



SUBMISSION

**AER Draft Decision on Proposed Revisions to the
Access Arrangement for Jemena's New South Wales
Gas Distribution Network**

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TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	RULE 40 AND THE AER'S EXERCISE OF DISCRETION	2
3	SATISFYING THE REQUIREMENTS OF RULE 40(3).....	3
4	RULE 87(1) – NOT RULE 87(2) – SETS OUT THE PRIMARY CRITERIA.....	5
5	TAKING INTO ACCOUNT THE REVENUE AND PRICING PRINCIPLES	7
6	SUMMARY.....	11



1 INTRODUCTION

In August 2009, Jemena Gas Networks (NSW) Ltd (Jemena) submitted, for Australian Energy Regulator (AER) approval under the regulatory regime of the *National Gas Law* (NGL) and the *National Gas Rules* (NGR), proposed revisions to the Access Arrangement for the Jemena gas distribution network in New South Wales. A draft decision on the proposed revisions was issued by the AER in February 2010 (Draft Decision), and the AER invited interested parties to make submissions on the Draft Decision by 28 April 2010.

This submission is made by WA Gas Networks Pty Ltd (WA Gas Networks).

WA Gas Networks is the owner and operator of the gas distribution network in the south west of Western Australia, and has recently submitted proposed revisions to the access arrangement for that network to the Western Australian Economic Regulation Authority. WA Gas Networks submitted its revisions after Jemena had submitted its proposals, but before the AER had issued the Draft Decision.

The Draft Decision is not the first decision on proposed revisions to an access arrangement to be made under the regulatory regime of the NGL and the NGR. It is, however, the first decision under the new regime to examine, in some detail, the rules which govern the critically important issue of the rate of return to be used in determining total revenue and reference tariffs. The AER's views on the way in which the rate of return is to be determined under the NGL and the NGR may well influence its approach in subsequent decisions, and the approach taken by regulators in other jurisdictions. WA Gas Networks is concerned about certain aspects of those views, and sets out its concerns in this submission.

Four main issues are identified and discussed:

- Rule 40 and the AER's exercise of discretion;
- satisfying the requirements of Rule 40(3);
- Rule 87(1) – not Rule 87(2) – sets out the primary criteria for the rate of return; and
- taking into account the revenue and pricing principles.

A final section of the submission summarises WA Gas Networks' concerns.

2 RULE 40 AND THE AER'S EXERCISE OF DISCRETION

Jemena proposed that the Fama-French three factor model be used to estimate the cost of equity to be taken into account in establishing the rate of return to be used in determining the total revenue for its gas distribution network.

Jemena's proposal was rejected by the AER, and the AER required that the Sharpe-Lintner Capital Asset Pricing Model (CAPM) be used to estimate the cost of equity.

This withholding, by the AER, of approval of an element of an access arrangement proposal, and the replacement of that proposal with a preferred alternative, is permitted by Rule 40 of the NGR. It is permitted only if the NGL and the NGR do not limit the regulator's discretion.

Rule 87, which governs the setting of the rate of return, does not explicitly limit the AER's discretion: it is not a provision under which the AER has no discretion, or has only limited discretion. In these circumstances, the AER would seem to have full discretion, and may withhold its approval of Jemena's proposed use of the Fama-French three factor model, and replace it with the CAPM, as permitted by Rule 40(3).

In exercising its discretion, the AER cannot simply replace Jemena's view of how the cost of equity should be determined with its own view. The regulator's exercise of discretion is governed by the requirements of NGL and the NGR. In particular, Rule 40(3) allows the AER to substitute its own preferred alternative only if that alternative:

- complies with applicable requirements of the NGL and the NGR; and
- is consistent with applicable criteria (if any) prescribed by the NGL and the NGR.

Furthermore, when exercising discretion or approving or making those parts of an access arrangement relating to a reference tariff, the AER must, in accordance with section 28(2) of the NGL, take into account the revenue and pricing principles set out in section 24.

WA Gas Networks is concerned that the AER has not given consideration to the requirements of Rule 40(3) in reaching its decision to reject Jemena's proposed use of the Fama-French three factor model, and its requirement that the CAPM be used to determine the cost of equity.

The relevant requirements of section 24 of the NGL are discussed in section 5 of this submission.

3 SATISFYING THE REQUIREMENTS OF RULE 40(3)

Before the AER can replace Jemena's use of the Fama-French three factor model with the CAPM, the AER must show that use of the CAPM complies with applicable requirements of the NGL and the NGR, and must show that it is consistent with the applicable criteria of the NGL and the NGR.

In section 5.4.1 of the Draft Decision, the AER notes:

The NGR refer to the CAPM as an example of a 'well accepted financial model' of the type to be used to determine the rate of return on capital. As outlined in section 5.5.3 the AER considers that the CAPM is a well accepted model that takes into account the expected return of an individual entity and the level of systematic (i.e. non-diversifiable) risk faced by that entity in accordance with r. 87 of the NGR.

Section 5.5.3 sets out the AER's analysis and considerations. The AER notes that Rule 87 requires that regard must be had to the following factors when establishing the rate of return:

- well accepted - the standard CAPM is recognised as a well accepted financial model under the NGR, and is the only model accepted for use under the *National Electricity Law* and *National Electricity Rules*;
- prevailing conditions in the market for funds - the market is the Australian domestic equity market;
- benchmark levels of efficiency - the return on capital is a benchmark return, not the return on capital for the specific circumstances of the service provider and, as outlined in the AER's review of weighted average cost of capital parameters (the WACC review), the benchmark levels of efficiency are determined in relation to a notional benchmark service provider.

The AER also notes the role of Rule 74(2). The rate of return determined in accordance with the requirements of Rule 87 must be:

- arrived at on a reasonable basis - the model used must provide for a statistically valid model that can be estimated from available Australian data to produce a reliable empirical estimate and, as part of the assessment of whether a model provides an estimate on a reasonable basis, the theoretical underpinnings and conceptual basis for the model may need to be considered; and
- the best estimate or forecast possible in the circumstances - the model must produce a better forecast and estimate of the expected rate of return than alternative models or approaches in the circumstances.

Although section 5.5.3 of the Draft Decision notes some of the requirements of Rule 87, and of Rule 74(2), and makes reference to the CAPM, the focus of that section is the



Fama-French three factor model. The only applicable requirement of the NGL and the NGR to which the AER gives consideration in its decision to require that Jemena use the CAPM is the requirement of Rule 87(2) for a well accepted financial model.

This issue is considered further in the next section of this submission.

4 RULE 87(1) – NOT RULE 87(2) – SETS OUT THE PRIMARY CRITERIA

Criteria which the rate of return must satisfy – the primary requirements of Rule 87 – are set out in Rule 87(1). The rate of return on capital must be a rate which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.

In setting, as one of the primary criteria, the requirement that the rate of return be commensurate with prevailing conditions in the market for funds, Rule 87(1) imposes no limitation on that market. Contrary to the AER's assertion in section 5.5.3 of the Draft Decision, neither Rule 87(1), nor any other provision of the NGL or the NGR, limits the consideration of prevailing conditions in the market for funds to consideration of the Australian domestic equity market.

A rate of return which is commensurate with prevailing conditions in the market for funds and the risks involved in providing the reference services is not directly observable, and must be determined through a process of estimation and the exercise of judgement.

Rule 87(2) guides the process of estimation which is required to inform the setting of the rate of return. Rule 87(2) does not prescribe the way in which a rate of return which satisfies the criteria of Rule 87(1) is to be determined. That is clear from the drafting. Rule 87(2) recognises the existence of alternatives, and requires only "a well accepted approach, such as a weighted average cost of capital", and "a well accepted financial model, such as the Capital Asset Pricing Model".

Use of a well accepted approach, and of a well accepted financial model, require that judgements be made about a number of factors, and different judgements can be expected to lead to different results. Rule 87(2) therefore restricts, in two ways, the range of judgements which can be made in the process of estimation which is required to inform the setting of the rate of return. They must be the judgements which would be made about a service provider which achieves benchmark levels of efficiency, and meets benchmark standards as to gearing and other financial parameters.

Rule 87(2) requires a process of estimation, and Rule 74(2) further requires that any estimate made must be arrived at on a reasonable basis, and must be the best estimate possible in the circumstances.

Rule 87(2) does no more than provide guidance for the setting of the rate of return. Rule 87(2) does not eliminate the need to make the assessment required by Rule 87(1). It does not make Rule 87(1) redundant.



In the setting of the rate of return, a further and explicit process of reasoning is required to establish that rate as a rate which is:

- commensurate with prevailing conditions in the market for funds; and
- commensurate with the risks involved in providing reference services.

There is no indication in the Draft Decision that the AER has given consideration to the primary criteria of Rule 87(1) in its decision to withhold approval of Jemena's proposed use of the Fama-French model, and to require replacement of that model with the CAPM.

In reaching its decision, the AER has given consideration only the subsidiary requirement of Rule 87(2) for a well accepted financial model. It has required use of the CAPM for no other reason than Rule 87(2) deems that model to be a well accepted financial model.

The subsidiary requirement of Rule 87(2) for a well accepted financial model has also been foremost in the AER's rejection of the Fama-French three factor model.

The AER does not consider whether use of the Fama-French three factor model provides guidance in the setting of a rate of return which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.

Instead, it requires replacement of that model with the CAPM without explicit consideration of whether the CAPM leads to a better estimate or forecast, and without much consideration of whether the CAPM provides guidance in the setting of a rate of return which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services.

Were the AER to have given proper consideration to whether the CAPM leads to a better estimate or forecast, and to whether it provides guidance in the setting of a rate of return which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services, it may well have come to different conclusions.

5 TAKING INTO ACCOUNT THE REVENUE AND PRICING PRINCIPLES

In withholding its approval of Jemena's proposed use of the Fama-French three factor model, and requiring that the CAPM be used to estimate the cost of equity, the AER was exercising, in accordance with Rule 40(3), discretion which the regulator appears to have under Rule 87.

When exercising discretion or approving or making those parts of an access arrangement relating to a reference tariff, the AER must, in accordance with section 28(2) of the NGL, take into account the revenue and pricing principles set out in section 24.

Within section 24 of the NGL, section 24(5) has immediate relevance for the issue of the rate of return required by Rule 87. Rule 87(1) requires, among other things, that the rate of return be commensurate with the risks involved in providing reference services. Section 24(5) provides the meaning of this criterion. It states:

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

Although the risks with which the rate of return is to be commensurate are specified in general terms in Rule 87(1), section 24(5) makes clear that the relevant risks are the regulatory and commercial risks involved in providing specific reference services. They are the regulatory and commercial risks involved in providing the reference services for which reference tariffs are to be determined.

One substantial reason which the AER gives for its preference for the CAPM is that the model properly takes into account risk in accordance with Rule 87(1). In paragraph 5.4.1 of the Draft Decision, the AER advises that the CAPM:

takes into account the expected return of an individual entity and the level of systematic (i.e. non-diversifiable) risk faced by the entity in accordance with r. 87 of the NGR.

This may well be the case, but it is not a sufficient reason to prefer the CAPM to the Fama-French three factor model, and to then accept a weighted average cost of capital calculated using the cost of equity determined from the CAPM, as the rate of return required by Rule 87(1).

The risks captured by the CAPM, and by other asset pricing models including the Fama-French model, are a small number of broad macro-economic risks.

In the CAPM, the expected rate of return on an asset is determined by the contribution made by that asset to the overall portfolio risk of investors. Since, on the assumptions used to derive the CAPM, all investors hold the same portfolio of risky assets, the risk that matters is the contribution of the asset in question to the riskiness of the market portfolio. The variance or "riskiness" of the return on the asset – its "own risk" – does



not appear in the CAPM: the asset's "own risk" does not influence the expected rate of return. (This important insight into the nature of the relationship between risk and return – and not its superiority in estimating rates of return – is the reason why the CAPM is a well accepted financial model.)

The AER refers, in its Draft Decision, to "systematic risk". Systematic risk may be described, somewhat loosely, as the risk which is associated with the covariation of asset return with other economic variables. Equally loosely, idiosyncratic risk is, then "unsystematic risk", or risk which is independent of economic activity. Systematic risk is, from the perspective of the CAPM the only type of risk for which investors are compensated by market rates of return. Underlying the CAPM is a view that investors have no need to bear idiosyncratic risks. By holding well diversified portfolios, they can limit the risk which they bear to systematic risk. Rates of return do not, therefore, need to compensate investors for bearing idiosyncratic risks.

Multiple linear factor models, such as the Fama-French three factor model, extend the types of systematic risk for which investors are compensated via equilibrium rates of return in financial markets, but they do not explain equilibrium rates of return in terms of compensation for the bearing of idiosyncratic risks.

The CAPM and the multiple linear factor models explain expected rates of return in terms of a small number of systematic risks (just one in the case of the CAPM). The reason for this is the limited perspective of each of these models. In these models, the only risk that matters for asset pricing is investor consumption risk as measured by the covariance of asset return with investor expectations about consumption growth. (In the case of the CAPM, investor expectations about consumption growth can be viewed as being correlated with variation in the return on a portfolio of total wealth, and risk is then the contribution of a specific asset to the riskiness of the market portfolio.) This is because the underlying theoretical scheme of each of the models is limited to investors buying and selling financial assets. This scheme is that of a simple exchange economy. It does not incorporate production, technological change, government and the regulation of economic activity, and economic growth. Because they are derived by assuming a simple exchange economy, the CAPM and the multiple linear factor models – including the Fama-French three factor model – cannot provide a complete explanation of the determinants of rates of return. In particular, they cannot explain rates of return on equity in terms of economy-wide technological and regulatory risks. The effects of these risks are excluded by the choice of premises from which the models are derived.¹

¹ That technological and other risks may be important in the explanation of asset prices is indicated by the growing number of pricing models developed within a general equilibrium framework incorporating production as well as exchange and consumption. These models are relatively new and untested. See, for example, John H. Cochrane (1996), "A Cross-Sectional Test of an Investment-Based Asset Pricing Model", *Journal of Political Economy*, 104(3): 572-621; Urban J. Jermann (1998), "Asset pricing in production economies", *Journal of Monetary Economics* 41: 257-275; Joao F. Gomes, Leonid Kogan and Lu Zhang (2003), "Equilibrium Cross Section of Returns", *Journal of Political Economy*, 111(4): 693-732, Leonid Kogan (2004), "Asset prices and real investment", *Journal of Financial Economics*, 73: 411-431; and Joao F. Gomes, Leonid Kogan and Motohiro Yogo (2009), "Durability of Output and Expected Stock Returns", *Journal of Political Economy*, 117(5): 941-986.



Not only are the CAPM and the multiple linear factor models – including the Fama-French model – derived in such a way that risks – technological risks and regulatory risks – which are potentially important for any assessment of risks involved in delivering gas pipeline reference services are excluded. They are also derived in a way which removes the need for any examination of the role of idiosyncratic risks in explaining rates of return. Portfolio diversification is assumed to limit the risk which investors bear to systematic risk, and rates of return do not need to compensate them for bearing idiosyncratic risks.

This may not, however, be the case. That investors do not hold well diversified portfolios is well known.² A large percentage of the wealth of the typical household is held in the form of illiquid assets such as human capital, sole proprietorships, partnerships, equity in other closely held firms, deferred compensation, pension plans, superannuation funds, and residential real estate. Among institutional investors, an increasing amount of wealth is being allocated to illiquid assets such as private equity, emerging markets, venture capital, commercial real estate, and hedge fund investments.

Recent research has shown that when investors hold heterogeneous expectations about investment opportunities and expected returns, optimal portfolios will not be well diversified, and idiosyncratic factors are important in explaining asset prices.³

The research referred to in the preceding paragraph – research which is showing that optimal portfolios will not be fully diversified, and that idiosyncratic factors are important in explaining asset prices – is being carried out within a conceptual framework in which investors maximise expected utility subject to constraints on investment and consumption opportunities including constraints on wealth and on the availability of information.⁴ It is being carried out within the "rational actor" framework of standard microeconomic theory in which individual behaviour is described in terms of utility maximisation. This was the framework within which the CAPM and multiple linear factor models were developed.⁵

Periodically, concern has been expressed over the naivety of the psychological foundations of the rational actor framework and, more specifically, over the presumption of expected utility maximization. During the 1980s, these concerns, and the fact that

² See, for example, John Y Campbell, Martin Lettau, Burton G Malkiel and Yexiao Xu (2001), "Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk", *Journal of Finance*, 56(1): 1-43.

³ The models are relatively new and untested, but are indicative of a growing icing with Heterogeneous Consumers", *Journal of Political Economy* 104(2): 219-240; John Y. Campbell, Martin Lettau, Burton G. Malkiel and Yexiao Xu (2001), "Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk", *Journal of Finance*, 54(1): 1-43; Alon Brav, George M. Constantinides, Christopher C. Geczy (2002), "Asset Pricing with Heterogeneous Consumers and Limited Participation: Empirical Evidence", *Journal of Political Economy*, 110(4): 793-824; Fangjian Fu (2009), "Idiosyncratic Risk and the cross-section of expected stock returns", *Journal of Financial Economics*, 91: 24-37; Francis A. Longstaff (2009), "Portfolio Claustrophobia: Asset Pricing in Markets with Illiquid Assets", *American Economic Review*, 99(4): 1119-1144.

⁴ On the issues with expected utility maximisation, see Mark Machina (1987), "Choice Under Uncertainty: Problems Solved and Unsolved", *Journal of Economic Perspectives*, 1(1): 121-154.

⁵ A brief history of behavioural finance and a review of the earlier literature are provided by Robert J Shiller (2003), "From Efficient Markets Theory to Behavioral Finance", *Journal of Economic Perspectives*, 17(1): 83-104.



rational actor models did not seem to provide adequate descriptions of financial markets, drove the emergence of a new conceptual framework – behavioural finance – based on more realistic psychological foundations supported by experimental and empirical analysis.

The research which has been undertaken within the behavioural finance paradigm provides further reasons to expect that the CAPM does not provide a complete view of risk as it affects expected rates of return on financial assets. Estimates of the cost of equity made using this model cannot, therefore, be commensurate with the risks involved in providing reference services. The Fama-French three factor model incorporates a broader characterization of risk than is incorporated in the CAPM, but may not account for all of the possible risks in its explanation of asset prices.

Rule 87(2) provides guidance for the setting of the rate of return. It does not – and cannot – prescribe a formula for setting the rate of return required by Rule 87(1). One reason why it does not, and cannot, prescribe a formula is that financial models which it contemplates do not provide a complete characterisation of the risks involved in providing reference services. Those risks are not limited to the systematic risks identified by the models in question. As section 24(5) of the NGL makes clear, the relevant risks are the regulatory and commercial risks involved in providing the reference services for which reference tariffs are to be determined.

Any assessment of these risks requires more than the mechanical application of a formula such as that provided in (but not prescribed by) Rule 87(2). This is the case even though the application of that formula may provide guidance on some risks, and on the implied rate of return. Rule 87(1) requires that this assessment be made.

It is not an assessment which the AER appears to have made, either in deciding to withhold its approval of Jemena's proposed use of the Fama-French three factor model, or in requiring that the CAPM be used to estimate the cost of equity.

6 SUMMARY

The AER's views on the way in which the rate of return is to be determined under the NGL and the NGR may well influence its approach in subsequent decisions, and the approach taken by regulators in other jurisdictions. WA Gas Networks is concerned about certain aspects of those views.

WA Gas Networks is concerned that the AER has not given consideration to the requirements of Rule 40(3) in reaching its decision to reject Jemena's proposed use of the Fama-French three factor model, and its requirement that the CAPM be used to determine the cost of equity.

Although section 5.5.3 of the Draft Decision notes some of the requirements of Rule 87, and of Rule 74(2), and makes reference to the CAPM, the focus of that section is the Fama-French three factor model. The only applicable requirement of the NGL and the NGR to which the AER gives consideration in its decision to require that Jemena use the CAPM is the requirement of Rule 87(2) for a well accepted financial model.

There is no indication in the Draft Decision that the AER has given consideration to the primary criteria of Rule 87(1) in its decision to withhold approval of Jemena's proposed use of the Fama-French model, and to require replacement of that model with the CAPM.

In reaching its decision, the AER has given consideration only the subsidiary requirement of Rule 87(2) for a well accepted financial model. It has required use of the CAPM for no other reason than Rule 87(2) deems that model to be a well accepted financial model.

Rule 87(2) provides guidance for the setting of the rate of return. It does not make Rule 87(1) redundant. It does not prescribe a formula for setting the rate of return required by Rule 87(1). One reason why it does not prescribe a formula is that financial models which it contemplates do not provide a complete characterisation of the risks involved in providing reference services. Those risks are not limited to the systematic risks identified by the models in question. As section 24(5) of the NGL makes clear, the relevant risks are the regulatory and commercial risks involved in providing the reference services for which reference tariffs are to be determined.

Any assessment of these risks requires more than the mechanical application of a formula such as that provided in (but not prescribed by) Rule 87(2). Rule 87(1) requires that this assessment be made.

The AER does not appear to have made the assessment of risk required by Rule 87(1), either in deciding to withhold its approval of Jemena's proposed use of the Fama-French three factor model, or in requiring that the CAPM be used to estimate the cost of equity.