Independent Panel Review of Economic Regulation Authority Draft Rate of Return Guidelines (2018)

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ACRONYMS

ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ACT	Australian Competition Tribunal
AER	Australian Energy Regulator
CAPM	Capital Asset Pricing Model
COAG	Council of Australian Governments
DBNGP	Dampier Bunbury National Gas Pipeline
ERA	Economic Regulation Authority
NGR87	National Gas Rule 87
QCA	Queensland Competition Authority
WACC	Weighted Average Cost of Capital

1 TASK

This report is a review by an Independent Panel (the Panel) of the Draft Rate for Return Guidelines prepared by the Economic Regulation Authority (ERA) of Western Australia and released on 29 June 2018.¹

The scope of the task for the Panel is set out in the ERA Engagement Process document.² The terms of reference for the panel is reproduced as Appendix 1 of this report.

The objective of the Panel's review is to assist the ERA in making the best Final Rate of Return Guidelines.

The focus of the review is on answering the following question:

In your view, is the draft guideline supported by sound reasoning based on the available information such that it is capable of promoting achievement of the National Gas Objective?

As required by the terms of reference the report focuses on considering the following factors:

- the impact of the guideline as a whole rather than issue-by-issue analysis;
- the revenue and pricing principles in the National Gas Law;
- the rate of return provisions in the National Gas Rules;
- the COAG Energy Council's ongoing reforms to implement a binding rate of return instrument;
- whether the ERA has had regard to relevant information in reaching its conclusions;
- whether there is a clear link between the ERA's conclusions and the information on which it relied;
- whether, in the view of panel members, the methodology set out in the draft guideline will allow stakeholders to replicate the ERA's estimate at a point in time; and
- interactions with other components of the ERA's regulatory determinations and the relevant rules affecting estimation of those components.

This report considers how well the Guideline, including the Explanatory Statement, addresses these factors and makes suggestions for improving the Guideline and Explanatory Statement but does not propose an alternative Guideline.

In an initial teleconference meeting, the ERA confirmed that the Panel should consider the Draft Guidelines and the associated information available at the time, including new information from the Australian Energy Regulator's consultation processes (available at that time). Thus the Panel has restricted its review of information to the period up to the release of the Draft Guidelines on 29 June 2018.

¹ ERA (2018a) Draft Rate of Return Guidelines, 29 June and ERA (2018b) Draft Explanatory Statement for the Rate of Return Guidelines, 29 June.

² ERA (2018) Engagement Process for Independent Panel for Rate of Return Guidelines (2018), 21 June.

In preparing this report the Panel has had regard to key information and a wide range of views presented in the separate rate of return review being undertaken by the Australian Energy Regulator up to the 29 June 2018. This includes various papers prepared by the AER, the Expert Joint Report of 21 April 2018, the Consumer Challenge submission of 30 May 2018, and other reports prepared by experts for the AER. A full list of references is provided in the reference section of this report. The Panel did not meet with any stakeholders in the course of its review.

Documentation of a meeting between the Panel and the ERA and questions the panel asked the ERA are available on the ERA's website.

The chapter structure of the report matches the structure in the Draft Guidelines and Draft Explanatory Statement, with the exception of the following chapter which provides an overview of the rate of return methodology to assist readers in understanding the context and key concepts.

2 THE RATE OF RETURN FRAMEWORK

This chapter provides a simplified overview of the rate of return methodology, and its underlying assumptions, used by the ERA, to assist readers in understanding the context and key concepts in setting an appropriate rate of return. The overview starts by defining and explaining the rate of return and then describes how it is applied to achieve the aims of the National Gas Objective. Details about implementing the method are provided in subsequent chapters.

2.1 RATE OF RETURN: DEFINITION AND EXPLANATION

The rate of return is the profit, expressed as a percentage of assets, that the regulated business is allowed to earn to promote the National Gas Objective which refers to various aspects of economic efficiency including incentives for efficient investment.

The assets of businesses are typically financed by two types of capital: debt and equity. The expected rate of return on (cost of) debt is lower than that of equity because debt is less risky. The total expected return for a business is therefore a weighted average of the expected returns to debt and equity, described as the weighted average cost of capital (WACC) with the weights reflecting the shares of debt and equity in the total capital of the business.

In deciding to invest in a business, investors consider the profit they expect to receive in their hands, that is, they focus on expected profit after tax. Investors aim to earn sufficient to cover the cost of debt (if used) and the post-tax return on their own invested capital (equity). In principle, the cost of capital can be calculated on a pre-tax basis. This can make comparisons difficult when tax rates change. To simplify matters and in accordance with the National Gas Rules, the ERA treats tax as a separate component of operating costs and so the regulatory WACC abstracts from tax considerations to provide a straightforward ("vanilla") post-tax WACC.

Inflation drives a wedge between the nominal (dollar value) return earned by investors and their real (purchasing power) return. Investors care about their real return and they take inflation into account in, for instance, their required nominal rate of return for equity which is used to calculate allowed nominal income from capital in allowed regulatory revenues.

Summarising all the above, the form of the nominal vanilla WACC that is proposed in the Explanatory Statement is as follows:³

(1) WACC_{vanilla} =
$$E(r_e) \times \frac{E}{V} + E(r_d) \times \frac{D}{V}$$

where

 $E(r_e)$ is the expected nominal post-(company) tax rate of return on equity;⁴

³ As discussed, the term nominal means that the return components are in nominal as opposed to real (inflation adjusted) terms so that an inflation premium is already included in the components. The term *"vanilla"* refers to the simple form of the WACC where explicit tax effects are not included in the formula but treated separately in defining allowed revenue requirements.

⁴ The post tax return on equity is post company tax but before personal income taxes. The pre tax return on

 $E(r_d)$ is the expected nominal pre-(company) tax rate of return on debt;⁵

E/V is the proportion of equity in total financing;

D/V is the proportion of debt in total financing;

V is E plus D and represents the total asset value.

The proportions of equity and debt in the total value of the firm are referred to as the capital structure. In general, a business' capital structure depends on its operating risk. A business with low operating risk is able to take on more debt because it is more confident it can repay the interest. In a regulatory context, the capital structure of the regulated firm is assumed to be similar to that of a benchmark firm with similar risk characteristics.

2.2 HOW THE APPROVED WACC IS USED TO ACHIEVE THE NATIONAL GAS OBJECTIVE

National Gas Rule 87 (NGR 87) requires the ERA to specify the WACC for the regulated business. The ERA-approved WACC is applied to the regulated business's allowed asset base to yield the allowed profit expressed in dollar revenues. This dollar profit is added to the costs that the business is allowed to recover from its customers to yield total allowable revenue. The allowable costs include operating costs, depreciation of the capital value of assets, and taxation. The following relationship applies:

Total Allowable Revenue = (WACC x Allowed Asset Base) + Allowed Operating Costs + Allowed Depreciation of Capital Value of Assets + Allowed Taxation.

Total Allowable Revenue is recovered from customers via prices charged per unit of gas sold as follows.

Total Allowable Revenue = Price per unit of demand x Forecast units of demand

Price per unit and units of demand are potentially both variable. Two basic forms of regulation can apply: a price cap and a revenue cap.

Under a price cap if actual demand differs from forecast demand revenue will differ from total allowable revenue. A price cap also provides incentives to expand demand if there is scope to do so by reducing prices or improving services. Under a revenue cap if actual demand differs from forecast demand prices are adjusted so that the revenue defined by the revenue cap is realised. A price cap provides more incentive to earn higher revenues by promoting demand expansion, where there is potential to do so, but is also characterised by more risk to revenue. A revenue cap clearly entails lower risk than a price cap. This in turn may impact on the appropriate parameters for calculating the WACC.

debt is before company taxes and personal income taxes.

⁵ There is a tax benefit from taking on debt as interest costs are tax deductible. This benefit is taken into account when calculating the tax cost that is allowed to be recovered by the regulated entity.

2.3 DEFINING THE APPROPRIATE WACC

An appropriate rate of return is that level of expected profit that, given the risk of the business, induces investors to make just that level of investment sufficient to achieve the National Gas Objective. A WACC that is more than needed to compensate for relevant risk may lead to over-investment in the regulated business, the costs of which are borne by consumers. A WACC that is less than needed to compensate for relevant risk may result in under-investment with the consequence of insufficient services which also impacts on consumers.

In general, the prices of assets today (their "present value") reflect the profits investors expect them to earn in the future, taking risk into account.⁶ This is the basis of the efficient markets hypothesis. The WACC (which, recall, is profit plus interest expressed as a percentage of assets) is the factor that connects present value with future value. The regulatory aim is to ensure that the present value of the revenues received by the regulated businesses equal the present value of the cost of assets and operating expenditure of the regulated businesses in generating their output. Thus the following relationship holds:

Present Value (PV) of Revenues less Present Value (PV) of Costs = Net Present Value (NPV)

An NPV greater than zero implies the revenues are in excess of the amount required to generate a sufficient profit to induce investors to invest in the regulated business. Conversely, if NPV is less than zero it implies the revenues are less than the amount required to generate a sufficient profit to attract investment into the regulated business.

The rate of return used in applying the NPV=0 condition is set separately based on the efficient financing costs of a relevant benchmark entity. The application of the NPV=0 condition means that revenues are calibrated so that they are just sufficient to cover all allowed costs, while enabling the allowed rate of return to be realised, given the estimated costs and demand over the regulatory period.

2.4 ESTIMATING THE APPROPRIATE WACC

In the context of economic regulation, the parameters of the WACC need to reflect efficient financing costs of a benchmark entity with similar risk to the regulated entity. Efficient financing costs are incurred by companies in competitive markets. Competition ensures that financing costs are not too high or too low for a given level of risk. If the WACC is based on efficient financing costs that recognise relevant risks then the allowed rate of return will promote achievement of the National Gas Objective provided other aspects of the regulatory arrangements are appropriate.

Given the regulated entity's capital structure (i.e., the respective proportions of debt and equity used to fund its assets), the key challenges are estimating the required rates of return for the entity's debt and equity given their risk. The required rate of return for debt is

⁶ This is the basis of the "efficient markets" hypothesis (EMH), the foundation of neo-classical finance theory which underpins the ERA Guidelines. It should be noted the EMH implies more than just that asset prices reflect investors' expectation of future profit; it also implies that investors' expectations are unbiased and reflect all available information.

relatively straightforward to estimate because there are observable competitive markets-based costs of debt that can be used as a proxy for the "true" cost of debt to the regulated entity.

The cost of debt, $E(R_d)$, is proxied by identifying the cost of debt for a private entity with a benchmark credit rating. It comprises a risk free rate of return, a debt risk premium reflecting the risk of the benchmark entity and relevant debt hedging and issuing costs.

The Capital Asset Pricing Model (CAPM) is the standard mechanism for deriving the expected return of a security given its risk. The derivation of the CAPM is based on modern portfolio theory in the field of finance which is a theory on how risk-averse investors can construct portfolios to maximise expected return based on a given level of market risk.⁷ A fundamental insight from modern portfolio theory is that a distinction can be made between diversifiable (unique) risk and non-diversifiable (systematic) risk and that by selecting an appropriate diversified portfolio of stocks investors can diversify away unique risk so that the only risk that is priced is non-diversifiable systematic risk which is reflected in a single 'beta' parameter as explained below.

The CAPM is a relative pricing model and measures the risk of a security relative to the risk of the market portfolio. Securities whose value is more sensitive to economic fluctuations than the market portfolio are riskier and so investors require an expected return higher than the expected return to the market portfolio to hold them (and vice versa for less sensitive securities).

The key benchmark, the expected return to the market portfolio, is not directly observable and must be inferred from historical data.

Operationally, the CAPM requires only three parameters: a risk free rate; a market risk premium that reflects the risk relating to the market for investments as a whole relative to the risk free rate; and a beta parameter that reflects the sensitivity of the benchmark entity's returns relative to the return for the market as a whole.

Thus the CAPM is defined as:

(2)
$$E(r_e) = r_f + \beta_e[(E(r_m) - r_f)]$$

where

 $r_{\rm f}$ is the risk free rate;

 β_e is the equity beta, which is a measure of the amount of relevant risk of the investment (as measured by the sensitivity of the return on the specific asset to the return on the market as a whole); and

 $E(R_m) - r_f$ is the expected market risk premium above the risk free rate and can be interpreted as the price of relevant risk.

Note that beta is the only parameter specific to the equity component of the business entity under consideration; the other two parameters, the risk-free rate and expected market risk premium, relate to the market for investments as a whole.

The nominal risk-free rate is readily observable from the return to securities issued by riskless entities (e.g., government bonds). The challenges in applying the CAPM derive from

⁷ The CAPM was developed by Sharpe (1964) and Lintner (1965) building on the model of portfolio choice developed by Markowitz (1952).

estimating beta for the specific entity and the expected market risk premium. The practical difficulties in estimating beta and the expected market risk premium include: (a) whether the past is a reliable guide to present expectations of the future (b) data quality relating to, for example, accuracy, coverage of assets, representativeness, and survivor bias; and, (c) when estimating the market risk premium using historical data, whether one should use the geometric mean or arithmetic mean.

Resolving, in a reasonable way, the practical challenges in estimating the parameters of the CAPM is a major concern of the ERA rate of return guidelines. In this context, it is important to be aware of the assumptions on which the CAPM is based, to help understand how to interpret key parameters and whether they may need adjustment. This is particularly the case where the existence and form of economic regulation may affect the applicability of certain assumptions or the nature and extent of risk reflected in the beta parameter.

The assumptions fall into two categories: behavioural assumptions and market structure assumptions.⁸ The market structure assumptions effectively amount to assumptions that the market is perfectly efficient, there are no taxes that differentiate between securities or investors, and all investors have the same one period investment horizon and identical views about expected returns and the variability of returns. These assumptions are unlikely to be met exactly in actual markets but the key consideration is whether markets come sufficiently close to approximating these assumptions to validate use of the model in practice.

The behavioural assumptions are set out below.

Behavioural assumptions for the CAPM

- (1) Investors are risk averse and choose investments that will have the highest possible expected return for a given risk level or the lowest possible risk for a given return level.
- (2) Investors make their decisions based solely on consideration of the expected mean return and variance of returns. The variance of returns is the measure of risk. This assumption implies either: that returns are symmetric (so that good outcomes perfectly offset bad outcomes) or that investors do not care about asymmetry in the expected distribution of returns or other characteristics of the probability distribution of returns is skewed).

The second behavioural assumption is the main area of concern in a regulatory context because economic regulation puts an upside cap on prices or revenues that is not necessarily offset by a downside limit on financial outcomes i.e. downside risk may not be balanced by upside potential. This inevitably leads to various regulatory arrangements to limit downside risk for the regulated entity and means that there is a need to consider the interaction of specific aspects of the regulatory arrangements and appropriate parameters in the CAPM. Where there is doubt about the extent to which the regulatory arrangements appropriately protect against downside risk there may be a need to be conservative in choosing appropriate parameters to ensure there are sufficient incentives for efficient investment to occur. The

⁸ Patterson (1995, pp.31-37).

Panel considers that this is an aspect that needs more consideration in the Guidelines and Explanatory Statement.

Despite its simple depiction of risk and required returns, the CAPM is the most widely used model in finance and business and in economic regulation in Australia and several other regulatory jurisdictions.⁹ It has been the subject of extensive analysis and review in Australia for the purposes of economic regulation and has been the primary model for determining the cost of equity since formal economic regulation of utilities began in Australia some 20 years ago. The CAPM is used extensively in practice, perhaps because, as renowned financial economists Eugene Fama and Kenneth French have observed, "the attraction of the CAPM is that it offers powerfully simple logic and intuitively pleasing predictions about how to measure risk and the relation between expected return and risk".¹⁰

The Panel recognises that the standard CAPM is an elegant but highly stylized and parsimonious representation of the relationship between risk and return on investments. Its assumptions are analogous to those that are required for the model of perfect competition in economics. Despite its simplicity the CAPM is still a very useful benchmark because it helps in understanding the relationship between risk and return; it highlights key relationships that are still important features of more general models; it is relatively easy to operationalize; and relatively robust to reasonable changes in the parameters.

⁹ KPMG Corporate Finance's Valuation Practices Survey 2015 found: "Not surprisingly, the capital asset pricing model is as popular as ever when deriving a cost of equity estimate. A substantial 83 percent of participants prefer it to any other method. In direct contrast the arbitrage pricing theory still has no support at all." This survey evidence backs Fama and French's (2004) observation that "four decades [after Sharpe's development of the model], the CAPM is still widely used in applications, such as estimating the cost of equity capital for firms and evaluating the performance of managed portfolios. It is the centrepiece of MBA investment courses. Indeed it is often the only asset pricing model taught in these courses.

¹⁰ Fama and French (2004, p. 25).

3 THE BROAD REGULATORY FRAMEWORK

3.1 COMPONENT DESCRIPTION

This chapter of the Guidelines sets out the relevant requirements of the National Gas Law and National Gas rules that establish the regulatory framework for the rate of return decision-making process.

The National Gas Law specifies a National gas objective as follows:¹¹

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

Revenue and pricing principles in the National Gas Law give effect to the National gas objective and are specified to provide incentives to achieve various aspects of economic efficiency.

National Gas Rules and sub-rules have been made under the National Gas Law. An allowed rate of return objective has been established in the National Gas Rules and is specified as being commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as for the regulated services. Other Rules specify a number of matters a regulator has to have regard to when determining an allowed rate of return including: estimation methods; inter-relationships between parameters; and the form of the allowed rate of return.

The Guidelines explain various aspects of the benchmark efficient entity and its implementation including the need for a forward looking (ex ante) perspective to provide outperformance incentives in setting an allowed rate of return to apply over the regulatory period.

The Guidelines also note that currently they are not binding but they become binding in the event there are changes to the National Energy Law that establish a Binding Rate of Return Instrument that is adopted in Western Australia. The Guidelines explain that they have been drafted to apply equally to the current framework and the proposed binding rate of return framework, if implemented.

3.2 PANEL ASSESSMENT

The Panel recognises that revenue and pricing principles in the National Gas Law, and the rate of return objective and rules in the National Gas Rules are in effect mechanisms to help achieve economic efficiency but their specification helps to provide clarity and consistency and more certainty in applications while also limiting regulatory costs. The Panel also considers that the revenue and pricing principles and rate of return objective logically follow from the definition of the National Gas Objective.

The Panel considers that the Guidelines and Explanatory Statement explain the legislative requirements and regulatory mechanisms very clearly. However, in some places in both the

¹¹ National Gas Law s. 23.

Draft Guidelines and Explanatory Statement reference is made to the concept of 'incentive regulation' but this concept is not adequately explained. The Panel considers that the Guidelines should be reasonably self-contained and not assume that key concepts are necessarily widely understood. The Panel considers that it would be useful to provide a brief explanation of 'incentive regulation' and that the particular form of regulation and associated rate of return framework constitute one form of regulation that has been developed to provide incentives to achieve economic efficiency.

The Panel notes that if the Binding Rate of Return Instrument is given effect in Western Australia the National gas objective and the revenue and pricing principles specified in the National gas law will apply along with requirements in relation to consultation and consideration of expert advice, but the National Gas Rule 87 and various sub-rules will not be legislative requirements. However, the Panel considers the ERA would have the discretion to apply these rules as mechanisms in the Guidelines to the extent they would be effective in promoting the National gas objective and supports their potential use in this way.

Thus the Panel agrees that the Guidelines provide the flexibility to apply equally under the current framework and the proposed binding rate of return framework.

The Panel understands that the Binding Rate of Return Instrument would set out how the rate of return would be automatically applied in each regulatory determination without the exercise of any discretion but that there is scope for regulatory discretion in establishing the approach and estimates for rate of return parameters in specifying the Binding Guidelines. However, the Panel considers that this is not made clear in the Draft Guidelines and Draft Explanatory Statement

The Panel considers that it would be helpful to make it clear over what time frame the Guidelines would apply and their application when regulatory periods for specific entities overlap.

The Panel also considers there needs to be an explanation of the conditions under which a binding rate of return would be re-opened reflecting unexpected changes in circumstances.

Table 1 provides a summary of the panel's assessment in relation to the factors to consider for the broad regulatory framework.

Factors to consider	Panel assessment	
Relevant information for reaching conclusions	The Guidelines should be reasonably self-contained. It would be helpful to provide a brief explanation of the concept of 'incentive regulation' and how the rate of return and arrangements contribute to the concept.	
Clear link between conclusions and information	The broad regulatory framework is clearly well explained.	
Reforms to implement a binding rate of return instrument	The Guidelines provide the flexibility to apply equally under the current framework and the proposed binding rate of return framework.	
	have discretion in developing certain aspects of the Binding Rate of Return Guidelines but that they would be automatically applied over the regulatory period for each regulatory determination.	
	It would be helpful to make it clear over what time frame the Guidelines would apply.	
	Consideration needs to be given as to whether and under what conditions a binding rate of return rule would be re-opened.	

Table 1: Summary of panel assessment for broad regulatory framework

4 OVERALL RATE OF RETURN

4.1 COMPONENT DESCRIPTION

The National Gas Rule 87 (NGR 87) requires the ERA to adopt a nominal vanilla weighted average cost of capital (WACC) for the allowed rate of return. The equation for the nominal vanilla WACC is a simple weighted average of a nominal post-company tax rate of return and the nominal pre-tax return on debt.

The exact form is shown as equation 1 of Chapter 3 of the Guidelines and is re-produced below.

(3) WACC_{vanilla} =
$$E(r_e) \times \frac{E}{V} + E(r_d) \times \frac{D}{V}$$

where

 $E(r_e)$ is the expected nominal post-(company) tax rate of return on equity;¹²

 $E(r_d)$ is the expected nominal pre-(company) tax rate of return on debt;

E/V is the proportion of equity in total financing;

D/V is the proportion of debt in total financing;

V is E plus D and represents the total asset value.

NGR 87 also requires the ERA to have regard to "the desirability of an approach that leads to consistent application of any estimates of financial parameters that are relevant to the estimates of, and are common to, the return on equity and the return on debt."

The Guidelines and Explanatory Statement note that the ERA will evaluate its estimate of the allowed rate of return in relation to the requirements of the allowed rate of return objective and the National Gas Rules more broadly and in particular whether the allowed rate of return estimate is reasonable for a benchmark efficient entity with a similar degree of risk.

The Guidelines and Explanatory Statement also note that if the binding rate of return instrument removes the allowed rate of return objective, the national gas objective and revenue and pricing principles "will still engage with key concepts required to promote the allowed rate of return objective."

4.2 PANEL ASSESSMENT

The Panel understands that NGR87 will not be specified in the binding rate of return instrument and this requires some assessment of the requirements of NGR87.

¹² The post tax return on equity is post company tax but before personal income taxes. The pre tax return on debt is before company taxes and personal income taxes.

4.2.1 Form of the rate of return

The nominal vanilla WACC is described as a post-tax specification but it does not explicitly recognise that debt interest costs are tax deductible which may lead to some confusion. The Panel recognises that the post-tax term is used because all tax impacts are accounted for separately including interest deductibility and the existence of imputation (franking) credits (that in effect represent pre-payment of company tax at the personal tax level). The Panel considers that these features could be noted in a footnote to improve general understanding.

The Panel considers that the nominal vanilla WACC is simple, transparent, relatively easy to implement and widely used by businesses and regulators. It also helps to set a return that ensures efficient financing of capital, if the underlying parameters take appropriate account of investors required risk-adjusted rate of return and the efficient cost of debt for an investment or business.

However, there is no explanation in the Explanatory Statement of why this form is preferred over other forms that achieve the same result. The Panel considers that this should be easy to do by noting the advantages of simplicity and separate calculation of tax effects. In the process some references as to the present value equivalency of all relevant candidates for the WACC should be presented (consistent with the Officer framework).¹³ Although the form and its evolution are well known to practitioners, some references along these lines would help with providing wider understanding and acceptance and ensure the Guidelines are self-contained.

4.2.2 Efficient financing costs

The Explanatory Statement provides an effective explanation of how the parameter estimates in the allowed rate of return need to ensure efficient financing costs as required in the allowed rate of return objective.

4.2.3 Term of the estimates

The Guidelines require that the term of the estimates for the rate of return will be, as far as possible, consistent with the term of the regulatory period. Some high level reasoning is provided in paragraphs 72 to 77 of the Draft Explanatory Statement with a reference to Appendix 2 of the 2013 Guidelines.¹⁴ Essentially the technical work shows this consistency is necessary to ensure NPV=0 which is important for providing economically efficient investment signals.

For clarity, the NPV=0 condition is the condition that the regulator applies in setting prices given forecasts of demand and costs over the regulatory period. It ensures prices are sufficient such that the present value of revenue equals the present value of costs where the costs include allowed depreciation, operating costs and allowances for taxation and the discount rate for calculating the present value is the allowed weighted average cost of capital (WACC).

¹³ Officer, R. R., (1994), The Cost of Capital of a Company Under an Imputation System, Accounting and Finance, May, pp. 1-17.

¹⁴ ERA (2013), Appendices to the Explanatory Statement for the Rate of Return Guidelines, 16 December, pp. 17-30.

However, while almost all regulators make use of the NPV=0 condition in setting allowed revenues or prices, some do not specify consistency with respect to the term of the estimates, based mainly on: reference to typically longer financing periods in practice; a cautious approach; and regulatory stability. Some stakeholders have challenged the relevance of the condition when borrowing terms in practice are often much longer than the regulatory period. This issue is also discussed in Chapter 7: The return on debt.

The Panel recognises the application of the NPV=0 principle is essential for achieving overall economic efficiency and particularly for ensuring efficient investment in the long term interests of consumers and also recognises the logical arguments in support of consistency in the term of estimates with the term of the regulatory period.

The Panel considers that on balance the requirement for the term of estimates of the rate of return to match the term of the regulatory period is a sound principle, provided it is feasible for businesses to implement and does not introduce additional risks that are not effectively addressed elsewhere in the Guidelines, in particular refinancing risk. Some further explanation and cross reference to Chapter 7: Return on debt, would help to make the Guidelines and Explanatory Statement more self contained.

Given differences in approaches of other regulators and scope for other potential risks to arise the Panel considers that it would be helpful and transparent to understand the intuitive arguments that lead to the conclusion that the term of estimates for the rate of return should match the regulatory cycle. So some reasoning explaining the technical work in an accessible manner would provide a clearer link between the conclusion and the information that was used in the reasoning.

4.2.4 Requirement to meet the allowed rate of return objective

The Panel notes the Guidelines confirm that the ERA will evaluate its estimate of the allowed rate of return in terms of the National gas rules and the application of a benchmark efficient entity. The Panel also notes that the concepts specified in the allowed rate of return objective and various National Gas Rules are relevant concepts that may best promote the national gas objective and the ERA would have the discretion to apply them in the implementation of the binding rate of return instrument, however, the explanation could be clearer.

4.2.5 Summing up

Table 2 provides a summary of the panel's assessment in relation to the factors to consider for the overall rate of return.

Factors to consider	Panel assessment	
Revenue and pricing principles	Explanation is effective.	
Rate of return provisions	Explanation is effective.	
Relevant information for reaching conclusions	The Guidelines should be reasonably self-contained. Some brief information providing justification for the specific form of the WACC would be helpful.	
Clear link between conclusions and information	The Guidelines should be reasonably self-contained. The intuitive arguments for consistency in the terms of the rate of return parameters and the regulatory period for achieving the NPV=0 should be presented to improve accessibility and demonstrate a clearer link between the conclusion and the information. It is relevant to explain that insisting on consistency in the terms does not entail the introduction of other risks that are not compensated for. Cross referencing to the Chapter on the Cost of Debt would be useful.	
Reforms to implement a binding rate of return instrument	The explanation could clarify that the ERA would have the discretion to implement relevant concepts in the National Gas Rules.	

5 THE BENCHMARK EFFICIENT ENTITY

5.1 COMPONENT DESCRIPTION

The Guidelines explain that the National Gas Rule 87(3) introduces the concept of the efficient financing costs for a benchmark efficient entity with a similar degree of risk as for the regulated entity. Financing costs are expressed as a weighted average cost of capital (WACC) for the benchmark firm and are efficient if they promote the National Gas Objective.

Chapter 4 of the Guidelines and the Explanatory Statement explain how the concept of a benchmark efficient entity is to be implemented.

The ERA defines the benchmark efficient entity as:15

An efficient 'pure-play' gas network business operating within Australia without parental ownership, with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

The 'pure-play' concept refers to a method for estimating firm-specific rate of return parameters for a benchmark firm by identifying firms that are ideally, for the purposes of benchmarking, engaged solely in the same business as the benchmark firm.

The reference to operating in Australia excludes similar firms in overseas jurisdictions i.e. a domestic market perspective is adopted.

The reference to without parental ownership is understood to be included to ensure that parental ownership does not affect risk and the compensation for risk in determining relevant rate of return parameters.

The reasoning in the Explanatory Statement discusses: economic theory and economic efficiency; financial theory; the use of domestic versus international markets; the nature and degree of risk for the reference services; and the determination of a benchmark sample.

The benchmark efficient entity is used to estimate the equity beta, the gearing ratio and the credit rating. To establish the benchmark efficient entity a sample of firms with similar risk characteristics and similar achievable financing practices is required. It is noted that an efficient benchmark entity is needed rather than actual financial costs for the regulated services in order to estimate efficient costs.

5.2 PANEL ASSESSMENT

5.2.1 Definition of the benchmark efficient entity

The Panel considers that some brief explanation of the components of the definition would be helpful when the definition is first presented, with cross reference to where the components are discussed in more detail.

¹⁵ ERA (2018a, p.17).

It is noted that the definition does not restrict the benchmark to a regulated business which contrasts with the definition specified in the ERA's 2013 Guidelines.

The reference to similar risk is important for establishing valid parameters for the benchmark efficient entity, as different relevant risks would imply different parameters to be used in specifying an efficient risk-adjusted rate of return. The Panel notes that regulation per se and the broad form and specific detail of regulatory arrangements may have a material impact on risk and by implication appropriate parameters in setting an allowed rate of return. The Panel considers that the form and detail of the regulatory arrangements and their implications for an allowed rate of return that promotes economic efficiency are matters that need more consideration in the Guidelines and Explanatory Statement. It may well be the case that the approach is reasonable but the Panel considers that the issue of regulation and its impact on efficient financing needs more consideration. This is discussed further in Chapter 11: Return on Equity.

Another issue with the choice of a benchmark based on existing firms is that it assumes that the existing technology is an appropriate benchmark. However, the Panel does not consider this is a material problem because, the regulatory arrangements may still provide a sufficient incentive to innovate and reduce costs provided the benefits from doing so can be retained for a sufficiently long period. This also may not be an issue for the regulated gas pipelines. However, the Panel considers the issue may be worth noting in the Explanatory Statement and notes this issue is related to the need to provide some more discussion of what is meant by 'incentive regulation'.

5.2.2 Economic efficiency

The Explanatory Statement discusses the concept of Pareto efficiency which is an important technical economic concept and is related to outcomes in perfectly competitive markets. The discussion is provided to explain why competitive markets are likely to be beneficial to society. However, the Panel considers that the reference to Pareto efficiency is somewhat misplaced.

The definition of Pareto efficiency is a situation where it is impossible to make one person better off without making someone else worse off. It arises in a theoretical construct when an economy has a complete set of perfectly competitive markets for all activities including the pricing of risk for all contingencies over time and there is perfect information and no unpriced transactions costs. It is also necessary for there to be an absence of increasing returns to scale. These conditions rarely hold across all markets and, in any case, most changes in an economy entail some losers as well as winners. This leads to widespread use of the concept of potential Pareto improvement assuming winners can compensate losers. But both of these concepts are more appropriate when assessing various public policies than trying to explain why particular competitive markets are beneficial to the community.

Rather than using the term Pareto efficiency the Panel considers that it would be better to refer to competitive markets contributing to various aspects of economic efficiency, as specified in the National Gas objective i.e. efficient investment (dynamic efficiency) efficient operation (productive efficiency) and efficient use (allocative efficiency). It is noted that the explanation in paragraph 95 of the Explanatory Statement relates to why competitive markets

achieve allocative efficiency but this still assumes the prices in the particular market reflect all relevant social marginal costs.

As an alternative, it may be better to note that the concept of effectively competitive or workably competitive markets has evolved and been used in economic regulation and competition matters as a benchmark for providing useful information and that provided markets are workably competitive the market information they provide can be used in making various policy and regulatory decisions and may be the best source of information. It may also be worth noting that the selection of appropriate parameters is based on the assumption that market-based parameters sufficiently reflect efficient outcomes.

The Panel suggests that the explanation could be improved to address these points.

5.2.3 Financial theory on market efficiency

The Panel considers that some readers may find it difficult to understand the section on Financial theory on market efficiency (4.2.1.3) in the Explanatory Statement. Paragraph 101 in particular is difficult to follow and the joint hypothesis problem is not explained.

In discussing the financial theory on portfolio efficiency in the Explanatory Statement, the Panel considers that the explanation is not sufficiently clear that 'risk' in portfolio theory is defined purely in terms of the expected variability of returns and this variability is the only risk that investors are concerned with. This means that either the probability distribution of expected returns is symmetric or investors do not care if the distribution of returns is asymmetric i.e. exhibiting skewness or bias on either side of the expected mean return. However, investors may be concerned about potential asymmetry of returns that is not reflected in the variance of returns. The Panel considers that this is an important aspect to consider given that the CAPM assumes the only relevant concerns relate to the expected mean return and variance of returns.

The key point is that recognising the scope for asymmetry when there is economic regulation requires some discussion of whether it is material and how it is addressed in the regulatory arrangements as a whole. This issue also arises in Chapter 11: Return on Equity.

Also this section would be difficult for someone to follow who is not familiar with the CAPM which relies on portfolio theory. Some further explanation would help make the Explanatory Statement more self-contained.

Some more minor points are that:

- The wording in paragraph 65 of the Guideline that refers to "the premise that markets deliver efficient outcomes" is considered to be too strong given the above considerations.
- "A productive investment" in paragraph 104 of the Explanatory Statement would be better described as "A profitable investment".
- The first sentence in paragraph 108 of the Explanatory Statement should be changed to recognise the comments about markets and efficiency.

5.2.4 Domestic market perspective

In discussing the justification for using a domestic market for establishing efficient financing costs, the Panel considers that the discussion should include material on the extent to which the economic and financial literature recognises that capital markets are not fully integrated and that market segmentation but with some foreign influence tends to be the main paradigm that is used in practice. It would also be worth noting that it is not practical to implement an international CAPM and not considered necessary for establishing an efficient financing benchmark.

The Panel also suggests that the Explanatory Statement should make it clear somewhere that the implementation of the CAPM is not strictly based on a domestic market perspective because, in practice, it assumes foreign investors affect relevant parameters and domestic investors can invest internationally as well. There is theoretical inconsistency because the portfolio theory on which the CAPM relies requires an assumption to be made about the overall market index that will be used, and if a domestic market perspective is used the overall market index should be a domestic one that effectively precludes international investment by domestic investors or domestic investment by foreign investors. The overall market index that the ERA and other regulators use in implementing a domestic CAPM is the Australian all ordinaries index but international investors and many domestic investors would likely be concerned about a wider market index. Furthermore, to the extent that international investors can invest in the domestic market and domestic investors can invest overseas the expected rate of return to ASX listed firms will at least partly reflect access to an international portfolio. Thus the Panel agrees that the domestic CAPM, recognising foreign influence, is the best practical alternative.

The Panel notes and supports the confirmation, in the Explanatory Statement, that international debt data can be used to help determine relative debt parameters. The Panel considers this is an appropriate approach, given the reasonable assumption of stronger integration of debt markets than equity markets, the ready observability of promised returns on debt and assuming the country of risk is classified as Australia.

5.2.5 Parental ownership

The reference to 'without parental ownership' in the definition of the benchmark efficient entity seems to be meant to ensure that the benchmark does not include government owned entities to the extent that government ownership in effect lowers risk. However, it may be that the risk of listed private entities is also affected if there is a sufficiently large shareholding by a major shareholder with an interest in backing the financial position of the private entity in the benchmark sample. It is not clear whether this has been considered in the specification of the definition of the benchmark efficient entity or the selection of the firms in the benchmark. The Panel considers that some clarification of the meaning of 'without parental ownership' is needed.

5.2.6 Selection of the sample

The Explanatory Statement notes that there are only four firms listed or listed until recently on the Australian stock exchange that can be used for establishing efficient financing costs for equity, gearing and a benchmark credit rating. The Statement considers that the use of international benchmarks would mean higher uncertainty in the estimates of benchmark parameters given different regulatory arrangements, economic conditions and risk factors.

The Panel considers that although it is reasonable to give primary consideration i.e. more weight to relevant comparators listed in Australia, the inclusion of relevant foreign firms is likely to be beneficial in terms of improving the statistical reliability of estimates of the Beta parameter in the CAPM. This is because much of the risk across countries may be reflected in the market risk premium and provided the sample has similar business and regulatory risk characteristics, estimates of Beta based on firms in well-developed markets such as the United States and the United Kingdom should not be ruled out and will likely mean narrower statistical confidence intervals. In addition, consideration of Beta estimates from other jurisdictions may help in understanding how different forms of regulation affect risk and how other regulators allow for risk.

It is also noted that one of the four firms in the ERA's sample is no longer listed and although there may be currently sufficient data to use this firm this may not be the case in the future. In addition, the reasons or events that led to this firm being delisted may well have influenced equity returns in the period and potentially introducing bias into the estimates.

The sample is discussed further in Chapter 13: Equity Beta.

5.2.7 The nature of relevant risk

The discussion of nature of relevant risk in the Explanatory Statement section 4.2.3 (and in particular the detail in Section 4.2.3.2) implies that only systematic risk is relevant for the investor. The Panel notes that this is an assumption in applying the CAPM and its validity depends on the extent to which the underlying assumptions for the CAPM apply. In particular the CAPM assumes that investors can effectively diversify risk and that there is either no asymmetric risk for the reference services or that investors do not care about asymmetric risk. The Panel considers that these assumptions need to be made clear and discussed in such a way that there is still reason to support use of the CAPM.

In this respect, the Panel considers that the discussion on identifying and classifying risk in the Explanatory Statement (Section 4.2.3.2) does not address these aspects effectively, particularly the impact of capping upside potential when there may be material asset stranding risk. The Panel considers that the form of regulation and the scope for stranded risk need to be discussed more. For example, can all stranded asset risk be diversified away if the upside potential is capped by regulation? However, the Panel notes that the economic circumstances and form of regulation can mean there is very limited downside risk.

In relation to paragraph 165 in the Explanatory Statement it should be recognised that conceptually the CAPM also applies to debt markets and if it did then only systematic risks would be relevant as per the equity CAPM provided the underlying assumptions of the CAPM held. The Panel also considers that it should be noted that while conceptually the CAPM could apply in pricing debt, it is not practical to do so and in any case is not necessary because the required rates of return on debt are observed directly in the debt market. Thus a separate methodology has been developed for the cost of debt component of the rate of return.

As noted elsewhere, the Panel considers that in developing the benchmark entity there needs to be discussion of the entities that are being regulated and their characteristics and how they compare to the benchmarks. There also needs to be consideration of how long term contracts and regulation affect risk and may imply adjustments to the sample. The Panel considers that consideration of such characteristics can help to support the use of the CAPM to the extent they support the application of its underlying assumptions.

At paragraph 176 of the Explanatory Statement it is argued that if the inflation of input costs differs from general inflation then the differentials should not be compensated for, as they are diversifiable. This implies that in considering forecasts of capital expenditure and operating costs for the purposes of determining allowable costs in the building block methodology the best forecasts of nominal expenditure should not be used but rather the nominal component of the forecasts should be replaced by a general deflator for inflation. However, this would violate the NPV=0 principle on both an ex ante and ex post. It is also noted that in a competitive market differential inflation is allowed for with respect to all costs; and prices reflect these differential costs. In response to our questions to the ERA dated 4 September 2018¹⁶ the ERA confirmed that in determining forecast revenue under a building block approach the best available nominal forecasts are used for operating and capital expenditure. This suggests there is a need to amend the explanation at paragraph 176 of the Explanatory Statement.

The conclusion however would still be the same i.e. there is no need for separate adjustment of the rate of return. It should also be noted that the correct expected inflation deflator to be included in the nominal rate of return should be what is required to compensate investors for the general purchasing power of their investment (normally this would be the CPI) and this is consistent with ensuring NPV=0 if nominal revenues in present value terms are calibrated to recover best estimates of nominal expected operating and capital costs using the allowed nominal WACC.

5.2.8 Other specific comments

At paragraph 113 of the Explanatory Statement it would be helpful to reference the CAPM equation at paragraph 457.

At paragraph 114 of the Explanatory Statement there is a statement that imputation credits are only of use to investors lodging an Australian tax return. The Panel considers that it may be worth checking and noting that there may be scope for some foreign investors to get partial credit for Australian taxes through double taxation agreements. The Panel also considers it would be useful to make reference to research that examines whether foreign investors can in effect avoid company taxes through trading around dividend payment time. (See the paper by Peter Swan – Investment, the Corporate Tax Rate and the Pricing of Franking Credits, 11 March 2018, UNSW Business School.) This is relevant for Chapter 16: The value of imputation credits as well. The point of noting this material is that it may help in justifying a lower bound for the relevant imputation parameter (gamma) in the allowance for estimating benchmark taxes.

Paragraph 134 on non-financial market information effectively repeats paragraph 132 and it

¹⁶ See ERA response to Further Independent Panel Questions for ERA, 4 September 2018, Answer to Question 1, ERA website.

is suggested that paragraph 132 be moved to replace paragraph 134.

At paragraph 141, there is a brief reference to choosing a benchmark based on firms delivering similar services to the reference services and that the benchmark takes account of the degree of risk associated with that delivery which is an important consideration under the National Gas Law. The panel considers that this description underlines the importance of examining whether the regulatory arrangements affect risk in a way that is not readily reflected in the benchmark parameters and if so determining what adjustments are warranted.

The Panel considers that the discussion on competitive neutrality and government ownership in the Explanatory Statement could be improved. Government owned network businesses do face less risk than the private sector because Governments can ultimately draw on the tax base or make other arrangements in the event of a liquidity or solvency crisis. However, Commonwealth and State governments have agreed to apply a competitive neutrality principle so that there is no distinction between regulated private and public network businesses and no competitive advantage for such publicly owned businesses over privately owned businesses. Thus it is not risk equivalency that leads to similar capital costs but rather the application of the competitive neutrality principle.

Also the descriptor for 4.2.2.3, in the Explanatory Statement, may be better described as "Definition of benchmark efficient entity" and it may be better to place this material after paragraph 139.

5.2.9 Summing up

The Panel considers that there needs to be more consideration of how various aspects of the regulatory arrangements affect risk with implications for specification of rate of return parameters relevant for ensuring efficient financing.

In relation to the discussion in the Explanatory Statement of a single benchmark, for determining gearing, the equity beta and the credit rating, and the three characteristics (described in paragraph 154), as noted above, the Panel considers that while the proposed sample should be given more weight in determining the equity beta this should not preclude consideration of beta estimates for comparable businesses in well developed financial markets in other countries.

The Panel considers there is sufficient information for stakeholders to implement the approach at a point in time.

Table 3 provides a summary of the panel's assessment in relation to the factors to consider for the benchmark efficient entity.

Factors to consider	Panel assessment
Revenue and pricing principles	An issue that needs further consideration in the Explanatory Statement is how regulation per se, the specific form of regulation and various regulatory details affect risk and relevant risk parameters.
Rate of return provisions	As above.
Relevant information for reaching conclusions	The Guidelines should be reasonably self-contained.
	Instead of reference to the concept of Pareto efficiency it would be preferable to make use of the concept of 'workable' or 'effective competition'.
	The concept of risk in portfolio theory and the CAPM and in the classification of risk needs to be explained better to highlight that the risk is purely in relation to the variance of returns and in the context of compensation for risk means that expected returns have a symmetric distribution or that investors do not care about asymmetry (skewness) in the distribution of returns.
	Recognising the scope for asymmetry when there is economic regulation requires some discussion of how it is addressed in the regulatory arrangements as a whole including in the parameters for the rate of return.
	It would be helpful to explain that there is agreement that equity market segmentation with foreign influence is the main paradigm that is used in practice and that implementation of the CAPM is not strictly based on a domestic market perspective.
	There needs to be more explanation of the meaning of 'without parental ownership' to consider what it might mean for private listed entities.
	The Panel considers that although it is reasonable to give primary consideration to relevant comparators listed in Australia there may still be scope to make use of comparators with similar characteristics in other countries to help improve the statistical reliability of estimates of the beta parameter in the CAPM.
	As noted elsewhere, the Panel considers that there needs to be more explicit discussion of the underlying behavioural assumptions of the CAPM and the extent to which deviations from those assumptions may have implications for the regulatory arrangements and appropriate rate of return parameters.
	It would also be useful to note that while the CAPM can apply conceptually to debt instruments it is not practical to do so in determining an appropriate return on debt and in any case a more direct estimate of the required return on debt is available from debt markets.
	The treatment of allowances for specific inflation rates for inputs needs to be clarified as discussed in the body of this Chapter.
	Some readers may find it difficult to understand some of the financial efficiency discussion.
	It may be relevant to provide some reference for the potential for foreign investors to make use of imputation credits if there is scope to do so with double taxation agreements and scope to reduce tax through trading around dividend dates as this may help define a lower bound to the value of imputation credits.
	Some minor points and suggestions for improving the explanations are also provided.

Clear link between conclusions and information	See above comments in relation to the impact of the regulatory arrangements on risk and appropriate rate of return parameters. See above comments in relation to the sample. Brief explanation of the components of the definition of a benchmark efficient entity would be helpful when the definition is first presented. Various minor suggests are provided to help improve the explanation of various conclusions.
Reforms to implement a binding rate of return instrument	The approach can be implemented under both the current and binding rate of return arrangements.
Implementation by stakeholders at a point in time	The proposed approach is sufficiently transparent to be implemented by stakeholders at a point in time.
Interactions with other components of the regulatory arrangements.	See the comments for the revenue and pricing principles.

6 GEARING

6.1 COMPONENT DESCRIPTION

Gearing refers to the proportions of a regulated business's assets assumed to be financed by debt and equity. The assumptions in relation to gearing for the benchmark are used to weight the benchmark costs of debt and equity, to help determine the credit rating for deriving the risk premium for the cost of debt, to take account of different gearing when estimating equity betas and to determine interest and tax expenses.

The allowed gearing is based on the gearing levels in the benchmark sample of Australian utility businesses. Market value gearing estimates are preferred, where available, as they reflect the market's current information on efficient financing. The market gearing data indicate a pronounced decline since late 2009 and this supports a reduction in the long held gearing level of 60 per cent to 55 per cent.

6.2 PANEL ASSESSMENT

In summary, the Panel considers that:

- The technical material presented in the discussion of gearing in the Explanatory Statement is sound.
- The reasons for preferring a level of gearing that reflects recent trends and that may differ from other regulators decisions are sound.
- The conclusion of a preferred gearing level of 55 per cent is clearly linked to and well supported by the information that it is based on.

Although there is an argument that retention of the long held value of 60 per cent gearing would contribute to regulatory predictability and capital structure of firms is typically relatively stable, the observed changes are market based, a clear trend is evident, and the change will not likely have a substantial impact on the overall rate of return. However, the Panel notes that the reduction in gearing seems unusual given the persistence of low interest rates and the credit ratings of the sample of firms and the sample size is quite small.

The Panel also considers that the ERA should consider the merit of checking the actual gearing of the firms it regulates because there can be scope to increase gearing and realise a higher return on equity to the extent that the cost of debt, including recognition of the tax deductibility of debt interest, is less than the cost of equity and the entity has lower risk then assumed in specifying the gearing and credit rating benchmarks. Although the interaction between the gearing ratio and equity beta means that the cost of equity increases with gearing there are limits to the relationship in practice such that while the realised return on equity may increase, the actual cost of equity capital in the market may not increase proportionately. It is noted that there have been instances in other jurisdictions where higher gearing as led to a higher realised return on equity and review of actual gearing may provide useful

information about whether the financing arrangements truly reflect relevant risk and are efficient.

As the gearing level would be fixed, this would readily enable implementation by stakeholders at a point in time.

Some minor points where the explanation could be improved are set out below.

At paragraph 198 of the Explanatory Statement it is stated that: "The average gearing of the benchmark sample determines the benchmark efficient level of gearing. This approach is consistent with incentive regulation discussed in Chapter 7." The reference should probably be to section 4.2.2.1 of Chapter 4 of the Explanatory Statement. Also it would be helpful to restate why the average gearing level is considered to be efficient in the reasoning section.

At paragraph 200 of the Explanatory Statement there is reference to using a hybrid approach in estimating gearing by using the book value of debt and market values of equity. However, in paragraph 201 it is noted the ERA places more reliance on the use of market value gearing estimates. The Panel suggests that some redrafting would eliminate any confusion here.

At paragraph 214 of the Explanatory Statement it would be helpful to provide a reference to the 'pecking order theory'.

Also in relation to paragraph 214, the following sentence could be explained better – "Internal financing with retained earnings is least likely to signal investors and is therefore management's preferred source of financing."

Table 4 provides a summary of the panel's assessment in relation to the factors to consider for gearing.

Factors to consider	Panel assessment
Revenue and pricing principles	It would be helpful to re-state why the average gearing level is considered to be efficient in the reasoning section.
	It would be useful to check the actual gearing levels of regulated entities.
Rate of return provisions	As above
Relevant information for reaching conclusions	Some minor suggestions are made for improving the explanation.
Clear link between conclusions and information	The conclusion of a preferred gearing level of 55 per cent is generally clearly linked to and well supported by the information that it is based on.
	Some minor suggestions are made to improve the explanation of information and conclusions.

Table 4: Summary of panel assessment for gearing

7 RETURN ON DEBT

7.1 COMPONENT DESCRIPTION

The Guidelines and Explanatory Statement explain that the National Gas Rules require the ERA to estimate the return on debt in a way that contributes to the allowed rate of return objective as specified in the National Gas Rules. The allowed rate of return objective requires the allowed rate of return to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as for the reference services.

The Guidelines approach to estimating the return on debt is designed to address various aspects of efficient financing as explained below. In addition the approach proposes to reflect debt raising costs at the time or shortly before the time of the regulator's decision for the relevant regulatory period or average financing costs over a longer historical period prior to the regulatory year or some combination.

The Guidelines express a preference for an approach described as a hybrid trailing average that recognises not all debt is refinanced on a single day while also recognising the role of current risk free interest rates in the period immediately before the regulatory decision for the particular regulatory period in providing efficient investment signals and satisfying the NPV=0 condition. This condition is essentially a condition that ensures that for the assumed costs and demand, revenues and hence prices will be calibrated based on a point estimate of an expected rate of return and is explained in Section 3.2.2 of the Explanatory Statement.

The return on debt is defined in the Guidelines as follows:

Return on debt = Risk free rate + Debt risk premium + Debt raising costs + Hedging costs

A minor point is that the first two components define a return on debt to debt holders but the last two terms are costs from the perspective of the firm so that better terminology for the above expression would be the cost of debt to the firm.

The first two components of the return on debt are estimated with the hybrid trailing average approach which:

- adopts the 5-year bank bill swap rate, set on a daily basis averaged over a 20 day period just prior to the regulatory period comprising a risk free rate and the margin between the risk free rate and the bank bill swap rate; and
- uses a 10-year trailing average for the debt risk premium, which is updated annually so that each year a new year's debt risk premium is estimated and the oldest estimate in the 10-year series is removed.

The bank bill swap rate in effect represents the rate at which an investor is indifferent between receiving a fixed and a floating rate of return. It is a widely used reference rate or

benchmark for floating rate debt instruments. The bank bill swap rate contains a risk free component plus a margin representing the difference between the swap rate and the risk free rate (the spread of the swap) (see section 7.2.1.2 of the ERA's Explanatory Statement). The debt margin then represents the difference between the yield on the relevant debt instrument and the swap rate.

Note that the hybrid trailing average only uses a trailing average of the debt risk premium in combination with an on-the-day measure of the bank bill swap rate.¹⁷

It is understood that the 10 year term is considered to best represent the typical period for financing long term debt for regulated infrastructure businesses.¹⁸

Annual debt raising costs and hedging costs are discussed in Chapter 14: Debt and equity raising costs.

The use of the 5 year bank bill swap rate is used in applying the present value principle that the term of the debt should match the term of the regulatory period of 5 years.

As the hybrid trailing average is a moving average it requires annual updating of revenue allowances and hence prices for each year of the regulatory period. However, the only component of the hybrid trailing average that changes is the debt risk premium each year. The updating of the debt risk premium is to be undertaken using a formula along with a methodology for calculating the annual update to the debt risk premium as described in Chapter 10: Debt risk premium.

7.2 PANEL ASSESSMENT

7.2.1 Binding rate of return instrument

As noted, in Chapter 3, if a binding rate of return instrument is given effect in Western Australia the allowed rate of return objective will not be specified as part of the instrument. However, the National Gas Objective and revenue and pricing principles will still apply and they cover the various aspects of economic efficiency that are in turn reflected in the allowed rate of return objective. The Panel considers this provides the ERA with the flexibility to continue with the current approach for defining a benchmark efficient entity and efficient financing costs.

The Panel considers that this means that the Guidelines and Explanatory Statement effectively cover the current situation and the situation if a binding rate of return instrument applies.

¹⁷ The bank bill swap rate contains a risk free component plus a margin representing the difference between the swap rate and the risk free rate (the spread of the swap), see section 7.2.1.2 of the ERA's Explanatory Statement. The debt margin then represents the difference between the yield on the relevant debt instrument and the swap rate.

¹⁸ See AER (2009, p. 167).

7.2.2 The hybrid trailing average

The Explanatory Statement discusses the two main alternatives to the hybrid trailing average and provides a brief assessment of each of the methods in terms of various aspects of efficient financing.

In understanding the strengths and weaknesses of the three approaches it is helpful to define the different approaches; outline how regulatory approaches have evolved in relation to consideration of the trailing average concept; and how they address the different financing risks.¹⁹

The three approaches are:

- The 'on-the-day' approach which sets the regulatory (i.e. allowed) cost of debt over a short period immediately preceding the start of the regulatory cycle. The allowed cost of debt is subsequently reset before the start of the next regulatory cycle (e.g. after five years).
- The full trailing average approach which measures the cost of debt as a trailing average (over a 10 year period including the current year) of the total cost of debt. The standard approach is to use the same proportional weight of 10 per cent for each year of the trailing average. This assumes that all debt is contracted for 10 years and 10 per cent of the total debt portfolio is refinanced each year.
- The hybrid trailing average approach preferred by the ERA combines elements from the on-the-day and the full trailing average approaches a risk free rate²⁰ at the start of the regulatory period matching the term of the regulatory period; and a debt risk premium that is estimated as a trailing average.

The on-the-day approach is very simple to implement and was the main approach adopted by regulators for regulated energy network business from the first decisions in the late 1990s until the AER adopted a trailing average cost of debt approach in its December 2013 Rate of Return Guideline.²¹

The key argument provided in support of the on-the-day approach is that the current rate of return, including the current cost of debt, at the time of a regulatory determination provides a forward looking return and the most appropriate signal for new investment.

The key issue of concern with the on-the-day approach, that led to the acceptance of some form of trailing average approach, is that it assumes all of the debt of the regulated entity can be financed at the prevailing rates in the short period just prior to the regulatory decision. Supporters of the standard full trailing average approach argue that it better reflects how regulated firms refinance their debt in practice, while reducing price volatility for the

¹⁹ The Queensland Competition Authority provides a useful summary and evaluation of the three approaches in QCA (2015) Trailing average cost of debt, Final Decision, April.

²⁰ The rate at the start of the regulatory period contains a risk free component plus a margin representing the difference between the swap rate and the risk free rate (the spread of the swap), see section 7.2.1.2 of the ERA's Explanatory Statement. The debt margin then represents the difference between the yield on the relevant debt instrument and the swap rate.

²¹ Australian Energy Regulator (2013), Rate of Return Guideline, December.

regulated services.

A variant of the full trailing average (which has equal increments for the proportion of debt that is refinanced) is a weighted trailing average where new capital expenditure is financed at the current rate but the trailing average applies to the existing capital base.²² This would provide more efficient signals for financing new investment than the standard full trailing average approach, by applying the current rate to all new investment, however the QCA examined the approach and found the effect was minor.²³

Assessment of the different methods requires consideration of how they address the key financial risks in relation to debt financing which are:

- the risk of differences between the allowed return on (cost of) debt costs and the actual cost of debt over the regulatory period often referred to as interest rate risk;
- refinancing risk if there are unusual conditions in debt markets at the time of rolling over the debt; and
- exchange rate risk if debt is issued in international markets.

Exchange rate risk is covered in the allowance for hedging costs discussed in Chapter 14: Debt and equity raising costs.

Interest rate risk can be managed by the use of interest rate swap contracts, assuming the swap contracts are efficiently priced. Refinancing risk can be managed by having multiple sources of debt, issuing longer term debt and staggering debt into smaller components over different periods.

As noted a key advantage of using an on-the-day approach is that the current cost of debt estimated just prior to the regulatory period provides the best estimate at the time of the forward looking cost of debt which is argued to be most relevant for investment decisions looking forward. In other words it is consistent with providing the most efficient investment signals for new investment. However, a counter consideration is that most of the capital for regulated network energy businesses has already been invested and is sunk so that the investment signal argument may have more limited applicability. However, for the sunk capital the focus still needs to be on ensuring that it is efficiently financed and in a way that is consistent with what was expected at the time of the investment, otherwise this could have adverse impacts on investment incentives for new capital expenditure as well.

The ERA considers that use of a current risk free rate matching the regulatory period is important for ensuring that the NPV=0 condition is satisfied. It is important to recognise that this interpretation is from an ex ante or expected perspective i.e. parameters for the allowed rate of return should be consistent with ensuring that from an ex ante (forward looking) perspective the expected NPV=0.

²² This approach has been advocated by the Queensland Treasury Corporation – see QCA (2015, p. 11 and 24-27).

²³ Ibid, pp. 24-27.

The intuition of the argument is that, for example, with the yield curve²⁴ typically exhibiting an upward slope, the use of risk free rate longer than the regulatory period would mean that the allowed return was larger than needed to finance investment given the regulatory resets that occur i.e. debt could be contracted on 5 year basis but at a lower rate of return then say a 10 year rate with assurance that the 5 year rate would again be set at the start of the next regulatory period. In this way the firm would benefit from the higher margin allowed in a 10 year rate if it did contract for 5 year debt.

Furthermore if the firm does issue 10 year debt (rather than 5 year debt), and prices are reset after 5 years assuming an allowed current cost of debt with a 10 year maturity, the latter cost of debt will likely differ from the former cost of debt (for the first regulatory period) and prices will diverge from actual costs based on the 10 year term which in effect still applies given the firm contracted for the debt and it was allowed in the previous regulatory period.

The Panel considers that this reasoning in relation to meeting the NPV=0 principle is correct but that further explanation as presented above should be provided in the Explanatory Statement. The Panel also notes that the proposition that using a term different to the regulatory period would violate the NPV=0 condition has been accepted by the AER but that the AER has preferred to retain a 10 year term based on a cautious approach to recognising refinancing risk.²⁵ The QCA also considers that the full trailing average approach violates the NPV=0 condition and requires rate of return parameters to match the term of the regulatory cycle.²⁶

The reasoning in relation to ensuring the rate of return parameters match the term of the regulatory cycle, as outlined above, does not take account of re-financing risk i.e. the risk arising in relation to exposure to unusual conditions in debt markets at the time of the regulatory reset. As noted this risk can be managed by issuing different types of debt, issuing longer term debt and staggering the maturity dates of debt. However, the on-the-day approach makes the assumption that all of the debt will be refinanced around the 20 day period for determining the return on debt prior to the regulatory decision. Many commentators and stakeholders have noted that this is not feasible in practice and the assumption does not ensure efficient financing costs are represented.

Thus refinancing risk provides the main justification for adopting some form of trailing average method. The full trailing average method may be most effective in addressing refinancing risk provided the trailing average period and weights for the trailing average are reasonable estimates for what the benchmark firm employs and the assumed 10 year term of debt actually applies. However, the full trailing average method is vulnerable to firms exploiting the typical slope of the yield curve to issue debt at a lower cost than allowed in the trailing average. This motivates the adoption of a hybrid approach which precludes the ability of the firm to gain from exploiting a typical yield curve while also incorporating compensation for refinancing risk and hedging costs to convert 10 year yields to yields that match the regulatory term. The compensation for refinancing risk in the ERA's hybrid approach is covered in Chapter 14: Debt and equity raising costs.

²⁴ In finance, the yield curve is a curve showing several yields or interest rates across different contract lengths for a similar debt contract.

²⁵ See AER (2009, pp. 166-168).

²⁶ QCA (2015).

In addition to a brief discussion of some of these considerations the Explanatory Statement provides a number of points when comparing the on-the-day approach and the hybrid trailing average. Key points are that the hybrid trailing average approach can be replicated by the firm and achieve the NPV=0 condition exactly at any point in time whereas the on-the-day approach can only achieve this condition on average over the longer term.

However, an advantage that the full trailing average approach has is that it can better take account of extreme events that affect both the risk free rate and the debt risk premium. If there is an extreme event during the regulatory period that affects both the risk free rate and debt premiums the hybrid approach will provide some compensation by recognising the impact on the debt risk premium at that time but the compensation for hedging the risk free rate is not likely to incorporate the impacts of extreme events. This point is not recognised in the Explanatory Statement. It may well be the case that the debt risk premium is most affected for many extreme events but there may be impacts on the risk free rate as well or it may be the impacts are partly offsetting. It may also be the case that extreme events would provide a valid reason to re-estimate the allowed rate of return and reset prices. This aspect is also not considered in the Explanatory Statement.

The Panel considers that these issues need more consideration in the Explanatory Statement. The Panel considers that the Explanatory Statement does not provide a clear and complete explanation of the various approaches to estimating the return on debt and their advantages and disadvantages.

Another consideration is complexity introduced by annual updating when applying the hybrid trailing average. The Explanatory Statement considers the difference in regulatory cost when compared with the on-the-day approach is not large. The Panel notes that an alternative to annual updating, should the regulatory costs be material, would be to make an NPV equivalent adjustment to prices in the next regulatory period with appropriate smoothing of prices over the regulatory period.

The Panel understands that the hybrid trailing average has already been implemented for all of Western Australia's gas regulated businesses. It would be helpful to note that is the case and also the transitional arrangements that were adopted. The Panel also considers that it is important to refer to the instructions that have been provided to facilitate automatic updating of formulas and estimates, for example as set out Appendix 4 of the ERA Final Decision on the Dampier to Bunbury Natural Gas Pipeline for 2016–2020 (ERA 2016c).

To reiterate the main points, the Panel recognises the importance of ensuring that the allowance for the cost of debt is consistent with achieving the NPV=0 condition while also taking effective account of refinancing risk. The Panel considers that there is good information to support the hybrid trailing average approach but that the explanation needs to be improved as discussed above and in particular considers that the Explanatory Statement discussion of the advantages and disadvantages of the different methods needs to be developed to take account of various points raised in this Chapter.

The Explanatory Statement should also contain a clear justification for estimating the hybrid trailing average over a 10 year period i.e. adopting the assumption that the typical term for issuing debt is 10 years.
7.2.3 Summing up

The Panel considers there is sufficient information for stakeholders to implement the approach at a point in time, although this assumes relevant technical expertise in establishing the debt risk premium in particular.

A minor point is that the Panel considers there is a need to provide a reference to the evidence in the first two dot points of paragraph 287 of the Explanatory Statement, relating to the performance of the on-the-day approach for the debt risk premium and for signalling efficient use by upstream and downstream users.

Table 5 provides a summary of the panel's assessment in relation to the factors to consider for the return on debt.

Factors to consider	Panel assessment	
Revenue and pricing principles	The approach to estimating the return on debt is designed to address various aspects of efficient financing but the explanation needs to be improved.	
Rate of return provisions	As above.	
Relevant information for reaching conclusions	The Explanatory Statement does not provide a clear and complete explanation of the various approaches and their advantages and disadvantages.	
	The discussion provided in the body of this Chapter was considered necessary to try to better highlight key points.	
	It might be useful to have some discussion of the weighted trailing average approach which ensures new capital expenditure is funded at the current rate of return while the existing RAB is funded using the trailing average.	
	There is a need to refer to transitional arrangements that are in place for implementing the hybrid trailing average.	
	There should be a clear justification for estimating the hybrid trailing average over a 10 year period i.e. adopting the assumption that the typical term for issuing debt is 10 years.	
Clear link between conclusions and information	The Panel considers that the reasoning in relation to meeting the NPV=0 principle is correct but further explanation would be helpful to make it more accessible to a wider audience in the Explanatory Statement.	
	There is a need to address how the preferred hybrid trailing average method effectively addresses refinancing risk when there are unusual conditions in debt markets.	

Table 5: Summary of panel assessment for return on debt

Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements. There is a need to consider whether and under what conditions the binding rate of return specification may need to be re-opened in relation to a material change in circumstances.
Implementation by stakeholders at a point in time	There is sufficient information for stakeholders to implement the approach at a point in time, although this assumes relevant technical expertise in applying the formula, in particular for the debt risk premium.

8 RISK FREE RATE OF RETURN

8.1 COMPONENT DESCRIPTION

The risk free rate of return is the rate of return that relates to an asset with a guaranteed payment stream. It in effect provides expected risk free compensation for the time value of money. As is the case for the overall return, the risk free rate is an ex ante or forward looking concept.

A nominal risk free rate is required for estimating a nominal vanilla rate of return.

The ERA uses 5 year term for the risk free rate to match the term of the regulatory cycle.

For the return on equity, Commonwealth Government Security bonds are used to estimate the risk free rate. The product of the beta and the market risk premium is then added to the risk free rate to estimate the allowed return on equity.

Linear interpolation is used to obtain estimates of returns from Commonwealth Government securities so as to exactly match the term of the regulatory period.

For the return on debt, the risk free rate is incorporated in the estimate of the prevailing 5 year term bank bill swap rate which is used as the 'base' rate in the return on debt calculation (it comprises the risk free rate plus the spread between the bank bill swap rate and the risk free rate). The debt risk premium, together with provisions for debt issuing and debt hedging costs are then added to the 'base' rate to estimate the allowed return on debt.

An averaging period of 20 consecutive days, as close as possible to the start of the regulatory period and nominated in advance is used to estimate the risk free and base rates.

8.2 PANEL ASSESSMENT

The use of Commonwealth Government bonds to estimate the risk free rate is widely accepted as the best measure of the risk free rate and estimates are readily available as noted in the Explanatory Statement.

As explained in the Explanatory Statement interest rate swaps are an important market benchmark at which financial institutions borrow and lend from each other and comprise a risk free rate and a margin representing the spread of the swap rate over the risk free rate. However, the swap rate is more useful than the risk free rate in facilitating hedging and for use in estimating the return on debt. The debt risk premium is estimated by the difference between the yield on the relevant debt instrument and the swap rate rather than the difference relative to the risk free rate. This is consistent with representing efficient debt costs.

Averaging over 20 days is considered necessary to smooth out the influence of idiosyncratic yields. Longer averaging periods e.g. 40 days typically do not have much impact and a shorter period relates more closely to current conditions. The requirement to nominate the averaging period in advance is relevant for ensuring regulated business do not in effect 'cherry pick' the best outcome, although this is not explained in the Explanatory Statement.

The Panel considers that the conclusions for estimating the risk free rate of return as an input to the cost of equity and the cost of debt are well supported and clearly linked to relevant information.

However, as suggested in the Panel's comments on the overall rate of return, the Explanatory Statement should provide more material explaining why the risk free rate should be for a period of five years to ensure the NPV=0 condition is met. It is noted in the Explanatory Statement that this was explained in detail in the ERA's 2013 rate of return guidelines but to assist understanding and ensure the Guidelines are reasonably self-contained, the Panel considers a summary and accessible explanation should be provided in the 2018 Explanatory Statement.

The Panel considers that it would also be helpful, for transparency, to provide the formula and a simple example of the linear interpolation that is proposed to be used for Commonwealth Government Securities.

The Panel considers there is sufficient information for stakeholders to implement the approach at a point in time.

Table 6 provides a summary of the panel's assessment in relation to the factors to consider for the risk free rate.

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates for the risk free rate to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	The reason for nominating the averaging period in advance should be provided. It would be helpful, for transparency, to provide the formula and a simple example of the linear interpolation that is proposed to be used.
Clear link between conclusions and information	As noted elsewhere in the Panel's comments there should be more explanation, including at an intuitive level, of why the risk free rate should match the term of the regulatory cycle to ensure the NPV=0 condition is met.
Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements.
Implementation by stakeholders at a point in time	There is sufficient information for stakeholders to implement the approach at a point in time.

Table 6: Summary of panel assessment for risk free rate

9 BENCHMARK CREDIT RATING

9.1 COMPONENT DESCRIPTION

The benchmark credit rating is defined as the forward-looking opinion provided by a ratings agency of an entity's credit risk. Credit ratings provide a broad classification of a firm's probability of defaulting on its debt obligations and can be used to establish a relevant debt risk premium for inclusion in the allowed cost of debt. The broad applicability of a credit rating means that the benchmark sample can be readily expanded beyond the sample of four firms for the benchmark efficient entity.

The ERA uses a median value approach to determine the credit ratings of the benchmark efficient entity that involves taking the median credit rating of a sample of comparator businesses and using this value as the credit rating for the benchmark efficient credit rating. Using the median approach rather than an average approach helps to reduce the influence of outliers. This approach suggests a credit rating around BBB+ and this is supported by other regulators' decisions.

The credit ratings can be either listed or unlisted or government owned. The ERA provided information on the median credit ratings for separate samples for: a sample of Australian gas and electricity businesses; a sample of gas and electricity businesses excluding any form of government ownership; and a sample excluding all privately-owned (non-government owned) gas and electricity businesses excluding businesses with support from their parent companies to determine if ownership features had a material impact on the median credit rating. The results were the same for the first two samples of a BBB+ rating for each of the years from 2014 to 2017. Sample 3 produced a result of a BBB rating but there was only one firm in the sample.

Also, as noted, most regulatory credit ratings support a BBB+ rating and the AER also applied the BBB+ credit rating to several decisions that were upheld by the Australian Competition Tribunal who also confirmed that more recent years firmly point towards a BBB+ credit rating for the benchmark efficient entity.

It is noted that this rating is an increase from the rating of BBB in the 2013 Guidelines.

9.2 PANEL ASSESSMENT

The Panel notes that the sample for establishing the benchmark credit rating is much larger than the sample that is used to estimate the gearing and the equity beta. However, as noted in the Explanatory Statement credit ratings provide a broadly uniform measure of default risk and the Panel considers that having a larger sample helps in establishing a more robust estimate.

However, the Explanatory Statement does not specify any detail about the criteria for selecting the sample of 13 comparator businesses used to establish an appropriate credit rating. The Panel considers more explanation is required as to how the sample of 13 comparator businesses was chosen for setting a benchmark credit rating.

The Panel considers that there is a clear link between the information and the conclusion of a BBB+ credit rating and notes that other aspects of the regulatory arrangements including application of a building blocks model at five year intervals, the assurance that model provides for cost recovery and the revenue cap form of regulation provide sufficient information to support the conclusion of at least a BBB+ credit rating for the Western Australia regulated gas network businesses. An appropriate credit rating is needed to assist in establishing an efficient debt risk premium.

The Panel considers that it may be worth noting these additional factors support at least a BBB+ credit rating.

As the credit rating would be fixed for the regulatory period stockholders could readily implement it at a point in time.

Table 7 provides a summary of the panel's assessment in relation to the factors to consider for the risk free rate.

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	The Panel considers more explanation is required as to how the sample of 13 comparator businesses was chosen for setting a benchmark credit rating. Otherwise, there is sufficient information for reaching the conclusion but it may be worth noting that various aspects of the regulatory arrangements reinforce the conclusion.
Clear link between conclusions and information	There is a clear link between the information and the conclusion.
Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements.
Implementation by stakeholders at a point in time	There is sufficient information for stakeholders to implement the approach at a point in time.

Table 7: Summary of panel assessment for credit rating

10 DEBT RISK PREMIUM

10.1 COMPONENT DESCRIPTION

The debt risk premium represents the return above that risk free rate that lenders require to compensate them for the risk of providing debt funding to a benchmark business.

To determine the debt risk premium used to calculate the rate of return, the ERA will construct a 10-year trailing average debt risk premium. This will consist of a debt risk premium for the current year and a debt risk premium for each of the nine prior years, equally weighted. The 10-year trailing average debt risk premium will be updated each year.

Estimating the debt risk premium involves the following steps:

- Step 1: Identifying a sample of relevant corporate bonds that reflect the credit rating of the benchmark efficient entity.
- Step 2: Converting the bond yields from the sample into hedged Australian dollar equivalent yields inclusive of Australian swap rates.
- Step 3: Estimating yield curves on this data by applying the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques.
- Step 4: Calculating the simple average of their three yield curves' 10-year cost of debt to arrive at a market estimate of the 10-year cost of debt.
- Step 5: Calculating the debt risk premium by subtracting the 10-year interest rate swap rate from the 10-year cost of debt.

The ERA's approach uses international and domestic bonds identified as having Australia as their country of risk. The ERA lists a number of characteristics that apply for including the bonds in the benchmark sample. Characteristics are defined so that as many bonds as possible are included in the sample as long as (i) the credit rating of each bond matches that of the benchmark efficient entity; (ii) time to maturity must be two years or longer; and (iii) issued bonds must have the country of risk specified as Australia but not issued by the financial sector.²⁷ Some additional more complex bonds are excluded.

The debt premium is estimated based on the 'spread to swap' for each bond which is converted to Australian dollar terms where relevant. As many of the estimates do not match the 10 year tenor, yield curves are estimated with appropriate statistical techniques. The statistical techniques are described in the Explanatory Statement.

A 20 day averaging period is required for the estimate of the risk free rate and the debt risk premium. For estimating the debt risk premium, bonds are removed that contain less than 50 per cent of observations over the averaging period. A number of criteria are also specified for

²⁷ See ERA response to Further Independent Panel Questions for ERA, 4 September 2018, Answer to Question 4, ERA website.

the averaging period including that it be confidential.

The ERA began calculating annual debt risk premiums in April 2015 and these will be used when constructing the trailing average. For relevant years prior to 2015 the ERA will use the RBA's historical credit spreads for 10-year non-financial corporate bonds. Past estimates of the debt risk premium will not be recalculated if there is a change in the credit rating.

In the ERA's Final Decision for the Dampier to Bunbury Natural Gas Pipeline the sample of bonds as at 10 June 2016 included 101 bonds in the BBB band credit rating and for Western Power's Draft Decision for March 2018 the BBB+ credit rating was used with a sample of 47 bonds.²⁸

The technical process to estimate the debt risk premium is documented in Appendix 4 of the ERA Final Decision on the Dampier to Bunbury Natural Gas Pipeline for 2016–2020 (ERA 2016c). Stakeholders need access to Bloomberg data and relevant software to estimate the debt risk premium.²⁹

The Explanatory Statement notes that the yield estimates are promised or stated estimates and allowing for the possibility of default the expected yield will be less than the promised yield. This means that the observed yield is a conservative estimate i.e. represents an upper bound. The Explanatory Statement also provides brief references to the approaches of other regulators.

10.2 PANEL ASSESSMENT

As the sample is based on relevant bonds traded in financial markets with the same credit rating as the benchmark efficient entity and are bonds with Australia as the country of risk, the resulting estimates will reflect prevailing market conditions relevant to those affecting the benchmark efficient entity as noted in the Explanatory Statement.

The approach proposed by the ERA is considered likely to provide robust estimates given the likely sample size and the sophisticated statistical techniques. However, it would be useful to provide reference to the sample size and statistical diagnostic results from the proposed approaches and reference to endorsement by the Australian Competition Tribunal.³⁰

In addition, it would be useful for the Explanatory Statement to explain why the ERA has adopted the revised bond yield approach rather than other methods and in particular the AER's use of RBA data and the Bloomberg valuation service which seems to be a simpler and valid approach.

Although the statistical techniques are formally described in the Explanatory Statement they require considerable technical expertise to understand and implement. The Panel notes that they have been applied and explained in several regulatory decisions for the regulated gas pipelines in Western Australia. The Panel also notes that the ERA considers that the approach to estimating the debt risk premium has been designed so that a stakeholder can

²⁸ See ERA response to Further Independent Panel Questions for ERA, 4 September 2018, Answer to Question 6, ERA website.

²⁹ Ibid, Answer to Question 8 and footnote 124 of the Explanatory Statement.

³⁰ Ibid, Answer to Question 7.

replicate the calculation and that once the approach has been established in Bloomberg and Excel for the first time, the settings and templates will not need to be established again and the process becomes mechanistic.³¹

The Panel has reviewed the information and ERA models to which stakeholders have access. The Panel considers the step-by-step guidance to implementing sophisticated statistical solutions to interpolating or extrapolating incomplete market data on yields is useful and necessary for clarity and even-handedness in treatment of regulated entities. The potential drawback, which is more an unintended consequence, is that the regulated entities adopt a mechanistic mindset and apply the detailed protocol without any judgement. To mitigate this effect, it would be helpful to explain the relative merits of the Gaussian Kernel, Nelson-Siegel and Nelson-Siegel-Svensson techniques and why a simple average of their respective estimates is a better solution than using, say, just the Nelson-Siegel-Svensson techniques. It is sufficient to have this explanation at a broad level that does not require advanced training in econometrics. The Panel is of the view that regulated entities are likely to be more compliant and have more confidence in the efficacy of regulatory guidelines when they understand the basis for them.

With the above caveat in mind, the Panel considers there is sufficient information for stakeholders to implement the approach at a point in time (but not replicate the allowed estimate given the confidentiality provision), however this assumes technical expertise in implementing the revised bond yield approach.

The Panel notes that although some stakeholders would have difficulty in replicating the estimates of the debt risk premium, this should not matter for practical purposes given the use of a trailing average which is not likely to be very sensitive to updating so that the most recent estimates of the trailing average could be used as a proxy.

The ERA has advised that the averaging period is to be confidential so as not to adversely affect a regulated entity's ability to obtain finance. The Panel considers this explanation should be provided and also notes that maintaining confidentiality precludes replication of the estimate.

It is noted that past estimates of the debt risk premium will not be recalculated if there is a change in the credit rating and the Panel considers this is reasonable when including new information on an incremental basis as per the trailing average approach.

The Panel also considers the approach can be implemented under the current requirements or the binding rate of return requirements.

Table 8 provides a summary of the panel's assessment in relation to the factors to consider for the debt risk premium.

³¹ ERA (2016 c, p. 204).

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	It would be useful to explain why the ERA's revised bond yield approach is preferred to other approaches and provide references.
	It would be useful to provide reference to the sample size and statistical diagnostic results from the proposed statistical models.
	An explanation of the respective merits of the Gaussian Kernel, Nelson-Siegel, and Nelson-Siegel- Svensson techniques and why a simple average of their results is best would enhance confidence in the value of the approach
	An explanation of why the averaging period is confidential should be provided.
Clear link between conclusions and information	As above.
Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements.
Implementation by stakeholders at a point in time	There is sufficient information for stakeholders, with relevant technical capacity, to implement the approach at a point in time.

Table 8: Summary of panel assessment for debt risk premium

11 RETURN ON EQUITY

11.1 COMPONENT DESCRIPTION

The relevant return on equity consistent with achieving the National Gas Objective is the expected return that is required for investors to invest in an asset. The return comprises a component to reflect the time value of money for a riskless asset plus a risk premium to reflect relevant risk.

The Guidelines aim to identify the most appropriate model to quantify the required return on equity for the relevant regulated assets. The approach is forward looking in nature reflecting investors' concerns about the risks associated with the expected future stream of net cash flows. As noted in the Explanatory Statement there is no guarantee that expected returns will be realised, for if this was the case the asset would have no risk.

The Guidelines refer to a number of models that have been developed in finance theory and other approaches that are not based on modelling per se but rather on data and expert opinions. These models and approaches have been considered and in some cases used by other regulators but in general the main approach adopted in Australia uses the Sharpe-Linter Capital Asset Pricing Model (CAPM) to provide a base estimate which may be modified in some cases depending on the relevance of other models and information.

The Explanatory Statement notes that the ERA reviewed these other approaches when developing the 2013 Guidelines and concluded only the Sharpe-Linter CAPM was relevant for informing the ERA's estimation of the prevailing return on equity for the regulated firm. The Explanatory Statement provided a number of other points supporting the use of the Sharpe-Linter CAPM as follows.

- The AER considers the Sharpe-Linter CAPM remains the dominant asset pricing model for estimating a firm's cost of capital.
- In 2016, the Australian Competition Tribunal found that the AER had not erred in applying the Sharpe-Linter CAPM.
- In making the case for use of the Sharpe-Linter CAPM, the AER referred to a range of aspects that justify its use, including: its link to relevant economic and finance principles, its ability to make use of market data, its limited sensitivity to errors in inputs, its transparency, and its flexibility.

Based on this information the ERA concludes it will give full weight to the Sharpe-Linter CAPM when estimating the return on equity.

In applying the CAPM model, the Explanatory Statement explains that:

• consistent with relevant theory the CAPM should be applied from an ex ante (expected returns) perspective;

- only systematic (non-diversifiable) risk is recognised in the model and asymmetric risk may need separate compensation;
- the benchmark entity needs to have a similar degree of risk as the regulated services; and
- prevailing conditions need to be considered.

The Explanatory Statement notes that in implementing the CAPM it will separately detail the approach to estimating each of the CAPM parameters: being the risk free rate, equity beta and market risk premium; and that this replaces a five step approach set out in the 2013 Rate of Return Guidelines.³²

For clarity, the CAPM for the expected return on equity is defined as:

(2)
$$E(r_e) = r_f + \beta_e [(E(r_m) - r_f)]$$

where

 $r_{\rm f}$ is the risk free rate;

 β_e is the equity beta, which is a measure of the amount of relevant risk of the investment (as measured by the sensitivity of the return on the specific asset to the return on the market as a whole); and

 $E(R_m) - r_f$ is the expected market risk premium above the risk free rate and can be interpreted as the price of relevant risk.

11.2 PANEL ASSESSMENT

11.2.1 The Sharpe-Lintner CAPM

The Panel considers that the ERA conclusion to give full weight to the Sharpe-Lintner CAPM is based on sufficient information and supports the use of the Sharpe-Linter CAPM as at least the primary model for informing an estimate of the allowed return on equity. The Panel considers that other models and methods may be used to help arrive at the best estimates of the parameters of the CAPM, consistent with other parts of the Guidelines. The estimation of the individual parameters in the CAPM is discussed in subsequent Chapters.

11.2.2 The implications of regulatory arrangements for rate of return parameters.

The Panel also considers that an appropriate rate of return depends on various detailed aspects of the regulatory framework including how to address: unexpected events; risks not normally reflected in standard models; and how to best establish and ensure the recovery of efficient costs in order to meet the National gas objective including whether to apply a revenue cap or a price cap.

The Panel considers that this means there is a need for more material in the Guidelines

³² ERA (2013, p. 127).

explaining the main elements of the regulatory framework that have implications in setting an appropriate rate of return. Key elements of the regulatory framework may affect risk and particular parameters that need to be allowed for. By way of example, at the extreme, the allowance of a mandated fixed rate of return to a utility may have the effect of its securities being priced as a bond since its cashflows will have been substantially derisked. Addressing this issue effectively may require a separate new chapter on the form of regulation, the specific treatment of various risks and implications for the rate of return. In particular to what extent do the regulatory arrangements for pass through of various costs, approval of capital expenditure, the scope for re-optimisation of the asset base, the treatment of material unexpected adverse events; the existence of guaranteed revenue through a revenue cap mechanism; and regular resetting of allowed revenue affect equity risk?

The Panel considers that in particular there is a need for more consideration of the extent to which the underlying assumptions of the CAPM apply for a regulated entity and may be affected by regulation. At paragraphs 473 and 474 reference is made to asymmetric risk that is not priced and with a cross reference to Chapter 4. But this important aspect is not discussed in Chapter 4.

11.2.3 Reviewing actual financial performance

The Panel also suggests the ERA give consideration to reviewing actual financial performance to help determine whether key recommendations collectively are appropriate. The Panel recognises the difficulty in establishing key parameters that are important in ensuring the allowed rate of return meets the National Gas Objective and that this entails considerable regulatory discretion. The Panel considers that review of actual financial performance outcomes on an ex post basis would provide relevant information on whether the approach to setting the rate of return led to reasonable outcomes and reasonably balanced the interests of all stakeholders.

The Panel notes different views expressed by experts in relation to the use of actual profitability data in the AER's concurrent expert evidence sessions.³³ An important opposing view is that review of financial performance on an ex post basis would be fundamentally inconsistent with an incentive-based regulation framework. The Panel considers that this view is likely to be based on the assumption that the incentive to reduce costs and be efficient would be substantially weakened if historical information on the regulated entity was used to adjust rate of return parameters that had been set in the absence of reference to that information. However, while there may be some impact on incentives to reduce costs there are other mechanisms such as auditing and benchmarking to help ensure approved costs are efficient and in addition the use of actual profitability data does not mean that parameters and the regulatory arrangements would be applied in a way that substantially reduced incentives to be cost efficient. There are other considerations as well.

The Panel considers the regulatory arrangements would still need to provide appropriate profit incentives for firms to be efficient but that the actual profitability performance is a relevant consideration in setting a reasonable allowed rate of return. In this respect, the Panel considers: there is considerable scope for the return parameters to differ from what is consistent with efficiency; review of ex post performance may establish that allowed returns

³³ Cambridge Economic Policy Associates (2018, pp. 35-36).

are too low rather than just too high; and realised returns may be well in excess of what is needed to ensure efficient investment occurs in the long term interests of consumers. With respect to the latter point if the allowed returns are well in excess of what was allowed and cannot be clearly explained by cost efficiencies the credibility of the regulatory arrangements may be questioned leading to changes that raise regulatory risk.

In relation to the issue of reviewing actual financial performance measures for the regulated entity, it is noted that the AER is considering various financial performance measures including actual rates of return on equity and assets and RAB multiples to provide transparency and contextual information and monitor the overall effectiveness of the regulatory regime in setting allowed revenues.³⁴

11.2.4 Summing up

The panel considers that the ERA's proposed approach can be implemented under both the current requirements and the binding rate of return requirements assuming that relevant parameters would be fixed over the regulatory period or subject to mechanistic adjustment. However, the Panel notes some additional matters the ERA should consider in developing and implementing its approach.

Although the basic CAPM is transparent and can be readily implemented, there is regulatory discretion that is justified in setting specific parameters so that stakeholders may not be able to replicate the approach at certain points in time.

Table 9 provides a summary of the panel's assessment in relation to the factors to consider for the return on equity.

Factors to consider	Panel assessment
Revenue and pricing principles	The Sharpe-Linter CAPM is considered to be the best primary model for use in establishing an allowed rate of return.
	However, there is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.
	Consideration should also be given to the use of actual profitability performance to help confirm the overall allowed return on equity is reasonable.
Rate of return provisions	As above.
Relevant information for reaching conclusions	As above.
Clear link between conclusions and information	As above.

Table 9: Summary of panel assessment for return on equity

³⁴ AER (2018b).

Reforms to implement a binding rate of return instrument	The ERA's proposed approach can be implemented under the current requirements or binding rate of return requirements but the Panel has made some suggestions as noted above.
Implementation by stakeholders at a point in time	Although the basic model is transparent and can be readily implemented, there is regulatory discretion that is justified in setting specific parameters so that stakeholders may not be able to replicate the approach at certain points in time.
Interaction with other components of the regulatory arrangements	There is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.

12 MARKET RISK PREMIUM

12.1 COMPONENT DESCRIPTION

The market risk premium is a major component of the estimate of the required *expected* rate of return on equity under the Sharpe-Lintner CAPM, the most commonly used model in finance.

The market risk premium consists of the additional return above the risk-free rate of return that investors require to invest in a fully-diversified portfolio. The market risk premium compensates investors for the systematic (i.e., non-diversifiable) risk inherent in a fully diversified portfolio. Systematic risk is risk that cannot be diversified away because it affects in common all assets in the portfolio.

Investors' expected market risk premium cannot be directly observed and hence the prevailing premium at future point needs to be estimated.

The ERA's broad approach is to issue guidelines that are consistent with the current provision for regulatory discretion but informed by matters considered under a proposed binding rate of return framework.

Under the present regulatory regime, the ERA considers historic market risk premiums provide better guidance to expected risk premiums than the dividend growth model. Estimates of the market risk premium are conditioned by variables including: default spreads, the five-year interest rate swap spread, dividend yields, stock market volatility and the debt risk premium.

Should a binding framework be introduced, the ERA seeks stakeholder comment on three options: (i) initial regulatory discretion, then fixed for the period, (ii) a mechanical approach consisting of mandated weighting of estimates from the historic risk premiums and the dividend growth model, and (iii) an historic approach relying solely on prior market data.

The historic premium is defined as the average realised return equity stocks have earned in excess of the five-year government bond rate. To address various biases and changes in economic conditions, the ERA takes the average of the arithmetic and geometric mean of the historic market risk premium over six partially overlapping periods dating back to 1883.

An alternative approach is to use the implied expected return to equity in the two-stage dividend growth model of valuation to estimate the market risk premium. The ERA places less reliance on the dividend growth model.

The reasoning in support of ERA's assessment of the issues in estimating the expected market risk premium over the regulatory period and the approach it favours in the guidelines occupy the rest of chapter 11 of the Explanatory Statement.

12.2 PANEL ASSESSMENT

12.2.1 Definition of the market risk premium

The Panel suggests introductory paragraphs 503 to 504 be amended to sharpen the definition of the market risk premium. Para 503 states:

"the market risk premium reflects the difference between two components: the nominal risk free rate and the market return on equity. The market risk premium can be defined as the realised return on the market portfolio above the prevailing risk free rate."

Para 503 is an operational definition of the realized market risk premium, which can be negative. The concern of Chapter 11 is estimating the *ex ante* market risk premium, which is always positive. A suggested amendment which better orients the reader to the issues addressed in the chapter is:

"The market risk premium is the expected rate of return over and above the risk-free rate that investors require to invest in a fully-diversified portfolio. Ex ante, investors always require a rate of return above the risk-free rate to invest and so the expected market risk premium is always positive. Ex post the realized return to the market portfolio may be negative; that is the nature of risk. In establishing the cost of capital it is the ex ante market premium that is relevant."

Para 504 usefully expands on the notion of systematic risk:

"The market risk premium compensates an investor for the systematic risk of investing in a fully diversified portfolio. Systematic risk is risk that cannot be diversified away by investors because it affects all firms in the market. Therefore, the market risk premium represents an investor's required return, over and above the risk free rate of return, on a fully diversified portfolio of assets."

The following additional explanation could be usefully added as a footnote to the second sentence of para 504 because it indicates the relevance of systematic risk to the non-expert reader:

"The foundation of the Sharpe-Linter CAPM is the proposition that adding an asset to a portfolio reduces risk via the diversification effect but not beyond the risks that the assets in a portfolio share in common, i.e., their systematic risk. At the limit, when one has invested in all available assets in the market portfolio, there is only systematic risk left. A key assumption of the CAPM is that assets are priced as though it is only their systematic risk that is relevant to investors."

In the last sentence of para 504, it should be made clear that, in the ex ante perspective which is the relevant one in this context, the market risk premium represents an investor's "required *expected* return" over and above the risk-free rate of return on a fully diversified portfolio of assets".

The Panel proposes the first sentence in para 505 be amended as follows: "The market risk premium cannot be directly observed, *because it depends on investors' expectations at the time of investment*."

There are two separate issues in estimating the expected market risk premium. One is identifying proxies for the market portfolio and the risk-free asset and the other is choosing how best to use both proxies to estimate the expected risk premium. In practice, it is common to finesse the first problem by using equity indices (e.g., ASX 200) and sovereign debt (e.g., Australian Treasury bonds) as proxies, even though both are problematic³⁵. The

³⁵ Most obviously, equity indices do not include all assets and sovereign debt is not always risk-free.

Panel suggests it is useful to highlight to the reader the use of proxies in the interest of completeness. The following paragraph is one way of doing so:

"In estimating the expected market risk premium it is common to use equity indices (e.g., ASX200) of listed companies as a proxy for the market portfolio and sovereign debt (e.g., Australian Treasury bonds) as a proxy for the risk-free asset. The widespread use of these proxies is testament to the proposition that they are effective proxies. Given this resolution, the question then becomes which approach is best to estimate the expected market risk premium."

12.2.2 Status of ERA's guidelines on calculating the market risk premium

There is a clear statement in the last sentence of the introductory section of chapter 11 of the Explanatory Statement (para 506) that the guidelines show "how the market risk premium is to be estimated". The implication is that the guidelines have been set and are prescriptive. This is a reasonable implication otherwise the guidelines do not show how the market risk premium is to be estimated but are only suggestive. However, a contradictory impression is given in para 508 where it is stated:

"for the purposes of setting the guidelines and future binding instrument, the ERA is considering how best to set a market risk premium under the current regulatory framework and, if implemented, under the proposed binding rate of return framework."

The implication, perhaps inadvertent, in para 508 is that the best approach to estimating the market risk premium is still under consideration by the ERA. It is an implication reinforced by para 509 which states:

"the level of discretion applied under the current framework will be informed by matters considered for the adoption of a binding framework".

In-so-far that the Guidelines, as they stand, take into account any matters considered for the adoption of a binding framework, the Panel suspects that perhaps what may have been intended is a statement along the following lines:

"for the purposes of setting the guidelines, the ERA has considered how best to set a market risk premium under the current regulatory framework and, if implemented, under the proposed binding rate of return framework. The level of discretion applied under the current framework **has been** informed by matters considered for the adoption of a binding framework".

If this is the case, it would be useful to identify the matters considered for the adoption of a binding framework that informed the level of discretion under the current framework. There is also an issue about defining the extent of discretion that would be reasonable.

12.2.3 Regulatory discretion in respect of conditioning variables

The Panel recommends changing the adjective "conditional" to "conditioning" in para 510 as follows:

"Under the current regulatory framework the ERA will determine an estimate of the market risk premium through the use of the historic market premium, the dividend growth model and other **conditioning** variables. This will involve a level of regulatory discretion."

The approach is sensible and the signal, in paras 511 and 512 that the ERA will place more reliance on the historic market premium to estimate the prevailing risk premium is clear. The

Remarkably, in recent times Apple Corp has issued debt at lower cost than the US federal government. https://www.businessinsider.com.au/apples-debt-raise-november-6-2014-11?r=US&IR=T reasons for relying on the historic risk premium are also clear. What is unclear is how the ERA will use its regulatory discretion in assessing the contribution of each of the five conditioning variables listed (in the third dot point of para 512).

Also, are the five conditioning variables an indicative set of those that may be considered or are they exhaustive of all that can be considered? For instance, the spread between different classes of bonds is a potential conditioning variable in estimating the expected market risk premium. Could it be used?

The Panel recognizes that it is difficult to define the extent of discretion by setting clear boundaries but considers some further discussion and examples of the application of discretion would help.

A further point that needs clarification relates to para 513 which states:

"the level of discretion applied under the current framework will be informed by matters considered for the adoption of a binding framework"

It is difficult to interpret this sentence. The matters considered for the adoption of a binding framework will not be finalised when the current guidelines are released. How can the level of discretion allowed under the current framework be informed by the unsettled matters relating to the adoption of a binding framework?

12.2.4 Discussion of three options to determine MRP under the binding instrument

This section describes the three options the ERA is considering to determine the expected market risk premium under the binding instrument ("expected" is left out in the sentence in para 514).

Given that the present regulatory arrangements are supported by well reasoned arguments and evidence against relying solely on the historic market risk premium or a weighted combination of just the historic risk premium and the dividend growth model, these two options appear like "straw man" alternatives. The point is, it seems anomalous to rule out the second and third options under the current regulatory arrangement and then propose stakeholder comment on these options if a binding regulatory regime is adopted. Why would the binding nature of the regime make any difference to the accepted arguments against their use under the current regulatory arrangements?

The Panel notes that an advantage of the current system which provides for regulatory discretion and flexibility in estimating the market risk premium is that relevant updated information can be used to weight the contribution of each of the historic risk premium, the dividend growth model and other conditional variables in estimating the expected market risk premium. For instance, as subsequent discussion in Chapter 11 (section 11.2.2.2) shows, ERA has moved away from the Wright specification of the CAPM in estimating the expected market risk premium following a critique by Partington and Satchell. Under the proposed binding rate of return framework it is not clear how this kind of evolution will be allowed if either the mechanical approach or the historic approach is adopted. The option allowing initial regulatory discretion then fixed over the regulatory period is the most flexible.

Notwithstanding the above, the Panel considers it would be useful to provide a sense of the difference in estimates using each of the three methods. A table showing the range of estimates using each method and the confidence interval of the estimates would have

provided the Panel a more informed basis for assessing the impact of the guidelines as a whole.

12.2.5 Discussion on historic market risk premium

The Panel considers the overview of the historic market risk premium in the Explanatory Statement is, on the whole, well explained.

To avoid doubt, the Panel suggests para 523 should note:

"the historic market premium is the average realised **annual** return that stocks have earned in excess of the five-year government bond rate. This historic market premium can be directly measured. **The five-year government bond rate is chosen because the duration matches the regulatory period.**"

The Panel considers that para 524 rationalises the use of the historic market risk premium in a way that could be better expressed. Para 524 states:

"While not forward looking, the historic approach has been used to estimate the forward looking market risk premium as past outcomes contribute to investors' forward expectations."

It is true past outcomes contribute to investors' expectations but other factors also play a role (hence the relevance of conditioning variables) and the relevance of market risk premiums measures decades ago is of questionable relevance to investors. Nevertheless, the Panel considers the principal basis for using the historic approach is the assumption that realized risk premiums provide the most reliable estimates of investors' expected market risk premium. As stated in para 536 of the Draft Guidelines:

"Market risk premium estimation methods can be classified as either historic based or forward looking. Historic based methods use actual returns as a proxy for future returns."

In relation to the second and third dot points in para 526, it should be noted that although simple averages of six overlapping time-periods are used to estimate the expected market risk premium, the method gives greater weight to returns in later years. This is because whilst the later years are included in every time period, the earlier years are not, as can been seen from the series: 1883-2017, 1937-2017, 1958-2017, 1980-2017, 1988-2017 and 2000-2017. (More on this point later, along with comment on the averaging algorithm to estimate the expected market risk premium from historic data.)

The Panel considers that there is an inconsistency between the market risk premium expressed in equation form and in narrative form.

In para 531 the market risk premium is, accurately, defined as the expected return on the market less the risk-free rate. However, in para 532 it is stated:

"the market risk premium is commonly defined, in both finance and academic literature, as the realised return the market portfolio makes above the prevailing risk free rate".

In-so-far that para 532 is accurate, it defines the *ex post* or realised market risk premium. However, as para 531 makes clear by referencing the expected return to the market, we are concerned with the *ex ante* market risk premium. However, changing "market risk" to "historic market risk" and "defined" to "measured" would avoid the problem.

There is an error in Table 14 (para 533) which "summarises the recent history of estimates of the value of market risk premiums by Australian regulators". The value of 5.36% for the MRP in the third row, rightmost column is not the market risk premium but the equity premium for Seqwater (ie, equity beta times the market risk premium). The estimate of the

market risk premium arrived at by QCA in 2018 was 7%. See p. 62 of Final Report - Seqwater Bulk Water Price Review 2018–21.

Notwithstanding the above correction, while the rationale for the table is not stated, it would be useful to note the differences in estimates of market risk premium given in Table 14 reflect, at least in part, changes in the approach of ERA following new analysis and information.

For instance, ERA's estimate of 7.4% in 2016 of the expected market risk premium in (sixth row of Table 14) is based in part on the reasoning provided in para 968 (on page 208) of the "Final Decision on Proposed Revisions to the Access Arrangement for the Goldfields Gas Pipeline" which states

"... second, because of the uncertainty as to whether the MRP in Australia is stationary or nonstationary, the Authority also references the Wright approach, which assumes that the MRP and risk free rate are negatively correlated one for one."

The commentary and discussion in paras 551 to 556 of the present draft explanatory guidelines make it clear that revised analysis, in particular, Partington and Satchell's "Report to the AER: Discussion of Estimates of the Return on Equity" (April 2017) has led the ERA to form the view that "it will not consider the Wright approach when estimating the market risk premium" (para 556).

12.2.6 Discussion of theoretical considerations

The Panel considers the overview of the theoretical considerations is clear. However, para 540 refers to ERA's 2013 review of the relationship between the market risk premium and the risk free rate. It would be useful to summarise the key findings.

Historic market risk premium

At para 543 it is not clear why the historic risk premium approach necessarily assumes the market return on equity will revert to a long term historical average – all it assumes is the market risk premium will do so. It is also not obvious that using the historic risk premium necessarily implies a reversion to a long-term historic average. For instance, in their (2016) paper "The equity risk premium in Australia – 1900 to 2014", Bianchi, Drew and Walk³⁶ find that while the historic market risk premium is volatile there is a declining secular trend. They ask, "if this is the trend, what might the future hold?" (p. 92).

Notwithstanding the above, as recognised in the draft, the dividend growth model and the Wright approach assume a constant rate of return to equity and endogenous market risk premium.

A better characterisation is that the assumption of a constant market risk premium implies a lock step transmission from the risk free rate to the cost of equity whereas a constant rate of return to equity implies a one for one inverse relationship between the market risk premium and the risk free rate. They are two extremes and there is conflicting evidence. It would not be unreasonable for there to be variation in the market risk premium but the relationship to the risk free rate is not well established.

³⁶ Bianchi, Robert J., Michael E. Drew, and Adam N. Walk, 2016, "The equity risk premium in Australia - 1900 to 2014" *Financial Planning Research Journal* v2(1):80-98

Wright approach

This section of the Explanatory Statement provides a substantial discussion of the Wright approach which culminates in the statement that the ERA "will not consider the Wright approach when estimating the market risk premium" (para 556). The prominence given to the Wright approach implies the ERA's disavowal of the Wright approach is a significant change to its analytical framework. If so, it would be helpful to include at least a footnote to advise the reader where a description of the Wright approach could be found. It would also be useful to discuss the differences in estimates of the market risk premium by not following the Wright approach.

Dividend growth model

The Panel considers the discussion of the dividend growth model to be clear and the reasons for reducing reliance on it are well explained. In particular, the Panel notes the dividend growth model is sensitive to its assumptions and subject to bias, particularly when analysts forecast of dividends are used, and that the ERA will place less reliance on the dividend growth model relative to the historic market risk premium.

12.2.7 Estimating the market risk premium

The Panel considers the discussion of issues in estimating the market risk premium is, on the whole, clear.

Para 577 comments on Siegel's argument that the long-term forward-looking market risk premium is expected to be lower over time relative to the historical estimate. It would be useful to reference Bianchi, Drew and Walk's (2016) Australian evidence on the historic market risk premium (discussed earlier) that supports Siegel's perspective.

The discussion of data sources for historical risk premium approaches occupies paras 580 to 590. The accuracy of data sources is important but it is difficult to know how to assess the significance of the differences in the two datasets discussed: Brailsford, Handley and Maheswaran (BHM)'s data series and NERA Consulting's adjusted version of BHM's data set. In para 587 it is noted that NERA's adjustments were made on fewer than 10 out of 300 data points and the AER has doubted whether they constitute a material improvement in reliability. As per Table 10 below the impact over the whole sample period of 1883 to 2017 amounts to 0.35 percentage points for both the arithmetic and geometric means.

It is theoretically sound to adjust for dividend imputation tax credits, as discussed in paras 591 to 593.

At para 593 second dot point, it is not clear what is meant by "dividend imputation consistent with the ATO data on credit yields from 1998 onward".

Para 597 states:

"Based on the above strengths and weakness, and given that no one data period has been assessed as superior, the ERA will use of six overlapping time periods (1883-2017, 1937-2017, 1958-2017, 1980-2017, 1988-2017 and 2000-2017). Until one data scenario may be clearly proven superior to another then it is advisable that the Authority retains its compromise strategy of averaging across the five data scenarios."

The decision to use six overlapping time periods may be due to apparently quite severe data limitations for the early periods, substantial tax changes and data improvements from 1980,

and substantial development of financial markets and economic circumstances since 1980. It is reasonable to question the relevance of data from 1883 to 1958 given both measurement issues and the likelihood of a higher risk environment in that period. However, the use of a long data series reduces the confidence intervals for estimates of the market risk premium.

Table 10 shows the means, standard errors and 95 per cent confidence intervals for each of the six series. It highlights the following points: (i) as expected, the confidence interval for a series with more data points is narrower, notwithstanding the data limitations, substantial tax changes, substantial development of financial markets and changes in economic circumstances that have occurred since 1883. (ii) Whilst the mean market risk premium exhibits a decreasing trend starting from the series that covers the earliest time period, the decrease is not monotonic over the six series. (iii) The lower bound is negative in the last three of the six time series covering the most recent periods for both the arithmetic and geometric means. A negative bound may be statistically accurate but it is not economically sensible as an expectation. These considerations add support to the case for incorporating market return data from as far back as 1883 in forming estimates of the expected risk premium notwithstanding the very different economic circumstances and arguably poorer data quality. However, it is also reasonable to give more weight to recent estimates of the market risk premium. This could be done by recognising a long term average as a starting point and then making use of a rolling average of the last 20 years along with reference to the dividend growth model estimates and conditioning variables in forming a preferred estimate for regulatory purposes.

The Panel suggests it would improve acceptance of, and confidence in, the validity of the averaging method adopted if the above points were considered in the reasoning section.

		Arithmetic Mean							
Period	No of								
	Years		NE	RA			BF	łM	
		Mean	S/E	Lower	Upper	Mean	S/E	Lower	Upper
				Bound	Bound			Bound	Bound
1883-2017	135	6.82%	1.41%	4.06%	9.58%	6.47%	1.41%	3.71%	9.23%
1937-2017	81	6.24%	2.14%	2.06%	10.43%	6.29%	2.14%	2.10%	10.48%
1958-2017	60	6.75%	2.79%	1.28%	12.22%	6.75%	2.79%	1.28%	12.122%
1980-2017	38	6.53%	3.42%	-0.21%	13.26%	6.53%	3.43%	-0.21%	13.26%
1988-2017	30	6.11%	3.14%	-0.05%	12.27%	6.11%	3.14%	-0.05%	12.27%
2000-2017	18	6.13%	4.22%	-2.14%	14.41%	6.13%	4.22%	-2.14%	14.41%
					Geometr	ric Mean			
Period	No of					1			
	Years		NE	RA		-	BI	IM	1
		Mean	S/E	Lower	Upper	Mean	S/E	Lower	Upper
				Bound	Bound			Bound	Bound
1883-2017	135	5.47%	1.41%	2.71%	8.23%	5.12%	1.41%	2.36%	7.88%
1937-2017	81	4.40%	2.14%	0.21%	8.59%	4.45%	2.14%	0.26%	8.64%
1958-2017	60	4.42%	2.79%	-1.05%	9.89%	4.42%	2.79%	-1.05%	9.89%
1980-2017	38	4.26%	3.43%	-2.47%	10.99%	4.26%	3.43%	-2.47%	10.99%
1988-2017	30	4.50%	3.14%	-1.66%	10.66%	4.50%	3.14%	-1.66%	10.66%
2000-2017	18	4.32%	4.22%	-3.96%	12.59%	4.32%	4.22%	-3.96%	12.59%

Table 10: Descriptive Statistics for the Market Risk Premium for Six OverlappingPeriods from 1883 to 2017

Source: ERA response to Panel's questions of 21 August 2018.

It should also be acknowledged that the averaging method implicitly weights more recent history higher since the later years are included in all five data scenarios whereas earlier years are not.

In relation to averaging method, it is stated in para 601 that:

"an arithmetic average will tend to overstate returns... it is the sampling error in the measurement of the arithmetic average return that causes the upward bias in the expected return"

The nature of the ostensible sampling error is not obvious. However, it is the case that, as Blume $(1974)^{37}$ has pointed out, the arithmetic mean gives an upward-based estimate of the mean compounded rate of return. The extent of the bias is a function of the volatility in sampling periods. For instance, the arithmetic mean of two equally likely returns of +25% and -20% is (+25-20)/2 = 2.5% even though the total return over the two periods is zero. The geometric mean provides the accurate value to use in compounding. In this example, the geometric mean is 0 = (1+25/100)x(1-20/100) - 1.

Para 601 also states:

"The geometric average normally gives a downward biased measurement of expected returns. The geometric mean can understate returns as it is based on an ideal consistent compounding, which does not account for the actual variability of returns over time".

A feature of discussions of geometric versus arithmetic means is that most of them provide an example of the upward bias in arithmetic means perhaps because simple examples can be used to illustrate the bias clearly. The biases in estimates using geometric return are less straightforward to illustrate. Blume (1974) points out the bias in the geometric average is not invariably downward. Let T be the number of past periods over which the estimate of the geometric average is calculated and N be the number of future periods over which investment performance is intended to be assessed. Blume shows if N is less than T then the estimated geometric mean calculated from T periods is a downward biased estimate of the true return whilst if N is greater than T than it is upward biased.

The point of the above comments is that the biases in the arithmetic mean and the geometric mean are not necessarily of the same order of magnitude. Taking a simple average of the two kinds of means does not provide an unbiased estimated average, although as noted in para 603 it is the case that (where N is less than T, as in the present context):

"an unbiased estimate of the market risk premium is likely to be somewhere between the geometric average and the arithmetic average of annual market premium"

Para 602 states:

"academic literature has found that the geometric average is useful in estimating a forward looking market risk premium"

This statement provides a view of the academic perspective on the issue that is less nuanced than the actual academic position³⁸. For instance, one of the two references cited in support

³⁷ Blume, Marshall., 1974, "Unbiased Estimators of Long-Run Expected Rates of Return", Journal of the American Statistical Association v69 no. 347 pp.634-638

³⁸ The statement is also inadvertently misleading about the academic position in that it indicates academic preference for the geometric mean. This is not obviously the case. For instance, Partington and Satchell in their Report to the AER: Return of Equity and Comment on Submissions in Relation to JGN (May 2015) report the Jacquier, Kane and Marcus (2003) claim that academics tend to use the arithmetic return and that practitioners tend to use the geometric return.

is the commentary on page 4 of JP Morgan's (2008) report "The most important number in finance: The quest for the market risk premium" which states, inter alia:

"The arithmetic average represents the best estimate of annual expected return. The geometric mean, however, will be 0%, which is the compounded annual return the investor actually earned. Many academics prefer the arithmetic average because it represents an investor's expected return at any given point in time. But the geometric mean better reflects asset returns investors should expect over long horizons".

It is true, consistent with the statement in para 602, that the geometric average is useful in the sense that it better reflects cumulative asset returns over long horizons but for any given period over the horizon, the arithmetic return more accurately reflects an investor's expected return.

Damodaran $(2016)^{39}$ provides a stronger case for using the geometric average but even he notes:

"in fact, if annual returns are uncorrelated over time, and our objective was to estimate the risk premium for the next year, the arithmetic average is the best and most unbiased estimate of the premium" (p.33).

The Panel suggests para 602 should be amended to say:

"The academic literature concludes there is no unequivocal case for relying exclusively on either the arithmetic mean or the geometric mean in estimating a forward looking market risk premium."

Para 604 states that the ERA will use a simple average of the lowest arithmetic mean and highest geometric mean. In support of this approach, para 605 notes the respective advantages of both averaging methods has been considered at length in previous AER decisions and references Partington and Satchell in footnote 243. (*There is a typographical error in footnote 243 where one of the co-authors is listed as McKenzie rather than Satchell*). However, whilst using an average of the two different methods as way of minimising their respective biases has received broad acceptance and is supported by Partington and Satchell⁴⁰, the academic literature indicates there are better ways of averaging than using the simple average. For instance, Damodaran (2016), who is cited as an authority in the Draft Guidelines, references the argument in favour of a weighted average with the weight on the geometric mean increasing with the time period (p. 34). Blume (1974) also suggests a differential weighting approach.

The Panel suggests it would be useful to have a sense of the difference made by these alternative approaches rather than relying principally on prior AER decisions.

The Panel notes the Draft Guidelines do not include discussion of the impact of investment period on the biases inherent in the arithmetic and geometric biases. It is implicit that the period is a year, although Partington and Satchell (2015) note:

"however, it seems to be a matter for the AER to determine whether it views the regulated return it is setting as an annual return, or a return to be earned over five years, or some other period."

³⁹ Damodaran, Aswath, Equity Risk Premiums (ERP): Determinants, Estimation and Implications – The 2016 Edition (March 5, 2016).

⁴⁰ Partington and Satchell (2015) state, on page 17: "in our opinion the use of arithmetic averages alone is likely to result in an upward biased estimate of expected returns and the use of geometric averages alone is likely to result in a downward biased estimate. There is therefore merit in the conclusion of McKenzie and Partington (2012) that: "the widespread current practice is to use unadjusted geometric and arithmetic averages. Given the current state of knowledge, we see no strong case to depart from this common practice and recommend the use of both of these metrics, tempered by an understanding of their inherent biases".

The Panel also notes the different views of experts in the AER Expert Joint Report with some experts supporting an arithmetic average, some supporting the use of both an arithmetic and geometric average and some noting that investors form expectations over longer periods than one year.⁴¹ One expert argued that the AER process for setting prices involves no compounding of returns and so the arithmetic mean must be used. However, the panel notes that the process for setting prices by the AER is not directly determinative of the time frame that investors typically focus on in determining their expectations. Investors know that if they invest in a regulated entity for the regulatory period they can expect to earn in effect a compound return over the regulatory period based on the allowed regulatory rate of return and building block assumptions and that typically the allowed return in the next regulatory period will be broadly similar to that in the current period.

Assuming the ERA has the same latitude as the AER to determine the regulated return as an annual return or, say, a five-year return (which would be in line with the period over which the risk-free rate is determined), this decision will impact the bias exhibited by both the arithmetic and geometric means. For instance, the arithmetic means will be less biased upwards, as the volatility of a series of five-year returns is likely to be typically lower than the volatility of a series of annual returns⁴².

The Panel considers that if the regulated return is intended to be an annual return (or some other period), this should be made explicit in the draft guidelines, along with the reasons. In saying this, the Panel is cognisant that what matters is the most appropriate time horizon for investors. The question for the ERA to address is, do investors in these assets target cumulative returns over a period closer to 5 years than 1 year?⁴³

12.2.8 Critique of conditioning variables

Given the argument presented in the Draft Explanation that the dividend growth model seems particularly subject to bias, there is a need to explicitly consider whether or not it should be used as part of the set of conditioning variables and, if so, the weight placed on it.

For the default spread and interest rate spread discussion (paras 622-626) it would be useful to explain the relevance of comparing the spread with the market risk premium, with a substantial divergence from the MRP raising the question of whether an adjustment might be needed (as is done for the debt risk premium discussion).

For the implied volatility discussion it would be helpful to explain the relationship is between the market risk premium and implied volatility and the empirical evidence.

Notwithstanding the above points, the Panel considers the reasoning in support of the conditioning variables to be clear and well justified.

⁴¹ Cambridge Economic Policy Associates (2018, p.57-58).

⁴² This point is made in Dimson, Marsh and Staunton (2002) "Global evidence on the equity risk premium" *Journal of Applied Corporate Finance.*

⁴³See the AER Consumer Challenge Panel Report, May 2018, p. 9.

12.2.9 Critique of options to determine MRP point estimate

The Panel's principal points on the options to determine the point estimate of the expected market risk premium have been made earlier in sections 12.2.3 and 12.2.4. They are repeated for convenience.

What is unclear is how the ERA will use its regulatory discretion in assessing the contribution of each of the five conditioning variables listed: default spreads; the five-year interest rate swap spread; dividend yields; a stock market volatility index; and the debt risk premium. Further, are the five conditioning variables an indicative set or are they exhaustive of all the variables that may be considered? For instance, could the spread between different classes of bonds be used as a conditioning variable?

In estimating the expected market risk premium, there are well reasoned and supported arguments against relying solely on the historic market risk premium or a weighted combination of just the historic risk premium and the dividend growth model. These two options seem like "straw man" alternatives. The Panel considers it seems anomalous to rule out the second and third options under the current regulatory arrangement and then propose stakeholder comment on these options if a binding regulatory regime is adopted. Why would the binding nature of the regime make any difference to the accepted arguments against their use under the current regulatory arrangements?

Notwithstanding the above, the basis of the proposition in para 658 that the mechanical approach may be appropriate if the market risk premium varies to a large degree within a four year period is not obvious.

Finally, a minor point: paragraph 660 is missing.

12.2.9 Summing up

Table 11 provides a summary of the panel's assessment in relation to the factors to consider for the market risk premium.

Factors to consider	Panel assessment
Revenue and pricing principles	The Panel considers the importance of the market risk premium for revenue and pricing has been adequately underscored and explained.
Rate of return provisions	The Panel considers that while the relevance of the market risk premium is well explained, it could be made clearer that it is an ex ante concept for which historic data and conditioning variables are used for its estimation.
Relevant information for reaching conclusions	An issue where there is potential for confusion or uncertainty is the influence of the prospective binding instrument in the design of the present guidelines.
	The Panel considers it would be useful to identify the matters considered for the adoption of a binding framework that informed the level of discretion under the current framework. The relative influence of the two perspectives in setting the present guidelines is

Table 11: Summary of panel assessment for market risk premium

	not clear.
	The reasons for relying principally on the historic risk premium for estimating the expected premium are clear. However, it is unclear how ERA will use its regulatory discretion in using the dividend growth model and applying the five conditioning variables and also whether those variables are exhaustive of the allowable set.
	The Panel has provided further arguments and evidence in favour of the averaging approach adopted in estimating the expected market risk premium using different datasets and methods of return calculation.
Clear link between conclusions and information	Whilst, as indicated above, the argument and evidence in support of conclusions could be improved, the Panel considers there is a reasonably clear link between conclusions and information.
Reforms to implement a binding rate of return instrument	The ERA has proposed 3 options to determine the MRP under the binding instrument. The mechanical and historical approach options seem like "straw man" options given the arguments against their use under the present arrangements and it is unclear why stakeholder views are being sought on them.
Implementation by stakeholders at a point in time	It is unclear exactly how the present guidelines will be revised or remain applicable if the proposed binding framework is adopted.
	The Panel also notes that given the role of discretion it is not clear how stakeholders could estimate the likely allowed market risk premium at a point in time.
Interaction with other components of the regulatory arrangements	The main issue is the relationship between the market risk premium and the risk free rate but this has been reasonably addressed.

13 EQUITY BETA

13.1 COMPONENT DESCRIPTION

The equity beta parameter in the CAPM measures the amount of risk for the particular investment relative to the risk of investing in the overall market of interest. The price of the risk is the market risk premium. The product of the equity beta and the market risk premium measures the equity risk premium that is added to the risk free rate to determine the required expected return on equity for the investor.

In the CAPM the beta parameter is the only investment or firm specific parameter that is recognised in estimating appropriate compensation for risk. As explained in Chapter 2 of this report the theoretical foundations for the CAPM support the propositions that a distinction can be made between diversifiable (or unique or non-systematic) risk and non-diversifiable (or systematic) risk from the perspective of investors and that diversifiable risk is not priced because it can be eliminated by diversification. The non-diversifiable or systematic risk is that part of risk that relates to the economy and markets more broadly.

As also explained in Chapter 2 the validity of the CAPM depends on the extent to which its underlying assumptions reasonably apply in practice and in particular the assumption that investors are only concerned with the expected average return and the variance of returns so that potential skewness in the distribution of returns can be ignored and it is reasonable to assume that markets are sufficiently efficient in pricing risk.

It is also relevant to recognise that the equity beta depends on the type of business and assets (business risk) as well as the capital structure or financial leverage of the business (financial risk). For the former an asset beta is relevant which is in effect a weighted average of a debt beta and an equity beta, with the weights reflecting the capital structure. For the latter, the financial leverage affects the equity beta but not the asset beta so that as financial leverage or gearing increases the equity beta increases offsetting the impact of increased leverage in terms of impact on the asset beta.

Statistical techniques can be used to measure the equity beta which is formally defined as the covariance over time between returns on the specific investment and returns on the market as a whole divided by the variance of returns for the market as a whole.

The ERA notes that business risk of relevant benchmark entities is considered to be lower than for the market as a whole and ceteris paribus implies a lower equity beta than for the market as whole, even with higher gearing levels than for the market as a whole.

The ERA's Draft 2018 Guidelines use the same approach as in the ERA's 2013 Guidelines which is based on a methodology developed by Henry for the Australian Competition and Consumer Commission in 2009 and updated in 2014.⁴⁴ The ERA improves on the Henry methodology by using three additional statistical methods for reducing the influence of outliers and the bootstrapping technique to assign measures of accuracy to the sample estimates. The methodology is applied to weekly data for a 5 year period to balance trade-

⁴⁴ Henry (2014, 2009).

offs between statistical standard errors and relevance of more recent information.

The methodology is applied to the sample of four firms that form the benchmark efficient entity described in Chapter 5 (APA Group, DUET Group, SP Ausnet and Spark Infrastructure Group).

The ERA's recent analysis using an updated data set to 2017 indicates an equity beta of 0.7 is appropriate. The ERA proposes that the equity beta would remain fixed over the period of the Guidelines.

13.2 PANEL ASSESSMENT

The Panel considers that the statistical techniques used to estimate beta are appropriate and reasonably well explained. However, the Panel considers that some further information and explanation would be helpful as set out below.

As noted in the Chapter 5: The benchmark efficient entity, in this report the Panel considers that while it is reasonable to use the sample of four firms to provide primary information about an appropriate estimate for beta, consideration should be given to using beta estimates for foreign firms with similar risk characteristics. Such an approach may help in highlighting how different regulatory arrangements may affect beta and also provide a useful source of back up information if the sample of four firms is reduced through de-listing. It may also be helpful in providing information about how other regulators estimate beta and make adjustments based on the specific regulatory arrangements.

As noted elsewhere in the Report the Panel considers there should be some discussion of the extent to which the regulatory arrangements may affect the beta estimate and the likely direction of the impact if any.

In particular the Panel considers that an important conceptual issue relevant to establishing a true measure of the specific risk embodied in the beta parameter is how the regulatory arrangements affect the specification of an appropriate beta. A key aspect that needs discussion is how a revenue cap combined with the various cost pass through provisions reduce risk for a regulated entity. As noted, the CAPM assumes that investors are only concerned with the expected mean and variance of returns and require compensation that relates to the variance in the setting of an appropriate expected return. The concern about variance exists because the investor may want to sell their investment at a time when downside risk has been realised. However, with a revenue cap, the cap is in effect both a maximum and a minimum on a present value basis and there is also very limited cost risk. This means that any observed variance in returns within the regulatory period is of very limited consequence to the extent that there is a guarantee that most of the variance will be offset on a present value basis because of the revenue cap. In other words within period variance of returns is of far less consequence than variance beyond the regulatory period. The Panel considers this aspect needs to be considered in estimating and specifying an appropriate rate of return.

The Panel considers that there are a number of other matters that need clarification as follows:

- The estimates of returns should be total returns including dividends. This is not clear in the explanation in paragraphs 693 to 695, with the focus of the discussion being on dividends.
- The explanation should also make it clear that no adjustments were made to returns to the assets in the sample or the overall market for the value of imputation credits and explain why this is reasonable.
- Assuming that within period estimation of beta is appropriate (see previous paragraph) the explanation should also note that weekly estimates of beta were used and explain why this is valid, particularly when other parameters are based on longer time horizons.
- In addition, there appears to be an error in the price term in the numerator of equation 18 as it is subscripted to period t-1 rather than period t.
- It is not clear from looking at Table 18 in isolation that the equity beta estimates have been adjusted to a common gearing of 55 per cent.
- The labels relating to the estimator in Tables 19 and 20 need some explanation to help make the Guidelines more self-contained.
- The choice of a beta estimate of 0.7 is reasonable based on the information provided (and subject to consideration of the impact of key aspects of the regulatory arrangements) but some explanation of why that exact number is preferred is needed.
- Some explanation of why the estimates are considered to be statistically robust is also needed.

As the beta estimate is proposed to be fixed over the regulatory period it can apply under both the current arrangements and a binding rate of return framework.

The approach could be replicated at a point in time provided stakeholders had relevant expertise and access to relevant data.

Table 12 provides a summary of the panel's assessment in relation to the factors to consider for the equity beta.

Factors to consider	Panel assessment	
Revenue and pricing principles	There is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.	
Rate of return provisions	As above.	
Relevant information for reaching conclusions	There needs to be discussion as to whether the regulatory arrangements and in particular the application of a revenue cap affect the specific risk that the beta parameter is supposed to represent. This is because the revenue cap and cost pass through provisions reduce the relevance to an investor of return variability within a regulatory period.	
	Consideration should be given to using beta estimates from other jurisdictions.	
	A number of specific aspects of the explanation need clarification as detailed in this Chapter.	
Clear link between conclusions and information	As above.	
Reforms to implement a binding rate of return instrument	The ERA's proposed approach can be implemented under the current requirements or binding rate of return requirements.	
Implementation by stakeholders at a point in time	The approach could be replicated at a point in time provided stakeholders had relevant expertise and access to relevant data.	
Interaction with other components of the regulatory arrangements	There is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.	

Table 12: Summary of panel assessment for return on equity

14 DEBT AND EQUITY RAISING COSTS

14.1 COMPONENT DESCRIPTION

Debt and equity raising costs and debt hedging costs are the administrative costs and other charges incurred by businesses when obtaining and hedging finance. They need to be included in an efficient benchmark for the cost of finance.

The Guidelines propose:

- an estimate of 0.1 per cent per annum for debt raising costs;
- an annual swap allowance of 0.114 per cent to compensate for the cost of conducting hedging for exposure to movements in the risk free rate; and
- an allowance for equity raising transaction costs that will be included in the capital expenditure building block component; as a consequence there is no allowance for equity raising costs in the allowed rate of return.

The Explanatory Statement notes that the debt raising costs should only include the types of direct costs recommended by the Allen Consulting Group in its 2004 report to the Australian Competition and Consumer Commission and that the recommendations in that report have been generally accepted by Australian regulators since its publication.⁴⁵

The Explanatory Statement notes that its preferred estimate of debt raising costs of 10 basis points (i.e. 0.1 per cent) is lower than the estimate of 12.5 basis points that it and several other Australian regulators have adopted in previous regulatory decisions. However, the Explanatory Statement concluded that 10 basis points is appropriate based on: work undertaken by the Queensland Competition Authority in its 2014 review of the Cost of Debt Estimation Methodology;⁴⁶ information in the original Allen Consulting Report that 12.5 basis points was likely to be an overestimate; the age of the Allen Consulting Report estimates (2002); a recent AER allowance that is slightly lower;⁴⁷ and a Price Waterhouse Coopers 2013 report prepared for the QCA.⁴⁸

The debt hedging costs are separate and additional to the debt raising costs. They are relevant for recognising that typically firms have 10 year debt terms (given refinancing risks which firms also address by having debt at any time with different maturity rates) and that if a 5 year debt term is used to match the 5 year period of the regulatory cycle it is efficient to provide compensation for hedging costs to convert from 10 year fixed debt to the regulated 5 year fixed rate. This involves a number of steps and the ERA has arrived at an estimate for debt hedging costs of 11.4 basis points.

⁴⁵ The Allen Consulting Group (2004), Debt and Equity Raising Transaction Costs, Final Report, December.

⁴⁶ Queensland Competition Authority (2014), Cost of debt estimation methodology: final decision, August.

⁴⁷ Australian Energy Regulator (2017), Draft Decision Ausnet Services Gas Access Arrangement 2018–2022, Attachment 3–Rate of Return, July.

⁴⁸ PricewaterhouseCoopers (2013), A cost of debt methodology for businesses regulated by the Queensland Competition Authority, June.

The estimate is substantially lower than the earlier QCA estimates of interest rate swaps of 17.5 basis points but similar in magnitude to recent major draft decisions for Aurizon Network of debt issuing and hedging costs <u>combined</u> of 23 basis points.⁴⁹ The information indicates that debt issuing and hedging costs vary over time with a downward trend, most probably reflecting increases in competition. However, this is an area where on-going market testing is helpful. Under tighter market conditions, it is entirely possible for the costs to increase.

14.2 PANEL ASSESSMENT

The Panel considers that the estimates of debt raising costs and debt hedging costs are justified based on the information provided and that the approach of including equity raising transactions costs in the capital expenditure component of the building block is appropriate.

As the estimates will be fixed the approach can be readily implemented by stakeholders including under both the current requirements or the binding rate of return requirements.

Table 13 provides a summary of the panel's assessment in relation to the factors to consider for the debt and equity raising costs.

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	Sufficient relevant information has been provided.
Clear link between conclusions and information	Confirmed.
Reforms to implement a binding rate of return instrument	Confirmed.
Implementation by stakeholders at a point in time	Confirmed.

Table 13: Summary of panel assessment for debt and equity raising costs

⁴⁹ QCA (2017, p. 63).

15 INFLATION

15.1 COMPONENT DESCRIPTION

An estimate of the expected inflation rate is needed for: indexing the asset base over the regulatory period; determining depreciation allowances; adjustment to other nominal building block allowances; and allowing observance of real rates of change in tariffs and the real rate of return.

The Guidelines and Explanatory Statement propose that the expected rate of inflation will be estimated based on differences between nominal risk free rates as measured by observed nominal yields on 5 year Commonwealth Government Securities and fixed interest rates for 5 year Treasury Indexed bonds.

Treasury Indexed Bonds are medium to long-term securities issued by the Australian Government for which the face value is adjusted for movements in the Consumer Price Index (CPI). Interest payments are made at a fixed interest rate, on the adjusted capital value of the bond. The fixed interest rate for the indexed Treasury bond is therefore a real interest rate required by investors to invest in a risk free asset with full compensation for actual inflation reflected in the indexing of the capital value. The nominal yield on Commonwealth Securities contains both a required real interest rate component and a component reflecting expected inflation.

The Guidelines explain that the expected inflation rate can be recovered from the Fisher equation:

$$1 + i = (1 + r) \times (1 + \pi^{e})$$

where i is the nominal interest rate, r is the real interest rate and π^{e} is the expected inflation rate.

Other points to note in the approach are:

- The use of a 5 year term to match the regulatory cycle.
- The use of an averaging period of 20 trading days, nominated in advance close to and prior to an access arrangement determination to reduce the volatility of the estimate.
- Linear interpolation to derive daily point estimates.

The approach assumes that yields on Commonwealth Government Securities and Treasury Indexed Bonds are efficiently priced and differ only by the impact of an inflation component.

The Explanatory Statement notes the approach was not appropriate during the period around the global financial crisis and notes criticisms that there are a relatively small number of Treasury bonds on issue and that there is an inherent bias to the extent that investors demand an inflation premium to compensate for uncertainty about the future inflation rate. However, the Explanatory Statement considers that the liquidity of the Treasury Indexed Bonds has improved and apparent liquidity premiums have subsided and that on balance the approach produces more accurate estimates of inflation over the next 5 years. The Explanatory Statement discusses the main alternative of using the mid-point of Reserve Bank of Australia (RBA) inflation forecasts over the next 2 years and the mid-point of the target inflation band of 2 to 3 per cent over subsequent years and notes this approach has been typically applied by other regulators with most also using a 10 year period.

However, the ERA notes there is evidence that the RBA inflation forecast and target band method has not responded to the changing inflation environment and leads to an overestimate of expected inflation. In addition, given the lag inherent in the method, the outcome can be a negative real risk free rate that is likely to have adverse regulatory implications.

15.2 PANEL ASSESSMENT

The Panel considers that the ERA's proposed approach is well explained, based on sound reasoning and given its use of appropriate market information likely to be the best means of forecasting inflation which is an input for ensuring efficient financing in the indexation procedures.

However, the Panel notes that there should be flexibility to adopt an alternative approach if there is sufficient evidence of inefficient pricing of Treasury Indexed bonds.

The Panel considers the approach can be readily replicated and used under the current arrangements or the binding rate of return requirement.

Table 14 provides a summary of the panel's assessment in relation to the factors to consider for the estimate of the expected inflation rate.

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	Sufficient relevant information has been provided but there should be flexibility to adopt an alternative approach if there is sufficient evidence of inefficient pricing of Treasury bonds.
Clear link between conclusions and information	Confirmed.
Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements.
Implementation by stakeholders at a point in time	Confirmed.

Table 14: Summary of panel assessment for expected inflation rate
16 VALUE OF IMPUTATION CREDITS

16.1 COMPONENT DESCRIPTION

16.1.1 Definition of the value of imputation credits

In establishing an appropriate allowance for tax expenses for a regulated entity in Australia, it is necessary to calculate a value for imputation credits. Imputation credits or franking credits represent the value of company taxes paid in Australia that Australian taxpayers can use to offset their total tax liabilities including the tax liability associated with gross value of the dividends. The value of the imputation credit in effect recognises the extent to which company tax represents pre-payment of personal tax for Australian shareholders. The value of the imputation credit is deducted from tax expenses for a benchmark entity to obtain an estimate of allowed net tax expenses for the benchmark entity.

This approach recognises that the effective company tax after adjusting for the value of dividends will be lower than the statutory company tax rate. It also recognises that investors who are able to utilise franking credits to reduce their tax liabilities will as a general rule accept a lower required rate of return on a before personal tax basis on an investment that provides franking credits compared with an investment with similar risk with less franking credits.

The gamma parameter (γ) represents the value of the imputation credits used to adjust the corporate tax rate for the benchmark entity. γ is between 0 and 1 and the effective corporate tax rate is t × (1- γ) where t is the statutory corporate tax rate. So if γ is 1 the effective corporate tax rate is zero because all of it represents pre-payment of personal tax and there will be full credit for the shareholder for the corporate tax paid in the form of the imputation credit. At the other extreme if γ is 0 there is no adjustment to the corporate tax rate. Adjustment for imputation credits is relevant because there is a need to focus on the rate of return expectations of the ultimate holders of equity investments.

In a seminal paper that still forms the basis for how to interpret the impact of dividend imputation on the cost of capital or allow for it in the cash flows for regulated businesses, Officer derived various formulae for the cost of capital recognising the impact of imputation credits.⁵⁰ The formula for the cost of capital differed depending on how the cash flows were defined to recognise the treatment of tax. In the case of the formula for the nominal post-tax vanilla WACC, all the tax adjustments are incorporated in the cash flows, rather than by the inclusion of terms in the WACC.

In his analysis Officer used the variable name 'gamma' to represent the value of imputation credits. He defined gamma as follows:

Thus [gamma] is the proportion collected from the company which gives rise to the tax credit associated with a franked dividend. This franking credit can be utilized as tax credit against the

⁵⁰ Officer (1994).

personal tax liabilities of the shareholder. [Gamma] can be interpreted as the value of a dollar of tax credit to the shareholder.⁵¹

In the Officer framework it is clear that the value of gamma depends on the proportion of company tax paid that is distributed as imputation credits attached to franked dividends and the proportion of distributed imputation credits that can be utilised by resident taxpayers to obtain a rebate on their tax. The Officer framework also assumes a domestic CAPM while allowing for the presence of foreign investors in the estimate of gamma. The Guidelines assume that overseas investors in Australian companies would not be able to use the imputation credit to obtain a rebate for the company tax paid in Australia.

Thus gamma is the product of two elements: the distribution rate – the ratio of imputation credits to company tax paid; and the utilisation rate – the rate at which investors (in aggregate) utilise the distributed imputation credits to obtain a tax rebate. So gamma is defined as follows:

 $gamma(\gamma) = distribution rate \times utilisation rate$

16.1.2 Estimating gamma

In order to estimate an appropriate allowance for imputation credits it is necessary to estimate the distribution rate and the utilisation rate and form their product.

The value of gamma can vary between 0 and 1. If all franked dividends are distributed and can be fully utilised then gamma = 1. But gamma must be less than 1 because not all franked dividends are distributed and some shareholders (particularly foreign shareholders) cannot utilise imputation credits.

As described in the Explanatory Statement, the ERA considers that the distribution rate is a firm-based parameter rather than a market-based parameter and is at least 0.83 based on estimates of the distribution rate from financial reports of the 20 largest ASX listed firms.

For the utilisation rate, the ERA relies on what is described as the equity ownership approach to determine the utilisation rate. The equity ownership approach estimates the utilisation rate as a weighted average of a utilisation rate of 1 for domestic investors and zero for foreign investors with weights reflecting the ownership shares of the two categories of investors. The ERA's proposed estimate of the utilisation rate is 0.6.

The Explanatory Statement states that the proposed estimate of gamma is therefore 0. 5 (0.83 \times 0.6) which would be fixed over the period of the Guidelines.

The Explanatory Statement notes that experts differ in their interpretation of the best approach to estimating gamma in a regulatory setting and that the appropriate value for gamma has been the subject of several recent litigation matters.

Central to the disagreement about an appropriate value for gamma is the definition of gamma and its interpretation. The disagreement concerns whether it should be interpreted as a 'value of a dollar of tax credit to the shareholder', as defined by Officer, or a 'market value' (that

⁵¹ Officer (1994, p. 4).

can be estimated by implied market value studies). The AER and the ERA adopt the approach as defined in the Officer framework.

It is relevant to note the key litigation outcomes as the most recent decisions support the AER and ERA approaches. A brief review of the litigation is set out below.

In May 2015 four electricity distribution networks and one gas network business applied to the Australian Competition Tribunal for review of decisions made by the AER in relation to a number of matters, including gamma. The main issues in dispute in relation to gamma were: the appropriate interpretation of the distribution rate and the utilisation rate; appropriate estimation methods; and information and estimates of the components of gamma. In February 2016 the Tribunal released its decision and reasoning.⁵² The Tribunal considered that, 'of the various methodologies for estimating gamma employed by the AER, market value studies are best placed to capture the considerations that investors make in determining the worth of imputation credits to them'. The Tribunal also concluded that tax statistics and the equity ownership methodologies provide an upper bound on estimates of the utilisation. It put forward a provisional view that the best estimate of the utilisation rate was 0.3.

The AER applied to the Federal Court for judicial review of the Tribunal's decision on gamma and in particular on the meaning of 'value' in the expression of 'value of imputation credits'. The Full Federal Court's decision was handed down on 24 May 2017. The court upheld the AER's appeal as the meaning of 'value' and found that the Tribunal's interpretation of value as based on market studies was incorrect and that the AER did not make an error of construction in focusing on utilisation by taxpayers rather than market values.⁵³ The court accepted the AER's submission that the rules require consistency in the way the relevant building blocks interact – that is, on a post-company tax and pre-personal tax and personal costs basis.

The AER discussion paper on the value of imputation credits notes that all AER regulatory decisions since November 2014 have been consistent the Full Federal Court's decision of 24 May 2017.⁵⁴ The AER discussion paper also noted that a further Tribunal decision in October 2017 upheld the AER's decision on the value of imputation credits. The ERA's Explanatory Statement also notes that the Full Federal Court affirmed the AER's decision on gamma of a value of 0.4 in January 2018 in hearing an appeal by SA Power Networks.⁵⁵

The Explanatory Statement also notes that the ERA's gamma decision in the most recent DBNGP access arrangement decision has been appealed and is currently before the Tribunal.

In the Explanatory Statement, the ERA has made use of information provided in the AER's Discussion Paper on the Value of imputation credits of March 2018 and an expert report by Lally for the AER, reviewing the various views and submissions.⁵⁶

⁵² ACT (2016, pp. 269–94).

⁵³ Federal Court of Australia, 2017: 215–16.

⁵⁴ AER (2018c, p. 11).

⁵⁵ ERA (2018b, p. 150).

⁵⁶ AER (2018c), Lally (2018) and ERA (2018b, p. 152).

16.1.3 Estimating the distribution rate

The distribution rate is a firm-specific parameter as it is the outcome of a decision at the level of the firm. The Explanatory Statement considered that listed firms are most relevant in establishing a gamma value for the benchmark given the regulated firms are listed. It also noted problems with using Australian Tax Office data on taxation statistics and noted Lally's view that audited financial statements of the 20 largest listed ASX firms provide transparent, reliable and relevant information and should be preferred in estimating a benchmark distribution rate. This approach means an estimate of the distribution rate of 0.83 based on the information available in preparing the Draft Guidelines.

Although the Panel considers the proposed approach is reasonable it considers that it would be relevant to explain why it is better than using the distribution rate from the sample of four firms that are used in estimating benchmark gearing and beta.

16.1.4 Estimating the utilisation rate

The utilisation rate is a measure of the extent to which imputation credits are of value to investors in reducing their tax liabilities. Consistent with the Officer framework the utilisation rate is a market-based parameter that reflects the value of imputation credits to investors.

The Explanatory Statement notes that in the past the ERA had used three methods to inform its estimate of the utilisation rate. The three methods were: the taxation statistics approach; an implied market value approach in the form of the dividend drop-off method; and the equity ownership approach,

The taxation statistics approach uses Australian Taxation Office data to estimate the proportion of distributed imputation credits that have been used by investors to reduce their personal taxation liabilities. The Explanatory Statement noted that two experts, Hathaway and Lally, as well as the Australian Tax Office have expressed significant concerns about the taxation statistics approach. As a result the ERA considers the taxation statistics approach is inappropriate for determining the utilisation rate.

Most implied market value approaches use observations of market values of imputation credits in specific trading situations. The most popular, known as the dividend drop-off method measures the amount by which a share price falls on ex-dividend days following the distribution of dividends and attached franking credits. The Explanatory Statement highlights a number of methodological and measurement problems for implied market volatility studies as follows:

- The assumption of perfect capital markets is not likely to hold and share prices on the ex-dividend day can be affected by other influences.
- The utilisation rate is a complex, weighted average over all investors and its value may not correspond to the market value on a particular day.
- The dividend drop-off method only estimates the utilisation rate based on two days rather than the value across all points in time.

- The utilisation rate in the Officer framework is not defined as the market value of imputation credits.
- Multiple statistical models can be used and the results are quite sensitive to a small number of outlying observations.
- There is considerable evidence of anomalous share price behaviour around exdividend days.
- Estimates form other methods have produced markedly different results.

For these reasons, the Explanatory Statement states that the ERA places no weight on dividend drop-off and applied market value estimates.

The equity ownership approach was described above in the discussion on estimating gamma. The equity ownership approach recognises the proportion of equities held by investors that can fully utilise imputation credits and the proportion of equities where imputation credits are assumed to be of no value to investors. The assumption is made that all relevant (see below) local investors can fully use the imputation credits and foreign investors cannot use the credits at all. This in effect means that the proportion of the ASX that is owned by relevant domestic investors is the measure of utilisation rate.

The Explanatory Statement notes that the Officer model formally assumes a segmented domestic market with no recognition of foreign investment but that the usual practice is to assume foreign influence on the value of the imputation parameter for pragmatic, practical reasons. It also notes that the equity ownership approach can be reliably estimated using ABS Australian National Accounts data.

The proposed approach in the Explanatory Statement is the same approach that the AER currently uses and entails several steps to obtain 'refined' equity share ownership estimates.

The steps are:

- Use of all equity rather than just listed equity.
- Exclusion of entities wholly owned by the public sector which refers to equity issued by the central bank, central bank borrowing authorities and public non-financial corporations.
- Calculate the equity held by those classes of investor that are eligible to utilise imputation credits (households, pension funds and life insurance corporations) as a share of the equity held by all classes of investor that either utilise or 'waste' imputation credits. According to the AER methodology the term 'waste' now relates to Australian equity held by the rest of the World whereas previously it also included government-held equity.

According to the explanatory statement this approach leads to an estimate of the domestic private ownership equity share in the range of 58 to 70 per cent with an average of 62 per

cent over 118 quarterly observations. On the basis of this information and Lally's report to the AER,⁵⁷ the ERA considers that an estimate of the utilisation rate of 0.6 is appropriate.

Thus the product of the distribution rate and the utilisation rate means a gamma of 0.5 is preferred by the ERA. The ERA explains that this gamma is consistent with the promoting the National Gas Objective and other requirements of the National Gas Rules.

16.2 PANEL ASSESSMENT

The Panel considers that the information and reasoning support a gamma of at least 0.5 and that stakeholders could implement the methodology at a point in time under both the current arrangements and a binding rate of return arrangement. The panel notes that recent court decisions in relation to AER determinations have supported the interpretation of the utilisation rate, which is the parameter where there have been the most divergent views, and affirmed the conclusion of the AER about the value of gamma at the time.

However, the Panel considers that it is necessary for the ERA to provide more explanation of the specific steps in obtaining the 'refined' equity share ownership estimate. In particular, for the last point at paragraph 880 of the Explanatory Statement where it is stated the method:

determines the share of equity held by investors eligible to use imputation credits as a proportion of the equity held by domestic investors that either use or waste imputation credits.

This description does not make sense unless 'waste' is properly defined. The AER defines 'waste' as referring to the inability of foreign investors ('the rest of the world') to use imputation credits and notes that it also now excludes government-held equity from the calculation of the refined domestic ownership share, whereas previously the latter was not the case.⁵⁸ The ERA has confirmed⁵⁹ that it uses the same approach as the AER and the Panel considers that it is necessary for the Explanatory Statement to make it clear what 'waste imputation credits' means.

The Panel considers that the Explanatory Statement also needs to explain why the 'refined' equity share measure is appropriate.

The Panel also notes that there is some further information that the Explanatory Statement could refer to in support of its preferred estimate of gamma and that the Panel considers also supports the proposition that the estimate of gamma is conservative in the sense that it is at least 0.5.

The Panel notes that some experts have argued that it is wrong to exclude from the equity ownership calculation, entities that are wholly owned by the public sector and doing so will mean that the utilisation rate is upward biased, presumably because the government sector cannot utilise imputation credits.⁶⁰ However, there is an argument that the government sector in effect has a utilisation rate of 1 because company tax is in effect pre-payment of tax for

⁵⁷ Lally (2018).

⁵⁸ AER (2017b, p. 4-160).

⁵⁹ ERA response to Panel Questions of 11 September 2018, Answer to Question 3, available on the ERA website.

⁶⁰ AER (2018, p. 4-164).

domestic shareholders that can be used to reduce their overall tax liabilities but in the case of the government there are no further tax liabilities to offset and this is equivalent of assuming a utilisation rate of 1. This argument recognises that imputation was introduced to eliminate the double taxation of company profits when dividends are distributed and was recognised in setting financial performance targets for government business enterprises in the mid-1990s.⁶¹ The AER has also noted that it could have assumed the government sector has a utilisation rate of 1 given the equity is Australian owned and that an estimate of gamma reduced due to government entities being assumed not to redeem credits is not appropriate.⁶²

The equity ownership methodology assumes that the utilisation rate for foreign investors is zero but no mention is made on whether double taxation agreements between Australia and other countries such as the United States effectively enable some credit paid for company taxes paid in Australia. In addition a recent research paper by Professor Swan at the University of New South Wales develops and implements a new methodology that improves on the traditional dividend drop-off methodology by recognising that the CAPM beta is related to the tax status of dividends and when this is taken into account imputation credits are sizeably if not almost fully priced.⁶³

Table 15 provides a summary of the panel's assessment in relation to the factors to consider for the estimate of the value of imputation credits.

Factors to consider	Panel assessment
Revenue and pricing principles	The approach will provide appropriate estimates to ensure efficient financing.
Rate of return provisions	As above.
Relevant information for reaching conclusions	Although the Panel considers the proposed approach is reasonable it considers that it would be relevant to explain why it is better than using the distribution rate from the sample of four firms that are used in estimating benchmark gearing and beta.
	The explanation of the steps in calculating the 'refined' equity ownership approach needs clarification as noted above and more discussion is needed on why the approach is preferred.
	Some additional information has been provided in the discussion above that would strengthen the conclusion.
Clear link between conclusions and information	As above.
Reforms to implement a binding rate of return instrument	The approach can be implemented under the current requirements or binding rate of return requirements.
Implementation by stakeholders at a point in time	Confirmed.

Table 15: Summary of panel assessment for expected inflation rate

⁶¹ Steering Committee on National Performance Monitoring of Government Trading Enterprises (1996, p. 41).

⁶² AER (2017b, p.4-161 and p. 4-164).

⁶³ Swan (2018).

17 SUMMARY OF PANEL'S CONSIDERATION OF REQUIRED FACTORS

This Chapter:

- outlines the main differences between the parameter estimates in the ERA's Draft 2018 Guideline, the 2013 Guideline and the most recent ERA decision for the Mid-West and South-West Gas Distribution system; and
- summarises the Panel's assessment of the Draft 2018 Guidelines.

17.1 COMPARISON OF PARAMETER ESTIMATES FOR 2018, 2013 AND RECENT DECISIONS

Table 16 provides a comparison of the preferred parameter estimates for the 2018 and 2013 Guidelines and the most recent ERA decision for the Mid-West and South-West Gas Distribution System.⁶⁴ The parameters for the latter decision are similar to the most recent decisions for the Dampier to Bunbury Natural Gas Pipeline⁶⁵ and the Goldfields Gas Pipeline.⁶⁶

The main differences between the Draft 2018 Guidelines and the 2013 Guidelines and decisions since those guidelines relate to the market risk premium and the value for gamma. There are also differences in relation to specifying a range for beta, the benchmark credit rating and hence debt margin, debt issuing and hedging costs and gearing.

For the market risk premium the 2013 Guidelines established a range for the market risk premium of 5.0 to 7.5 per cent based on a range for historic estimates of 5.0 to 7.0 per cent and range based on six estimates of the dividend growth model of 6.0 to 7.5 per cent.⁶⁷

The 2013 Guidelines provided extensive discussion of a relationship between the market risk premium and the risk free rate; noting the various views about the nature and extent of a relationship between the market risk premium and the risk free rate and the conflicting and inconclusive evidence for a relationship.⁶⁸ The Guidelines noted that the historic average approach assumes no relationship between the risk free rate and the market risk premium while the dividend growth model assumes a constant market cost of equity and therefore one-for-one inverse relationship between the market risk premium and the risk free rate. The Guidelines allowed for both approaches to be used in establishing a range for the market risk premium and that the ERA would exercise regulatory judgement at the time of a determination in order to estimate an appropriate point estimate within this range.⁶⁹

⁶⁴ ERA (2016a).

⁶⁵ ERA (2016b).

⁶⁶ ERA (2016c).

⁶⁷ ERA (2013, p. 159).

⁶⁸ Ibid, p. 147.

⁶⁹ Ibid, p. 159.

Table 16: Comparison of rate of return parameters for the ERA's 2013 Guidelines,	a
recent decision and the Draft 2018 Guidelines	

Parameter	ERA 2013 Guideline	2016 Decision on Mid-West and South-West Gas Distribution Systems	ERA Draft 2018 Guideline
Averaging Period	29 March 2018	2 April 2015	29 March 2018
Cost of equity parameters			
Nominal risk free rate (per cent)	2.37	1.96	2.37
Equity beta	0.5 to 0.7	0.7	0.7
Market risk premium (per cent)	5.0 to 7.5	7.5	5.7 to 6.7^1
Nominal after tax return on equity (per cent)	4.87 to 7.62	7.21	6.36 to 7.06
Cost of debt parameters			
Five year interest rate swap (effective yield) (per cent)	n/a	2.431	2.590
Debt risk premium (per cent)	n/a ²	2.676	2.327 ³
Benchmark credit rating	BBB band	BBB band	BBB+
Term of debt for debt risk premium	n/a	10 years	10 years
Debt issuing costs (per cent)	0.125	0.125	0.100
Debt hedging costs (per cent)	0.025	0.114	0.114
Nominal cost of debt (return on debt) (per cent)	n/a	5.346	5.131
Other parameters			
Debt proportion (gearing) (per cent)	60	60	55
Forecast inflation rate (per cent)	1.84	1.90	1.84
Franking credits (gamma) (per cent)	25-39	25	50
Corporate tax rate (per cent)	30	30	30
Weighted average cost of capital (WACC)			
Nominal after tax WACC (per cent)	n/a	6.09	5.68 to 6.00
Real after tax WACC (per cent)	n/a	4.00	3.77 to 4.08

Source: ERA responses to the Panel's questions of 21 August 2018 and ERA (2016a).

1 For illustrative purposes, the range is generated by the historic market risk premium as the lower bound and 50/50 weighting between historic and dividend growth model approaches for the upper bound.

2 The debt risk premia in the 2013 Guideline was based on an on-the-day and bond yield approach with a jointweighting mechanism and annually updated. It has not been applied in any decision. The trailing average approach, as used in the 2016 decision in the Table, was adopted soon after the 2013 Guideline was released.

3 Each of the regulated gas pipelines has its own historic debt risk premia. For representational purposes, the Goldfields Gas Pipeline debt risk premia and a 29 March 2018 update are used.

In the ERA's Final Decision for Mid-West and South-West Gas Distribution System, the ERA noted that it now concluded it was not reasonable to constrain the market risk premium to a fixed range over time, given potential changes in the risk free rate and potential impacts on the market risk premium and that it was appropriate to determine a range for the market risk premium at the time of each decision.⁷⁰ In this decision the ERA proposed a range of 5.5 to 9.7 per cent for the market risk premium: with the lower part of the range based on historic data and the upper part of the range based on the upper bound of recent dividend growth models.⁷¹ It then specified a point estimate of 7.6 per cent based on consideration of various conditioning variables.⁷² This was revised to 7.5 per cent in the ERA's revised decision of 25 October 2016.⁷³

The range for the market risk premium in the Draft 2018 Guideline has been reduced considerably but there is still considerable discretion in the determination of a point estimate. The Panel provided various comments about averaging methods and periods and the use of conditioning variables to arrive at a preferred point estimate.

The preferred point estimate for the equity bet in the Draft 2018 Guideline is the same as the ERA's Final Decision for Mid-West and South-West Gas Distribution System which is at the extreme of the range for the 2013 Guidelines. The Panel's main comment on the preferred equity beta is the need to provide more discussion about how the parameters of the CAPM may be affected by the form and detail of the regulatory arrangements.

In relation to the cost of debt and gearing, as explained in the body of this report the Panel considers that the information and reasoning provided in the ERA's Explanatory Statement reasonably support the approaches and preferred parameter estimates.

In relation to franking credits the panel notes that the specification of a gamma of 0.25 was required for a period following a successful appeal decision by the Australian Competition Tribunal.⁷⁴ However, as discussed in the Chapter on the Value of Imputation Credits there have been subsequent legal decisions that support a higher gamma and the approach adopted by the ERA as described in the Explanatory Statement.

17.2 SUMMARY OF THE PANEL'S ASSESSMENT

We have been asked to assess whether, in our view, the draft guideline is supported by sound reasoning based on the available information such that it is capable of promoting achievement of the National Gas Objective.

In our opinion, the draft guideline is supported by sound reasoning based on the available information such that it is capable of promoting achievement of the National Gas Objective. Our opinion is qualified by the specific matters summarised in Table 17.

⁷⁰ ERA (2015 p. 251).

⁷¹ Ibid, p. 261.

⁷² Ibid, p. 268.

⁷³ ERA (2016a).

⁷⁴ Ibid.

Table 17 presents a summary of the Panel's assessment of the rate of return guidelines with specific reference to the factors the Panel was required to consider. The Panel Assessment focuses on where the Panel considers further information and improvements could be made. Confirmation of each factor that the Panel considers is met is contained in the Tables in the individual Chapters of this report.

In closing, the Panel wishes to put on record its members' unanimous agreement with the content and all the recommendations in this report.

Factors to consider	Panel assessment	
Impact of the Guidelines as a whole	The overall approach set out in the Guidelines and the proposals in relation to most of the parameters for determining an appropriate rate of return are considered to reasonably and generally ensure that the National Gas Objective and revenue and pricing principles are effectively addressed.	
	The main issue that needs addressing is the extent to which the regulatory arrangements including both the approach to setting the rate of return and all other aspects of the regulatory arrangement affect risk and the underlying assumptions used to justify the rate of return parameters.	
	Another general issue is the need to make the Guidelines and Explanatory Statement reasonably self-contained so that it is not necessary to understand all key aspects of the Guidelines without referencing the 2013 Guidelines and supporting documents.	
Revenue and	General	
pricing principles	An issue that needs more consideration in the Explanatory Statement is how economic regulation per se, the specific form of regulation and various regulatory details may affect risk and relevant parameters and require adjustments to the parameters.	
	Gearing	
	It would be helpful to restate why the average gearing level is considered to be efficient in the reasoning section.	
	It would be useful to check the actual gearing levels of regulated entities.	
	Return on debt	
	The approach to estimating the return on debt is designed to address various aspects of efficient financing but the explanation needs to be improved as detailed in the Return on debt Chapter.	
	Return on equity	
	The Sharpe-Linter CAPM is considered to be the best primary model for use in establishing an allowed rate of return.	
	However, there is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.	
	Consideration should also be given to the use of actual profitability performance to help confirm the overall allowed return on equity is reasonable.	

Table 1	7: Summarv	of panel's	assessment	for the	rate of ret	urn guidelines
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Rate of return	Overall rate of return
provisions	As the Panel considers that the allowed rate of return objective follows from the National Gas Objective and the revenue and pricing principles, the comments on revenue and pricing principles apply to the rate of return provisions as well.
	Market risk premium
	The Panel considers that while the relevance of the market risk premium is well explained it could be made clearer that it is an ex ante concept for which historic data and conditioning variables are used for its estimation.
Relevant	Broad regulatory framework
information for reaching	The Guidelines should be reasonably self-contained.
conclusions	It would be helpful to provide a brief explanation of the concept of 'incentive regulation' and how the rate of return and arrangements contribute to the concept.
	Overall rate of return
	Some brief information providing justification for the specific form of the WACC would be helpful.
	Benchmark efficient entity
	Instead of reference to the concept of Pareto efficiency it would be preferable to make use of the concept of 'workable' or 'effective competition'.
	The concept of risk in portfolio theory and the CAPM and in the classification of risk needs to be explained better to highlight that the risk is purely in relation to the variance of returns and in the context of compensation for risk means that expected returns have a symmetric distribution or that investors do not care about asymmetry (skewness) in the distribution of returns.
	Recognising the scope for asymmetry when there is economic regulation requires some discussion of d how it is addressed in the regulatory arrangements as a whole.
	There needs to be more explanation of the meaning of 'without parental ownership' to consider what it might mean for private listed entities.
	The Panel considers that although it is reasonable to give primary consideration to relevant comparators listed in Australia there may still be scope to make use of comparators with similar characteristics in other countries to help improve the statistical reliability of estimates of the beta parameter in the CAPM.
	The treatment of allowances for specific inflation rates for inputs needs to be clarified as detailed in the Chapter on the Benchmark Efficient Entity.
	Some readers may find it difficult to understand some of the financial efficiency discussion.
	It may be relevant to provide some reference for the potential for foreign investors to make use of imputation credits if there is scope to do so with double taxation agreements and scope to reduce tax through trading around dividend dates as this may help define a lower bound to the value of imputation credits.
	Some minor points and suggestions for improving the explanations are also provided.
	Gearing
	Some minor suggestions are made.
	Return on debt
	The Explanatory Statement does not provide a clear and complete explanation of the various approaches and their advantages and disadvantages.

The discussion provided in the body of the Return on debt Chapter in this report was considered necessary to try to better highlight key points.
It might be useful to have some discussion of the weighted trailing average approach which ensures new capital expenditure is funded at the current rate of return while the existing RAB is funded using the trailing average.
There is a need to refer to transitional arrangements that are in place for implementing the hybrid trailing average.
There should be a clear justification for estimating the hybrid trailing average over a 10 year period i.e. adopting the assumption that the typical term for issuing debt is 10 years.
Risk free rate
The reason for nominating the averaging period in advance should be provided.
It would be helpful, for transparency, to provide the formula and a simple example of the linear interpolation that is proposed to be used
Benchmark credit rating
The Panel considers more explanation is required as to how the sample of 13 comparator businesses was chosen for setting a benchmark credit rating.
Otherwise, there is sufficient information for reaching the conclusion but it may be worth noting that various aspects of the regulatory arrangements reinforce the conclusion.
Debt risk premium
It would be useful to explain why the ERA's revised bond yield approach is preferred to other approaches and provide references.
It would be useful to provide reference to the sample size and statistical diagnostic results from the proposed statistical models.
Market risk premium
An issue where there is potential for confusion or uncertainty is the influence of the prospective binding instrument in the design of the present guidelines.
The Panel considers it would be useful to identify the matters considered for the adoption of a binding framework that informed the level of discretion under the current framework. The relative influence of the two perspectives in setting the present guidelines is not clear.
The reasons for relying principally on the historic risk premium for estimating the expected premium are clear. However, it is unclear how ERA will use its regulatory discretion in using the dividend growth model and applying the five conditioning variables and also whether those variables are exhaustive of the allowable set.
The Panel has provided further arguments and evidence in favour of the averaging approach adopted in estimating the expected market risk premium using different datasets and methods of return calculation
Equity beta
There needs to be discussion as to whether the regulatory arrangements and in particular the application of a revenue cap affect the specific risk that the beta parameter is supposed to represent. This is because the revenue cap and cost pass through provisions reduce the relevance to an investor of return variability within a regulatory period.
Consideration should be given to using beta estimates from other jurisdictions.
A number of specific aspects of the explanation in the Explanatory Statement need clarification as detailed in the Chapter.

	Inflation
	There should be flexibility to adopt an alternative approach if there is sufficient evidence of inefficient pricing of Treasury bonds.
	Value of imputation credits
	Although the Panel considers the proposed approach is reasonable it considers that it would be relevant to explain why it is better than using the distribution rate from the sample of four firms that are used in estimating benchmark gearing and beta.
	The explanation of the steps in calculating the 'refined' equity ownership approach needs clarification as noted above and more discussion is needed on why the approach is preferred.
	Some additional information has been provided in the discussion above that would strengthen the conclusion.
Clear link between	Overall rate of return
conclusions and	The Guidelines should be reasonably self-contained.
information	The intuitive arguments for consistency in the terms of the rate of return parameters and the regulatory period for achieving the NPV=0 should be presented to improve accessibility and demonstrate a clearer link between the conclusion and the information.
	It is relevant to explain that insisting on consistency in the terms does not entail the introduction of other risks that are not compensated for.
	Cross referencing to the Chapter on the Cost of Debt would be useful.
	Benchmark efficient entity
	See above comments in relation to the impact of the regulatory arrangements on risk and appropriate rate of return parameters and on comments in relation to the sample for the benchmark efficient entity.
	Brief explanation for the components of the definition of the benchmark entity would be helpful when the definition is first presented.
	Various minor suggestions are provided to help improve the explanation of various conclusions.
	Gearing
	Some minor suggestions are made.
	Return on debt
	The Panel considers that the reasoning in relation to meeting the NPV=0 principle is correct but further explanation would be helpful to make it more accessible to a wider audience in the Explanatory Statement.
	There is a need to address how the preferred hybrid trailing average method effectively addresses refinancing risk when there are unusual conditions in debt markets.
	Risk free rate
	As noted elsewhere in the Panel's comments there should be more explanation, including at an intuitive level, of why the risk free rate should match the term of the regulatory cycle to ensure the NPV=0 condition is met.
	Debt risk premium
	It would be useful to explain why the ERA's revised bond yield approach is preferred to other approaches and provide references.

Reforms to implement a binding rate of return instrument	Broad regulatory framework
	The Guidelines need to clarify that the ERA would have discretion in developing certain aspects of the Binding Rate of Return Guidelines but that they would be automatically applied over the regulatory period for each regulatory determination.
	It would be helpful to make it clear over what period the Guidelines would apply.
	Consideration needs to be given as to whether and under what conditions a binding rate of return was re-opened.
	The overall rate of return
	The explanation could clarify that the ERA would have the discretion to implement relevant concepts in the National Gas Rules.
	Market risk premium
	The ERA has proposed 3 options to determine the MRP under the binding instrument. The mechanical and historical approach options seem like "straw man" options given the arguments against their use under the present arrangements and it is unclear why stakeholder views are being sought on them.
Implementation by	Return on debt
stakeholders at a point in time	There is sufficient information for stakeholders to implement the approach at a point in time, although this assumes relevant technical expertise in applying the formula, in particular for the debt risk premium.
	Debt risk premium
	There is sufficient information for stakeholders, with relevant technical capacity, to implement the approach at a point in time.
	Return on equity
	Although the basic model is transparent and can be readily implemented, there is regulatory discretion that is justified in setting specific parameters so that stakeholders may not be able to replicate the approach at certain points in time.
	Market risk premium
	It is unclear exactly how the present guidelines will be revised or remain applicable if the proposed binding framework is adopted.
	The Panel also notes that given the role of discretion it is not clear how stakeholders could estimate the likely allowed market risk premium at a point in time.
Interaction with	Return on equity
other components of the regulatory arrangements	There is a need for more consideration to be given as to how the parameters of the model may be affected by the form and details of the regulatory arrangements.

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APPENDIX 1 TERMS OF REFERENCE FOR THE INDEPENDENT PANEL

Background

The ERA will publish a draft rate of return guideline which sets out the methodology the ERA will use to estimate the rate of return in its revenue determinations for gas pipeline service providers.

This guideline will be made under a framework set out in the National Gas Law and the National Gas Rules. The overall objectives of the frameworks are set out in the National Gas Objectives:⁷⁵

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

Task

In your view, is the draft guideline supported by sound reasoning based on the available information such that it is capable of promoting achievement of the National Gas Objective?

In your review, please have regard to the following factors:

- the effect of the guideline as a whole rather than issue-by-issue analysis;
- the revenue and pricing principles in the National Gas Law;⁷⁶
- the rate of return provisions in the National Gas Rules;
- the impact of the COAG Energy Council's ongoing reforms to implement a binding rate of return instrument;
- whether the ERA has had regard to relevant information in reaching its conclusions;
- whether there is a clear link between the ERA's conclusions and the information on which it relied;
- whether, in the panel's view, the methodology set out in the draft guideline will allow stakeholders to replicate the ERA's estimate at a point in time; and
- interactions with other building block components and the relevant rules affecting estimation of those components.

⁷⁵ National Gas Law s. 23.

⁷⁶ National Gas Law s. 24.

Please set out your conclusions in a publishable report that will be available to all stakeholders via the ERA's website. Where the panel does not agree on conclusions or recommendations in the report, the report should set out the range of final views by panel members without specifically attributing them to individuals.

Information

To assist in your review, you will have access to all source material available to the ERA in making its draft guideline, including but not limited to:

- submissions;
- independent expert reports;
- underlying datasets; and
- relevant calculations or models.

The panel is also able to ask questions of the ERA or stakeholders.

The panel should take minutes of meetings with the ERA or other stakeholders so that these can be published on the ERA's website subject to the ERA undertaking confidentiality checks.

Timing

The report is due no later than 50 business days following the commencement of the panel.

Secretariat support

The panel will have access to secretariat support from ERA staff with respect to organising meetings, document templates, publication of the report, office space (where necessary) and IT support.

However, drafting of the report will be the panel's responsibility.

Confidentiality

Independent panel members will be required to sign a confidentiality undertaking with the ERA to allow access to confidential and proprietary information.

Five business days prior to the publication of the report on the ERA's website, the panel will provide the ERA with the final report for confidentiality checking. The ERA will confirm any suggested redactions with the panel prior to publication.