15 March 2013

Mr James Cox PSM
Chief Executive Officer and Full Time Member
Independent Pricing and Regulatory Tribunal
PO Box Q290
QVB Post Office NSW 1230

Dear Mr Cox

Re: Sydney Water Submission to IPART discussion paper: Review of method for determining the WACC

I refer to the Independent Pricing and Regulatory Tribunal’s (IPART’s) discussion paper, Review of method for determining the WACC. We appreciate the opportunity to provide a submission on IPART’s discussion paper.

Sydney Water agrees with IPART that it is timely to review the method by which it sets the weighted average cost of capital (WACC) for price regulated businesses. The global financial crisis (GFC) has driven considerable volatility in the market-based parameters used in the capital asset pricing model (CAPM). Given IPART currently sets Sydney Water’s prices for a four year period, the current method may generate a WACC outcome that significantly under or over compensates a regulated business depending on the market outcomes observed over a short period of time. IPART’s current combination of forward-looking and historic parameters can generate WACC outcomes that deviate significantly from efficiently incurred debt costs, and reasonable returns to equity. IPART’s discussion paper, therefore, represents a positive development to an acknowledged problem.

As part of Sydney Water’s consideration of IPART’s discussion paper, we commissioned NERA Economic Consulting (NERA) to provide an Expert Report, which has explored options for setting a WACC consistent with an agreed set of regulatory objectives.

Regulatory objectives

Specifying the right objectives that are to be pursued by IPART in setting the WACC is central to this review. Arguably, the current issues with WACC outcomes stem from the fact that the method is seeking to pursue regulatory objectives that are not entirely suited to current and likely prevailing market conditions.

IPART’s discussion paper lists three stated objectives in setting a WACC: efficiency, similar economic risks and ‘new entrant’. These objectives are similar to those pursued by many economic regulators.

Sydney Water supports the objectives of efficiency and similar economic risks. Sydney Water and NERA’s Expert Report has expanded on these objectives, providing additional detail that
allows for a more explicit assessment of potential WACC methods against stated objectives. In setting a WACC each price determination, Sydney Water considers that IPART should apply a method that:

1. encourages efficient debt raising practices, and minimises distortions between the debt costs of an efficient water business and those allowed for in price determinations,
2. does not drive unnecessary refinancing and/or hedging costs,
3. provides for a return on equity consistent with businesses subject to similar economic risks, using a method more robust to the economic cycle,
4. ensures any regulatory discretion by IPART is exercised in a reasoned manner, based on a transparent and consistent framework, and
5. provides for regulatory certainty, allowing Sydney Water to confidently estimate its WACC (within established bounds) when considering its investment decisions, and in preparing its pricing submission to IPART.

Sydney Water does question the theoretical and practical merits of the ‘new entrant’ objective. In particular, pursuing the new entrant objectives has arguably contributed to the current volatility and issues with WACC outcomes. This issue is covered in more detail in NERA’s Expert Report.

As acknowledged in its discussion paper, in making price determinations, IPART is required to consider the matters listed under section 15 of the Independent Pricing and Regulatory Tribunal Act 1992. The WACC set by IPART each price determination has a large influence on the final prices paid by customers. Sydney Water would also note that the WACC is one element of the ‘building blocks’ approach to price setting used by IPART. As such, the method used to set the WACC needs to be consistent with the approach used to determine the other components of the building blocks model.

As such, Sydney Water considers that in undertaking its review, IPART should explicitly assess the likely outcomes of its chosen WACC method on the section 15 matters. Sydney Water believes that its stated objectives for the WACC are consistent with the section 15 matters. The objectives promote the setting of a WACC that is consistent with cost of providing services, encourages efficient investment, protects consumers from monopoly power, and provides for an appropriate return on funds invested.

**Cost of debt**

Sydney Water considers that it raises its debt finance in an efficient and prudent manner. Sydney Water raises all new debt, and refinances maturing debt, through TCorp. TCorp acts as Sydney Water’s broker in the market. Sydney Water, however, makes the strategic decision as to when transactions are undertaken, the type of debt sourced, and the term of the debt.

The majority of Sydney Water’s debt transactions are of a long term nature (around 10 years) to best match the long useful lives of the infrastructure. The debt portfolio is structured to ensure debt maturities are spread across the yield curve, and limits apply to the concentration of debt in any one maturity, to ensure liquidity risk is effectively managed. The debt portfolio is managed with the aim of minimising financing costs whilst maintaining appropriate controls over risk. Management review the portfolio strategy on a monthly basis.
The physical debt instruments available to Sydney Water from TCorp include Bonds, CPI indexed debt, floating rate notes and short term interest bearing debt. Sydney Water also has approval to use a range of derivative transactions, including interest rate futures and swaps if necessary. However, the use of derivatives has been limited in recent years as the physical debt market has met Sydney Water’s needs.

IPART’s current approach to setting the cost of debt in the WACC can vary significantly from the prudent manner by Sydney Water raises new debt and refinances maturing debt. With the observed volatility in forward-looking rates, the cost of debt set by IPART could differ by some 2% to Sydney Water’s prudently incurred average cost of debt. As Sydney Water currently has about $6 billion in debt finance, a 2% difference translates into some $120 million per year difference between assumed and actual debt costs. Sydney Water does not believe that economic regulation should drive such large differences between actual and assumed debt costs, when efficient debt raising practices are pursed by the price regulated business.

The most substantial change sought by Sydney Water is for IPART to change the way it determines the cost of debt for price regulated businesses. Sydney Water considers that the cost of debt should be set with reference to a ‘benchmark’ cost of debt, calculated and published by TCorp, using an agreed methodology. The benchmark would be based on prudent debt raising practices, especially maturity terms and average annual refinancing proportions. This approach is currently referred to as a ‘trailing average’, reflecting the fact that prudent financing practices limit the concentration of debt in any one maturity.

Given the current market volatility in debt costs, there could be a material difference between the annual updated benchmark and the assumed debt cost used to set prices over a four year period. Sydney Water considers that differences between the assumed and benchmark debt cost should be addressed through an annual price adjustment (done at the same time each year as other price adjustments, such as CPI).

NERA’s Expert Report outlines the proposed new method for calculating the cost of debt, focusing on the implementation issues that need to be addressed in moving to the proposed approach.

A reasonable return on equity
Sydney Water agrees with IPART that the current approach to estimating the cost of equity can result in estimates that may vary significantly from current market expectations for a sustained period of time. This outcome is not in the interests of Sydney Water or our customers.

Sydney Water supports NERA’s Expert Report, which recommends that IPART should avoid relying wholly on the capital asset pricing model (CAPM) to estimate the cost of equity. Rather, IPART should acknowledge any weaknesses with its preferred financial model, and have regard to a wider set of relevant approaches to estimating the cost of equity, including information contained in independent expert valuation reports. This additional information should guide IPART in setting the value of component parameters within the CAPM, such as the market risk premium and equity beta.
Regulatory discretion
It is not possible to specify a prescriptive or mechanistic approach to setting the WACC that is likely to be robust over the economic cycle. As such, IPART will need to exercise appropriate discretion in setting a WACC for price regulated businesses each price determination.

In exercising its discretion, Sydney Water considers that IPART needs to specify and apply a consistent and transparent framework by which it exercises such judgement. This framework should include consideration of the businesses’ ‘financeability’ and credit rating. Regardless of whether IPART chooses from within a ‘WACC range’ or applies judgement to individual WACC parameters, this discretion should be exercised in a consistent and transparent manner. In doing so, IPART will promote the certainty and transparency of its price setting process.

Progressing a more robust method to setting the WACC
Sydney Water considers that substantial change is necessary to allow IPART to set a WACC consistent with sound regulatory objectives together with the matters contained under section 15 of its Act. IPART has the opportunity to provide regulatory leadership in developing a method for setting the WACC that is far more robust to the economic cycle.

It will be necessary for IPART to develop new methods, and incorporate far more information into its processes. Given the level of change necessary, Sydney Water does not consider it possible for IPART to conclude the basis on which it sets the WACC by the planned date of May 2013. Instead, Sydney Water considers that IPART will need to progress the practical implementation of a new approach in detail over a number of months. Sydney Water would welcome the opportunity to work with IPART in implementing a more robust method for setting the WACC.

Thank you for the opportunity to provide a submission on the setting of the WACC. We look forward to further consultation with you as the review progresses. For further information, the relevant contact is Sandra Gamble, General Manager, Business Strategy and Resilience, who may be contacted on telephone (02) 8849 6884.

Yours sincerely

Kevin Young
Managing Director
IPART’s WACC methodology discussion paper

A report for Sydney Water

14 March 2013
Project Team

Greg Houston

Brendan Quach
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Executive Summary

This report has been prepared by NERA Economic Consulting (NERA) at the request of Sydney Water Corporation. Its purpose is to be submitted to the Independent Pricing and Regulatory Tribunal (Tribunal) and to respond to the Tribunal’s discussion paper entitled *Review of method for determining the WACC* (Discussion Paper).

Our report is structured so as to respond to a number of specific questions posed by the Tribunal concerning:

- the weighted average cost of capital (WACC) objective;
- the allowance for the cost of debt; and
- the estimation of the cost of equity.

In section 2 we conclude the Tribunal’s objective to *set a value that reflects the efficient cost of capital for a ‘benchmark utility’* is in line with those used by other Australian regulators. However, the three additional characteristics cited by IPART are neither necessary nor helpful to the question of how the WACC should be determined, ie:

- fundamentally, the setting of the regulated rate of return cannot mimic (to a greater or lesser extent) the effects of product market competition;
- the clarification that the WACC should reflect only market risks rather than company specific risks is unnecessary since this is a natural consequence of an efficient cost of capital (as required by the overreaching WACC objective); and
- the requirement for the WACC to reflect the costs of a new entrant is deeply unhelpful since:
  - there is no economic rationale for setting the WACC by reference to a new entrant’s costs without applying a similar principle to all other cost components;
  - the principle distorts the financing practices that firms with long lived assets would otherwise undertake in the absence of regulation; and
  - it is inconsistent with the development of a trailing average cost of debt, a methodological refinement that has the potential to reduce equity return volatility and smooth customer prices over time.

Section 3 considers the financing practices of efficient infrastructure service providers and concludes that, in the absence of regulation, firms would seek to minimise refinancing risk by:

- issuing longer term debt, thereby limiting the number of occasions that debt must be rolled over; and/or
- staggering debt maturity dates over time, thereby minimising the amount of debt that must be refinanced in any given time period.

It follows that the term of benchmark debt should not reflect the length of the regulatory period. Rather, a benchmark term of 10 years is appropriate. Further, at any point an efficient infrastructure service provider’s actual cost of debt would reflect an average of its historical
debt issuances. It follows that a regulatory framework which uses current debt yields has the potential to set an allowance for the cost of debt that differs substantially from a firm’s actual debt costs.

The introduction of a trailing average cost of debt has the potential to be welfare enhancing since:

- the cost of debt allowance will better reflect the debt financing practices of a benchmark efficient infrastructure service provider with long-lived assets;
- reduces the need for regulated utilities to entering into complex hedging arrangements to lower the risk of their actual debt portfolios;
- it is likely to reduce the volatility of the returns to equity and so provide a better environment for investment;
- it would remove the incentive for infrastructure service providers to refinance their debt close to the reset period and so avoids the significant refinancing risk associated with this practice; and
- it provides the infrastructure service provider with a reasonable opportunity to recover at least the efficient debt costs associated with the provision of regulated services over the long term.

We note that development of a trailing average will involve a number of implementation issues. However, in our opinion, the benefits outlined above justify the Tribunal actively engaging with stakeholders on the development of a trailing average cost of debt for regulated utilities.

Section 4 of our report examines the Tribunal’s proposed approach to estimating the cost of equity. The task of estimating the cost of equity cannot be undertaken with a high degree of precision, and necessarily involves a degree of uncertainty.

In our opinion, a regulator that limits its assessment of the cost of equity to a single financial model, such as the capital asset pricing model (CAPM), is unlikely to produce a high-quality estimate of the required return. This is because there are a number of known weaknesses in the empirical performance of the CAPM, including:

- a number of studies have found that estimates of the cost of equity derived from the CAPM do not closely match observed returns;
- the consistent finding that the CAPM underestimates the return on low beta stocks and overstates the return on high beta stocks; and
- factors other than beta have been found to explain the observed returns.

The consequence of these known weaknesses is that the Tribunal should avoid relying wholly on the CAPM to estimate the cost of equity for regulated infrastructure service providers. Rather, the Tribunal should acknowledge any weaknesses with its preferred financial model and have regard to a wider set of relevant approaches to estimating the cost of equity.

A review into the cost of equity that considers a variety of relevant methods, models and market data has the potential to provide additional insights into what equity investors actually
require as compared with a review that restricts itself to just the CAPM. In our opinion, relevant information of the cost of equity for a benchmark firm can be extracted from, at least, an assessment of;

• alternative financial models such as the Black CAPM, or the Fama-French three-factor model;
• estimation methods such as dividend growth models;
• market data such as independent valuation reports; and
• business transactions such as the sale of the Sydney desalination plant.

The Tribunal has indicated that these approaches could potentially provide a cross check to estimates of the cost of equity derived from the CAPM. In our opinion, this approach is unnecessarily limited and all relevant information should form part of an evidence-based approach to estimating the cost of equity. This may potentially take the form of utilising alternative approaches to inform the value of component parameters within the CAPM, such as the market risk premium and equity beta.

Finally we observe that determining a point estimate for the cost of equity requires more than the simple application of an average of the upper and lower plausible boundaries. Averages are a blunt instrument and implicitly assign a similar weight to all observations of the cost of equity, even when it is inappropriate to do so. Averaging a poor (biased) estimate with a good (unbiased) estimate will not result in a high quality estimate of the cost of equity for a benchmark firm.

In our opinion, a high quality cost of equity decision requires one to:

• pursue an evidenced-based assessment of the cost of equity rather than focusing on potential theoretical or methodological infirmities of a particular model or method;
• consider all relevant sources of information, which requires, amongst other things:
  — estimating (where feasible) the value or values that are implied by each relevant source of information;
  — acknowledging both the strengths and weaknesses of each model/method; and
  — assess their evidentiary strengths and weaknesses in terms of their capacity to determine the cost of equity that is consistent with the efficient cost of capital for a ‘benchmark utility’; and
• in determining the point estimate of the cost of equity, provide reasons in a logical and (statistically) unbiased manner.

The principal benefit of high quality cost of capital decisions is their ability to increase regulatory certainty and thereby improve the investment environment to the benefit of both regulated entities and end users.
1. Introduction

This report has been prepared by NERA Economic Consulting at the request of Sydney Water Corporation. Its subject is the evaluation of a number of options for setting a WACC, consistent with an agreed set of regulatory objectives. Its purpose is to respond to the Independent Pricing and Regulatory Tribunal’s (Tribunal’s) discussion paper titled the ‘Review of method for determining the WACC’ and in particular, to a number of specific questions posed by the Tribunal in that paper.

Developments in global financial markets since the global financial crisis (GFC) as well as the Australian Energy Markets Commission’s (AEMC’s) recent rule changes applicable for energy network service providers highlight the risks of excessive reliance on a single method for estimating the WACC. These developments have led the Tribunal to question the robustness of its current WACC methodology.

The report assesses the current methodology for calculating the WACC and focuses on estimating the expected cost of debt and the expected cost of equity. We also analyse whether consideration of alternative methods for estimating the cost of equity are consistent with the Tribunal’s objective to set a WACC that reflects the efficient cost of capital for a benchmark “efficient utility”.

To the extent that the Tribunal proposes to use regulatory discretion, we also discuss requirements directed at ensuring consistent and transparent decisions eventuate, and that they promote continued investment in utilities and efficiency in the market.

1.1. Structure of this report

Our report is structured as follows:

• Section 2 discusses the objectives for the WACC, with particular attention to the problems with including reference to a new entrant costs, and sets out a number of further considerations to which regulators should have regard;
• Section 3 discusses the estimation of the expected cost of debt; and
• Section 4 evaluates the methodology for calculating the expected cost of equity and the benefits and limitations of the current approach, as well as the potential benefits of considering a variety of methods, models, market data in the estimation of the cost of equity.

We have prepared this paper based on our experience in advising regulators and stakeholders on how best to determine the WACC to promote a set of efficiency related objectives.
2. **WACC Objective**

The discussion paper invites comments on the Tribunal’s existing WACC objective. The Tribunal stated aim is to set a value that reflects the efficient cost of capital for a ‘benchmark utility’. Further, in determining the WACC for a hypothetical benchmark infrastructure service provider the Tribunal instills a number of additional characteristics, ie:

- **it is efficient** – ie, the WACC should seek to encourage greater efficiency by stimulating the effects of competition;
- **it faces similar economic risks to the regulated business** – ie, the WACC should compensate for similar market risks associated with general economic trends not risks that are specific to that business;
- **it is a new entrant** – ie, the WACC should reflect the costs of a new entrant since it creates a strong incentive for regulated businesses to achieve the most efficient financing outcome overall.

In addition, the Tribunal also states that, in practice, the WACC is estimated using data on privately-owned firms.

The overarching objective, ie, the aim to set a value that reflects the efficient cost of capital for a ‘benchmark utility’ is in line with those used by other Australian regulators. However, in our opinion the three additional characteristics specified by the Tribunal are neither necessary nor helpful.

The first unnecessary and unhelpful interpretation of this objective is the Tribunal’s suggestion that the objective of the WACC methodology should be to stimulate the effects of competition so as to encourage greater efficiency. In our opinion, this suggestion is unlikely to be of any utility in a discussion of the appropriate method for determining the WACC.

Fundamentally, the setting of the regulated rate of return by one method or another cannot mimic (to a greater or lesser extent) the effects of product market competition in relation to infrastructure. By definition, the services provided by natural monopoly infrastructure are generally not subject to the forces of competition, and it is difficult to imagine how one or another approach to determining the regulatory WACC can simulate those effects. Even if one or other approach to the WACC methodology could simulate the effects of competition, it is not at all clear whether this may be efficiency enhancing. Since competition involves risk, and increased risk raises the cost of capital, there would need to be strong evidence of the efficiency benefits of introducing any such risk into the WACC methodology before it could be held out as welfare enhancing.

Alternatively, this aspect of the Tribunal’s proposed objective might be interpreted as suggesting that the WACC should reflect the cost of capital that would be faced by a service provider operating in an effectively competitive market. However, this perspective is also

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1. See clauses 6.5.2(c) and 6A.6.2(c) of the National Electricity Rules (NER) that specify the allowed rate of return objective to apply to electricity distribution and transmission network service providers.
unlikely to offer any utility to the question of how the WACC should be determined – particularly since the risks arising in a hypothetical, effectively competitive product market may well be different from those arising in the particular market in which the regulated services are to be provided.

In our opinion, the most important form of competition to take into account in determining the WACC methodology is that arising in the market for capital itself. This perspective requires that the WACC methodology reflect the risks associated with the provision of the services. Further, it also implies that the WACC methodology should be established and applied in a manner that minimises those risks over the long term, since this is itself likely to be welfare enhancing.

The second interpretation of the WACC objective identified by the Tribunal is that the WACC should reflect only market risks rather than company-specific risks. However, this characteristic is an unnecessary clarification, since it is a natural consequence of an efficient cost of capital. In other words, if a risk can be avoided (such as company-specific risks) then a WACC that compensates a regulated entity for this risk cannot be deemed efficient.

Finally, the third aspect of the WACC objective identified by the Tribunal is that which requires the WACC to reflect the costs of a new entrant. In our opinion, this characteristic is deeply unhelpful, and is likely to inhibit the potential for efficiency-enhancing development of the WACC methodology.

The new entrant objective has its origins in the principle that regulation should, as far as possible seek to imitate the outcomes of a competitive market and, in particular, to institute circumstances where prices are constrained by the entry, or threat of entry, by new producers.

For prices to reflect those of a new entrant it is necessary for all costs components to be estimated by reference to the new entrant benchmark. However, although the Tribunal apparently seeks to establish at each price review a ‘new entrant’ WACC, it neither cites nor applies this principle to determine other cost components, such as:

- the valuation of existing assets,
- the costs of new capital expenditure (which, rather, reflect the consequences of the existing – rather than new entrant – network infrastructure);
- operating and maintenance costs; and
- company tax costs.

In our opinion, there is no economic rationale for setting the WACC by reference to a new entrant’s costs when a similar benchmarking principle is not applied to all other cost components.

Further, setting the WACC by reference to a new entrant’s cost of capital is unlikely to achieve the most efficient financing outcome overall. This characteristic means that the WACC is reset to the new entrant’s costs at every regulatory determination. Although this approach may be a reasonable for determining the cost of equity, a benchmark that refines all debt every four years (as is the case for Sydney Water) is unrealistic and distortionary.
Companies with large external capital requirements, such as utilities, would never allow a position to develop where they are required to refinance all their debt within a small window of time such as 20-40 days. To do so would expose the firm to unacceptable levels of refinancing risk and would conceivably result in firm suffering a substantial credit downgrading. The risks associated with such a strategy were highlighted in the period following the bankruptcy of Lehman Brother’s when global credit markets essentially closed down. During that period there was a real risk that firms that were otherwise solvent (ie, where a firm’s assets have a greater value than its debts) could become insolvent due to the maturing of debt that could not be refinanced. Instead of having all debt being refinanced at a single point in time, firms seek to mitigate refinancing risk by evenly distributing their debt refinancing requirements over time.

Notwithstanding these risks, setting the WACC on the basis of new entrant costs creates a potent incentive for regulated entities to accept substantial refinancing risk. Regulated firms that refinance their debt just prior to the start of each regulatory period are able to hedge their debt costs with the debt allowance provided in their reset prices/revenues. In effect the setting of a debt cost allowance on the basis of a new entrant distorts the financing practices that firms with long lived assets would otherwise apply in the absence of regulation.

A further consequence of the new entrant objective is its inconsistency with the development of a trailing average cost of debt. A trailing average cost of debt has the potential to remove the perverse incentives associated with setting the cost of debt by reference to new entrant costs. When the Australian Energy Market Commission (AEMC) considered the issue of a trailing average cost of debt, it concluded:

> Historical trailing average approaches have sufficient merit to be an option for regulators to consider.

To conclude, the Tribunal’s objective to set a value that reflects the efficient cost of capital for a ‘benchmark utility’ is sound. However, the three additional characteristics of an efficient benchmark utility cited by the Tribunal are neither necessary nor helpful. Rather, to the extent that the Tribunal believes that the WACC objective requires further clarification, in our opinion it should consider affirming that:

- for the purposes of determining the WACC, the relevant benchmark infrastructure service provider is a privately-financed entity;
- the WACC should reflect a rate that is at least sufficient to facilitate efficient investment in the industry over the long term; and
- the WACC should seek to minimise any distortions to what would otherwise be the efficient financing practices of the benchmark firm.

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2 An example of a company that found itself in such as position is Centro, which had to refinance $1.3 billion in maturing debt in the late 2007/early 2008.

3. Cost of Debt

Determining the cost of debt for the purpose of setting the WACC involves three distinct steps:

1. the articulation of the characteristics of the debt benchmark against which the cost of debt is to be estimated, such as Australian dollar denominated corporate debt, issued by Australian entities, with a Standard and Poor credit rating of BBB and a term of 10 years;

2. the specification of the time profile over which this benchmark should be estimated, i.e., whether a spot estimate updated at each regulatory price review, or an historical trailing average estimate, or some combination of the two; and

3. the development of a methodology for estimating the cost of debt by reference to the specified benchmark.

Notwithstanding, the Tribunal’s Discussion Paper seeks responses on:

• only one characteristic of the cost of debt benchmark, namely its term; and
• whether or not a debt benchmark should be estimated by reference to the applicable spot rate at each price review, or a trailing average.

Although the Tribunal has not sought submissions on its methodology for estimating the cost of debt by reference to its proposed benchmark, in our opinion there are a number of important, outstanding methodological problems with the approach adopted in the Tribunal’s most recent decisions.

One such outstanding problem is that the Tribunal’s methodology does not explicitly recognise that the term structure of debt is non-linear. The consequence of this non-linearity is that averages, weighted averages and/or median values of a sample of bond yields do not provide robust information on the prevailing yield of the benchmark form of debt.

Notwithstanding this observation, in the remainder of this section we focus on the three distinct steps that we identify above.

We also note that all other Australian regulators have developed methodologies that derive a point estimate of the cost of debt. In our opinion developing a methodology to provide a point estimate of the cost of debt allowance has few drawbacks. Furthermore, this point estimate could then be applied in the Tribunal’s post-tax revenue modelling in a manner that ensures consistency between the allowed return on assets and the calculation of tax costs.

3.1. Efficient financing of infrastructure service’s

In our opinion, the most helpful reference point from which to assess the methodological issues arising in the three steps we identify above is to assess the approach to debt financing that would be adopted by a business that was providing services by means of long-lived assets, but not subject to any form of administrative price determination. A service provider in such circumstances can be expected to pursue an efficient approach to debt financing, following established principles of debt portfolio management. We explain these below.
Debt is used (in conjunction with equity) to finance the capital investments necessary to operate a business. The predominant investments made by most infrastructure service providers are in long lived assets – average asset lives of 40 years or more at the date of their commissioning are the norm.

In an ideal world, a firm making such long term capital commitments would seek to match the term to maturity of its debt finance with the economic lives of its assets. Such an approach would remove the requirement to roll over (or refinance) the debt used to support the initial investment. However, it is generally neither possible nor economic to raise debt for terms even close to the typical average asset lives of infrastructure service providers. In consequence infrastructure service providers must periodically roll over their debt, which gives rise to refinancing risk.4

Efficient firms seek to minimise refinancing risk, although it can never be completely eliminated. Refinancing risk is greatest if all debt falls due at a single point in time. Alternatively a firm can minimise refinancing risk by:

- issuing longer term debt, thereby limiting the number of occasions that debt must be rolled over; and/or
- staggering its debt maturity dates over time, thereby minimising the amount of debt that must be refinanced in any given time period.

Counterbalancing the desire for longer term debt is that borrowers generally must pay relatively higher yields for longer term debt, since investors in long dated debt forgo the potential to seek higher returns for an extended period. This phenomenon was recognised by the AER in its 2009 WACC review, where it concluded that:5

network business will seek to include long term debt in their portfolios so as to mitigate refinancing risk. However, it is clear that the preference for long term debt is balanced with the competing objectives of:

- the need to diversify across different maturities, and
- minimising the overall cost of debt.

In other words, in the absence of any form of economic regulation, an efficient infrastructure service provider would finance its long lived assets with a portfolio of long term debt with staggered maturity dates so as to minimise refinancing risk.

Furthermore, an efficient firm’s pattern of borrowing is also likely to be influenced at the margin by fluctuations in the market cost of debt. When the cost of long term debt is thought

4 Refinancing risk refers to the possibility that a borrower cannot repay its debt obligations when they fall due. This may occur even though the firm’s assets are greater than its liabilities (i.e., a positive net worth), because the firm nevertheless cannot raise sufficient liquid funds to pay creditors as those obligations come due. The existence of aberrant capital market conditions – such as those seen during the most disruptive periods of the global financial crisis, provide a pertinent example.

5 AER, Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters: Final decision, May 2009, page 152.
to be relatively more expensive than shorter term debt, an efficient firm can be expected to reduce the duration of new debt raisings, while the vice versa is likely to apply when long term debt is thought to be relatively cheap. Importantly, changes in the average duration of a firm’s debt portfolio also bring about change to the level of refinancing risk that is being borne.

By way of practical example, infrastructure service providers typically have explicit policies that serve to limit their exposure to refinancing risk by restricting the amount of debt maturing in any given year, eg.\textsuperscript{6}

\begin{quote}
In relation to refinancing risk the Policy states that no more than 15\% of the debt portfolio should mature in any one financial year.
\end{quote}

The consequence of putting such principles into practice is that a firm’s actual cost of debt at any point in time reflects an historical average of a portfolio of debt maturities, with tranches of this portfolio continually being refinanced at the ‘spot’ cost of debt.

3.2. Distorting effect of price regulation

Notwithstanding the clarity of the principles that would be applied by an efficiently financed infrastructure service provider that was not subject to economic regulation, the methodological framework for establishing the cost of debt allowance adopted by the Tribunal and all other Australian regulators has developed by reference to a reverse chain of logic. In our opinion, the prevailing logic is flawed, and should be revisited.

In particular, the methodology for measuring the cost of debt adopted by the Tribunals (and, hitherto, virtually all Australian regulators) requires that the cost of debt allowance for an infrastructure service provider’s entire portfolio of debt be reset by reference to the spot rate applying prior to the commencement of each regulatory period. The generally cited justification for this approach essentially states that, since the regulatory process involves resetting the financial returns to an asset for periodic, fixed terms, the cost of debt allowance should reflect the regulatory construct.

In our opinion, this step in logic is mistaken. Instead of designing a cost of debt methodology that best fits the periodic, four or five yearly regulatory redetermination of prices, the regulatory approach to the cost of debt methodology should, as far as practicable, reflect the approach that would be taken by a benchmark, efficient firm investing in long-lived assets that were not subject to administrative price determination.

The problem with the current cost of debt adopted by regulators – including the Tribunal – is that the debt financing strategy that minimises the risk that an infrastructure service provider’s actual cost of debt will vary from its regulatory allowance would involve raising (and re-raising) all of its debt finance immediately prior to the commencement of each (typically four- or five-year) regulatory period. However, the discussion above highlights that

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such a debt finance strategy that involves mismatching the process for determining the regulatory allowance is highly risky, since it involves a very high degree of refinancing risk.

Further, for many infrastructure service providers – and particularly including Sydney Water, which has approximately $6 billion of outstanding debt – it would not (economically) be possible to raise sufficient debt finance within the relatively short sampling period typically adopted by the Tribunal, which is generally in the order of 20 trading days.

In our opinion, the range of matters that must be addressed in determining an appropriate methodology for the cost of debt could be approached with a great deal more clarity if it were accepted as a guiding principle that:

The regulatory approach to the cost of debt should be designed so as best to reflect the efficiency financing practice of an infrastructure service provider that was not subject to price regulation.

Upon acceptance of this guiding principle, the vast proportion of the steps that we identify in section 3.3 as necessary for the development of any methodology for determining the cost of debt would become clear. For example:

- the substantial body of empirical data supporting the proposition that utilities such as Sydney Water issue debt of an average term close to 10 years would lead to the clear conclusion that ten years was an appropriate term for the debt benchmark; and
- further, that the fact that the term of the regulatory pricing period is four (or five) years is not a relevant consideration for determining the term of the debt benchmark, since regulation should reflect efficient financing practice, not the other way around; and
- finally, there is no financial instrument that can avoid the additional credit risk premium that debt owners require for accepting ten year debt. In other words, firms using financial instruments to convert 10 year debt into two consecutive five year debt instruments retain the 10 year credit risk premium.

3.3. Trailing average

The current approach to estimating the cost of debt allowance is to estimate the benchmark debt over 20 days at a date close to the Tribunal’s final determination. The principal difference in adopting a trailing average cost of debt would be to extend that estimation period from 20 days to one that covers a period of years. For example, benchmark debt yields could be estimated for each year over the preceding decade, and a trailing average could be constructed as a simple average of these 10 annual average yields.

The introduction of a “trailing average” cost of debt has the potential to be welfare enhancing since:

- the cost of debt allowance will better reflect the debt financing practices of a benchmark efficient infrastructure service provider with long-lived assets;
- reduces the need for regulated utilities to entering into complex hedging arrangements to lower the risk of their actual debt portfolios;
• it can reduce the volatility of the returns to equity and so provide a better environment for investment;
• it would remove the incentive for infrastructure service providers to refinance their debt close to the reset period and so avoids the significant refinancing risk associated with this practice; and
• provides the infrastructure service provider with a reasonable opportunity to recover at least the efficient debt costs associated with the provision of regulated services over the long term.

In other words, establishing a cost of debt allowance using trailing average estimate could be designed to closely mimic the debt financing practices of a benchmark efficient infrastructure service provider with long-lived assets. A trailing average cost of debt allowance would then be expected:

• to provide infrastructure service provider with a reasonable opportunity to recover at least the efficient cost of providing the regulated services; and
• to reduce the extent of debt financing risks faced by an infrastructure service provider, eg, by reducing the possibility that the cost of debt actually incurred by a firm differed substantially from its cost of debt allowance.

The potential for a mismatch between a firm’s actual cost of debt and the regulatory cost of debt allowance embedded in the current approach unnecessarily increases the volatility of returns to equity.7 As a matter of principle, any reduction in this risk that can be delivered by the adoption of a trailing average is likely to improve the environment for investment in regulated infrastructure and so be welfare enhancing.

We note that there are a number of possible forms in which a trailing average could be applied to set the regulatory cost of debt allowance. For example, a trailing average could be determined:

• at the start to the regulatory period on the basis of:
  ─ a trailing average of the total cost of debt benchmark yield; or
  ─ a trailing average of the debt risk premium; or
• at the start of the regulatory period and updated each year on the basis of a rolling trailing average of the total cost of debt.8

The developing a trailing average mechanism is likely to be substantive task that will require active engagement with relevant stakeholders and so may necessitate a process outside the

7 Where the actual cost of debt is greater than its cost of debt allowance, the profitability of the NSP will be less than the allowed return on equity. Alternatively, where the actual cost of debt is less than its cost of debt allowance, the firm’s profitability will be higher than the allowed return on equity.

8 For example, the cost of debt in 2016 could be estimated on the basis of a trailing average benchmark debt yields over the 2006 to 2015 period. While in 2017, the cost of debt would be estimated on the basis of benchmark debt yields over the 2007 to 2016 period, and so on.
Tribunal’s current WACC review. The development of a practicable form of trailing average that can be applied to determine allowable revenues of regulated utilities will require the Tribunal:

• to determine the form of trailing average that it deems is most appropriate for regulated infrastructure service providers;
• to establish a clear debt benchmark that the trailing average will be measured;
• to formulate the mechanism that determines how the trailing average will be established, ie:
  – how often the benchmark will be measured (annually, end of week, month, quarter);
  – over what period the trailing average is the trailing average to be measured, ie, 5 or ten years; and
  – should the trailing average be weighted, if so how, ie a simple average, or one that weights the debt financing requirements of the infrastructure service provider.

Further, a trailing average that was to be updated annually will also require the development of:

• a mechanism in the price/revenue control formula that would allow updated debt allowances to be incorporated; and
• an replicable mechanism that would allow the debt benchmark to be automatically updated annually.

Consideration will also have to be had to the need for appropriate transitional provisions. Transitional provisions will be necessary to mitigate the risk that implementing a trailing average did not result in any unintended outcomes to the detriment of infrastructure service providers and/or end users.

Notwithstanding, these implementation issues it is our opinion that the potential benefits of a trailing average cost of debt are substantial and that the Tribunal should actively engage with stakeholders on the development of a trailing average cost of debt mechanism.
4. **Cost of Equity**

Equity owners have a right to the residual cash flows of a business. The return that investors require to accept the risks associated with equity is the subject of considerable interest, uncertainty and cannot be determined with a high level of precision. Unlike the fixed and known contractual payments of bonds, it is difficult to determine what the residual equity earnings are in advance. In consequence, it is not possible to observe the cost of equity directly.

Although the cost of equity can be estimated or imputed from a variety sources such as financial models, estimation methods and market data, the Tribunal has indicated its preliminary view that the Capital Asset Pricing Model (CAPM) provides the best estimate of the expected cost of equity.

4.1. **Sources other than the CAPM**

The cost of equity can be estimated by reference to a variety sources such as financial models, estimation methods and market data. Financial models are simplified mathematical statements of hypothesised investor behaviour. These models allow us to interpret what is happening in financial markets. A near universal assumption contained in all financial models is that:

- investors require extra return for taking on risk; and
- investors are predominately concerned with risks that cannot be avoided through diversification.

Furthermore, all financial models have distinct strengths and weaknesses and no one model can be said to be unambiguously superior to all others. In this respect, we believe that considerable insight can be found in the history of regulatory decisions in the United States of America (US). US regulators and courts have had to grapple with issue of how to estimate the cost of equity for regulated utilities for over 100 years. In assessing the information derived from financial models, US regulators have embraced the “end-result” doctrine that was developed from the *Hope* case.\(^9\) This doctrine is expressed:\(^10\)

> It is the result reached and the impact of the rate order rather than the method or theory employed that is controlling. Potential infirmities inherent in the methods used are of secondary importance, according to this doctrine. This is a reassuring assertion, given the stringency and surrealism of the assumptions that frequently characterize the financial models and theories employed in the determination of a fair return.

Under such an approach, the paramount consideration is the empirical validity of the model outcomes, assessed by reference to the WACC objective. It follows that a financial model

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would not be excluded from consideration solely because of any perceived theoretical deficiency.

Given the Tribunal’s preliminary views as to the primacy of the CAPM, the logical starting point of any assessment of what, if any, other models should be considered is an appreciation of the strengths and weakness of the primary financial model.

4.2. The strengths and weaknesses of the CAPM

The CAPM is an elegant model with a simple and intuitive theoretical basis that significantly advanced the field of financial theory. Sharpe (1964) and Lintner’s (1965) insight was that the return that investors require on an individual asset will be determined not by how risky the asset would be if held alone, but by how the asset contributes to the risk of the market portfolio.\(^\text{11}\)

The simplicity and insight to portfolio analysis means that CAPM is normally the first financial model taught to finance students. Further, the CAPM has been widely used as the single financial model used by Australian regulator authorities to estimate the cost of equity for regulated businesses. Also surveys indicate that the CAPM is applied by a large number of businesses to estimate the cost of equity. Despite the universal acceptance of the CAPM by Australian regulators, the empirical validity of the model has never been explicitly assessed.

The empirical performance of the CAPM has a number of known weaknesses including that:

- a number of studies that have found that estimates of the cost of equity derived from the CAPM do not closely match observed returns;\(^\text{12}\)
- it underestimates the return on low beta stocks and overstates the return on high beta stocks;\(^\text{13}\) and


Sharpe won the Nobel Prize in Economics in 1990 for his work on how assets are priced.

\(^\text{12}\) The empirical version of the Sharpe-Lintner CAPM that uses a portfolio of stocks as a proxy for the market portfolio fails both of these tests. Sharpe’s paper introducing the Sharpe-Lintner CAPM was published in 1964, but the tests that Fama and MacBeth (1973) conduct on data from before 1964 reject the model. See:


The tests that Campbell (2004) and Lewellen, Nagel and Shanken (2008) conduct using data drawn for the most part from after 1964 also reject the model. See:


• factors other than beta have been found to explain the observed returns.\textsuperscript{14}

It is important to distinguish that these criticisms are not directed towards the theoretical ideal CAPM, which is impossible to test. Rather, such analysis is focused on the practical application of the CAPM as normally applied by Australian regulators, which necessarily differs from the theoretical ideal, since:

• the CAPM states that the market portfolio should include \textit{all} assets – although the empirical model normally just includes stocks,\textsuperscript{15} as Ibbotson, Siegel and Love (1985) point out, stocks make up a relatively small fraction of total wealth, and so the return to a portfolio of stocks need not track closely the return to total wealth;\textsuperscript{16} and

• the CAPM is an expectations model and so should be populated with investor’s forward looking expectations of beta and the return on the market; however, in practice these parameters are estimated using historical data, either because expectations are immeasurable (beta) or difficult to measure (MRP).

In our opinion, these issues suggest that the Tribunal should avoid a simple mechanical application of the CAPM. Rather the Tribunal should acknowledge the weaknesses associated with its preferred financial model and have regard to a variety of relevant approaches to estimating the cost of equity. In the following section, we outline a non-exhaustive list of other relevant sources of information on the cost of equity.

\section*{4.3. Other models and methods}

The Discussion Paper asks what, if any, alternative financial model should the Tribunal consider to use to estimate the cost of equity as a cross check. We strongly support the sentiments expressed by the Australian Energy Markets Commission’s (AEMC’s) finance advisors, who stated:\textsuperscript{17}

\begin{quote}
\textit{If the goal is to produce the highest-quality estimate of the required return on equity – the value that most closely corresponds with what equity investors would actually require from an investment in the benchmark firm – the question is whether restricting the estimation approach to the CAPM only is more likely to produce the highest-quality estimate. In our view it is difficult to make the case that allowing the regulator to consider more information about the required return on equity would systematically result in lower-quality estimates.}
\end{quote}

In our opinion, the use of alternative sources of information on the cost of equity should not be restricted to financial models alone. Rather, regulators should have regard to all relevant

\textsuperscript{14} It has long been known that small firms and firms with high book-to-market ratios earn returns that are too high for the CAPM to explain. These observations lead to the development of the Fama-French three-factor model.


\textsuperscript{17} SFG Consulting (SFG), \textit{Preliminary analysis of rule change proposals: Report for AEMC}, 27 February 2012, paragraph 109.
information. reflecting the potential relevancy of alternative sources of information, in its recent change to the cost of capital framework, the AEMC introduced a requirement for the AER to have regard to:18

relevant estimation methods, financial models, market data and other evidence

Possible sources of relevant information could include:

- alternative financial models such as the Black CAPM, or the Fama-French three-factor model;
- estimation methods such as dividend growth models; and
- market data such as independent valuation reports.19

The following sections provide a short description of each of these approaches and their potential to provide relevant information on the cost of equity for regulated utilities.

4.3.1. **Black CAPM**

The primary insight of the Black CAPM is that the Sharpe-Lindner CAPM will systematically underestimate the expected return on low beta stocks and overstate the expected returns of high beta stocks. The Black CAPM is a more general version of the CAPM by relaxing the assumption that investors can borrow or lend freely at a single risk-free rate.

Black (1972), Vasicek (1971) and Brennan (1971) examine the impact of relaxing the assumption that investors can borrow or lend freely at a single rate.20 In specifying the Black CAPM, it is common to assume that the difference between the zero-beta and the risk-free rates, referred to as the zero-beta premium, is a constant through time.21 Thus the Black model is:

\[ E(R_j) = R_f + \beta_j [E(R_m) - R_f - z] \]

where

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18 See clauses 6.5.2(e)(1) and 6A.6.2(e)(1) of the National Electricity Rules and clause 87(5)(a) of the National Gas Rules.

19 Independent expert reports are provided by experienced corporate advisers in the context of market transactions, such as mergers and acquisitions. In forming an opinion on the valuation of the asset or shares, the independent expert generally either applies a capitalisation multiple to a current or prospective earnings or cash flow value, or applies discounted cash flow (DCF) valuation. The latter involve an explicit estimate of a firm’s cost of capital.

Since these are publicly available documents, the cost of equity range developed therein as well as other individual parameter estimates are a potentially helpful source of independent expert opinion on the cost of equity of comparable businesses.


The principal deficiency of the Black CAPM is that the empirical estimates of the model do not conform to its theoretical predictions. Specifically, the estimated zero-beta premium does not fall between risk free lending and borrowing rates. Instead estimates of the zero-beta premium commonly exceed the MRP, ie, the estimated returns on low beta stocks are above high beta stocks. We note that this finding is also troubling, if not more so, for empirical versions of the CAPM.

Notwithstanding the deficiency of the Black CAPM, the insight provided by Black, Vasicek and Brennan suggest that the Tribunal should be careful not to simply apply the CAPM mechanismically especially in circumstances where the analysis suggests that the utility has a low beta.

4.3.2. Fama-French three-factor model

The Fama-French three-factor model arose in response to the inability of the CAPM to explain the returns to small\(^{22}\) and value\(^ {23}\) stocks. The Fama-French three-factor model is consistent with the Arbitrage Pricing Theory (APT) of Ross (1976), and holds that, if there are factors besides the return to the market portfolio that are pervasive, then these additional risk factors should be priced.\(^ {24}\)

The Fama-French three-factor model assumes that investors care only about the exposure of an asset to these three factors, and that there exists a risk-free asset. It has the following functional form:

\[
E(R_j) = R_f + b_j [E(R_m) - R_f] + h_j HMLP + s_j SMBP
\]

where

\(b_j, h_j\) and \(s_j\) are the slope coefficients from a multivariate regression of \(R_j\) on \(R_m, HML\)\(^ {25}\) and \(SMB\)\(^ {26}\);  
\(HMLP\) is the HML premium\(^ {27}\); and  
\(SMBP\) is the SMB premium\(^ {28}\).

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\(^ {22}\) Small stocks are stocks with a small market capitalisation.

\(^ {23}\) Value stocks are stocks where their book value of the equity is close to its market value.


\(^ {26}\) The high minus low book-to-market factor

\(^ {27}\) The difference between the return to a portfolio of high book-to-market (or ‘value’) stocks and the return to a portfolio of low book-to-market (or ‘growth’) stocks.
Fama-French find that a financial model that measures a stock’s exposure to HML and SMB factors in addition to its exposure to the market portfolio substantially improves the estimated returns compared to the CAPM.

The primary criticism of the Fama-French three-factor model is directed at its perceived lack of a theoretical basis. However, Fama and French (1993) make clear the Fama-French three-factor model, like the Sharpe-Lintner CAPM, does have theoretical grounding. They argue that:

‘if assets are priced rationally, variables that are related to average returns, such as size and book-to-market equity, must proxy for sensitivity to common (shared and thus undiversifiable) risk factors in returns.’

‘Suppose the explanatory returns have minimal variance due to firm specific factors, so they are good mimicking returns for the underlying state variables or common risk factors of concern to investors. Then the multifactor asset-pricing models of Merton (1973) and Ross (1976) imply a simple test of whether the premiums associated with any set of explanatory returns suffice to describe the cross-section of average returns: the intercepts in the time-series regressions of excess returns on the mimicking portfolio returns should be indistinguishable from zero.’

The Fama-French three-factor model can explain behaviour that the Sharpe-Lintner CAPM cannot explain, ie, whether an asset’s return is exposed to risks other than beta and specifically, to proxies such as the SMB or HML.

4.3.3. Dividend Growth Models

The dividend growth model (DGM) is not strictly a financial model. Rather it is a mathematical procedure that matches the current price of an asset with the present value of future cash flows derived from ownership of that asset. The relationship embedded in DGM analysis has a central role in the financial analysis. DGM based estimates of the cost of equity are almost universally adopted in the regulation of utilities in North America.

There are a number of potential forms of the DGM and, in Australia, applications have been predominately been of the form of a simple Gordon growth model. The Gordon growth model is expressed as:

\[
p = \frac{D}{k-g}
\]

where

\[k-g\] is the discount rate.

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28 The difference between the return to a portfolio of small cap stocks and the return to a portfolio of large cap stocks.


30 We note that US regulators adopted a form of the DGM that internally consistent in that the growth rate of dividends is related to the proportion of earnings that is retained and reinvested in the business.
$P$ is the current price of the stock;

$D$ is a forecast of the next dividend;

$k$ is the discount rate applied to equity (which is also assumed to be constant); and

$g$ is the perpetual growth rate of dividends.

Rearranging this equation to estimate the discount rate for equity:

$$k = \frac{D}{P} + g$$

The principal strengths of the DGM are that:

- the theoretical basis of the model, namely that the price of an asset is equal to the present value of its future cash flows, is widely accepted;
- DGM analysis is widely applied in the finance sector to value equity;
- it provides a direct measure of investor’s forward-looking expectations; and
- it is unaffected by the prevailing low risk free rate environment.

A consequence of this last strength is that DGM analysis can provide estimates of any changes in the equity premia during periods of market instability and low risk free rates, and so provide estimates of the prevailing MRP.

The primary criticism of DGM analysis is the difficulty of estimating one of its parameters, ie, the future growth rate of dividends. However, this criticism is by no means unique to the DGM - all models have estimation difficulty and in our opinion, DGM analysis can provide important insights into the cost of equity for regulated utilities.

### 4.3.4. Independent Expert Reports

An important potential source of information on the required cost of equity may be found in independent expert valuation reports. These reports are provided by specialist valuers (such as Grant Samuel and Lonergan Edwards) or corporate value advisers (such as the major accounting firms) in the context of market transactions (such as mergers and acquisitions).

The reasons why independent expert reports provide relevant information on the cost of equity are that:

- they are public documents and subjected to intense investor scrutiny - the firms that produce them have reputations to maintain and are regulated by ASIC;
- the expert reports generally cross check their findings to observed valuation multiples (eg, cash flow multiples), transaction multiples, and sometimes also to the dividend growth model (DGM), and estimates of the cost of equity made by investment analysts; and
- independent expert reports are prepared by accredited independent experts, working within an explicit regime of regulation that comprise both formal statutory rules and less
formal guidelines, which require that the experts be accountable for the results of their work.\textsuperscript{31}

In our opinion, the most important reason that independent valuation reports provide relevant information on the cost of equity is that they produced in the context of substantial market transactions such as mergers and acquisitions. In other words, investors buy and sell large equity stakes that, in part, rely on the guidance given in such reports as to whether the price of the firm is fair and reasonable.

The major drawback is that these reports are produced in the context of mergers and acquisitions that occur relatively infrequently, and so may not be readily available for the relevant entity or sector at the time the Tribunal is seeking to set the cost of equity. Nevertheless, at a minimum they generally contain helpful guidance of the value of market-wide parameters, such as the expected return on the market portfolio. By way of example, a recent report by Ernst & Young relies on independent valuation reports to conclude that a MRP of 6 per cent is inconsistent with prevailing expectation in the market.\textsuperscript{32}

\textbf{4.3.5. Conclusion}

The Tribunal has indicated that these alternative approaches could potentially provide a cross check to estimates of the cost of equity derived from the CAPM. In our opinion, this approach is unnecessarily limited and all relevant information should form part of an evidence-based approach to estimating the cost of equity. This may potentially take the form of utilising alternative approaches to inform the value of component parameters within the CAPM, such as the market risk premium and equity beta.

\textbf{4.4. Discretion and certainty}

The cost of equity is a matter of considerable uncertainty and cannot be determined with a high level of precision. It follows that a decision on the cost of equity necessarily requires a degree of regulatory discretion. Further, a regulator could reasonably conclude the existence of a plausible range within which the cost of equity would fall, after having regard to a variety of different sources and consideration of the uncertainty of underlying parameters.

However, in our opinion the determination of a point estimate for the cost of equity requires more than the simple application of an average of the upper and lower plausible boundaries. As the Australian Competition Tribunal (ACT) noted in its Jemena (No 5) decision:\textsuperscript{33}

\textit{An average is a blunt instrument unless careful thought is given to the individual components and whether each should be given the same consideration, or weight, in}

\textsuperscript{31} Experts preparing independent expert reports which express an opinion as required by the Corporations Act or ASX Listing Rules should be experts in their field. Furthermore, paragraph 111.128 of Regulatory Guide 111 ASIC advises that it will consider regulatory action if it considers there are material issues about the adequacy and completeness of an independent expert’s analysis, or if it has concerns about the expert’s independence.


\textsuperscript{33} Application by Jemena Gas Networks (NSW) Ltd (No 5) [2011] ACompT 10, paragraph 62.
the calculation of the average. A simple unweighted average gives each component the same weight. This will not always be appropriate, especially where (as here) the two fair value curves differ considerably over the relevant periods to maturity.

Further, in the same decision the ACT makes the point that different sources will have varying levels of relevancy to the issue at hand and consequently those with greatest relevancy should be given greatest weight.

In our experience, well-constructed and unbiased decisions imbue greater levels of regulatory certainty than those that contain a level of arbitrariness. In our opinion, a high quality cost of equity decision would therefore require the Tribunal:

• to pursue an evidenced-based assessment of the cost of equity rather than focusing on potential theoretical or methodological infirmities of a particular model or method;
• to consider all relevant sources of information, which requires, amongst other things, estimating (where feasible) the value or values that are implied by each relevant source of information and acknowledging both the strengths and weaknesses of each model/method – and, particularly, their evidentiary strengths and weaknesses – with the primary objective being the determination of a rate of return that is consistent with the efficient cost of capital for a ‘benchmark utility’; and
• in determining the allowable cost of equity, provide its reasons in a logical and (statistically) unbiased manner and, if possible to set a rate that reconciles the strengths and weaknesses of apparently disparate estimates.

4.5. Prevailing low risk free rates

In the aftermath of the GFC, one of the significant issues that has arisen in the application of the CAPM is the effect of the historically low risk free rates observed in a number of developed countries, including Australia. These market conditions have a profound effect on estimates of the cost of equity derived from the CAPM applied by most regulators.

Combining a current (‘spot’) risk free rate with a long term average MRP has the consequence that any change in the risk free rate translates to the same change in the cost of equity. However, as the Reserve Bank of Australia has stated:34

... market risk premia are unlikely to be stable through time.

In other words, during periods of market instability and where there is an observed drop in the risk free rate will result in the market risk premium (MRP) to rise above its long term average. It follows that specifying the CAPM using a prevailing risk free rate together with a long term historical average MRP will result in a downwardly biased estimate of the cost of equity.

Given the objective to set a value that reflects the efficient cost of capital for a ‘benchmark utility’ the Tribunal may wish to consider:

- whether the specification of the CAPM can be modified to address the demonstrable effect of the prevailing low risk free rates; and
- the possibility that other methods for estimating the cost of equity may be unaffected by prevailing low risk free rates.

Importantly, the implications of the currently very low risk free rates is not an isolated, Australian-specific issue, and regulators internationally have adopted various methods to counteract the effect that it has on their cost of equity allowances. In all cases, these adjustments effectively resulted in an upward adjustment in the estimated cost of equity. For example:

- in the UK, Ofgem (the UK Energy regulator) moved away from using current averages of gilt (government bond) yields and has instead relied on what it describes as very long-run averages for both the risk-free rate and the MRP that are broadly consistent with regulatory precedent, although the exact derivation of its numbers is unclear. Ofgem writes: 35

  *We considered it appropriate to focus on longer-term estimates (...) Our experience from previous price controls shows that looking beyond short-term volatility is a prudent approach to take when setting the cost of equity assumption for network companies.*

We note that this long run average risk free rate is combined with Ofgem’s estimate of the long-run arithmetic average MRP for the UK.

Other UK regulators have also increased their estimates of the MRP while using estimates of the risk-free rate significantly above current government bond yields. Ofwat, the regulator for the water sector, chose an estimate at the top of the range recommended by its advisers, while using long-run estimates of the risk-free rate. Ofwat concluded: 36

*It reflects our view that we should assume a high equity risk premium given the economic conditions within which the cost of capital is set and is at the top of the historical range.*

Similarly, the UK aviation regulator, the CAA, also adopted an approach that included an uplift to total market returns (i.e., the sum of the risk-free rate and the ERP) relative to long-run normal conditions. 37

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35 Ofgem (2012): RIIO-GD1: Initial Proposals Supporting Document · Finance and uncertainty, p.18. Ofgem discusses this in the context of an eight-year price control. However, the previous price controls it refers to have been five-year price controls, i.e. similar in length to the Dutch experience.


the market return included a small uplift on the longer-run market return for the current macroeconomic conditions

- in Germany, the regulator uses the 10 year average for calculating the risk-free rate. In addition, although the Bundesnetzagentur (BNetzA) used the latest DMS data and up-to-date estimates of beta to calculate a risk premium (as the product of beta and ERP) for a draft decision, its final decision adopted a risk premium that was 70 basis points higher than that given in its draft decision. \(^{38}\) It listed the impact of the financial crisis as one driver for this decision alongside the specific considerations associated with the German “energy turnaround”. \(^{39}\)

The review of the consultation responses has led us to question the results of the application of the CAPM in light of past and ongoing developments on international capital markets. (...) After the review of the consultation responses the Decision Chamber considers it justified to deviate from the CAPM approach. Alongside the operators numerous institutional investors have pointed out the exceptional situation on the financial markets that cannot be ignored.

The BNetzA implicitly acknowledged that mechanical application of the CAPM (using long-run historic estimates of the MRP) was not suited to estimating the cost of capital in the midst of a financial crisis, since it did not pick up short-to-medium term changes in one central parameter, namely the MRP.

- in Finland, the energy sector regulator (EMVI) uses short-run averages of the risk-free rate and a fixed estimate of the MRP based on a consultant’s estimate. EMVI noted in 2011 that the real risk-free rate implied by its current methodology had turned negative. In order to avoid including such an effect in the cost of capital, the EMVI adopted an estimate of the rate of inflation capped at 1 per cent (which was significantly lower than actual inflation at the time), which essentially amounted to an uplift on the cost of equity. Although there is no theoretical basis for capping inflation in this manner, the EMVI’s approach gives a result that is similar to Ofgem’s approach of looking at long-run numbers, since the EMVI considered a long-run MRP together with an estimate of the risk-free rate that mitigates the current downward trend. \(^{40}\)

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\(^{38}\) For the draft decision the BNetzA calculated a risk premium of 2.9% based on an equity beta of 0.66 and an ERP of 4.4%. The BNetzA eventually uses the risk premium it applied for the previous regulatory period, which was 3.59% based on an ERP of 4.55% and an equity beta of 0.79.

\(^{39}\) Bundesnetzagentur (Nov 2011): Beschluss BK4-11/304, p.7. (Determination of the Return on Equity) - German original, translation by NERA. Original in German: "Vorliegend hat die Auswertung der Stellungnahmen jedoch dazu geführt, eine Überprüfung des aktuellen Ergebnisses aus dem CAPM-Ansatz (sic) vor dem Hintergrund der zurückliegenden und anhaltenden Entwicklungen an den internationalen Kapitalmärkten zu hinterfragen. (...) sieht die Beschlusskammer nach Auswertung der eingegangenen Stellungnahmen es als sachgerecht an, vom CAPM-Ansatz abzusehen. Neben den Netzbetreibern haben zahlreiche institutionelle Investoren auf die außergewöhnliche Situation an den Finanzmärkten hingewiesen, die nicht außer Acht gelassen werden kann."

\(^{40}\) EMVI (2011): Regulation methods for the assessment of reasonableness in pricing of electricity distribution network operations and high-voltage distribution network operations in the third regulatory period starting on 1 January 2012 and ending on 31 December 2015, chapter 2.1
In our opinion, the Discussion Paper outlines two reasonable modifications to the standard specification of the CAPM that could potentially resolve the issue of prevailing low risk free rates, namely:

- a long/long specification of the CAPM that combines a long run average estimate of both the risk free rate and the MRP; or
- a short/short specification of the CAPM, that combines a current (‘spot’) estimates of both the risk free rate and the MRP.

We also note that, estimating the short/short CAPM the Tribunal could have regard to estimates of the prevailing expected return on the market portfolio through the application of a dividend growth model on the market. Another potential source of the prevailing expected return on the market portfolio is to have regard to independent expert valuation reports, similar to that recently undertaken by Ernst & Young for the Victorian gas pipeline businesses.41

Determining which of these two methods deals better with the low risk free rate environment, is a matter that is best addressed on a case-by-case basis. We note that the Tribunal could also examine estimates of the cost of capital derived from methods such as the DGM that are unaffected by low interest rates. In our opinion, each of these approaches provides relevant information on the prevailing efficient cost of capital for a “benchmark utility” during periods of low risk free rates, and so should be considered by the Tribunal.

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