GasNet's Response to Draft Decision

Dated 20 September 2002

Contents

1 Introduction

1.1 Public consultation

On 27 March 2002, GasNet lodged with the Commission its proposed Access Arrangement and Access Arrangement Information for the period commencing 1 January 2003, together with a detailed submission ("**Submission**") in support of its proposed Access Arrangement.

On 19 April 2002, the Commission published its issues paper relating to the proposed GasNet Access Arrangement and the proposed VENCorp Access Arrangement. As part of that issues paper, the Commission invited public submissions in relation to these Access Arrangements. GasNet, along with a number of other interested parties made submissions to the Commission in relation to the issues paper.

On 14 August 2002, the Commission released its Draft Decision on GasNet's proposed Access Arrangement. The Commission has invited written submissions on the Draft Decision.

This is GasNet's response to the Commission's Draft Decision. GasNet may seek to make further submissions and to respond to submissions lodged by other interested parties.

This Response adopts the conventions established in GasNet's Submission, in particular the glossary in section 11.1 of the Submission.

1.2 Criteria for assessing revisions to access arrangements

The key criteria to be applied in assessing revisions to an access arrangement are set out in section 2.24 of the Code. Section 2.24 provides that the Commission must take into account:

(a) the Service Provider's legitimate business interests and investment in the Covered Pipeline;

(b) firm and binding contractual obligations of the Service Provider or other persons (or both) already using the Covered Pipeline;

(c) the operational and technical requirements for the safe and reliable operation of the Covered Pipeline;

(d) the economically efficient operation of the Covered Pipeline;

(e) the public interest, including the public interest in having competition in markets (whether or not in Australia);

(f) the interests of Users and Prospective Users; and

(g) any other matters the Relevant Regulator considers appropriate.

GasNet notes that in the recent Epic Energy Case, the Supreme Court of Western Australia emphasised that where a regulatory regime requires that the regulator must take into account certain guiding principles in making

regulatory decisions, in undertaking the "balancing exercise" the regulator should give each of those principles weight as fundamental elements in assessing the matter. In particular, the Court stated that:

> *"The factors in s 2.24(a) to (g) of the Code are relevant to, and are to be given weight as fundamental elements in, the Regulator's assessment of the proposed Access Arrangement, including the issue whether the Regulator is satisfied that the proposed Access Arrangement contains the elements and satisfied the principles set out in s 3.1 to 3.20……The factors in s. 2.24(a) to (g) should guide the Regulator, in determining, if necessary, the manner in which the objectives in s 8.1(a) to (f) can best be reconciled or which of them should prevail*".[1]

GasNet submits that the Commission has failed to give fundamental weight to the factors listed in section 2.24 in its assessment of GasNet's revised Access Arrangement. The Draft Decision contains only a brief discussion of section 2.24 and there is no indication as to the weight the Commission has applied to each of the elements listed in section 2.24. The Commission simply states that if the amendments proposed in its Draft Decision are adopted, the Code principles contained in section 2.24 will be met.[2]

GasNet is concerned that, in a number of key areas, and in particular, the rate of return, the Commission has failed to give proper weight to elements listed in section 2.24. In particular, GasNet considers that the Commission has failed to give proper weight to GasNet's legitimate business interest and investment in the GNS.

In the Epic Energy Case, it was recognised that the Code does not prescribe a precise figure for revenue calculation but rather provides for a range of possible outcomes for revenue setting. GasNet submits that in exercising its discretion in determining where GasNet falls within that range, the Commission has failed to give fundamental weight to the matters described in section 2.24.

In many cases, regulatory risk lies not in initial decisions (in which investors might expect some uncertainty) but in sudden unanticipated changes in ongoing regulatory approach. GasNet submits that in a number of aspects of the Draft Decision the Commission has, without a proper basis, changed the way it applies the Code, contrary to GasNet's legitimate expectation of consistency in regulatory approach.

2 Background

The Commission identified a number of broad issues in relation to the proposed revisions to the Access Arrangement.

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1 Re Dr Ken Michael AM, ex parte Epic Energy (WA) Nominees Pty Ltd and Anor [2002] WASCA 231, p.91.

2 Australian Competition and Consumer Commission, *Draft Decision*: *GasNet Australia access arrangement revisions for the Principal Transmission System*, 14 April 2002, p.154.

2.1 Merging of GasNet's access arrangements

GasNet notes the Commission's proposal to accept the merger of the PTS and WTS Access Arrangements into a single Access Arrangement.

VENCorp, TXU and GasNet are in the process of finalising the arrangements in relation to the termination of the WTS and the allocation of equivalent AMDQ rights to TXU.

2.2 Regulation of GasNet's Dandenong LNG facility

GasNet agrees with the Commission's assessment that the LNG system security reserve is separate from the GNS and should not be regulated once the relevant provisions of the Tariff Order cease to have effect.

2.3 Market carriage

In its Submission, GasNet noted that the unique features of the market carriage system had a number of significant implications for GasNet. In particular, the pay-as-you-go tariff system means that GasNet is subject to increased volume risk.

However, GasNet acknowledges that under the regulatory arrangements currently in place in Victoria, market carriage will continue to apply until at least 2007 when the relevant arrangements will be reviewed.

2.4 Interaction with VENCorp's access arrangement

GasNet proposed revisions to the form of its Services Policy to bring it into line with the underlying commercial and regulatory arrangements. The revisions aimed to clarify the relationship between GasNet and VENCorp. One of the issues arising from the proposed revisions was whether GasNet provides a Service to VENCorp and whether VENCorp is a User within the meaning of the Code.

In the Draft Decision, the Commission rejected GasNet's proposed amendments to its Services Policy and expressed the view that GasNet's Access Arrangement should continue to contain a Services Policy under which GasNet provides a Reference Service to VENCorp. One of the reasons suggested by the Commission to justify the retention of the current Services Policy was that VENCorp had a pre-existing contractual right in the form of the Service Envelope Agreement and that the new proposal would have the effect of depriving VENCorp of that pre-existing right contrary to section 2.47 of the Code.

As indicated in GasNet's Submission and in its responses to various public submissions, GasNet considers that the services provided by GasNet under the Service Envelope Agreement (ie making the GNS available to VENCorp) should not be characterised as "Services" within the meaning of the Code. On this basis, GasNet considers that the Service Envelope Agreement is not a pre-existing contractual right within the meaning of the Code. In any event, even if the Service Envelope Agreement could be characterised as a pre-existing contractual right, the revisions proposed by GasNet do not deprive VENCorp of that contractual right. The Service Envelope Agreement will

continue to remain in operation for the Second Access Arrangement Period regardless of whether GasNet's revision to the Services Policy is accepted.

3 Reference Tariff methodology

3.1 Reference Tariff policy

GasNet notes that the Commission is generally supportive of the use of the CPI - X price path methodology. However, the Commission proposes a number of amendments to GasNet's proposals in relation to its redundant capital policy and pass through mechanism.

3.2 Redundant capital policy

GasNet has proposed a revised capital redundancy policy which provides that the Capital Base may only be adjusted for wholly redundant assets, being assets which no longer contribute *in any way* to the provision of the Tariffed Transmission Service. However, the Commission has rejected GasNet's proposal on the basis that it is not persuaded that the risks of partial redundancy should be fully shifted to users.

GasNet notes that section 8.27(a) of the Code, which deals with capital redundancy, specifically refers to the removal of assets from the Capital Base which cease to contribute in any way to the delivery of Services. Section 8.27 further provides that before approving a mechanism to remove redundant capital from the Capital Base, the relevant regulator must take into account the uncertainty that such a mechanism would cause.

GasNet accepts that it is appropriate for it to have a capital redundancy policy. However, it considers that the policy as it currently stands is open to wide interpretation and creates uncertainty.

GasNet submits that through the policy of cost reflective tariffs, it already bears the risk associated with partially redundant assets. If an asset becomes under-utilised, the tariff would need to increase to recover the revenue requirement. If this tariff is not sustainable, GasNet would need to defer depreciation in order to achieve a sustainable tariff. However, GasNet is at risk that if volumes do not grow in the future, then the deferred depreciation will not be recovered.

GasNet considers that this approach to partial redundancy achieves a fair sharing of costs when assets are under-utilised, as required by the Code, and is consistent with the Commission's Draft Statement of Regulatory Principles.

3.3 Pass through mechanism

The Commission requires a number of changes to GasNet's pass through mechanism including the following.

(a) A 40-day assessment period as opposed to the 20 day period proposed by GasNet.

(b) The inclusion of a provision allowing for both positive and negative pass through amounts

(c) The inclusion of a provision allowing the Commission to initiate the review process.

(d) Amending the definition of "change in tax event" to include the removal of a tax.

(e) Amending the definition of "regulatory event" to include both increases and decreases in regulatory requirements.

(f) Amending the definition of "insurance event" to allow for changes in the minimum insurance level that exceed or fall short of the benchmark insurance costs.

(g) Amending the definition of "insurance event" to include amounts currently identified in the asymmetric risk allowance as deductibles in current insurance.

(h) The retention of the current definition of "relevant tax" as set out in the Tariff Order.

Assessment period

GasNet acknowledges the Commission's concerns in relation to the length of the assessment period and considers that the 40-day period proposed by the Commission is reasonable.

Insurance deductibles

GasNet also agrees that it would be appropriate to deal with insurance deductibles by way of a pass through mechanism.

Negative pass-through

In relation to the issue of whether express provision should be made for negative pass through amounts, GasNet considers that the possibility of a negative pass through is already dealt with in section 6.3(f) of its proposed Access Arrangement. Section 6.3(f) provides that the Commission must, in considering any application by GasNet for a positive pass through amount, take into account the effect of any previous pass through event (which would include negative pass through events). As previously indicated in its response to submissions, GasNet has not included a specific obligation to make a pass through application for negative pass through events on the basis that pass through events are asymmetric, in that positive pass through events are far more likely than negative pass through events. On this basis, GasNet considers that the proposed amendments to the definitions of "regulatory event", "change in tax event" and "insurance event" are not warranted.

Relevant tax

In relation to the definition of "relevant tax", the Commission states that GasNet's proposed definition is too broad but provides no explanation as to why it has adopted this view. The Commission has proposed a definition of

"relevant tax" which is based on the current Tariff Order and which excludes virtually all taxes. GasNet considers that the definition proposed by the Commission is too restrictive and gives the tax pass through no substantive operation. For example, it is unacceptable for GasNet to bear the risk of increases in land taxes and taxes imposed by municipal authorities. In a competitive environment, these taxes would be imposed equally on all competitors and (assuming an efficient market) would be passed through in full to consumers.

4 Capital Base

4.1 Initial capital base

The Commission has indicated in its Draft Decision that it will not adjust the initial Capital Base to include the assets that were excluded in the Final Decision in 1998.

GasNet understands that the Code does not permit the Commission to undertake a revaluation of the initial Capital Base. However, GasNet is not proposing that the Commission revalue GasNet's Capital Base. As indicated in its Submission, GasNet considers that the Code does require the Commission to verify that the Capital Base expressed in the text of the Commission's Final Decision accurately reflects GasNet's Capital Base (in this case, as expressed in the 1998 GHD valuation). The initial asset base identified by the Commission contained a number of omissions (including easements and pipeline regulators) which should be rectified.

In its Submission, GasNet also questioned whether the value of the asset base determined by the Commission as at 1 January 1998 was $363.7 million or $358.0 million. GasNet accepts that the Access Arrangement Information for the First Access Arrangement Period supports the value of $358.0 million

4.2 New facilities investment - South West Pipeline

The Commission proposes to approve the roll-in to the Capital Base of approximately 50% of the cost of the SWP under the system wide benefits test and recovery of the balance under the economic feasibility test.

GasNet acknowledges that, in determining the sustainable tariff for the SWP, the likelihood of gas from the Yolla field being injected into the GNS must be taken into account. On this basis, it accepts that it is unlikely that the whole cost of the SWP can be recovered under the economic feasibility test.

System-wide benefits

GasNet agrees with the Commission that it is appropriate to roll-in a portion of the SWP under the system-wide benefits test.

GasNet notes that a number of parties have questioned whether the SWP provides any system-wide benefits. In particular, BHP Billiton and Exxon/Mobil have previously expressed the view that the SWP does not provide system-wide benefits that would justify an increase in Reference Tariffs for all users. However, GasNet notes that in the Longford proceedings, BHP Billiton's joint venture partner Esso has alleged (as part of

its third party claim against GasNet and others) that the losses flowing from the Longford fire and explosion were contributed to by the failure to develop alternative supply pipelines (such as the SWP) to provide additional security of supply. This is inconsistent with the view expressed by Exxon/Mobil and BHP Billiton that the SWP has no system-wide benefits.

GasNet stands by its views expressed in its Submission that the system security benefits and the competition benefits generated by the SWP justify its inclusion in the Capital Base under the system-wide benefits test.

Tariff levelisation

GasNet has proposed that the revenue requirement for the SWP should be levelised (escalated at CPI) for a period of 20 years. This procedure has the effect of back-ending the recovery of depreciation. In fact, this procedure leads to a negative depreciation allowance of $1.1 million in 2003 and $0.7 million in 2007[3]. GasNet considers that this level of back-ending is appropriate to encourage growth in use of a new pipeline such as the SWP.

The Commission has suggested that the SWP tariff (as opposed to the revenue requirement) should be levelised over 20 years. It is not clear how it proposes to deal with the portion of the revenue requirement which is added to the Capital Base under the system-wide benefits test. However, it is GasNet's understanding that the suggested procedure levelises the tariff at CPI-2%.

GasNet's preference would be to levelise the whole revenue requirement of the SWP at CPI over 20 years and to apply this procedure to both the "stand-alone" capital and the capital rolled-in under the system-wide benefits test. Our calculations do not show a significant difference between tariff levelisation at CPI-2% and revenue requirement levelisation at CPI.

GasNet would prefer to levelise the revenue requirement as this procedure makes a clear and unambiguous assessment of the amount of back-ending of depreciation that is implied. On the other hand, tariff levelisation generates a depreciation deferral profile which depends on the forecast of volumes over 20 years. It will give a different depreciation deferral if the forecast is altered (for example, the alteration to the forecasts to account for Yolla flows).

4.3 New Facilities Investment - Murray Valley Pipeline

GasNet notes the Commission's view that the Murray Valley Pipeline should be classified as new facilities investment under the Code.

The roll-in of the Murray Valley Pipeline was not treated as new facilities investment by GasNet in its Submission. However, GasNet has subsequently provided the Commission with information to support the inclusion of the Murray Valley Pipeline in the Capital Base.

The information provided to the Commission sets out GasNet's arguments in relation to why the Murray Valley can be rolled-in under the economic feasibility test at the tariff which has been calculated using the cost allocation

[3] These figures have been calculated using the Commission's proposed WACC.

procedures adopted in the tariff model. That is, the revenues to be generated by the pipeline at this tariff will be sufficient to recover the incremental costs of the pipeline.

It should be noted that these incremental costs include the capital cost of the pipeline and the incremental operating costs. They do not include any costs to augment the Longford to Chiltern Valley pipelines. This is because the initial allocation of AMDQ provided for the forecast load on the Murray Valley pipeline. Therefore, there is adequate capacity from Longford to Chiltern Valley (the point at which the Murray Valley pipeline connects to the GasNet system) to supply the growing Murray Valley load without the requirement to augment the capacity from Longford.

In theory, the tariff to apply on the Murray Valley pipeline could be set at a higher rate than is required to pass the roll-in test. However, GasNet is concerned that the Murray Valley pipeline tariff for Longford supply is the highest tariff on the system. Moreover, the industrial customers on this pipeline are disadvantaged by the move to a flat withdrawal tariff (many are spring peakers). In addition, the Murray Valley pipeline is a greenfields pipeline and requires some tariff support till growth has been achieved. Therefore, GasNet proposes that the Tariff-D withdrawal tariff be set no higher than is required for the economic feasibility test to be passed, provided this does not lead to a lower tariff than applies to users in the North Hume and Wodonga zones.

4.4 New Facilities Investment - other projects

The Commission proposes to accept the inclusion of capital expenditure incurred by GasNet in the First Access Arrangement Period relating to compressor station automation and maintenance.

In the Final Decision in 1998, the Commission approved the capital expenditure associated with the Brooklyn compressor restaging and cooler upgrade on the basis that it was likely to pass the system-wide benefits test. GasNet agrees with the Commission that it is now appropriate to roll-in the cost of this project on the basis that facilitating the use of WUGS provides a system-wide benefit.

5 Rate of return

5.1 Applying the Code

GasNet submits that in determining the rate of return, the Commission has failed to take into account the fundamental elements set out in section 2.24 of the Code and in particular, section 2.24(a).

Section 2.24(a) requires the Commission to take into account GasNet's:

(a) legitimate business interests; and

(b) investment in the GNS.

The Epic Energy Case supports the view that seeking to maximise financial returns is a legitimate business interest, provided that the conduct of the

relevant service provider does not involve price manipulations or breaches of the TPA. For example, the court held that the recovery of the actual investment in a pipeline, *together with a reasonable return on that investment,* is a legitimate business interest for the purposes of section 2.24(a).[4]

GasNet submits that the concept of a reasonable rate should inform the Commission's discretion in relation to setting an appropriate return on GasNet's investment in the GNS.

GasNet has raised debt and equity in the lead up period to a rate reset. For those investors and lenders who provided those funds, there was an expectation of a certain rate of return post the reset, based on expectations of consistency of application of the regulatory regime. Provided that that return does not imply the extraction of excessive rents, it is a legitimate business interest to meet those expectations. There was no suggestion from the Commission that GasNet's proposals in relation to the WACC involve the extraction of excessive rents.

GasNet is also of the view that the Commission has failed to take into account its investment in the GNS. GasNet purchased the transmission network in 1999 and did so in an environment where it was entitled to make a number of assumptions. One of the key assumptions was that the regulatory regime would be applied in a consistent manner over time. The Draft Decision represents a significant shift in the application of the regulatory regime, particularly in the calculation of the equity beta.

GasNet believes it is not appropriate to change the accepted parameters from previous decisions simply because this is the first regulatory reset. The Code must be applied in a consistent manner regardless of whether it is an "initial" decision or a "reset" decision.

5.2 Summary of the draft decision

In determining the rate of return, the Commission has employed a CAPM framework based on equity and debt margins over the prevailing real risk free rates.

The following table shows the rate of return (expressed using the Commission's terminology as the real WACC) which GasNet operates under, its proposal for the next regulatory period and the Commission's draft determination.

	Real WACC	**Margin above real risk-free rate**
First Access Arrangement Period	7.75%	4.2%

[4] Re Dr Ken Michael AM, *ex parte Epic Energy (WA) Nominees Pty Ltd and Anor* [2002] WASCA 231, p.61.

	Real WACC	Margin above real risk-free rate
GasNet proposal for Second Access Arrangement Period	8.22%	4.9%
Commission's draft determination	6.4%	3.2%

In reaching its decision, the Commission has rejected GasNet's proposals in the following areas.

Risk free rate	The Commission has calculated the risk free rate using the 5-year government bond rate, whereas GasNet has proposed a 10-year rate.
Equity beta	The Commission has determined an equity beta of 1.0, which is less than the equity beta approved in the 1998 Final Decision of 1.20 and less than the 1.40 proposed by GasNet for the Second Access Arrangement Period.
Debt margin	The Commission has determined a margin of 1.38%, which includes all transactional debt-raising costs. GasNet's proposal was a margin of 1.20% plus annualised transactional costs of $2.0 million.
Tax normalisation	The Commission has rejected the normalisation of tax payments as proposed by GasNet and as allowed in the 1998 Final Decision and instead employed a pass-through model for tax payments.
Accelerated depreciation	The Commission has rejected GasNet's proposal that the benefits of tax allowances from accelerated depreciation should be retained by the company.

GasNet's response in relation to each of these issues is detailed below.

5.3 Regulatory consistency

As a general comment, GasNet is concerned that, in a number of key areas, the Commission's Draft Decision reflects a sea-change from the previous Commission decisions without any apparent basis.

GasNet considers that the Commission had established a reasonable level of consistency in its previous decisions on gas and electricity transmission

companies. However, GasNet is concerned that the Draft Decision represents an unwarranted shift from this pattern of decisions.

The Draft Decision introduces a measure of regulatory inconsistency which is detrimental to GasNet's business interests. Investors have a legitimate expectation that regulators will make consistent decisions over time. If regulators implement a paradigm shift without any change in underlying circumstances, then this not only harms the investors who have relied on previous decisions but also acts as a disincentive to investment in regulated infrastructure. Some elements of the decision send a signal to potential investors that regulatory outcomes are unpredictable and cannot be relied upon.

The Macquarie Bank report commissioned by the Commission makes it clear that consistency of regulatory decision-making is an important consideration in setting the cost of capital. Macquarie states[5]:

> *"The consistency of approach by the regulator exhibited in precedent transactions may provide comfort that change will only be incremental. However, the uncertainty may be reflected in lower debt levels and/or higher pricing."*

The WACC determination made by the Commission in the Draft Decision is the lowest gas or electricity transmission WACC decision made to date. This is despite the fact that electricity transmission companies generally operate under a revenue cap, which provides a far more certain revenue stream than the average price cap which applies to GasNet.

GasNet is also concerned at the magnitude of the change from 7.75% in the previous decision to 6.4% in the Draft Decision, a change which is not explained by any significant shift in the prevailing market conditions. Further, such a change is not warranted given that in the current Access Arrangement Period, the weather trend and consequent volume downturn resulted in GasNet under-performing against its target revenue. This clearly demonstrates the fact that GasNet is subject to significant volume risk.

5.4 Tax normalisation

The Cost of Service methodology employed by GasNet permits the service provider to recover the full costs of providing the Reference Service, including the cost of company tax expenses. The recovery of tax expenses has been the subject of some controversy in the past. However, the Commission has established a policy framework for the treatment of tax expenses which is set out in the Draft Statement of Regulatory Principles and in the recently published Post-Tax Revenue Handbook.

As GasNet understands it, the post-tax methodology is based on the principle that the actual taxes payable are calculated from the benchmark business parameters. This amount is included in the Cost of Service as a cashflow item. The returns to capital are then determined as the product of the Capital Base and the "vanilla" WACC.

[5] Macquarie Bank, *Issues for debt and equity providers in assessing greenfields gas pipelines*, May 2002, p.17.

However, the Commission's methodology also allows for a procedure called tax normalisation. Under this procedure, the depreciation profile of the assets is adjusted to generate a smoothed profile for the revenue requirement over the life of the assets. This avoids the S-curve that might otherwise arise in the allowance for taxation costs.

GasNet has submitted a procedure for the calculation of the tax allowance which it believed was consistent with the Commission's policies. This procedure uses the tax normalisation option presented in the Post-Tax Revenue Handbook and employs a simplified version of the model which does not allow for capital expenditure. GasNet is prepared to enhance this methodology by calculating the required adjustment to the depreciation profile using the actual Regulatory Asset Base model. GasNet will publish the adjusted depreciation profile in the revised Access Arrangement Information.

5.5 Interest rates and inflation

Risk free rate

The Commission has rejected GasNet's proposal to use the 10-year government bond rate to set the risk free rate. Instead, the Commission proposes a 5-year bond rate on the basis that this is the appropriate bond term to consider when the regulatory period is 5 years. In coming to this position, the Commission relies on advice it received from Dr Martin Lally.

GasNet notes that the Commission is alone among economic regulators in Australia in using the 5-year rather than the 10-year rate. In order to explore this issue further, GasNet, in conjunction with SPI PowerNet and ElectraNet, held a seminar on this and other WACC issues on 24 June 2002. Both of the principal academic speakers at this conference (Henry Ergas and Bob Officer) concurred that the appropriate value for the risk free rate for regulated companies was the 10-year rate.

GasNet is also concerned that the decision stands in complete opposition to the recent draft decision handed down by the ESC on the three Victorian gas distributors. GasNet believes that economic regulators have an obligation to ensure that they take consistent views on specific technical issues such as this. It is apparent that the ESC has not been persuaded by the Commission's arguments on this issue.

GasNet has commissioned David Robinson of Ernst & Young to review the Lally paper which forms the basis for the Commission's decision. His paper is contained in Annexure A.

Robinson has presented a thorough analysis of the issue of the appropriate term for the risk free rate. The weight of argument supports a risk free rate which reflects the long-term nature of the investment. This is generally taken to be the 10-year government bond rate. The argument that the appropriate maturity period is the term of the regulatory period cannot be supported.

> *"The argument for using a regulatory period linked rate of return would only be true if the owner of the asset could be sure that they*

would be fully compensated if the asset was stranded or abandoned at the end of the regulatory period."[6]

Robinson points out that the use of a rate with an incorrect maturity will lead to a mis-allocation of resources.

In addition, Robinson notes the inter-relationship of the risk free rate and the market risk premium. In order to be consistent, the risk free rate should be determined over the same period that the market risk premium is determined.

Robinson has reviewed the approach of other regulators to this issue. All Australian state-based regulators have applied the ten year rate. Moreover, Robinson notes that in the UK, the Competition Commission, Ofwat, Ofgem and the Office of the Rail Regulator use the yield on 10 and 20 year British government bonds to arrive at the risk free rate.

The Commission has relied heavily on the paper by Lally as support for its views. Robinson has reviewed this paper and finds that the arguments in support of the five year rate are not persuasive.

Period of Measurement

The risk free rate to apply over the Second Access Arrangement Period is obtained by assessing the prevailing fixed term real rates for Commonwealth Government bonds. The Commission has previously used an average of the bond rates over a period of 40 days ending shortly before the date of the Final Decision.

The Commission has accepted GasNet's proposal for the Commission to advise GasNet of the relevant end date no later than four weeks before the expected release of the Final Decision.

However, GasNet proposed that the period for determination of the risk free rate would also be agreed with GasNet. GasNet sees no valid reason not to agree on the duration of the period as well as the end date of that period.

Inflation Rates

GasNet agrees with the Commission that the inflation rate should be determined from the nominal and real risk free rates, using the Fisher equation. However, as discussed above, GasNet believes the appropriate term for these rates is 10 years.

5.6 Debt margin and the cost of debt

Summary of draft decision

The debt margin is the cost of borrowings expressed as a margin over the risk free rate. The appropriate margin can be estimated by analysis of actual borrowings in the market and is, as stated by the Commission, an empirical matter.

[6] David Robinson, *Review of issues in the estimation of the risk free rate for regulatory purposes*, September 2002, p.7.

In preparing its revised Access Arrangement, GasNet has separated the margin into an interest rate spread and a transaction cost. It is, however, the total annual cost which is relevant to the assessment of the GasNet revenue requirement.

In reaching its Draft Decision, the Commission has relied on a paper prepared by Macquarie Bank[7] which is attached to the Commission's Greenfields Guidelines. The Commission has also relied on the spreads above the Commonwealth bond rates of traded corporate bonds to give an estimate of the interest margin. To these spreads, the Commission has added an allowance of 8 basis points to cover the transaction costs of raising debt, namely bank fees and a dealer swap margin. The Commission does not recognise other costs, such as legal and advisory costs, credit rating fees and agency fees. The Commission has not provided a source for this estimate of transaction costs.

GasNet believes the Commission may have quoted selectively and out of context from some of its sources. In some cases, the Commission has not identified the sources, particularly in respect of its assessment of transaction costs. For example, the Macquarie report states:

> *In addition to the interest rate margin, the project will also incur non-margin financing costs, such as arrangement fees, advisory fees and syndication costs all of which are paid at the time the financing arrangements are entered into. …. These non-margin financing costs will be incurred each time the project refinances or renegotiates its debt. If the project obtains a credit rating, it will incur both upfront and annual rating agency costs. If any of the project's debt is provided as a syndicated loan facility, it will also incur an annual agency fee for the management of the facility.*[8]

Further, it is stated in the Macquarie report that:

> *…. if the project has entered into a floating rate debt facility, it will need to swap its floating interest rate exposure into a fixed rate exposure. A dealer swap margin therefore needs to be added to the interest margin to obtain the fixed interest rate for the project. The margin will be determined by the volume and tenor of the swap arrangement, the credit of the project and prevailing conditions.*[9]

While recognising that such costs exist and are commonly charged to borrowers, the Macquarie report does not give any indication of the magnitude of these fees and charges. GasNet submits that these charges can be significant, and it is inappropriate for the Commission to estimate benchmark transaction costs without adequate sources. Clearly, this information will tend to be confidential and difficult to obtain in the public arena. However, GasNet has direct experience of these transaction costs.

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7 Macquarie Bank, *Issues for debt and equity providers in assessing greenfields gas pipelines*, May 2002.

8 Macquarie Bank, *Issues for debt and equity providers in assessing greenfields gas pipelines*, May 2002, p.21.

9 Macquarie Bank, *Issues for debt and equity providers in assessing greenfields gas pipelines*, May 2002, p.21.

Information on these costs has been provided to the Commission on a confidential basis.

The Commission considered that it was not appropriate to incorporate advisory and legal fees for debt raising or agency costs incurred when obtaining a credit rating. The Commission's basis for not including the legal and advisory fees is that they are negligible. GasNet submits that this statement may be based on a misunderstanding by the Commission as to the extent of the legal and advisory fees that must be paid. When raising debt, the borrower not only has to pay its own legal fees but those of the lender which can be substantial and can include US counsel and those of any agent that is required. The quantum of the legal fees is not based on the margin of a particular benchmark company. In GasNet's recent refinancing, the legal costs claimed were $0.69 million.

In the Draft Decision, the Commission has stated that a credit rating is not required by debt providers[10]. This view is based on a statement made by Macquarie Bank in their paper on Greenfields projects that:

> *"……Debt Providers will review the rating level and the rationale for the rating provided by the agency. However, Debt Providers, particularly bank lenders, do not usually rely on this analysis. The majority of Debt Providers do not delegate their credit decision process to the credit rating agencies"*[11].

However, this statement referred to a greenfields project, when the risks are high and the lender would obviously prefer to take their own advice (which would be reflected in a higher fee). For a refinancing, the lender will rely on credit ratings agency advice. The fee for this service is therefore a legitimate cost.

As a case in point, under GasNet's bond issue and its syndicated bank facility, the margin paid by GasNet depends upon the credit rating of the company. The definition of "credit rating" in that agreement means:

> *"the most recent investment rating for either long term unsecured senior debt issued by the company not supported by third party credit enhancement by the company itself by S&P or, if S&P ceases to issue such ratings, the equivalent rating issued by a reputable credit rating agency selected by the Agent".*

An event of default under these borrowings is indeed a failure to retain an investment grade credit rating. This provides clear evidence that GasNet does require a credit rating to raise debt. Accordingly, the Commission should make an allowance for these costs.

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[10] Australian Competition and Consumer Commission, *Draft Decision: GasNet Australia access arrangement revisions for the Principal Transmission System*, 14 August 2002, p.[***insert***].

[11] Macquarie Bank, *Issues for debt and equity providers in assessing greenfields gas pipelines*, May 2002, p.12.

Benchmark Debt Margin

The Commission considers it appropriate to estimate a benchmark for the purpose of setting a credit rating, and further considers that a BBB+ credit rating represents an appropriate proxy rating for a benchmark company.

The Commission further states that debt requirements have primarily been met by the bank market for projects involving construction in Australia and that it understands that the interest margin associated with bank issued debt is generally lower than capital market interest margins. However, as information on the debt margin associated with bank debt is generally not widely available, the Commission proposes the use of capital market data as the basis of the benchmark debt margin calculation even though it may provide a benchmark which is biased in favour of the service provider.

GasNet is currently rated BBB, which is below the benchmark rate. However, its gearing is higher than the benchmark 60%. Therefore, on the basis of current evidence, GasNet accepts BBB^+ as the benchmark rating.

However, GasNet considers it misleading to assume that bank debt is readily available to a benchmark company and that therefore using capital market data may provide a bias in favour of the service provider. In GasNet's opinion, there are many other factors which could lead to bank debt being the more expensive option.

The refinancing decisions faced by a company include, at the very least:

(a) the availability of funding;

(b) the required tenor (or duration); and

(c) the cost of funds (debt raising costs).

Availability of Funding

The Commission contends that bank debt is less expensive than debt raised in the capital markets. The obvious question is, therefore why do companies such as GasNet raise funds in capital markets? This is particularly pertinent given there is an additional risk of a "failed" bond issue which is very public, with all the likely consequences in respect to cost and availability, versus the confidentiality associated with a bank debt raising.

The answer is that it is not possible to say with certainty that bank debt is cheaper or more readily available than capital market funds. Circumstances change, and companies, in pursuing their business interests, must remain flexible to seek to obtain the best package available at any particular time, taking into account timing, upfront costs, and risks of failure.[12] In addition, bank funds may not be readily available at the benchmark margins, either on terms and conditions that are acceptable to borrowers, or at all. For example:

[12] The *Australian Financial Review* reported on 18 September 2002 that TXU abandoned a bond issue because of a glut of other issues at the same time in the market, and resultant increasing bond spreads.

(a) banks have policies of spreading risk in any particular sector. Therefore, while the Commission states that benchmark companies should be stand-alone entities, these are (in the absence of a government guarantee) often the least attractive companies to lend to; and

(b) banks seek business where they have existing relationships, where there is a likelihood of collateral business and where, if there is ever a credit issue, there is a strong cornerstone investor who can provide the requisite coverage. A stand-alone company, in a mature market with limited opportunity for growth or collateral business, does not readily fit these criteria.

Tenor

In GasNet's experience, banks prefer to provide short term facilities rather than longer term facilities. Longer periods are available in the capital markets albeit at a greater cost. When considering the appropriate tenor for GasNet, regard was given to both the refinancing risk and the regulatory period. Banks prefer to lend only up to the duration of the regulatory period in order to avoid the risk associated with the next regulatory reset.

On the other hand, it is not prudent for the borrower to assume it can successfully refinance a significant amount of debt within a short timeframe when it is also likely that the debt markets are being accessed by the refinancing requirements of other regulated entities on the same reset cycle. The depth of the Australian debt market at a point in time, for one sector of risk, is limited.

Therefore, the borrower must mitigate its refinancing risk by spreading the tenor while at the same time seeking to best match its regulatory period. All of these decisions have cost consequences.

Debt Raising Costs

The Commission has stated in its Draft Decision that it is appropriate to add an 8 basis point margin for prudent debt raising costs. GasNet contends that the Commission has significantly underestimated the costs involved.

GasNet has provided the Commission with a range of quotes that it received in its recent debt raising for traditional debt and capital markets debt. GasNet also provided the Commission with information in relation to the fees actually incurred by GasNet. This information has been provided to the Commission on a confidential basis.

Based on the information provided to the Commission, GasNet considers that a debt raising transactional cost margin of approximately 30 basis points is reasonable.

5.7 Equity beta

The Commission is proposing to reduce GasNet's equity beta from 1.20, as determined in the 1998 Final Decision, to 1.0. This reduces the real WACC by approximately 0.5%.

In setting this value, it appears that the Commission has relied on a paper prepared by Allens Consulting Group ("**ACG**") and a number of additional factors, which the Commission claims point to a lower equity beta.

GasNet submits that neither the ACG paper nor the additional factors identified by the Commission support a lower beta.

The ACG Report recommendations

The underlying assumption of the CAPM is that beta is an objective empirical fact, and not a subjective assessment. The ACG paper endeavoured to make an estimate of the GasNet beta from empirical data from comparator companies.

However, GasNet is concerned that the Commission has incorrectly interpreted the findings contained in the ACG paper. In our view, the recommendations of the paper support a beta of at least 1.2 for GasNet.

In its paper, ACG actually concluded that:

> *The use of a proxy beta of 0.7 would represent a substantial reduction in the estimates of the costs of capital associated with these activities compared to the assumptions previously adopted. While such a revision would be warranted in the face of reliable, objective evidence, it cannot be concluded definitively that this quality of evidence exists at this time."*[13]

Further, ACG suggested that the Commission adopt a conservative approach in setting the equity beta. It was stated that:

> *…in the near term, while noting that how the Commission chooses to exercise its discretion is for it alone to decide, it is recommended that it adopt a conservative approach, which is suggested to imply not using a proxy equity beta that is too far from the range of previous, relevant regulatory decisions.*[14]

The ACG paper indicates that the quality of the data is inadequate to draw a conclusion about the equity beta and they recommend against a shift from previous decisions. However, the Commission appears to have ignored this recommendation in setting the equity beta.

The Draft Decision on the equity beta represents a significant move away from the previous range of relevant regulatory decisions. In particular, GasNet notes the following:

(a) In the December 2000 draft decision on the Moomba-Sydney pipeline, the Commission noted that the revenues on the Victorian transmission system, which operates under a market carriage regime, show a greater sensitivity to changes in economic conditions than the Moomba-Sydney pipeline, which operates under a contract carriage

[13] The Allen Consulting Group, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, July 2002, p.6.

[14] The Allen Consulting Group, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, July 2002, p.6.

system. Consistent with that view, the Commission approved an equity beta of 1.16, lower than the equity beta of 1.20 currently prevailing on the GasNet system.

(b) The Commission approved an equity beta of 1.5 on the Central West pipeline in June 2000 and an equity beta of 1.16 on the Amadeus to Darwin pipeline in May 2001. OffGar approved an equity beta of 1.2 on the Dampier to Bunbury pipeline in June 2001 and 1.33 on the Goldfields pipeline in April 2001.

(c) As recently as July 2002, the Commission confirmed its view on the appropriate beta for a gas transmission pipeline, when it approved a beta of 1.16 for the Moomba-Adelaide pipeline. This pipeline also operates under a contract carriage regime.

(d) While the Commission approved a beta of 1.0 for the PowerLink system, it should be understood that this company operates under a revenue cap. Its revenues do not change with changes in demand. On the contrary, GasNet revenues are linked to demand, which in turn is known to be linked to economic factors. Accordingly, one would expect GasNet to have a higher systematic risk than PowerLink.

On the basis of the pattern of these decisions, the logical response to the ACG recommendation would be to approve a beta of at least 1.16. Further, GasNet submits that since the Moomba-Adelaide and Moomba-Sydney pipelines are contract carriage pipelines, they would have a lower systematic risk (a point noted by the Commission in the EAPL Moomba-Sydney Draft Decision). On this basis, the ACG recommendation would be consistent with an equity beta of no lower than the current value of 1.20.

GasNet notes that the ESC has approved an equity beta of 1.0 in its draft decision on the gas distributors access arrangements. However, GasNet submits that gas distributors are likely to have a lower systematic risk than GasNet for a number of reasons. Firstly, the gas distributors' revenue is heavily weighted to the residential market, whereas GasNet's revenues are weighted 50% to the industrial market. Accordingly, GasNet's revenues are likely to show a higher level of systematic risk. Secondly, GasNet has a lower ratio of variable operating costs to total revenues, which increases the impact of revenue fluctuations on equity returns[15]. Finally, a Fixed Principle has been approved for the gas distributors which removes all redundancy risk from these companies for 30 years, whereas GasNet is exposed to both full and partial redundancy risk.

An evaluation of the ACG paper

ACG has calculated the equity beta from a range of Australian, US, Canadian and UK companies which ACG considers are comparable to GasNet. However, ACG cautions against relying on the evidence it has collected. With respect to the Australian data, ACG states:

[15] The ratio of operating costs (including tax) to revenue is 40% for the distributors, but only 30% for GasNet. GasNet's operating costs also have a higher fixed component. This implies a higher level of operating leverage for GasNet, and hence a higher beta. R.A. Morin, *Regulatory Finance - Utilities Cost of Capital*,p.364-367.

> *"First, the primary source of evidence – which derives from the listed Australian entities – consists of a group of only four firms. Moreover, only two of the firms have been in existence for long enough to permit the AGSM's-preferred four years of observations to be used, with the beta estimate of one of these – the Australian Pipeline Trust – being based upon only 21 observations (just above the cut-off that the AGSM Risk Management Service applies for providing beta estimates)."*[16]

With respect to the overseas company analysis, ACG states:

> *"Secondly, we are concerned about the magnitude of the beta estimates derived for firms operating in other countries. The re-levered equity betas for the US firms, in particular, are substantially lower than the estimates that have been obtained from past time 'sampling windows'. It could be hypothesised that the recent events on US share markets – such as the large surge in the values of high-technology stocks and then their subsequent fall – may have affected the beta estimates, and which may have biased the estimate of the forward-looking beta risk of these firms if those events were not considered by investors to be normal events. However, it is impossible to prove or disprove such a conjecture."*[17]

This suggests that, despite having conducted an extensive analysis of overseas companies, ACG is not convinced by its analysis. Notwithstanding the doubts expressed by ACG as to the usefulness of the analysis, it still attempts to draw conclusions from the data. For example, ACG states:

> *"Rather, the latest evidence from these markets would be more supportive of a view that the Australian estimates overstate the true betas for these activities, although concerns are expressed with the reliability of the beta estimates from these other countries."*[18]

GasNet submits that this, and similar statements, are an attempt to draw conclusions which are not warranted by the evidence.

On the basis of a fair reading of the ACG paper, GasNet considers that the empirical evidence is not available to support an estimate of the equity beta. GasNet concurs with the recommendation of the ACG that the Commission has no evidence to support a shift from previous decisions on transmission pipelines.

GasNet has commissioned a paper from David Robinson of Ernst & Young (see Annexure B) to review the evidence put forward by the Commission on the beta. GasNet has been informed by the Commission that the ACG paper is the only external report informing its draft decision on the equity beta. Therefore, the focus of the Robinson paper is a critique of the ACG methodology.

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16 The Allen Consulting Group, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, July 2002, p.42.

17 The Allen Consulting Group, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, July 2002, p.42.

18 The Allen Consulting Group, *Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities*, July 2002, p.5.

The thrust of the Robinson analysis is that there are numerous concerns in relation to the methodologies applied and in the quality of the data that is available. These include:

(a) a lack of comparative companies;

(b) insufficient sampling periods;

(c) large standard errors;

(d) small sample biases when averaging betas;

(e) no adjustments for potential differences between domestic and foreign beta factors; and

(f) potential biases in beta measurements due to non-standard statistical properties of the data.

Robinson also queries the assumptions made by ACG which were used to critique the NECG paper submitted by GasNet in March 2002.

In addition, in reviewing the companies that are considered to be comparable to GasNet, ACG makes no allowance for the actual differences that do exist. For example, AGL and United Energy have significant retail interests. Furthermore, the Australian Pipeline Trust is significantly bigger than GasNet, has locational and regulatory diversity of assets, and most importantly, has limited volume risk, being a contract carriage pipeline. These differences have not been analysed.

From a reading of the ACG and Robinson papers, GasNet considers that the empirical data is not adequate to draw firm conclusions on the equity beta. The NECG paper submitted by GasNet in its original Submission indicated a range of possible results which suggest an equity beta higher than 1.0.

Regulatory consistency

As discussed above, the Epic Energy Case makes it clear that the Commission must give fundamental weight to the factors listed in section 2.24 of the Code in its assessment of GasNet's revised Access Arrangement.

GasNet submits that in setting the value of the equity beta, the Commission has failed to give any weight to GasNet's legitimate business interest in ensuring that a reasonable equity beta is maintained.

When GasNet purchased the transmission network in 1999, it did so on the basis that the regulatory regime would be applied in a consistent manner over time. In particular, GasNet had a legitimate expectation that, in the absence of any material change in the underlying circumstances, the Commission's calculation of the equity beta would not change significantly. Similarly, GasNet is now owned predominantly by retail investors (superannuants) who invested in and rely on the yield from their investment. These investors all acquired their interests in GasNet after November 2001, after the majority of the decisions noted above. It is reasonable for these investors to rely on the precedents that the ACCC has provided.

As indicated above, the Draft Decision on the value of the equity beta represents a significant shift form the 1998 Final Decision and from more recent decisions of the Commission. GasNet submits that in setting an equity beta of 1.0, the Commission has failed to give weight to GasNet's legitimate business interest in ensuring that it obtains a reasonable return on its investment.

Other factors

In addition to the ACG paper, the Commission relied on three factors to support the lower beta.

First, the Commission suggests that as the asset beta approved in the 1998 Final Decision included an allowance for specific risks and specific (or asymmetric) risks are now to be provided for separately, the asset beta should be reduced.

However, in its 1998 Final Decision, the Commission simply stated that these risks were hard to quantify and should be taken account of by choosing beta estimates towards the top end of the plausible range. The specific risks were simply one of a number of intangible factors taken into account by the Commission. In particular, there is no evidence that if the Commission had ignored specific risks, it would have reached a different view on the asset beta or what the quantum of that difference would have been (indeed using the allowance in the recent Draft Decision as a guide, the impact would have been negligible).

Second, the Commission notes that the 1998 Final Decision reflects the view that revenue or price cap regulation is more risky than rate of return regulation. The Commission goes on to observe that it proposes to accept the removal of the feature which "allowed most of the [sic] GasNet's first period revenue shortfall to accrue" and that there is a "frequently held view" that utilities are less risky than the market average.

These observations are not a sufficient basis to conclude that a lower asset beta is warranted. The reference to the feature of the revenue control formula is presumably a reference to the liberalisation of the tariff control, in particular, the K factor. However, this accounts for about only half of the $19.3 million revenue shortfall that GasNet has already experienced in the First Access Arrangement Period to end 2001 (and even then does not fully compensate for the lost time-value of money). The other half (primarily the result of lower volumes) will never be recovered.

In addition, the Commission provides no basis for the "frequently held view". Even if this can be established, GasNet contends that it is inappropriate to compare the current risk profile of GasNet with the traditional utility risk profile. GasNet is not a 'traditional' low risk utility, as this term is conventionally understood. Historically, most Australian utilities have been government owned, and therefore protected from financial failure. Similarly, the traditional US utility is subject to low risk, rate-of-return regulation, and supported by take-or-pay contracts. However, the Victorian Government reform process has significantly increased the level of risk on infrastructure businesses in Victoria. There is simply no comparison between traditional

views of utility risks and the risks now being experienced in the reformed Victorian market.

Also, it is difficult to see how the Commission can place much weight on informal assertions, particularly when it has commissioned its own (admittedly inconclusive) empirical study.

GasNet also disputes the view expressed in the Draft Decision that an equity beta of 1.2 implies greater volatility than the market as a whole, and that it is inconsistent with the general market assessment that utilities are less risky than the market average. This comment ignores the higher gearing of utilities, which implies a higher equity beta through the effect of financial leverage. To make a proper assessment, it is required to deliver the equity beta and compare asset betas. The asset betas approved in the past by the Commission are lower than the asset beta of the market as a whole.

Third, the Commission claims there is no longer a need for an allowance in the asset beta for the newness of the regulatory regime and perceived uncertainties for investors. As with the specific risks, it is not clear the Commission would have made a different decision in 1998 without this factor (or what the magnitude of this difference would have been).

As discussed in section 1.2, regulatory risk often lies not in initial decisions, in which markets expect an amount of volatility, but in sudden changes of ongoing regulatory philosophy. It would be ironic for the Commission to rely on regulatory maturity as a basis for effecting a sea-change in regulatory application.

The suggestion that an allowance is no longer required for the newness of the regulatory regime is also inconsistent with the Commission's recent decision for the Moomba-Adelaide pipeline where it approved an equity beta of 1.16, notwithstanding that the Code has been in place for almost five years.

6 Revenue elements

6.1 Operating and maintenance expenditure

The Commission has proposed a number of amendments to GasNet's forecast operating and maintenance costs. GasNet's response in relation to each of these proposed amendments is set out below.

As discussed in clause 6.9 of this response, VENCorp has only recently informed GasNet that it requires at least 3 additional chromatographs to be installed on the GNS. GasNet is required to install and operate this equipment under the MSO Rules. In addition to the capital expenditure that will be incurred in installing this equipment, GasNet will also incur ongoing operation and maintenance costs in the order of $70,000 per annum. Given that this requirement only became known in September 2002, the forecast of operating costs is not yet complete. GasNet provides the estimate on the basis that it will be adjusted when accurate costings have been completed. This amount includes the following:

	Costs per unit	Total
Helium	$7,200	$21,600
Reference gas	$2,000	$6,000
Labour	$10,800	$32,400
Telemetry	$1,000	$3,000
Travel	$1,000	$3,000
Parts	$2,000	$6,000
Total	$24,000	$72,000

GasNet proposes to add this amount to each year's forecast operating and maintenance costs, except that in the year 2003, the cost will be pro-rated for half a year.

6.2 Allocation of costs

The Commission suggested in its Draft Decision that listing costs, governance costs and increased insurance costs have been overestimated on the basis that these costs have not been allocated between GasNet's regulated and unregulated operations.

GasNet has reviewed the information provided on these costs in the draft AA Information and determined that the full costs rather than the allocated costs were shown in the relevant tables. Accordingly, GasNet will amend its AA Information to include the correct figures. GasNet notes that the tariff model which has been provided to the Commission includes the correct allocation of these costs. Consistent with the AA Information, GasNet has now updated its estimate of insurance premiums. The result is a slight increase in the costs identified in the original submission.

6.3 Ongoing litigation expenses

In the Draft Decision, the Commission rejected GasNet's proposal to include an allowance for ongoing litigation expenses arising from the Longford incident in 1998. The Commission suggested that this allowance was not appropriate given that the Longford incident occurred prior to the commencement of the First Access Arrangement Period and GasNet was compensated for such risk through the beta parameter in the First Access Arrangement Period. Further, the Commission argued that it was unreasonable to expect users to fund GasNet's litigation given that GasNet has not proposed to share any compensation received with users should it be successful in court.

The Commission's response on this issue reflects a misunderstanding of GasNet's involvement in the Longford litigation. GasNet has not brought proceedings in anticipation of obtaining compensation. Rather, it is defending an action brought by other parties. On this basis, the Commission's assertion that it is unreasonable to expect users to fund GasNet's litigation is unfounded.

Further, while the Longford incident occurred prior to the First Access Arrangement Period, the action against GasNet was brought after the regulatory period had begun, and was therefore not a consideration at the time the GasNet rate of return was set.

GasNet understands that the Commission may be reluctant to approve the costs associated with the Longford litigation when it is difficult to determine in advance what those costs might be. For this reason, GasNet suggests that it may be more appropriate to deal with these costs using the pass-through mechanism set out in clause 6 of GasNet's draft Access Arrangement.

6.4 Regulatory review costs

The Commission has requested that GasNet provide an itemised breakdown of its regulatory review costs. This information will be provided when the costs are finalised.

6.5 Capital raising costs

GasNet's response to the Commission's proposals on capital raising costs is set out section 5.6.

6.6 K Factor

The Commission proposed that GasNet amend its revised AA Information so that the estimated K factor under-recovery to be recovered from the benchmark revenues is $10,359,839 in 2002 dollars adjusted to 2003 dollars using the formulae in schedule 5 of the Tariff Order. The Commission also proposed that GasNet amend section 3.5 of its revised AA Information to state that annual tariffs set for 2003 will be adjusted to reflect the 2002 K factor carry over, which is to be calculated at the annual tariff review process at the end of 2002.

As stated in its Submission, GasNet considers that the better approach is to use the K factor balance as at the end of 2002 as the input into the 2003 - 2007 tariffs. In practice, this will result in almost the same tariffs for 2003 as would have been calculated using the Commission's two step proposal in the Draft Decision where the closing 2001 balance is used in the base revenue requirement calculation and the tariffs are later adjusted for the actual 2002 K factor. Moreover, this approach has the advantage that the tariffs approved by the Commission in its Final Decision will be exactly those charged in 2003 whereas, under the Commission's proposal, the tariffs charged would be different to those approved, reflecting the addition of the 2002 K factor.

As the K factor calculation is a rolling calculation over the regulatory period, the use of the value calculated in November 2002 provides the correct value to be applied to the revenue requirement for the next regulatory period. It removes the requirement to calculate the proportion of the 2001 closing K factor balance forecast to be recovered and the proportion of that amount which has actually been recovered during 2002.

If this methodology is adopted, there will still be a requirement to calculate the Ktb balance for 2002 when the 2004 tariffs are being set at the end of

2003. The value of the balance will be calculated according to the methodology set out in Schedule 5 of the Tariff Order.

It is important to note that the interest factor is applied to the closing K factor balance in each year before it is factored into the calculation of the maximum average tariff for the following year. Accordingly, the value of the K factor calculated for the end of 2002 must then have the interest factor applied to it for the purpose of determining the opening value for 2003. Once the opening value is set for 2003, that figure then needs to reflect the cash flow timing assumed in the revenue requirement model (ie receipt at the end of the year). This means that the balance must be escalated so that the future value at the end of 2003 is the same as the calculated opening value.

GasNet does not propose to calculate a value for the balance at the end of 2002 until it has the final volume data for the current winter period (in late October). At that time GasNet will provide the Commission a model which will calculate the balance for the opening of 2003.

For any calculations that the Commission might wish to undertake before a final value for the K factor balance is known, GasNet's best estimate at this time is that opening balance for 2003, calculated as outlined above, will be close to $14 million.

The Commission agrees in principle with GasNet's proposal to change the rebalancing control formula for individual tariffs but considers that the proposed maximum increase in tariffs of 2% above the average increase is unreasonable.

GasNet stands by its position set out in its Submission that it is appropriate to retain some flexibility to rebalance the relative weights of one tariff component against another and that it is reasonable to set the proposed maximum increase at 2%.

6.7 Asymmetric risk

In its draft AA Information, GasNet included an estimate of costs which represents compensation for asymmetric risks. These estimates were based on a review of GasNet's business conducted by Trowbridge.

From a rate of return viewpoint, the asymmetric risks are a sub-set of diversifiable risks. Diversifiable risks arise from entity-specific events which are not correlated with market returns and which are therefore not recoverable from the cost of capital. Where an event has symmetrical outcomes, the events will not affect the present value of anticipated returns over the life of the asset. However, where the financial outcomes are asymmetric, the present value of anticipated returns will be below the value of the capital base. In such circumstances, a compensating adjustment to the cashflows is justified.

GasNet has proposed an annual adjustment of $0.75 million to the cashflows to allow for a range of identified risks. However, the Commission has approved an amount of only $0.022 m. This is summarised below.

Risk	GasNet Submission ($'000s)	Commission Draft Decision ($'000s)
Property	20	10
Deductibles	140	0 (pass through)
Credit	252	12
Terrorist	65	0
Stranding	75	0
Other	200	0
Total	752	22

The basis for this decision is that the Commission:

(a) disputes that the relevant risk identified by GasNet is asymmetric in nature;

(b) disputes the calculation of the specific amount; or

(c) proposes a pass through of the financial consequences of specific events.

GasNet accepts that informed parties could come to different views on the financial consequences of rare or unpredictable events. However, GasNet submits that it has been conservative in its proposals and that there may in fact be additional asymmetric risks which are not identified in its Submission.[19]

In the event that the Commission maintains its current view that some of the risks identified by GasNet are exaggerated or that the relevant premium is too high, GasNet considers that it should be given an option to pass through the costs of that event, rather than seek a self-insurance premium.

Deductibles

GasNet agrees with the Commission that the proposed pass through mechanism is a reasonable way to deal with the issue of deductibles.

Credit risk

The Commission has approved an amount of $10,000 for this risk, compared to the Trowbridge estimate of $200,000. In coming to this position, the Commission appears to have relied entirely on the response of the ESC to a similar claim made by the gas distributors in Victoria.

However, there are significant differences between the payment protections afforded to the gas distributors and the protections afforded to GasNet under the market carriage system. In its draft decision on the gas distributors access arrangements, the ESC noted that gas distributors are already substantially shielded from credit risk:

> *…The Commission considers that these assumptions substantially understate the protection that the distributors will achieve as a result of*

[19] For example, statutory liability insurance, costs of replacing equipment after failure and earthquake risk.

> *the Commission's Draft Decision in relation to the 'terms and conditions for the reference services'. The Commission has accepted the principle implicit in the distributors' terms and conditions that the distributors be substantially shielded from credit risk, only requiring an amendment to permit firms with an investment grade credit rating and good payment history to be exempt from the requirement to obtain a bank guarantee (mirroring the Victorian electricity credit support arrangements).*[20]

GasNet does not have the same protections as those put in place for the distributors. The only contractual relationship GasNet has with users (typically gas retailers) is an indirect relationship through the Gas Transportation Deeds. The Gas Transportation Deeds do not impose any creditworthiness restrictions on the users.

The MSO Rules allow a wide range of possible Market Participants to flow gas on GasNet pipelines. These include retailers, transmission customers and traders. Although the MSO Rules do impose certain prudential requirements on these potential users, they do not protect a gas transmission company from defaulting users. Therefore, GasNet is uniquely exposed to customer default.

The ESC also relied on the fact that retailers generally have credit ratings of BBB or higher and therefore the risk of default is relatively small. However, as indicated above, GasNet is not only obliged to transport gas for retailers but also for transmission customers and traders who use the transmission system but may not use the distribution system. There is currently one transmission customer and it is possible that there could be numerous new customers (including a number of new gas-fired power stations) in the next five years. While some of these new users may be subsidiaries of larger companies, it is our understanding that some new developments are project financed and do not have recourse to the parent company. While there are currently no market traders on the transmission system, there is the potential for such users to enter the system. The recent collapse of Enron is evidence that a real risk of default by a trader exists.

If the Commission rejects a reasonable self-insurance premium for credit risk, then GasNet considers that it would be appropriate to include this risk in the pass through mechanism contained in GasNet's draft Access Arrangement. While this would result in a marginal reduction in tariffs, if a credit event occurred, then there would be a significant one-off tariff increase for users, which the users may not have budgeted for.

Terrorist threat

The Commission has rejected GasNet's proposal to include an amount of $0.065 million for terrorist threat on the basis that the threat of terrorist sabotage is very small and the estimate of the premium would be subjective. Further, the Commission expressed the view that all companies face a similar risk and accordingly, the risk is already accommodated by the market.

GasNet does not agree with the Commission that the terrorist threat is immaterial. GasNet notes that insurance companies formerly covered

[20] Essential Services Commission, *Draft Decision: Review of Gas Access Arrangements*, July 2002, p.274.

terrorist sabotage, but now refuse to cover this risk after the events of 11 September 2001. This implies that the risk is not regarded as small or immaterial by insurance companies. The fact that the risk is difficult to quantify does not mean that the prudent premium is zero. GasNet submits that its proposal is very conservative, particularly as it only contemplates damage to above-ground assets.

It is not correct to disallow a self-insurance premium because the whole market suffers the same risk. The fact that the whole market suffers the same risk does not imply that the risk is diversified to zero, or that it becomes a non-diversifiable risk. So long as this specific risk is present, the value of GasNet's business will be reduced and accordingly, a cashflow adjustment will be required.

As indicated above, if the Commission does not allow a self-insurance premium for this type of event, GasNet proposes that such an event be included in the pass through mechanism contained in GasNet's draft Access Arrangement. As above, this could cause a very significant one-off tariff jump.

Uplift risk

The Commission considers that it is not appropriate for GasNet to self insure for the liability associated with equipment failure on the basis that equipment maintenance is GasNet's core business.

GasNet submits that any diversifiable risk, no matter what the cause, which has an asymmetric outcome, must be compensated for in the cash flows. A failure to do so will result in a mismatch between the present value of the business and the target capital base value.

The fact that equipment can fail and exposes GasNet to uplift penalties, means that the GasNet return to equity will fall below the fair and reasonable target level. Clearly, this cost will be minimised to the extent that GasNet is a skilled and prudent operator. However, even the most skilled and prudent operator cannot avoid all possible failures, in particular random equipment failures.

A prudent business would make an assessment of the appropriate level of resources to be devoted to equipment maintenance. If a very high investment is made in operating and maintenance resources, the failure cost could be made close to zero. However, this would lead to higher operating costs and an excessive tariff. The prudent course would be to draw a balance between excessive maintenance costs on the one hand and the costs of failures on the other. However, in making this assessment, the business must cover off the costs of those failures as well as the annual operating and maintenance costs, or the business value would fall. Accordingly, GasNet believes it is prudent to make some provision for the costs of equipment failure in the cashflows.

In assessing the cost of failures, GasNet originally proposed that the entire cost to GasNet would be the uplift liability. However, upon further consideration it is our view that there are also costs to rehabilitate and replace failed equipment, above and beyond the budgeted operating costs. Together

with the market compensation costs, GasNet proposes a cashflow adjustment of at least the Trowbridge estimate of $65,000 and up to $100,000 per annum.

Key person risk

The Commission has rejected the self-insurance premium of $72,000 for key person risk as unwarranted, because there is no likelihood that departure of a key person would cause a loss of income. However, this analysis does not address the argument put forward by Trowbridge in its report.

Trowbridge identified three costs associated with the departure of a key person, being:

(a) standard replacement costs;

(b) additional replacement costs (related to the specialisation or high skills of a person); and

(c) business disruption costs.

Trowbridge excluded the standard replacement costs on the basis that this would be part of the standard budgeted operating costs of the business. However, based on an actuarial analysis of the probability of a key person leaving, Trowbridge calculated additional replacement costs as $17,600 and business disruption costs as $54,400.

The Commission interprets business disruption costs to mean loss of income from tariffed services. GasNet agrees that this is unlikely to occur. However, business disruption also includes the additional costs of hiring consultants and contractors to undertake the work normally undertaken by the key person and the potential cost of correcting errors made in the absence of the key person (such as inefficient use of existing resources, inappropriate management of inventories, inefficient design work, etc). On this basis, GasNet submits that the Trowbridge estimate is reasonable.

Employment Practices Insurance

The Commission rejected GasNet's proposals in relation to self insurance for wrongful acts in relation to employment practices on the basis that all businesses face a similar risk.

However, GasNet believes that this risk is asymmetric and diversifiable (that is, there is no correlation between the employment practices claims across businesses), and therefore the cost should be recovered as a cashflow adjustment. The fact that other businesses may bear similar costs does not change the fact that GasNet must be compensated for this cost in order to be held whole.

6.8 Working capital

The Commission proposes that GasNet amend section 3.5 of its revised AA Information to remove the proposed allowance for working capital from its revenue calculations. The Commission expressed the view that spare parts and linepack inventories do not form part of the generally accepted definition of "working capital" and instead form part of the capital base of the firm.

The Commission also suggests that linepack and inventories were included in the GHD valuation as part of the capital base but excluded in the Final Decision and therefore GasNet should not be allowed to receive a return on these items.

GasNet acknowledges that the GHD valuation included a value for linepack and inventories. However, in the Final Decision, these assets were separated out from the asset base and included in the calculation of working capital for the current Access Arrangement Period. Therefore, the approach adopted by GasNet for the revised Access Arrangement is consistent with that approved by the Commission for the current Access Arrangement Period.

GasNet did include an amount for linepack and inventories when it purchased the business from the Victorian Government. However, these items were included in the purchase price as part of working capital, not the regulated capital base.

6.9 Capital expenditure

The Commission proposes to accept most of GasNet's forecast capital expenditure but disputes the forecasts in relation to:

(a) the Brooklyn Loop;

(b) the Stage 2 Lurgi line rehabilitation; and

(c) service lines.

GasNet acknowledges that, on the assumption that the gas will flow from the Yolla field, it is unlikely that the demand forecasts will support the construction of the Brooklyn Loop. Therefore, GasNet will amend its capital expenditure forecast to exclude amounts relating to the loop. In the event that gas does not flow from Yolla and there is a need to construct the Brooklyn Loop, GasNet will make an application at that time to include the pipeline in the asset base.

In relation to the Stage 2 Lurgi line rehabilitation forecasts, GasNet understands that the Commission may be reluctant to approve these costs when the scope of work and range of costs are uncertain. Accordingly, GasNet will remove this amount from its capital expenditure forecasts. If the stage 1 works reveal that further work is required, GasNet will make an application to include this capital expenditure in the asset base.

In relation to the inclusion of forecast capital expenditure for service lines, GasNet agrees with the Commission that if amendments to GasNet's extensions and expansions policy to allow service lines to be excluded from the Access Arrangement are approved, it may be unreasonable to include the cost of service lines in the forecast capital expenditure. On this basis, GasNet will amend its capital expenditure forecast to exclude amounts relating to the service lines. However, if GasNet constructs any service lines during the Second Access Arrangement Period which it elects to include in the Access Arrangement, it will make an application to include this capital expenditure in the asset base.

In addition to the changes proposed by the Commission, GasNet has recently been informed by VENCorp that, under clause 4.3.3(a) of the MSO Rules, GasNet is required to install 3 new gas chromatographs (GCs) on its transmission system at or near North Paaratte, Lara and the Brooklyn compressor station (a copy of the direction from VENCorp is contained in Annexure C). The requirement for these GCs has arisen from the more complex gas flows and different gas compositions associated with different sourcing of gas. These GCs have been identified by VENCorp as being required to calculate heating values for gas flowing at those locations with a sufficient degree of accuracy to allow the energy content of gas measured at affected offtakes to meet the accuracy required under Schedule 4.1 of the MSO Rules.

Under clause 4.3.3(a)(2) of the MSO Rules, GasNet, as Transmission Pipeline Owner, is required to pay for these installations. GasNet's practice with regard to the recovery of costs associated with GCs is as follows:

(a) those located at injection points are charged to the injection point charges;

(b) those which are embedded in the transmission system are charged through the transmission tariff; and

(c) those located at withdrawal points are allocated to the withdrawal point charges (unless the information is used to calculate energy values elsewhere in the transmission system, in which case a proportion will be recovered as for embedded sites).

GasNet was aware that VENCorp had previously canvassed the possibility of further GCs on the GNS. This possibility had been reviewed in mid 1999 at the time that the SWP was commissioned. This review concluded that the cost of these installations would not be justified at the time. VENCorp did not indicate prior to August 2002 that they had come to a different conclusion. As a result, GasNet did not include any allowance for this capital investment in the forecasts contained in its Submission. As VENCorp now requires GasNet to make this investment, GasNet proposes to add the capital costs to its capital investment forecast.

As the requirement has only been identified this month, GasNet does not yet have final capital cost forecast. However, preliminary indications are that the costs will be as follows.

North Paaratte	$272,000
Lara/Corio	$260,000
Brooklyn	$370,000

It is expected that this investment will be made in 2003.

6.10 Depreciation

The Commission has accepted GasNet's proposals in relation to the economic life for non-pipeline assets and for each of GasNet's pipelines, with the exception of the Longford pipeline.

With respect to the Longford pipeline, the Commission rejects GasNet's proposal for an end date of 2024 and instead proposes that GasNet retain the current assumption of 2030. In coming to this conclusion, the Commission appears to have given weight to the views expressed by BHP Billiton in its submission on GasNet's Access Arrangement. However, the Commission does not provide any explanation as to why it has not given weight to the conclusions set out in the Saturn Resources report commissioned by GasNet.

GasNet notes that a recent report issued by ABARE[21] is consistent with the proposal put forward by Saturn Resources and GasNet. ABARE concludes that it is unlikely that the Gippsland basin will maintain production beyond 2020 unless substantial further discoveries are made. ABARE has conducted a sophisticated modelling exercise on gas supply and demand in Australia, using its proprietary MARKAL model to match supply and demand. This model takes account of the economics of gas supply and transportation and generates the most likely production scenarios in each gas basin and the associated interstate transfers of gas.

ABARE has used its previously published demand forecast, which is similar to that used in the Saturn Resources report. However, it also considered a high scenario, based on new uses for gas, which was not used in its supply/demand evaluation, but which would result in an earlier depletion of gas fields if it eventuated.

With respect to gas supply, ABARE has used the current estimates of commercial and non-commercial gas reserves from Geosciences Australia. It has assumed that non-commercial reserves will be developed (by further exploration and development work) as required to maintain supplies. However, it has included an estimate of "unidentified resources" for the Gippsland basin, which is 1358 PJ above the current reserves estimates of 8368 PJ. This compares to the approach of Saturn Resources, which included an additional 3000 PJ for "undiscovered resources" in their probabilistic scenarios. Without this allowance of 1358 PJ for undiscovered gas in the Gippsland basin, the fields would be depleted 3-4 years earlier than their quoted end-date of 2020.

In conducting its analysis, ABARE has assumed that for all practical purposes a gas basin is depleted before all identified gas reserves have been produced from the fields. This reflects the reasonable assumption that production is expected to cease when the costs associated with extracting the last of the gas from tight formations render further production uneconomic.

ABARE concluded that:

> *"..while the modelling results suggest these established south eastern markets will not require significant new supplies for other regions before 2019-20, at the end of the study period almost all eastern*

[21] ABARE, *Australian Gas Supply and Demand Balance 2019/20*, August 2002.

> *Australian gas reserves are depleted or nearing depletion with only an estimated three years worth of production remaining in 2019-20".*[22]

On this basis, and noting that a proportion of the gas reserves in a basin will not be economical to produce, the conclusions of the ABARE study support an economic life for the Longford pipeline of 2020.

ABARE notes that there may be further gas discoveries which would extend the life of the fields. However, ABARE does not expect significant new discoveries, stating that:

> *"The Gippsland basin is also a mature basin, and while industry consensus is that hydrocarbon accumulations are likely to be located in the many undrilled offshore areas of the basin, it is unlikely these discoveries will be large".*[23]

Saturn Resources has made a reasonable allowance of up to 3000 PJ for new gas discoveries in the Gippsland basin. This is a 35% increase over known reserves, and 1640 PJ above the undiscovered reserves estimate of ABARE. This assumption supports a life of 2024 for the Longford pipeline.

A recent critique of the ABARE study by APIA does not, in GasNet's opinion, change the conclusions drawn by ABARE in respect of the Gippsland reserves. The critique is most focussed on the potential for competition between Timor/PNG gas and coal seam methane in Queensland and NSW.

BHP Billiton has suggested that the life of the Gippsland basin based on known reserves is 2037. In support of this view, they assert that the Eastern Gas Pipeline (EGP) would not have been constructed if the owners had anticipated a reserve life of only 2024, implying that the pipeline could not be economic over this period. However, GasNet has determined that the EGP can be economic if the pipeline captures a sufficient proportion of the NSW market, even though the flows might cease in 2024 (a model has been provided to the Commission). In fact, the scenario put forward by BHP Billiton, in which the EGP captures only 25 % of the NSW market (an assumption which leads to a longer life for the Gippsland field reserves), is less profitable for the EGP. GasNet is not making any assertions about likely EGP flows, but points out that the construction of the EGP is not inconsistent with the shorter life of the Gippsland fields.

In support of its contention that further gas discoveries will be made in the Gippsland basin, BHP Billiton states that it has commenced a Northern Margin seismic survey. However, it does not give any indication of the likely prospects for further discoveries, or whether the assumptions made by ABARE (1360 PJ) or Saturn Resources (3000 PJ) are inconsistent with its expectations from this exploration activity.

GasNet acknowledges that there are prospects for further discoveries in the Gippsland basin, which would extend the life of the Longford pipeline.

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[22] ABARE, *Australian Gas Supply and Demand Balance 2019/20*, August 2002, p.3.

[23] ABARE, *Australian Gas Supply and Demand Balance 2019/20*, August 2002, p.12.

However, Saturn Resources has made an allowance of 3000 PJ for undiscovered reserves, which is 35% of current reserve estimates. GasNet believes this is a reasonable assumption, particularly in light of the ABARE opinion quoted above that large discoveries are unlikely in the Gippsland basin.

Irrespective of the assumptions made about undiscovered reserves, GasNet believes that the economic life of a regulated pipeline should be based on reliable, scientifically established reserve estimates (such as provided by GeoSciences Australia), and not on possible outcomes of speculative exploration activity. A bank would not lend to a new pipeline project on the basis that returns are subject to the discovery of new reserves at some time in the future. The same principal applies to the existing Longford pipeline. Moreover, even if new gas discoveries are reasonably anticipated, it is not possible to know in advance that they will be economic to produce against competitive alternatives, such as Otway or Timor sea gas. For example, the potential gas discoveries could be in uneconomical tight formations, or may lack sufficient gas liquids to raise the financial returns above the hurdle rate.

6.11 Inflation

The Commission proposes to use the expected inflation rate determined by the relevant bond rates, currently 2.5 %, to adjust the Capital Base through the Second Access Arrangement Period.

GasNet considers that this is an appropriate method of calculating the expected inflation rate.

7 Volumes and revenue

7.1 Demand forecasts

The Commission proposes to accept GasNet's proposed annual volume forecasts for the Second Access Arrangement Period but will consider further submissions from interested parties before making its final decision.

GasNet has conducted further investigations into the warming trend. The figure contained in Annexure D shows the Annual Effective Degree Days ("**EDD**") with the identified warming trend. The estimated actual for 2002 has been plotted, based on the actual weather to date and an assumption of average weather for the remainder of the year. GasNet is concerned that the 2002 value is the second warmest on record and that the last six years have been below the trend line, which suggests that there may have been a shift in the weather in Victoria. A reduction in demand due to a shift in weather patterns is a specific risk which should be compensated by an adjustment to cash flows. It is not an issue which affects beta risk nor is it compensated by the beta factor in the CAPM. GasNet proposes that there should be a reassessment of weather patterns in 2004, by which time it will be apparent if there has been a shift in weather patterns. If this fact can be substantiated,

GasNet proposes that the forecast volumes for 2005 to 2007 be adjusted for the impact of the shift in EDDs[24].

GasNet is proposing to levy injection tariffs on the top 10 peak days at each injection point. The forecast peak day volumes are strongly influenced by the top 10 coldest days (in EDD terms) through winter. GasNet did not include a warming trend in the peak day forecasts because it believed that the 10 peak days would follow the same trend as the peak day. GasNet's own analysis confirmed the analysis of VENCorp as reported in the VENCorp Annual Planning Review, that there is no significant trend in the peak day. Therefore, GasNet did not allow for a trend in the top 10 days. However, subsequent analysis has shown that the sum of the top 10 days in the winter shows a strong trend. This is demonstrated in the attached figure. In statistical terms, the trend is more significant than the trend identified in the annual EDD totals. GasNet's opinion is that the peak days may also show a trend, but that this is masked by the larger fluctuations apparent in the peak day. The trend in the top 10 days is consistent in percentage terms with the trend in the annual EDD.

Accordingly, GasNet proposes to amend the forecast of the top 10 peak days to allow for the identified weather trend.

GasNet also proposes to make some minor amendments to the zonal volume forecasts to reflect the latest information from the 2001 actual flow data. The volumes submitted in March were based on year 2000 actual as the final settlement data for 2001 was not available at that time.

7.2 Supply forecasts

GasNet considers that it is probable that the Yolla field will be developed and proposes to amend its injection forecasts appropriately. However, GasNet will continue to monitor the progress of this project. GasNet notes that the revised forecasts will lead to a discounted tariff for those withdrawals in Victoria which are matched to the Yolla field injections at Pakenham.

7.3 Forecast revenue

The Commission considers that GasNet's proposal to maintain the Cost of Service approach and to utilise tariff smoothing is appropriate. However, the Commission requires GasNet to make a number of changes to the benchmark revenue assumptions to reflect amendments which the Commission requires GasNet to make to the return on working capital, forecast depreciation and forecast operating and maintenance costs. GasNet's response to the Commission's proposals in relation to each of these revenue elements is discussed in section 6 of this response..

[24] The correction will require the sensitivity of demand to EDD, which is regularly determined and published by VENCorp.

8 Reference Tariffs

8.1 X-Factor

GasNet has proposed a CPI–X price control, which is consistent with the Fixed Principle in the current Tariff Order. However, GasNet has used different X factors in different zones, although in any one zone the X-Factor is fixed over the five-year regulatory period. The Commission has accepted that this proposal is consistent with the Fixed Principle.

GasNet believes that it is appropriate to maintain a zero X-Factor in certain zones. For example, where there is a bypass threat on a particular pipeline, it is desirable to maintain the tariff at a fixed real rate until volumes grow sufficiently to justify a change in the bypass tariff.

8.2 Peak and non-peak relativities

GasNet generally agrees with the Commission's comments on the degree of congestion on specific pipelines.

There is still some capacity available on the WTS, but it cannot carry a large new load. However, the proposed pipelines to South Australia will certainly target any large new load. Therefore, it is unlikely that the WTS will become congested. GasNet contends that it is inconsistent to offer prudent discounts on a pipeline and at the same time to levy peak price signals which are designed to discourage flows on the peak.

GasNet agrees with the Commission that there is potential for congestion on the Wollert-Wodonga pipeline if the northern zones receive all their gas from the south and none through the Interconnect. This may justify a peak signal on the withdrawal tariffs for supply from the south, but not on withdrawal tariffs for supply from the north. However, GasNet considers that it is impractical to levy peak charges on one pipeline alone and that there is minimal loss of economic efficiency given that gas is likely to continue to be injected at Culcairn.

In relation to injection pipelines, the Commission notes that on current forecasts there is not likely to be congestion over the next 5 years. However, there is considerable scope for flows to change on injection pipelines. Withdrawal pipelines require the establishment of a new customer before they can become congested (which can generally be forecast). However, an injection pipeline can become congested by a simple decision to source gas from another injection point. GasNet considers that it is appropriate to send a peak signal on injection pipelines so that this sourcing decision is made with proper regard to the cost of congestion on the injection pipeline. Withdrawal charges are levied on the customer, whereas injection charges are levied on the injecting Retailer, who is more likely to be responsive to the price signal than a withdrawal customer.

In addition, while congestion will not occur on injection pipelines on current forecasts, there is likely to be congestion during the subsequent Access Arrangement period. Therefore, in order to provide some continuity into the subsequent period and to provide an appropriate price signal in relation to gas sourcing, injection pipelines should bear a peak charge.

8.3 Postage stamp allocation

GasNet agrees with the Commission that unrecovered K factor and capital raising costs should not be allocated on a postage stamp basis. The unrecovered K factor will be allocated to all tariffs on a uniform percentage basis and capital raising costs be allocated on the same basis as other capital costs.

8.4 Matched rebates

As indicated in GasNet's first Submission, GasNet will allow a matched rebate where the withdrawing retailer differs from the injecting retailer, provided there is evidence of a commercial relationship between the parties. GasNet's model has already been provided to the Commission.

8.5 Prudent discounts

The Commission proposes to accept the prudent discounts contained in the GasNet Access Arrangement. As stated previously, GasNet accepts that gas is likely to be injected into the GasNet transmission system at the Pakenham injection point. These injections, and the matched withdrawals in east Melbourne, will attract a prudent discount. GasNet will amend the tariffs to allow for this prudent discount.

8.6 Tariff path

The Commission has expressed concern with the step change in tariffs between 2002 and 2003 and with the rate of decline at CPI-4.5% thereafter. The Commission believes that it is important to consider a balance between:

(a) the initial tariff change from 2002 to 2003;

(b) the slope of the price path; and

(c) the transition from 2007 to 2008.

The Commission has analysed the tariff path at the proposed WACC and has determined that a smaller initial tariff increase of 4% can be accommodated with a smaller X factor of 2% (at the cost of a greater step down in tariffs from 2007 to 2008).

GasNet accepts that there should be a balance of the three factors identified by the Commission. When the final revenue requirement for GasNet has been determined, GasNet will recalculate the tariff path with regard to these principles.

GasNet believes it is appropriate to expect some increase in zonal tariffs to allow for the inclusion of that part of the SWP which is rolled-in under the system-wide benefits test. This is consistent with the outcome that was approved by the Commission after the roll-in of the Interconnect assets.

8.7 Compliance with tariff principles

GasNet stands by its earlier view that its proposed tariffs comply with the tariff principles in the Code.

9 Access Arrangement Information

9.1 Complexity of application

The Commission has indicated that it considers the AA Information comprises both the AA Information and GasNet's Submission (including the schedules and annexures).

GasNet considers that its draft AA Information is a stand alone document and contains all the information required by users to determine whether the tariffs comply with the Code.

In contrast, the Submission is to provide a detailed explanation of the content of and principles underlying the proposed Access Arrangement and GasNet AA Information. It is not intended to form part of GasNet's AA Information.

If the Commission considers that there is any specific material which is contained in the Submission that should also be contained in the AA Information, then GasNet will consider amending the AA Information to include that material.

9.2 Further information

The Commission has requested that GasNet provide further information in relation to the following matters:

(a) KPIs on the operating costs/km/TJ;

(b) historical operations and maintenance expenditure for the First Access Arrangement Period; and

(c) data in support of GasNet's proposed inclusion of the Murray Valley Pipeline in the Capital Base.

The KPI information is contained in Annexure E. Information in relation to historical operations and maintenance expenditure and the Murray Valley pipeline has already been provided to the Commission.

10 Performance and incentives

10.1 Benefit sharing for subsequent periods

The Commission proposes to use the ESC 5-year carry-forward model. This is claimed to have a range of appropriate incentive mechanisms, such as a continuous incentive to improve each year.

GasNet acknowledges that the model has a number of appropriate incentive properties.

However, GasNet submits that the model will penalise GasNet for cost increases which are beyond management control. For example, GasNet has had to bear an increase in insurance costs of over $1.2 million in 2002, which has had a direct impact on 2002 returns. However, under the proposed efficiency sharing model, this loss would be borne for five years including the

subsequent Access Arrangement Period. The Commission suggests that the regulatory system is actually advantageous to GasNet, since in a price-taking market, the service provider would have to bear the loss indefinitely, rather than until the time of the next price reset. However, in a competitive market, costs increases such as insurance costs would be incurred by ***all*** competing entities. In such a case, the price to consumers would increase, since all competitive parties would pass the cost increase through immediately.

GasNet believes that certain cost categories should be defined which are excluded from the efficiency carry-over mechanism. GasNet proposes that the cost categories which have been accepted for the pass-through mechanism would fall into the category of costs to be excluded from the efficiency carry-over mechanism.

10.2 Benefit sharing for first period

The Commission proposes to allow GasNet no incentive payments relating to efficiencies made in the First Access Arrangement Period. The Commission concludes that the glide path mechanism is appropriate for the First Access Arrangement Period but, on the Commission's calculations, GasNet has not attained any efficiencies that would lead to a positive glide path revenue element.

GasNet submits that it has in fact achieved significant and sustainable efficiency gains in its O&M activities, particularly in the areas of pipeline and compressor maintenance. These gains should be recognised, consistent with the spirit of section 8.44 of the Code.

The Commission has agreed with GasNet that, whatever method is used to calculate carried over efficiencies for the incentive mechanism, adjustments to the raw actual and/or forecast O&M costs are required to allow for changes in scope and unexpected uncontrollable cost changes. The Commission, in its calculations in section 10.1 of the Draft Decision, has made allowance for the effects of the major increase in GasNet's scope of operations during the current regulatory period and the government's decision not to collect the Commission's regulation fee budgeted for the current regulatory period.

GasNet accepts the appropriateness of the glide path mechanism for the first regulatory period. However, GasNet considers that the Commission has not made all of the necessary adjustments to the actual and forecast O&M to enable the like-for-like comparison required for the application of the glide path.

In addition to the reduction in GasNet's cost base in the current regulatory period occasioned by the removal of the Commission's regulation fee, GasNet, along with all companies, has been subject to extraordinary increases in insurance premiums arising from a number of extraneous events. These cost increases have been accepted by the Commission as both genuine and outside the control of GasNet. The Commission has therefore allowed GasNet to treat these costs in a special category outside the normal treatment of O&M costs so that any further shocks, whether positive or negative, can be passed through in its tariffs. The Commission's decision in this matter means that, for consistency, they should also be excluded from the efficiency

calculations. This can be done by excluding it from the forecast for the next period.

GasNet has recalculated the glide path for the current regulatory period using the methodology of the Commission set out in section 10.1 of the Draft Decision together with the additional adjustment. The calculation assumes that the extraordinary increase in insurance premiums is maintained in nominal terms only. GasNet agrees with the base year (2002) O&M of $18.90 million ($ 2003) and, for the purposes of this calculation, will use the Commission adjusted forecast O&M for the 2003-2007 period. The adjusted calculation is shown in the following table.

Table #
GasNet Adjusted Glide Path Calculation
($ million)

	2003	2004	2005	2006	2007
O&M ($nominal)	18.2	19.9	19.7	21.4	21.8
Pass through insurance	1.27	1.27	1.27	1.27	1.27
Adjusted nominal forecast	16.93	18.63	18.43	20.13	20.53
Real dollars (2003)	16.93	18.18	17.54	18.69	18.60
Average ($2003)	17.99				
Variance to base year ($2003)	0.91				
Efficiency carryover ($ nominal)	0.91	0.73	0.55	0.36	0.18

10.3 KPIs

The Commission requires GasNet to provide information on operating costs/TJ/km in its comparison of Australian KPIs. This information has been provided in Annexure E.

11 Non tariff elements

11.1 Services Policy

The Commission has formed the view that GasNet does provide a service to VENCorp and that VENCorp is a "user" within the meaning of the Code.

GasNet stands by the position it has taken in both its Submission and in its subsequent responses to submissions from interested parties that it does not provide a service to VENCorp within the meaning of the Code.

11.2 Terms and conditions

The Commission proposes that GasNet include in its Access Arrangement the terms and conditions upon which it supplies services to VENCorp (which in turn are set out in the SEA and the MSO Rules).

For the reasons identified in its Submission, GasNet considers that responsibility for complying with the requirement to include the terms and

conditions upon which the reference service is provided to users should be allocated to VENCorp.

11.3 Extensions and expansions policy

GasNet acknowledges that the Commission proposes to accept revisions to its extensions and expansions policy to give greater flexibility to exclude certain pipelines from coverage under the Access Arrangement.

GasNet's Response to Draft Decision

Annexure A - Review of issues in the estimation of the risk free rate for regulatory purposes.

Review of issues in the estimation of the risk free rate for regulatory purposes

Report prepared for
Gasnet Australia Limited

ERNST & YOUNG

SEPTEMBER 2002

Authorship

This submission has been prepared by an Ernst & Young team comprising David Robinson, Peter Braithwaite, Douglas LeCocq and Ivan St Clair at the request of GasNet Australia Limited ("GasNet").

The views expressed in this report are those of Ernst & Young and do not necessarily reflect those of GasNet.

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1 Background

1.1 Task & Appointment

In August 2002 GasNet Australia Limited ("GasNet") engaged Ernst & Young to provide comments to GasNet on a number of weighted average cost of capital ("WACC") issues detailed below arising from the Australian Competition & Consumer Commission ("ACCC") "Draft Decision, GasNet Australia Access Arrangements Revisions for the Principal Transmission System" (" Draft Decision"), released in August 2002.

In its Draft Decision the ACCC has concluded that five-years is an appropriate maturity for setting the risk free rate. In doing so it has had regard to a paper provided to it by Martin Lally titled "Determining the risk free rate for regulated companies". The purpose of this engagement was for Ernst & Yong to provide comments to GasNet in relation to the following:

- the regulatory period vs. life of the asset argument for the risk free rate.
- review the Lally paper and provide a critique of its contents; and
- the current practice regarding the setting of the risk free rate by other regulators both in Australia and internationally;

2 Review of the regulatory period vs. life of the asset argument for the risk free rate

2.1 The risk free rate

The risk free rate should reflect a rate of return which can be obtained with certainty by the investor without any risk. Once funds are invested in a risk free asset the investor is guaranteed if the asset is held to maturity to receive both the principal and interest and thereby achieve the rate of return. There is no instrument available in financial markets that can be truly regarded as risk free. Therefore it is necessary to identify a suitable proxy for use in Australian regulatory decisions. To date Australian regulators have approximated the risk free rate by using the yield on a Commonwealth government bond.

In estimating the WACC, the risk free rate is applied in the estimation of both the cost of debt and the cost of equity.

2.2 Regulatory period vs. life of the asset

In setting the maturity for the risk free rate a continuing debate exists as to whether the risk free rate should be set to a maturity consistent with the regulatory access arrangement period or to a period consistent with the life of the asset. As noted by Davis et al[1]

[1] J. Van Horne, J. Wachowicz Jr, K. Davis, M. Lawriwsky, 'Financial Management and Policy in Australia', Fourth Edition, Prentice Hall, 1995, pp 479-480.

> *'The risk free return estimate is controversial – not as to the type of security return that should be used but as to the security's relevant maturity. Most agree that a Treasury security, which is backed by the full faith and credit of the Australian government, is the proper instrument to use in making a risk free return estimate. But the choice of a proper maturity is another matter. As the CAPM is a 1-period model, some contend that a short term rate such as that used for 180 day Treasury notes, is in order. Others argue that because capital investment projects are long lived, the 10 year Government bond rate should be used. Still others feel more comfortable using a range of rates appropriate to the maturity of the cash flows which are being discounted. They argue that this provides the best indication of the true opportunity cost of funds over the different periods after taking account of the expected inflation which is impounded into the government rates. Unfortunately, this is a rather murky area.'*

As noted above there is no clear guidance as to which rate should be applied in assessing the risk free rate.

The ACCC acknowledges that the most commonly used proxy for the risk free rate is the ten year government bond yield and that the benefit of using this contemporaneous measure of the risk free rate is that the value is readily measurable and the resulting revenue requirements and network prices tend to reflect current costs[2]. Despite this acknowledgement, the ACCC has adopted a preference for using a rate linked to the regulatory period – typically set at five years.

2.3 Regulatory period arguments

The regulatory period argument proposes that the risk free rate should have a maturity equal to the length of the regulatory review period. As discussed in the Draft decision, the ACCC appears to have adopted a five-year risk free rate based on:

- the ACCC's interpretation of the Gas Code at section 8.30. In doing so the ACCC notes[3] that it is required to set a rate of return "commensurate with prevailing conditions in the market for funds". The ACCC concludes that this implies that information used in deriving the rate of return should be as up to date as possible and reflect the circumstances (economic conditions) of the regulatory framework. It then argues that in accordance with this requirement that it is appropriate to maintain the use of interest rates that correspond with the length of the access arrangement period (i.e. five years);
- the submissions from stakeholders such as BHP Billiton, Amcor and PaperlinX. BHP Billiton argue that the 5 year rate matches the regulatory period and that GasNet prefers the longer term rate as it leads to a higher WACC. Amcor and PaperlinX argue that the 5 year period matches the regulatory review period and that it reflects the expected risk profile of the period under review; and
- the advice sought from Dr Martin Lally (discussed below in section 3).

[2] ACCC, 'Draft Statement of Principles for the Regulation of Transmission Revenues', May 99
[3] ACCC, 'Draft Decision: GasNet access arrangement 2002' page 61

2.4 Life of the asset arguments

As noted by Ergas and Officer at the PowerNet, GasNet, ElectraNet Conference held in June 2002, the life of the asset argument suggests that the risk free rate should be set to reflect the long term nature of the investment horizon in the asset and to be consistent with both efficient debt financing and the setting of the market risk premium.

Arguments typically presented in support of the life of the asset argument include:

- in selecting assets for investment investors have regard to both the risk and return of assets. If selecting assets of similar risk, the return on the asset becomes a critical input to the decision process. In determining the returns expected from an asset, investors will have regard to the returns they expect to get relative to the opportunity cost of capital from comparable term – risk adjusted – investments. In determining the return on assets investors will have regard to the size and timing of the expected cash flows obtained from the operation of the assets. From this information, investors will assess the present value of the expected cash flow stream from the assets to allow a suitable comparison. Thus the timing of the expected cash flows and the choice of an appropriate discount rate become critical to this calculation. It is imperative that the maturity of the discount rate be matched directly to timing of the expected cash flows else the analysis will under or over value the present value of the expected cash flows.

  Further, the review period for an investment is not relevant to return expected from holding an asset over its life. To highlight that it is inappropriate to use shorter dated securities as the proxy for the risk-free rate consider the following example. Assume an investor held a bond portfolio with an expected life of 10 years and monitors the portfolio daily. The benchmark applied would be the 10-year bond rate as opposed to the official overnight cash rate.[4] To apply the daily rate would be inconsistent with the life of the asset and the risk in the equity risk premium.

  In a regulatory setting, typically the assets have economic lives that are greater than the regulatory periods. Thus to apply a discount rate linked to the regulatory period to the expected cash flows will result in an incorrect interpretation of the rate of return on the assets. The impact when the yield curve is flat is minimal relative to periods of ascending or descending rates.

  Given the long-term nature of the investment it is important that the rate applied for discounting purposes also reflect this long term feature. Thus, as acknowledged by the ACCC and discussed above in section 2.2, the most commonly used proxy for the risk free rate is the ten year government bond yield.

  This view is supported by a number of leading academics. For example as noted by Damodaran[5]:

[4] Comments by Dr Neville Hathaway at ACCC and ORG, 'Public Forum on the Weighted Average Cost of Capital (WACC) in the Victorian Gas Access Arrangements', 3 June 1998, p. 82.
[5] A. Damodaran, 'Applied Corporate Finance: a user's manual', John Wiley and Sons, Inc., 1999, p. 65.

> *'For an investment to be risk free, two conditions have to be met:*
> - *There has to be no default risk, which generally implies that the security has to be issued by the government.*
> - *There can be no uncertainty about reinvestment rates, which implies that there are no intermediate cash flows.*
>
> *Thus, the risk-free rate is the rate on a zero coupon government bond matching the time horizon of the cash flow being analysed. Theoretically, this translates into using different risk free rates for each cash flow on an investment – the one year zero coupon rate for the cash flow in year one, the two year zero coupon rate for the cash flow in year two and so on. Practically speaking, if there is substantial uncertainty about expected cash flows, the present value effect of using time-carrying risk-free rates as opposed to using an average risk free rate is generally so small that it is not worth the trouble. Using a long term government rate (even on a coupon bond) as the risk free rate on all of the cash flows in a long term analysis will yield a close approximation of the true value. For short term analysis, it is entirely appropriate to use a short term government security rate as the risk free rate.'*

This view is also supported in Samuels[6] et al who argue that

> *'in most instances projects will extend over several years rather than just a single short period. In these circumstances the risk free return could be related to a government security having the same maturity as the life of the project. For example, with a five year project the risk free rate could be related to the yield to maturity on a five year government security.'*

- the risk free rate should reflect a rate of return that allows investors to preserve the initial capital expended in their investment. Central to the notion of the return being risk free is that it will allow investors to recover their principle or to maintain their capital intact. In order for this to occur the rate must reflect the economic life of the asset. The argument for using a regulatory period linked rate of return would only be true if the owner of the asset could be sure that they would be fully compensated if the asset was stranded or abandoned at the end of the regulatory period.
- the risk free rate should also reflect a rate consistent with signalling the efficient cost of debt. In so doing it should reflect the rate at which new investment in the asset should be compensated. The 10-year bond rate is a signal for long term investment – it represents the expected return from holding a risk-free security for the next 10 years.

If the incorrect rate is applied, by using an inappropriate maturity, then this will cause resource allocation distortions. For example, if too low a risk-free rate is set, the firm would not be adequately compensated for its investment. Whilst this would lower

[6] J.M. Samuels, F.M Wilkes and R.E. Brayshaw, 'Management of Company Finance', Fifth Edition, Chapman & Hall, 1991, pp 206-207.

prices in the short term, the firm would be unlikely to undertake further investment in the network, leading to congestion and an inability of shippers to deliver their product to their market in the longer term. The rate of return allowed as part of a regulatory decision is not only important to provide a return on past investment. It also provides a signal for long term decision making. Accordingly, the use of shorter term securities as benchmarks for decisions affecting long term assets could distort these investment decisions.

- a rate linked to the regulatory period will distort this process as the period over which debt is financed will typically exceed the regulatory period and will be linked directly to the economic life of the assets being financed.
- in setting the market risk premium (i.e. the difference between the return on the market portfolio and the return on the risk free asset) to be applied for estimation of the capital asset pricing model ("CAPM"), the market risk premium should reflect the maturity of the long lived economic life of the assets. To do otherwise would be inconsistent with the CAPM assumption that the model is a one period model and will bias the estimate of the market risk premium. This point is acknowledged by Lally[7] who notes:

> *"In principle it should correspond to the investor horizon implicit within the CAPM. However the model gives no guidance in determining this."*

Lally[8] further notes that in estimating the market risk premium that unless the risk free rate corresponds to the investor horizon that biases will occur in the estimation of the market risk premium. In later recommending the use of shorter dated bonds Lally concedes that:

> *"It might seem that the solution here is to define the market risk premium relative to short bonds. However, the investor horizon may be long term, and therefore we just swap one source of bias for another."*

- the use of a long maturity for the risk-free rate is also supported by the finding in the empirical literature that there is no base level to which both short and long term nominal interest rates in Australia and international markets systematically return .[9] In other words, interest rates exhibit non-stationarity.[10]

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[7] M.Lally, 'The Cost of Capital under dividend imputation' paper prepared for the ACCC, June 2002 p21
[8] M.Lally, 'The Cost of Capital under dividend imputation' paper prepared for the ACCC, June 2002 p22
[9] Australian examples of the empirical evidence include Ann, A.T.H. & L. Alles (1999) 'An Examination of the Causality and Predictability between Australian Domestic and Offshore Interest Rates', Working Paper No. 99-09, Department of Economics and Finance, Curtin University (examined bank accepted bills and AUD-Euro deposits); Mishkin, F.S. & J. Simon (1995), 'An Empirical Examination of the Fisher Effect in Australia', *The Economic Record,* vol. 71(214), pp. 217-229 (examined treasury notes); Moschos, D.M. (1995), 'The Information Content of the Yield Curve in Australia' *Journal of Macroeconomics*, vol 17(1), pp. 93-109 (examined cash rates, Treasury notes and 2,5 and 10-year bonds).
[10] Typical visual characteristics of non-stationarity include that the series either grows in a secular way over long periods of time (such as time series representing aggregate economic behaviour such as GDP), or the series gives the appearance of wandering around as if it has no fixed population mean (typically found in asset prices such as share prices). Alternatively, a time series may give the appearance of non-stationarity due to structural changes in the underlying economy which cause sharp and sudden shifts in mean levels.

3 ACCC reliance on Lally paper

In its Draft Decision the ACCC has concluded that five-years in an appropriate maturity for setting the risk free rate. This term to maturity is consistent with the length of the regulatory period. In doing so it has had regard to a paper provided to them by Martin Lally titled "Determining the risk free rate for regulated companies".

3.1 The Lally paper

The Lally paper addressed the following issues on behalf of the ACCC:

- what is the appropriate term to use in choosing a risk free rate?
- what is the appropriate method to use for forecasting inflation, for the purpose of setting the allowed output price in the first year?
- over what period should the risk free rate be averaged in determining the rate to be used?
- should a forward rate be deduced from the observed term structure of rates, so as to match the period to which the allowed output price relates?
- is it appropriate to confidentially advise the regulated firms in advance of the period over which the interest rate will be averaged?

The Lally paper concludes that:

- the appropriate term to use for the risk free rate is that matching the regulatory period, of five years;
- the process for supposedly forecasting inflation from the geometric difference in the real and nominal five year bond rates is not correct as an inflation forecast. However the process is not actually intended to generate an inflation forecast and is sound for the actual purpose involved;
- the principle of averaging the observed rates over a short period of time is sound, although no definite answer can be offered on the issue of the optimal period. However a period of five days would seem to be the bare minimum consistent with the purpose of smoothing. In respect of the particular averaging technique, Lally favours arithmetic averaging;
- the principle of deriving a forward interest rate to match the period for which revenues will arise is sound. It allows firms to match their borrowing costs to the revenues allowed to them; and
- the concept of prior confidential notification to the regulated firm of the period over which the interest rate will be averaged is sound, although a period of some months notification seems excessive.

Issues arising from the Lally paper are commented on below.

3.1.1 Life of the asset vs. regulatory period

Lally (p7 and 8) states that use of longer term rates will lead to over and under compensation and that resetting of the rates consistent with the regulatory period will eliminate interest rate risk. Critical assumptions to the Lally analysis include that expected inflation is consistent with actual inflation and that firms do not experience any Capital expenditure.

From Lally's paper it is observed that:

- The mathematical analysis conducted by Lally is correct within the bounds of the assumptions made and reported.. Whilst Lally's analysis refers to the rate of return it appears it is being treated in this analysis as the rate of return being equivalent to only the nominal risk free rate. The analysis has not commented on issues related to the risk premium expected in a WACC analysis and is therefore incomplete as cash flows will not be discounted by the risk free rate but rather by the WACC.. As noted by Link et al the return on assets is composed of three primary components: [11]

  'The first part is an estimate of the expected rate of inflation, the second part is what economists call the real rate of interest or the finite return to an investor for sacrificing current purchasing opportunities for future purchasing opportunities, and the third part is a premium for accepting the risk that characterises the investment. Thus the investor's required return on investment (ROI) is:

  ROI = compensation for inflation + compensation for foregone purchasing opportunities + compensation of risk
  = expected rate of inflation + real rate of interest + risk premium

  An investor will, at a minimum, want to be compensated for what is called the time value of money.'

  However, the weighted average cost of capital is a function of not only the risk free rate but of a number of other parameters such as the debt margin, asset, equity and debt betas, the market risk premium, taxation and imputation. The role of the risk free rate in establishing a firms cost of debt and equity have not been addressed by Lally in his report.

- the approach adopted by Lally directly links the prevailing interest rate for the current regulatory period to their long term investment horizon. This has the impact of distorting the benchmarks to be applied for long term investments and suggests that the cost of debt as experienced by firms can be automatically reset to current market levels at the beginning of each regulatory period;
- interest rate risk is not defined by Lally. In its usual context interest rate risk refers to unexpected changes in interest rates. The analysis performed by Lally has incorporated expected yields into the analysis of future cash flows and asset values - not unexpected yields. For any investor, a significant influence on investment

[11] Albert N. Link and Michael B. Boger, 'The Art and Science of Business Valuation', Quorum Books, 1999, p. 60.

returns is the rate at which periodic cash flows received before maturity can be reinvested. To the extent that changes in the interest rate are unexpected the investor will still be exposed to interest rate risk;

- the approach used also assumes that the life of the asset can be neatly packaged as five year intervals which thereby converts the CAPM model to a multi-period model;
- the analysis has not conceded the market observation that investors prefer financing at long term interest rates reflecting the life of the assets rather than a series of short term reinvestments linked to the timing of the regulatory cycle;
- the extended implication of the approach adopted by Lally is that investors are assumed to make capital budgeting decisions using short term rates even though they are investing for long term horizons;
- the analysis performed by Lally uses the example of only a one year regulatory period with the life of the asset being two years – the regulatory period applied by the ACCC is five years and the average life of the assets in utilities industry can be as high as fifty years. The robustness of Lally's analysis is therefore questionable;
- the regulated entity is assumed to face zero volume risk with revenue achieved in each regulatory period consistent with expectations at time zero which is consistent with a revenue cap rather than price determination review;

Lally finds that arguments supporting the long term rate in measuring the market risk premium are false (p12). However as noted in Section 2.4 Lally[12] notes that

> *"In principle it should correspond to the investor horizon implicit within the CAPM. However the model gives no guidance in determining this."*

Lally further notes that in estimating the market risk premium that unless the risk free rate corresponds to the investor horizon that biases will occur in the estimation of the market risk premium. In later recommending the use of shorter dated bonds Lally[13] concedes that:

> *"It might seem that the solution here is to define the market risk premium relative to short bonds. However, the investor horizon may be long term, and therefore we just swap one source of bias for another."*

The market risk premium can be estimated in a number of ways including survey based approaches, derived from asset pricing models such as price earnings multiplier analysis, derived from consumption based models or directly from historical data. The preference applied and used by regulators is to have regard to historical measures. In the Australian context the Officer study is regarded as the benchmark analysis where comparisons are made over a long history of the Australian market to conclude that an average rate between 6 to 8 percent is applicable. In the Officer approach, ten year average returns to the market are compared directly with ten year government bond rates. It is an empirical as opposed to theoretical issue as to whether the market risk premium will change if the measurement interval is reduced to five years for consistency with the regulatory period. Ernst & Young has not performed this analysis but anticipates higher volatility in the annual market risk premium measures and therefore anticipates a movement from the Officer study levels.

[12] M.Lally, 'The Cost of Capital under dividend imputation' paper prepared for the ACCC, June 2002 p21
[13] M.Lally, 'The Cost of Capital under dividend imputation' paper prepared for the ACCC, June 2002 p22

3.1.2 Forecasting inflation

The level of expected inflation can be estimated in a number of ways including the building of fundamental econometric models, the use of time series analysis and the use of implied inflation parameters from the analysis of the relativity between Commonwealth government nominal and inflation indexed bonds.

The fundamental and time series approaches are highly contingent on the ability to specify, estimate and evaluate the models developed. There are numerous approaches discussed in the economic literature. Many produce reasonable results in a within sample or ex-post environment. However, when it comes to ex-ante the models do not perform with high levels of accuracy.

Most Australian regulatory decisions now apply the implied inflation method, as discussed above, for deriving a proxy for inflation.

In relation to the implied estimation technique, Lally notes that the approach results in an imprecise measure of expected inflation. In the Australian context, this is due to several factors such as:

- Mismatches in the term to maturity of the bonds;
- Mismatches in the coupon yield paid on the bonds;
- Coupons on inflation linked bonds are paid quarterly as opposed to semi-annually on coupon bonds; and
- The volume of indexed and nominal bonds on issue and traded for each maturity differ significantly – this results in the price of the bonds and hence the yield also incorporating a liquidity premium. The illiquidity is exacerbated by the behaviour of the major holders of indexed linked securities such as pension funds seeking assets to correlate with their index linked pension obligations.

Whilst endorsing the use of inflation linked bonds as a proxy for expected inflation it is important that the possibility of inflation risk also be acknowledged and measured for incorporation into the analysis of the relativity between the nominal and "real" yield to maturity.

Regulated firms are exposed to the risk that expected inflation may differ from actual inflation during the life of the asset. This is because firms typically borrow in nominal terms (where the rate of interest reflects expected inflation) whereas their revenues are a function of actual inflation via the CPI – X mechanism. In particular, regulators are reluctant to compensate for inflationary risk despite the observation that firms are exposed to inflation risk in their financing costs.

The process of linking the risk free rate to the regulatory period will not remove this risk.

3.1.3 Averaging of observed rates

Lally supports the use of arithmetic averaging of nominal yields over a minimum five day period for the estimation of the risk free rate. Past regulatory decisions have typically

applied an averaging approach despite acknowledging that the theoretically correct approach is to apply the rate applicable to the date of the decision as it best incorporates market expectations.

A review of 5, 20 and 40 day yields on the 10 year Commonwealth government bond rate reveals that the correlations to the spot yield are relatively constant. The respective correlations are 99% for 5 days, 95% for 20 days and 91 % for 40 days. The analysis does show however that the longer the averaging period the smoother the series becomes and the longer it takes for jumps in interest rates to be incorporated.

It is interesting to note that the ACCC has regularly applied a 40 day moving average whilst state based regulators have applied a 20 day moving average.

It is agreed that there is no theoretical rationale available that suggests an optimal structure for smoothing, Therefore, the choice of any approach to smoothing applied should not disadvantage the firm or investors relative to current market yields.

3.1.4 Forward rate analysis

The application of forward rates implies that the forward rates are an unbiased estimator of expected spot rates. There is little empirical evidence to support this assertion. The principle of applying forward rates through a regulatory period assumes that there is market consensus regarding the forward rate levels. Like spot rates, forward rates for all maturities cannot be directly observed in the market but rather are implied from spot rates which have also been estimated by market participants through the use of a yield curve fitting algorithm.

In periods of ascending yield curves, forward rates will be higher than current spot rates and during periods of descending yield curves the rates will be below these rates. To apply a forward rate and then experience a yield curve shift will cause the need for continual yield curve monitoring and increase the level of regulatory supervision and risk to the firm.

Thus the use of forward rates is not endorsed.

3.1.5 Confidential advice

The Queensland Competition Authority in its 2001 gas and electricity decisions confidentially advised the regulated entities prior to the release of their decisions the date at which the risk free rate was to be determined. The QCA also applied a 20-day moving average of the 10 year bond rate in its decisions.

By knowing the decision date, regulated entities could then manage their hedge programmes on an incremental basis in the period leading up to the decision date. Further the "surprise element" of the risk free rate is lessened if an averaging approach is conjointly applied. For example in a 20 day average, a 20 basis point change in yields on the final day will only have an impact of 1 basis point.

The approach of advising regulated entities of the averaging period and the determination date in advance is endorsed.

4 Domestic and International regulatory decisions

An important aspect in determining the risk free rate is to ensure there is consistency in the estimation of the risk free rate to avoid regulatory risk. All regulatory bodies in Australia except the ACCC have applied the 10-year rate to their regulatory decisions in the period since 2000.

4.1 Domestic decisions

All ACCC decisions since 1998 have applied a risk free rate based on the 5 year regulatory period except for the January 1999 Assessment of Telstra's Undertaking for PSTN Originating and Terminating Access – Cost of Capital[14] and the January 2000 NSW and ACT electricity decision. The latter of these decisions applied the 10 year rate to achieve consistency with a previous IPART decision. It is also noted that the ACCC shifted from a 10 to a 5 year rate between the draft to the final decision in the Access Arrangement for AGL Pipelines (NSW) Pty Ltd for the Central West Pipeline. Table A1 in Appendix A summarises the rationale applied by the ACCC in estimating the risk free rate linked to the regulatory period in each of its recent decisions. In each case the rationale is a preference for a rate linked to the regulatory review period

Arguments supporting a rate linked to the regulatory review period initially arose from criticisms directed at the use of the longer 30-year rate proposed by CSFB in the Victorian Gas decision. The 30-year rate was proposed by CSFB for consistency with the life of the asset argument. Also the maturity of 30 years reflected the longest maturity risk free asset (ie. US Treasury bonds). No bonds were available for a 30-year maturity in Australian capital markets. The longest maturity in the Australian market is approximately 10 years.

As debated by Prof Davis[15],

> *"Given the anticipated life of the assets and the likely time pattern of the resulting cash flows, it would seem very difficult to sustain an argument for use of a risk free rate greater than 10 years. Use of a shorter maturity rate would not be inappropriate – particularly if there were to be regular regulatory pricing reviews."*

However, Davis[16] also notes in a report for SAIPAR regarding the Envestra access arrangement:

> *"Envestra argues for the use of a ten year bond rate. The arguments for and against using this maturity have been well canvassed in the Victorian decisions. There is no reason to believe that use of the ten year rate is particularly inappropriate."*

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[14] The ACCC came to this decision because it considered there was very little difference between the three, five and ten year bond rates as at 1 July 1998 and because it wanted to maintain consistency with the term commonly used to measure the market risk premium

[15] Prof K.Davis, "Analysis of the Cost of capital for necessary new investment at Perth International Airport: Submission to the ACCC Western Airports Corporation, 9 January 1999.

[16] David, K., 'The weighted average costr of capital for access arrangements for Envestra", prepared for SAIPAR October 1999, p6

More recently it has been argued by the ACCC[17] that

> *For practical purposes, the choice between a 5 year and 10 year interest rate is largely immaterial since it is the real interest rates that matter. As the difference between short and longer term real interest rates is small, there will only be minor differences in the WACC estimates. However, to ensure consistency with other parameters having a term structure linked to the regulatory period the five year Government bond rate is the preferred measure"*

The issue of whether there is material difference between real 5 or 10 year rates is an empirical question that is perhaps more relevant if the ACCC was applying a real WACC measure and if there was no term premium embedded in the nominal rate of return on bonds.

In contrast all state based regulators have applied the 10 year rate in their assessment of the risk free rate. State based regulatory decisions are summarised in Table A2 in Appendix A.

It is also noted from the Tables that the ACCC consistently applies a 40 day period to smooth the risk free rate, whilst most State based regulators have applied a 20 day average.

4.2 International decisions

In assessing international decisions Ernst & Young has had regard to decisions made in the United Kingdom which applies similar regulatory structures to the Australian market in relation to utilities.

UK regulators have used the redemption yield on UK index linked securities to provide a direct estimate of the real risk free rate. The UK Government has issued index-linked securities (gilts) which are generally considered to have negligible default risk and inflation risk (when inflation is measured by the Retail Price Index). The redemption yield on these index-linked gilts is also assumed to provide a direct estimate of the real risk-free rate for different maturities.

[17] ACCC, Draft Statement of Principles for the Regulation of Transmission Revenues, May 1999.

The Competition Commission, Ofwat, Ofgem and the Office of the Rail Regulator use the yield for medium (10-year) and long-term (20-year) gilts to establish the real risk free rate used in price resets for their five year regulatory periods. In some recent decisions, the Competition Commission[18], Offwat[19], the Office of the Rail Regulator[20] and Ofgem[21] have determined this risk-free range by using longer term gilts and correcting for specific UK liquidity factors that might have reduced the real yield on these longer-term gilts.

In the current UK Competition Commission inquiry into the 2003-2008 price caps for Manchester, Heathrow, Gatwick and Stansted airports, the Civil Aviation Authority[22] has also proposed the use of a risk free rate based on the real yield on long-term gilts.

[18] Competition Commission (August 2000), *Mid Kent Water Plc, A report on the references under sections 12 and 14 of the Water Industry Act 1991*,
[19] Ofwat (1999), *Final Determinations, Future water and sewerage charges 2000-05*,
[20] Office of the Rail Regulator (ORR) (October 2000), *Periodic Review of Railtrack's access charges: Final conclusions*,
[21] Ofgem (2002), *Independent Gas Transporter Charges and Cost of Capital*, and Ofgem (2001) *Review of Transco's price Control for 2002, Final Proposals*
[22] Civil Aviation Authority (2002) *Manchester Airports Price Cap, 2003-2008:CAA recommendations to the Competition Commission* and *Heathrow, Gatwick and Stansted Airports Price Cap, 2003-2008:CAA recommendations to the Competition Commission*

5 APPENDIX A – Australian regulatory decisions

5.1 ACCC decisions

Table A1 – ACCC risk free rate decisions

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
July 2002	ACCC	Epic – Moomba – Adelaide (Final Approval)	5.61	3.32	5	40	Epic submitted 5yr bond rate. The ACCC "considers that the term associated with the risk-free rate should coincide with the duration of the access arrangement period" (Draft Decision p75). "the five year bond rate has the advantage of a lower built-in premium to compensate for inflation risk".
Dec 2000	ACCC	EAPL– Moomba – Sydney (Draft Decision)	6.0	3.1	5	40	EAPL submitted 10yr bond rate. The ACCC "considers that the term associated with the risk-free rate should coincide with the five-year duration of the initial access arrangement period" (Draft Decision p38). Refers to TPA GasNet 1998 decision incl Prof Davis advice.
June 2000	ACCC	AQGL Central West Pipeline (Final Decision)	6.38	3.44	5	40	Greenfields pipeline – higher risks allowed in betas (debt beta = 0). AGL submitted 10yr bond rate. 10yr access arrangement period yet ACCC still used 5yr bond rate. Assessment of equity beta for AGL at 0.8-0.85 (p43).

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
October 1998	ACCC	TPA GasNet (Final Decision)	6.0	3.43	5	40	TPA submitted 10yr bond rate. The ACCC "considers that the term associated with the risk-free rate should coincide with the five-year period until the next review" (Final Decision p41). "It is probably worth noting that for practical purposes, within the CCA framework proposed, the choice of very long (for example, 30 years) or shorter term (five or ten years) interest rates is largely immaterial since it is the real interest rates that matter. As the difference between long and short term *real* interest rates (indexed bond rates) is just six basis points (see Table 3.3 above), there will be only minor differences in the real WACC estimates regardless of the maturity." (p41)
August 2002	ACCC	GasNet AA Revisions (Draft Decision)	5.72	3.14	5	40 moving	GasNet submitted 10yr bond rate. The ACCC advised by Dr Martin Lally who found that the arguments proposed for not using the 5yr bond rate are largely unfounded.

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
May 2001	ACCC	NT Gas Pipeline (Draft Decision)	5.0	2.98	5	40 moving	AGL submitted 10yr bond rates. "However, the Commission considers that the term associated with the risk free rate should coincide with the duration of the access arrangement period. Thus, five-year bond rates are used in reference to access arrangements with an expected initial access arrangement period of five years. In addition, the five-year bond rate has the advantage of a lower built-in premium to compensate for inflation risk. A ten-year bond rate is usually higher than the five year rate because, in part, it accommodates a risk premium for inflation uncertainty. As the regulatory framework already compensates the service provider for inflation risk through the use of a CPI-X adjustment mechanism, the inclusion of an inflation risk premium in the risk free rate used for determining the cost of capital is inappropriate. Accordingly, the Commission considers that five-year rates are appropriate for this analysis."

5.2 Other domestic regulators

Table A2 – State based regulator risk free rate decisions

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
December 2001	SAIPAR	Envestra SA Distribution (Final Decision)	6.0	3.5	10	40 moving	"In the Draft Decision SAIPAR determined that the nominal yield of 10 year Commonwealth Government bonds was an appropriate indicator for the risk free rate. For the Final Decision SAIPAR further examined the debate over whether 5 or 10 year bonds are the most appropriate indicator of the risk free rate for determining a WACC (given the 5 year period of the Access Arrangement). This centred around the merits of using the yield to maturity of a bond with a time horizon that coincides more closely with the refinancing activities of the firm; the yield to maturity of a bond with a time horizon that coincides more closely with the life of the long-lived assets in question; or a yield to maturity of a bond with a time horizon that coincides with the length of the Access Arrangement Period. It is noted also that Professor Davis found that Envestra's proposed use of a 10 year bond rate was reasonable in the context of determining the WACC. Public Submissions on WACC did not have issue with SAIPAR's use of a 10 year bond rate. For the Final Decision SAIPAR has found no reason to change its position of using a 10 year Commonwealth Government Bond rate as the relevant indicator of the risk free rate in calculating a level of WACC for the Access Arrangement Period. (p86)."

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
July 2000	IPART	AGL Gas Networks (Final Decision)	6.44	3.52	10	20	AGL submitted 10yr bond rate. IPART adopted the 20day moving average. "Following the Tribunal's adoption of the 20 day average, ORG and ACCC used a 40 day average in their decisions on the Victorian access arrangements and ACCC's Draft Statement of Principles for the Regulation of Transmission Revenues. The Tribunal does not consider there is a significant difference between the 40 and 20 day average." (Draft Decision p60).
March 1999	IPART	GSE Gas Networks (Final Decision)	5.18-5.67	3.43-3.46	10	20	"Whilst it is theoretically correct to use the 'on-the-day' rate under CAPM, the Tribunal acknowledges a practical difficulty in that the use of on-the-day rates introduces a degree of short term variability. Therefore, in its draft decision, the Tribunal considers it appropriate to adopt an average over a relatively short period to smooth daily variations. It also understands that the benchmark of a 20 day average has a degree of acceptance in financial markets." (p168)
October 1998	ORG	Vic Distribution Businesses (Final Decision)	6.0	3.4	10	365 (12 mth range)	"The Applicant proposed that the risk-free rate should: • reflect the rate that would apply for a risk-free bond that has the same maturity as the "investment project" (which is well in excess of 10 years and is proposed to be of the order of 30 years)[67]; and • be based on an average of historical bond rates, as opposed to the prevailing market yield." (refer discussion p195-201)

Date	Regulator	Decision	Risk Free Rate - Nom	Risk Free Rate – Real %	Bond Period yrs	Averaging Period days	Comment
July 2002	ESC	Vic Distribution Businesses - Revisions (Draft Decision)		3.5	10	20	"a reasonably standard practice has emerged amongst Australian regulators of deriving the nominal risk free rate on the basis of the average (over 20 to 40 days) of the redemption yield on long-dated Commonwealth Government securities (with terms to maturity of either 5 or 10 years) The ESC applied a real risk free rate proxied by "the average redemption yield over the last 20 trading days to 31 May 2002 for an inflation indexed bond with a 10 year term to maturity as the past 20 days" (Refer p209-12 Draft Decision).
October 2001	QCA	Allgas & Envestra Distribution (Final Decision)	5.96		10	20	Discussion re bond period – the risk free rate is linked to the life of the asset resulting in a suitable long term proxy to be applied p211 Final Decision.

GasNet's Response to Draft Decision

Annexure B - Critique of the approach adopted by the ACCC in estimating asset, debt and equity betas.

Critique of the approach adopted by the ACCC in estimating asset, debt and equity betas

Report prepared for
Gasnet Australia Limited

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ERNST & YOUNG

Authorship

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The views expressed in this report are those of Ernst & Young and do not necessarily reflect those of GasNet.

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1 BACKGROUND

1.1 Task & Appointment

In August 2002 GasNet Australia Limited ("GasNet") engaged Ernst & Young to provide GasNet with comments on a number of weighted average cost of capital ("WACC") issues detailed below arising from the Australian Competition & Consumer Commission ("ACCC") "Draft Decision, GasNet Australia Access Arrangements Revisions for the Principal Transmission System" (" Draft Decision"), released in August 2002.

In its Draft Decision the ACCC has concluded that the appropriate asset, equity and debt betas for GasNet were 0.50, 1.00 and 0.15 respectively. In estimating the asset, equity and debt betas the ACCC has had regard to papers provided by Allens Consulting Group "Empirical evidence on proxy beta values for regulated gas transmission activities." The purpose of this engagement was for Ernst & Young to provide comments to GasNet in relation to the following:

- the method of beta estimation proposed by the ACCC and provide a critique;
- the method of beta estimation proposed by NECG in relation to GasNet;
- the Allens Consulting Group paper and provide a critique of its contents; and
- the Lally paper[1] "The Cost of Capital under Dividend Imputation" and provide a critique of its contents as they apply to the estimation of beta.

1.2 ACCC "Draft decision, GasNet Australia Access Arrangements Revisions for the principal transmission system"

In July 2002, the ACCC released its Draft decision regarding GasNet's gas transmission access arrangements. In this Draft Decision, the ACCC reported a real post tax weighted average cost of capital ("WACC") of 6.40 per cent. The ACCC calculated this figure from the following reported inputs (figures from the 1998 ACCC Gas transmission decision are included for comparative purposes:

[1] M.Lally, 'The Cost of Capital under dividend imputation' paper prepared for the ACCC, June 2002 p21

Parameter	ACCC GasNet Draft Decision 2002	ACCC Final Gas Decision 1998
Nominal Risk free rate (%)	5.72	6.00
Real Risk Free Rate (%)	3.14	3.43
Market risk premium (%)	6.00	6.00
Equity beta	1.00	1.20
Asset beta	0.50	0.55
Debt beta	0.15	0.12
Debt/value (%)	60	60
Franking credit (gamma) (%)	50	50
Debt margin (%)	1.38	1.20
Cost of debt (%)	7.10	7.22
Expected inflation (%)	2.51	2.50
Nominal post tax cost of equity (%)	11.86	13.22

2 THE WACC – CAPM FRAMEWORK

2.1 Introduction

In the WACC-CAPM framework, as applied by the ACCC, the weighted average cost of capital is estimated using estimates of expected asset, debt and equity returns that reflect systematic or non-diversifiable risks.

2.2 Capital Asset Pricing Model

The Capital Asset Pricing Model ("CAPM") determines the return on investments for an enterprise using a single risk factor related to market return. The central concept of CAPM is that of systematic risk (known as beta. β). Basically, the total risk of a business activity can be separated into two distinct classes of risk, being systematic and non-systematic risk. The systematic risk is that risk which affects the market as a whole and relates to the correlation between the riskiness of an entity compared to the market as a whole. It can be calculated by a linear regression based on historic data.

The remaining risk is known as non-systematic or diversifiable risk. This risk can be removed by holding the security as part of a well diversified portfolio of assets. CAPM assumes that investors will not be compensated for the risk they can cost effectively avoid. This avoidable risk arises because the fluctuations in an investor's returns from holding a security can be ameliorated by holding that security as part of a portfolio of diversified investments. In other words, CAPM assumes that investors will only be compensated through the rate of return for the risk that cannot be avoided through diversification.

The CAPM is a forward-looking model. For practical application, CAPM requires estimates of the risk free rate, the expected return on the market portfolio, the expected return on the asset and the beta measure. CAPM is expressed as:

$$R_i = R_f + \beta_i (R_m - R_f)$$

where

Ri is the expected return on asset I

Rf is the risk free rate

Rm is the expected return on the market portfolio

βi is the non diversifiable risk of asset i and is equivalent to $\frac{Cov(R_i, R_m)}{\sigma_m^2}$

2.3 Weighted Average Cost of Capital

A firm's WACC recognises that its capital is provided by two sources, namely lenders and equity investors (that is owners or shareholders), and is equivalent to the weighted average cost of servicing the various classes of financial claims on the firm. Each source of capital or financial claim will involve different risks and hence different costs. A firm's WACC is calculated by adding the cost of its debt, weighted by the proportion of debt to total assets, to the cost of equity funds weighted by the proportion of equity funds to total assets. The methodology requires estimates of the current market values of the firm's debt and equity and market rates for both sources of funds.

Subject to how cash flows are defined, alternative approaches can be taken to estimate WACC. Inconsistency between the measured cash flow and the approach to assessing the WACC will result in errors in the valuation process. Provided cash flows are expressed as the levered cash flow available to service debt and equity, after allowing for the tax deductibility of interest and the value of any imputation tax credits, the nominal post-tax WACC for an entity (assuming that taxation and allowances for dividend imputation credits are included in the entity's cash flows) can then be calculated as follows:

$$WACC_{post\ tax} = R_{equity}\frac{E}{V} + R_{debt}\frac{D}{V}$$

where

R_{equity} = the return on equity (the cost of equity)

R_{debt} = the return on debt (the cost of debt)

V = the total market value of the firm

E = the market value of the equity

D = the market value of the debt

In transforming the nominal post tax WACC to a real post tax WACC it is necessary to either estimate the nominal post tax WACC and convert to the real post tax WACC using the

Fisher equation[2], or alternatively, to express all parameter inputs in real terms and estimate the return on assets in the usual manner.

2.4 Interrelationship of asset, debt and equity betas

In the WACC-CAPM approach, there is a critical assumption that investors will be compensated for all systematic risks regardless of whether the firm is financed via equity or debt. Thus, any estimate of the equity beta employed, should also reflect the debt and asset betas being employed.

There are alternative approaches to estimating the nominal post tax WACC. The approach reported by the ACCC in the Draft Decision is known as the Vanilla WACC. This approach involves the application of the formula discussed above in section 2.3. If CAPM equivalent returns were substituted for each of the return on assets, equity and debt (R_a, R_e and R_d) gives:

$$R_f + \beta_a\left(R_m - R_f\right) = \left(R_f + \beta_e\left(R_m - R_f\right)\right)\left(\frac{E}{D+E}\right) + \left(R_f + \beta_d\left(R_m - R_f\right)\right)\left(\frac{D}{D+E}\right)$$

Which is equivalent to:

$$\beta_a = \beta_e\left(\frac{E}{D+E}\right) + \beta_d\left(\frac{D}{D+E}\right)$$

It is obvious from above that the beta of an entity's assets is equal to the betas of the entity's equity and debt weighted by the respective weights for equity and debt. Whilst equity and debt betas can be calculated via CAPM based methods, the asset beta can only be inferred via the above relationship. An asset beta represents the risk arising from the sensitivity, or covariance, of the operating cash flows generated by the assets of an entity compared with the market in general. Asset betas are not directly observable and therefore must be derived directly from equity betas. The difference between an asset beta and an equity beta reflects the extent to which debt is used to finance the entity's assets.

In the case of equity, the equity beta is a measure of the systematic risk faced by the entity relative to the market portfolio. Two factors have been identified as key determinants of an entity's equity beta:

- asset risk arising from the entity's sensitivity to cash flow movements – relative to overall economic activity, where more cyclical cash flows are associated with higher betas; and
- financial risk arising from financial leverage – the ratio of debt to equity, where a higher level of debt implies a higher beta.

[2] The Fisher equation expresses the relationship between real and nominal interest rates and inflation. It is expressed as follows:

real interest rate = (1+nominal interest rate) / (1+ expected inflation rate) - 1

Using the following equation it is possible to reflect the asset beta as a function of both the equity and debt betas:

$$\beta_a = \beta_e\left(\frac{E}{D+E}\right) + \beta_d\left(\frac{D}{D+E}\right)$$

Which when transformed is equal to:

$$\beta_a = \frac{\beta_e + \beta_d \times \frac{D}{E}}{1+\frac{D}{E}}$$

And the equity beta can be expressed as a function of the asset and debt betas as follows:

$$\beta_e = \beta_a + (\beta_a - \beta_d) \times \frac{D}{E}$$

It is noted however, that despite their use of the vanilla WACC approach, the ACCC have indicated a preference for using the Monkhouse formula for delevering asset betas (p68). Using this formula equity betas can be estimated as follows:

$$\beta_e = \beta_a + (\beta_a - \beta_d)[1 - (\frac{r_d}{1+r_d})(1-\gamma)T_e]\frac{D}{E}$$

and asset betas are estimated as follows:

$$\beta_a = \frac{\beta_e + \beta_d[1 - (\frac{r_d}{1+r_d})(1-\gamma)T_e]\frac{D}{E}}{1 + [1 - (\frac{r_d}{1+r_d})(1-\gamma)T_e]\frac{D}{E}}$$

where

Te is the effective tax rate for company I
$\gamma$is gamma which represents the level of dividend imputation

Whilst debt betas can also be derived using the above relationships, in a WACC-CAPM the debt beta should also reflect the financial risk born by shareholders due to the entity's use of debt financing and is typically estimated as:

$$R_d = R_f + \beta_d \left[R_m - R_f \right]$$

Transformed

$$\beta_d = \frac{\left(R_d - R_f \right)}{\left[R_m - R_f \right]}$$

where

R_f = the risk free rate

R_m = the expected return on the market portfolio of risky assets

R_d = the expected return on debt

$\beta_d = \frac{Cov\left(R_d, R_m \right)}{Var\left(R_m \right)}$ = the debt beta

$\left[R_m - R_f \right]$ = the equity risk premium

Critical to each of the above expressions is the notion that there should be a circular equivalence to each of the parameters being set. For example, an equity beta of 1 and a debt beta of 0.15 with a debt to equity ratio of 1.50 should produce an asset beta of 0.49. Similarly, an asset beta of 0.49and a debt beta of 0.15 should result in an equity beta of 1. Due to the circularity of the relationship between asset, debt and equity betas in the WACC relationship, if any of the parameters are misspecified then the relationship will not hold.

3 ACCC RELIANCE ON THE ACG PAPER

In forming their view regarding the beta estimates for application in the draft decision the ACCC has had reliance on a report prepared by ACG titled "Empirical evidence on proxy beta values for regulated gas transmission activities". The substantive issues discussed in this paper included:

- Discussion of systematic risk including factors influencing systematic risk and the impact of asset stranding;
- A survey of comparable entities and discussion of the criteria for assessing comparability;
- A presentation of empirical estimates of equity betas for comparable entities including discussion of alternative sources and methods of estimation employed;
- A discussion of adjustment mechanisms to raw betas and the use of betas estimated for foreign firms; and
- Discussion of the levels of gearing employed by comparable entities and alternative methods of measurement.

In their report ACG conclude that:

- The CAPM approach is appropriate for use in regulatory decisions as it assesses the systematic risk of the entity via the estimation of equity betas;
- beta estimates differ between firms in different countries due to a number of factors such as regulatory differences, taxation and market portfolio construction (pp16-20). Due to the differences between markets more weight should be placed on equity betas as a secondary source of information. This issue is discussed below in section 4.4.1;
- Comparable entities should be selected on the basis that they have a similar level of non-diversifiable risk relative to the regulated entity. this issue is discussed below in section 4.4.2;
- The delevering of equity betas is discussed (pp25-29) and a method is proposed by ACG based on recent US market findings. This issue is discussed below in section 4.4.3
- raw equity betas are advocated over the use of asset betas or adjusted equity betas. This issue is discussed below in sections 4.4.4 to 4.4.6
- based on a number of criteria (pp 21-25) including the use of a value weighted index for the market portfolio proxy that the AGSM estimates of equity betas provide the most suitable proxy for equity betas. Issues in the estimation of equity betas are discussed below in section 4.4.7;

Ernst & Young agree with a number of the issues discussed by ACG including the use of CAPM, the need to select proxy betas by consideration of systematic risk issues, the need to delever betas to estimate asset betas. However, the paper does raise a number of concerns that require further comment. These include:

- the focus on equity betas as opposed to asset betas for comparative purposes;
- the use of a revised method for estimating debt betas;
- the reliance on point estimates of equity betas from the AGSM without consideration of the statistical significance of these estimates or the implied spread over which the estimates may exist due to the standard errors of the estimates;

Of lesser significance are the issues associated with the choice of leverage measure for delevering betas

Each of the above issues is discussed in detail below in section 4.

4 BETA ISSUES

4.1 ACCC beta estimates

The ACCC has identified the following estimates for the asset, debt and equity betas for the 2002 decision.

Asset beta	0.50
Equity beta	1.00
Debt beta	0.15

If a Vanilla WACC were applied, and the return on assets was estimated from the equity beta of 1, debt beta of 0.15 and debt to equity ratio of 1.50 (i.e. debt to asset ratio of 0.60) the implied asset beta of 0.49 or approximately 0.50 would be achieved. This reconciles with the ACCC analysis.

In forming its view regarding the beta estimates the ACCC has had extensive regard to a report provided to the ACCC by Allen's Consulting Australian Group ("ACG") "Empirical evidence on proxy beta values for regulated gas transmission activities".

In forming its view of the equity beta, the ACCC identified the equity beta having had regard to stakeholders comments, a report provided by ACG and its own consideration of gas transmission businesses relative to the market. The ACCC notes correctly (p68) that:

> *'Systematic risk is accommodated in the CAPM framework by the equity beta.'*

And further that (p72)

> *"The Commission is not aware of any supporting evidence that the systematic risk of GasNet has changed significantly"*

However, despite acknowledging that there is no change to systematic risk, the ACCC has lowered the equity beta for GasNet from 1.20 to 1.00. This is somewhat confusing as the equity beta only incorporates the reward for systematic risk. Thus a lowering of the equity beta seems most inappropriate.

In relation to the asset beta the ACCC has concluded that an asset beta of 0.50 would be appropriate but suggests that an asset beta at this level will be biased in favour of the service provider. The level of the asset beta is set at 0.50 despite having been set at 0.55 in 1998. Given that the cost of debt is less in 2002 and there is acknowledged to be no change in systemic risk it is not clear from the ACCC draft decision as to why the asset beta has decreased.

In relation to the debt beta the ACCC has amended its historical approach and treatment to arrive at a debt beta of 0.15. This beta is consistent with the approach recently adopted by the Victorian Essential Services Commission who also placed reliance on information supplied by ACG. This revised approach reflects an approach reported recently in a research paper prepared by Elton, Gruber, Agrawal and Mann ("EGAM") who disaggregated bonds

across their default premium, risk premium, and tax premium. In their report ACG concluded (p28-29) that a default premium of 0.28 was included in BBB+ bond debt margins for debt with a ten year maturity and that a debt beta of 0.18 was therefore appropriate for this maturity. However, ACG subsequently adjusted the debt margin by a factor of 0.92 to reflect the shorter term to maturity of five years to be consistent with the term to maturity of the risk free rate. This resulted in a debt beta of 0.15.

4.2 Debt beta analysis

The ACCC has applied a debt beta of 0.15 based on the report by ACG. The use of a debt beta of 0.15 is contentious. By using 0.15 as a maximum debt beta, the Essential Services Commission ("ESC") has ignored the implied debt betas of Australian, UK and US listed firms and has placed a heavy reliance on the study by EGAM.

We wish to point out the following:

- The yields on corporate debt in the US and Australia were assumed by ACG to be similar with respect to their proportional disaggregation of default premium, risk premium and tax premium. This is highly unlikely especially given the lack of a longer dated corporate debt market in Australia;
- The swap curve between Australia (6.15%) and the US (4.64%) suggests a premium of 151 basis points difference between Australian and US swap yields for a 5-year maturity[3]. However, it is noted that, in the same way that it is inappropriate to compare US firm equity betas with Australian equity betas, it is similarly inappropriate to draw direct inference from US debt rates to the Australian context; and
- The use of spot rates for determining the debt margin is inappropriate given that the debt margin is to be used in conjunction with a 5 year risk free rate that has been interpolated from coupon paying CGS bonds.

The EGAM study used by the ESC makes a series of significant assumptions which make the reported results contingent on the methods employed:

- The study uses data from 1987 to 1996 from US bond markets. This period differs from the current period where interest rates are lower in levels and different economic circumstances exist in the US;
- In estimating the spot curve, the study uses the Nelson and Siegel approach for estimating forward rates, which are transformed to spot rates. This approach uses continuously compounded as opposed to discretely compounded rates – bond yields are quoted on a discretely compounded basis and typically continuously compounded rates of return are less than similar maturity discretely compounded rates for bonds of equal price;
- The study identifies the following average spreads from US treasury rates for A and BBB bonds. Two features of the data are quite striking. Firstly, these rates are significantly lower than comparable rates in the Australian context in 2002 and

[3] Source: Bloomberg 16 July 2002.

secondly, the default spreads on A rated stock are increasing whilst the BBB stock spreads are decreasing rather than increasing with maturity. For comparative purposes the default spreads to Commonwealth Government bonds for AUD A and BBB rated bonds at 17 May 20024 are included. The default margins on AUD BBB bonds are significantly different from their US comparators.

Year	A - US	A - AUD	BBB – US	BBB - AUD
2	0.621	0.74	1.167	1.44
3	0.680	0.83	1.205	1.62
4	0.715	0.87	1.210	1.71
5	0.738	0.90	1.205	1.76
6	0.753	0.92	1.199	1.80
7	0.764	0.93	1.193	1.82
8	0.773	0.94	1.188	1.84
9	0.779	0.95	1.184	1.86
10	0.785	0.95	1.180	1.87

- Table 1 of the EGAM study also details data from the sub periods of 1987 to 1991 and 1992 to 1996. In the first sub group A spreads increase whilst BBB spreads are hump-shaped decreasing from year 5 onwards. In the second sub group, A spreads increase but BBB spreads decrease from year 4 onwards. In all cases there is a significant increase in the measure of the default spread from years 2 to 3. It is not possible to identify comparable data in Australia using specific A and BBB rated bonds as the debt market does not have the same depth of liquidity across maturities as found in the US market.
- Default spreads as used by ACG are reported in the EGAM Table VI which includes not only mean but also minimum and maximum spreads for the default premium. In its analysis, ACG has only had reliance in its analysis on the mean level. Each of the default premiums is estimated assuming risk neutrality and involved estimates of coupon rates, recovery rates and marginal default probabilities each of which reflect ex-post as opposed to ex-ante measures. The assumption of risk neutrality provides a solution that is highly contingent on its input parameters.
- The study reports a disaggregation of the data sample between financial and industrial firms with no further disaggregation thereby no identifying factors that impact at the industry level;
- The study acknowledges that the estimate of the risk premium represents a controversial part of the analysis. The analysis employs the Fama-French methodology to examine the residual of spreads for industrial bonds after accounting for the default and tax premiums as estimated. It is interesting to note that there is statistically significant evidence of systematic risk relative to the market portfolio for A and BBB rated bonds – but the evidence is less conclusive for AA rated bonds.

[4] Source: CBA Spectrum data reported in Standard and Poors, "Credit Focus" June 2002

Further the degree of fit of the regression equations is reported as higher for BBB than for A bonds. However, the low R2 provides evidence that the regression may still be misspecified or the proxy choices may be inappropriate for the variables measured;

- The study attempts to disaggregate the spread across three factors – however, the three factors clearly do not capture all of the information in the spread – therefore to draw deterministic conclusions from such a study may result in biased results for the US market – and this is before the issue of timing applicability and cross market issues are considered; and
- In its conclusion, the study does not suggest at any point that the results of the disaggregation have any impact on debt beta. Therefore, in the context of the Australian market a study such as this should not be used by the ESC unless the impact on debt beta can be clearly demonstrated.

Based on the ACCC's quoted debt margin of 138 basis points, an implied debt beta of 0.23 would appear to be more appropriate. If the debt beta of 0.23 were applied together with the equity beta of 1.00 and debt to equity ratio of 1.50, an asset beta of 0.538 or approximately 0.55 rather than 0.50 would be estimated. This would result in significantly higher estimate of the real post tax rate of return than reported by the ACCC in the Draft Decision.

4.3 ACCC Equity and asset beta estimates

The ACCC estimates an equity beta of 1 and an asset beta of 0.50 based on the ACG report and its own considerations. In the ACG report estimates of equity and asset betas were derived from:

- An analysis of the estimated equity and asset betas from Australian comparator listed utility companies,
- Estimated equity and asset betas for US and UK gas companies;
- Having regard to maintaining continuity between it current and prior 1998 decision where the equity beta was set at 1.20

4.4 Equity and asset beta analysis

4.4.1 Weighting applied to Asset vs. Equity betas

ACG argue (p29) that there are problems in applying consistent assumptions in the process of levering and delevering. As a result ACG argues that

> *'In order to avoid the potential for misinterpretation of empirical data, this report will focus on the proxy equity beta that is consistent with the standard benchmark gearing assumption of 60 per cent debt to assets.'*

The equity beta reflects both the asset risk and leverage risk associated with operating a firm. To directly compare equity betas is misleading as firms with the same asset risk but different

leverage would be expected to have different equity betas. Further, when using comparators it is essential that all comparators be delevered and then relevered at the regulated debt to equity ratio.

It is agreed that when delevering in different markets several different effects must be considered making comparisons of asset and for that matter equity betas difficult to compare directly.

To achieve the outcome of deriving equity betas with a standard benchmark gearing of 60 per cent will still involve the need to delever estimated equity betas. The relevance of relevering comparator companies at the 60 per cent rate is not clear from the ACG analysis.

Further in the theoretical WACC – CAPM framework, if an estimate of the asset beta is derived, due to the circularity of the relationship between asset, debt and equity betas the capital structure and hence the size of the gearing will be irrelevant. If this theoretical vanilla WACC relationship holds, The post tax nominal vanilla WACC will remain unchanged regardless of the capital structure.

4.4.2 Identification of comparators

Equity beta estimates in an environment where there are no directly comparable companies need to be implied from *somewhat* comparable entities. In each of the Australian listed companies, the equity and asset beta estimates do not singularly reflect gas transmission business activities.

In its report ACG has used an average of estimated betas from AGL, Australian Pipeline Trust, Envestra and United Energy for comparisons of asset and equity betas. Of these comparators, only Australian Pipeline Trust significantly derives its revenues from gas transmission business.

The ACG report does not report the individual betas for firms but rather reports average equity and asset betas.

The ACG report advocates the placing of secondary importance on international equity betas. The logical conclusion of suggesting it is not appropriate to apply relevance for comparative purposes to delevered asset betas due to market and structural differences between countires is that it is also inappropriate to apply relevance to equity betas. This is because equity betas are a function of the underlying asset beta for each company.

At present there is no generally recognized model for transferring foreign betas to domestic equity beta equivalents. At best foreign country betas provide information that can be used to assess the relativity of comparator groups to other industry groups. Reliance on this information at the firm level is dangerous as it is not clear as to how much of the relative difference between foreign betas and domestic betas is due to equity market risk or foreign exchange risk.

4.4.3 Gearing levels

The ACG report identifies gearing levels formed as follows:

> *'by obtaining point observations on net debt (calculated as long term debt plus short term debt minus cash) and equity (market capitalisation) and taking simple averages of these measures over the periods of beta estimation'*

The estimates of gearing incorporate Net debt as opposed to total debt estimates. Net debt estimates typically assume that available cash is dedicated to the payment of debt – whereas other competing stakeholders such as taxation authorities may also have claims to cash. Thus, net debt figures tend to understate the level of gearing and cause estimates of asset betas to be understated.

4.4.4 Averaging of equity and asset beta estimates

The ACG applies a simple average of the estimated equity betas (p39), average asset betas (p40) and the relevered equity betas for the Australian, US, Canadian and UK companies (p40).

The use of a simple average can be misleading if outliers exist in the group or if the range is large. Similarly a median measure would offer little additional information as such a measure will bias attention to the centre of the distribution of outcomes. A more suitable measure would reflect a range of possible outcomes reflecting the interquartile range. Based on demand and supply considerations the proxy asset beta could then be located by consideration of comparable features.

4.4.5 Vasicek method of estimating the average asset beta

In its discussion of alternative pooling techniques (pp30 - 33) for the averaging of equity and asset betas ACG discusses the Vasicek method. This method is only intended for averaging equity betas for individual firms with weightings applied conditional on the standard errors of the equity beta estimates. To adjust for asset betas it has been proposed by ACG previously that "the standard error of the asset beta can be approximated by replacing the equity beta with the standard error of the equity beta in the delevering equation (with a debt beta of zero)".

The Vasicek measure is expected to minimise the variance of the average beta for the proxy group. Clearly this method of estimation assumes that the equity betas have standard errors which are equivalent to those of asset betas after consideration of leverage effects. Given that asset betas are derived with regard to both gearing and debt betas the use of delevered equity beta standard errors as proposed by ACG would therefore appear inappropriate as each will have their own distributional properties and clearly the size of the estimated asset beta standard error should also be proportional to the interaction between the debt beta and the gearing level applied as this will effect the size of the numerator in the delevering equation.

The approach of using the standard error of betas is an approach advocated by Vasicek, whose method assumes like the Blume method, that individual firm equity betas are misspecified when estimated by the OLS method. Vasicek does not refer to it as an approach for estimating the average of asset betas. Empirically, the equation used to estimate the weightings will give higher weightings to low standard errors as opposed to high standard errors due to the use of the squared inverse measure. This is confirmed in the example below.

Company	SE	SE^2	1/SE^2	weighting
A	0.34	0.1156	8.650519	0.306906
B	0.27	0.0729	13.71742	0.486672
C	0.47	0.2209	4.526935	0.160608
D	0.88	0.7744	1.291322	0.045814
Total			28.1862	1.000000

The weighting scheme as proposed is totally independent of the empirical fact that low betas tend to be overestimated and high betas tend to be underestimated under OLS. The standard error may be large or small independent of the estimated beta size but rather as a function of the appropriateness and fit of the variable being examined. Therefore weighting by standard errors offers little extra explanatory information.

Finally, the use of a small sample is inappropriate to represent industry conditions due to the small sample biases in distributional properties. The method advocated by Vasicek has been designed for samples of greater than 20 observations. In the ACG case we have only 4 for the Australian listed companies.

4.4.6 Blume adjustment to equity betas

NECG proposed that raw equity betas should be adjusted to reflect the time variation of beta and the empirically observed tendency for betas to move on average over time toward the beta of the market portfolio. Whilst it is agreed that choices about taking on more or less risk are "conscious behavioural decisions of management" (p32), it is still an empirical issue as to whether betas do in fact move over time.

Australian empirical evidence regarding betas stability suggests that betas do have a tendency to move over time and recent Australian empirical evidence does support the use of adjustment factors to capture the movement of betas over time. The nature of the adjustment factors suggested by Australian studies estimated are consistent with the Blume type measure.

Brailsford et al[5] identified two related notions of beta instability – 'inter period' instability and 'intra period' instability. The former arises due to instability of beta between the

[5] T. Brailsford, R. Faff and B. Oliver, 1997, *Research Design Issues in the Estimation of Beta,* McGraw Hill, Sydney.

estimation period and the "application" period. The other arises due to instability of beta during the estimation period. The primary reasons for inter period instability are due to:

- mean reversion in the beta where beta has been found to have a regression tendency over time towards the grand mean[6] of 1. Over time, high betas tend to move down and low betas tend to move up;[7] and
- structural breaks in the underlying economy involving clear delineation in the underlying market that affect all participants – examples include the shift from a classical to the imputation taxation system in 1987 and the floating of the Australian dollar in December 1983. Care must be taken in the identification of break points as there may be prior learning about the break event, learning of the consequences of the event or the break may involve a structural change over several months or years.

The primary reasons for intra period instability are due to:

- changes in firm specific factors during the estimation period such as a change in core business or business divestment;
- changes in market factors such as the level of financial leverage or shifts in the business cycle or sudden major moves by competitors.

The stability of the equity beta as an important issue in identifying the appropriate equity beta for gas transmission businesses. Empirical evidence from the Australian markets supports the mean reversion of beta.[8] The raw beta values, which were derived from historical data, can be adjusted based on the assumption that beta factors change over time especially in industries where there is considerable structural reform underway.[9] Clearly few of the comparator firms identified by ACG are solely engaged just in the business of gas transmission. The Australian utilities industry is in a constant state of change as companies diversify and divest operations. The use of adjusted betas is also supported by practitioners.[10]

The overall effect of the Blume adjustment in relation to firms with betas below 1 is to increase their beta estimates. Any asset beta estimated from these adjusted betas will also be at a higher level than the raw beta implied asset betas.

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[6] The grand mean represents the mean of all the individual means estimated.

[7] Beta have been found to have a regression tendency over time towards the Grand Mean of 1. Over time, high betas tend to move down and low betas tend to move up. The Australian study by Castagna, A. and Z. Matolcsy (1978) 'The Relationship between Accounting Variables and Systematic Risk and the Prediction of Systematic Risk', *Australian Journal of Management,* vol. 3, pp. 113-26, found that it was possible to adjust the estimated OLS beta as follows:

$$\beta_i^{CM} = 0.541 + 0.464\hat{\beta}_i$$

A study by Brooks, R. and R. Faff (1997) 'A Note on Beta Forecasting', *Applied Economics Letters,* vol.. 4, pp. 77-78 compared a series of adjustments to betas estimated from a market model during the period 1983-1987 and also found that the adjustment based on the following provided a very useful adjustment:

$$\beta_i^{BF} = 0.50 + 0.50\hat{\beta}_i$$

[8] See Castagna, A. and Z. Matolcsy (1978), 'The Relationship Between Accounting Variables and Systematic Risk and the Prediction of Systematic Risk', *Australian Journal of Management,* vol. 3, pp. 113-26 and Brooks, R. and Faff, R. (1997), 'A Note on Beta Forecasting', *Applied Economics Letters,* vol. 4, pp. 77-78.

[9] International studies supporting the use of adjusted betas include Sharpe, W.F., Alexander, G.J. and Bailey, J.V. (1995), *Investments*, 5th edition, Englewood Cliffs, Prentice Hall, (rationale for adjusting beta section); Blume, M.E. (1971), 'On the Assessment of Risk', *Journal of Finance*, March, pp. 1-10; and Blume, M.E. (1975), 'Betas and their Regression Tendencies', *Journal of Finance*, June, pp. 785-795.

[10] It is worth noting that Merrill Lynch adjusts beta by the following formula:
Adjusted (future) beta = Raw Beta * (0.65) + (0.35)*1.

4.4.7 Raw equity beta estimation issues

In estimating equity betas (in particular, if they are to subsequently be used in delevering), caution must be exercised in relation to the sampling interval for the data and the length of the estimation period. Estimates using short interval data (measured at daily or weekly intervals) are systematically biased, such that highly traded securities are over stated whilst those of infrequently traded securities are understated. Although not heavily regarded the UK entity estimates are estimated with five years of weekly as opposed to monthly data.

Empirical evidence shows that beta estimates using monthly data estimated over 4 to 5 year intervals provide the most reasonable trade off between the number of observations and the stability of beta estimates.

Empirically the estimates from Bloomberg measured over both 4 and 5 years support the instability of using weekly as opposed to monthly estimates for equity betas:

	AGL Ltd	**Envestra Ltd**	**United Energy Ltd**
Monthly estimates			
4 years	0.32 (0.28)	**0.44 (0.25)**	0.27 (0.39)
5 years	0.36 (0.23)	**0.50 (0.22)**	0.31 (0.40)
Weekly estimates			
4 years	0.13 (0.12)	0.10 (0.11)	**0.45 (0.18)**
5 years	**0.26 (0.11)**	**0.23 (0.10)**	**0.50 (0.18)**

Source: Bloomberg: All estimates to 28.06.02. 5 year estimates for United Energy Ltd involved 49 observations and for Envestra Ltd 58 observations. The numbers in brackets indicate standard errors of the beta estimates. Estimates that are statistically significant are in bold.

In the ACG report (Appendix b pp1-2) the equity beta estimates for AGL, Envestra and United Energy obtained from the Risk Management Service of the Australian Graduate School of Management. Of these estimates only the Envestra estimate is statistically significant. Data obtained from Bloomberg to 31 March 2002 for the 4 and 5-year estimation periods are reported below: figures in bold are the only statistically significant estimates.

	AGL Ltd	**Envestra Ltd**	**United Energy Ltd**
Bloomberg:			
Monthly estimates			
4 years	**0.40 (0.23)**	**0.47 (0.26)**	0.55 (0.42)
5 years	0.39 (0.30)	**0.50 (0.23)**	0.33 (0.42)
AGSM			
4 years	0.47 (0.34)	**0.65 (0.27)**	0.39 (0.47)

The data obtained from Bloomberg highlights the sensitivity of beta estimates both in terms of:

- The variation in beta estimates between the Risk Management Service data and Bloomberg data where differences occur due to assumptions regarding compounding versus continuous compounding and the choice of the market portfolio (ASX200 for the Bloomberg data);
- The variation in beta estimates over time whereby the difference in monthly estimates (even when holding the estimation period constant) varies significantly for both AGL and United Energy.

Under such circumstances it is difficult to place heavy reliance on the equity betas estimated and therefore even less reliance can be placed on asset betas inferred from the equity beta estimates.

In understanding why such estimation differences occur, it is necessary to consider the assumptions necessary when estimating equity betas in a regression framework. In this framework[11], it is assumed that the relationship between the return on the asset and the market risk premium is linear and that the estimated coefficients are efficient and unbiased estimates of the 'true value' of the coefficients. If these assumptions are violated two results can occur:

- We could obtain biased sample estimates of the coefficients; and
- Standard formulas and tests for statistical significance are invalid.

Empirically, the estimation of the coefficients using Ordinary Least Squared techniques have typically produced unstable estimates of beta due to findings of heteroscedasticity (non-constant or time varying volatility of the regression errors) and autocorrelation in the residuals. Other findings suggest the presence of non-normality in the residuals, outliers, non-linearity in the relationship between the return on the asset and the market return, non-stationarity in beta estimates, or the possibility of omitted variables such as firm size or seasonalities.

An important but often overlooked issue in the interpretation of equity betas derived via ordinary least squared regressions is that the estimated coefficients provide a point estimate of the mid-point of the range over which the coefficient may actually occur with 95 per cent probability. For example a coefficient of 0.50 and a standard error of 0.40 suggests a possible range for the beta of 0.10 to 0.90. This range also suggests that point estimates of the asset betas will also be misrepresented and should not be considered as point estimates.

[11] It is assumed that the estimated coefficients of $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the best linear unbiased estimates (BLUE) of the parameters α_i and β_i.

5 Regulatory Issues and Beta Estimates

In their determination the ACCC does not refer to the equity betas applied in recent regulatory decisions. Although the debt beta used by alternative regulators was not always consistent, the table below provides a review of recent regulatory decisions shows the equity betas have typically been in the range of 0.90 to 1.20 with asset betas in the range of 0.40 to 0.60 with the majority of decisions having an asset beta of 0.55. The equity and asset betas of recent decisions are detailed in Appendix A.

As shown in Appendix B, a constant but often under emphasised issue that is expressed in most regulatory decisions is the degree of qualitative judgement needed to estimate an appropriate asset, debt and equity beta for determining the rate of return.

6 Review of the Lally Paper as it Applies to Beta Estimation

The ACCC sought advice from Lally regarding the estimation of the cost of capital in the presence of dividend imputation. The paper addressed the following questions:

- to what extent if any should foreign investors be recognized?
- what is an appropriate adjustment to the company tax rate to reflect the benefits of imputation. This adjustment reflects both the utilization rate for imputation credits and the ratio of credits assigned to company tax paid.
- what is an appropriate estimate for the market risk premium in the "Officer" model? and
- in view of the simplifying assumption in the "Officer" approach that ordinary income and capital gains are equally taxed, should an allowance be made for differential taxation of ordinary income and capital gains.

The scope of the Lally paper does not directly address the estimation of equity, debt or asset betas and the ACCC appears to have continued its use of the Vanilla post tax nominal WACC formula. Therefore no further action was taken with respect to this report.

7 APPENDIX A REVIEW OF REGULATORY ESTIMATES OF EQUITY AND ASSET BETAS

Date	Regulator	Decision	Asset Beta	Equity Beta
July 2002	ACCC	Epic – Moomba – Adelaide (Final Approval)	0.50	1.16
Dec 2000	ACCC	EAPL– Moomba – Sydney (Draft Decision)	0.5	1.16
June 2000	ACCC	AQGL Central West Pipeline (Final Decision)	0.6	1.5
October 1998	ACCC	TPA GasNet (Final Decision)	0.55	1.2
August 2002	ACCC	GasNet AA Revisions (Draft Decision)	0.5	1.0
May 2001	ACCC	NT Gas Pipeline (Draft Decision)	0.5	1.16
December 2001	SAIPAR	Envestra SA Distribution (Final Decision)	0.45-0.50	0.94-1.06
July 2000	IPART	AGL Gas Networks (Final Decision)	0.4-0.5	0.9-1.1
March 1999	IPART	GSE Gas Networks (Final Decision)	0.4-0.5	0.96-1.1
October 1998	ORG	Vic Distribution Businesses (Final Decision)	0.55	1.2
July 2002	ACG	Vic Distribution Businesses - Revisions (Draft Decision)	0.51	1.0
October 2001	QCA	Allgas & Envestra Distribution (Final Decision)	0.55	0.97
January 2000	ACCC	NSW/ACT Transmission Network Revenue Caps (Final Decision)	0.35-0.5	0.78-1.25
February 2001	ACCC	Snowy Mountains Hydro-Electric Transmission (Final Decision)	0.4	1.0
November 2001	ACCC	Powerlink Network Revenue Cap (Decision)	0.4	1.0

8 APPENDIX B REVIEW OF REGULATORY ACKNOWLEDGEMENT OF PROBLEMS IN RATE OF RETURN ESTIMATION

Regulator	Decision	Issue	Comment
ACCC	GasNet AA Revisions August 2002- (Draft Decision)	Systematic risk	"The Commission acknowledges that the beta estimate adopted in the 1998 Final Decision accommodated some aspects of specific risk. However, the Commission has worked to refine its approach to beta, and CAPM in general, subsequent to that decision. It does not consider it appropriate to continue with these ad hoc adjustments merely because they were carried out in the past. In particular, it does not consider that an adjustment for the uncertainty due to the 'newness' of the regulatory regime is appropriate any longer. For GasNet, the Commission must also consider whether the business has changed such that its risk relative to the market in general has fundamentally changed since 1998. **The Commission is not aware of any supporting evidence that the systematic risk of GasNet has changed significantly.** However, it does note that it proposes to accept the removal of the feature of the revenue control formula which allowed most of the GasNet's first period revenue shortfall to accrue. In addition, the Commission notes that the equity beta estimate used in the 1998 Final Decision was 1.2. This suggests that the business experiences greater volatility than the market in general. This does not appear to be consistent with the frequently held view that gas, and electricity, utilities are less risky and more stable than the market average. Greater stability suggests that the equity beta should be less than one." (p71/72).
		Asset beta	"The Commission has considered the information presented by GasNet as well as other interested parties in its assessment of the appropriate asset beta for the business. In particular, it has referred to the report prepared by ACG which indicates that the current appropriate asset beta for Australian gas transmission businesses may be between 0.27 and 0.37. However, for the reasons indicated by ESC in reference to the equity beta as noted above, the Commission considers that it may be premature to rely on market data exclusively when determining the asset beta. Accordingly, the Commission considers that an asset beta of 0.5, while biased in favour of the service provider, is appropriate for GasNet at this time."

Regulator	Decision	Issue	Comment
		Debt beta Issue raised in Envestra report	The upper limit to the debt beta (ßd) can be determined from the formula: ßd=(rd – rf)/MRP With the current proposed values for the relevant parameters, the calculation results in a debt beta of approximately 0.23. However, the ACG has recently undertaken work to provide further insight into the debt beta. It concluded that the debt beta is likely to be between 0 and 0.18 although a value toward the upper end of this range was more likely. ACG has also considered this information and suggested that an appropriate range for the debt beta would be between 0 and 0.15. On balance, the Commission considers that an appropriate value for the debt beta for this Draft Decision is 0.15." (p72)
		transparency and repeatability	"The Commission considers that an important aspect of its regulatory decisions is the selection of specific estimates of the values of the CAPM parameters, and the associated discussion on the parameter values chosen. Using point estimates of inputs allows the CAPM outputs and cash flow analysis carried out by the Commission to also be clearly numerated, consistent and repeatable. The Commission considers that this transparency and repeatability is an important feature of its regulatory approach. In contrast, approaches that generate a wide range of possible outputs can require the exercise of a degree of regulatory judgment which may lead to considerable uncertainty for service providers and other stakeholders. In addition, use of specific values can make it easier to pinpoint contentious aspects which may warrant closer examination." (p74)
ACCC	TPA (Gasnet) Final Decision 1998	WACC model	"While the CAPM/WACC framework provides a well recognised theoretical framework to establish the cost of capital, there is less than full agreement on the precise magnitude of the various financial parameters which need to be applied (as evidenced by the range of parameter values suggested by different commentators). ... The Commission has given careful consideration to the value that should be assigned to TPA given the nature of its business and current financial circumstances. Accordingly, the parameter values used are those considered most appropriate. Mostly these fall near the middle of a narrow range based on the information available, however a few, such as the equity beta and the margin on debt, have been chosen to give TPA the benefit of associated uncertainty." (p63) 1998 ACCC Final Decision – equity beta = 1.2, debt margin = 1.2 - 2002 draft decision has debt margin at 1.38 suggesting that ACCC differed in 1998 when giving "TPA the benefit of associated uncertainty".

Regulator	Decision	Issue	Comment
		other risks	"In determining the beta pertinent to TPA, submissions have suggested that regulatory arrangements which are based on revenue caps or price caps are inherently more risky than the US rate of return regulation which provided the main source of benchmark firms for beta determination. As a consequence, EPD has suggested higher beta assumptions than it originally proposed would be appropriate. The asset beta range for Transco in the UK, which is subject to a similar regulatory regime to TPA, was assessed by the Monopolies and Mergers Commission 1997 price review as being between 0.45 and 0.60. In addition, it was suggested that the 'newness' of the regulatory framework introduced perceived uncertainties on the part of investors which should be taken into account in setting the cost of capital via the beta value assumption. The Commission accepts these considerations as being relevant and has acknowledged that commensurate increase in the beta estimates may be appropriate. The asset beta (equity beta) has been increased from 0.35 (0.85) to 0.55 (1.20). Given that the risks are compensated for by the higher beta which leads to a higher rate of return, it would be difficult to justify additional compensation should one of these risk events materialise and impose additional costs on the service provider. (p49)
		Uncertainty hence uses cash flow analysis	"Given the uncertainty represented by the conversion formula, the Commission has decided to focus primarily on the nominal return on equity which comes directly from the parameters in Table 3.3 and the post-tax nominal WACC. There is broad agreement among experts and commentators about how these are to be calculated from the basic input parameter assumptions. To obtain the pre-tax real WACC, the Commission has used computer models which simulate the cash flows emanating from the regulatory framework. The value is chosen so that the cashflows indicated by the model are consistent with the nominal return on equity of 13.2 per cent (and the post-tax nominal WACC of 6.9 per cent) indicated by the CAPM model based on parameters identified as being appropriate to TPA within this regulatory period. The value of the real pre-tax WACC consistent with these outcomes is 7.75 per cent, which is between the values suggested by EPD and Macquarie (reverse) transformation formulae. (p52)
ACCC	Epic Moomba – Adelaide Sept 2001 Final Decision	rate of return parameter values	"The parameter values used by the Commission are those considered most appropriate for the MAPS as a stand-alone business. These generally fall near the middle of a narrow range based on the information available." (p53)

Regulator	Decision	Issue	Comment
ACCC	Epic Moomba – Adelaide Pipeline System July 2002 Final Approval	regulatory precedent	"Epic argued that the Commission placed too much emphasis on regulatory precedent, and that the regulatory precedent actually supports a higher asset beta than 0.50. In reading the Commission's Final Decision however, it is evident that the Commission based its assessment of beta on analysis of the systematic risk relevant to the MAPS, empirical evidence and regulatory precedent. The Commission has assessed the asset beta with regard to regulatory precedent due to the level of reliable data available for Australian gas transmission businesses." (p23)
		Comparison with Victorian 1998 Final Decision	"With respect to Epic's comparison with the Commission's 1998 Final Decision for the Victorian gas transmission system, as noted in the Final Decision for the MAPS, the Commission has required an asset beta of 0.50 rather than 0.55, which it determined for the Victorian system in 1998. In 1998, the Commission added a premium to the asset beta for risk associated with the newness of the regulatory regime. Page 46 of the Commission's Final Decision for the MAPS states that the treatment of risk (Victorian 1998 decisions) associated with the newness of the regulatory regime is no longer considered appropriate, regardless of whether this perceived risk has increased or decreased. This is supported by Professor Kevin Davis' comments that follow in the Commission's Final Decision that: "If there does exist "regulatory risk" there is no obvious reason to believe that such risk would have a systematic element to it, which would warrant adjusting the underlying asset beta. It should also be noted that the Commission has not included a premium for the newness of the regulatory regime in any subsequent decision to the 1998 Final Decision." It should also be noted that the Commission has not included a premium for the newness of the regulatory regime in any subsequent decision to the 1998 *Final Decision.*
ACCC	Qld Transmission (Powerlink) Revenue Cap November 2001 Decision	cost of equity parameters	"The Commission has given careful consideration to the values that should be assigned to the Powerlink's cost of equity given the nature of its business and current financial circumstances. Accordingly, the parameter values used are those considered most appropriate. Mostly these fall near lower to mid point of a range based on the information available." (p27)
ORG	Gas Distribution AA October 1998 Final Decision	Beta estimation	"The Office recognises that the process of beta estimation is very sensitive to the period and frequency of observation, the statistical techniques applied, and a variety of other factors. The process involves as much "art" as science, even when direct, relevant observations are available. Reaching a decision on the appropriate beta for the gas distribution businesses is therefore one of the most subjective elements of the CAPM framework. That assessment is made the more difficult in the current context of rapid change in the market and regulatory environment for gas and by the paucity of

Regulator	Decision	Issue	Comment
			relevant stock market and other data to inform the analyses." (p210)
ESC	Review of Gas Access Arrang July 2002 Draft Decision	regulatory precedence	"While the Commission has noted that primacy should be placed upon objective market evidence, it previously has placed weight upon other regulatory decisions – and, in the case of the Victorian electricity distributors, consideration of these decisions applied pressure for a higher proxy beta than otherwise." (p242) "The Commission sees considerable merit in deriving a proxy beta that is based upon the latest estimates of betas for sufficiently comparable entities. The use of the latest estimates is objective and can be repeated across successive price reviews and industries. It is also unbiased, because while beta estimates (and the average beta across a group of comparable entities) inevitably will move over time, there is no means of testing which of the time periods provides the best beta estimate. Applying these principles to the current review would imply using a proxy equity beta for the target level of gearing of approximately 0.7 (using the arithmetic average), or somewhat lower if more weight is assigned to the more precise beta estimates. The Commission has noted that it considers it appropriate to take account of betas from other jurisdictions as a secondary source of information. However, as tables C.11 and C.12 show, regard to the latest beta estimates in the US and UK would lead to downward revision of this proxy beta. However, the Commission also notes that the use of such an estimate is substantially lower than that used in other regulatory decisions, including by the Commission itself. In its last decision, the Commission noted a reluctance to move too far from the range of proxy betas that have been adopted in comparable regulatory decisions given the limited range of capital market information that currently exists.338 Since that decision, one further empirical beta estimate is available (the Australian Pipeline Trust), although that beta estimate has relied upon only 21 observations, and is correspondingly imprecise. The Commission is also aware of the long-term consequences of its decisions, and the appropriateness of adopting a conservative approach where there is substantial uncertainty. The Commission considers that the derivation of the proxy is one of the matters upon which a conservative exercise of judgment is justified. That said, the Commission considers the evidence from the capital markets indicates that a change to the proxy beta from that adopted in the 1998 review is appropriate. During the last two years, the average re- levered equity beta has not exceeded 1 for any of the quarterly estimates, well in excess of the assumption of 1.2 adopted in the 1998 decision. The proxy beta the Commission adopted in 1998 also is well in excess of the most comparable of the decisions by other regulators (namely, gas and electricity distribution). The Commission has adopted a proxy equity beta of 1 for the Victorian gas distributors' regulated activities, for an assumed gearing level of 60 per cent. This is approximately equivalent to an asset beta of 0.40 for a debt beta of zero, or 0.51 for a

Regulator	Decision	Issue	Comment
			debt beta of 0.18. However, the Commission emphasises that this estimate is well above that which would be derived exclusively with reference to the latest market data. That is, in deriving this proxy beta, the Commission has placed considerable weight on the desirability of continuity between regulatory decisions, and the long-term consequences of the Commission's decisions for the Victorian gas industry." (p243)
QCA	Gas Distribution AA October 2001 Final Decision	beta determination	"In its Draft Decision, the Authority recognised that the determination of an appropriate equity beta for both listed and unlisted entities was a difficult exercise, relying on judgment regarding the risks faced by the entity relative to others in the market." (p226) "The difficulties outlined above merely serve to highlight that the calculation of WACC using CAPM to estimate the return on equity involves some degree of imprecision. However, the Authority considered that, in applying CAPM in a regulatory setting, regard must be given to the risks of allowing too low a rate of return. Consequently, the Authority proposed to consider adjusted (as well as raw) betas in the assessment of the rate of return for the gas distribution businesses." (p227)
IPART	Great Southern Energy gas Networks March 1999 Final Decision	rate of return	"In the light of further submissions following the draft decision, the inherent conversion problems, and the arbitrariness of the combined effects of different inputs to CAPM, the Tribunal maintains its view that it is inappropriate to derive a single rate of return. Rather, the Tribunal has adopted a feasible range for the cost of capital based on a combination of feasible parameters and available information." (p27) "It is important to ensure that the rate of return is set at a level which enables owners of regulated businesses to finance their regulated undertakings at a reasonable cost. The Tribunal regards this issue as fundamental to the financial position and prospects of a gas network company. It is also important to the long term interests of customers and end users who pay for the services. The Tribunal's underlying intention is to ensure that the service provider has the opportunity to obtain reasonable returns on capital in accordance with the risks involved. If the rate of return is set too low, prices will be distorted and the regulated businesses could become capital constrained or face financial distress, and would have to reduce maintenance and capital expenditure to below optimum levels. This would degrade the level of service, resulting in increased costs to consumers. On the other hand, if the rate of return is set too high, this will be reflected in higher prices. This could result in distorted pricing signals to consumers, and is likely to lead to inefficient outcomes. High prices could distort the apparent economics of network bypass options, demand side management, or use of alternative energy sources. The rate of return adopted for the purpose of calculating regulated revenues should take account of the factors listed in section 2.24 of the Code *and* achieve the objectives set out in

Regulator	Decision	Issue	Comment
			section 8.1 of the Code. The outcome has to be considered reasonable in the context of present capital market conditions and expectations. The Tribunal considers that the cost of capital issue must be approached in a way that reflects the fundamental principles on which the regulatory system is based. The totality of the risks inherent in the gas transportation industry must be allocated appropriately to customers and the providers of equity and debt finance." (p36)
ORG	Electricity Price Determination September 2000 Final Decision	beta estimation	"As a result of considering these issues, the Office concluded that the proxy asset beta in the Draft Decision may have overstated the range for the appropriate proxy beta. However, the Office has been careful not to place undue weight on recent trends in asset beta, and is also mindful that some of the issues raised in submissions subsequent to the Draft Decision (such as the appropriateness of certain technical adjustments to beta estimates) have not been subject to the rigours of full and open public consultation. The Office is also reluctant to determine a proxy beta that is below the range adopted in recent Australian regulatory decisions given the limits on the capital market data available (in turn due to the absence of a deep pool of comparable entities on the Australian stock exchange). Accordingly, the Office has decided to retain a proxy asset beta equivalent to that adopted in the Draft Decision. As noted above, the Office has decided to assume a zero debt beta, which implies that the asset beta of 0.50 in the Draft Decision (for a debt beta of 0.2) would translate into an asset beta of 0.38 (for a zero debt beta), which the Office has rounded this to 0.40. Given the Office's benchmark gearing assumption of 60 per cent debt to assets, this translates into a proxy equity beta of 1." (p127)

GasNet's Response to Draft Decision

Annexure C - VENCorp direction relating to installation of gas chromatographs dated 11 September 2002.

61 3 9797 5189
VENCorp
Victorian Energy Networks Corporation

11 September 2002

Mr Ross Bundey
Chief Operating Officer
GasNet Australia Pty Ltd
180 Greens Road
DANDENONG Vic 3175

FAXED 11/9/02

Dear Ross

Re: Gas Composition Monitoring and WTS Communications

In a letter last month (Western Transmission System - Gas Composition Monitoring and Metering) I alerted you to VENCorp's requirement for gas composition monitoring (i.e. a gas chromatograph) in what is currently the Western Transmission System (WTS). As part of the incorporation of the WTS into the "Gas Transmission System" it would be prudent to review the communications links to the CTM sites, as VENCorp will require reliable, twice hourly communication for data transfers for energy measurement and system operations. The existing "dial up" system may not be the optimum approach.

It is appropriate to also let you know that, because of day-to-day changes in flow rates experienced over the last six months at the Iona TXU-GS injection point it has been found that the gas composition at off-takes along the Geelong to Brooklyn pipeline varies significantly depending on the source of the gas (ie Longford or Iona). These changes in gas composition mean that VENCorp cannot reliably determine (MSOR Clauses 4.4.13 (h) & (i)), the correct source of heating value and gas composition data thus leading to the likelihood of energy measurement errors outside the limits set in the MSOR.

We hereby notify you (under clause 4.3.3(a) of the MSOR) that VENCorp will require the installation of two gas quality monitoring systems (gas chromatograph only) to monitor gas composition one in the vicinity of Geelong and the other at Brooklyn. These two units are in addition to the unit that VENCorp requires to be installed in the Paaratte/Allansford area mentioned above. The chromatograph at Brooklyn should also be configured to monitor gas entering the Ballarat and the South Melbourne pipelines.

Note that the above requirements are based on current flows in the system. Should the flows at Culcairn increase significantly VENCorp may require up to two further gas chromatographs at locations where gas may be blended at major off-takes.

Should you have any queries regarding the above please contact Dr Howard Wright on 8664 6663.

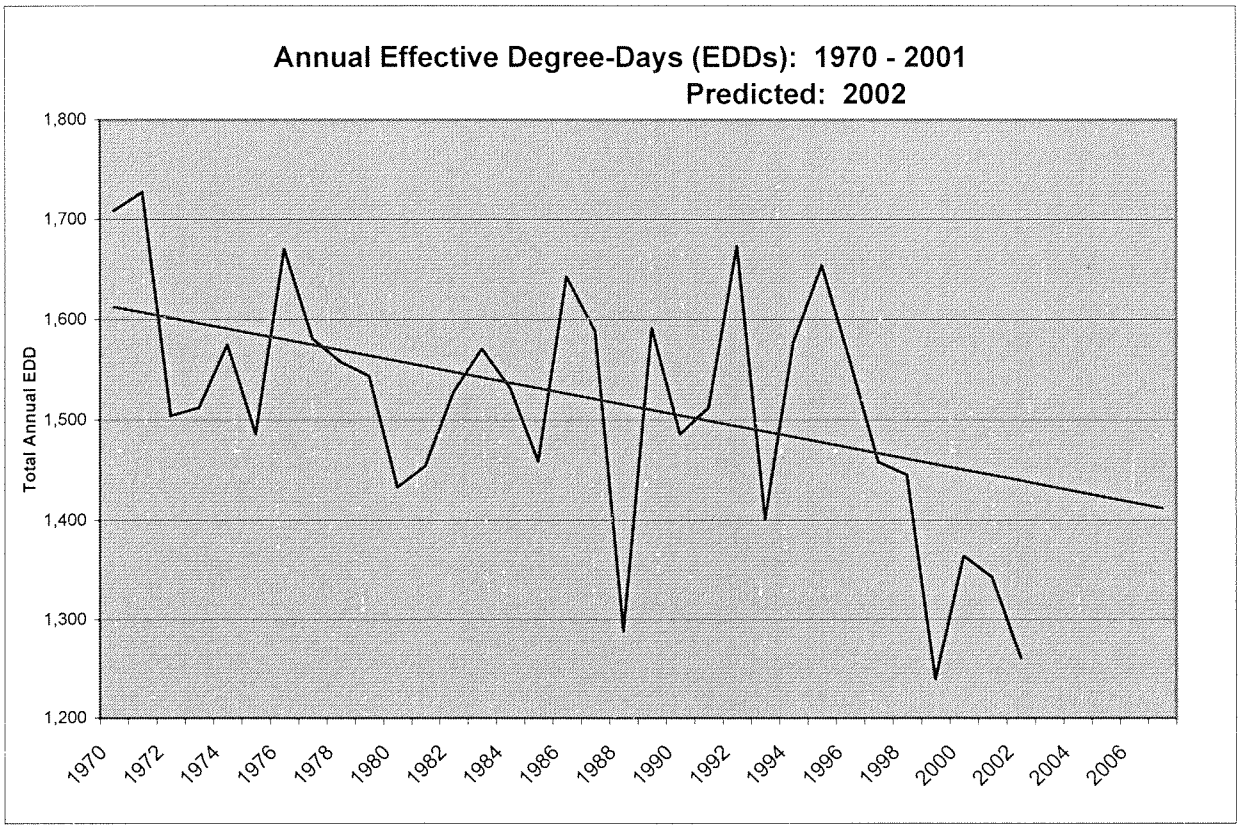
Yours sincerely

Chris Ely
EXECUTIVE MANAGER - OPERATIONS

Doc No. 47838

GasNet's Response to Draft Decision

Annexure D - Effective Degree Days.



Conclusion

T-Statistic is greater than 2. Trend is statistically significant.

Estimated actual for 2002 will be the second warmest on record. Concern that there has been a steep change in temperatures.

SUMMARY OUTPUT 1970 - 2001

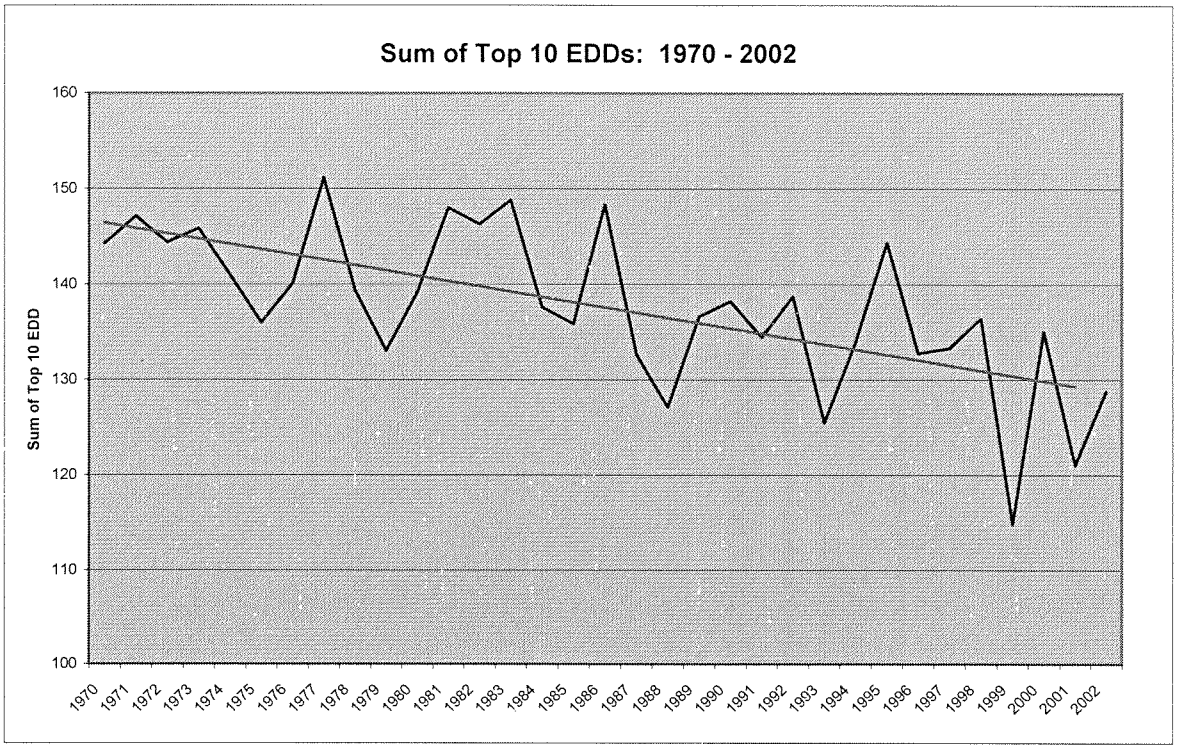
Regression Statistics	
Multiple R	0.48
R Square	0.23
Adjusted R Square	0.21
Standard Error	102.95
Observations	32

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	95,848	95,848	9.04	0.01
Residual	30	317,965	10,599		
Total	31	413,813			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	1,618	37.27	43.43	0.00	1,542	1,695	1,542	1,695
X Variable 1	-5.93	1.97	-3.01	0.01	-9.95	-1.90	-9.95	-1.90

For the period January 1 to Sept 17, 2002, EDDs are tracking 15% below standard, and 13% below the expected (actual YTD + standard) annual EDD.



Conclusion **T-Statistic is 4.44. The trend is highly significant.**

SUMMARY OUTPUT 1970 - 2001 (not incl. 2002)

Regression Statistics	
Multiple R	0.63
R Square	0.40
Adjusted R Square	0.38
Standard Error	6.50
Observations	32

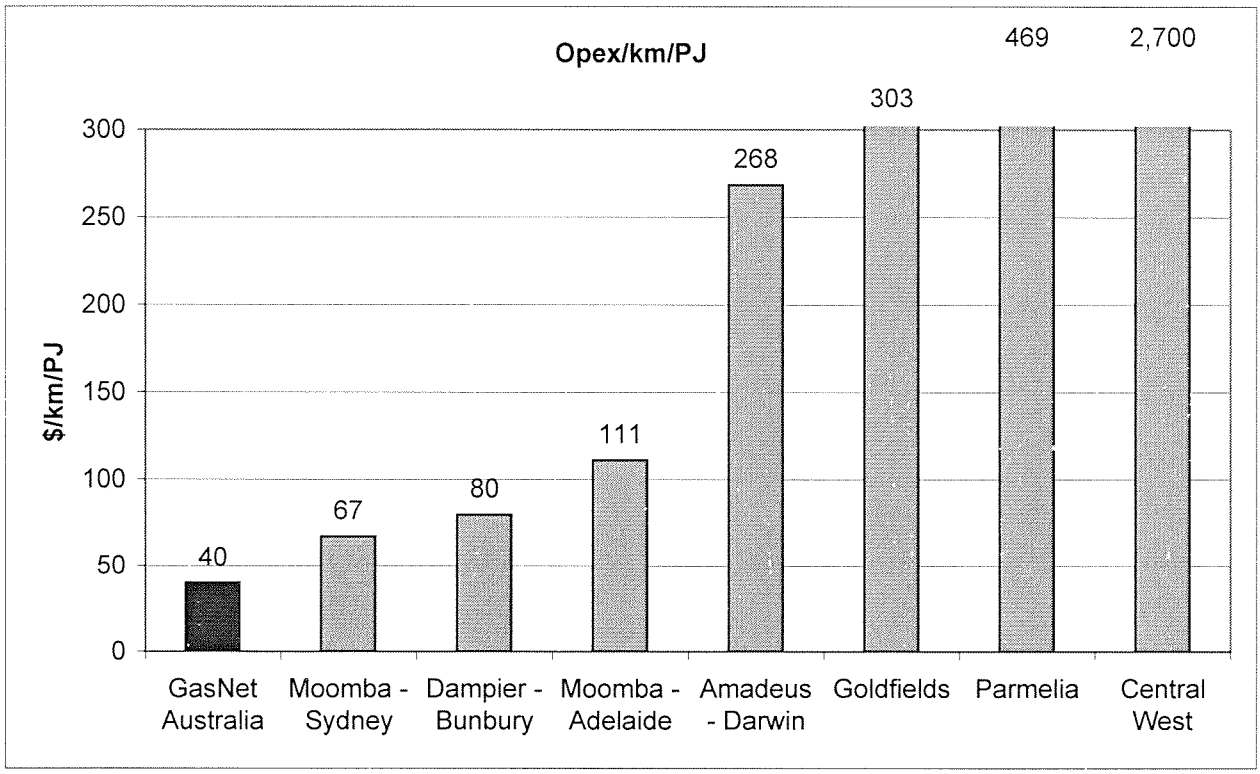
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	834	834	20	0.00
Residual	30	1,268	42		
Total	31	2,102			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
Intercept	146.97	2.35	62.46	0.00	142.17	151.78	142.17	151.78
X Variable 1	-0.55	0.12	-4.44	0.00	-0.81	-0.30	-0.81	-0.30

GasNet's Response to Draft Decision

Annexure E - KPI Information.



	Opex	O&M	G/A	Flow	Length	ORC
Amadeus - Darwin	7.30	5.84	1.46	16.40	1,658.00	351.07
Parmelia	4.12	3.70	0.42	20.10	438.00	173.30
Central West	0.80	0.50	0.30	1.16	255.00	30.42
Moomba - Sydney	12.41	8.87	3.53	91.40	2,024.00	1,038.15
GasNet Australia	16.64	9.82	6.82	216.60	1,930.00	807.60
Dampier - Bunbury	29.64	24.82	4.81	201.60	1,845.00	1,650.75
Moomba - Adelaide	15.60	0.00	0.00	133.00	1,056.00	656.54
Goldfields	10.63	7.39	3.25	25.50	1,376.00	448.92

	Opex/m/GJ
GasNet Australia	40
Moomba - Sydney	67
Dampier - Bunbury	80
Moomba -Adelaide	111
Amadeus - Darwin	268
Goldfields	303
Parmelia	469
Central West	2,700