Australian Competition and Consumer Commission

Supplementary Submission to the Productivity Commission Review of the Gas Access Regime

24 November 2003

CONTENTS

Abbreviations

ACCC	Australian Competition and Consumer Commission
ACG	Allens Consulting Group
CAPM	Capital Asset Pricing Model
Code	*National Third Party Access Code for Natural Gas Pipeline Systems*
CPI	Consumer Price Index
GJ	gigajoule
ICB	Initial Capital Base
MRP	Market Risk Premium
NECG	Network Economics Consulting Group
NERA	National Economic Research Associates
Parer Review	COAG Energy Market Review
Part IIIA	Part IIIA (Access to Services) of the *Trade Practices Act 1974* (Cth)
PC	Productivity Commission
TPA	*Trade Practices Act 1974* (Cth)
Tribunal	Australian Competition Tribunal
UK	United Kingdom
US	United States of America
WACC	Weighted Average Cost of Capital

Summary

International comparisons of regulatory WACC determinations

In September 2003, Network Economics Consulting Group (NECG) provided a submission to the Productivity Commission that set out the results of an international comparison of WACC decisions by Australian and overseas regulators. The NECG study is one of a number of such reviews produced in recent years, with other comparisons prepared by National Economic Research Associates (NERA) and Pareto Associates.

NECG methodology

The NECG study is a comparison of international regulatory decisions to assess whether ex ante returns received by Australian infrastructure companies are comparable with regulated infrastructure overseas.

The sample in this comparison is taken from Australia, US, UK, Canada, France, Ireland, the Netherlands and New Zealand and includes gas, electricity, water, telecommunication, rail and airport sectors.

The variables compared in the NECG analysis were the vanilla WACC margin and the asset beta. NECG stated:

> Our analysis has focused on two key components of a regulatory decision: the margin of the vanilla WACC over the risk free rate and the asset beta provided. [1]

Prior to comparing regulator decisions, NECG undertook a number of adjustments to the raw data. The core adjustment made was a reduction to the market risk premium (MRP) of countries other than Australia, based on NECG's assertion that the MRP varies between countries and is likely to be higher in Australia than in overseas countries. However, in the absence of sound empirical data to provide guidance on the extent to which the MRP might vary across countries, NECG has adopted an arbitrary 'first principles' approach to determining the magnitude of the necessary adjustment. On the basis of NECG's assumptions about possible variations in the MRP between countries, the returns applied by non Australian regulators have been artificially inflated.

By comparing the margin of the vanilla WACC over the risk free rate, rather than comparing the vanilla WACC itself, NECG also implicitly adjusted the total return adopted by regulators for differences in prevailing risk free rates between countries.

In considering the extent to which the MRP might vary between countries, the NECG analysis discusses issues relevant to the debate on segregated or integrated world financial markets and uncovered interest rate parity. NECG does not explicitly state its views on the extent of integration of world financial markets, but comments within the report suggest that NECG considers financial markets to be more integrated than

[1] NECG (September 2003), *International comparison of WACC decisions, Submission to the Productivity Commission Review of the Gas Access Regime,* Submission 56, p. 5.

segregated. The NECG analysis fails to recognise that if world financial markets are perfectly integrated then the MRP does not vary across countries, rather the correct MRP to apply is a single world financial market MRP.

In the context of substantially integrated world financial markets, there is considerable doubt about the key comparator employed by NECG. Where financial markets are largely integrated it is the total return that is relevant rather than the margin above the risk free rate. In this context, the NERA methodology which compares total returns is a more appropriate approach than the NECG study.

In addition to the MRP adjustment NECG has also made adjustments to:

- account for differences in the term of the risk free rate assumed by the relevant regulator and a 10 year bond rate;
- debt beta depending on the financial model used;
- real post- or pre-tax returns; and
- rounding off.

Comparing international regulatory decisions

The results of international comparisons need to be applied with caution owing to the difficulty in accommodating the many country specific factors that interact to affect the comparability of regulatory decisions.

Owing to the absence of information on appropriate parameters from the Australian capital market, Australian regulators in the past have given some weight to international comparisons of regulator decisions as an approximate indicator of the appropriate order of magnitude for required returns and some individual parameters. However, the ACCC is currently placing an increasing emphasis on direct observation of market parameters as the information base expands. Such an approach is consistent with greater objectivity and independence of regulation.

The ACCC is aware that additional research drawing on direct market observations has been undertaken recently by ACG and incorporated in BHP Billiton's submission to the review of the gas access regime.[2] The research compares the market value of regulated Australian utilities to their regulatory asset value. A ratio of one implies that investors believe that the earning potential of the asset equates to the risk adjusted return required to hold the asset. Rather than finding a ratio of one or less (which would have implied that regulators had failed to fully compensate investors), ACG found the current ratio of market to regulatory values to be in the range of 1.4 to 1.6.[3] On this basis, ACG has concluded that:

> The conclusion reached is that no empirical support can be found for the view that the stance of regulators provides a threat to new investment in these activities, that regulators are 'too ambitious' when setting regulated charges, or that regulators consistently adopt forecasts that are biased towards the interests of the customers. Indeed, the more plausible conclusion that can be drawn from this analysis, is that the regulators systematically err in favour of providing

[2] BHP Billiton (September 2003), *BHP Billiton Initial Submission to the Productivity Commission Review of National of Gas Code*, Submission 26.

[3] The Allen Consulting Group (2003), *Review of the Gas Code: Commentary on Economic Issues, report to BHP Billiton*, August, p. 58.

> regulated entities with a return that exceeds the cost of capital associated with the regulated activities.[4]

Importantly, the results of the ACG study have the benefit of reflecting direct market evidence, rather than just the views of other regulators. The results also have the benefit of reflecting evidence from the Australian capital market, rather than information from overseas.

The results set out in the ACG study are supported by the findings of Moody's Investors Service on the regulatory regime in Australia compared to the UK.

> Differences in regulatory philosophy between Australia and the UK mean that Moody's on average rates Australian gas and electricity transmission and distribution (T&D) companies one notch above those of their UK peers, even though both parties may have approximately the same level of debt coverage measures. …
>
> Moody's believes Australian regulators have shown a willingness to let T&D companies earn returns in excess of WACC. …[5]

Such results are clearly contrary to the conclusions and implied findings of the NECG analysis and support the reservations over NECG's methodology raised in this submission.

Investment outcomes

On the basis of its assessment, NECG concluded that regulatory returns in Australia have not been generous in international terms. NECG also speculated that regulatory returns overseas were not high enough to generate adequate investment levels which NECG linked to recent blackouts and other infrastructure failures. NECG then implied that the regulatory environment in Australia is not conducive to adequate levels of investment. However, NECG's conclusions are not supported by the analysis in its report.

The effectiveness of the regulatory regime with respect to investment can be assessed more directly and reliably by examining the level of investment occurring in the industry and by exploring whether there are any shortcomings in investment activity.

In the context of the gas sector, the weight of evidence indicates that investment has been at historically high levels since the introduction of the Code. Investment measured in terms of capital expenditure and length of pipelines commissioned has accelerated substantially. There is no evidence that efficient investment in the transmission sector has been deterred following the introduction of the Code. Rather, there is evidence that the Code has facilitated investment.[6]

Consequently, in view of current investment levels and the conclusions of the ACG study it would be fair to conclude that the current regulatory environment is conducive

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4 The Allen Consulting Group (2003), *Review of the Gas Code: Commentary on Economic Issues, report to BHP Billiton*, August, p. 5.

5 Moody's Investors Service (August 2003), *Regulatory Differences Justify Higher Rating For Australian Gas And Electricity T&D Companies Over UK Counterparts*, pp. 3-4.

6 For a more detailed discussion of this issue see the ACCC's first submission to the Productivity Commission's inquiry into the gas access regime of 15 September 2003.

to efficient and effective investment going into the future. Further, there is no reason to believe that the returns permitted by Australian regulators will lead to infrastructure failure. On this basis there is no reason for adjusting the current framework for determining the cost of capital as suggested by NECG.

Methodological issues

The methodology applied by NECG is subject to a number of questionable assumptions that lead to concerns about the validity of the results presented. In particular, the NECG results may overstate the comparable level of return provided in overseas regulatory decisions.

Some of the key deficiencies identified in the NECG methodology include:

- The study is selective owing to the narrow scope of variables examined. Further, those factors that are examined are not necessarily comparable. For example:
  - — The incentive nature of Australian utility regulation which provides opportunities for regulated entities to outperform the benchmark approved by the regulator is not acknowledged.
  - — US regulation of gas transmission entities is based on the capacity of the pipeline rather than forecast volumes as employed in Australia. This significant concession means that market risk for US entities is greater than that faced by Australian entities. This is at odds with NECG's assertion that market risk is higher in Australia.
- An important omission is a discussion of the difficulties of taking a required return in one country and using it to draw inferences about the required return in another, given the less than fully integrated nature of world capital markets. At the centre of the NECG comparison methodology is that investors' required returns would rise one-for-one with the level of local interest rates (which is implicit in NECG's benchmarking of the risk margin rather than the total return). However, while such a proposition may be valid in a perfectly integrated capital market, the empirical evidence on the actual behaviour of capital markets rejects such a proposition. Rather, given the difficulties of economic theory to explain interest rate differentials between countries, it is probably more accurate to compare total returns across countries – which is what was undertaken in the NERA (2001) study.
- There is a lack of empirical evidence to support NECG's arbitrary 'first principles' assumptions adopted to adjust market risk premiums.
- There is inadequate consideration of whether the observed higher total regulated returns in the US and Canada are a function of the decline in interest rates over the study period owing to the practice of regulators in those countries to adjust interest rates with a lag.
- The study employs an unsupported assumption that investors require higher returns in countries that have higher domestic interest rates.

The NECG results for gas

Despite the serious concerns over the NECG methodology, the results in respect of gas transmission and distribution show that returns permitted by Australian regulators are broadly consistent with returns permitted in overseas jurisdictions.

- The average implied asset beta employed in Australia exceeds those in all other jurisdictions except the US.

- The unadjusted returns provided in Australia exceed those provided in the UK and Ireland by a small but significant margin.
- The risk premia assumed by Australian and Canadian regulators have been very similar for both transmission and distribution systems on average. Note, however, that the risk premia assumed by Canadian distribution regulators have varied substantially – presumably as the risk free rate used by NECG has varied (the lack of information provided in the NECG report makes this difficult to assess).
- The risk premia assumed by US regulators have exceeded that assumed by Australian regulators when averaged across the decisions reported. However, the US risk premia have also varied across a substantial range, which appears to reflect the timing of the observation – in the case of distribution, between 2.88 per cent (November 1999) and 5.63 per cent (May 2003).

An analysis of domestic investment incentives and regulatory returns should be based, to the extent possible, on observable data. Perhaps not surprisingly given the questionable assumptions made, NECG's conclusions are contrary to such evidence. The observable evidence indicates that regulatory returns in Australia are well in excess of those sought by investors. Further, investment in gas infrastructure since the introduction of the Gas Code substantially exceeds previous levels of investment.

Conclusion on the NECG report

The crux of the debate is ultimately whether the regulatory approach is conducive to efficient and adequate investment. For this to occur, the regulatory environment must provide rewards to investors that are sufficient to compensate them for the risk inherent in the asset. There is no evidence that returns provided by Australian gas regulators are a disincentive to efficient investment going into the future. Rather, there is credible evidence to suggest that regulatory returns in Australia are actually higher than those required by investors. On this basis there is no reason for adjusting the current framework for determining the cost of capital as suggested by NECG.

International comparisons of WACC decisions

1.1 Background

In September 2003, Network Economics Consulting Group (NECG) provided a submission to the Productivity Commission that set out the results of an international comparison of WACC decisions by Australian and overseas regulators.[7] Previously, in March 2001 National Economic Research Associates (NERA) published a similar comparison of international regulatory decisions.[8] A third such comparison was provided to the ACCC in the context of its GasNet decision by Pareto Associates for BHP Billition in June 2002.[9] This submission provides general comments in respect of international comparisons followed by some specific comments on the NECG study.

NECG methodology

The NECG study has undertaken an international comparison of regulator decisions to assess whether ex ante returns received by Australian infrastructure companies are comparable with regulated infrastructure overseas.

The sample in this comparison is taken from Australia, US, UK, Canada, France, Ireland, the Netherlands and New Zealand and includes gas, electricity, water, telecommunication, rail and airport sectors.

The variables compared in the NECG analysis were the vanilla WACC margin over the risk free rate and the asset beta. NECG stated:

> Our analysis has focused on two key components of a regulatory decision: the margin of the vanilla WACC over the risk free rate and the asset beta provided. [10]

Prior to comparing regulator decisions, NECG undertook a number of adjustments to the raw data. The core adjustment made was a reduction to the market risk premium (MRP) of countries other than Australia, based on NECG's assertion that the MRP varies between countries and is likely to be higher in Australia than in overseas countries. However, in the absence of sound empirical data to provide guidance on the extent to which the MRP might vary across countries, NECG has adopted an arbitrary 'first principles' approach to determining the magnitude of the necessary adjustment. On the basis of NECG's assumptions about possible variations in the MRP between countries, the returns applied by non Australian regulators have been artificially inflated.

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7 NECG (September 2003), *International comparison of WACC decisions, Submission to the Productivity Commission Review of the Gas Access Regime*, Submission 56.

8 NERA, *International Comparison of Utilities' Regulated Post Tax Rates of Return in: North America, the UK and Australia*, Report to the ACCC.

9 Pareto Associates (June 2002), *The weighted average cost of capital for gas transmission services: benchmarking regulated Australian and UK vanilla WACC components*, Comment on WACC proposals by GasNet Australia, For BHP Billiton.

10 NECG Submission (September 2003), p. 5.

In considering the extent to which the MRP might vary between countries, NECG discusses issues relevant to the debate on segregated or integrated world financial markets and uncovered interest rate parity. NECG does not explicitly state its views on the extent of integration of world financial markets, but comments within the report suggest that NECG considers financial markets to be more integrated than segregated. The NECG analysis fails to recognise that if world financial markets are perfectly integrated then the MRP does not vary across countries, rather the correct MRP to apply is a single world financial market MRP.

In the context of substantially integrated world financial markets, there is considerable doubt about the key comparator employed by NECG. Where financial markets are largely integrated it is the total return that is relevant rather than the margin above the risk free rate. In this context, the NERA methodology which compares total returns is a more appropriate approach than the NECG study.

Furthermore, by comparing the margin of the vanilla WACC over the risk free rate, rather than comparing the vanilla WACC itself, NECG also implicitly adjusted the total return adopted by regulators for differences in prevailing risk free rates between countries.

In addition to the MRP adjustment NECG has also made adjustments to:

- the vanilla WACC margin to make it consistent with the margin over the 10 year bond rate in situations where regulators adopted a bond of a different maturity as the risk free rate;
- debt beta depending on the financial model used;
- deduct the component considered to reflect the allowance for taxation where a pre-tax WACC had been used; and
- to account for regulators' decisions to round-off their WACC estimates.

Comparing international regulatory decisions

Where markets are not contestable, regulation is applied to remove monopoly rents which would otherwise usually be eroded over time through the process of competition. In undertaking this task regulators are faced with the following question:

> What level of return should be permitted so that the market place will provide the regulated business with sufficient capital to efficiently operate its business and to undertake efficient investment?

If the permitted level of return is inadequate then the regulated business will be unable to meet the legitimate costs of running its business and may face financial distress. Alternatively, if the permitted level of return is excessive then the regulated entity may accrue monopoly profits or sustain inefficient operating practices, which would in turn deter efficient investment in upstream and downstream industries.[11]

[11] It would also be incorrect to assume that a monopoly service provider would invest efficiently.

For many years there has been significant discussion regarding the appropriateness of regulatory decisions. Owing to the absence of market information on appropriate parameters, regulators have been required to exercise judgement in determining regulatory settings and commentators have experienced difficulty in objectively assessing regulatory decisions.

In this environment some weight has been placed on international comparisons of regulatory decisions in the past. The results of the NERA survey provided information on allowed post tax regulatory rates of return for gas and electricity transmission and distribution businesses in North America and the UK. These results have been reviewed as part of the ACCC's decision making processes on various proposed access arrangements. Similarly, the Pareto report published in June 2002 was reviewed by the ACCC in making its GasNet decision in November 2002 and in making its final decision on the MSP in October 2003. The NECG study has now provided additional information for consideration in the context of the review of the gas access regime.

While comparisons of international regulatory decisions provide some information on the merits of regulated outcomes, the results of such comparisons need to be interpreted with caution.

First, comparisons of regulator decisions do not directly measure the parameters of interest. That is, the comparison is of other regulators' estimates of the costs of capital rather than a direct observation or estimate of market requirements. In addition, regulated entities' expected returns may depart from the regulators' declared or target returns – for example, due to conservatism in the setting of expenditure forecasts.

To the extent that it is possible to directly observe the requirements of capital markets, such observations are superior to an observation of regulatory determinations.

Second, it is difficult to generate a table of international regulatory parameters that are compatible. There are many factors that interact to affect the incidence of regulatory decisions and regulators frequently apply different methodologies. In addition, regulators tend to present their results in different formats which require adjustment in order to be comparable with other regulatory decisions, even within a country.

Third, the comparison of required returns across countries raises complex issues about the relevance of those returns for Australia and the adjustments required to make them relevant, particularly in light of the less than full integration of international capital markets.

In a previous publication, NECG has articulated its views on the complexity of international comparisons as follows:

> We emphasise that very simplistic comparisons across industries and across countries are unlikely to be particularly informative or helpful, unless the full range of explanatory variables are given careful consideration and adjustments made accordingly. As such, any move to effectively benchmark the returns that Australian regulators set for Australian companies against international comparisons of this kind are dangerous. The NERA analysis does not, and

> cannot, offer any justification for moving away from detailed and rigorous analysis of the individual cost of capital parameters in future access price reviews.[12]

In view of these difficulties, where possible, the ACCC relies on direct market evidence from the Australian capital markets to inform its decision making processes. This approach is becoming more practical as data are collected over time. For example, when the access arrangement for the GasNet system was first assessed in 1998, there was little relevant market data available to assist the ACCC in determining equity betas for regulated businesses in Australia. In the second assessment of the GasNet system in 2002, the ACCC was able to draw on a range of empirical data to assist its decision making in respect of WACC parameters.

In the ACCC's final decision for the MSP in October 2003, the ACCC was able to draw on empirical estimates of equity betas prepared by the Allen Consulting Group (ACG) and the Australian Graduate School of Management Risk Measurement Service (AGSM) to support its decision making process.

The ACCC is aware that additional research drawing on direct market observations has been undertaken recently by ACG and incorporated in BHP Billiton's submission to the review of the gas access regime.[13] The research compares the market value of regulated Australian utilities to their regulatory asset value. A ratio of one implies that investors believe that the earning potential of the asset equates to the risk adjusted return required to hold the asset. Rather than finding a ratio of one or less (which would have implied that regulators had failed to fully compensate investors), ACG found the current ratio of market to regulatory values to be in the range of 1.4 to 1.6.[14] On this basis, ACG has concluded that:

> The conclusion reached is that no empirical support can be found for the view that the stance of regulators provides a threat to new investment in these activities, that regulators are 'too ambitious' when setting regulated charges, or that regulators consistently adopt forecasts that are biased towards the interests of the customers. Indeed, the more plausible conclusion that can be drawn from this analysis, is that the regulators systematically err in favour of providing regulated entities with a return that exceeds the cost of capital associated with the regulated activities.[15]

Importantly, the results of the ACG study reflect direct market evidence, rather than the views of other regulators, and evidence from the Australian capital market rather than information from overseas. Moreover, the results presented in the ACG study are supported by the findings of Moody's Investors Service on the regulatory regime in Australia compared to the UK.

> Differences in regulatory philosophy between Australia and the UK mean that Moody's on average rates Australian gas and electricity transmission and distribution (T&D) companies

12 NECG (18 July 2001), *International comparisons of rates of return, comment on NERA report*, p. 2.
13 BHP Billiton (September 2003), *BHP Billiton Initial Submission to the Productivity Commission Review of National of Gas Code*, Submission 26.
14 The Allen Consulting Group (2003), *Review of the Gas Code: Commentary on Economic Issues, report to BHP Billiton*, August, p. 58.
15 The Allen Consulting Group (2003), *Review of the Gas Code: Commentary on Economic Issues, report to BHP Billiton*, August, p. 5.

> one notch above those of their UK peers, even though both parties may have approximately the same level of debt coverage measures. …
>
> Moody's believes Australian regulators have shown a willingness to let T&D companies earn returns in excess of WACC. …[16]

Such results are clearly contrary to the conclusions and implied findings of the NECG analysis and support the reservations over NECG's methodology raised in this submission.

Investment outcomes

On the basis of its assessment, NECG concluded that regulatory returns in Australia have not been generous in international terms. NECG also speculated that regulatory returns overseas were not high enough to generate adequate investment levels which NECG linked to recent blackouts and other infrastructure failures. NECG then implied that the regulatory environment in Australia is not conducive to adequate levels of investment.

The effectiveness of the regulatory regime in this area to date can be assessed by examining the level of investment occurring in the industry and by exploring whether there are any shortcomings in investment activity.

In the context of the gas sector, the weight of evidence indicates that investment has been at historically high levels since the introduction of the Code. Investment measured in terms of capital expenditure and length of pipelines commissioned has accelerated substantially. There is no evidence that efficient investment in the transmission sector has been deterred following the introduction of the Code. Rather, there is evidence that the Code has facilitated investment.[17]

Consequently, in view of current investment levels and the conclusions of the ACG study it would be fair to conclude that the current regulatory environment is conducive to efficient and effective investment going into the future. Further, there is no reason to believe that the returns permitted by Australian regulators will lead to infrastructure failure.

1.2 Methodological issues

General comments

The methodology applied by NECG is subject to a number of questionable assumptions that have led to concerns about the validity of the results presented. In particular, the NECG results may overstate the comparable level of return provided in overseas regulatory decisions.

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[16] Moody's Investors Service (August 2003), *Regulatory Differences Justify Higher Rating For Australian Gas And Electricity T&D Companies Over UK Counterparts*, pp. 1, 3.

[17] For a more detailed discussion of this issue see the ACCC's first submission to the Productivity Commission's inquiry into the gas access regime of 15 September 2003.

As a general comment, it has been difficult to assess important elements of the NECG analysis as the report does not provide sufficient detail to permit independent review of the methodology. In many cases, assumptions and adjustments have not been clearly documented and study data are not clearly referenced.

For example, the NECG report provided only the 'risk margin' over 10 year bond rates the relevant regulator assumed for most of the decisions reported. Thus, NECG did not disclose the total 'vanilla' return for most of the decisions, nor the breakdown of that return into the assumed costs of equity and debt and gearing assumptions, nor any further breakdown into inputs behind those returns (such as the risk free rate). Consequently, the following commentary is limited to the few broad aspects identified by NECG in its submission.

Compatibility of results

As identified by NECG, there are many factors that need to be accommodated when undertaking an international comparison so that observed results can be compared on a compatible basis. Some of the factors that need to be accounted for in the comparison are outlined in the following passages from the NECG report:

> There are a number of key methodological issues that need to be considered in any comparison. In particular these include consideration of the estimation model used to estimate the WACC, and the approach to the risk free rate, market risk premium and beta. It is critically important that WACC allowances are considered in relation to the regulatory environment in which the regulated business operates. This requires that factors such as the treatment of asset valuation, the ability of the firm to earn more than the WACC, the certainty in the approach taken to WACC, and the impact of WACC allowances be considered in addition to other factors that expose investors to regulatory risk.[18]

> It is critically important that WACC allowances are considered in relation to the regulatory environment in which the regulated business operates. Therefore, empirical results drawn in this paper must be seen in relation to the regulatory risk to which the business is exposed. This requires factors to be considered such as the treatment of asset valuation, the ability of the firm to earn more than the WACC, the certainty in approach taken to the WACC, and the impact of WACC allowances, in addition to other factors that expose investors to regulatory risk.[19]

In addition to these factors identified by NECG, it is also important to examine the treatment of tax in each jurisdiction, the level of gearing and differences in incentive approaches in order to understand its potential impact on regulatory decisions.

Despite recognising the importance of a wide range of factors, NECG has undertaken a narrow analysis that does not adequately accommodate the identified factors as indicated by the following:

> Our analysis has focused on two key components of a regulatory decision: the margin of the vanilla WACC over the risk free rate and the asset beta provided. These variables have been considered after normalising for: the effect of different bond maturities in the risk free rate; the approach to the debt beta; the specification of the initial decision (whether in nominal or real

[18] NECG (September 2003), p. 5.
[19] NECG (September 2003), p. 8.

terms and post-or pre-tax); and for the fact that the CAPM is not the prime model used to determine the WACC in the US and Canada. We have also considered the impact of adjusting the results to reflect different market risk across countries.[20]

Incentive regulation

Australian gas transmission regulation provides incentives for regulated entities to outperform the benchmark approved by the regulator by growing the market or operating the asset more efficiently. If the regulated entity is able to outperform the benchmark, then the entity is permitted to retain the higher earnings. This is in contrast to the situation in some overseas jurisdictions (especially the US) where regulation is applied which more tightly caps upside returns to the regulated entity. NECG has failed to account for the positive benefits provided through incentive gas regulation in Australia.

Volume risk

In Australia, gas regulation is based on the concept of a reference tariff rather than an allowed rate of return, so the regulated entity has the opportunity to earn higher returns if actual volumes exceed forecast volumes. The ACCC regulates gas transmission entities on the basis of forecast volumes rather than the capacity of the pipeline as is the case in the US. This shifts some volume risk from pipelines to users reducing the level of risk compensation required by Australian investors. This significant concession has not been accommodated in the NECG analysis.

The state of integration of world financial markets

A central concept that is not explicitly addressed by the NECG study is the level of integration that exists in world financial markets. The view that is held about the level of integration has critical implications for elements of the NECG analysis.

There are two alternative polar possibilities for the relevance of the rest of the world for Australian asset prices (and hence required returns):

- First, that capital markets are segregated between nations (that is, Australian asset prices are set by investors who make decisions with reference to a portfolio of only Australian assets). The implication of complete segregation is that returns available to investors from assets overseas would be irrelevant to the returns required by investors within Australia.
- Second, that capital markets are perfectly integrated between nations (that is, Australian asset prices are set by investors who make decisions with reference to a globally diversified portfolio of assets). The implication of perfect integration is that it is the demand and supply of investment funds globally that sets the price (and required return) of all assets.

Neither of these extremes is likely to accurately describe the current environment.[21] While there are substantial cross border capital flows and foreign investment in

[20] NECG (September 2003), p. 5.

[21] A discussion of the level of integration of world financial markets can be found in: Industry Commission (1991), *Availability of capital*, Report Number 18, Appendix D.

Australia, the extent of these flows is less than would be predicted for a world with perfectly integrated capital markets. Nevertheless, there appears to be a substantial level of integration across financial markets in the developed world.

NECG has not explicitly stated its view on the extent of integration of the financial markets of the countries included in its study. However, the following statements suggest that NECG believes that international capital markets are more integrated than segregated.

> … many of the world's economies have only been integrated with world securities markets for a period of 20-30 years …[22]

> … data prior to a market becoming integrated into world markets are also of questionable relevance.[23]

As noted above, if world capital markets were perfectly integrated, then returns available overseas would have obvious significance for the required returns for Australian assets, as investors would switch their capital to other countries if returns were insufficient.[24]

Accordingly, one interpretation of NECG's comparison is that the overseas regulatory decisions set the 'hurdle rate' that Australian regulators need to achieve to attract capital into Australian utilities.

However, when trying to take expected returns available in one country to draw an inference about the 'hurdle rate' for investments in another, it is important to take account of the available evidence on the actual operation of the financial markets. There are two adjustments to declared returns implicit in NECG's study that may not be appropriate in a partly integrated world, which are the adjustment for differences in interest rates, and the adjustment for the market risk premium. These are considered in turn.

Adjustment for differences in local interest rates

Implicit in NECG's model is that investors would require higher *total returns* in countries that have higher domestic interest rates, by an amount equal to the difference in those rates. In perfectly integrated world capital markets, NECG's adjustment for differences in interest rates between countries would be correct, as any difference in rates would reflect a combination of expected exchange rate movements and compensation for exchange rate risk.[25]

However, it is less clear that investors would actually require higher *total returns* in countries that have higher domestic interest rates. The only reason that global investors

22 NECG (September 2003), p. 56.
23 NECG (September 2003), p. 58.
24 The small size of the Australian economy would imply that directing investment away from Australia would have little impact on the degree of portfolio diversification achieved.
25 This is an explicit assumption of the model presented in: Solnik, B. (1974), An Equilibrium Model of the International Capital Market, *Journal of Economic Theory*, Vol 8, pp. 500-524.

would require higher returns in countries that have higher interest rates is because they fear that their exchange rate will appreciate, or because a premium is required for exchange rate risk. However, the ability for economic theory to link exchange rate movements and interest rate differentials is poor. As has been commented in text on the topic:

> The undeniable difficulties that international economists encounter in empirically explaining nominal exchange rate movements is an embarrassment, but one shared with virtually any other field that seeks to explain asset price data. [26]

The expected relationship between nominal exchange rates and interest rate differentials (absent a risk premium for exchange rate risk) is known as uncovered interest parity (UIP), which posits that interest rates should only diverge where there is an expectation of a movement in exchange rates. However, not only is UIP overwhelmingly rejected in empirical tests, but exchange rates tend to move in a counter direction to that predicted by UIP – that is, if Australian interest rates exceed US rates, the Australian dollar tends to appreciate.

Moreover, the existence of a risk premium is not considered by many to explain the failure of UIP to hold (or its associated hypothesis, speculative efficiency).[27] As Krugman has observed:

> For a number of years, there was a sort of academic industry that focused on testing the speculative efficiency of the forward exchange rate. A few early papers claimed to confirm that the forward rate was an efficient predictor of the subsequent change in the exchange rate (or more accurately, failed to reject the null hypothesis that it was an efficient predictor). Since the crucial paper by Hansen and Hodrick (1980), however, it has been obvious that this is not the case. Indeed, if anything, the correlation is negative. Now, this need not imply a rejection of efficiency if there are risk premia, especially shifting ones – although nobody thought large shifting risk premia were likely to be important until the devastating failure of simple efficiency ideas became apparent. In the end, however, it just won't wash. [There is a] huge and dispiriting literature on foreign-exchange-market efficiency: after more than a decade of work, it seems clear that nobody has found any reasonable way to 'save' the speculative efficiency hypothesis within the data …What we know how to model are efficient markets; what we apparently confront are inefficient ones. [28]

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[26] Obstfeld, M., and K. Rogoff (1996), Foundations of International Macroeconomics, (MIT Press, Cambridge, Mass), p. 625.

[27] Speculative efficiency says that in an efficient, risk neutral foreign exchange market, the current forward exchange rate should be an unbiased predictor of the spot exchange rate at the expiration of the contract. Speculative efficiency implies uncovered interest parity if covered interest parity holds. Covered interest parity is an arbitrage relationship, and amply supported by empirical evidence. For a discussion of the empirical problems, see: Beechey, M., D. Gruen and J. Vickery (2000), The Efficient Market Hypothesis: A Survey, Reserve Bank of Australia Research Discussion Paper 2000-01, pp. 8-9. Notwithstanding the empirical support for covered interest rate parity, the ACCC notes that an investor in international regulated infrastructure is highly unlikely to maintain a covered exchange rate position due to substantial transaction costs. That is, while covered interest rate parity is supported by empirical evidence, it is unlikely to represent a feasible strategy for infrastructure investment.

[28] Krugman, P., 1993, 'What Do We Need to Know About the International Monetary System?', Essays in International Finance No 190, International Finance Section, Department of Economics, Princeton University, quoted in Beechey (op cit, n **Error! Bookmark not defined.**), p.9.

Thus, it would be inconsistent with the actual working of the world financial markets to conclude that, say, a US investor will require higher total returns from an asset situated in Australian than it would from an asset situated in the US, just because Australian interest rates exceed those in the US. In contrast, armed with the knowledge of the empirical rejection of UIP and the counter-finding, a rational US investor may actually be willing to receive a lower return from Australian assets if Australian interest rates exceed those in the US, as it may expect the Australian dollar to appreciate, and so increase its returns – although in reality, we do not know.

The NECG approach can be compared to that undertaken by NERA (2001), where total returns were benchmarked between countries, albeit adjusted for expected inflation in the home country (that is, real returns were compared). This is equivalent to assuming that investors expect the real exchange rate to remain constant, even if real interest rates differ between countries. Given the uncertain state of the empirical literature, NERA's (2001) approach is likely to be more reasonable.

Adjustments for the Market Risk Premium

NECG's adjustment for country risk may also be questionable, given the partial integration of world capital markets.

In perfectly integrated capital markets, any adjustment for country risk would be flawed (at least if the beta value for the asset is held constant, as NECG has done). This is because all assets would be priced against an internationally diversified portfolio of assets, and individual country risk premia would no longer exist. For partly integrated capital markets, the impact is less clear, but again, there is uncertainty as to the appropriateness of the adjustments to regulators' declared total returns that NECG has compared.

Adjustments performed by NECG

Even putting aside the question of whether NECG's implicit adjustment for differences in interest rates across countries and its adjustment to the market risk premium between countries is relevant given the at least partial integration of world capital markets, the actual adjustments that NECG has made raise concerns. These are discussed in turn below.

Adjusting the market risk premium

A core element of the NECG study is the explicit adjustment that has been made to the market risk premium to account for country specific factors. The basis of this adjustment is an assertion by NECG that 'the market risk premium (MRP) varies between countries'.[29] However, as discussed above, this assertion may not be consistent with NECG's view of integrated capital markets.

Various empirical studies are examined to support NECG's assertion that the market risk premium varies between countries, however, NECG does not find any of the

[29] NECG (September 2003), p. 54.

material to be conclusive and reverts to an arbitrary 'first principles' construction to estimate its adjustment factors. At the centre of this construction is a further assertion that:

> Smaller firms tend to have higher betas. Translating this finding to countries implies that a country with smaller companies listed on its equity market should have a higher MRP than a country with larger companies listed.[30]

While it has been observed that smaller firms tend to have higher betas, it is not clear that the same phenomenon would be observed with the market risk premia of small countries relative to a global market. Further, NECG did not present any analysis underlying its extrapolation of the tendency for small firms to exhibit relatively higher betas to the market risk premium. Accordingly, NECG's assumptions underpinning its 'first principles' are somewhat questionable. Thus, the basis of NECG's core adjustment justifying its methodology to uplift the MRP is in doubt.

Magnitude of the market risk premium in Australia

Adjustments to country specific market risk premia were made with an assumed MRP for the country in question against an assumed MRP in Australia of 6 per cent. Consequently, the validity of the magnitude of NECG's adjustment relies on the relativities between the MRPs it has assumed between countries being accurate. However, the assumption of an Australian market risk premium of 6 per cent is at odds with the views of many informed Australian market participants and commentators who believe the actual MRP for Australia is less than the figure commonly adopted in regulatory decisions.

The ACCC has adopted a MRP of 6 per cent in its latest gas regulatory decision, but has recognised that 'there is evidence from recent studies which would appear to suggest that the market risk premium is less than the 6 per cent used to date in regulatory decisions'.[31] NECG suggests that the true value is close to 7 per cent.[32] However the analysis presented ignores the evidence which suggests that the forward looking MRP is lower than the MRP calculated over the past century, in addition to the empirical evidence presented in the ACCC's and other regulators' recent decisions.

As part of its recent review of its review of Victorian gas access arrangements, the Essential Services Commission (ESC) considered a study by Mercer Investment Consulting (MIC) which undertook an ex-ante assessment of the MRP based on its forecast of returns for Australian shares for the next ten years. MIC derived a forward looking MRP of just 3 per cent.[33] In its final decision, the ESC concluded that:[34]

30 NECG (September 2003), p. 61.
31 ACCC (October 2003), *Final Decision East Australian Pipeline Limited access arrangement for the Moomba to Sydney Pipeline System*, p. 125.
32 NECG (September 2003), p. 64.
33 Mercer Investment Consulting (July 2002), *Australian equity risk premium*, p. 8.
34 ESC (October 2002) *Final Decision: review of gas access arrangements*, p. 336.

> … the evidence discussed above … would suggest that many market practitioners would adopt an assumption about the equity premium that is lower than the assumption of 6 per cent that the Commission [ESC] has adopted in its precious decisions…

Accordingly, the evidence on MRP presented by NECG is somewhat one-sided and its corresponding conclusions highly debateable.

Inferences from current US decisions

The NECG analysis suggested that returns provided over the risk free rate in the US exceed those offered in Australia in respect of gas transmission and distribution. Putting aside the question of whether it is more appropriate to benchmark the risk margin or the total return (as discussed above), there are reasons for believing that the results presented by NECG overstate the level of returns over the risk free rate available in the US.

NECG noted in its report that the US regulatory regime (as well as the Canadian regime) embeds a degree of inertia in the total return that is factored into regulated charges.[35] There are three sources of this inertia:

- For debt financing, it has been common to pass though the actual (embedded) cost of debt.[36] Thus, when interest rates change, the cost of debt assumed by the regulator will only change as existing debt instruments are refinanced at the new rate. Accordingly, there will be a lag between the change in interest rates generally and the regulatory assumption about the cost of debt.
- For equity financing, the most widely used method for estimating the cost of equity (in the US) – the dividend growth model – may change more gradually than the base interest rates.
- For equity financing, some regulators have stated a desire to phase in changes to interest rates so that the risk margin would be expected to react with a lag to changes in interest rates.

Where the regulatory WACC responds to changes in interest rates with a lag care must be taken with the interpretation of the risk margin at any point in time. By way of example, if bond rates fall there would be a commensurate expansion in the observed risk margin until the fall in bond rates flows through to regulatory decisions fully.

In an environment where interest rates have been falling relatively quickly, there is a significant risk that the observed long term risk margin is overstated due to the lag structure incorporated in the regulatory decision. Owing to the decline in interest rates over the period since the commencement of the NECG sample, there is significant doubt over validity of the risk margin estimated for the US. It would appear that the inertia factor may explain much of the increase in reported risk margins in US decisions. However, if interest rates stabilise, then this expansion in the risk margin is likely to be a temporary phenomenon. The same issue does not arise in respect of

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35 NECG (September 2003), pp. 30-33.

36 As a separate issue, note the lack of incentive for the service provider to finance its operations efficiently. Conversely, a service provider under the Gas Code in Australia has the incentive to outperform the regulatory benchmarks and retain excess earnings.

Australian decisions as Australian regulators apply a benchmark that reflects market rates and is therefore not subject to the same level of inertia.

Inferences from current Canadian decisions

The NECG report cites two Canadian regulatory decisions. In relation to the first, NECG states that:

> the Canadian National Energy Board Multi-Pipeline Cost of Capital decision (RH-2-94) concluded that the cost of equity capital for a benchmark pipeline should be 300 basis points above the yield on long-term Government of Canada bonds.[37]

In the second, NECG states:

> the British Columbia Utilities Commission Return on Common Equity Decision, June 10, 1994 specifies that the return on common equity for a low risk gas utility will be 3.5% above an estimate of the 30-year bond rate derived from the 10-year bond rate.[38]

The ACCC notes that in a more recent publication the Canadian National Energy Board (NEB) has revised its estimates of the cost of equity capital:

> At the time of the RH-2-94 Decision, the Board expressed the view that the ERP for the market as a whole was 450 to 500 basis points and that a reasonable all-inclusive ERP for the benchmark pipeline was 300 basis points. Several factors, such as a decline in interest rates and reduced barriers to international investments, suggest that the current level of ERP would be higher than it was in 1995. Specifically, the Board is of the view that the ERP for the market as a whole currently is 550 to 600 basis points, and that there has been a commensurate increase in the Mainline's ERP. That being said, the all inclusive ERP resulting from the application of the RH-2-94 Formula has increased to 388 basis points for 2001 and to 390 basis points for 2002.[39]

Notwithstanding the caution that must be applied in making international comparisons, these returns appear to be significantly below the returns permitted by the ACCC. For example, in the ACCC's final decisions on GasNet and the MSP, the permitted return on equity was almost 600 basis points above the 10 year bond rate.[40]

It is also noteworthy that the NEB's latest view of the appropriate market risk premium corresponds with the market risk premium adopted in Australian decisions and does not support NECG's proposed adjustment to the Canadian MRP. (NECG's adjustment is based on the premise that the MRP in Canada is 1 percent lower than the MRP in Australia.)

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37 NECG (September 2003), p. 32.

38 NECG (September 2003), p. 33.

39 Canadian National Energy Board (2001), *Reasons for Decision TransCanada PipeLines Limited*, RH-4-2001, p. 53.

40 Notwithstanding, the ACCC's final decisions used the 5 year bond rate consistent with the terms of the regulatory period.

Comments on failures in other regimes

NECG refers to failures that have occurred in infrastructure in other countries (such as the US and UK blackouts and the problems with UK rail) and draws the spurious inference that insufficient returns from regulators have been a cause. These claims by NECG deserve close scrutiny. In the failures referred to by NECG, there have been a number of contributing factors and it appears that the returns offered by regulators had little to do with the relevant failure.

By way of example, in the recent US blackouts there was a power failure that cascaded across a large section of the network. However, the core of the problem was that the initial failure was not contained in the local area, but was allowed to spread and trip off successive transmission lines with increasing speed. We do not know as yet why the initial failure was not quarantined, but the more likely explanations are that operating procedures were not followed, or that procedures (and in particular, communications protocols between the different operators) had not been adapted to meet the more complex network interactions and flows associated with the liberalised electricity market.

The North American grid comprises a collection of networks that criss-cross State borders and interconnect the US with Canada and Mexico. There are also multiple system operators, with no single entity having a role managing this heavily meshed network. In North America at least five individual system operators were required to manage their system without a full understanding of the overall network implications.

The physical characteristics of the grid, when combined with a lack of co-ordinated system management, meant that local line disruptions, some of which occurred an hour before the blackout reached its peak, were not isolated, which allowed a cascade of power system shutdowns stretching from Michigan to New York City and into Canada.

By contrast, the reforms of the Australian electricity industry, which culminated in the commencement of the NEM in 1998, provide for system co-ordination. Since the commencement of the NEM, a single body, the National Electricity Market Management Company (NEMMCO), has had 'whole of system' responsibility for transmission monitoring and management. System analysis is run as frequently as every five minutes, and the failure of particular system elements examined. This enables NEMMCO's network controllers to maintain the power system conditions to ensure potential disturbances do not cascade and to take remedial actions to isolate unexpected failures and protect the grid.

1.3 The NECG results for gas

Despite the serious concerns identified with the NECG methodology, there is some merit, albeit limited, in examining the NECG results that are directly applicable to the current review, that is, the gas transmission and distribution regulatory decisions included in the study.

Tables 1.1 and 1.2 reproduce the gas related results from the NECG study.

Table 1.1 NECG gas distribution system results[41]

Country	Regulator	Decision	Date	Vanilla WACC margin	Increase applied to MRP to give 6% MRP	Revised vanilla WACC margin (MRP=6%)	Asset beta (debt beta = 0)
Australia	ORG	Vic DBs	Oct-98	3.37	-	3.37	0.48
Australia	IPART	Great Southern	Mar-99	3.26	-	3.26	0.41
Australia	IPART	Albury	Dec-99	3.31	-	3.31	0.41
Australia	IPART	AGLGN	Jun-00	3.43	-	3.43	0.41
Australia	ICRC	ActewAGL	Nov-00	3.63	-	3.63	0.41
Australia	Offgar	Alinta	Dec-00	3.31	-	3.31	0.43
Australia	QCA	Qld gas DBs	Oct-01	3.30	-	3.30	0.40
Australia	SAIPAR	Envestra	Dec-01	3.40	-	3.40	0.43
Australia	ESC	Vic DBs	Oct-02	3.42	-	3.42	0.40
UK	Ofgem	Transco	Sep-01	2.50	2.50	3.44	0.38
Ireland	CER	BGE	Sep-02	2.91	0.60	3.15	0.40
Canada	NB	Enbridge	Jun-00	4.51	1.00	5.21	0.71
Canada	Alberta	ATCO-AGS	Dec-01	3.13	1.00	3.45	0.32
Canada	Alberta	ATCO-APS	Dec-01	3.41	1.00	3.80	0.39
Canada	BC	Aquila (2002)	Feb-02	2.94	1.00	3.28	0.34
Canada	BC	Aquila (2003)	Feb-03	3.68	1.00	4.07	0.39
Canada	BC	BG Gas	Feb-03	1.86	1.00	2.16	0.30
US	Oregon	NW Natural gas	Nov-99	2.88	-	2.88	0.34
US	Conn	CNG Gas	Feb-02	4.40	-	4.40	0.49
US	Conn	Southern Gas	Feb-02	5.06	-	5.06	0.52
US	CPUC	SGD&E	Nov-02	4.73	-	4.73	0.56
US	CPUC	PG&E	Nov-02	5.19	-	5.19	0.57
US	Utah	Questar gas	Dec-02	5.61	-	5.61	0.63
US	Colorado	Public Service Co	May-03	5.63	-	5.63	0.64

[41] NECG (September 2003), *International comparison of WACC decisions, Submission to the Productivity Commission Review of the Gas Access Regime*, Submission 56, p. 73.

Table 1.2 NECG gas transmission system results[42]

Country	Regulator	Decision	Date	Vanilla WACC margin	Increase applied to MRP to give 6% MRP	Revised vanilla WACC margin (MRP=6%)	Asset beta (debt beta = 0)
Australia	ACCC	TPA (Vic)	Oct-98	3.33	-	3.33	0.48
Australia	ACCC	Central West Pipeline	Jun-00	4.29	-	4.29	0.60
Australia	Offgar	Parmelia	Oct-00	3.93	-	3.93	0.53
Australia	ACCC	Moomba Sydney (draft)	Dec-00	3.22	-	3.22	0.46
Australia	Offgar	Goldfields	Apr-01	3.43	-	3.43	0.48
Australia	ACCC	Moomba Adelaide	Sep-01	3.26	-	3.26	0.46
Australia	Offgar	Tubridgi	Oct-01	3.88	-	3.88	0.53
Australia	ACCC	GasNet	Nov-02	3.09	-	3.09	0.39
Australia	ACCC	Amadeus Basin Darwin	Dec-02	3.38	-	3.38	0.41
Australia	Offgar	Dampier Bunbury	May-03	3.61	-	3.61	0.48
UK	Ofgem	Transco	Sep-01	2.50	2.50	3.44	0.38
US	FERC	Transcontinental pipeline	Mar-00	4.47	-	4.47	0.62
Ireland	CER	BGT	Jun-03	2.77	1.00	3.17	0.40
Canada	NEB	TransCanada	Jun-02	3.81	1.00	4.06	0.25
Canada	BC	Pacific Northern (I)	Jul-02	3.64	1.00	3.96	0.32
Canada	BC	Pacific Northern (II)	Jul-02	3.73	1.00	4.07	0.33

These results can be summarised by taking country averages for the vanilla WACC margin, the revised vanilla WACC margin and the asset beta. These summary results are shown in Tables 1.3 and 1.4 and are sorted by the vanilla WACC margin.

Table 1.3 Summary of NECG gas distribution system results

Country	Vanilla WACC margin	Revised vanilla WACC margin	Asset beta
US	4.8	4.8	0.54
Australia	3.4	3.4	0.42
Canada	3.3	3.7	0.41
Ireland	2.9	3.2	0.40
UK	2.5	3.4	0.38

Table 1.4 Summary of NECG gas transmission system results

Country	Vanilla WACC margin	Revised vanilla WACC	Asset beta
US	4.5	4.5	0.62
Canada	3.7	4.0	0.30
Australia	3.5	3.5	0.48
Ireland	2.8	3.2	0.40
UK	2.5	3.4	0.38

[42] NECG (September 2003), *International comparison of WACC decisions, Submission to the Productivity Commission Review of the Gas Access Regime*, Submission 56, p. 75.

The summary of results suggests the following conclusions:

- Returns permitted by Australian regulators are broadly consistent with returns permitted in overseas jurisdictions.
- The average implied asset beta employed in Australia exceeds those in all other jurisdictions except the US.
- The unadjusted returns provided in Australia exceed those provided in the UK and Ireland by a small but significant margin.
- The risk premia assumed by Australian and Canadian regulators have been very similar for both transmission and distribution systems on average. Note, however that the risk premia assumed by Canadian distribution regulators have varied substantially – presumably as the risk free rate used by NECG has varied (the lack of information provided in the NECG report makes this difficult to assess).
- The risk premia assumed by US regulators have exceeded that assumed by Australian regulators when averaged across the decisions reported. However, the US risk premia have also varied across a substantial range (which appears to reflect the timing of the observation) in the case of distribution, between 2.88 per cent (November 1999) and 5.63 per cent (May 2003).

1.4 Conclusion on the NECG report

The crux of the debate is ultimately whether the regulatory approach is conducive to efficient and adequate investment. For this to occur, the regulatory environment must provide rewards to investors that are sufficient to compensate them for the systematic risk inherent in the asset. There is no evidence that returns provided by Australian gas regulators are a disincentive to efficient investment going into the future. Rather, there is credible evidence to suggest that regulatory returns in Australia are actually higher than those required by investors. On this basis there is no reason for adjusting the current framework for determining the cost of capital as suggested by NECG.