Discussion paper

The allowed rate of return, compensation for risk and the use of data when judgement is required

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Shortened forms

Shortened form	Extended form
ABS	Australian Bureau of Statistics
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
ATO	Australian Tax Office
CCP	Consumer Challenge Panel
COAG	the Council of Australian Governments
DGM	dividend growth model
energy networks	electricity and gas network service providers
the Guideline	the allowed rate of return guideline
MRP	market risk premium
NEL	national electricity law
NEO	national electricity objective
NER	national electricity rules
NGL	national gas law
NGO	national gas objective
NGR	national gas rules
RBA	the Reserve Bank of Australia
regulatory period	an access arrangement period for gas network service providers and/or a regulatory control period for electricity network service providers
regulated network service	Refers to electricity distribution, electricity transmission, and/or gas pipeline services (includes direct control and reference services)
the rules	collectively, the NER and NGR

Contents

1 Introduction

The Rate of Return Guideline (Guideline) outlines our approach to setting the allowed rate of return for regulated gas and electricity network services. We are currently reviewing the Guideline.

The purposes of this discussion paper are to:

- summarise submissions received from stakeholders on the appropriate compensation for risk that the network service providers receive as part of the allowed rate of return
- summarise submissions received on data and the exercise of judgement
- provide background relevant to further consideration of this issue
- set out the reasons for our current approach as a starting point for discussion and the concurrent expert evidence sessions; and
- set out questions to frame that discussion.

We also consider the use of judgement for selecting point estimates for parameters when there is no consensus.

We note that a key purpose of the concurrent evidence sessions is to determine if the current approaches of the AER remain appropriate, or if the evidence (theoretical and/or empirical) support changes. This discussion paper is prepared for these sessions to assist with this purpose. We also note that the discussion papers and questions for the topics, including those contained in this discussion paper, cover a broad range of material that stakeholders wish to have considered in the Guideline review. This material should not be taken to imply the AER has yet formed views on the appropriate approaches to apply, or numerical values to take, in the 2018 Guideline in determining the allowed rate of return.

2 Background on data and judgement

2.1 Criteria used for data and the exercise of judgement

As part of the previous guideline process, we developed a number of criteria and applied these to inform our regulatory judgement when evaluating material put before us.[1] The criteria are subordinate to the law and the rules. We developed them to provide stakeholders greater certainty as to how we intend to exercise our regulatory judgement whilst keeping sufficient flexibility to make decisions consistent with changing market conditions

We stated in the 2013 Guideline, we consider decisions on the rate of return are more likely to be consistent with the allowed rate of return objective if they use estimation methods, financial models, market data and other evidence that are:

1. where applicable, reflective of economic and finance principles and market information
    a. estimation methods and financial models are consistent with well accepted economic and finance principles and informed by sound empirical analysis and robust data
2. fit for purpose
    a. use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose
    b. promote simple over complex approaches where appropriate
3. implemented in accordance with good practice
    a. supported by robust, transparent and replicable analysis that is derived from available credible datasets
4. where models of the return on equity and debt are used these are
    a. based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation
    b. based on quantitative modelling which avoids arbitrary filtering or adjustment of data, which does not have a sound rationale
5. where market data and other information is used, this information is
    a. credible and verifiable
    b. comparable and timely

[1] AER, Better Regulation explanatory statement rate of return guideline, December 2013, pp. 6, 35.

c. clearly sourced

6. sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.

We will assess the use of data for the relevant rate of return parameter in more detail in subsequent discussion papers. The table below summarise submissions on new data that should be considered and shortcomings in the availability of existing data.

Table 1: Submissions on data

Submission	Comment
Agriculture Industries Energy Taskforce	The AER should request and assess a range of financial performance data and financial data when assessing regulated energy businesses.[2]
APA	It is appropriate for the AER to assess additional third-party data sources which might be used in estimating the rate of return on debt.[3] Information on profitability, and asset sales, and other financial information, which might be used when assessing outcomes against the NEO and NGO, the ARORO, and the related RPPs, will be largely irrelevant to assessing allowed rates of return.[4] If data for the nine businesses were still to be relied upon, the resulting beta estimates would be made using obsolete data, and may be biased by unusual share price activity around the times some comparators were delisted. Consideration should be given to the data potentially available for beta estimation for the benchmark efficient entity.[5]
ATCO Gas Australia	It is important to consider overall performance measure rather an specific components or input. Financeability assessments should also be explored.[6]
APGA	Any use of profitability metric needs to ensure that this incentive framework is not upset by, for example, altering the existing symmetry between upside and downside risk.[7] The AER should consider pros and cons of all third-party data sources and engage on which ones to combine to give a robust estimate of return on debt[8] The AER should consider the sample set that could provide a robust estimate for beta and whether the existing sample is sufficient or require widening.[9]

2 Agriculture Industries Energy Taskforce, AER discussion paper profitability measures for regulated gas and electricity network business, December 2017, pp. 4–5.

3 APA, Review of the rate of return guidelines APA submission responding to AER issues paper, 12 December 2017, p. 7.

4 APA, Review of the rate of return guidelines APA submission responding to AER issues paper, 12 December 2017, p. 3.

5 APA, Review of the rate of return guidelines APA submission responding to AER issues paper, 12 December 2017, p. 11.

6 ATCO gas, Re: Review of rate of return guideline-issues paper, 12 December 2017, p. 4.

7 Australian Pipeline and Gas Association, Submission to the Issues Paper: AER review of the rate of return guideline, 12 December 2017, p. 5,

8 Australian Pipeline and Gas Association, Submission to the Issues Paper: AER review of the rate of return guideline, 12 December 2017, p. 6.

Cheung Kong Infrastructure	The AER should consider the fact that three of nine comparator firms in empirical beta analysis remain listed. A sample of three firms is insufficient to provide a robust and statistically reliable estimate. The AER's sample should expand to include international energy network businesses and domestic infrastructure firms.[10]
Consumer Challenge Panel – CCP16	Profitability and RAB multiples should be used to assess outcomes against the NEO/NGO and ARORO.[11] The AER can broaden the range the range of information considered in setting the ROR to include comparisons of profitability with other sectors and consideration of RAB multiples in setting the ROR and ROE, and reviewing specific parameters such as the MRP, beta and the benchmarks for the cost of debt.[12]
Energy Networks Australia	Information on profitability, asset sales, financeability and any other financial information cannot be used to assess the reasonableness of the allowed rate of return.[13] The remaining comparator firms cannot be used reliably to construct a binding primary range for estimation of an equity beta. Other relevant evidence such as international energy network businesses and domestic infrastructure businesses should be included.[14] The combination of two ATO statistics (Company Taxation Paid and the subsequent Franking Credits Redeemed) is able to directly estimates gamma as the proportion of company tax that is in practice pre-payment of personal tax. [15] ATO tax statistics can be used to provide a reliable estimate of gamma provided.
Ergon Energy and Energex	It is difficult to use profitability, asset sales, financeability and any other information to directly inform the rate of return, and more specifically to make like-for-like assessments. A range of other factors have an effect on profitability, asset sales and financeability etc.[16] Ergon Energy and Energex support a review of all four third party debt data series published by the Reserve Bank of Australia (RBA), Bloomberg, Thomson Reuters and Standard & Poor's.[17]
Major Energy Users	There is now a very small data set from which to derive an asset beta for network service providers listed on the ASX.[18] MEU raised whether sufficient market data is available to identify what risks are faced by network services providers and whether a new approach (e.g. a bottom

9 Australian Pipeline and Gas Association, Submission to the Issues Paper: AER review of the rate of return guideline, 12 December 2017, p. 7.

10 Cheung Kong Infrastructure, AER Issues Paper – Review of the rate of return guideline, 12 December 2017, p. 5.

11 Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 6.

12 Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 8.

13 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p.13.

14 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p. 34.

15 Energy Network Australia, Capital Research letter on tax statistics, 12 December 2018.

16 Ergon Energy and Energex, AER Issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 3

17 Ergon Energy and Energex, AER Issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 5

18 Major Energy Users Inc, Review of the rate of return guidelines issues paper submission by the Major Energy User Ince, December 2017, p. 7.

	up build of risk) is needed to assess the operational risks faced by network service providers.[19]
Origin Energy	The examination of a firm's profitability and financeability provides a useful cross-reference regarding the relationship between regulatory returns and the broader performance of the business.[20]
Public Interest Advocacy Centre (PIAC)	PIAC support the AER having regard to additional information such as profitability, asset sales and financeability in making its decisions. Similarly, PIAC supports the AER having regard to new prospective data sets, such as those used for cost of debt.[21] More data should never be used as a proxy for better data, and the AER should include principles for considering new data sources.
Spark Infrastructure	Investors do not believe the AER should use information on profitability, asset sales, financeability and other financial information to assess outcomes against the ARORO.[22]
Energy Consumers Australia	There is a lack of clarity about how information is being assessed and combined when estimating the return on equity.[23]

Source: AER analysis of submissions

2.2 The use of judgement

There is not always consensus on the correct methods to estimate parameters used for informing or determining the allowed rate of return. In our role as a regulator, we must exercise our regulatory judgement about the use of different models, data, methods and other evidence that may be available to us when making our decision. We recognise that there are potential strengths and weaknesses in the different models and estimation methods.

Nevertheless, we must ultimately determine an overall allowed rate of return that will achieve the NEO or NGO. We must do this by estimating the key inputs into an estimate of the weighted average cost of capital (WACC) that will achieve this. In addition, we must estimate a value for imputation credits consistent with this WACC. This requires judgement at many different levels in our process. For example, we must exercise judgement:

- on methodological choices (for example on whether to use market values, book values, or some hybrid to determine the gearing level to use in the WACC calculation)

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19 Major Energy Users Inc, Review of the rate of return guidelines issues paper submission by the Major Energy User Ince, December 2017, p. 8.

20 Origin Energy, Review of rate of return guideline, 12 December 2017

21 Public Interest Advocacy Centre, Submission on rate of return guideline review issues paper, 18 December 2017, p. 1.

22 Spark Infrastructure, Re: Response to issues paper on the review of the rate of return guideline, 12 December 2017, p. 6.

23 Energy Consumers Australia, Review of the rate of return guideline response to the AER Issues Paper, December 2017, p. 20.

- on the data sets to use and the relative weight to attach to different data sets (for example on what weight to attach to Australian Taxation Office data for informing estimates of imputation credit utilisation rates relative to Australian Bureau of Statistics data on ownership of Australian Equity)
- when choosing point estimates from possible ranges when different data indicates different things (for example choosing a point estimate for beta given different beta estimates exist from different comparator companies over various time periods)
- when deciding how (if at all) to take into account other information in making particular judgment calls (for example, how might trading multiples of RAB be taken into account in exercising judgement on where to choose a point estimate within a range

As part of our consultation process, we have received submissions that have asked us to actively consider how our judgement should be exercised where information and data is unclear or incomplete. Some consumers have raised concerns that we have used a conservative approach for some parameter estimates that has resulted in too high a compensation when considered in combination.[24] Some regulated service providers submitted that the foundation model approach used for the return on equity requires judgement that is too opaque.[25]

Because it is the overall WACC that must contribute to achieving the NEO or NGO, we consider each individual piece of judgement needs also be considered in light of other judgements and the overall WACC that will be achieved. In doing this we also consider interrelationships between different cost of capital variables for a benchmark efficient entity (for example, the relationship between the credit rating and the gearing ratio).

Beyond this, we consider that exercising judgement generally should involve, to the extent possible, good regulatory process combined with good research practice discussed above. We consider good regulatory process includes:

- Genuine consultation with key interested parties at important stages of the process. This allows all stakeholders to engage in the process prior to each decision point and to have their views taken into account in the exercise of judgment. It also should allow for greater rigour in decisions through ongoing testing of regulatory work with different stakeholders.
- Transparent decisions in plain language logically supported by evidence that explain the reasons for the exercise of judgement. This should help make decisions more rigorous and result in greater confidence in decisions. This should allow more stakeholders to fully engage in the process and have confidence in final decisions.

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[24] For example see Consumer Challenger Panel (sub-panel 16), Submission to the AER on its Rate of Return Guideline Issues Paper, December 2017, p. 12

[25] For example, see Ergon Energy and Energex, AER issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 2; Australian Pipeline and Gas Association, Submission tthe issues paper: AER review of the rate of return guideline, 12 December 2017, p. 5.

- A draft decision to allow stakeholders to comment on any exercise of judgement prior to a final decision. This allows a cross check on draft decisions for errors and allows different stakeholders to explain why they consider judgement/s should be exercised differently in the final decision. This step should improve the quality and confidence in final decisions.

We welcome submissions on our exercise of judgement in this process including on the use of different data to inform this judgement. A list of framing questions is provided in Section 5.

The table below provide a summary of submissions on the use of judgement.

Table 2: Submissions on the exercise of judgement

Submission	Comment
APGA	The AER needs to provide more clarity in how and why it chooses the range it does, and how it relates to the particular problems being addressed if the current approach for equity beta is retained.[26]
Consumer Challenge Panel – CCP16	CCP16 endorse the AER's approach of establishing a set of implementation rules and selection criteria to allow a more systematic approach to considering a new bond series.[27] CCP16 caution against allowing greater flexibility for networks to select their preferred methodologies in the new Guideline for estimating the return on debt.[28] The new Guideline should not adopt the 'menu' approach to setting the ROD that has been rejected in the past as this provides too many opportunities for gaming and increases the uncertainties around the outcome. [29] It should not be automatic that a 'trigger event' results in a change to the MRP. Rather, it is a signal to review the estimation and the context in which the trigger event occurs. [30] The AER should exercise caution in adjusting the MRP in response to variations in the forward-looking estimates of the MRP derived from the DGM.[31] The AER should collect and assess a range of additional information (e.g. effective tax rates of industries, specific industry data on the utilisation of imputation credits, etc.) when assessing imputation credits.[32]
Energy Networks Australia	Network business do not advocate for purely mechanistic approaches to be used in setting allowed rates of return. Regulatory judgement and discretion remain

[26] Australian Pipeline and Gas Association, Submission to the Issues Paper: AER review of the rate of return guideline, 12 December 2017, p. 6.

[27] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 8.

[28] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 55.

[29] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 55.

[30] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 82.

[31] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 107.

[32] Consumer Challenger Panel (sub-panel 16), Submission to the AER on its rate of return guideline issues paper, December 2017, p. 110.

	important tools, and qualitative assessments remain a legitimate approach when quantitative precision is not possible.[33] The AER could either set out a clear process or a fixed estimate (that is subject to revision) when estimating the market risk premium.[34] In deriving a point estimate of gamma, Energy Networks Australia suggests that the AER sets out clearly how the updated empirical analysis has been used and distilled into a point estimate.[35] ENA also proposed principles to be applied when selecting a point estimate for gamma. [36]
Ergon Energy and Energex	In relation to the averaging period used to estimate the annual prevailing return on debt, Ergon Energy and Energex note that, in addition to the conditions in the guideline, the AER set out further conditions in the revenue determinations to accommodate the annual pricing proposal process[37] The AER has continued to use its discretion to maintain the MRP at 6.5 per cent, despite evidence of a change in market conditions from DGMs.[38] If the AER continues with its current approach, then Ergon Energy and Energex consider that the AER should set out clear worked examples illustrating, first, the events/conditions that would trigger a reconsideration of the estimated equity risk premium, and secondly, how the AER would adjust the equity risk premium. In other words, if the guideline is binding, there must be significantly less application of discretion after the guideline is finalised.[39]
Jemena	The AER should fix the equity risk premium at the Guideline review.[40]
Origin Energy	The AER's use of conservative values for each of the various inputs to the development of a RoR results in a massive increase in the overall conservatism in the final value for RoR, especially where two conservative values are multiplied.[41]
Public Interest Advocacy Centre (PIAC)	The AER should retain discretion as to whether and how to incorporate new data in its decisions[42]
Queensland Treasury Corporation	A fixed MRP or equity risk premium should not be prescribed in the Guideline.[43] A binding Guideline should be more prescriptive than a non-binding Guideline. One way to achieve greater prescription is by assigning fixed weights to the

33 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p. 10.
34 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p. 22.
35 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p. 38.
36 Energy Network Australia, AER Rate of return guidelines response to issues paper, 12 December 2018, p. 37.
37 Ergon Energy and Energex, AER Issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 4
38 Ergon Energy and Energex, AER Issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 5
39 Ergon Energy and Energex, AER Issues paper review of the rate of return guidelines Ergon Energy and Energex submission, 12 December 2017, p. 6
40 Jemena, Response to AER's Issues Paper on the rate of return guideline, 12 December 2017, p. 4.
41 Major Energy Users Inc, Review of the rate of return guidelines issues paper submission by the Major Energy User Ince, December 2017, p. 11.
42 Public Interest Advocacy Centre, Submission on rate of return guideline review issues paper, 18 December 2017, p. 1.
43 Queensland Treasury Corporation, Rate of return guideline review issues paper, 12 December 2017, p. 3.

	Ibbotson, Wright approach and dividend growth model (DGM) estimates of the MRP. [44]
Spark Infrastructure	Continued broad discretion is not appropriate in the absence of Limited Merits Review (LMR).[45]
Energy Users Association of Australia (EUAA)	In the case of variable like market risk premium and beta, the AER has selected a point estimate at the upper lend of that range. This decision serves to result in a higher cost of equity.[46]

Source: AER analysis of submissions

[44] Queensland Treasury Corporation, Rate of return guideline review issues paper, 12 December 2017, p. 4.

[45] Spark Infrastructure, Re: Response to issues paper on the review of the rate of return guideline, 12 December 2017, p. 4.

[46] EUAA, EUAA submission – AER rate of return review issues paper October 2017, 18 December 2017, p. 5

3 Background on risk compensation

As part of our review of the rate of return guidelines the AER is considering the appropriate compensation for risk that the network service providers receive as part of the allowed rate of return. This issue was considered in our 2013 guideline and in our subsequent regulatory determinations. Correct compensation for risk is an important part of the rate of return regulatory framework and is integral to achieving the national gas and electricity objectives.

This section sets out:

- Submissions received in response to our issues paper on risk compensation
- Background on previous assessment of the appropriate compensation for the risks (particularly for equity holders)

3.1 Submissions

In response to our issues paper, stakeholders also made submissions on the appropriate compensation for risk. These are summarised in Table 3.

Table 3: Submissions on compensation for risk

Submission	Comment
APA	The degree of risk which applies to the service provider is the degree of risk to be attributed to the benchmark efficient entity.[47] The degree of risk may not be common across electricity distribution, electricity transmission, gas distribution, and gas transmission. There may be similarity in degree of risk between, for example, gas transmission service providers, but not between those service providers and service providers in the electricity sector.
ATCO Gas Australia	An increasingly competitive energy market, combined with existing cost allocation and ring-fencing requirements, are sufficient to ensure returns are commensurate with the inherent risks of gas distribution businesses.[48]
APGA	The RoD calculations should reflect the differences in risk between different network businesses.[49] The NZCC adopted an asset beta for gas business 0.05 points higher than electricity businesses. The use of a range and point on a range approach to fix some of the issues with CAPM should be explained better by the AER, if they are going to remain.
SA Power Networks, Australian Gas Infrastructure Group,	The energy industry faces greater risks now than in 2013 and these additional risks should be taken into consideration when setting the RoE.

47 APA, APA submission responding to AER issues paper, 12 December 2017, p. 5.

48 ATCO Gas Australia, review of rate of return guideline – issues paper, 12 December 2017, p. 1.

49 APGA, Submission to the Issues Paper – AER Review of the Rate of Return Guideline, 12 December 2017, p 3–5

CitiPower, United Energy and Powercor[50]	International utility businesses and domestic infrastructure firms should inform the Beta.
Consumer Challenge Panel – CCP16	The appropriate risk that should be assessed in setting the ROR is the risk that network businesses will not achieve their expected ROR. The RPP insulate the networks from write-down risk. Once assets are put in the RAB they are not removed. The capital base is protected. Once approved, capital never becomes 'inefficient'. The networks do not face risks of impairments from asset obsolescence through technology changes or competitive advances.[51] Given this and the ARORO, the risk that network businesses will not achieve their expected ROR is very low. The network businesses have very steady cashflows, so returns to investors are highly predictable.
Energy Networks Australia	The Guideline review will need to take into account the changing role of networks, and potential implications of evolving competition and other risks, to ensure the overall regulatory risk compact and assumptions around sectoral risks remain consistent. [52] International utility businesses and domestic infrastructure firms should inform the Beta.
Ergon Energy and Energex	The current approaches to setting the benchmark term and level of gearing remain appropriate.[53]
Ian McAuley	Beta is used to measure stock volatility rather than risk and a different measure should be used.[54] Different sectors face different risks and this should be explored further
Major Energy Users	The asset beta is a measure of volatility of share price and not of the risks that the firm faces for its operation which ultimately drives its revenue. The MEU considers that use of asset beta is useful for investors of shares in companies (the initial reason for the development of the CAPM model) so while volatility of a share price provides a guide to the investor of shares on the risks they may face, it does little to assess what the operational risks faced by the firm are; an assessment of the operational risks is what is needed to set the risks to set a forward looking RoE for a network.[55] As revenue cap is less risky than price cap, current applied estimates of equity beta are overstated.
Origin Energy	The NER require the AER to determine an allowed rate of return that achieves the allowed rate of return objective at the time it makes its revenue determination; notably that it provide a DNSP with a rate of return commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as the service provider in respect of the provision of standard control services.[56] The similar degree of risk may change from service provider to service provider

50 SA Power Networks, Australian Gas Infrastructure Group, CitiPower, United Energy and Powercor, Submission on rate of return issues paper, 12 December 2017, p 3–5.

51 Consumer Challenge Panel (sub panel 16), Submission to the AER on its Rate of Return Guideline Issues Paper, December 2017, p. 5

52 Energy Networks Australia, AER Rate of Return Guidelines – Response to Issues Paper, 12 December 2017, p. 4.

53 Ergon Energy and Energex, Issues Paper – Review of the Rate of Return Guidelines, December 12 2017, p. 3.

54 Ian McAuley, Submission to AER on Rate of Return Guidelines, December 2017, p. 3.

55 Major Energy Users, Review of the rate of return guidelines, December 2017, p 7–8.

56 Origin Energy, Review of rate or return guidelines, 12 December 2017, p. 1–2.

	meaning there is no single benchmark efficient entity.
Public Interest Advocacy Centre (PIAC)	The AER should examine the risks that efficient regulated network businesses face, through a bottom-up analysis.[57]
Spark Infrastructure	Could be made to the RoR by recognising the broader risk environment, sanctity of the BEE and the impact on incentives of using performance information to set the rate of return. Setting the RoR on the BEE, rather than actual financial information is prudent and effective.[58] Debt data should appropriately reflect the risks of a BEE.
The Australian Institute	A Beta can be 0, if the NSP is simply not correlated with the overall market they would not receive anything above the RF rate. If a risk premia is to be used, it should be based on the volatility directly for the relevant market sub-group.[59] No equity premium should apply.
CaneGrowers	The standard calculation of Market Risk Premium (MRP) and Equity Beta (ß) for the regulated components of electricity network businesses, as if they were operating in the competitive markets, is likely to overstate the risks that natural monopoly network firms face.[60]
Energy Consumers Australia	Distributors face lower risk than unregulated firms that their premiums are based on. Recommend that the reduced risk be factored in to the CAPM.[61] Risk should be allocated per asset rather than on the owner of the asset. Equity risk premium may not be able to be estimated. The terminology used implies the AER uses the benchmark as a literal entity, how the AER views a benchmark efficient entity (BEE) should be explored. Suggest to move away from seeing the BEE as being set so the provider can outperform it, rather it should be seen as a constraint. Gas and Electricity should have the same benchmark.
Energy Users Association of Australia (EUAA)	More emphasis need to be on an examination of the risks networks face and whether the market risk premium and beta accurately reflect that risk allocation – confidence in the regulatory regime requires transparency around the evidence used to arrive at a rate of return that appropriately compensates networks for the risk they bear – and the risk that they pass on to consumers[62]. Over the past decade networks bore very limited business, financial and regulatory risk.

Source: AER analysis of submissions

3.2 Past considerations of compensation for risk

57 Public Interest Advocacy Group, Submission on rate of return guideline review issues paper, 18 December 2017, p. 2.

58 Spark Infrastructure, Response to issues paper on the review of the Rate of Return Guidelines, 12 December 2017, p. 5.

59 The Australian Institute, Submission to the review of the rate of return guidelines, December 2017, p. 5.

60 CANEGROWERS, CANEGROWERS submission to AER Review of the Rate of Return Guideline, December 2017, p. 4.

61 Energy Consumers Australia, Review of the rate of return guideline, December 2017, p. 15–18.

62 Energy Users Association of Australia, EUAA submission – AER Rate of Return Review Issues Paper, October 2017, p. 5–6.

Compensation for the risk of equity holders is provided in our framework through the foundation model approach. The Beta of the SL CAPM, however, is the primary representation of the compensable risk compared to that of the market (i.e. systematic risk). In this section we provide a brief overview of previous analysis on beta (the measure of systematic risk in the SL CAPM).

Our point estimate of beta used in the 2013 guideline and recent decisions was informed by both conceptual analysis and empirical evidence.[63]

As part of the conceptual analysis, we concluded that there were reasonable conceptual grounds to expect the equity beta of a benchmark efficient entity to be below 1.0, which applied equally to gas and electricity network service providers.[64]

The conceptual analysis did not indicate the magnitude of the difference between the benchmark efficient entity and the market average (1.0). Therefore, we used our conceptual analysis as a cross check on the results of our empirical analysis.

Below we provide more detail on our previous conceptual analysis and empirical evidence.

3.2.1 Conceptual analysis

Previously, we considered it was possible to determine a conceptual expectation of the systematic risk of the benchmark efficient entity relative to the market average firm. This then gave us some insight into the equity beta for the benchmark efficient entity relative to the average equity beta across all firms in the market, which is 1.0 by definition.[65] Our conceptual analysis indicated that the equity beta of a benchmark efficient entity will be less than 1.0. This implies that returns to a benchmark efficient entity vary less with economic conditions than returns for the market as a whole. Professor Michael McKenzie and Associate Professor Graham Partington (McKenzie and Partington) supported this conclusion in their recent reports.[66] We addressed this

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63 AER, *Better regulation explanatory statement: Rate of return guideline*, December 2013, pp. 83–88.

64 AER, *Better regulation explanatory statement: Rate of return guideline (appendices)*, December 2013, pp.39–43.

65 More precisely, the value weighted average across all firms in the market is 1.0. As pointed out by McKenzie and Partington, the equal weighted average may not be 1.0, since larger firms may be unevenly distributed above or below 1.0. See: McKenzie and Partington, *Estimation of the equity beta (conceptual and econometric issues) for a gas regulatory process in 2012*, April 2012, p. 21. (McKenzie and Partington, *Estimation of equity beta*, April 2012)

66 McKenzie and Partington, *Report to the AER, Part A: Return on equity*, October 2014. This report was updated in 2015 (Partington, *Report to the AER: Return on equity (Updated)*, April 2015). The material on conceptual analysis is the same in both reports so any reference to McKenzie and Partington's 2014 report in this section also applies to Partington's 2015 report. Partington and Satchell provided another updated report in May 2015, which considered submissions to JGN's access arrangement review. They noted there is nothing in those submissions that would lead them to depart from the findings in McKenzie and Partington (2014) and Partington (2015). See: Partington and Satchell, *Report to the AER: Return on equity and comment on submissions in relation to JGN*, May 2015, p. 6. Therefore, references to McKenzie and Partington (2014) or Partington (2015) also apply to Partington and Satchell (2015).

type of conceptual analysis in the Guideline and our 2012 decision for the Roma to Brisbane pipeline.[67]

We considered two key types of systematic risk were relevant for this conceptual assessment: business risk and financial risk.

3.2.1.1 Business risk

Business risk in this context refers to the systematic risk exposure of the underlying business assets.[68] It is generally accepted that the benchmark efficient entity has lower business risk than the market average firm.[69] We have previously concluded that business risk for the benchmark efficient entity will be low for the following reasons:[70]

- There are a number of inherent characteristics of an energy transportation network that lead to low systematic risk exposure. For example, operation of a natural monopoly and provision of an essential service with low price elasticity of demand.
- The structure of the regulatory regime insulates service providers from systematic risk. For example, this provides for revenue cap regulation, tariff variation mechanisms and cost pass through mechanisms. This also provides for tariff structures that include fixed charges and protection of sunk investment through rolling forward the regulatory asset base (RAB).

3.2.1.2 Financial risk

Financial risk relates to the additional systematic risk exposure that arises from the debt holdings of a firm. The underlying principle is that, since payments to debt holders take precedence over payments to equity holders, the systematic risk exposure for equity holders (that is, the equity beta) increases as the firm issues more debt. It is

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67 AER, *Explanatory statement to the rate of return guideline (appendices)*, December 2013, pp. 39–44; AER, *Draft decision: APT Petroleum Pipeline Pty Ltd, Access arrangement draft decision, Roma to Brisbane pipeline, 2012–13 to 2016–17*, April 2012, pp. 149–51, 315–319; AER, *Final decision: APT Petroleum Pipeline Pty Ltd, Access arrangement final decision, Roma to Brisbane Pipeline, 2012–13 to 2016–17*, August 2012, pp. 88–89.

68 We note business risk in this context is only systematic/market risk and does not include firm specific risk that can be diversified away.

69 McKenzie and Partington, *Estimation of equity beta*, April 2012, pp. 6, 10; SFG, *Equity beta: Report for Jemena Gas Networks, ActewAGL and Networks NSW*, May 2014, pp. 17–18. (SFG, *Equity beta*, May 2014); SFG, *Estimating the required return on equity: Report for Energex*, 28 August 2014, p. 60; SFG, *Beta and the Black capital asset pricing model: Report for Jemena Gas Networks, Jemena Electricity Networks, ActewAGL, Ausgrid, Ausnet Services, Australian Gas Networks, CitiPower, Endeavour Energy, Energex, Ergon, Essential Energy, Powercor, SA Power Networks and United Energy*, 13 February 2015, p. 42 (SFG, *Beta and the Black capital asset pricing model*, 13 February 2015); SFG, *Equity beta report prepared for APT Petroleum Pipelines Ltd*, October 2011, p. 11; McKenzie and Partington, *Report to the AER: Risk, asset pricing models and WACC*, June 2013, p. 11; Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 64. McKenzie and Partington, *Report to the AER, Part A: Return on equity*, October 2014, p. 11. Origin Energy, *Submission to NSW distribution network service providers regulatory proposals for 2014–19*, August 2014, p. 7.

70 AER, *Explanatory statement to the rate of return guideline (appendices)*, December 2013, pp. 40–41. Also see: Frontier Economics, *Assessing risk for regulated energy networks*, July 2013; McKenzie and Partington, *Estimation of equity beta*, April 2012, p. 6.

generally accepted that the benchmark efficient entity has higher financial risk than the market average firm.[71] The key characteristic causing this higher financial risk is the relatively high financial leverage (gearing) for the benchmark efficient entity (60 per cent) relative to the market average firm (roughly 30 to 35 per cent).

However, the exact relationship between financial risk and financial leverage is not straightforward

In its 2013 report, Frontier disaggregated financial risk (arising because of how the business's activities are funded) into five different subcategories.[72] For each of the subcategories that contribute to financial risk, Frontier assessed the level of risk for regulated Australian energy network businesses relative to other businesses in the economy as:[73]

- low risk—default risk, financial counterparty risk, and illiquidity risk (for large networks)
- medium risk—refinancing risk
- medium to high risk—interest rate reset risk, and illiquidity risk (for small networks).

Further, when the Frontier report assessed interest rate reset risk as 'medium to high', it did so on the basis that the regulated return on debt would continue to be set using an 'on the day' approach.[74] Later in that report, Frontier acknowledges that our implementation of a trailing average approach would reduce interest rate reset risk.[75]

On the basis of the information set out above, we have previously concluded that although the benchmark efficient entity has high financial leverage (relative to the market average firm), this does not necessarily imply it has an equivalently high exposure to financial risk.

3.2.1.3 Overall systematic risk assessment

The conceptual assessment of equity beta relative to the market average is determined by the direction and relative magnitude of these two systematic risk factors: business risk and financial risk.

The above assessment of business risk and financial risk for the benchmark efficient entity suggests that the intrinsic business risk of a firm is the main driver of its systematic risk. We expect the benchmark efficient entity to have low intrinsic risk

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71 McKenzie and Partington, *Estimation of equity beta*, April 2012, pp. 7, 10; SFG, *Equity beta*, May 2014, pp. 17–18; SFG, *Estimating the required return on equity: Report for Energex*, 28 August 2014, p. 60; SFG, *Beta and the Black capital asset pricing model*, 13 February 2015, p. 42; SFG, *Equity beta report prepared for APT Petroleum Pipelines Ltd*, October 2011, p. 11.

72 This report included both systematic and non-systematic risk, although only the former is relevant for the estimation of equity beta.

73 Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 65.

74 Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 64.

75 Frontier Economics, *Assessing risk for regulated energy networks*, July 2013, p. 74.

exposure (relative to the market average). We also consider the high financial leverage of the benchmark efficient entity (relative to the market average) does not necessarily correspond to an equivalently high exposure to financial risk. On the basis of this information, we consider there are reasonable conceptual grounds to expect the overall systematic risk for the benchmark efficient entity to be below that of the market average firm. This leads to our expectation that the equity beta of the benchmark efficient entity will be below 1.0.

3.2.2 **Empirical work**

Empirical estimates of equity beta are based on regressions that relate the returns on a set of comparator firms to the return on the market. Empirical estimates using a comparator set of listed Australian energy network firms are the main determinant of our equity beta estimate for a benchmark efficient entity.

For this analysis we commissioned an expert report from Professor Olan Henry (Henry), which provided an update on his 2009 econometric analysis of equity beta.[76] Henry's 2014 report is one of a number of Australian empirical studies showing a consistent pattern of equity beta estimates that is robust to the use of different econometric techniques, comparator sets and time periods. From 2002 to 2014, these empirical studies have presented equity beta estimates that converge on the range of 0.4 to 0.7. In our decisions we considered the evidence presented in Henry's 2014 report in detail because it uses the most recent data and this is relevant in selecting an equity beta (and return on equity) that is reflective of prevailing market conditions.[77] This report applied a number of regression permutations based on different econometric techniques, comparator sets and time periods. The resulting equity beta estimates consistently fall within the range of 0.4 to 0.7, with most estimates clustered around 0.5.

[76] Henry, *Estimating β*, April 2009; Henry, *Estimating β: An update*, April 2014.

[77] NER, cll. 6A.6.2(g) and 6.5.2(g); NGR, rule 87(7). Note: Grant Samuel and Associates' 2014 independent expert report for Envestra use more recent data than Henry's 2014 report. However, this report is not specific to equity beta estimation, and as such there is no detailed explanation of their methodology or results.

4 Compensation for risk

As part of our review of the rate of return guidelines the AER is considering the appropriate compensation for risk that the network service providers receive as part of the allowed rate of return. We previously considered in our 2013 guideline and in our subsequent regulatory determinations.

Correct compensation for risk is an important part of the rate of return regulatory framework and is integral to achieving the national gas and electricity objectives.

Under the current rules, we set the allowed rate of return to achieve the national gas and electricity objectives as well as the allowed rate of return objective.[78] In setting the allowed rate of return, we must also have regard to the revenue and pricing principles.

The national gas and electricity objectives require the promotion of efficient investment in, and efficient operation and use of, energy network services for the long-term interests of energy consumers.[79] The national gas and electricity objectives govern every aspect of our regulatory determinations and have primacy, including over the allowed rate of return objective. However, we do not view the national gas and electricity objectives and the allowed rate of return objective to be in disagreement. We therefore set the allowed rate of return to meet both the national gas and electricity objectives and the allowed rate of return objective.

As part of our previous processes we have explored the risks that arise for investors in network service providers.[80] Finance theory suggests that the required return on an investment only reflects its systematic risk, and whether risk is partially or fully systematic can be subjective.[81]

We use an estimated weighted average return on capital that a benchmark efficient entity would require to finance (through debt and equity capital) investment in its network.[82] This is both required in the National Gas and Electricity Rules and avoids

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78 NER clauses 6.5.2(b) and 6A.6.2(b); NGR clause 87(2).

79 The National Electricity Objective is in section 7 of the National Electricity Law and the National Gas Objective is in section 23 of the National Gas Law.

80 For example, see: AER, *Better regulation explanatory statement: Rate of return guideline (appendices)*, December 2013, pp. 39–43; AER, *Better regulation explanatory statement: Rate of return guideline*, December 2013, pp. 32–45.

81 See section 4 below for more discussion on systematic and non-systematic risk. For example, see: AER, *Better regulation explanatory statement: Rate of return guideline (appendices)*, December 2013, pp. 39–43; AER, *Better regulation explanatory statement: Rate of return guideline*, December 2013, pp. 33–34.

82 The term network service provider relates to service providers that provide gas and electricity transmission and distribution services.

the need to calculate the magnitude of required compensation for each risk faced by the networks and the assessment of whether each risk is systematic[83].

The sections below discusses the compensation for risks faced by the network service providers and how we target this compensation through a benchmark efficient entity that has similar degree of risk as the service provider. We also pose questions in Section 5 for discussion on the appropriateness of a similar benchmark for differing entities and how to measure these if found appropriate.

While the material below largely sets out the key views we have expressed in recent determinations on the required compensation for risk under the regulatory framework[84], this should not be taken to indicate a final view has been formed on these matters for the purposes of this review.

4.1 Risk and return

An essential concept to consider when setting an allowed return is risk. As explained by Handley, the risk-return trade-off is one of the most fundamental paradigms of finance.[85] The risk-return trade off simply states that a risk averse investor will want a higher expected return when faced with a higher risk.[86] As well as being a fundamental principle of finance, the risk-return trade-off is also an important objective of the regulatory framework.

The national gas and electricity rules states that the objective of the allowed rate of return is to be commensurate with *the efficient financing costs* of a benchmark efficient entity *with a similar degree of risk as that which applies to the service provider in respect of the provision of regulated network services*.

The revenue and pricing principles also state that risk needs to be accounted for when determining the allowed rate of return. In addition, the revenue and pricing principles require that a price or charge for the provision of a regulated network service should allow for a return commensurate with the regulatory and commercial risks involved in providing the regulated network service to which that price or charge relates.

A definition of risk: risk is the degree of uncertainty about an event.[87] For instance, investing in the share market is risky because there is a spread of possible outcomes (or spread of possible returns relative to the expected return at the time of the investment). The usual measure of this spread is the expected standard deviation or

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83 NER clauses 6.5.2 and 6A.6.2; NGR clause 87; Whether a risk is systematic is important for determining whether the risk requires compensation. This is explored later in section 4.

84 For example, see AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return, November 2017.

85 Handley, J., 'Advice on the return on equity: report prepared for the AER', 16 October 2014, p. 4.

86 Handley, J., 'Advice on the return on equity: report prepared for the AER', 16 October 2014, p. 4.

87 Bishop, S., Faff, R., Oliver, B., Twite, G., 'Corporate Finance', Ed. 5 Pearson Prentice Hall, 2004, p. 577.

variance around the expected return.[88] Similarly, the total risk of a benchmark efficient entity would be the uncertainty around its expected return (noting only systematic risk is generally considered compensable). More specifically, the systematic or market risk of investment in a benchmark efficient entity would be the uncertainty around the expected return of this investment relative to the expected return on an investment in the market.[89] We would measure this as the standardised correlation between a benchmark efficient entity's returns with that of the overall market (measured by the equity beta in the CAPM).[90]

Brealey et.al. use the figure we have presented as figure 1 to illustrate the following.[91]

> Investments A and B both have an expected return of 10%, but because investment A has the greater spread of possible returns, it is more risky than B. We can measure this spread by the standard deviation. Investment A has a standard deviation of 15%; B, 7.5%. Most investors would prefer B to A. Investments B and C both have the same standard deviation, but C offers a higher expected return. Most investors would prefer C to B.

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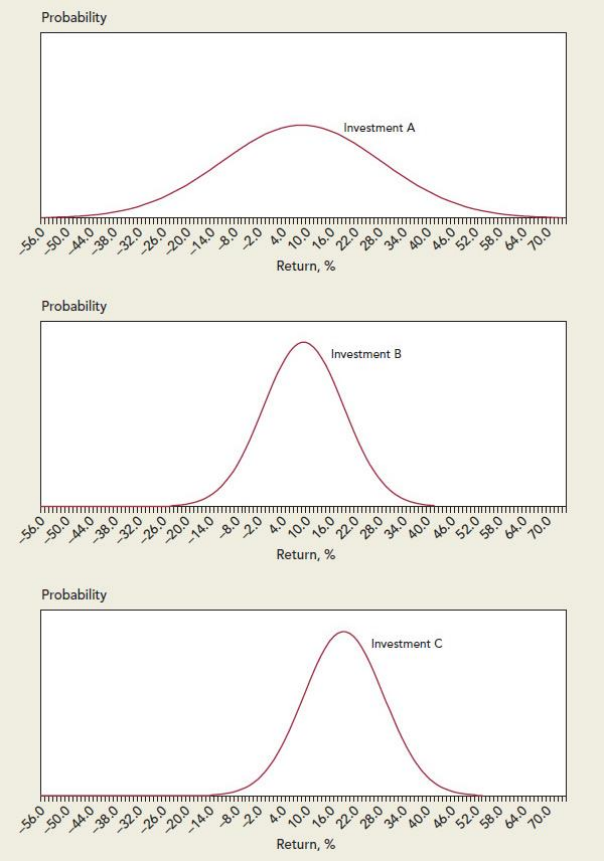
88 Brealey, R., Myers, S., Partington, G., Robinson, D., 'Principles of corporate finance', 2007, The McGraw-Hill Companies Inc., 2007, p. 201.

89 We note that the expected return on debt is likely less than the promised yield (or yield to maturity) as the promised yield will include any required compensation for any expected loss on default risk due to idiosyncratic risk.

90 McKenzie, M., Partington, G., *Risk, asset pricing models and WACC*, June 2013, p. 21; Brealey, R., Myers, S., Partington, G., Robinson, D., 'Principles of corporate finance', 2007, The McGraw-Hill Companies Inc., 2007, p. 107.

91 Brealey, R., Myers, S., Allen, F., 'Principles of corporate finance', 2011, Ed. 10, McGraw-Hill Irwin, Figure 8.2, p. 187.

Figure 1 Risk versus expected return



Source: Brealey, Myers, Allen (2011), Figure 8.2.

We have used the above example to explain the relationship between risk and return for a single investment. Investors are generally assumed to prefer an investment with a lower variance for a given expected return under the assumption that investors are risk averse. However, we note that for an investment that is to be included in an investment portfolio the risk that is relevant to its price is the risk it will add to this portfolio. Therefore, under the assumption that investors hold fully diversified 'efficient' market portfolios, it is an investment's non-diversifiable (or systematic) risk that is relevant. In the case of equity investments, as discussed above, this is measured by the equity beta of the investment.

4.2 Efficiency

When considering an efficient return for risk, it is important to differentiate between risk that is efficiently compensated through the allowed rate of return (compensable risk) and non-compensable risk.[92]

In estimating an efficient allowed rate of return, we highlight four factors that we have previously considered important:

- Estimating a forward-looking return
- Estimating a market return through use of market data
- Providing a return for systematic risk
- The role of incentive regulation

4.2.1 Forward-looking return

Risk is the degree of uncertainty about an event—such as the uncertainty around the expectation of the return on an investment.[93] It is strictly a forward looking concept as no event is uncertain after it has occurred.

4.2.2 Use of market data

Because the market for capital finance is competitive, an efficient network service provider should face competitive prices in the market for funds. Therefore, we have expressed the view that efficient financing costs are reflected in the prevailing market cost of capital (or WACC) for an investment with a similar degree of risk as that which applies to a service provider in respect of the provision of standard control, prescribed transmission, or reference services.[94] As Alfred Kahn stated, 'since the regulated company must go to the open capital market and sell its securities in competition with every other would-be issuer, there is clearly a market price (a rate of interest on borrowed funds, an expected return on equity) that it must be permitted and enabled to pay for the capital it requires'.[95]

We have also expressed the view that economic efficiency is advanced by employing a rate of return that reflects rates in the market for capital finance.[96] Similarly, Partington

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92 See also: Frontier, *Assessing risk when determining the appropriate rate of return for regulated energy networks in Australia*, July 2013.

93 Bishop, S., Faff, R., Oliver, B., Twite, G., 'Corporate Finance', Ed. 5 Pearson Prentice Hall, 2004, p. 577.

94 See Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15. We note the cost of capital (from a firm's perspective) is also known as investors' required rate of return (from an investors' perspective).

95 Kahn, A.E., 'The economics of regulation: Principles and institutions', The MIT Press, Massachusetts, 1988, p. 45.

96 For example, see: AER, Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return, November 2017, p. 12, 16. AER, Final decision United Energy distribution determination 2016 to 2020 Attachment 3–Rate of return, May 2016, pp. 281–292.

and Satchell interpret efficient financing costs as the opportunity cost of capital, which is a market rate of return for assets with a given level of risk.[97]

4.2.3 Diversification, and compensation for systematic risk

'Risk' has a specific meaning in finance theory. As such, we have expressed the view that it is important to apply this specific meaning in setting a rate of return that achieves the NEO, NGO, and ARORO. In finance, there are two distinct types of risk—systematic risk (sometimes called market risk or non-diversifiable risk) and non-systematic risk (firm-specific or diversifiable risk). That is, in finance:[98]

> The risk of any share can be broken down into two parts. There is the *unique risk* that is peculiar to that share, and there is the *market risk* that is associated with market-wide variations. Investors can eliminate unique risk by holding a well-diversified portfolio, but they cannot eliminate market risk. *All* the risk of a full diversified portfolio is market risk.

Similarly, McKenzie and Partington have advised: [99]

> modern finance theory specifies that the risk to be compensated via the WACC is the non-diversifiable, or systematic, component of total risk (in simple terms, that risk which cannot be eliminated by holding stocks in a well diversified portfolio). This risk is measured as covariance, or equivalently beta, risk.

The rate of return allows a network service provider to compensate investors for the risk of committing capital to fund investments in its network. We have expressed the view we do not consider investors require compensation for all risks involved in investing in a network service provider.

Investors can eliminate non-systematic risk by holding a well-diversified portfolio, but they cannot eliminate systematic market risk. If diversification can allow investors to eliminate non-systematic risk, then it is unlikely that investors will require compensation for these risks in order to invest, and inefficient to compensate investors for this non-systematic risk in the allowed rate of return.

In setting the allowed return on equity in our previous decisions, we provided compensation for the systematic risk that an efficient network service provider would face through the equity beta.[100] The equity beta under the Sharpe–Lintner capital asset pricing model (CAPM) measures systematic risk as the sensitivity of an asset or

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97 Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15.

98 Brealey, R., Myers, S., Partington, G., Robinson, D., 'Principles of corporate finance', 2007, The McGraw-Hill Companies Inc., 2007, p. 201.

99 McKenzie, M., Partington, G., *Risk, asset pricing models and WACC*, June 2013, p. 10.

100 For example, AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 20.

business[101] to the overall movements in the market. It does this by measuring the standardised correlation between the returns on this asset or business with that of the overall market.[102] The key risks for debt holders are systematic (beta) risk, credit risk (the risk of default and credit rating downgrades) and liquidity risk.[103]

In setting the allowed return on debt, we provide the efficient compensation for the risks that an investor in the network service provider's debt faces, as they are included in the promised returns we observe using our debt data sources.[104] Further, since we provide a return on debt based on the promised yield, our allowed rate of return will be slightly above the expected return. This also means the overall allowed return includes some compensation for the expected default loss on debt due to idiosyncratic (or non-systematic) risk.

4.2.4 Benchmarking and incentive regulation

The service providers' actual returns could differ from the allowed return depending on how efficiently it operates its business. This is consistent with incentive regulation. That is, our rate of return approach drives efficient outcomes by creating the correct incentive by allowing (requiring) service providers to retain (fund) any additional income (costs) as a result of outperforming (underperforming) the efficient benchmark.[105]

4.3 Similar degree of risk

We have concluded in recent decisions that the appropriate return is an ex-ante return that includes a risk premium over the risk free rate for bearing compensable risk.

We have also determined in recent decisions that a benchmark efficient entity for a network service provider is one that has a similar degree of risk as that which applies to the network service provider in respect of the provision of the relevant reference services.[106] The allowed rate of return is to be commensurate with the efficient financing costs of such a benchmark efficient entity.[107]

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101 Theoretically, this asset or business is 'a benchmark efficient entity'. In practice, we use a sample of businesses we consider comparable to a benchmark efficient entity to calculate equity beta. See: AER, Better regulation explanatory statement rate of return guideline, December 2013, pp. 83–86.

102 McKenzie, M., Partington, G., *Risk, asset pricing models and WACC*, June 2013, p. 21; Brealey, R., Myers, S., Partington, G., Robinson, D., 'Principles of corporate finance', 2007, The McGraw-Hill Companies Inc., 2007, p. 107.

103 McKenzie, M., Partington, G., *Risk, asset pricing models and WACC*, June 2013, p. 14.

104 We observe the promised returns of debt issued by a sample of firms we consider comparable to a benchmark efficient entity based on the benchmark credit rating and term. In practice, we may have overcompensated a benchmark efficient entity for these risks as we observe broad BBB debt whereas we consider a benchmark efficient entity would issue BBB+ debt.

105 NEL, s. 7A(3); NGL s. 24(2)(b).

106 See NER cl. 6A.6.2(c). Instead of 'prescribed transmission services', the distribution rules refer to 'standard control services' and the NGR refers to 'reference services'. See NER, cl. 6.5.2(c), NGR r. 87(3).

107 NER clauses 6.5.2(b) and 6A.6.2(b); NGR clause 87(2).

4.3.1 Risk of providing energy network services

We have assessed the efficient financing costs of the service providers by using the prevailing market cost of capital (or WACC). We have expressed the view that this market data reveals the required compensation for an investment with a similar degree of risk as that which applies to a service provider in respect of the provision of standard control, prescribed transmission, or reference services.[108]

We have used market data for firms that are similar to the regulated service providers. This is done for a number of the parameters estimated, including (but not exhaustively) equity beta, gearing, credit rating and term of debt. Using data for firms that provide other services would likely have different levels of systematic risk and the estimated parameters would likely not be commensurate with those appropriate for the specific service provider.

4.3.2 Australian market

In past guideline processes, we generally have considered that the Australian market is the market within which a benchmark efficient entity for each service provider operates, and this is appropriate to make it properly comparable in degree of risk to the service providers. This recognises that the location of a business determines the conditions under which the business operates and these include the regulatory regime, tax laws, industry structure and broader economic environment. As most of these conditions will be different from those prevailing for overseas entities, the risk profile of overseas entities is likely to differ from those within Australia. Consequently, the returns required are also likely to differ. Hence, when estimating input parameters for the equity we have placed most reliance on Australian market data whilst using overseas data informatively.

4.3.3 Effect of regulation on systematic risk

All else being equal, we have concluded in past decisions that an entity providing unregulated services in a competitive market is likely to have a higher risk and more variable expected returns than a monopoly business such as the network service providers in the provision of regulated energy services.[109] This is because regulation:[110]

- mitigates monopolies from being able to extract monopoly rents, thereby constraining potential profits

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[108] See Partington, G., Satchell, S., *Report to the AER: Discussion of the allowed cost of debt*, 5 May 2016, p. 15. We note the cost of capital (from a firm's perspective) is also known as investors' required rate of return (from an investors' perspective).

[109] For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 24.

[110] For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 24.

- increases the certainty of the revenue stream, thereby reducing risk.

For clarity, regulation of the kind embodied in the national electricity and gas legislation reduces risks that are compensated through the rate of return (for example, demand risk). Regulation also reduces risks that would not be compensated through the rate of return (for example, by allowing cost pass throughs for non-systematic risks such as industry-specific tax changes or geographic-specific natural disasters). However, in our decisions we have only focused on risks that are compensated through the rate of return (compensable risks).

We have also expressed the view that incentive regulation affects compensable risks by allowing service providers to earn more stable cash flows with periodic resets of revenues to better reflect actual expenditure.[111] Further, we have concluded that most unregulated businesses do not have these same protections or restrictions, and so are likely to have a different systematic risk profile.[112] This is important when considering the allowed return, and the market information used to set the allowed return, that may reflect a similar degree of risk to the service provider in relation to the provision of its regulated services.[113] Frontier has also recognised the role of regulation in affecting risk in advising:[114]

> The form and nature of regulation applicable to Australian energy networks mitigates most of the business risks they face as compared to the business risks faced by other types of firms in the economy. Regulated revenues are set on a periodic basis and changes in volumes may only affect the timing of revenues (under a revenue cap). Even where revenues fall short of expectations due to lower volumes (as under a price cap), the lower volumes imply that costs would probably also have been lower than expected. Unanticipated or poorly-managed changes in costs are partly borne by customers and only partly by the network business through the building block form of incentive regulation that applies. Stranding and optimisation risks are minimal for energy networks, a complete contrast to businesses operating in other sectors.

Consumer Challenge Sub-Panel 3 (CCP3) also recognised this in highlighting the need to take into account the protections provided under the regulatory framework when

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111 For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 25.

112 For example see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 36–46; AER, *Better regulation explanatory statement rate of return guideline (appendices)*, December 2013, pp. 39–46; AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 25.

113 There is some discussion of this in AER, *Better regulation: Explanatory statement to the rate of return guideline*, December 2013, pp. 32–45, although that discussion needs to be read in light of recent litigation decisions.

114 Frontier Economics, *Assessing risk when determining the appropriate rate of return for regulated energy networks in Australia*, July 2013, p. 4.

making assessments about the degree of risk of an efficient network service provider. These included risk reductions arising from:[115]

- a revenue cap, which removes volume risk
- the indexation of the RAB, which protects the value of the underlying assets even when they might otherwise be written down in a commercial environment
- the progressive transition to a 10-year trailing average, including annual updating of the return on debt.

In previous decisions, we have expressed the view that network service providers are inherently less exposed to systematic risk and therefore have lower equity betas than if they were operating in a competitive market and therefore lower costs of equity. Also, given their lower risk cash flows, service providers might issue a higher proportion of debt than if they were operating in a competitive market. This reduces their cost of capital if debt is cheaper than equity. As a result, we have found that service providers face lower compensable risk than would otherwise be the case absent price regulation of energy network services. As such, they would have a lower cost of capital.[116]

We have previously determined that price regulation of energy network services reduces some systematic risks including:

- Demand risk: the revenue or price setting mechanism mitigates demand risk. Under a price cap, service providers may mitigate the risk of forecast error by restructuring tariffs, such that higher fixed charges are set to offset falls in demand. Under a revenue cap, where forecast quantity demanded differs from actual quantity demanded, service providers are made whole for any variation through price adjustments in subsequent years.
- Inflation risk: service providers of reference services face less inflation risk than unregulated businesses. The effect of inflation on investments is taken into account under the regulatory framework.
- Interest rate risk: Both providers of regulated services and firms operating in competitive markets are exposed to interest rate risk. The regulatory framework effectively moves risk of interest rate movements impacting financing costs onto customers. Service providers may further limit their exposure to this risk by raising capital during the averaging period/s that they know in advance.[117] To the extent they are unable to raise capital over the averaging period/s, they can still materially reduce their exposure to interest rate risk by hedging the base rate.

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[115] See CCP3, *Submission to the AER: An Overview — Response to AER Preliminary Decisions and revised proposals from Victorian electricity DNSPs for a revenue reset for the 2016-2020 regulatory period*, 22 February 2016, p. 31.

[116] For example, see: AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 25;

[117] Network service providers are able to propose future averaging periods for the returns on debt and equity as part of their regulatory proposal for the upcoming regulatory period.

Table 4 summarises a selection of provisions in the rules that we have considered likely to have the effect of mitigating various systematic and non-systematic risks. A version of this table has been set out in recent AER decisions on the allowed rate of return.[118]

Table 4: Key clauses in the rules that mitigate systematic risk

Rule	Effect on risk
50	The term of each access arrangement period is a fixed duration, and generally five years, in which a service provider is provided with a regulated return on its assets in respect to the provision of its reference services, certainty about reference tariffs and fixed terms of access for its services, supported by arbitration.
92	A reference tariff variation mechanism accounts for indexation and annual increases in efficient input costs. The reference tariff variation can be used to smooth the reference tariff from year to year to provide service providers with a stable level of revenue over each access arrangement period, reducing risks of short term revenue and pricing volatility.
97(5)	The prices service providers may charge for reference services are certain. Reference tariffs are not to vary during the course of an access arrangement period except as provided by a reference tariff variation mechanism.
76, 77, 78,87(1), 90	The AER's determination of reference tariffs incorporates a return on and of the service provider's asset base. The historical asset base rolls forward from one access arrangement period to the next and from year to year within each access arrangement period. The NGR provides for recovery of historical asset costs through depreciation, the earning of a return on the asset base, indexation and recovery of future efficient capex. This substantially lessens risks in capital investment that might otherwise apply to a business operating in a workably competitive market.
87	The AER sets the rate of return on the asset base by reference to the risks faced by the service provider. The AER updates this each access arrangement period to account for changed market conditions.
87A	Provision for tax in determining total revenue is required regardless of whether the service provider pays tax.
79, 91	The AER assesses expenditure requirements for each service provider by reference to the amount necessary to meet standards and objectives. These include the need to meet the expected demand for services and to meet safety and integrity standards and regulatory obligations or requirements. The AER does not assess expenditure by reference to the capacity of consumers to pay. This removes risks that could otherwise arise in providing a reliable and safe service. The AER reassesses the requirements of service providers for each access arrangement period to account for changes in market conditions and trends.
97 (1)(c)	Allows service providers to pass through certain costs to consumers in circumstances where this might not be possible in a workably competitive market. For instance, the pass through provisions provide for a pass through of costs that arise through regulatory changes.
80-86, and 103-104	Includes provisions for appropriate planning which allow for greater certainty to deal with changes in the commercial environment, including provisions for dealing with the funding of new projects during an access arrangement period, and the treatment of extensions and expansions and customer access queuing.
Parts 19-21	Provides for a statutory billing and settlements framework with prudential requirements (and other similar provisions) to minimise financial risk associated with providing and charging for

[118] For example, see: AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 26.

Rule	Effect on risk
	services. There is also provision for dealing with potential risks associated with retailer insolvency.
50	The term of each access arrangement period is a fixed duration, and generally five years, in which a service provider is provided with a regulated return on its assets in respect to the provision of its reference services, certainty about reference tariffs and fixed terms of access for its services, supported by arbitration.

Source: NGR, AER analysis.

4.4 Interrelationships

In determining the allowed rate of return, we must have regard to any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.[119] The 2013 Guideline described these interrelationships in detail where we have had regard to them in developing our approach.[120]

We have previously expressed the view that one should not view any component or relevant parameter adopted for estimating the rate of return in isolation.[121] In developing our approach and implementing it to derive the overall rate of return, we are cognisant of a number of interrelationships relating to the estimation of the return on equity and debt and underlying input parameters.

Importantly, the principles set out in this paper regarding the efficient compensation of risk through the allowed rate of return should be applied consistently in the estimation of all rate of return parameters. However, while agreed principles should be applied consistently, the availability of particular data may mean that the consistent application of these principles may result in different datasets being used for different parameters.

4.5 Similarity of compensation for risks

4.5.1 Risks for gas and electricity service providers

Past submissions to our decisions have stated that there are differences in the required compensation for risks between gas and electricity network service providers and between distribution and transmission service providers. Our earlier findings were that:[122]

119 NER, cl. 6.5.2(e); NER, cl. 6A.6.2(e); NGR r. 87(9).

120 For example, see: AER, *Better regulation explanatory statement rate of return guideline*, December 2013, pp. 15, 20, 158; AER, *Better regulation explanatory statement rate of return guideline (appendices)*, December 2013, pp. 12, 25–26, 51, 78, 166,

121 For example, see: AER, *Final decision APA VTS gas access arrangement 2018 to 2022 Attachment 3–Rate of return*, November 2017, p. 40.

122 AER, *Better regulation explanatory statement rate of return guideline (appendices)*, December 2013, pp. 36–38;

- Both gas and electricity service providers face limited competition risk by virtue of being regulated natural monopolies. Generally, competition risks for regulated networks are low. Such networks are usually regulated because they are natural monopolies.
- We consider the regulatory framework for gas and electricity service providers are similar. Differences in demand risk are mitigated by the regulatory regime through the revenue or price setting mechanism (form of control). While electricity transmission service providers are required to use a revenue cap, electricity distribution and gas service providers are able to propose the form of control they employ.[123] Under a revenue cap, where forecast quantity demanded differs from actual quantity demanded, in subsequent years price adjustments are made to enable the approved revenue to be received by the service provider. Under a price cap, service providers may mitigate the risk of forecast error by restructuring tariffs, such that higher fixed charges are set to offset demand volatility.
- To the extent that there are genuine risks of extreme changes in demand for specific service providers which present the potential for stranding of an asset, the regulatory regime for gas and electricity can mitigate this risk by providing prudent discount and accelerated depreciation provisions.[124]
- Our Australian empirical analysis is based on a comparator set which includes gas service providers. Therefore, if there are differences in the systematic risks of electricity and gas service providers, this may be captured in our Australian empirical estimates of equity beta.

4.5.2 Risks changing overtime

It is possible that the service providers' exposure to systematic risk varies over time. Measuring such changes, however, can be difficult.

We note though that some parameter estimates such as credit rating and the cost of debt have previously been estimated as forward looking and will include such changes in exposure to systematic risk. On the other hand, some parameter estimates such as equity beta and the market risk premium tend to rely materially on historical data and require a reasonable length of historical data to estimate. These parameters may be relatively slower to adjust to changes in exposure to systematic risk.

We welcome discussion on the estimation of time varying exposure to systematic risk.

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[123] See: NER, cl. 6A.4.2(a)(1); NER, cl. 6.2.5(b); NGR, r. 97(2).

[124] For prudent discounts, see NER, cl. 6A.26, NGR r. 96; for accelerated depreciation provisions see NER, cll. 6.5.5(b)(1), 6A.6.3(b)(1); NGR, r.89(1).

5 Questions

Criteria for exercising judgement

1. Are the assessment criteria created in the 2013 Guideline and used to assess the merits of the various sources of information in setting the allowed rate of return still appropriate (these are set out on page 6 of the current Guideline)?

Use of judgement and data

2. Do the current data sets remain appropriate and what are the strengths and weaknesses (mainly to be discussed in each topic)
3. Where does the balance between judgement and data lie, and how precisely can we seek to estimate rate of return parameters objectively, and in a way that can be replicated independently by any stakeholder, using market data?
4. Is the current foundation model approach to return on equity a sound approach to decision making under uncertainty?
5. Is there a feedback loop that starts with a given rate of return (which could be too high or too low) and perpetuates the same outcome due to a focus on market data to make decisions?
6. Is there better (or different) data to inform judgement? Can we use other data to better inform judgement (e.g. RIN or profitability data)?

Risk and compensation

7. What risk should be compensated through the allowed rate of return objective? Should only systematic risk be compensated in the allowed return on equity?
8. Is it likely the required compensation varies (materially) as between: gas and electricity networks; transmission and distribution segments; and price and revenue caps?
9. To what extent are emerging technologies and policy risks systematic? Should these risks be compensated through the allowed rate of return?
10. What impacts investor confidence and how might this impact the exercise of discretion?
11. How might compensable risk be measured (high level with detail on specific topics expected to be covered in specific topic discussions)?
12. How should any changing risk profile faced by networks be taken into account in the regulatory framework?
13. Under what circumstances should a binding Rate of Return Guideline be re-opened?

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