppa;

- Liquidity requirement costs – 5.6 bppa; and

- Refinancing costs – 3.2 bppa.

Transaction costs are costs incurred issuing bonds including arrangement fees, bond master program costs, legal fees, credit rating fees, issuance fees etc. Incenta relied on a 2013 benchmarking report prepared by PwC in its estimation of transaction costs. PwC estimated transaction costs on the basis of recent observations of market practice. Incenta adjusted PwC's estimate of arrangement fees for JGN's WACC in line with the AER's approach.

Liquidity requirement costs are associated with establishing and maintaining bank facilities to fulfil Standard & Poor's liquidity requirements and to maintain an investment grade credit rating.

Refinancing costs are costs associated with Standard and Poor's requirement that financing occur three months ahead of the refinancing date, resulting in a three month overlap. Incenta estimated the cost of three month ahead financing as a three month interest cost on the newly issued bond less the three month interest that could be earned on BBB rated debt. This is based on PwC's approach, adjusted in agreement with the AER's view that the cost of new debt should be used rather than the trailing average cost of debt.

In its June 2015 report for AGN CEG considered the estimate of debt raising costs and concluded: "*We consider that Incenta's approach to estimating benchmark debt raising costs is appropriate. In our opinion the debt raising costs should be updated using the same approach for AGN in its revised proposal to reflect data that will be available at that time.*"

10.9   AGN Proposal

If it is accepted that the efficient debt management strategy under the "on the day" approach was to adopt a hybrid approach, CEG is of the view that the only reasonable approach to transition to the trailing average is *from* the hybrid approach, in the manner set out in section 3.3 of the CEG report.[185] Such a transition to the trailing average is one that reflects the actual transactions that a benchmark efficient entity

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[181]   Ibid, page 22.

[182]   Ibid, paragraph 22.

[183]   CEG The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, section 3.5. Provided as Attachment 10.22 to this AAI.

[185]   CEG: *The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN*, June 2015, 17d As noted above, if there is only one benchmark efficient approach, then AGN submits that approach ought to reflect the trailing average without transition. Provided as Attachment 10.22 to this AAI.

would enter into to move from a staggered long-term debt portfolio with base rate hedging to the long-term position in which the hedging component is progressively unwound.

In its report for the AER, Chairmont found that the transition from the hybrid to the trailing average cost of debt in the way CEG has described in section 3.3 of its report for AGN, best reflects the cost of debt faced by a benchmark efficient entity funding itself using the hybrid debt management strategy and the AER's proposed transition does not:

> "AER's transitional arrangements do not reflect the required transactions for the BEE to transition its portfolio to the 'trailing average'. This is a structural problem with both the base rate and DRP, as follows:
>
> While a transition path for the base rate is required, the current measurement does not reflect the required transactions. It is currently measure using a 10 year term whereas NSPs can transition their portfolio using a series of 1-10 year swaps with maturities to coincide with the annual partial allowance resets. The average interest rate for a portfolio of 1 to 10 year swaps is usually a lower rate, including in 2014; and
>
> The DRP does not need to be transitioned because the NSWP already has a staggered floating rate debt portfolio. In treating DRP differently from the base rate it needs to be measured in relation to the swap curve, not the Commonwealth Government Securities (CGS) curve".[186]

In defining the efficient debt management strategy under the "on the day" approach, the AER and Lally consider that the relevant question is what strategy minimised the variation between the actual cost of debt and the allowed cost of debt in the past?   On this basis the AER and Lally have concluded that entering into swap contracts to hedge the base rate of interest was the uniquely efficient debt management strategy under the on the day approach, being the strategy that reduced interest rate risk. However, the AER and Lally have only considered two extreme cases, hedging none or 100% of the base rate.[187]

In a new report CEG has considered Lally's analysis and found that, making no assumption as to the extent of the use of swaps, and when precisely the same dataset and methodology is used, the percentage use of interest rate swaps that minimises interest rate risk is 81%.[188]   CEG go further and build upon and correct Lally's analysis and find that the use of interest rate swaps under the on the day approach which would have minimised interest rate risk would have been significantly less than 100%.[189]

The analysis undertaken by Lally and continued by CEG is a new area of enquiry and would benefit from further consideration by the AER, Service Providers and their advisers. However, in AGN's submission it is highly likely on the evidence available to date that hedging an amount less than 100% of the base rate would have resulted in a better match to the regulatory allowance under the "on the day" approach, that is, it would have minimised interest rate risk.

In this proposal AGN takes a conservative approach in relation to the return on debt and proposes to apply the hybrid transition methodology recommended by CEG in section 3.3 of its June 2015 report for AGN and as explained further below. AGN's proposal is to apply a hybrid transition assuming 100% of the base

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[186]   Chairmont, *Cost of debt: Transitional analysis*, April2 2015, pp. 8-9.

[187]   CEG *Efficient use of interest rate swaps to manage interest rate risk*, June 2015, section 3. Provided as Attachment 10.23 to this AAI.

[188]   Ibid paragraph 5.

[189]   CEG has concluded that when an appropriate dataset is used, only 1/3 of base rate interest rate exposure would have needed to be hedged at the beginning of the regulatory period in order to minimise interest rate exposure under the "on the day" regulatory regime. CEG *Efficient use of interest of interest rate swaps to manage interest rate risk*, June 2015. Provided as Attachment 10.23 to this AAI.

rate is hedged, but will give further consideration to the possibility of a starting point based on a lower percentage.

10.9.1   Cost of Debt Averaging Period

The Rate of Return Guideline envisages the averaging period for the return on debt for each regulatory year will be up to 12 months in length and be specified for each regulatory year in the control period. The Guidelines also envisage that a single averaging period will be specified for both the base rate of interest and the DRP to be measured concurrently, or that there will be no division between the measurement of the base rate and the DRP.[190]

The Guidelines also require that the averaging period should be:

- as close as practical to the commencement of each regulatory year in a regulatory control period; and

- specified up to five years in advance.

The Guidelines do not appear to anticipate a different averaging period for the DRP and the base rate in each year. However, in CEG's view, a longer averaging period for the DRP and a shorter period for the base rate would be consistent with an efficient debt management strategy where:

- debt issuance cannot be easily managed to short windows in each year (e.g. cannot easily be managed such that 10% of the portfolio is refinanced each year in a short window determined up to five years earlier); this may be due to a less than perfectly even maturity profile of the existing debt, lumpy future capex requirements, unknown future debt market conditions ,etc.; but

- swap contracts, being more flexible and liquid, can be used to manage base rates of interest to short windows each year.

CEG conclude that:

> *"The scenario described above appears to be a reasonable description of the circumstances of many firms, potentially including AGN. In which case, we consider that the allowing a separate averaging period for the DRP and base rate of interest would promote Rule 87(3) in that it would allow the cost of debt allowance to better match efficient costs.*
>
> *This would also have other potential benefits in that, a long averaging period for the DRP would mean that there was less volatile DRP compensation which is important because there is no instrument by which AGN can hedge its DRP to a short window of time – other than issuing debt in that period which will not always be practical. In addition, given the evidence that the prevailing DRP and prevailing base rates of interest are inversely correlated, having a longer averaging period for DRP than swap rates will reduce the inverse correlation and make the use of interest rate swap hedging more effective.*
>
> *Practically, this would mean that the cost of debt measured for any year would be the sum of:*
>
> - *DRP measured relative to 10 year swap rates in the DRP averaging period; plus*
>
> - *The 10 year swap rate measured in the base rate averaging period.*"[191]

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[190]   CEG 2015, "The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt, Assessment and Calculations for AGN", June 2015, Section 8, paragraph 293. Provided as Attachment 10.22 to this AAI.

[191]   CEG 2015, "The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt, Assessment and Calculations for AGN", June 2015, Section 8, paragraph 295 to 297. Provided as Attachment 10.22 to this AAI.

For these reasons, AGN's proposal is to nominate separate averaging periods for each of the base rate and the DRP for the purposes of calculating the cost of debt using the hybrid transition approach and, to that extent, departs from the AER's Rate of Return Guideline.

For the placeholder cost of debt, AGN has used the following averaging periods:

- In respect of the base rate, the average of 1 to 10 year swap rates in the period 9 February 2015 to 6 March 2015.

- In respect of the DRP, the 10 year trailing average spread to 10 year swap; over the period from 1 July 2005 to 30 June 2014, plus the placeholder period of 9 February 2015 to 6 March 2015.

Confidential Attachment 10.2 sets out AGN's proposed final averaging periods with respect to the base rate and DRP for each year of the the AA period.

10.9.2 Calculation of the Cost of Debt

As set out above, AGN's proposal is to calculate the cost of debt by reference to separate averaging periods for the base rate and the DRP, such that the cost of debt for each regulatory year is calculated as the sum of:

- The 10 year swap rate measured in the base rate averaging period; plus
- The DRP measured relative to 10 year swap rates in the DRP averaging period.

10.9.3 Base Rate

The hybrid transition calculates a base rate consisting of the average of the swap rates for swaps that would still be in place for the relevant regulatory year. AGN proposes that the base rate for the cost of debt be calculated and updated annually in accordance with the hybrid transition methodology as follows:

- in the first year of the transition (2016/2017) – the average of one-to-10 year swap rates in the base rate averaging period for year 1;

- in the second year of the transition – 90% weight to the average of two-to-10 year swap rates in the base rate averaging period for year 1, and 10% weight to the 10 year swap rate in the base rate averaging period for year 2;

- in the third year of the transition – 80% weight to the average of three-to-10 year swap rates in the base rate averaging period for year 1, 10% weight to the 10 year swap rate in the base rate averaging period for year 2, and 10% weight to the 10 year swap rate in the base rate averaging period for year 3;

- …and so on for years four to nine, updating the weightings accordingly and adding the relevant average 10 year swap rate measured over the base rate averaging period for the relevant year; and

- in the tenth year of the transition – 10% weight to each of the 10-year swap rates in each of the base rate averaging periods from year 1 to year 10.

10.9.4 DRP

Added to the base rate is a DRP consisting of the historical average DRP for debt that would have been raised prior to the start of the first regulatory period and which would be yet to mature and the DRP for debt issued since the beginning of the ten year transition period, measured over the DRP averaging period. To be clear, AGN proposes that the DRP component of the hybrid transition be calculated and updated annually as follows:

- in the first year of the transition (2016/2017) – the historical average DRP for the 10 years ending 2015/16 using the averaging periods as set out in Confidential Attachment 10.2;

- in the second year of the transition – 90% weight to the historical average DRP for the nine years ending 2015/16 (using the averaging periods as set out in Confidential Attachment 10.2) and 10% weight to the DRP measured over the DRP averaging period for year 2;

- in the third year of the transition – 80% weight to the historical average DRP for the eight years ending 2015/16 (using the averaging periods as set out in Confidential Attachment 10.2) 10% weight to the DRP measured over the averaging period for year 2 and 10% weight to the DRP measured over the averaging period for year 3;

- …and so on for years four to nine, updating the weightings accordingly and adding the DRP measured over the DRP averaging period for the relevant regulatory year; and

- in the tenth year of the transition – the 10 year average DRP applying the DRP Averaging period set out in Confidential Attachment 10. 2.

10.9.5   Testing for Goodness of Fit

In respect of the data sources and extrapolation methods used to calculate the DRP for the hybrid transition AGN's proposal is that:

- In respect of the 8 years ending 30 June 2014, the DRP be calculated as the average of Bloomberg and Reserve Bank of Australia estimates extrapolated to 10 years using the AER methodology, the average DRP in each of these years is set out in Table 9 of the CEG report for AGN – the eight year average is 2.64%;

- In respect of the data source (or sources) and extrapolation method to be used for subsequent years, following completion of the DRP averaging period as set out in Confidential Attachment 10.2, testing be undertaken using the approach set out in Section 5 of the CEG report (June 2015) (calculating the sum of squared errors from observed bond data of difference in   third-party yield estimates[192] extrapolated to 10 years using AER and SA Power Networks extrapolation methodologies[193]); and

- the data source (or sources) and extrapolation method that provides the best fit to the data in accordance with this approach be used to calculate the DRP for each relevant year.

10.9.6   Placeholder Cost of Debt

In respect of the placeholder averaging period, AGN's proposed cost of debt is 5.44% (annualised) calculated as follows:

- base interest rate of 2.52% – measured as the average of one to 10-year swap rates over the AGN placeholder averaging period of 9 February 2015 to 6 March 2015; plus

- DRP of 2.35% – measured as the 10-year trailing average spread to the 10-year swap rate measured over the nine year period 1 July 2005 to 30 June 2014 plus the placeholder averaging period of 9 February 2015 to 6 March 2015; plus

- swap transaction costs of 23 basis points –reflecting the transaction costs of implementing a swap portfolio; plus

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[192]   AGN proposes to not rely on Bloomberg's published yield curve on the basis that Bloomberg is using the shape of the government bond yield curve to extrapolate its yield curve, resulting in published Bloomberg 10 year BBB BVAL estimates that are not robust for the AER's purpose. See CEG The hybrid method for the transition to the trailing average rate of return on debt, Assessment and calculations for AGN, June 2015, Section 7.

[193]   CEG 2015, "The Hybrid Method for the Transition to the Trailing Average Rate of Return on Debt, Assessment and Calculations for AGN", June 2015, Appendix A. Provided as Attachment 10.22 to this AAI.

- new issue premium of 27 basis points – which reflects the difference between the cost of debt faced by an issuer in the primary market (where service providers issue debt) and the estimate of yields on bonds observed in the secondary market (where the AER's cost of debt estimates are observed).

To this, debt raising costs of 17.84 basis points are added.

10.10 Summary of Cost of Debt

The fundamental difference between the AER's Option 2 and AGN's proposed approach relates to the way in which the AER transitions the return on debt to the trailing average. Rather than starting from the hybrid approach, the AER starts its transition with an "on" the day" approach. This is notwithstanding it is not actually a replicable debt management strategy, and that the AER accepts an efficient approach in previous periods was the hybrid approach and that on any view, the benchmark efficient entity's DRP already reflects a trailing average. The effect of the AER's transition approach in Option 2 is to:

- impose an unjustified/unnecessary transition to the DRP component of the cost of debt;

- impose a return on debt which undercompensates the benchmark efficient entities' efficient financing costs on the basis of alleged windfall gains under the "on the day" approach;

- estimate a return on debt which fails to meet the ARORO, the RPP and the NGO and which is not the best estimate available.

For the reasons set out in this submission, the Guidelines and AER's 2015 Decisions should be departed from and AGN's proposal for the cost of debt accepted.

11 AGN WACC Proposal

TABLE 5. WACC PROPOSAL

Parameters	AGN Proposal
Return on equity	9.91%
Return on debt	5.44%
Inflation	2.50%
Debt raising costs	0.1784%
Leverage	60%
Gamma (addressed in chapter 11)	0.25
Corporate Tax rate	30%
Nominal vanilla WACC	7.23%