ElectraNet SA

Submission to the ACCC Review of Draft Principles for the Regulation of Transmission Revenues

28 November 2003

ElectraNet SA
electricity transmission network

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APPENDICES

1. Introduction

The ACCC first released its Draft Statement of Regulatory Principles (DRP) for the regulation of transmission revenues in May 1999[1]. Since that time the DRP has been adopted by the ACCC as a guide to setting transmission revenue caps.

This submission has been prepared in response to the ACCC's August 2003 Discussion Paper on the *2003 Review of the Draft Statement of Principles for the Regulation of Transmission Revenues*.

1.1 The DRP and Regulatory Risk

ElectraNet has previously been critical of the lack of finalisation of the *Regulatory Principles* and the significant level of uncertainty and regulatory risk that this has created – risk for which ElectraNet has to date received no compensation.

ElectraNet is, therefore, encouraged by the ACCC's current consultation towards finalising its *Regulatory Principles* and sees this as an opportunity to provide greater certainty to investors – this is particularly relevant to ElectraNet as an investor owned company.

The ACCC has now almost completed regulatory reviews for each of the transmission network service providers (TNSPs) including TransGrid, Energy Australia, Powerlink, ElectraNet, SPI PowerNet and Transend.

In each of these reviews, the ACCC has confirmed the approach on certain issues outlined in the DRP and on other issues has moved away from the position set out in the DRP.

Such changes by the regulator underscore the degree of uncertainty and regulatory risk that exists for investors who make long-term investment decisions based on the regulatory rules in place at the time.

While ElectraNet recognises that the *Regulatory Principles* will likely need to evolve over time, their finalisation is necessary to improve the certainty of the regulatory framework and, as a result, enhance the strength of the incentives provided by that framework.

ElectraNet understands that some of the outstanding issues raised in the Discussion Paper are complex and may take some time to resolve.

Nevertheless, finalisation of the *Regulatory Principles* should be given a high priority, as should providing the greatest amount of certainty possible about how the details of the regulatory framework are to be implemented.

Proposed changes to the existing regulatory framework should not be considered lightly given that proposed changes create regulatory risk for equity and debt investors and diminish incentives for investment in like manner to actual changes.

[1] Australian Competition and Consumer Commission, "*Draft Statement of Principles for the Regulation of Transmission Revenues*", 27 May 1999.

It is also important to understand that incentives will only be strengthened to the extent that investors can have confidence that the regulator will adhere to the *Regulatory Principles* established.

1.2 Submission Outline

The ACCC's Discussion Paper identifies a number of issues for review within the DRP including:

- the revenue cap decision making process;
- asset valuation – the merits of revaluation versus roll-forward;
- capital expenditure;
- operating and maintenance expenditure;
- incentive regulation and benchmarking; and
- the weighted average cost of capital.

This submission addresses issues raised within each of these areas and generally follows the structure of the Discussion Paper with the exception that incentive regulation and benchmarking issues are considered under the capital and operating expenditure sections.

2. Code Objectives of Transmission Regulation

The National Electricity Code establishes objectives and principles for the transmission revenue regulatory regime administered by the ACCC[2].

The ACCC has asked that those making submissions explain how their preferred approaches for addressing the issues raised in the Discussion Paper meet the principles and objectives set out in the Code.

Key objectives that are particularly relevant to the current review process are that the transmission revenue regulatory regime to be administered by the ACCC must seek to achieve the following outcomes:

(a) an efficient and cost-effective regulatory environment;

(b) incentive based regulation which provides for:

- a sustainable commercial revenue stream, including a fair and reasonable rate of return on efficient investment
- incentives and reasonable opportunities for TNSPs to increase efficiency
- an equitable allocation of efficiency gains between owners and users

(c) environment for efficient investment and efficient use of existing infrastructure

(d) regulatory accountability through transparency and public disclosure of regulatory processes and the basis of regulatory decisions

(e) reasonable certainty and consistency over time of the outcomes of regulatory processes

This submission will make reference to these objectives in responding to the questions raised in the Discussion Paper.

[2] National Electricity Code, clauses 6.2.2 – 6.2.5

3. Revenue Cap Decision Making Process

The ACCC has proposed changes to the revenue cap decision-making process.

In summary, the ACCC proposes to extend the regulatory review period to twelve months, with associated changes to:

- regulatory review procedures;
- the operation of public forums;
- treatment of late submissions; and
- confidentiality requirements.

ElectraNet supports the changed timetable for regulatory reviews, which effectively extends the review period from 6 months to 12 months.

ElectraNet also supports the proposed approach to the conduct of public forums, the treatment of late submissions and confidentiality requirements.

In relation to confidentiality requirements, ElectraNet understands that in order to achieve a transparent review process it is important to limit the amount of confidential information that is restricted from public release. Nevertheless, it is important that the regulatory process recognise that there will always be some information that cannot be released publicly due to commercial sensitivities or contractual obligations.

ElectraNet believes that the DRP should also address the following matters that are important to the decision making process.

3.1 Principles of Best Practice Regulation

The DRP recognises the connection between the actions of the regulator and regulatory uncertainty and risk:

> *"In a regulated environment, the actions of the regulator could influence the assessment of risk and expected returns by introducing elements of uncertainty and risk. Regulatory uncertainty weakens existing incentives for efficient behaviour, so that a higher rate of return is required for investment.*
>
> *In order to minimise regulatory risk, the Commission is committed to achieving best practice regulation and has adopted a set of guiding principles that will underpin its regulatory work. The principles set out have been identified by the Regulators' Forum as essential elements required to achieve best practice regulation, and have been adopted by the Commission".*[3]

The four key principles set out in the DRP are:

- Communication and consultation;

[3] ACCC Draft Regulatory Principles, p6.

- Predictability;
- Flexibility; and
- Effectiveness and efficiency.

ElectraNet would like to see this section of the *Regulatory Principles* expanded to include the regulator's commitment to other principles of best practice regulation, including accountability and transparency[4].

Clause 6.2.6(a) of the Code requires that:

> *"In making a revenue cap or any other decision under this Clause 6, the ACCC must publish full and reasonable details of the basis and rationale of the decision including but not limited to the following:*
>
> *(1) reasonable details of qualitative and quantitative methodologies applied including any calculations and formulae;*
>
> *(2) the values adopted by the ACCC for each of the input variables in any calculations and formulae, including a full description of the rationale for adoption of those values;*
>
> *(3) reasonable details of other assumptions made by the ACCC in the conduct of all material qualitative and quantitative analyses undertaken in relation to the setting of a revenue cap or related matter; and*
>
> *(4) full reasons for all material judgments and qualitative decisions made and options considered, and all discretions exercised which have a material bearing on the outcome of the ACCC's overall decision.*

ElectraNet believes that the ACCC has not always been successful in achieving these objectives in its regulatory decisions. For example, consistent with these objectives, revenue cap decisions should:

- treat each revenue cap application on its merits and provide a comprehensive and detailed analysis of the relevant issues;
- address and respond fully to the material issues raised in the application and other submissions throughout the review process;
- present clear and logically consistent arguments in support of the decision, particularly where the ACCC has not accepted the arguments put to it by the regulated business.

A greater commitment to principles of best practice regulation in the *Regulatory Principles* and regulatory decision-making will enhance regulatory certainty rather than promote uncertainty and diminish incentives for investment.

[4] For example, ESCOSA's best practice standards include these and other principles of best practice regulation.

Placing a greater emphasis on principles of accountability and transparency is consistent with the Code objective of achieving regulatory accountability and transparency of process.

3.2 Financial Modelling

ElectraNet believes that the regulatory process should allow a TNSP to have access to the regulator's detailed financial modelling of its own revenue cap decision.

ElectraNet's experience has been that without access to the ACCC's detailed modelling, a great deal of time and effort has been required to model and predict the outcome of the revenue cap decision, and then even more so to try and explain differences in the outcomes between the two models.

The ACCC should make a commitment in the DRP to provide TNSPs with full access to its detailed modelling of their revenue cap decisions during and at the conclusion of the review process. For example, the TNSP should be able to review and understand how the draft and final revenue cap decisions were arrived at.

This proposal is consistent with the Code objective of achieving regulatory accountability and transparency of process.

3.3 Appeal process

Currently, regulated transmission companies have access to a limited administrative appeal for revenue decisions made by the ACCC under the NEC.

ElectraNet understands that appeals are limited to considering simple errors of process or errors of fact and are not open to consider particular decisions or opinions expressed by the regulator on their merits.

Therefore, unlike the gas industry, the electricity transmission industry has no access to a merits based appeal of a revenue decision made by its regulator.

ElectraNet believes that the revenue cap decision-making process would be improved if TNSPs have access to a third party merits appeal regarding the ACCC's decisions.

The nature of transmission regulation is that there are many contentious issues with strong arguments on both sides that require interpretation and judgement by the regulator. In this environment it is highly inappropriate that regulated businesses do not have recourse to an independent review of regulatory decisions.

Finalising the *Regulatory Principles* provides an opportunity for the ACCC to indicate its support for such a provision in the Code.

This proposal is consistent with the Code objective of achieving regulatory accountability and transparency of process.

3.4 Summary of ElectraNet's comments on the decision process

- ElectraNet generally supports the ACCC's proposed changes to the regulatory review process, including extension of the review period from six to twelve months.
- The regulatory process must continue to recognise that some information provided by TNSPs cannot be released publicly due to commercial sensitivities or contractual obligations.
- The *Regulatory Principles* should be expanded to include the regulator's commitment to achieving principles of best practice regulation, including accountability and transparency, in its revenue cap decisions.
- The ACCC should make a commitment in the DRP to provide TNSPs with full access to its detailed modelling of their revenue cap decisions.
- The ACCC should indicate its support for a provision in the Code that would give regulated businesses recourse to an independent review of regulatory decisions.

4. Asset Valuation

The Discussion Paper seeks comment on three options for future asset valuation:

- Option 1 – Periodic revaluation using the Optimised Depreciated Replacement Cost (ODRC) methodology;
- Option 2 – Lock in the initial jurisdictional valuation and roll forward the asset base adding in new investment at cost; and
- Option 3 – One off revaluation of the jurisdictional asset base using ODRC, and roll in new investment at cost in subsequent regulatory periods.

The ACCC's preferred position on asset valuation is summarised as follows:

The Commission's preferred position:

The Commission's initial view is to consider each revenue cap on a case-by-case basis but with the preferred position to lock-in at this stage, as there is no evidence to suggest that there are significant problems with the jurisdictional valuations. The Commission notes that the asset base includes both fixed assets and easements.

The Commission's preferred position is to lock-in the asset base but if option 1 or 3 is adopted the Commission is likely to adopt historical cost when revaluing easements. Refer to section 3.6 for further discussion on easements.

An important consideration in the treatment of asset valuation is the principle of financial capital maintenance; that is:

> *"investors should have a reasonable expectation of recouping the costs involved in the prudent provision of assets. So long as this condition is met for outlays efficiently incurred, then investment will be appropriately encouraged."*[5]

This is a fundamental, and reasonable, expectation when investing in regulated assets with long lives and commensurately long return periods.

4.1 Revaluation versus roll forward

The relative merits and implications of revaluation versus roll forward treatment of the regulatory asset base have been broadly covered in the Allen Consulting Group report for the ACCC[6].

ElectraNet strongly supports the ACCC's preferred position to lock in the value of sunk assets, but only once a fair and reasonable asset valuation has been established.

Where it can be demonstrated that the jurisdictional asset valuation was subject to material errors or omissions, Option 3 should be adopted to correct these material errors or omissions before adopting a roll forward methodology.

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5 Henry Ergas, "*Epic in Retrospect and Prospect*", available at www.necg.com.au.

6 The Allen Consulting Group, "*Methodology for updating the regulatory value of electricity transmission assets*", August 2003.

ElectraNet believes that once a fair and reasonable asset valuation has been established rolling forward the asset base will strengthen the incentive properties of the regulatory framework by:

- Removing a significant and currently uncompensated asymmetric risk associated with future revaluation using the modern equivalent asset methodology – the ACCC recognised this risk in its ElectraNet revenue cap decision by creating a special asset class to quarantine certain refurbishment/ replacement expenditure from future revaluation.

- Simplifying and improving the efficiency of the regulatory regime by avoiding costly future valuation exercises.

The proposed changes are consistent with the Code objectives of achieving an efficient and cost-effective regulatory environment; and reasonable certainty and consistency over time of the outcomes of regulatory processes.

4.2 Treatment of revaluation – depreciation adjustment

The Discussion Paper comments on the treatment of revaluations as follows:

> *"There are two main methods in treating revaluations. The Commission could choose to revalue the asset base and any rise or fall in the value of the asset base could be accounted for by positive or negative depreciation. The Commission considers that if the regulator revalued the asset base and provided compensation it would neutralise the affect of the revaluation.*
>
> *In contrast the Commission could choose to revalue the asset base and any rise and fall of the asset base would not be accounted for by depreciation. The Commission considers that this is a more appropriate treatment of revaluations.*
>
> *The regulator could do this for example if it judged that an original asset valuation and the revenue stream derived from it were inaccurate in some way and the Commission did not have the necessary information to correct the inaccuracy. For example a TNSP's asset base might include an easement valuation that did not reflect the TNSP's expenditure on that easement or there was an optimisation process carried out and now the assets are back in service".*[7]

ElectraNet believes that the correct treatment depends on the purpose of the revaluation.

If the asset base has been appropriately valued at commencement then a depreciation adjustment is appropriate if for example revaluation is due to changes in depreciation rates (standard or remaining lives) or changes in replacement unit costs.

In this case, a revaluation should have essentially the same outcome as rolling forward the asset base. Any gains or losses resulting from the revaluation should be appropriately compensated by a depreciation adjustment (i.e. financial capital maintenance).

[7] ACCC Discussion Paper, p18.

However, in the case of a one-off revaluation to correct errors or omissions from the current asset base, a depreciation adjustment would not be appropriate, as it would cause the asset base correction to have no effect.

This would apply for example when correcting errors in replacement unit costs, application of the valuation methodology or correcting errors in the physical asset data base to which the valuation methodology has been applied.

The question of asset revaluation and deprecation adjustments is considered in more detail in the KPMG report included as Appendix B. KPMG conclude that:

> *"… compensatory depreciation adjustments should only occur where a revaluation due to changes in replacement costs has taken place. In other circumstances, such as errors in asset registers or other error corrections, no depreciation adjustment would be warranted"*[8]

4.3 Establishing an appropriate opening value

ElectraNet strongly disagrees with the ACCC's view that:

> *"there is no evidence to suggest that there are significant problems with the jurisdictional valuations".*[9]

ElectraNet provided extensive information to the ACCC during its 2002 revenue reset process demonstrating material omissions from the jurisdictional asset valuation used to set ElectraNet's opening asset base.

While the jurisdictional valuation of fixed network assets generally followed a consistent approach and methodology, the treatment of project financing costs (interest during construction or IDC) and easements has been inconsistent with other revenue cap decisions. Significant value was omitted from the valuation used as the basis of the ACCC's revenue cap decision for ElectraNet.

The South Australian jurisdiction wrote to the ACCC in August 2001 acknowledging that the ACCC had discretion to amend the regulatory asset base to address the omission of IDC and easement value from the jurisdictional asset valuation.

Investors purchased ElectraNet with the reasonable expectation that these material omissions would be addressed at a future revaluation and the price paid by investors reflected this expectation.

In ElectraNet's case, the omission of IDC and easement value must be remedied prior to lock-in and subsequent roll forward of the regulated asset base.

This could be accomplished through a limited one-off revaluation. However, if the ACCC elects to undertake a full and comprehensive revaluation of ElectraNet's regulatory asset base (rather than a limited revaluation to address IDC and easements only), then it is essential that comprehensive transmission

[8] KPMG, "*Depreciation and Asset Base Roll Forward*", a report prepared for Powerlink and ElectraNet, November 2003, p12 – report included as Appendix B.

[9] ACCC Discussion Paper, p25.

network valuation guidelines be developed. These would require further detailed input from ElectraNet and other TNSPs.

4.4 Limited revaluation and roll forward

As noted above the current ElectraNet regulatory asset base has material omissions in two areas – easements and interest during construction (IDC).

These omissions have been clearly identified and are discrete and easily remedied without recourse to a full revaluation with the inherent complexity and expense involved in the ACCC developing full valuation guidelines and applying them at an appropriate level of detail to achieve a fair valuation of the network and other assets in service.

ElectraNet engaged Sinclair Knight Merz (SKM) to review the ACCC Discussion Paper in relation to the ElectraNet jurisdictional asset valuation and the ODRC implementation questions raised in the Discussion Paper. The SKM report is included as Appendix A of this submission[10].

Easements

The ACCC has stated a preference for a historic cost approach to easement compensation.

In recent decisions, most notably that of ElectraNet, the ACCC has only recognised those costs for which the TNSP could effectively produce receipts. This position has resulted in ElectraNet receiving recognition for approximately $3 million for easements, an order of magnitude less than the next lowest easement valuation for a TNSP.

Table 1 shows the easement values allowed in ACCC revenue cap decisions for TNSPs in comparison with easement lengths. The easement value allowed ElectraNet was $607 per km compared to $13,714 per km for the next lowest easement valuation.

Table 1: TNSP Transmission Line Circuit Lengths and Easement Values

Network	Length (circuit km)	Easement value ($million) (1)	Ratio (2)
ElectraNet	5,600	3.4	607
SPI PowerNet	6,500	94.5	14538
Powerlink	11,200	174.9	15616
TransGrid	12,400	402	32419
Transend	3,500	48	13714

Notes

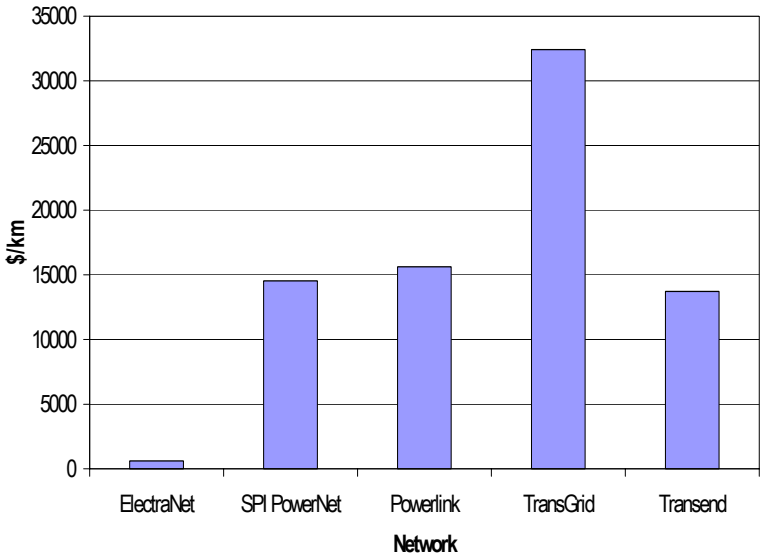
(1) ACCC decisions

(2) Ratio equals Easement value /Length

This comparison is illustrated in Figure 1.

[10] Sinclair Knight Merz (SKM), "*Review of Draft Statement of Regulatory Principles – Report*", a report prepared for ElectraNet, November 2003 – report included as Appendix A.

Figure 1: Comparison of TNSP Easement Values ($/km)



In commenting on this comparison, SKM conclude that:

> *"In making a broad assessment of the value of easements for ElectraNet SA it is reasonable to compare it with the other TNSPs, probably excluding TransGrid. The general characteristics of the networks are similar in terms of the types of line and land occupation where the lines are located.*
>
> *It is apparent then, that the easements for ElectraNet SA are grossly undervalued and that there is a strong case for this aspect of the ElectraNet SA asset base to be revalued."*[11]

ElectraNet's easements have been acquired over a period of up to 70 years and have been maintained through nationalisation, vertical integration, disaggregation and privatisation. During that time the rights have been transferred between entities numerous times making access to actual compensation records virtually impossible.

If the ACCC adopts a historic cost approach for easement compensation then it must also allow a benchmark approach to easement compensation where historical cost records are unavailable.

The ACCC's Discussion Paper recognises that this approach would:

> *"…deliver values for TNSPs which lack historical records. This approach would also maintain consistency between the valuation methods used for TNSPs".*

The South Australian Minister for Energy in a letter to the ACCC dated 5 September 2002 also supported this approach:

[11] SKM Report, p12.

> *"It is recognised that there is a need to include a fair and reasonable value of the easements in the asset base."*

The Minister went on to say that in the absence of historic cost data:

> *"the South Australian Government proposes that the ACCC adopt an approach that discounts the easement values in Victoria for the difference in real estate values, and values the easements in South Australia accordingly."*

Easement compensation costs are discrete and readily remedied without recourse to a full revaluation of the asset base.

ElectraNet believes that easement compensation costs should not be depreciated until such time as the easement is to be vacated. In these circumstances the TNSP should be able to depreciate the easement in order to recover its capital value.

Easement acquisition costs such as surveying, route selection, environmental and cultural heritage costs should be included with line valuations and depreciated with the lines. ElectraNet's regulatory asset base specifically excludes any such allowance, a fact confirmed by declarations from the valuer that determined the original jurisdictional valuation[12]. Any detailed revaluation must correct this material omission.

Interest During Construction (IDC)

Current valuations of TNSP networks generally include interest during construction. In the case of ElectraNet, IDC has been applied only to assets valued at more than $50 million (one asset only).

As noted in the attached SKM paper:

> *"In our view IDC is a valid project cost and should be included in the valuation of all assets in the ElectraNet SA asset base. In addition, the treatment of IDC in the ElectraNet SA asset base is inconsistent with the approach used for other TNSP valuations. It is material and it is considered that there are strong grounds for a revaluation of this aspect of the ElectraNet valuation."*[13]

Project financing costs are discrete and readily remedied without recourse to a full revaluation of the asset base.

4.5 Full valuation – Guidelines

If a full revaluation were conducted then considerable effort would be required to develop transmission asset valuation guidelines that provide for the full recognition of the costs incurred in developing the network.

The SKM report supports this view:

[12] "*ElectraNet SA Asset Valuation Review*", SKM File Note, 8 June 2002.
[13] SKM Report, p9.

> *The NSW Treasury Guidelines on asset valuations for regulated network businesses were first published in draft form in December 1995 and are primarily written around distribution businesses. While there are some "generic" similarities between distribution and transmission businesses, there are also significant differences.*
>
> *A full revaluation of transmission asset bases would require the development of transmission specific valuation guidelines."*[14]

The current valuation tools fail to fully recognise significant prudent capital expenditure. This is particularly true of expenditure to refurbish or enhance network performance that typically occurs below the level of recognition in a revaluation. The analogy of replacing the engine in a used car having no impact on the cost of a replacement new car highlights the problem.

In its ElectraNet and SPI PowerNet decisions the ACCC recognised the issue of valuation risk and sought to address this by creating a special asset class to quarantine the expenditure from future revaluation.

It is essential that future valuation guidelines fully and fairly address:

- Unit Costs;
- Brownfields or staged development factors;
- Locality, terrain and environment factors;
- Level of asset recognition;
- Optimisation;
- Easements; and
- Interest during construction.

The SKM report addresses each of these items in response to the specific ODRC implementation questions raised in the Discussion Paper (refer to Appendix A).

4.6 Asset base roll forward methodology

The *Regulatory Principles* should clearly set out the asset base roll forward methodology and how this is to be implemented.

ElectraNet believes that the current methodology for rolling forward to asset base from one year to the next should be maintained. That is the closing asset base in year t equals:

- The opening asset base in year t;
- plus new investment rolled into the asset base at build cost (based on actual capitalisations during the year);

[14] SKM Report, p4.

- plus non-capex additions to the asset base;
- plus indexation of the asset base by actual CPI;
- less straight-line depreciation;
- less asset disposals;

The opening asset base in year t+1 equals the closing asset base in year t.

This approach is consistent with the roll forward of the asset base used as the basis of the regulatory accounts reported annually to the ACCC.

The depreciation allowance in the revenue cap decision is based on a set of assumptions, which include:

- the amount of capital expenditure to be spent in the forecast period;
- the mix of capital expenditure allocated to different "standard life" groups;
- a degree of averaging in the calculation of depreciation for initial assets and capital
- expenditure where it in not practical to model the asset register on an asset by asset basis;
- whether there were any customer contributions associated with that capital expenditure; and
- the CPI forecast for the regulatory period.

Actual depreciation calculated by the business will reflect:

- actual capital expenditure including the mix of capital expenditure within classes of asset lives;
- when the capital expenditure is incurred during the regulatory period (which year, and when during that year);
- a more detailed accounting of assets which may include calculations at an individual asset level; and
- actual CPI.

Even in the event that the amount of outturn capital expenditure may closely represent the forecast, other factors are likely to ensure that the outturn depreciation is different to that provided in the decision.

Allen Consulting, in their paper on the *Methodology for Updating the Regulatory Value of Electricity Transmission Assets* recognise that asset base roll forward could be conducted with:

- outturn depreciation (calculated from within the TNSPs own detailed systems); or

- decision depreciation (adjusted for actual CPI).

KMPG in commenting on the alternative approaches conclude:

> *"When acknowledging that either approach is acceptable in a roll-forward, Allen's accept that in the case of using outturn depreciation, the business has not been fully compensated for the appropriate depreciation. Therefore, in the case of a capital expenditure overspend (as compared to forecasts) the business will be under compensated for depreciation. Since the Allen's paper states that either approach is acceptable, it follows that if the business is only compensated through decision depreciation, but the roll forward conducted with outturn depreciation, then any over or under depreciation should be carried forward as a charge in the next period. To ignore this would result in windfall gains in under spending on forecast capex or windfall losses on over spending on capex forecasts"*[15]

KPMG go on to note that there are:

> *"two alternative methods of recovering revenue under-recovered in previous periods:*
>
> - *capitalising the amount of under-recovery as an asset and earning a return on and of capital on that amount over the useful life of the assets concerned; or*
> - *taking the under-recovery in cash, by adjusting either the Po or X factor to allow it to be recovered over the following regulatory period.*
>
> *There are pragmatic reasons for businesses wanting to obtain any recoveries in the short term, in that the rate of return that regulators have been allowing network companies to earn have been declining since reforms commenced"*

ElectraNet agrees with the discussion presented and believes that any forgone depreciation (and return on capital) should be treated as an adjustment to the cash flows in the next regulatory period.

4.7 Depreciation

The ACCC asks whether it should adopt an annuity depreciation scheme to take into account factors such as technology, costs and environment in the electricity industry; and if so what rate of change is appropriate.

The Discussion Paper refers to advice obtained by the ACCC on this issue:

> *"Sinclair Knight and Merz (SKM)*[13] *stated that factors such as technological change in the electricity market have not significantly decreased the optimised replacement cost of the network. Technological changes have resulted in the asset owners being able to work existing assets harder and hence delay network reinforcement rather than significantly reducing the cost of new assets. As a consequence of the increased utilisation of the network, use of these*

[15] KPMG Report, p4.

new technologies will not necessarily result in a significantly lower cost of an optimised network".

An annuity depreciation scheme does not appear to be warranted based on a need to account for technological change.

ElectraNet cannot see any benefit in moving away from the current straight-line deprecation methodology that has been used in revenue cap decisions.

ElectraNet believes that an annuity depreciation scheme would introduce an unnecessary level of complexity and inconsistency to the regulatory framework without delivering any material benefits.

ElectraNet supports the use of straight-line depreciation because it is easy to understand, simple to apply, and is consistent with treatment of the asset base in the regulatory accounts.

The KPMG report supports this view.[16]

4.8 Summary of ElectraNet's comments on asset valuation

- ElectraNet strongly supports the ACCC's preferred position to lock in the value of sunk assets, but only once a fair and reasonable asset valuation has been established.
- ElectraNet strongly disagrees with the ACCC's view that there is no evidence to suggest that there are significant problems with the jurisdictional valuations – this is not the case for ElectraNet.
- In ElectraNet's case, the omission of IDC and easement value must be remedied prior to lock-in and subsequent roll forward of the regulated asset base (i.e. Option 3).
- The asset value omissions have been clearly identified and are discrete and easily remedied without recourse to a full revaluation
- If the ACCC adopts a historic cost approach for easement compensation then it must also allow a benchmark approach to easement compensation where historical cost records are unavailable.
- If a full revaluation were conducted then considerable effort would be required to develop transmission asset valuation guidelines that provide for the full recognition of the costs incurred in developing the network.
- The SKM report in Appendix A responds to the detailed ODRC questions in the ACCC's Discussion Paper.
- Compensatory depreciation adjustments should only occur where a revaluation due to changes in replacement costs has taken place. In other circumstances, such as correcting errors in asset registers or other error corrections, no depreciation adjustment would be warranted.

[16] KMPG Report, p13-17.

- ElectraNet believes that the current methodology for rolling forward to asset base from one year to the next should be maintained consistent with the treatment in the regulatory accounts; i.e. using outturn and straight-line depreciation.

- Any forgone depreciation (and return on capital) resulting from over spending relative to capex forecasts should be treated as an adjustment to the cash flows in the next regulatory period.

- ElectraNet supports the use of straight-line depreciation (as compared to annuity depreciation) because it is easy to understand, simple to apply, and is consistent with treatment of the asset base in the regulatory accounts.

5. Capital Expenditure

The ACCC's current regulatory process examines capex from two perspectives:

- Firstly the ACCC conducts an assessment of the reasonableness and efficiency of a TNSP's proposed capex program for the forthcoming regulatory period considering future demand growth, generating patterns, network limitations and any other relevant information – for the purpose of determining the TNSP's revenue cap, projected capex is rolled into the asset base when it is forecast to become operational.

- Secondly at the start of the next regulatory period, the ACCC considers differences between the forecast capex allowance and the actual capex undertaken during the regulatory period – only actual capex is included in the going forward asset base with adjustments made for any over or under expenditure[17].

The Discussion Paper proposes changes to the current DRP that will have a direct impact on the strength of incentives for efficient new capital investment.

In the context of the discussion on capex, these incentives will depend on:

- how the prudency of capex and future capex forecasts are assessed;

- the value at which capex is rolled into the asset base;

- the treatment of prudent over or under spend of the capex allowance at the end of the regulatory period;

- whether capex can be benchmarked; and

- the benefit sharing mechanism that is applied to capex efficiency savings.

The remainder of this section considers each of these matters in turn with reference to the specific questions raised in the Discussion Paper.

5.1 Assessing the prudency of capex and future capex forecasts

The ACCC believes a more detailed review process needs to be set out in the DRP, which recognises that TNSPs must now apply the regulatory test to network augmentations during the regulatory period:

> *"it is appropriate that it (the ACCC) only considers a TNSP's capex program by having regard to the regulatory test"*[18]

The ACCC's preferred position is summarised as follows[19]:

- When assessing a TNSP's proposed capex program, the ACCC will assess the likelihood that the proposed capex projects for both augmentations and non-augmentations will pass the regulatory test.

[17] ACCC Discussion Paper, p34-35.
[18] ACCC Discussion Paper, p36.
[19] ACCC Discussion Paper, p38.

- At the next regulatory reset the ACCC will conduct a review of whether the regulatory test applications were conducted in accordance with the process and methodology outlined in the regulatory test.

The Commission's preferred position:

The Commission's preferred position is to adopt the regulatory test when assessing and reviewing revenue proposals associated with augmentation and non-augmentation capex programs.

Assessing Future Capex Forecasts

The ACCC suggests that the regulatory test could be used to assess future capex forecasts used in TNSP revenue cap decisions.

This suggestion appears to be based on the assumption that TNSPs have an incentive to overstate their required capex allowance.

ElectraNet understands the current approach to assessing capex forecasts to be as follows:

- The capex allowance for revenue setting purposes is a "best estimate" – the probabilistic approach adopted in recent revenue cap decisions takes into account the inherent uncertainty in predicting future network limitations and network developments.

- The asset base is rolled forward using actual capex; and

- Adjustments are made at the following revenue reset for the forgone return and depreciation on prudent expenditure exceeding the capex allowance or additional return and depreciation on expenditure below the capex allowance.

TNSPs do not have an incentive to overstate their required capex allowance given this approach. ElectraNet believes that the current approach should be maintained and clarified in the *Regulatory Principles*.

ElectraNet also believes that using the regulatory test to assess future capex forecasts is impractical for the following reasons:

- Prior to the commencement of the regulatory period there would only be a small number of projects that have already been subject to the regulatory test process;

- The regulatory test stipulates that a proposed augmentation must not be determined to pass the test more than 12 months before construction begins;

- Applying the regulatory test to projects by up to 5 years before they are required (even if this could be done for the purpose of assessing capex forecasts) would amount to a significant duplication of resources and added costs.

- It is also extremely unlikely that the outcome of the regulatory test would reflect the outcome obtained when the test is subsequently applied for regulatory approval purposes – one reason for this is that feasible non-network alternatives may not become apparent until closer to the time that the network limitation actually occurs; and

For the reasons given above, the proposal to apply the regulatory test to assess future capex forecasts is impractical and does not offer any benefits compared to the current assessment process.

Prudency of Augmentation Capex

ElectraNet supports the proposal that if a project has been subject to and passed the regulatory test then it should, by definition, be considered a prudent project to undertake and should not be subject to future optimisation.

ElectraNet particularly supports this proposal because it is not presently compensated for optimisation risk in its revenue cap.

Accepting this approach recognises the inherent checks and balances in the regulatory test and associated public consultation processes.

However, ElectraNet does not believe that the regulatory test project cost can be used as measure of whether the incurred cost of a project was prudent. There are a number of reasons for this:

- Firstly, the focus of the regulatory test as it is currently applied is on ranking the expected net benefit or expected net cost (for reliability augmentations) of a project compared with the benefit or cost of alternatives projects.

- The regulatory test requires that sensitivity analysis be undertaken to demonstrate that the ranking of alternative projects is robust to changes in input variables – the outcome of the regulatory test is, therefore, a ranking rather than a definitive cost estimate.

- The regulatory test is carried out before detailed design work is undertaken and refined cost estimates are obtained. It is also carried out before environmental impact assessment and community consultation are completed, and planning approvals are obtained. This is necessarily so because the application of the regulatory test should not presuppose a particular network solution to the network limitation in question.

- The above processes, which are only carried out once the regulatory test has identified a preferred project, may substantially change the project cost estimate.

In summary, there are many reasons beyond the control of the TNSP for why the cost at which a project satisfies the regulatory test may differ from the actual build cost. If required, ElectraNet would expect to be able to demonstrate on a case-by-case basis the reasons for why a variation in costs has occurred.

ElectraNet agrees that whether a project was prudent to undertake should be assessed against whether the project passed the regulatory test and whether

the regulatory test was conducted in accordance with the process and methodology outlined in the regulatory test.

However, the regulatory test cost estimate cannot be used as a measure of whether the incurred cost of a project was prudent. The incurred cost should be considered to be prudent if:

- design standards are in accordance with good electricity industry practice; and
- project design, procurement and construction were carried out using competitive market processes.

Prudency of Non-Augmentation Capex

Currently the regulatory test only applies to augmentation capex. However, the ACCC has suggested that TNSPs voluntarily apply the regulatory test to asset replacement and refurbishment capex.

> *"The Commission therefore proposes to develop a more rigorous process that TNSPs must adopt when assessing non-augmentation capex, which is consistent with the methodology outlined in the regulatory test. The Commission would prefer that a capex test be applied by the TNSP during the regulatory control period as the capex is undertaken. The Commission is aware that it cannot compel TNSPs to apply such a test during the regulatory control period. However, the Commission considers that if a TNSP is aware of the criteria that the Commission would employ to assess capex for the purpose of rolling it into the regulatory asset base then the TNSP would adopt similar criteria. TNSPs who voluntarily assess replacement or refurbishment capital expenditure against the regulatory test will not face optimisation risk."*[20]

ElectraNet believes that applying the regulatory test to non-augmentation capex would be impractical and/or inefficient in most cases.

Whether or not a non-augmentation project was prudent to undertake could be determined with reference to whether a TNSP's asset management strategy and processes are in accordance with good electricity industry practice.

Whether the incurred cost of non-augmentation capex was prudent should be determined in the same way as for augmentation capex; i.e. incurred costs should be considered to be prudent if:

- design standards are in accordance with good electricity industry practice; and
- project design, procurement and construction were carried out using competitive market processes.

[20] ACCC Discussion Paper, p36.

5.2 Value at which capex should be rolled into the asset base

The Commission invites comment on…

… whether or not the capex amount to be rolled into the asset base should be based on the outcome of the regulatory test, or based on actual build costs.

If the regulatory test could be used to set a reasonably firm ex ante benchmark cost, then rolling capex into the asset base based on the outcome of the regulatory test would strengthen incentives for TNSPs to achieve capex efficiency savings – by rewarding incurred costs below the regulatory test value.

However, as explained in Section 5.1, the regulatory test project cost does not provide a firm basis for setting a capex benchmark.

ElectraNet believes that the capex amount rolled into the asset base should be the actual build cost.

5.3 Treatment of prudent under or over spend of capex allowance

The Commission invites comment on…

The Commission is seeking views from interested parties on how the Commission should deal with under or over spend on the allowed capex from the previous period.

An important question here is whether the capex allowance is considered to be an approved level of capex or rather an allowance for prudent expenditure in response to network limitations that actually occur during the regulatory period

ElectraNet believes that the capex allowed in the TNSP's revenue cap should be seen as an allowance. This is consistent with recognising that actual outcomes may vary substantially from those anticipated prior to the commencement of the regulatory period.

It is appropriate, therefore, that adjustments be made at the beginning of the next regulatory period for prudent under or over spend of the capex allowance.

ElectraNet considers that the actual costs incurred should be rolled into the asset base when asset are brought into service and that the revenue cap for the next regulatory period should be adjusted up for the foregone returns and depreciation resulting from prudent over spend or down in the case of under spend.

5.4 Benchmarking capex

The Commission invites comment on…

The Commission is seeking views from interested parties on what alternative approaches to assessing capex such as benchmarks may be.

ElectraNet supports the objective of increased incentives for capex efficiency savings. However, strengthening incentives for efficiency savings generally

requires that a reasonably firm ex ante benchmark can be set that does not change significantly on the basis of ex post outcomes.

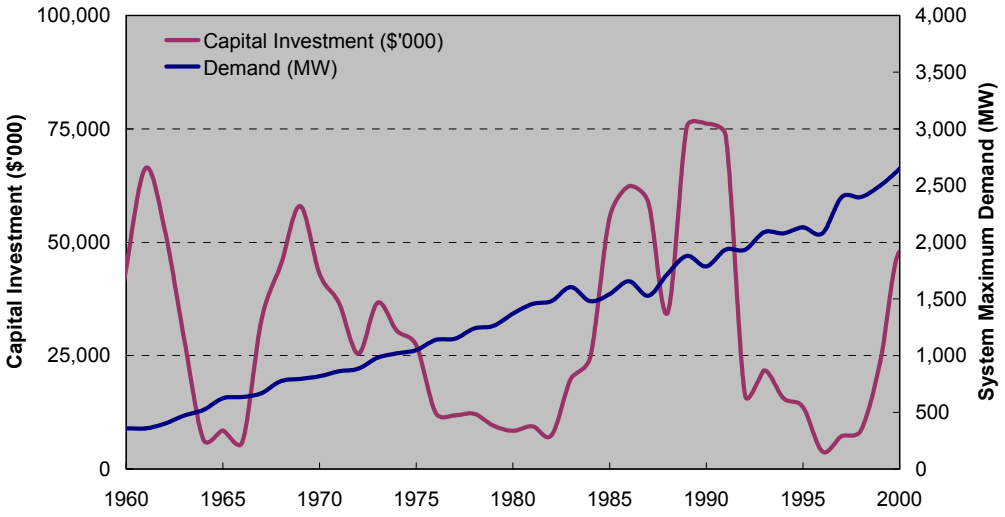
For most TNSPs capex tends to be dominated by augmentation capex, which is highly variable in nature and cannot be sensibly benchmarked against other networks or historical levels of expenditure.

The primary drivers for augmentation capex are growth in customer demand and service standard obligations, which must be met irrespective of capex comparisons.

TNSPs experience large variations in capex requirements due to a range of factors including different demand growth, geography, environmental conditions, system voltages, service standards, design standards and historical planning decisions.

A TNSP's own capex can also be highly variable over time. This is illustrated in Figure 2, which shows how transmission capital expenditure in South Australia has varied with demand growth over the past 40 years.

Figure 2: Transmission Capital Investment in South Australia versus Growth in Electricity Demand



As can be seen past capex does not provide a good indication of future capex requirements.

ElectraNet believes that it is clearly impractical to attempt to benchmark future capex requirements from either a comparison with other TNSPs or historical expenditure.

5.5 Efficiency carryover mechanism for capex

The Commission invites comment on…

The Commission is seeking views from interested parties on what alternative approaches to assessing capex such as benchmarks may be.

In the absence of benchmarking against other TNSPs or against historical levels of capex, a mechanistic efficiency carryover mechanism for capex does not appear to be achievable.

However, it is clearly in the best interests of consumers that the regulatory framework provides incentives for TNSPs to achieve capex efficiency savings wherever possible.

Some incentive is already provided in the current DRP:

> *"… the regulated TNSP is invited to demonstrate at each regulatory review that any capital expenditure below forecast levels has arisen because of management induced efficiency gains. Where it is clearly demonstrated by the TNSP that capital expenditure shortfalls have resulted because of management efficiencies or innovation, the capital expenditure efficiency gains may be subject to a glide path, similar to the operations and maintenance expenditure."*[21]

ElectraNet believes that it is important that the regulatory framework provide for the sharing of capex efficiency savings where such efficiencies can be demonstrated to be the result of management actions.

ElectraNet accepts that such a scheme puts the onus on the TNSP seeking an efficiency payment to demonstrate that any under spend of the capex allowance is due to management action rather than simply not undertaking or deferring expenditure.

ElectraNet believes that current incentives should be strengthened by setting out in the *Regulatory Principles* broad categories of management actions that would be recognised by the regulator as forming the basis of a legitimate capex efficiency claim. Examples of these might include:

- Changes to design standards or standard designs;
- New investments in technology;
- Reduced construction costs – e.g. efficiency gains built into service contracts;
- Changes in work practices or asset management policies and procedures;
- Changes in systems for procurement;
- Bulk purchasing arrangements etc.

Setting out broad categories of management actions in this way would strengthen incentives by giving TNSPs greater confidence about the likelihood that management efforts to seek capex efficiency savings would be rewarded.

ElectraNet recognises that actual claims would have to be supported by detailed documentation and potentially be subject to external review before being accepted by the regulator.

[21] Draft Statement of Regulatory Principles, p95.

5.6 Summary of ElectraNet comments on capex

- The proposal to apply the regulatory test to assess future capex forecasts is impractical and does not offer any benefits compared to the current assessment process.
- ElectraNet supports the proposal that if a project has been subject to and passed the regulatory test then it should, by definition, be considered a prudent project to undertake and should not be subject to future optimisation – ElectraNet is not presently compensated for optimisation risk in its revenue cap.
- ElectraNet does not believe that the regulatory test project cost can be used as measure of whether the incurred cost of a project was prudent.
- The incurred cost should be considered to be prudent if design standards are in accordance with good electricity industry practice and if project design, procurement and construction were carried out using competitive market processes.
- ElectraNet believes that the capex amount rolled into the asset base should be the actual build cost.
- ElectraNet believes that the capex allowed in the TNSP's revenue cap should be seen as an allowance. Actual costs incurred should be rolled into the asset base when assets are brought into service and the revenue cap for the next regulatory period adjusted up for foregone returns and depreciation resulting from prudent over spend or adjusted down in the case of under spend.
- ElectraNet supports the objective of increased incentives for capex efficiency savings.
- ElectraNet believes that it is clearly impractical to attempt to benchmark future capex requirements from either a comparison with other TNSPs or historical expenditure.
- In the absence of benchmarking, a mechanistic efficiency carryover mechanism for capex does not appear to be achievable.
- However, ElectraNet believes that it is important that the regulatory framework provide for the sharing of capex efficiency savings where such efficiencies can be demonstrated to be the result of management actions.
- ElectraNet believes that the current incentives in the DRP should be strengthened by setting out in the *Regulatory Principles* broad categories of management actions that would be recognised by the regulator as forming the basis of a legitimate capex efficiency claim – this would strengthen incentives by giving TNSPs greater confidence about the likelihood that management efforts to seek capex efficiency savings would be rewarded.

6. Operating and Maintenance Expenditure

The ACCC's current approach to ensuring that TNSPs operate efficiently has been summarised as follows:

- At each revenue reset the ACCC appoints a consultant to assess the TNSP's proposed opex allowance and relies heavily on the consultant's findings when making its own assessment;
- Limited benchmarking is used more as a sanity check than with the objective of achieving quantifiable efficiency measures; and
- An efficiency carry-over mechanism provides incentives for TNSPs to reduce controllable costs by rewarding them with higher profits where reductions are achieved.

The Discussion Paper questions whether the regulatory regime can be improved by providing stronger incentives for efficiency and investment with a more light-handed regulatory approach.

It notes that a recent workshop on incentive regulation explored the greater use of external benchmarks, such as total factor productivity measures for setting the price and revenue cap parameters. The ACCC considers that this may result in more efficient practice, as benchmarking breaks the nexus with the firm's actual costs and revenues.

However, the ACCC recognises that there are a number of implementation issues that would need to be resolved before it could adopt such an approach.

> *"In the interim the Commission will stay with forecasting the firm's actual costs and using a carry-over mechanism that results in constant incentives and reveals the true costs of the TNSP over time."*[22]

The Commission's preferred position:

The Commission's preferred position is to rely more on benchmarking in the future when assessing the TNSP's opex costs.

The Commission would like interested parties to comment on what they consider to be the most effective means of reducing costs: the Commission's current approach; or benchmarking.

These questions are considered in the remainder of this section.

6.1 Benchmarking

The Discussion Paper recognises the following different types of benchmarking:

- Endogenous benchmarking that uses a TNSPs own costs to determine future cost benchmarks taking into account changes in volume, external cost factors etc;

[22] ACCC Discussion Paper, p41.

- Exogenous benchmarking of components of the total revenue allowance, such as the opex allowance, against industry wide costs; and

- Exogenous benchmarking of total revenue against industry wide or economy wide total factor productivity measures.

Exogenous Benchmarking

ElectraNet believes that the most extreme form of exogenous benchmarking using total factor productivity or similar methods is unrealistic for industries such as electricity transmission that have the following characteristics:

- A large proportion of revenue derived from sunk assets (return on and return of capital); and

- A high degree of variability in capital expenditure requirements over time.

The ACCC states that it currently uses benchmarking against industry wide costs only as a sensibility check of the opex allowance, but in the Discussion Paper asks whether it is possible to go beyond this and develop a reasonably reliable cost model for Australian TNSPs.

The Discussion Paper correctly recognises that external benchmarking comparisons need to be treated with caution because:

> *"a substantial component of the differences in cost observations between firms are due to legitimate or "uncontrollable" differences in factors which affect the level of costs incurred by the firms".*[23]

and goes on to list the following examples of why the efficient costs of network businesses might differ:

- The *nature of the services* provided by each firm (for example, a transmission network designed to provide reliability services might appear to have quite different average costs than an otherwise identical network designed to provide transportation services);

- The *range of services* provided by the firm;

- The *volume of services* provided (a transmission or distribution business carrying smaller volumes might appear as higher average cost if there are economies of scale);

- The *quality of services* provided (a firm which offers *n-2* reliability might appear as higher average cost than a firm which offers *n-1* reliability);

- The *price of inputs* (firms in rural areas might have to pay more to attract particular labour skills);

- *Governmental regulations* (companies which have more stringent vegetation clearance requirements may face higher average costs than those which do not);

[23] ACCC Discussion Paper, p61.

- The *number, density, load factor and size distribution of the customers they serve* (companies which have a higher load factor or customer density may have lower average cost than those companies which do not);

- *Environmental factors* (companies in regions with high temperatures or a greater propensity to electrical storms may have to take more precautions than those in more temperate areas);

- The age and quality of the capital stock.

The ACCC's current use of benchmarking is simplistic and does not take into account the above reasons for why the efficient costs of network businesses might differ.

ElectraNet believes that the development of a reliable cost model to correctly account for all the above factors is unachievable in the short term due to the complexities involved.

However, ElectraNet would be happy to support further work to investigate whether improvements can be made towards identifying more meaningful benchmarking measures. An industry-benchmarking group along the lines of the current Service Standards Working Group could be established to further this work.

Endogenous Benchmarking

ElectraNet believes that forecasting opex benchmarks based on TNSPs own historical costs can be an effective alternative to external benchmarking when combined with an appropriate benefit sharing mechanism for opex efficiency savings.

6.2 Setting an opex benchmark

The ACCC states that:

> *"In the interim the Commission will stay with forecasting the firm's actual costs and using a carry-over mechanism that results in constant incentives and reveals the true costs of the TNSP over time."*[24]

It is important to recognise that even though opex will generally be more stable than capex, efficient opex can still be subject to significant variability over time.

Therefore, while a TNSP's historical expenditure may be used as a starting point to determine future opex benchmarks, adjustments must be made to account for factors such as changes in volume or other cost drivers that are outside of the control of the regulated business.

6.3 Efficiency carry-over mechanism

The Discussion Paper raises a number of issues relating to the design of the efficiency carry-over mechanism. The purpose of the efficiency carry-over mechanism is to:

[24] ACCC Discussion Paper, p41.

- provide regulated businesses with incentives to deliver efficiency gains; and
- thereby "reveal" the efficient costs of the business to the regulator.

The efficiency carry-over mechanism provides the regulator with a tool for overcoming the information asymmetry that exists between the regulated business and the regulator.

The DRP currently specifies a glide path mechanism for sharing of efficiency gains over a five-year regulatory period:

> *"… for reasons of simplicity the glide path will be a simple straight line phase out of efficiency gains. That is, for a regulatory period of five years, efficiency gains beyond the X factor would reduce at a rate of 20 percent per year. Thus, the TNSP will keep 100 percent of excess efficiency gains for the first year of the next regulatory period, 80 percent of the excess efficiency gains for the second year, and so on, until all of the excess efficiency gains are phased out by the end of the regulatory period".*[25]

The ACCC has indicated a preference for moving away from the glide path mechanism to one that leads to incentives for cost-reducing efforts that are constant over time.

The simplest method of achieving this is to provide the TNSP with a benefit for a fixed period of time following the year in which the efficiency is generated rather than a fixed amount of time from the end of the regulatory period.

ElectraNet believes that an efficiency carry-over mechanism should:

- Be easy to implement, simple to administer and as non-intrusive as possible;
- Yield constant incentives over time;
- Not differentiate between management actions and other reasons for under spending – the incentive scheme should be allowed to work to reduce efficient costs;
- Exclude changes in external cost drivers such as taxes, rates, insurance etc. resulting from defined pass through events; and
- Provide for an equitable sharing of the benefits of efficiency savings between the regulated business and customers.

Adopting the above criteria would increase the power of the incentive mechanism.

ElectraNet notes that the rolling carryover mechanisms adopted by the Essential Services Commission of South Australia (ESCOSA) and the Essential services Commission in Victoria have many of these characteristics.

[25] ACCC Draft Regulatory Principles, p90-91.

ElectraNet also notes the ACCC's preference for increasing the power of the incentive mechanism. It is important, therefore, that overall incentives be increased rather than diminished in moving away from the glide path mechanism to an alternative carry-over mechanism.

ElectraNet's analysis has shown that adopting a rolling carryover mechanism with efficiency savings kept for 5 years beyond the year in which they are produced may diminish benefits to the regulated business compared to the existing glide path mechanism.

ElectraNet proposes that this problem be overcome by increasing the amount of time that the TNSP is allowed to retain efficiency savings (e.g. from 5 years to 10 years).

The ACCC should seek to finalise any changes to the existing efficiency carry-over mechanism as a high priority and clearly set out the details of the incentive mechanism in the *Regulatory Principles*.

6.4 Self insurance and pass-through guidelines

The Commission identifies three mechanisms for managing risk:

- taking out insurance cover;
- self-insuring against certain risks; and
- establishing pass-through rules so that the financial impact of designated events is met by customers.

The ACCC considers that it is important that these three approaches to risk management: are adequately scoped and defined to ensure there is no overlap between them.

The Commission's preferred position:

The Commission supports cost pass-throughs in limited circumstances. The Commission considers that it is important that the three approaches to risk management: taking out insurance with external providers; self-insuring for certain other risks; or agreeing pass-through rules to pass the cost of designated events on to customers; are adequately scoped and defined to ensure there is no overlap between them. Guidelines for dealing with these matters have been included in the Commission's GasNet and SPI PowerNet revenue cap decisions issued in 2002.

ElectraNet broadly supports the ACCC's preferred position on self-insurance and pass-through events. The combination of the three approaches allows the final cost of insurance to be minimised for both the TNSP and the customer.

However, ElectraNet does not agree with the following condition of an application for a self-insurance provision:

> *"a regulated entity's resolution to self-insure would also be expected to explicitly acknowledge the assumed risks of self-insuring (i.e. in the event of future expenditure required as a result of an insurance event*

> *such costs would not be recoverable under the regulatory framework as the relevant premiums would have already been compensated for within the operating and maintenance element of the allowed MAR and funded by users, eg if a 1 in a 100 year event occurs in year 1 then the business will need to have the financial ability to restore assets out of its own resources).*[26]

Self-insurance in the context of the regulatory framework should not be thought of in the same way as this term is used in the insurance industry; i.e. the TNSP does not bear the risk associated with a self-insurance event.

Rather, the provision of self-insurance simply allows price smoothing to occur in comparison to treating the self-insurance event as a pass through.

If a high impact low probability event occurs before a sufficient self-insurance provision has been built up then any costs over the balance provided by the self-insurance provision must be recoverable via pass through.

This is the basis of the self-insurance provision that the ACCC allowed as part of the ElectraNet revenue cap decision.

6.5 Summary of ElectraNet's comments on opex

- ElectraNet believes that exogenous benchmarking using total factor productivity or similar methods is unrealistic for electricity transmission
- The Discussion Paper correctly recognises that a substantial component of the differences in cost observations between firms are due to legitimate or "uncontrollable" differences in factors, which affect the level of costs, incurred by the firms.
- The ACCC's current use of benchmarking is simplistic and does not take into account the reasons the ACCC has identified for why the efficient costs of network businesses might differ.
- ElectraNet believes that the development of a reliable cost model to correctly account for all the differences in cost drivers is unachievable in the short term due to the complexities involved.
- ElectraNet would be happy to support further work to investigate whether improvements can be made towards identifying more meaningful benchmarking measures.
- While a TNSP's historical expenditure may be used as a starting point to determine future opex benchmarks, adjustments must be made to account for factors such as changes in volume or other cost drivers that are outside of the control of the regulated business.
- Overall incentives should be increased rather than diminished in moving away from the glide path mechanism to an alternative carry-over mechanism.

[26] ACCC Discussion Paper, p47.

- The ACCC should seek to finalise any changes to the existing efficiency carry-over mechanism as a high priority and clearly set out the details of the incentive mechanism in the *Regulatory Principles*.

- ElectraNet broadly supports the ACCC's position on self-insurance and pass-through events. However, the guidelines should recognise that self-insurance is simply an option that a TNSP may seek to smooth the impact of pass-through events on customers.

7. Cost of Capital

The Code requires that the ACCC provide TNSPs with a sustainable commercial revenue stream, including a fair and reasonable rate of return on efficient investment.

The regulated rate of return has two purposes:

- to provide a fair and reasonable rate of return on sunk investments; and
- to provide sufficient incentive to undertake efficient new investments.

The regulated rate of return is the single most important factor in determining the strength of incentives for investment provided by the regulatory framework. If the regulated rate of return is too low efficient levels of new investment will not occur.

There has been much controversy over whether regulated rates of return in Australia are providing the right signals for new investment.

This question is considered in the remainder of this section along with the detailed questions on WACC raised by the ACCC in its Discussion Paper.

ElectraNet engaged the Network Economics Consulting Group (NECG) to review the WACC section of the Discussion Paper and prepare a response on behalf of electricity TNSPs[27].

The NECG response forms part of ElectraNet's submission.

7.1 Is the WACC providing the right signals for investment?

In the past the ACCC has pointed to the current level of investment in transmission networks as evidence that regulatory decisions are delivering a satisfactory level of incentives. However, indications are that investment is only just keeping pace with load growth and the need to replace network assets at the end of their useful lives. This investment is almost entirely driven by mandated service standard obligations. In relation to discretionary investment, the Parer report highlighted that there has been a lack of investment in interconnectors to facilitate interstate trading.

In the past the ACCC has also made a number of statements that regulated rates of return in Australia compare favourably to those provided overseas. However, careful analysis shows that this is not the case if factors such as market risk and different values of the risk free rate are taken into account.

An international comparison of WACC decisions by NECG has found that:

> *"… Australian electricity transmission decisions made by the ACCC since January 2000 do not compare favourably with decisions of overseas regulators when considered on a comparable basis."*[28]

[27] Network Economics Consulting Group, "*2003 Review of the Draft Regulatory Principles for the Regulation of Transmission Revenues – Submission to the ACCC for the electricity TNSPs*", November 2003.

[28] NECG Submission, p12.

NECG concluded that:

> *"Our results show that WACC allowances to the Australian TNSPs are not generous in international terms, and certainly not excessively so. This conclusion is still valid if these decisions are seen in relation to approaches to asset valuation and the overall level of uncertainty in the WACC in Australia and overseas."*[29]

The NECG submission also highlights a number of deficiencies in earlier reports on comparative returns that have suggested that there is no evidence that regulated returns in Australia compare unfavourably to those overseas[30].

The ACCC's most recent decisions argue that returns of less than 3 per cent above the risk free rate (long-term bond rate) are appropriate for Australian TNSPs. In the US, despite electricity companies receiving returns of about 5 per cent above the risk free rate, the need to provide additional incentives for investment in transmission has been recognised.

ElectraNet is concerned that returns over the risk free rate have been steadily decreasing, as illustrated in Table 2, and that the ACCC's Discussion Paper signals that rates of return may decrease further in the future.

Table 2: ACCC Electricity Transmission Revenue Cap Decisions – Margin Over Risk Free Rate

TNSP	Decision Date	Margin over Risk Free Rate
TransGrid	25 Jan 2000	3.42%
Powerlink	1 Nov 2001	3.18%
ElectraNet	11 Dec 2002	3.13%
SPI PowerNet	11 Dec 2002	3.11%
Murraylink	1 Oct 2003	2.91%
Transend Draft	24 Sep 2003	2.87%

The uncertainty created by these signals substantially diminishes the strength of incentives for investment provided by the regulatory framework.

[29] NECG Submission, p22.

[30] Responses are provided to reports written by Pareto Associates, which undertook an international review of WACC allowances, with particular focus on Australia and the UK; and a submission by the Allen Consulting Group on behalf of BHP Billiton, which argued that the prices investors are willing to pay for infrastructure assets provides evidence that regulatory rates of return are not hindering investment – see p23-30 of the NECG submission.

The approach on WACC set out in the *Regulatory Principles* should recognise the following important realities:

- Even monopoly network businesses compete for capital in a highly competitive international market. If WACC allowances provided to regulated businesses in Australia are lower than returns that can be earned elsewhere for an equivalent risk, investment will not be forthcoming with the impact ultimately borne by consumers through congestion and lower service quality.

- Network assets have long lives. Investors must have confidence that they will earn a fair and reasonable rate of return over the life of the assets in order to make the necessary investments. This means that incentives are influenced not only by the allowed WACC in the current regulatory period, but also by investors expectations of WACC in future revenue cap decisions.

- The ACCC should also be aware that there is only a limited capital market in Australia for investment in the infrastructure sector. Over the past few years, this market has tended to avoid making investments in the regulated utilities sector due to the perceived uncertainty and inconsistency of the regulatory environment (both state and federal).

- Setting WACC too low may reduce prices for consumers in the short term (by a small amount), but ultimately the costs of under-investment and inadequate infrastructure will be much higher. Regulatory decisions should, therefore, be risk adverse and ensure that they err on the side of encouraging more rather than less investment.

As discussed earlier, greater regulatory certainty is what is needed to enhance the strength of the incentives provided by the regulatory framework. This is what will ultimately deliver the greatest benefits to consumers.

ElectraNet believes that the ACCC should address this uncertainty by adopting a “line in the sand” approach to setting a level of WACC that investors can reasonably expect over the life of new investments. Once set, the ACCC should not vary from this approach except under very exceptional circumstances.

Taking this approach would have the additional benefit of overcoming the currently interminable public debate over whether the WACC is set too high or too low.

The US has taken this more pragmatic approach where regulators have determined a fair and reasonable rate of return and then stuck to it over a long period of time – improving regulatory certainty and thereby strengthening incentives for investment

7.2 Approach to WACC

The ACCC has to date determined a return on assets by using a “vanilla” weighted average cost of capital (WACC) and making allowance for tax and franking credits in the cash flows. The capital asset pricing model has been used to determine the cost of equity.

The Commission's preferred position:

The Commission's position is to maintain its current approach to estimating a fair and reasonable WACC applicable to TNSPs and considers it is the most appropriate method for determining the return on the asset base.

Whilst the Commission is aware of the alternatives to the CAPM and their strengths and weaknesses, at the present time the Commission prefers the continued use of CAPM to calculate the cost of equity.

ElectraNet supports the current approach for determining WACC, including use of the CAPM, provided that the focus of the regulator in implementing this approach is to achieve a fair and reasonable rate of return that encourages efficient investment.

There should be no illusion that determining the rate of return using the CAPM is a precise scientific exercise. The CAPM is a theoretical model that has the advantage of simplicity, but also has serious and well-known shortcomings. Attempts to finesse the individual WACC parameters should not stand in the way of providing an adequate overall rate of return that will encourage efficient investment.

This point is also emphasised in the Code:

> *"The theory underlying the CAPM is rigorous. However, in applying the CAPM, there should be a recognition of the limitations of the model. The limitations of CAPM, as with any model, relate mainly to the measurement and estimation of relevant input variables. Consequently, the CAPM should be regarded as providing an indication of the cost of equity, rather than a firm and precise measurement".*[31]

7.3 Risk free rate of return

The Commission's preferred position:

…the Commission's preferred position is to adopt a government bond rate that matches the regulatory period as a proxy for the risk free rate.

The ACCC's approach to the risk free rate is contentious and has been subject to significant debate over recent years. ElectraNet has provided extensive critiques of analysis commissioned by the ACCC from Associate Professor Martin Lally, and other arguments raised by the ACCC to justify its current position of basing the bond maturity in the risk free rate on the length of the regulatory period[32].

The current NECG submission includes an overview of international approaches to the risk free rate that highlights the isolation of the ACCC on this issue[33].

[31] National Electricity Code, schedule 6.1, clause 2.2.
[32] See ElectraNet's submissions to the ACCC in relation to the risk free rate prepared by NECG for ElectraNet's revenue reset application.
[33] NECG Submission, p31.

The NECG submission also considers the recent work done by Professor Kevin Davis for the ACCC. The details of this are not repeated here, but the following extracts summarise the key outcomes:

> *"A key area of differences in conclusions between Davis and ourselves is his assumption that the ACCC will always use the entity's actual debt margin.*
>
> *In many, but not all regulatory environments, the ACCC sets WACC so that the entities net revenues are responsive to that setting. If the ACCC will then credibly commit to using actual debt margins (or debt margins appropriate to an entity's actual credit circumstances and leverage) for the full life of the assets, then we agree with Davis that the maturity of the risk free rate for debt could be the regulatory period. However, as the ACCC cannot commit to this in practice, the most appropriate policy is to set the maturity of the risk free rate to best approximate the life of the assets employed."*[34]
>
> *"We believe the ACCC is wrong to base the maturity of the risk free rate in the cost of debt and equity in the WACC on the length of the regulatory period.*
>
> *In addition to the potential incompatibility of the approach with efficient debt management, the ACCC's proposed approach ignores the reality that recontracting risk can only be removed if the ACCC were to credibly commit to providing the regulated firm its actual cost of debt. However, such an approach would be counter to the ACCC's proposed benchmarking method to debt and one that cannot be delivered in an ex ante regulatory environment where debt may need to be raised over the course of a regulatory period.*
>
> *In the case of equity, we see no rationale for aligning bond maturity with the regulatory period. In both cases, the appropriate approach is to base the bond maturity on the life of the asset, with the longest-dated bond, namely the 10-year Commonwealth bond providing the best available proxy."*[35]

The ACCC's position on using a term equivalent to the regulatory period appears to be unsustainable. The weight of evidence suggests that the ACCC should change its position and adopt the 10-year bond rate to determine the risk free rate.

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the length of period used in calculating the moving average of the risk free rate.

ElectraNet supports the ACCC's proposal to let the regulated firm choose the averaging period at the time of its revenue application as a reasonable approach, given that a pre-determined time period is unlikely to be optimal for all businesses.

[34] NECG Submission, p41.
[35] NECG Submission, p4-5.

7.4 Market Risk Premium

The Commission's preferred position:

The Commission considers no changes should be made to the current approach of estimating the MRP.

In the Discussion Paper the ACCC supports adoption of a value of 6.0% for the market risk premium.

While this value is consistent with regulatory precedent in Australia, longer-term historical data and benchmarking approaches to MRP suggest that a higher MRP may be justified.[36]

The current NECG submission concludes:

> *"Given that any estimate of MRP is a matter of judgement, the asymmetric consequences of regulatory intervention favour choosing a rate that is tilted to overestimating the MRP rather than under estimating it. Accordingly, we believe that the appropriate range for a forward-looking MRP to be between 6% and 8%."*[37]

7.5 Equity Beta

The Commission's preferred position:

The Commission's initial view is to move towards benchmarking an equity beta from current market evidence and incorporating an upper confidence interval.

Beta of a regulated business against beta of market as a whole

The ACCC has made a number of statements that an equity beta for a regulated business should not be above 1. In the discussion paper, the ACCC notes:

> *The Commission has generally computed an equity beta of one for TNSPs. An equity beta of one implies that the firm has the same level of systematic risk as the market average. Intuitively an equity beta of less than one may be more appropriate for regulated TNSPs in Australia given the level of market risk, which they face. These firms are regulated entities with a guaranteed revenue stream and a demand for their essential services that is inelastic.*[38] *[emphasis added]*

In its ElectraNet revenue cap decision, the ACCC notes:

> *The Commission notes that an equity beta estimate of 1.0 was adopted for the draft decision. This suggests that the TNSP experiences the same volatility as the market in general. However, this is not consistent with the frequently held views that gas and electricity transmission*

[36] The appropriate value of the MRP has been covered extensively in recent NECG submissions to the ACCC on behalf of ElectraNet and other TNSPs. We refer the ACCC to these past submissions in relation to this point.
[37] NECG Submission, p63.
[38] ACCC Discussion Paper, px.

> *businesses are less risky and have more stable earnings than the market average. Greater stability suggests that the equity beta should be less than 1.0.*[39] *[emphasis added]*

These quotes are misleading. An equity beta of one implies that the firm's equity share has the same systematic risk as the market as a whole – not that the firm itself has the same level of systematic risk. This is only true where the gearing of the firm is the same as the gearing of the market. Therefore, in making such comparative statements, what is of relevance is the asset beta of the market and the firm, not the equity beta.

If the gearing of the Australian market is considered, the asset beta of a TNSP is significantly lower than the average asset beta of the market. The NECG submission includes an estimate of the average asset beta for a firm listed on the All Ordinaries Index (value weighted) of 0.64 – significantly higher than the asset beta of 0.40 typically provided for TNSPs.

International beta estimate

The NECG submission agrees with Professor Kevin Davis that international data on beta values can provide useful information in determining a beta value for an Australian regulated firm.

The submission includes an up-to-date international review of beta allowances for transmission providers, which was implemented by using data obtained from Bloomberg, which calculates and publishes beta and financial analysis data on all publicly listed companies.

The analysis based on a sample of 33 international companies shows estimates of asset beta (unadjusted) having a confidence interval at the 95% level of 0.45 $\pm$ 0.27 if transmission-only providers are considered and 0.54 $\pm$ 0.14 if all firms in the sample are considered. If a 99% confidence interval is used the respective upper bound confidence intervals on the asset beta are 0.81 and 0.73 respectively – considerably higher than the benchmark 0.40 used in recent ACCC decisions.

Statistical analysis of market data

The ACCC's Discussion Paper estimates equity beta based on a statistical analysis of market data for a sample of comparator firms over three different sample periods. The equity beta estimates are in the range 0.53 to 0.83 for a 95% upper confidence bound and 0.61 to 0.97 for a 99% upper confidence interval.

NERA has examined the ACCC's proposed approach to statistical estimation of equity beta and found that:

> *"There appears to be two statistical errors in the ACCC's calculation of the upper bound estimate of the βe under different confidence levels. The first of these arises from the fact that the ACCC has used a two-tailed confidence interval to establish a single-tailed upper bound probability. Calculating a one-tailed upper bound estimate tends to*

[39] Australian Competition and Consumer Commission, Decision: South Australian Transmission Network Revenue Cap 2003-2007/08, December 2002, page 36.

> *reduce the upper bound on the βe relative to the ACCC's estimates. The second error arises from the fact that the ACCC has reported an upper bound estimate of the* population mean for comparable firms *rather than the upper bound estimate of the βe for* an individual firm *(such as an individual TNSP). Calculating an upper bound estimate for a TNSP's βe tends to increase the βe above the ACCC estimates."*[40]

The NERA report shows that correcting these errors has the net effect of considerably increasing the upper bound estimates of equity beta to well above 1.0 for a 99% upper confidence interval.

NERA shows that making appropriate adjustments to the sample of comparator firms used in the analysis further increases the beta estimates.

The NECG submission also considers this aspect of equity beta estimation and concludes:

> *"We recognise the ACCC's attempts to address the imprecision of beta estimation by estimating beta as an upper confidence interval (without stating the level of confidence it would require) from a sample of listed comparators. However, we are concerned that this approach is flawed and will create significant regulatory uncertainty for a number of reasons. First, the beta estimates that the ACCC relies upon have poor statistical properties. Second, even if this problem could be overcome, the approach of pooling estimates is open to gaming and abuse by both regulated entities and the regulator alike. Finally, even if a mechanistic formula can be determined, the choice of the appropriate level of confidence to apply is inevitably ad hoc".*[41]

ElectraNet is concerned about the volatility that such an approach to beta estimation would introduce to regulatory decision-making. A high degree of variability in beta estimates would substantially increase the regulatory risk associated with future revenue cap decisions and is inconsistent with the Code objectives of achieving:

> *"regulatory accountability through transparency and public disclosure of regulatory processes and the basis of regulatory decisions"*
>
> *"reasonable certainty and consistency over time of the outcomes of regulatory processes"*

While ElectraNet understands that simply adopting an equity beta of 1.0 on the basis of historical practice may be seen as arbitrary, it does have the advantage of providing stability of returns over time.

ElectraNet submits that the approach taken to equity beta estimation should not deliver highly variable results. Adopting the 95% confidence level for the upper bound equity beta in the combined sample used in the ACCC's statistical analysis provides a rationale for setting the allowed equity beta at 1.0 or above.

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[40] NERA, "*Evaluation of the ACCC's proposed approach to statistical estimation of equity betas for TNSPs*", a report prepared on behalf of transmission network owners, November 2003, p3 – report included as Appendix C

[41] NECG Submission, p5.

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the Commission's proposed approach in deriving an B_e from market data. Also, given the limited availability of market data, the estimation of the B_e in the future and in the interim.

ElectraNet believes that the ACCC should adopt a "line in the sand" approach of setting an equity beta of 1.0 for future revenue cap decisions. This position is supported by:

- Comparisons of equity beta with the equity beta of the market as a whole adjusted for different gearing levels;
- International beta estimates;
- The ACCC's own statistical analysis when correctly applied; and
- The negative impact on incentives for investment that would result from the increased variability and uncertainty associated with estimating equity beta from statistical analysis of market data.

7.6 Cost of debt

The Commission's preferred position:

The Commission does not propose to vary its current approach to benchmarking the debt margin.

The ACCC supports use of a benchmark credit rating as follows:

> *"The Commission considers it is appropriate to abstract from the actual cost of debt facing a TNSP, as the actual cost of debt may not reflect efficient financing. Therefore the cost of debt should be determined through reference to a benchmark credit rating and an associated debt margin. Adopting a benchmark credit rating for the TNSP is also more appropriate given that the creditworthiness of the entity is in part under managerial control and the use of a benchmark is consistent with other assumptions".*[42]

The ACCC then sets out the long-term credit rating of Australian electricity companies that have been assigned a credit rating by Standard and Poor's and concludes:

> *"The Commission considers that on the basis of current market information, an A credit rating represents an appropriate proxy credit rating for the benchmark electricity company"*

ElectraNet disagrees with the ACCC's approach, in particular the inclusion of the credit ratings of State Government owned entities.

The Code suggests that the WACC should be based on the assumption of a privately owned company:

[42] ACCC Discussion Paper, p82.

> *"The weighted average cost of capital is a "forward looking" weighted average cost of debt and equity for a commercial business entity. Accordingly, the Network Owner's weighted average cost of capital will represent the shadow price or social opportunity cost of capital as measured by the rate of return required by investors in a privately-owned company with a risk profile similar to that of the network company"[43]. [emphasis added]*

The NECG submission also comments on this matter and concludes:

> *"We believe the ACCC's approach to determining a benchmark credit rating unnecessarily penalises efficient electricity transmission businesses and violates principles of competitive neutrality. The ACCC should not react to a lack of suitable comparators by including the credit rating of Government owned electricity businesses, except where those ratings are determined on a stand-alone basis."[44]*

The ACCC should change its approach and only consider businesses that have a stand-alone credit rating in determining an appropriate benchmark for the cost of debt.

7.7 Debt and equity raising costs

The Commission's preferred position:

The Commission prefers debt raising costs to be treated in the opex allowance rather than as an addition to the cost of debt.

In recent decisions, the ACCC has accepted the validity of including allowance for the transaction costs of raising debt finance and has to date provided allowances in the range of 10.5 to 12.5 basis points on the cost of debt.

NECG's view is that the total cost of issuing debt significantly exceeds the amounts granted to date and that the empirical evidence that is available is consistent with total debt issuance costs, stated as a rate of return, in the order of up to 0.50%.

ElectraNet does not have a strong preference for whether debt raising costs should be treated as an addition to the opex allowance or the cost of debt.

The Commission's preferred position:

The Commission prefers to maintain its approach to providing an allowance for equity raising costs.

ElectraNet supports an addition to the opex allowance for equity raising costs.

The NECG submission considers alternative ways calculating this allowance and concludes:

> *"In our opinion, the appropriate rate to use for the calculation is the cost of equity capital. Moreover, since the equity has been raised to*

[43] National Electricity Code, schedule 6.1, clause 2.1.
[44] NECG Submission, p5.

finance assets, the period over which equity raising costs should be amortised is the average life of the assets rather than perpetuity".

7.8 Imputation credits – gamma

The Commission's preferred position:

The Commission's preferred position is to retain the current assumed value of 0.5 for gamma.

NECG note that there is considerable uncertainty associated with the value of gamma, and agree with the ACCC that this uncertainty is unlikely to be definitively resolved in the near term.

"A gamma in the range of 0.30 to 0.50 is well established in Australian regulatory decision-making, with the ACCC's value at the upper end.

We do not believe there is a basis for any increase in gamma above 0.50. A value of zero is consistent with the marginal shareholder being international investors, which may be a realistic assumption, at least for larger listed firms.

However, we note that given the uncertainty associated with the value of gamma, and that this uncertainty is unlikely to be definitively resolved in the near term, a value within the range of 0.30 to 0.50, consistent with regulatory precedent, can be justified".

ElectraNet supports the ACCC's position to retain the current assumed value of 0.5 for gamma.

7.9 Asymmetric risk

ElectraNet refers the ACCC to the NECG submission for a discussion of asymmetric risk and agrees that the *Regulatory Principles* should explicitly recognise that asymmetric risk exists.

We do not believe a particular approach should be prescribed. Instead TNSPs should be provided with the opportunity to make submissions in the format considered appropriate given the risks faced.

7.10 Drawing a line in the sand for WACC

Earlier in this section we emphasised that incentives for new investment are not only influenced by current levels of allowed WACC, but also by the level of WACC that investors can reasonably expect over the life of new investments.

The ACCC needs to understand that investors' expectations of future allowed returns are heavily influenced by comments and statements on WACC made by the regulator.

The NERA report included as Appendix D analyses recent statements on WACC by the ACCC and notes the uncertainty that these statements create concerning future allowed returns.

ElectraNet submits that the ACCC should seek to reduce the current level of uncertainty concerning future returns by adopting a "line in the sand" approach to WACC in the *Regulatory Principles*.

The NERA report assesses the relative merits of taking this approach – more specifically, drawing a line in the sand around a particular level of the margin above the risk free rate.

NERA conclude that:

> *"A distinct reason for reducing the range for the expected WACC is that the costs of under and over investment are asymmetric. It is generally recognised that the costs associated with under-investment in essential infrastructure are, in a probabilistic sense, higher than the costs associated with over-investment. This is a reflection of the fact that failure in an essential infrastructure, such as electricity transmission, will result in damage to a large number of downstream enterprises and households.*
>
> *The ACCC appears to accept this view and is at pains to point out that it is conservative in the WACC provided to businesses. Unfortunately, such statements go a long way to undermining the benefits of any purported conservatism – unless they are accompanied by a commitment that the ACCC will continue to be conservative into the future. To date it is this commitment that has been missing from ACCC discussion of its 'conservative' approach to the WACC".*[45]

Again ElectraNet submits that the ACCC should seek to reduce the current level of uncertainty concerning future returns by adopting a "line in the sand" approach to WACC in the *Regulatory Principles*.

7.11 Summary of ElectraNet comments on WACC

- The regulated rate of return is the single most important factor in determining the strength of incentives for investment provided by the regulatory framework. If the regulated rate of return is too low efficient levels of new investment will not occur.
- An international comparison of WACC decisions by NECG has found that Australian electricity transmission decisions made by the ACCC do not compare favourably with decisions of overseas regulators when considered on a comparable basis.
- Incentives for new investment are not only influenced by current levels of allowed WACC, but also by the level of WACC that investors can reasonably expect over the life of new investments.
- The ACCC needs to understand that investors' expectations of future allowed returns are heavily influenced by comments and statements on WACC made by the regulator.

[45] NERA, "*Drawing a line in the sand for regulatory WACC*", a report prepared on behalf of transmission network owners, November 2003, p17 – report included as Appendix D.

- ElectraNet is concerned that returns over the risk free rate have been steadily decreasing and that the ACCC's Discussion Paper signals that rates of return may decrease further in the future.

- Greater regulatory certainty concerning WACC is needed to enhance the strength of the incentives provided by the regulatory framework. This will ultimately deliver the greatest benefits to consumers.

- ElectraNet believes that the ACCC should increase certainty by adopting a "line in the sand" approach to setting a level of WACC that investors can reasonably expect over the life of new investments – specifically in relation to the margin above the risk free rate. Once set, the ACCC should not vary from this approach except under very exceptional circumstances.

- International comparisons show that the ACCC stands alone in using a term equivalent to the regulatory period to determine the risk free rate. The weight of evidence suggests that the ACCC should change its position and adopt the 10-year bond rate to determine the risk free rate.

- ElectraNet supports the ACCC's proposal to let the regulated firm choose the length of period used in calculating the moving average of the risk free rate at the time of its revenue application.

- ElectraNet believes that the ACCC should adopt an equity beta of 1.0 for future revenue cap decisions. This position is supported by comparisons of equity betas with the equity beta of the market as a whole adjusted for different gearing levels; international beta estimates; the ACCC's own statistical analysis when correctly applied; and the negative impact on incentives for investment that would result from the increased variability and uncertainty associated with estimating equity beta from statistical analysis of market data.

- The ACCC should only consider businesses that have a stand-alone credit rating in determining an appropriate benchmark for the cost of debt.

- The *Regulatory Principles* should explicitly recognise the existence of asymmetric risk.

Appendix A

SKM Report: DRP Asset Valuation Issues

Review of Draft Statement of Regulatory Principles

REPORT

- 10-Dec-03

Review of Draft Statement of Regulatory Principles

REPORT

- 10-Dec-03

Sinclair Knight Merz
ABN 37 001 024 095
369 Ann Street, Brisbane 4000
PO Box 246
Spring Hill QLD 4004 Australia
Tel: +61 7 3244 7100
Fax: +61 7 3244 7301
Web: www.skmconsulting.com

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1. Introduction

SKM has been retained by ElectraNet SA to review the ACCC Discussion Paper titled "2003 Review of the Draft Statement of Principles for the Regulation of Transmission Revenues", in relation to the ElectraNet SA jurisdictional asset valuation and the DORC implementation questions raised in the discussion paper.

While the Commission has stated that its preferred option is not to revalue the asset vase, should a revaluation be necessary then it is essential that the DORC implementation questions first be resolved.

SKM has been involved in asset valuations of TNSP and DNSP networks in all states and territories of Australia and in New Zealand and Canada. We offer our comments as practitioners in the area since 1994.

It is our view that jurisdictional valuations carried out at different times over the last 10 years have some inevitable inconsistencies. In our view, a TNSP should have the option to address material inconsistencies in the regulated asset base. We believe that there is a strong case for ElectraNet SA's asset base to be revalued on a limited basis to address such inconsistencies.

2. Asset valuation – Issues raised by the Commission

2.1 Introduction

SKM's comments relate to the issues raised by the Commission in Section 3 of the "2003 Review of the Draft Statement of Principles for the Regulation of Transmission Revenues".

We have confined our commentary to a number of key issues that need to be addressed if revaluations of the jurisdictional valuations are undertaken. We have also commented on aspects of the ElectraNet SA jurisdictional valuation where there are material inconsistencies with TNSP asset base valuations in general and where it is considered that there may be a strong case for a limited revaluation.

2.2 Issues in regard to the revaluation of the asset base

One of the issues raised by the Commission is,

"under what specific circumstances should the Commission revalue the asset base?"

Jurisdictional valuations have been carried out over the last 10 years. The more recent valuations reflect the ongoing refinement of the methodology used for DORC valuations as a result of ongoing debate between valuers, TNSPs, regulators and network customers. In addition, over the period, TNSPs have been developing advanced asset management methods that required more detailed asset data bases. As a result there is better data available now for asset base valuation purposes than were available for some of the earlier jurisdictional valuations.

The more recent valuations have treated certain aspects of their valuations differently to the treatment adopted for earlier valuations. In our experience this has resulted in the undervaluation of some earlier TNSP asset bases, with material differences in some aspects when compared with more recent TNSP valuations.

In relation to the ElectraNet SA jurisdictional asset base valuation, we consider that there are two areas that warrant revaluation; the value assigned to easements and the application of Interest During Construction (IDC). These matters are dealt with later in the report.

2.3 Issues in regard to optimisation

The application of optimisation principles has been inconsistent in the past, and existing optimisation guidelines did not envisage that transmission assets could be made redundant (wholly or partially) by the economic and prudent expansion of generation capacity to meet the growing demand of the National Electricity Market.

It is noted in the ACCC Discussion Paper (page v) that periodic revaluation of the asset base *"generates a high level of uncertainty for the TNSP's and there is a strong possibility it could deter new investment"*.

SKM views this statement primarily to reflect the uncertainty over whether the rigid application of current optimisation principles might render some existing or planned transmission assets superfluous by the decisions of other market participants to invest in new generation at certain locations on the network.

SKM has found the optimisation principles outlined in the Code, and the NSW Treasury Guidelines to be too "generic", to be applied in a consistent way from valuation to valuation. In recent years we have supplemented these guidelines with more specific guidelines in an internal SKM document "Optimisation Guidelines - June 2001". This paper sets out the approach to the optimisation process and outlines a more specific "step by step" approach. It describes the basic steps in the optimisation process as:

a) *Review the network planning criteria to determine if they are in accordance with "good electricity industry practice". Any optimisation carried out on the network configuration or assets must meet current good practice planning criteria.*
b) *Review the design criteria for network assets to determine if they are in accordance with good practice for the location and application of those assets. If the design criteria result in the assets being over-designed compared to good practice they would be optimised down.*
c) *Review operating criteria, practices and performance as required to ensure that operating constraints are considered as part of the optimisation process.*
d) *Review the forecast load, generation and interconnector flows for the nominated planning horizon. The period must also take into consideration that most transmission assets can only be installed in relatively large blocks.*
e) *Review asset ratings.*
f) *Carry out steady state and dynamic network studies to ensure that the optimised network and its configuration meets required levels of service and quality standards, and the requirements of the National Electricity Code (NEC) and the Reliability Panel.*

The paper adopts minimum planning horizon of 10 years which is consistent the NEC horizon of 10 to 15 years for jurisdictional planning.

The paper also clarifies the approach to network loads and configuration;

Optimisation follows an incremental approach and not a greenfields approach. With incremental optimisation the existing network is reviewed and configurations, ratings and designs assessed to identify excess redundancy, over-capacity and over-design. It is based on there being no changes

to points of supply (generating stations), location of loads, transmission line or cable routes, easements or substation sites. However, existing substations or lines can be amended in layout, or rating, or design, or deleted as appropriate.

However this SKM discussion paper does not eliminate the possibility that certain transmission assets may be made redundant by future generation investments. We believe that some "quarantining provisions" need to be made in any future set of transmission specific valuation guidelines to avoid optimisation of new transmission investment that underwent and passed the regulatory test under the Code.

2.4 Issues in regard to replacement cost

We have addressed two questions raised by the Commission;

"What condition should the regulator assume already exists? Should RC be calculated on the basis that 'brownfields conditions' exist where basic existing infrastructure is already in place, or should they be calculated on the basis of 'greenfields' assumptions so that the replaceemnt transmission system assets would therefore not need to work around such structures?"

and

"Finally, if the regulator decided to revalue the asset, would it revalue every asset or group some assets together when re-valuing?"

SKM's view is that the RC should be calculated on the basis that brownfield conditions exist and that every asset should be re-valued at a higher level of detail rather than grouped for the reasons set out below.

Asset base valuation guidelines

The NSW Treasury Guidelines on asset valuations for regulated network businesses were first published in draft form in December 1995 and are primarily written around distribution businesses. While there are some "generic" similarities between distribution and transmission businesses, there are also significant differences.

A full revaluation of transmission asset bases would require the development of transmission specific valuation guidelines.

Uniform asset class definitions and unit rates

A standard set of asset class definitions and unit rates developed for transmission assets at all voltage levels in use in Australia (eg. 110kV, 132kV, 220kV, 275kV, 330kV, 500kV) would need to be developed.

Professional consultants, such as SKM, have usually conducted transmission asset valuations based on knowledge of historical project costs, contract and budget price information for projects and major items of plant and equipment. This knowledge is progressively updated over time as new projects are completed. However often the most current pricing information is commercially sensitive, and is sometimes not available to consultants conducting asset valuations.

Standard unit rates for valuation purposes should be set at efficient long term sustainable and competitively sourced prices. It is SKM's experience that there are often examples of contract prices in the market place for electrical assets that do not necessarily reflect competitively efficient and sustainable pricing. Therefore valuations should not be arbitrarily raised and lowered to reflect the lowest known price in the market place for an asset.

The outcome from a pricing exercise should be to establish a set of standard unit rates that are consistent with recent industry experience and sustainable in the competitive market. A consistent approach to the "scale of the project" adopted for establishing rates is also essential.

Improvements in asset recording systems

TNSP asset databases have improved over time, and the historical data upon which some previous jurisdictional valuations have been undertaken have been in error.

SKM has been involved with undertaking asset valuations for TNSP's since 1994. During that time we have seen a dramatic improvement in the quality of both asset recording systems, and the quality and consistency of data recorded in those systems. In particular, the specific data that has improved most is not necessarily the quantity of each asset held, but the specific definition of the asset type (which impacts unit cost), and the specific commissioning dates and ages of assets (which impacts the DRC).

The older that the original jurisdictional valuation is, upon which the opening RAB adopted by the Commission is, the greater will be the aggregate error from poor asset recording data.

SKM has previously expressed concern over the fact that the opening RAB for ElectraNet SA is based on a 1995 valuation, even though SKM reviewed that valuation in 1998 this review did not constitute a revaluation.

Brownfield cost factors

The NSW Treasury draft publication "Valuation of Electricity Network Assets – A Policy Guideline for NSW DNSPs, July 2001" uses the term "brownfield" as follows:

"Current costs can be determined on a "greenfields" or "brownfields" basis. The "greenfields" cost basis assumes construction occurs in an area free of development. The "brownfields" cost

basis assumes construction occurs around all existing infrastructure and development (other than the asset being valued).

The "brownfields" cost basis is considered appropriate because it is consistent with the concept of establishing the potential purchaser's lowest alternative cost to replicate the network (ie. a duplicate network would need to be built in the existing environment). The current cost estimates should reflect the current state of land use development.

The "brownfields" cost structure is widely used for ODRC valuations including electricity, gas and water infrastructure assets in most states."

The New South Wales Treasury policy guidelines refers to the application of brownfield cost factors to adjust replacement costs to provide for costs associated with *"construction around all existing infrastructure and development (other than the asset being valued)."*

The New South Wales guidelines are intended for distribution networks. In this application brownfield cost factors are applied to the cost for construction of an overhead line to include costs due to, say, road crossings, road closures during construction and restrictions to normal work practice due to access constraints.

Similarly, for underground cables, brownfield cost factors could take account of additional cost associated with the cost of installation in CBDs due to road and footpath reinstatement, road closures and restrictions on installation practices.

For transmission network valuations cost adjustment factors have been developed for transmission lines to recognise additional construction costs associated with:

- Terrain
- Vegetation density
- Access difficulty
- Ground conditions (rock, soil type)
- Land zoning (construction on urban or near urban areas involves shorter spans and greater number of angle structures)
- Existing infrastructure (road, highway, power line, communications crossings)

For substations, while brownfield cost factors have not been developed, the different types of substation sites (size and site conditions) are recognised in assessing replacement costs.

Most, if not all, TNSP jurisdictional valuations have used cost adjustment factors for transmission line valuations, but not for substations.

Staged Development Factors

None of the jurisdictional valuations take into account the additional cost to a TNSP of installing a new asset adjacent to existing operating, energised plant and equipment where restrictions to work methods generally apply. This occurs where an existing switchyard is being extended by the installation of additional switchbays or where existing plant (power transformers, circuit breakers, instrument transformers) is being replaced.

In our view adjustment factors need to be adopted to take into account the additional costs to a TNSP associated with working adjacent to energised, operating plant and equipment. To avoid confusion with brownfield cost factors we refer to these factors as staged development cost factors.

SKM has recently carried out some studies into the staged development cost factors for substations. Table 1 indicates the magnitude of these factors for various asset classes.

Table 1 Staged Development Factors

Description	Stage Development Cost Factor
Switchbays (1)	1.20 to 1.3
CBs, CT speed VTs	1.1
Transformers (1)	1.02 to 1.07

Note (1) Depends on voltage and rating

Based on recent work carried out by SKM the application of staged development factors can increase the replacement cost of TNSP substation assets by 4% to 7%.

Re-valuation at a more detailed asset class level

The widely acknowledged Modern Equivalent Asset (MEA) valuation methodology for transmission networks consists of three primary steps:

- Identify each asset class within the transmission network. Typically for transmission substations, asset classes include transformers, capacitor banks, reactors, switchbays, and substation establishment (including all common civil works, buildings, scada, auxiliary power supplies etc).
- Assign each asset class a MEA replacement cost.
- Assign each asset a "remaining life", based on the original commissioning date of the asset and the class life for the parent asset class.

The resulting substation depreciated replacement cost using the ODRC methodology becomes a simple aggregate of the individual depreciated replacement costs of the constituent assets. This asset valuation methodology is very simple to apply. For the jurisdictional valuations some asset classes did not recognise capital expenditure on assets "beneath or within" the nominated asset class. This resulted in a lower ODRC valuation because a "remaining life reset" for new capital

expenditure on assets below the nominated asset class can not be applied. The new asset adopted the remaining life of the parent asset, which often is approaching expiration. Such a dilemma only arises when the selected asset classes are too "coarse" to recognise the replacement of essential constituent assets. The most salient example of such an inadequacy is the choice of the substation switchbay as a building block.

A typical substation switchbay can be broken down to five sub-asset classes;

- Civil works (structures and foundations)
- Circuit breakers
- Current transformers
- Voltage transformers
- Control and protection

By breaking down the substation switchbay into five sub-asset classes, the replacement of say a circuit breaker can be recognised in the ODRC valuation. Revaluations at this asset level will recognise TNSP capital expenditure on asset replacement that occurred prior to the jurisdictional valuation.

Table 3 shows the DRC calculations for two cases; where the valuation is carried out at the switchbay asset class level and where the valuation is carried out at a more detailed asset class level. It is assumed that the switchbay was commissioned in 1970 and has an asset class life of 45years. It is also assumed that the circuit breaker was replaced in 2000. For this example 100 has been assumed as the replacement cost for the switchbay.

- **Table 2 - DRC calculation at switchbay component level**

	RC	Remaining Life	DRC	Remaining Life	DRC
Switchbay Level					
Total	**100**	12	**27**		
Switchbay Component Level					
Civils	32			12	9
Circuit Breakers	22			42	20
CTs	11			12	3
VTs	6			12	2
Control & protection	29			12	8
Total	**100**				**41**

The DRC for the valuation at the switchbay asset class level is 27% of the switchbay replacement cost. In this case the replacement of the circuit breaker would not be recognised. However if the

valuation is done at the lower asset class level, the DRC would have been 41% of the switchbay replacement cost.

For a typical 275/132kV substation the impact of replacing say, the circuit breakers on five switchbays as described above would be to increase the DRC of the substation by approximately 15%.

Interest during construction (IDC)

Current valuations of TNSP networks generally include project financing costs (IDC). In the case of ElectraNet SA, IDC has been applied only to assets valued at more than $50 million (one asset only).

The original valuation of the ElectraNet SA network was carried out by Hill Michael Associates (HMA) in 1995. In their valuation report they referred to the practice of applying IDC only to projects valued at over $50 million and said,

"The restriction of project financing (IDC) costs to projects valued at over $50m does not reflect actual replacement cost valuations which should be include IDC for all projects. This would increase the valuation by some 5%."

In November 1997, SKM carried out an overview of the HMA valuation for the Electricity Reform and Sales Unit. In that report SKM made the following observation in relation to IDC.

"As requested by ETSA Transmission, the HMA Report valuation only included project financing or interest during construction (IDC) on projects valued at over $50M. This principal has also been followed in this review. However, in its report HMA pointed out that they considered the exclusion of IDC did not reflect actual replacement costs and that it should be included for all projects. Sinclair Knight Merz endorses this point of view. To provide an indication of the significance of IDC, approximate estimates have been made for typical transmission lines and substations. For an assumed interest rate of 7.5% the IDC for a transmission line is 5% and for a substation it is 3%. These values would increase the ETSA Valuation ODRC by $23M."

In the most recent valuations of TNSP networks rates for IDC have been applied.

In the 1998 SKM review of the 1995 valuation SKM estimated that the ETSA Transmission ODRC would be increased by $23 million if IDC was applied to all projects. Based on recent work by SKM, a rate of 7.5% for IDC is now appropriate. The application of this rate would increase the DRC of the ElectraNet SA asset base by approximately $45 million.

In our view IDC is a valid project cost and should be included in the valuation of all assets in the ElectraNet SA asset base. In addition, the treatment of IDC in the ElectraNet SA asset base is

inconsistent with the approach used for other TNSP valuations. It is material and it is considered that there are strong grounds for a revaluation of this aspect of the ElectraNet valuation.

2.5 Issues in regard to easements

Commission's preferred position

The Commission's preferred position is

"not to revalue the asset base; however, if the Commission decided to revalue the asset base (using a DORC methodology for fixed assets) it sees merit in adopting an historical cost approach for easements.

If historical cost cannot be established for easements then a benchmarked approach would be adopted."

The Commission seeks comment

"on its preferred position of regarding two options, DORC or historic cost for revaluing existing easements"

SKM Comment

In establishing a substation site or transmission line route, TNSPs are faced with acquisition costs associated with:

- Identifying practical options.
- Initial assessment of options to identify options to go forward for detailed evaluation.
- Assessment of the impacts of options (social, environmental, cultural, technical, cost (capital and operating)).
- Public consultations.
- Selection of preferred option.
- Obtaining statutory approvals.

These costs are in addition to, and separate from the consideration paid for substation sites and the compensation paid to land owners for easements.

In very sensitive areas the process to establish a substation site or transmission line route can become protracted with the activities described above repeated a number of times.

It is SKM's view that asset valuations, to date, have not adequately recognised these costs for the substation sites and transmission line routes established over the past 20 years.

In the 1950s and 1960s acquisition costs were minimal and generally included as part of the survey and design costs of the project. Development of transmission networks was seen as part of the general growth in infrastructure and there was little public debate. In addition TNSPs had (or were perceived to have) considerable statutory powers to compulsorily acquire substation sites or transmission line routes.

Over the past 20 to 30 years there has been an increasing awareness by governments, TNSPs and the public of the impacts of development projects (including transmission network projects) that has resulted in significant costs to TNSPs in establishing substation sites and transmission line routes.

Recent work by SKM shows that, for transmission lines longer than 50km that have no major protracted issues to resolve, the cost of acquiring a route are typically $20 000 to $30 000 per km. We note that, in the Powerlink submissions, its deprival concept valuation for easements included an amount of $20,000/km for assemblage factors to provide for environmental impact studies, cultural heritage studies, corridor selection reports, community offsets, professional and survey costs and acquisition costs. Refer Powerlink Network Valuation Review, PB Associates, April 2001. We understand that this may not have been included in the final decision.

For route acquisition involving a protracted process these costs can be significantly higher.

In our view ODRC methodology can be applied to this element of easement costs using the land tenure that existed at the time of acquiring the easement. There are generally good records of historical land zoning information available from government authorities and local authorities that would provide sufficient detail to establish the land zoning that existed at the time of acquisition of the easement.

Where records are available, the compensation paid to land owners for granting a registered easement could be valued on a roll forward of historical costs. Where this information is not available we believe that there would be sufficient information available to make a reasonable estimate of compensation paid.

ElectraNet SA easement value

Table 3 compares the ElectraNet SA transmission line network and easement value with those of other TNSPs. The ratios of easement value to circuit length for Powerlink, SPI powerNet and Transend show reaonable agreement. The higher value for TranGrid probably reflects the fact that a significant proportion of TransGrid lines are located in areas of denser occupation in the Newcastle, Sydney and Wollongong regions and that land may also be included in this category. The ratio for ElectraNet SA over 20 times lower than the other TNSPs and indicates a material difference in the treatment of easement value compared with the other TNSPs.

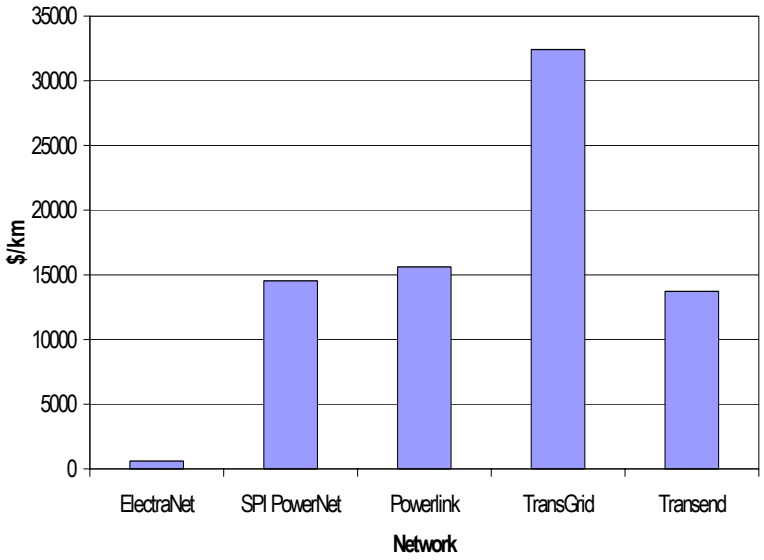
Figure 1 shows the same data graphically and again demonstrates the disproportion in the value of the ElectraNet SA easements.

- **Table 3 – Comparison of TNSP transmission line networks and easement values**

Network	Length (circuit km)	Easement value ($million) [1]	Ratio [2]
ElectraNet	5,600	3.4	607
SPI PowerNet	6,500	94.5	14538
Powerlink	11,200	174.9	15616
TransGrid	12,400	402	32419
Transend	3,500	48	13714

Notes
(1) ACCC decisions
(2) Ratio equals Easement value /Length

- **Figure 1 - TNSP transmission line circuit lengths and easement values**



In making a broad assessment of the value of easements for ElectraNetSA it is reasonable to compare it with the other TNSPs, probably excluding TransGrid. The general characteristics of the networks are similar in terms of the types of line and land occupation where the lines are located.

It is apparent then, that the easements for ElectraNet SA are grossly undervalued and that there is a strong case for this aspect of the ElectraNet SA asset base to be revalued.

Appendix B

KPMG Report: Depreciation and Asset Base Roll Forward

KPMG

Powerlink Queensland
(on behalf of Powerlink Queensland and ElectraNet SA)

Depreciation and Asset Base Roll Forward

KPMG Energy and Natural Resources
November 2003
This report contains 19 pages
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Contents

1 Introduction

1.1 Background

This report follows a workshop with Powerlink Queensland ('Powerlink') and ElectraNet SA ('ElectraNet') on 7 November 2003. At that workshop, KPMG were requested to provide advice on specific areas associated with asset roll forward and depreciation in the context of the ACCC's discussion paper on the Statement of Regulatory Principles. It was agreed that KPMG would respond with a discussion on:

- The treatment of differences between forecast and actual capital expenditure at the end of a regulatory period;
- The use of depreciation as an offset to changes in asset valuation; and
- The use of annuity depreciation.

1.2 Disclaimer

Please note that, in accordance with our Firm's policy, we are obliged to advise that neither the Firm nor any member nor employee undertakes responsibility in any way whatsoever to any person or organisation (other than Powerlink and Electranet) in respect of information set out in this paper, including any errors or omissions therein, arising through negligence or otherwise however caused.

2 Roll forward and Capital Expenditure

Powerlink and ElectraNet requested that we set out a summary of the workshop discussions in relation to treatment of capital expenditure variations (forecast compared to actual) and depreciation expenditure variations (forecast compared to actual) at the end of a regulatory period. Specifically, the discussion focussed on:

- Whether forecast (approved) capital expenditure at the commencement of the previous regulatory period, or actual capital expenditure during the previous regulatory period, should be 'rolled into' the capital base for the next regulatory period;
- Whether forecast (approved) depreciation at the commencement of the previous regulatory period, or actual depreciation as calculated during the previous regulatory period, should be subtracted from the initial capital base for the next regulatory period; and
- The impact of differences between forecast and actual expenditure, in the under or over recovery of revenue during the previous regulatory period.

We note that our scope of engagement did not include forming a view on the most appropriate method of rolling forward the asset base for all TNSPs. Further, the most appropriate method of rolling forward the asset base will essentially depend on the individual circumstances of the business and the regulatory environment in which they operate.

2.1 Forecast (approved) versus Actual Capital Expenditure

Differences in capital expenditure are a fact in most regulatory resets due to the difficulty in forecasting capital expenditure (due to changing generation patterns) and demand over the forecast period. Notwithstanding that revenues are set for a five year period (or in the case of Murraylink – 10 years), the TNSP will still need to meet Code and licence obligations, and service standards on an annual basis and therefore need to reinforce the network to meet demand. The TNSP may need to advance, or it may find the opportunity to defer capex depending on standards, demand and capacity at the time. Forecast capex is therefore likely to differ to outturn capex.

For capex to be rolled into the rate base, it will have to be deemed to be prudent or efficient, at least to the regulator. The degree to which one can assess all capital expenditure as efficient or prudent without detailed investigation will depend somewhat on the degree to which there is an incentive based regulatory system. Under incentive regulation, the business should have sufficient incentive not to over capitalise, or over spend opex and capex. In the absence of workable incentive based regulation, the regulatory review process may require an assessment of the outturn capex to ensure that it is efficient.

Efficient capex should then be rolled into the asset base to maintain the financial capital maintenance concept, providing a return to the investor for appropriate, efficient capital invested. If outturn capex is not rolled into the rate base, it is likely that the business will not

invest in the network, and the NEC principle of providing a regulatory system that fosters efficient investment will not be met.

The result of using actual capex in place of the forecast decision capex is that there are likely to be differences in the calculation of depreciation that need to be considered.

2.2 Forecast (approved) versus 'Actual' Depreciation

A regulator's allowed revenue decision will usually identify an allowance for depreciation in the application of the building blocks methodology. This "decision" depreciation is based on a set of assumptions which include:

- The amount of capital expenditure to be spent in the forecast period;
- The mix of capital expenditure allocated to different "standard life" groups;
- A degree of averaging in the calculation of depreciation for initial assets and capital expenditure where it in not practical to model the asset register on an asset by asset basis;
- Whether there were any customer contributions associated with that capital expenditure; and
- The forecast of CPI for the regulatory period.

Actual depreciation calculated by the business will reflect:

- Actual capital expenditure including the mix of capital expenditure within classes of asset lives;
- When the capital expenditure is incurred during the regulatory period (which year, and when during that year);
- A more detailed accounting of assets which may include calculations at an individual asset level; and
- Actual CPI.

Even in the event that the amount of outturn capital expenditure may closely represent that forecast, other factors are likely to ensure that the outturn depreciation is different to that provided in the decision.

In developing the roll-forward calculation, a TNSP is presented with two options. The roll-forward could be conducted with either:

- Outturn depreciation (calculated from within the TNSPs own detailed systems); or
- Decision depreciation (adjusted for actual CPI).

Allen Consulting, in their paper on the Methodology for Updating the Regulatory Value of Electricity Transmission Assets[1] recognises that either approach could be adopted, but notes that other regulators have adopted the later for simplicity.

When acknowledging that either approach is acceptable in a roll-forward, Allen's accept that in the case of using outturn depreciation, the business has not been fully compensated for the appropriate depreciation[2]. Therefore, in the case of a capital expenditure overspend (as compared to forecasts) the business will be under compensated for depreciation. Since the Allen's paper states that either approach is acceptable, it follows that if the business is only compensated through decision depreciation, but the roll forward conducted with outturn depreciation, then any over or under depreciation should be carried forward as a charge in the next period. To ignore this would result in windfall gains in underspending on forecast capex or windfall losses on overspending on forecast capex.

2.3 Impact on Long Term Required Revenue and Possible Treatment

Over or under-recoveries in revenue will occur if actual capital expenditure and/or actual depreciation during the previous regulatory period varied from that allowed by the Regulator. Mechanistically:

- If actual capital expenditure was less than allowed capital expenditure, a company will have over-recovered on both the return on, and return of assets within the revenue setting process; and conversely
- If actual capital expenditure was more than allowed capital expenditure, a company will have under-recovered on both the return on, and return of assets within the revenue setting process.

The company is likely to want to recover any shortfalls in return on and of capital not received in the previous period, as this represents forgone revenue not returned to the investor. To deny the investor of this return violates the capital maintenance concept of investment and returns ascribed to by the ACCC. It also contravenes the principles in section 6.2.2 of the NEC that requires that the regime provide a sustainable commercial revenue stream on efficient investment.The workshop discussed two alternative methods of recovering revenue under-recovered in previous periods. These were:

- Capitalizing the amount of under-recovery as an asset and earning a return on and of capital on that amount over the useful life of the assets concerned; or
- Taking the under-recovery in cash, by adjusting either the Po or X factor to allow it to be recovered over the following regulatory period.

There are pragmatic reasons for businesses wanting to obtain any recoveries in the short term, in that the rate of return that regulators have been allowing network companies to earn

[1] Appendix A to the ACCC's discussion paper on the statement of regulatory principles

[2] Outturn depreciation is identified by TNSPs annually within their ACCC Regulatory Reports.

have been declining since reforms commenced. KPMG has analysed the trend in the allowed rate of return for regulated network businesses in Australia, and there is a clear downward trend after allowing for differences in the real risk free rate over time[3]. This downward pressure on WACC lowers the return over time, and a TNSP is therefore concerned with obtaining returns as early as possible and is not indifferent to the timing of returns as might be assumed by the regulator.

Providing that the present values of either treatment are identical, however, the choice on which option to take depends largely on the extent of regulatory risk inherent in the system[4]. This is essentially because the true extent of regulatory risk is not generally thought to be included within the WACC formula used to calculate the present value of each option.

If this notion of regulatory risk is not included within the WACC, it holds that the business will prefer to obtain the under-recovery sooner rather than later by an adjustment in cash flow rather than through a glide pathing approach. Indeed, this is a direct response to the issue that regulators have been too focused on extracting "monopoly rents" from the businesses at the expense of encouraging investment. The recent Productivity Commission[5] (PC) report is clearly critical of this and suggests that regulation can result in either too much or too little infrastructure investment, with the risks of the latter outweighed by the risks of the former[6]. Indeed, the PC stated that *"So-called 'regulatory risk' under the regime is greater than it need be.[7]"*

This negative sentiment is somewhat reinforced by the absence of any references in the ACCC's discussion paper to the recent Productivity Commission review of the National Access Regime, the CoAG report on Energy Markets and the Epic Energy court case which are discussed below.

2.3.1 Regulatory Risk and the Absence of National Context in the Discussion Paper

These three milestones in the Australian regulatory environment should be considered, or at least referenced, in any deliberations on effective and appropriate regulation. These developments highlight a widely held view amongst policy makers that energy market regulation in Australia is at a crossroad, between the current application by regulators and the need to ensure that infrastructure owners earn a fair rate of return on investment.

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[3] We are also aware that interest rates have changed over the period of comparison.

[4] This risk includes how the Regulator will treat any incremental capital value associated with asset revaluations.

[5] Productivity Commission, Review of the National Access Regime: Inquiry Report, 28 September 2001

[6] Or that "in resetting price caps, regulators should set rates of return and revenue or price caps that err towards the interests of infrastructure owners (i.e. a degree of economic rent should be allowed to accrue to infrastructure asset owners.)". ESC, Review of Gas Access Arrangements: Draft Decision, July 2002, p.ix.

[7] Productivity Commission, Review of the National Access Regime: Inquiry Report, 28 September 2001, p.xxi.

2.3.1.1 Productivity Commission - Inquiry into the National Access Regime

An important element of National Competition Policy reforms of the 1990s was the establishment of a National Access Regime (the Regime) in Part IIIA of the *Trade Practices Act* (the TPA). This allows third parties to seek access to the services of certain essential infrastructure facilities on reasonable terms and conditions. The reforms provided for a review of the Regime following five years of operation.

The Productivity Commission (PC) completed this review and strongly supported the retention of the Regime. Nevertheless, it highlighted the need to modify some aspects of the Regime and made 33 recommendations to improve its operation. In particular, it identified as a *"threshold issue, the need for the application of the regime to give proper regard to investment issues"* and *"the need to provide appropriate incentives for investment."*

The Commonwealth Government has decided to make changes to the TPA which *"endorse the thrust"* of the PC's recommendations. In particular, the Government will modify the Regime along the following lines:

- Include a clear objects clause: *"The objective of this part is to promote the economically efficient operation and use of, and investment in, essential infrastructure services thereby promoting effective competition in upstream and downstream markets…"*
- Insert pricing principles: "The Australian Competition and Consumer Commission (ACCC) must have regard to the following principles:

  (a) that regulated access prices should:

  (i) be set so as to generate expected revenue for a regulated service or services that is at least sufficient to meet the efficient costs of providing access to the regulated service or services;

  (ii) include a return on investment commensurate with the regulatory and commercial risks involved;
- Include a provision for merit review by the Act of decisions by the ACCC on proposed undertakings.

The PC and the Government have recognised that the current application in Australia of economic regulation is being applied in Australia is leading to a serious risk of inadequate investment in essential infrastructure and is not in the public interest.

Moreover, the Government is making amendments to the Trade Practices Act to *clarify* the Regime and to provide further guidance to regulators, rather than fundamentally *change* it. It is therefore not the Regime itself that Government has decided is the problem; the problem has been the implementation of the Regime by the relevant regulators. This is an important realisation in a time where judgments are being made between prescription and flexibility in regulation.

2.3.1.2 The Epic Decision

On 23 August 2002 the Western Australian Supreme Court made a decision in regard to the matter of *Re Dr Ken Michael AM; Ex Parte Epic Energy (WA) Nominees & Anor* [2002] WASCA 231 (the Epic Decision).

The Epic Decision concerned the interpretation of the *National Third Party Access Code for Natural Gas Pipeline Systems* (the National Gas Code) and its application to Epic Energy's Dampier to Bunbury Natural Gas Pipeline by the Independent Gas Access Regulator of Western Australia. The Full Court of the WA Supreme Court accepted the basis of Epic's action.

A number of important principles emerge from the Epic Decision. Importantly, it raises the question of whether it is appropriate for regulators to rely on the notion of a perfectly competitive market in justifying their decisions. The Court held that a perfectly competitive market was not the appropriate standard for regulators to replicate in the context of the National Gas Code. According to the Supreme Court, references to competitive markets should be interpreted as references to *workably competitive* rather than perfectly competitive markets. In other words, regulation should aim to mimic the outcomes or, more accurately, the incentives found in workably competitive markets.

The Epic Decision therefore provides a strong endorsement of the PC's view that an environment of 'zero monopoly profit' is neither a realistic nor appropriate target for regulators to aim for.

2.3.1.3 CoAG Energy Market Review

The recent CoAG Energy Market Review Report "*Towards a Truly National and Efficient Energy Market*" made a number of observations in relation to network regulation, and made four key findings:

- That whilst there is value in the wider debate, it is unclear at this stage whether it will yield a fundamental change in regulatory approach;
- That much of the current regulatory debate focuses on quite narrow issues, centering on the value of the regulated asset base and the appropriate return on capital;
- That the future debate would be most effective if it focused on moving regulation to a less intrusive form. It was noted that this may best be brought about by giving further consideration to regulators relying on industry wide rather than detailed company specific information; and
- That there is a need for immediate changes to address some of the obvious deficiencies.

The Report recommended priority action in relation to the following:

- Increasing certainty as to how the gains from cost reductions will be shared over time and on how particular investments will be treated in the cost base;

- Moving away from revenue caps which can cause unintended consequences when demand forecasts are inaccurate; and
- Including incentives for meeting defined service standards. Without such a regime, there is an incentive only to cut costs, which can work to the detriment of the network.

2.4 Summary

The ACCC, through their advisers, Allen Consulting, have accepted that there are two alternative methodologies to the roll forward of the asset base. Allen's paper acknowledges that the roll forward of the asset base using the forecast depreciation approach rather than the outturn depreciation is somewhat simpler in application, but also recognises that either approach is acceptable.

We suggest that since TNSPs are presented with two options in the ACCC's discussion paper, they should not reduce their available options today by locking in one approach over another, and indeed might find it advantageous to argue for the appropriate roll forward methodology at the time of their respective revenue application. By taking this approach, a TNSP will therefore be able to consider which approach best suits it's needs having regard to it's specific circumstances, financial management systems and it's ability to employ a specific roll forward methodology.

3 Asset Revaluation and Depreciation Adjustments

3.1 Background

This section sets out how and why depreciation adjustments are used by the ACCC as an offset to revaluations, and sets out one possible amendment to the ACCC's proposed treatment based upon the need for the revaluation.

While acknowledging that it can see no immediate need to revalue jurisdictional asset bases, the ACCC has put forth a number of options in relation to the impact of revaluations. On page 18 of the Discussion Paper, the ACCC states that they could:

> "*revalue the asset base and any rise or fall in the value of the asset base could be accounted for by positive or negative depreciation*."[8]

The discussion paper notes that alternatively, the ACCC could:

> "*Choose to revalue the asset base and any rise and fall of the asset base would not be accounted for by depreciation*"[9]

3.2 Relationship between Revaluation and Depreciation Adjustments

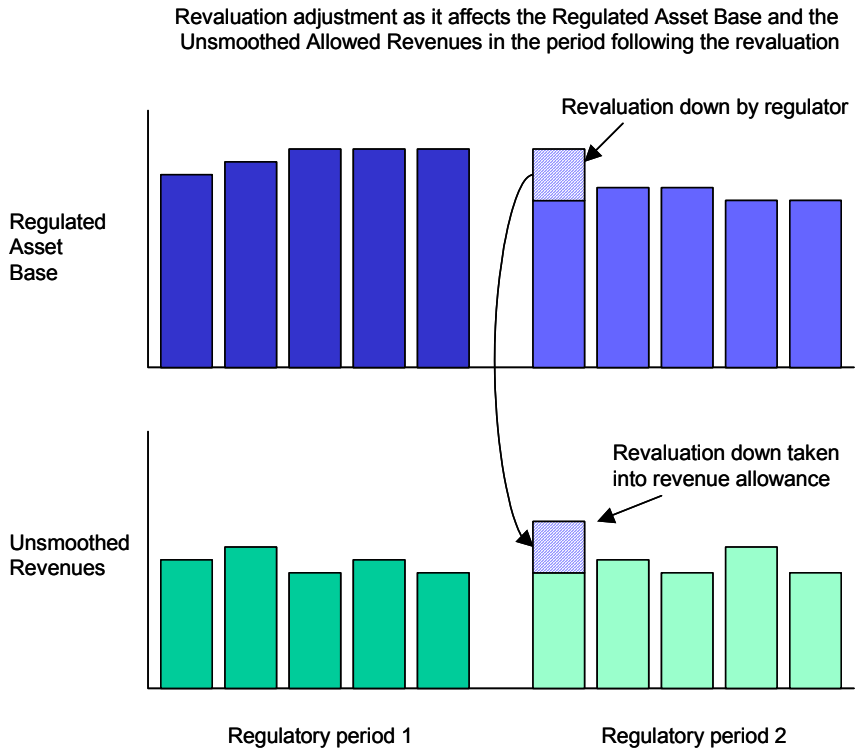
3.2.1 Adjustments through depreciation

The ACCC quite rightly recognises that the first approach neutralises the effect of the revaluation, as depreciation is only a return of the capital invested in the network.

For example, in the case of a revaluation adjustment that reduces the value of the regulated asset base (RAB), that valuation adjustment could be effected through an appropriate charge to depreciation. If that depreciation is included in the building blocks methodology for determining allowed revenue, and therefore returned to the investor, the investor is no worse off as a result of the valuation adjustment. The premise that the investor is no worse off is based on the assumption that the investor can obtain at least the regulated WACC on an alternative investment.

The revaluation adjustments that reduce the RAB and that result in an adjustment to depreciation are illustrated in the following example, where the effect of a decrease in the opening RAB of a new regulatory period results in a corresponding increase in the allowed revenues in the new regulatory period.

[8] ACCC Discussion paper – page 18
[9] Ibid



In the above illustration it may appear that the business has lost a return on the revaluation adjustment, but since the capital is returned to the investor (through the increase in the depreciation component in the allowed revenue calculation), the investor is allowed to invest this capital in other opportunities on which it can derive a return[10].

Similarly, when the revaluation involves an increase in the RAB, a corresponding amount of negative depreciation (reduction in revenue) is applied. This is similar to the business investing in a piece of capital expenditure on which it will earn a return in the future. The returns sacrificed today (through a revaluation adjustment to depreciation) will be returned to the investor over the life of the associated assets through a return on and of the capital employed.

3.2.2 Adjustments to RAB without the depreciation allowance

The alternative approach discussed by the ACCC, and one that they suggest is more appropriate will result in any revaluation adjustment being taken to the regulated asset base only, and not through the depreciation account. This will result in windfall gains or losses.

[10] We note that the original basis on which the investor contributed capital to the TNSP will not have been fulfilled. The observation in this paragraph will hold to the extent that investors do not demand a higher return as compensation for unanticipated early return of capital in a dynamic model,

In accounting terms, a single sided entry which reduced the value of the assets would impact on future returns on and of capital.

Of course there is another side to this view and it is possible that a revaluation may result in an increase in the RAB, and therefore a windfall gain in future revenues resulting from a return on and of capital associated with the revaluation adjustment.

We are unaware of any increases in the valuation of RABs that have resulted in a significant windfall gain to the regulated entity. ElectraNet SA in their 2002 application for a revenue reset applied for a revaluation of assets including easements. The revaluation resulted in an increase of more than 10% of the value of the regulated asset base. The ACCC's final decision did not allow any significant increase of asset values however it did result in a reassessment of some previously optimised assets, which suggests that there may be a place for a revaluation adjustment without reference to the depreciation charge in a final regulatory decision.

3.2.3 When should the different approaches be adopted

We have cited above an example of a certain revelation adjustment that can be tied to a specific event affecting the valuation of the RAB. That event was optimisation.

Where an optimisation adjustment results in a decrease in the RAB, our experience suggests that the adjustment to the value is carried out without any corresponding adjustment through depreciation. This may be applied where it is necessary to adjust the value of the business as to effect the adjustment through depreciation will not have a financial effect on the business in NPV terms. The ACCC has applied this principle in a number of TNSP decisions where assets are under-utilised or do not represent efficient investment for current demand condition. Other regulators have made similar adjustments without adjustments to the depreciation charge in order to reduce the value of the business to reflect a notion of a "brownfields" hypothetical new entrant. Therefore if an asset previously optimised out is brought back into service due to increased utilisation of the asset, then it seems fair that the re-optimisation adjustment should be considered on the same grounds as the original adjustment.

3.2.4 Application of the two alternatives

As the two alternatives have a significant value impact for a TNSP, we have considered below, the alternative treatment of these two valuation adjustment principles and where they might be used:

Adjustments involving a charge through the depreciation account **(No change in the NPV of the revenue stream)**	**Adjustments involving no charge through the depreciation account** **(Will result in windfall gains and losses)**
Correction for errors in depreciation rate (standard lives or remaining lives)	Correcting for errors in replacement cost and application of benchmark valuation methodology
Accelerating depreciation to recognise obsolescence	Correcting for errors in the physical asset data base on which the valuation methodology has been applied
Recognising changes in replacement cost	
Recognising changes that need to be reflected in prices without penalising the business (to correct for intergenerational charging issues)	

It is worth recognising that valuation adjustments can result in an increase or a decrease to the asset values and where adjustments are not reflected in a charge through depreciation, a regulated business will have an incentive to seek increases to the RAB. Correspondingly, the ACCC will be seeking to reduce the RAB in order to reduce prices to customers. Any desire by a business to open a review of the RAB to effect an increase using this approach should be tempered by the ACCC's desire to review other valuation principles which may have greater downside risk for the business than the upside potential of windfall gains.

3.2.5 Conclusion

Adjustments to valuations through the depreciation account are broadly consistent with the capital maintenance concept employed by the ACCC. It has very little effect on the NPV of the cashflows of the business as capital is returned to the investor through depreciation today or at some future time. If the business accepts the WACC allowed by the regulator then the business is indifferent to this revaluation approach.

Adjustments to the valuation other than through the depreciation account will be of concern to the regulated business. It is true that there exists the possibility of windfall gains to the business, but there is also a risk that there will be windfall losses to the business if the regulator can find reason to reduce the value of the assets. As windfall gains will result in price increases to customers, it is unlikely, based on passed experience, that the ACCC will approve material valuation adjustments.

Accordingly, it follows that compensatory depreciation adjustments should only occur where a revaluation due to changes in replacement costs has taken place. In other circumstances, such as errors in asset registers or other error corrections, no depreciation adjustment would be warranted.

4 Annuity Depreciation

4.1 Background

It is both an objective and principle of the NEC that the regulatory regime for the regulation of transmission revenues must have regard to the need to provide a fair and reasonable rate of return to TNSPs on efficient investment. This means that if the ACCC changes the real value of an efficient investment, and therefore changes the value to which a rate of return is applied, the change in the real value of the efficient investment (e.g. due to depreciation or revaluation) should equal the return of assets to the TNSP.

This principle is consistent with the financial capital maintenance concept (FCM). FCM requires that the financial value of an entity's net assets at the end of a period equals the financial value of the entity's net assets at the beginning of the period, after adjusting for any distributions to, or contributions from, the entity. Net assets, in the context of the NEC, are the financial value of efficient investment.

The above principle is likely to have an impact on another NEC principle that the regulatory regimes should create incentives for efficient investment. If the TNSPs face significant risk that asset investments will not be fully recovered through return of assets, then the TNSP will have a skewed incentive to under invest, and visa versa.

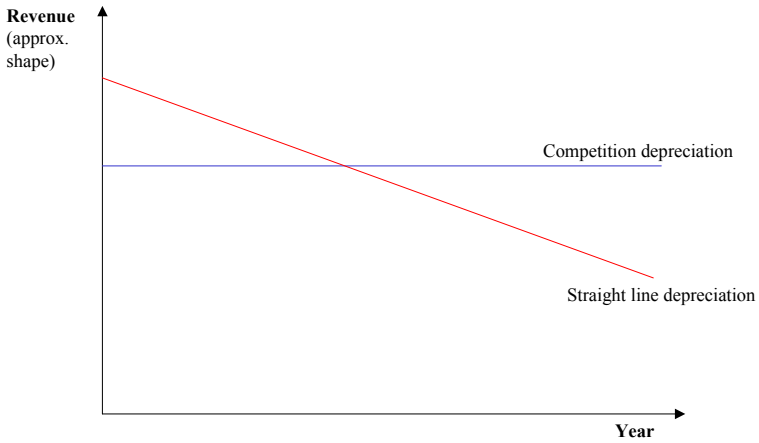
The above principles say nothing about the timing of the return of assets to the TNSP. The timing of depreciation is important because of its impact on the profile of annual transmission revenue caps, and hence on prices.

In light of this, there are three basic ways of calculating a return on assets:

- A nominal rate of return plus a linear depreciation schedule, based on historic costs.
- A real rate of return plus a linear depreciation schedule, based on current cost accounting.
- A nominal/real annuity based on a nominal/real rate of return.

Annuity depreciation is essentially the selection of a stream of payments to the business that equates to an agreed return on and of assets. It achieves the objectives of depreciation in a broad sense, in that it ensures that the investor is compensated for the value of its investment. From the economic perspective of depreciation, how the asset is depreciated does not matter as long as the investor is compensated for the full value of its investment.

The chart below contrasts the annuity versus straight-line methods of depreciation.



The ACCC has considered annuity depreciation[11] for some time in its draft statement of Regulatory Principles, however it has not employed this method in practical regulatory decisions, most of which have been prepared using a straight-line depreciation methodology on an current cost asset base.

Prima facie, Powerlink and ElectraNet do not consider that annuity depreciation offers significant benefits to the appropriate determination of revenues for transmission service providers. Powerlink and ElectraNet asked us to consider three points in order to consider this issue in detail:

- Whether the use of annuity depreciation offers the TNSP a materially different revenue stream when compared to straight line depreciation; and
- Complexity of calculating annuity depreciation in a practical sense.

4.2 Impact of annuity depreciation – materiality

It is unlikely that the use of annuity depreciation would impact materially on revenue streams, compared to conventionally used straight-line depreciation / return on asset depreciation[12]. This is because:

[11] Annuity depreciation is sometimes referred to as competition depreciation.

[12] We have reached this conclusion on the basis that a mature portfolio of assets, with no expansion of services and no technological change, will exhibit a steady state real written down value and weighted average age of the asset base over the long term.

- Asset-related transmission revenues, calculated by conventional straight-line methods, account for about 10% of total electricity costs paid for by end users[13]. While this of itself is a reasonable proportion of the end use customer bill, the increment between annuity and straight-line depreciation costs is not likely to impact on annual regulatory returns to any significant degree. The ACCC's focus on this issue highlights its ongoing push for greater prescription for its own sake. As a illustration, the customer's own demand variability is likely to produce fluctuations which are more significant than that which might be attempted to be removed by annuity depreciation;
- Over the long term, the return of, and on assets satisfies the capital maintenance principle under both methods of calculation. This is because both methods of calculation will provide for assets to be replaced at the end of their useful life, with only the timing of the payments differing under each option. Given that mature transmission networks tend not to have significant fluctuations in straight line depreciation calculations due to the size of capital expenditure relative to the existing network asset base, straight-line depreciation / return on asset approach is likely to deliver a relatively constant real asset-related revenue stream. In saying this, we acknowledge that, by leveling the capital charge the (real) annuity method assists intergenerational equity (users at different dates make same payment for one unit of service; under straight line, earlier generations pay more than later generations). This has been discussed on a number of occasions in the US regulatory literature, however US practice continues to favor straight line.

The principle of over precision is also relevant to this issue. The Productivity Commission noted that[14] *a sensible goal should be to improve significantly on unregulated outcomes, while recognising that precision is not possible.* In our view, the long-term immateriality of annuity depreciation, compared to straight-line depreciation, is another example of undue precision in regulation, without corresponding increases in regulatory outcomes.

4.3 Complexity

While the annuity approach to calculating returns on and of capital is conceptually simple, its practical application is likely to be more complex than straight-line depreciation and require the resolution of a number of difficult issues. Many of these issues do not arise in the calculations under a straight-line approach, and relate both to the precise annuity formula to be adopted in the final approach, and the inputs into the annuity formula. These are not clearly defined and would be subject to considerable judgement in the implementation of an annuity approach.

[13] The Electricity Supply Association of Australia indicates the revenues of government-owned electricity businesses in 2001/02 in *Electricity Australia 2003*. Based on this, transmission revenues in Queensland, NSW/ACT and Tasmania are about 14% of total electricity revenues in those states. Asset-related revenue accounts for about 75% of transmission costs.

[14] PC Inquiry Report

The complexity of using annuity depreciation derives from a number of issues, some of which are discussed below:

- Annuity depreciation formulae are not intuitive. By way of observation, there is an error in the annuity formula for integrating technological change in the ACCC's Draft Statement of Principles for the Regulation of Transmission Revenues (Box A5.1 on page 66) that appears to illustrate that the ACCC has had its own difficulties in the practical application of the annuity depreciation approach**.**
- In order to practically implement an annuity approach, the ACCC and industry will need to agree on the way in which many issues will be dealt with. Some of these philosophical issues include, but are not limited to:
  - How the ACCC's particular approach in relation to annuity depreciation will remain consistent with the concept of financial and operational capital maintenance. Straight-line depreciation is in our opinion consistent with the financial capital maintenance approach as currently implemented and provides a workable benchmark for setting regulatory outcomes;
  - How the ACCC will determine the basis for the written down value of assets at the time of the transition between the straight line and annuity approaches. We note that straight line depreciation is well entrenched in TNSP systems and there will be no transition issues if this were to remain;
  - How the ACCC will determine the level of asset class at which the annuity approach would be applied, and in particular how averaging would be applied to account for different classes of assets. We note that definition of asset classes and the issue of averaging can be calculated relatively easily under the straight line depreciation approach as the averaging principles are linear;
  - Whether a tilted annuity would be applied, and if so how and whether it would incorporate an agreed rate of technological change. The rate of technological change would need to be adjusted in future on some basis to be agreed by the ACCC and TNSPs. We note that straight-line depreciation is relatively easily understood, and any accelerated depreciation for technological change can be carried out through adjustment to the remaining lives of those assets;
  - How the annuity approach would be applied to the written down value (WDV) of assets or the optimised replacement cost (ORC) of assets. Straight-line depreciation is deducted from the written down value. Calculation of straight-line depreciation is relatively easy through the determination of average remaining life based on WDV or ORC averaging. Further, having established a commissioning date it is a relatively easy and logical process to calculate a WDV for any particular year under the straight-line approach; and

- How the method of annuity depreciation would adjust for changes in WACC over time, particularly given that changes in WACC will change the rate of the annuity return at a point in time. The calculations to be employed to derive the asset value remaining at the time the WACC changes are more complicated than the straight-line approach, and may become more complicated with asset averaging for a limited number of classes. Straight-line depreciation, by comparison, allows for a relatively simple calculation of the written down value at a point in time. This can then be used to derive a return on assets through application of the relevant WACC.

Overall, there is significant regulatory precedent, although always room for debate, in resolving such issues within a straight-line depreciation approach. There is, by contrast, little precedent for such resolution in the annuity approach.

Further, with revenue resets generally being conducted at five-year intervals, there is likely to be considerable complexity associated with the annuity calculations being reset at the beginning of each five years. The reset process will need to consider at the very least, how it might adjust for differences in capital expenditure between forecast and actual expenditure achieved, differences in WACC and CPI and the complexities of averaging for the forecasting necessary to deliver a determination. It is difficult to see how the complexities associated with applying these issues through an annuity depreciation approach will deliver a benefit to the determination of revenues under a building block approach.

4.4 Summary

In summary, we consider that:

- The differences between the annuity and straight line depreciation models is not likely to be material to TNSPs; and
- The annuity depreciation model is far more complex than the conventional straight line depreciation method, primarily because of the lack of precedent in resolving key practical and implementation issues with the annuity approach. Resolving these between industry and regulators will be a lengthy process, after which time a judgement call on the benefits of the approach could be better made.

Given these factors, it is unlikely that the selection of an annuity depreciation method would satisfy section 6.2.2 of the NEC, which notes that the regulatory regime to be administered by the ACCC should achieve an efficient and cost effective regulatory environment. Even in the absence of such a provision, it seems sensible to allow TNSPs with the flexibility to approach annuity depreciation at their own pace, and subject to the appropriateness of the method to their own business.

Appendix C

NERA Report: Statistical Estimation of Equity Beta

EVALUATION OF THE ACCC'S PROPOSED APPROACH TO STATISTICAL ESTIMATION OF EQUITY BETAS FOR TNSPS

A Report for TransGrid

Prepared by NERA

November 2003
Sydney

Project Team:
Tom Hird (Ph.D.)
Prof. Bruce Grundy – Special Consultant

n/e/r/a
National Economic Research Associates
Economic Consultants

Level 6, 50 Bridge Street
Sydney NSW 2000
Australia

Tel: (+61) 2 8272 6500
Fax: (+61) 2 8272 6549
Web: http://www.nera.com

An MMC Company

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1 INTRODUCTION

TransGrid, on behalf of other transmission network owners, has asked NERA to comment on the Australian Competition and Consumer Commission's (ACCC's) preferred position on estimating the equity beta for Transmission Network Service Providers (TNSPs) as outlined in its recent *Review of the Draft Statement of Regulatory Principles Discussion Paper*. TransGrid has asked NERA's view on the relative merits of the ACCC's preferred approach in the context of the regulatory framework and good regulatory practice. TransGrid has also asked NERA to assess the practical difficulties in codifying the 'ACCC's preferred position' in order to ensure that a common understanding exists of how this position would be implemented.

The remainder of this report is set out as below. We attempt to keep the first three sections as factual as possible with the last section providing a summary of NERA's assessment of the merits of the ACCC's approach.

- Section 2 outlines the ACCC's preferred approach and examines the statistical procedures used in arriving at the empirical estimates reported in the ACCC's discussion paper;

- Section 3 examines the difficulties that would be encountered if the ACCC's preferred approach were to be implemented. This section also addresses the difficulties that would exist in codifying the approach in a manner that provides an adequate level of certainty as to what the ACCC's preferred approach would mean in practice;

- Section 4, examines the a priori view expressed by the ACCC that the equity beta for TNSPs should be less than one;

- Section 5 provides a summary of NERA's views on the relative merits of pursuing the ACCC's preferred approach; and

- Attachments A and B provide further support for arguments advanced in the body of the report.

2 THE ACCC's PREFERED POSITION

2.1 The ACCC's Preferred Position at a Conceptual Level

The ACCC outlines a range of issues relating to determining the appropriate equity beta for TNSPs in section 8.7 of its Discussion Paper. In that section the ACCC states that its current approach of providing an equity beta of 1 is, in its view, likely to be conservative and that there are good reasons to believe that the true equity beta for TNSPs is below 1. In this regard the ACCC notes that:

> *"An βe of less than one intuitively seems more appropriate for regulated electricity networks in Australia given the level of market risk which they face. These firms are regulated entities guaranteed a revenue stream and the demand for its essential services is inelastic."* Page 76.

In support of this position the ACCC references a report from the Allens Consulting Group that:

> *"… suggested an βe for Australian gas transmission companies of just below 0.7 based exclusively on market evidence, with the corresponding figures for the US, UK and Canada all below 0.2.52 The report advised that caution should be taken with the data from overseas, as equity returns were compared with markets outside Australia, subject to different tax and regulatory regimes. The paper's results provide supporting evidence for the notion that the βe for Australian utilities is overstated at a value of one."* Page 76

The ACCC then goes on to perform its own statistical analysis using estimates of the beta values for 'comparable' Australian companies. This analysis appears to support the view that the equity beta for regulated businesses is likely to be lower than 1. However, the ACCC notes that their sample of comparable businesses is small and that, in this context, it may be appropriate 'build in' a confidence interval based on the sample data.

> *"According to Davis, the size of the comparator firms trading in the Australian market does not seem sufficient to currently justify its use as the sole input for beta estimation. It is however a relevant source of information about beta values which should not be ignored. To the extent that sample market data indicate a substantial reduction from the typically assumed βe of one, the Commission is conscious that a transitional/cautious approach may be required such that the Commission take a conservative view to adopting a market based proxy βe.*
>
> *"One approach is to construct a statistical upper confidence interval based on the sample data. Table 5.2 provides an example of calculating a t-student distribution for upper 95% and 99 % confidence betas."* Page 78.

This is essentially the ACCC's preferred position as confirmed by the ACCC in its concluding statement:

> *"The Commission's initial view is to move towards benchmarking an equity beta from current market evidence and incorporating an upper confidence interval."* Page 81

The ACCC does not directly discuss detailed implementation of this preferred position presumably with a view that later rounds of consultation would address such issues (eg, the process for determining comparable firms etc). We address these issues in Section 3 of this report. However, the ACCC does provide some insight into its thinking on these issues in the empirical work it provides to illustrate how its approach may work. This empirical work is summarised in table 5.2 of the Discussion Paper which is reproduced in full below.

Table 1: ACCC Discussion Paper, Table 5.2 Upper 95 % and 99 % confidence betas

		June 02 AGSM data	Sept 02 AGSM data	Dec 02 AGSM data
Core Sample	Re-levered average β_e	0.30	0.17	0.19
	Standard deviation	0.1103	0.0583	0.0890
	Number in sample	5	5	5
	95 % $t_{(\alpha/2)}$	2.776	2.776	2.776
	95 % confidence β_e	**0.44**	**0.24**	**0.30**
	99 % $t_{(\alpha/2)}$	4.604	4.604	4.604
	99 % confidence β_e	**0.53**	**0.29**	**0.37**
Combined Sample (core and additional firms)	Re-levered average β_e	0.51	0.36	0.33
	Standard deviation	0.4140	0.3078	0.2548
	Number in sample	9	9	9
	95 % $t_{(\alpha/2)}$	2.306	2.306	2.306
	95 % confidence β_e	**0.83**	**0.60**	**0.53**
	99 % $t_{(\alpha/2)}$	3.355	3.355	3.355
	99 % confidence β_e	**0.97**	**0.70**	**0.61**

The ACCC's 'core sample' consists of 5 firms with significant regulated revenues (Australian Pipeline Trust, Envestra, Alinta Gas, Australian Gas Light and UnitedEnergy) while the 'combined sample' includes additional firms that are considered to be 'less comparable' but still 'comparable' (Transurban, Macquarie Infrastructure, Auckland International Airport, Hills Motorway Group).

The ACCC considers that this analysis supports their view that the appropriate equity beta for TNSPs is less than 1 because not only are the mean estimates of the equity beta below 0.52 in all periods and for both groups but so are the 99% confidence equity beta estimates below 1 for both samples and in both periods.

2.2 The ACCC's Practical Estimation of an Upper Bound βe

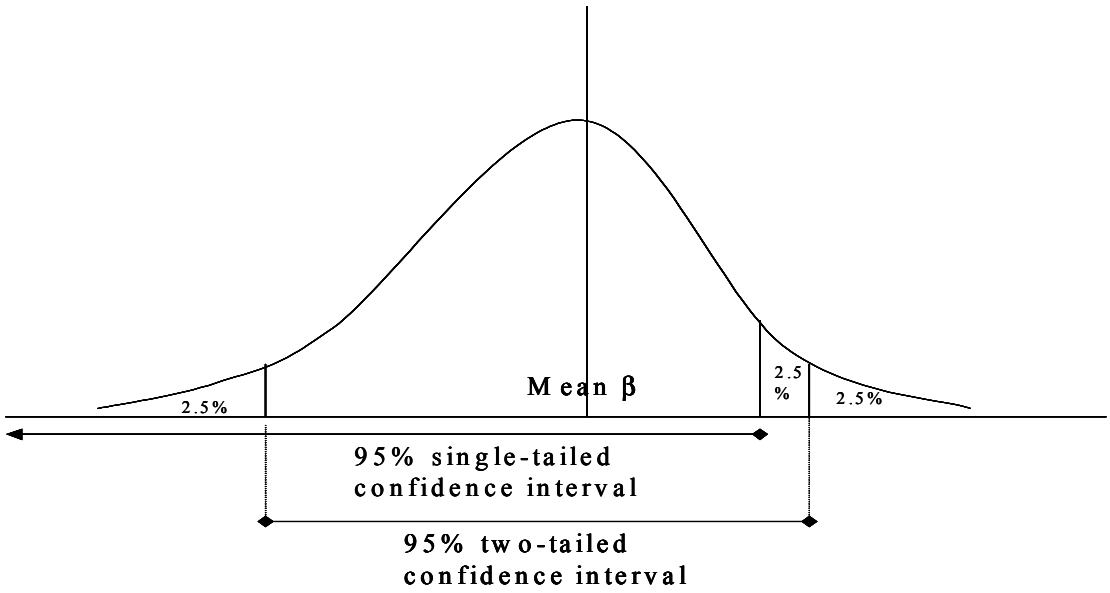
There appears to be two statistical errors in the ACCC's calculation of the upper bound estimate of the βe under different confidence levels. The first of these arises from the fact that the ACCC has used a two-tailed confidence interval to establish a single-tailed upper bound probability. Calculating a one-tailed upper bound estimate tends to reduce the upper bound on the βe relative to the ACCC's estimates. The second error arises from the fact that

the ACCC has reported an upper bound estimate of the *population mean for comparable firms* rather than the upper bound estimate of the βe for *an individual firm* (such as an individual TNSP). Calculating an upper bound estimate for TNSP's βe tends to increase the βe above the ACCC estimates.

2.2.1 Calculating one-tailed confidence for the upper bound

In calculating the relevant 95% upper bound estimates of βe the ACCC assumes that the relevant statistic is distributed according to a student-t distribution. The ACCC then adopts the 'critical value of t' such that the probability that the true value of is either above the upper bound or below an analogous lower bound is only 5%. However, in setting a 95% confidence upper bound we are interested in establishing the value of the statistic where there is only a 5% probability that the true value is above that level. Consistent with this definition of an upper bound the ACCC's 95% confidence β_e is, in reality, a 97.5% confidence upper bound. This is because there is only a 2.5% probability that the statistic's true value is above this level. (Of course, there is also a 2.5% probability that the true value of βe is below an analogous lower bound.)

This can be explained graphically. **Graph 1**



The ACCC's estimate of the 95% confidence upper bound on βe involves setting a value that ensures that there is only a 2.5% probability that the true value of βe is outside a range around the sample mean estimate. The 'correct' 95% confidence upper bound on βe involves setting a value for the statistic that ensures there is only a 5% probability that the true value is above this level. Consequently, the correct 95% confidence upper bound is less than the ACCC estimate.

In terms of the actual calculations, the ACCC's "core" and "combined" samples have degrees of freedom of 4 and 8 respectively. Using this information to determine the critical t values and the associated upper bound estimates we have the following correct equations for the upper bound:

confidence upper bound βe	=	Sample mean βe + $t_{(\alpha)}$ *Standard deviation of statistic	(1)
95% confidence upper bound βe for core sample	=	Sample mean βe + 2.132*Standard deviation of statistic	(2)
95% confidence upper bound βe for combined sample	=	Sample mean βe + 1.860*Standard deviation of statistic	(3)

By contrast, instead of using critical t values of 2.132 and 1.860, the ACCC has used critical t values of 2.776 and 2.306 (see Table 5.2 of the discussion paper reproduced above).

2.2.2 Calculating the upper bound for TNSPs

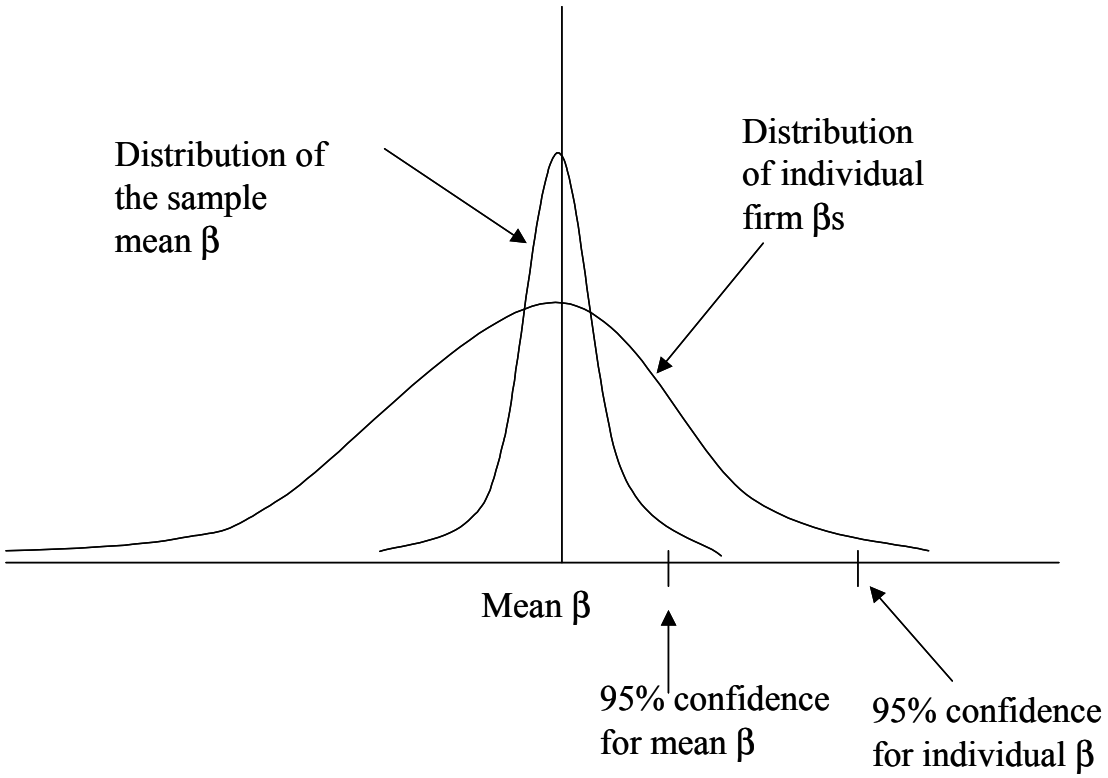
A further error in the calculations in Table 5.2 of the discussion paper is that rather than calculating the upper bound estimate for *an individual TNSP's equity beta*, they have calculated the upper bound estimate for *the mean of the population of all comparables*. That is, when the ACCC states a 95% confidence upper bound estimate of the equity beta what it is really saying is that it is 95% confident that *the mean of all comparable firms' equity beta* is below that level.

The impact of this is illustrated graphically below. Assume that a sample of comparable firms' equity betas are estimated and that a sample mean is calculated. The 'wide' distribution in the graphic below is a depiction of the probabilistic distribution of equity betas for *comparable firms* not in the sample. The most likely value for any such firm's equity beta is the sample mean. However, the expectation is that some equity betas of firms not in the sample are higher than the sample mean while other equity betas are lower.

The 'thinner' distribution is the distribution of the possible values for the *population mean*[1] given the sample mean that has been observed. This distribution is 'thinner' because we can be more certain that the sample mean is a good approximation for the *population mean* equity beta than we can be that the sample mean is a good approximation of *any individual firm's* equity beta.

[1] That is, the mean of all comparable (in and out of the sample) firms' equity betas.

Graph 2



Algebraically, we can see the difference between the 95% confidence upper bound for the population mean and for the βe of an individual firm by examining the formula for the standard deviation for the sample mean versus the standard deviation of the difference between an individual firm's βe and the sample mean.

Standard deviation of the sample mean βe = $\frac{\sigma}{\sqrt{n}}$

Standard deviation for the difference between an individual firm's βe and the sample mean βe = $\sigma\sqrt{1+\frac{1}{n}}$

σ is is the cross sectional standard deviation of beta values in the population and n is the size of the sample used to calculate the sample mean.

Substituting these values into equation 1 and replacing σ by its sample estimate S gives:

95% confidence upper bound βe for *population mean βe* = Sample mean βe + $t_{(\alpha)} * \frac{S}{\sqrt{n}}$ (1′)

95% confidence upper bound βe for *TNSP βe* = Sample mean βe + $t_{(\alpha)} * S\sqrt{\frac{n+1}{n}}$ (1′′)

The ACCC uses the standard deviation of the sample mean (ie, equation 1') to calculate the upper bound βe rather than equation 1''. Clearly, the 95% upper bound for the population mean βe collapses to the sample mean as the sample size grows large, but the upper bound for an individual firm's βe approaches the sample mean βe plus 1.860*S as the sample size grows large. This is an unsurprising result because, as the sample size approaches infinity, the sample and the population become the same thing. Consequently, we know the population mean is equal to the sample mean with 100% certainty (ie, the confidence interval for the population mean is zero). On the other hand, the cross-sectional standard deviation of the sample becomes the standard deviation of the population – which must be used to estimate the confidence level for any individual observation from within that population (such as the confidence interval associated with a TNSP's equity beta).

So far in this section we have established that the ACCC's Table 5.2 establishes the upper bound standard deviation for the population mean but we have not directly addressed why we regard this as an 'error'. In order to explain this we note that it is necessary to answer the question why the ACCC is calculating an upper bound? We are only aware of one answer to this question which can be put as follows:

> *"The calculation of an upper bound is necessary because the negative consequences of underestimating a TNSP's equity beta are more severe than the negative consequences of overestimating a TNSP's equity beta."*

If this were not the case then it would be inappropriate to set the regulatory beta at anything other than the sample mean (ie, there would be no reason for erring on one side of the mean than for erring on the other). Accepting this explanation, it follows axiomatically that the appropriate upper bound is the upper bound associated with *a single firm* not with the *value of the population mean of all firms*. As already discussed, as the sample size grows the ACCC's calculations gives an equity beta that approaches a probability of roughly 50% that the value calculated is below any single firm's true equity beta.

2.2.3 The impact of correcting errors in calculation of the upper bound

The analysis in the discussion paper appears to have led the ACCC to believe that its preferred approach would result in an equity beta that is, on average, below 1. Table 5.3 in the discussion paper illustrates the potential impact of equity beta values of 0.70, 0.80 and 0.9 on ElectraNet allowable revenues. It is relatively easy to see how the ACCC may have come to the conclusion that its preferred approach would reduce the equity beta below 1. In table 5.2 of the discussion paper all upper bound equity beta's are below 1 – even at the 99% confidence interval.

However, correcting the upper bounds in the ACCC's Table 5.2 has the net effect of considerably increasing the upper bound estimates of βe. We report below the upper bound estimates for three confidence levels derived from data reported for the ACCC's "combined sample".

Table 2: Correctly estimated upper bounds equity beta based on AGSM data (combined sample)

	June 02	Sept 02	Dec 02	Average
95.0% upper bound	1.33	0.97	0.83	**1.04**
97.5% upper bound	1.52	1.11	0.95	**1.20**
99.0% upper bound	1.78	1.31	1.11	**1.40**

These estimates of the upper bound are clearly significantly in excess of the ACCC estimates of the upper bound outlined in the ACCC's Table 5.2 reproduced above (these averaged 0.65). If a 95% upper bound were calculated the average equity beta upper bound over the three periods used by the ACCC in the Discussion Paper would still be equal to 1.04. If any higher confidence interval were used then the average equity beta would be significantly above 1.00. We also provide a fully amended version of the ACCC's Table 5.2 below.

Table 3: Amended Version of Table 5.2 in the ACCC Discussion Paper to Correct Calculation Errors

		June 02 AGSM data	Sept 02 AGSM data	Dec 02 AGSM data
Core Sample	Re-levered average β_e	0.30	0.17	0.19
	Standard deviation	0.1103	0.0583	0.0890
	Number in sample	5	5	5
	95 % $t_{(\alpha)}$	2.132	2.132	2.132
	95 % confidence β_e	**0.56**	**0.31**	**0.40**
	99 % $t_{(\alpha)}$	3.747	3.747	3.747
	99 % confidence β_e	**0.76**	**0.41**	**0.56**
Combined Sample (core and additional firms)	Re-levered average β_e	0.51	0.36	0.33
	Standard deviation	0.4140	0.3078	0.2548
	Number in sample	9	9	9
	95 % $t_{(\alpha)}$	1.860	1.860	1.860
	95 % confidence β_e	**1.33**	**0.97**	**0.83**
	99 % $t_{(\alpha)}$	2.896	2.896	2.896
	99 % confidence β_e	**1.78**	**1.31**	**1.11**

3 IMPLEMENTATION ISSUES

This section outlines a number of implementation issues that would have to be addressed each time the ACCC's preferred approach could be implemented. The approach to these issues would have to be codified before a common understanding of the ACCC's preferred position could be established and reflected in the SRP. Each of the remaining subsections addresses one of the below issues:

- uncertainty surrounding the CAPM;
- selection of comparables
- sampling periods/intervals and adjustments for thin trading;
- circularity in the analysis as a result of regulatory decisions affecting observed equity beta and *vice versa*; and
- questions concerning the AGSM beta estimates.

3.1 The CAPM Framework

Prior to entering into any statistical procedures designed to estimate the upper bound of CAPM parameters such as βe it is important to recognise that there is a great deal of uncertainty as to whether the CAPM itself is an accurate reflection of what determines investor behaviour. Consequently, it is possible to imagine a situation where there was sufficient data to accurately estimate every CAPM parameter in the recent past, but to still be highly uncertain what the true required WACC was for a TNSP.

That is not to say that we can suggest a better conceptual framework to work within when estimating the required WACC for TNSPs – no such agreed framework exists in the literature on finance theory. However, it should be recognised that the framework that we do have is not perfect for understanding investor behaviour. For example, the CAPM does not recognize the return required from an asset will depend in part on the covariance between that asset's return and future investment opportunities in the economy. The CAPM is a one-period model in which the only risk is that of covariance between the asset's return and the contemporaneous return on other assets—there are no future investment opportunities. Ross, Westerfield and Jaffe (1999) note in their graduate text that :

> *"However, one must never forget that, as with any other model, the CAPM is not revealed truth but, rather, a construct to be empirically tested. The first empirical tests of the CAPM occurred over 20 years ago and were quite supportive. …While a large body of work developed over the following decades, often with varying results, the CAPM was not seriously called into question until recently. Two papers by Fama and French (…) present evidence inconsistent with the model. Their work has received a great deal of*

> *attention, both in academic circles and in the popular press, with newspaper articles displaying headlines such as "Beta Is Dead". These papers make two related points. First they conclude that the relationship between average return and beta is weak over the period from 1941 to 1990 and virtually non-existent from 1963 to 1990. "*[2]

If upper bound estimates of the required WACC are to be derived within a CAPM framework then it would be appropriate to take account of uncertainty surrounding the explanatory power of the CAPM as well as any uncertainty associated with statistical estimates of individual parameters. That is, while we may not have a better theory than the CAPM to work within, we should recognise that we are nonetheless uncertain that the CAPM correctly describes reality.

When we can not be certain as to the factors that do explain differences in required and expected returns, then the catholic response is to assume that the required return on all stocks are equal. Using a beta of 1 in the CAPM yields a required return equal to the expected return on the market. The CAPM with a beta of 1 is simply a way of saying that one expects the same return from this stock as one expects from the typical stock in the economy.

3.2 Selection of Comparables

Sample selection is a critical component of any statistical methodology. This is particularly so in the current context where the ACCC has only identified five businesses in the 'core sample' and, consequently, has relied on 'additional firms' that the ACCC appears to regard as 'less comparable' but still 'comparable'. This raises three main questions:

- how is the distinction between the core and additional firms to be made? For example, is it obvious that AGL with its significant retail and international exposure should be included in the core group but that Transurban should not?

- what criteria is to be used to determine firms that qualify as 'additional but non-core' comparables?

- what criteria is to be used to determine the total sample size (ie, how many firms from the 'additional but non-core' comparables should be included in a combined sample)? If less than all 'additional but non-core' comparables are to be included in the core sample what criteria is to be used to determine which are included and which are excluded?

This problem is intensified when it is recognised that four of the five firms in the ACCC's 'core sample' have significant cross-ownership such that it is arguably inappropriate to

[2] Ross, Westerfield and Jaffe (1999), Fifth edition, *Corporate Finance*, McGraw-Hill, pp 269-270.

regard them as five independent observations. Note that the upper bound on βe is greater than that given in equations (1′) and (1′′) when the sample mean used in creating that upper bound is itself calculated from observations that are not independent. This is due to the fact that the standard deviation of a sample mean calculated from n observations that are not independent is in fact greater than $\frac{\sigma}{\sqrt{n}}$. It can be as large as σ.

In particular, AGL has a minimum equity investment of 30% in APT and UnitedEnergy was a 'foundation shareholder' in AlintaGas. In any event, UnitedEnergy was recently sold (with the sale process significantly affecting variance in its share price over the period estimated by the ACCC) and future observations of UnitedEnergy will not be available. This suggests that, at best, there were only three independent observations within the core sample during the period examined by the ACCC. Moreover, APT's first monthly return was only available in July 2000 and AlintaGas October 2000 - leaving less than the AGSM's recommended four years for observations. On the other hand, in the future a longer time series for GasNet will be available and this firm, as a regulated Australian business, should be able to join the 'core sample'. Nonetheless, this will only provide four observations within the ACCC's core sample.

To see the implications of removing UnitedEnergy and APT from the sample (to ensure all observations are independent) we recalculate the estimates in Table 5.2 of the ACCC's discussion paper with these observations removed from the analysis.

Table 4: Amended Version of Table 5.2 in the ACCC Discussion Paper to Correct Calculation Errors and to Remove Interdependent Observations

		June 02 AGSM data	Sept 02 AGSM data	Dec 02 AGSM data
Core Sample	Re-levered average β_e	0.30	0.16	0.16
	Standard deviation	0.1531	0.06027	0.06245
	Number in sample	3	3	3
	95 % $t_{(\alpha)}$	2.92	2.92	2.92
	95 % confidence β_e	**0.81**	**0.36**	**0.37**
	99 % $t_{(\alpha)}$	6.065	6.065	6.065
	99 % confidence β_e	**1.37**	**0.58**	**0.60**
Combined Sample (core and additional firms)	Re-levered average β_e	0.57	0.41	0.36
	Standard deviation	0.4579	0.3359	0.2835
	Number in sample	9	9	9
	95 % $t_{(\alpha)}$	1.943	1.943	1.943
	95 % confidence β_e	**1.52**	**1.11**	**0.94**
	99 % $t_{(\alpha)}$	6.065	6.065	6.065
	99 % confidence β_e	**2.11**	**1.54**	**1.31**

The impact of removing UnitedEnergy and APT is to significantly increase the upper bound estimates of equity betas.

It is not obvious to us that there is any non-arbitrary answers to the previously outlined three questions. We would be keen to respond to any proposals from the ACCC on how they would envisage the sample selection process proceeding. However, we believe that it would inevitably be a somewhat arbitrary process. This exposes he regulated businesses to significantly higher variability in their allowed rate of return. It is quite possible to foresee the situation where the inclusion of one comparable and not another could halve/double the estimated upper bound equity beta derived from a small sample.

3.3 Thin Trading, Sampling Period and Sampling Interval

3.3.1 Thin trading

If a stock is 'thinly traded' then information that affects the observed returns to other stock may not show up in the observed returns to the thinly traded stock until the following sampling interval. For example, if the sampling interval is monthly returns and a stock is only lightly traded at the end of the month then information that may have affected the market late in the month may not yet be observed in the individual stock's share price. Consequently, running a simple contemporaneous OLS regression will incorrectly attribute a lower beta to that stock as it will not recognise the fact that the information is only reflected in the stock's share price with a lag.

There are standard statistical techniques for dealing with these issues that involve using lagged and leading variables in the relevant regressions (eg, Scholes-Williams beta estimates). However, while such beta estimation procedures have a more accurate expected value (because they remove thin trading bias) the variance associated with this form of statistical procedure, for any given data set, is higher because more parameters, namely the leading and lagged relation as well as the contemporaneous relation, have to be estimated from the same amount of data.

The AGSM deals with this trade-off between the bias in the beta estimate and the standard error of the estimate by reporting both ordinary OLS regressions and Scholes-Williams beta estimates for the same time period. The AGSM then reports a test for whether the Scholes-Williams beta estimate is statistically different to the OLS beta estimate. If it is, the AGSM recommends use of the Scholes-Williams beta estimate. The downside of adopting such an approach is that it introduces a bias into the beta estimates (as Scholes-Williams beta estimates are not universally used). The upside is that the variance of the estimates is dramatically reduced. (We note that the ACCC's consultants the Allen Consulting Group used the AGSM thin trading beta of 0.93 and not the OLS beta of 0.44 in its July 2002 report to the ACCC.[3])

[3] Empirical Evidence on Proxy Beta Values for regulated Gas Transmission Activities.

While this trade-off may be appropriate for the main purposes to which the AGSM data is to be used it is not obvious that it is appropriate for the purpose to which the ACCC proposes to use the data – ie, to set returns for regulated businesses. An alternative approach would be to use Scholes-Williams estimates of the beta universally. In general, one could also consider the possibility of increasing the number of observations by extending the sampling period beyond four years and/or reducing the sampling interval to less than one month.

By way of example of the magnitude of the impacts, NERA has run its own regressions to compare the use of ordinary OLS and Scholes-Williams regressions on the estimated equity betas for the ACCC's core sample. Using the same 4 year sampling period with a monthly sampling interval and using the All Ordinaries as the market portfolio we calculate the following upper bounds.

Table 5: Comparison of OLS with Scholes-Williams Beta Estimates

(up to) 4 years ending	Jun 02	Sep 02	Dec 02	Mar 03	Jun 03	Sep 03
95% upper bound using simple OLS	0.78	0.49	0.46	0.54	0.65	0.58
95% upper bound using thin trading	1.37	2.47	1.04	1.36	1.19	1.11

The Scholes-Williams (thin trading) upper bounds are considerably larger than the OLS estimates. This is largely driven by the higher variance in the estimated sample interacting with the calculation of the upper bound estimate. However, this higher variance should be reduced if a longer time period were used (or, indeed, if APT and AlintaGas had been traded for the full four year periods).

3.3.2 The sampling period and interval

The appropriate sampling period and interval are important issues in their own right (not just in relation to the thin trading issue). Assuming that the beta is constant over the sampling period, the longer the sampling period the greater the number of observations and the greater the accuracy of the estimates. However, if the beta is not constant over the sampling period using longer sample periods may bias the results – although the direction of any bias is unclear unless there is reason to believe the beta has moved in a particular direction.

The optimal length of the sampling interval (eg, monthly versus weekly) is quite complex. While it looks at first blush as if monthly observations mean we have a smaller number of observations available for any given sampling period, monthly observations will largely aggregate weekly results. For example if we estimate the mean continuously compounded return per annum on some stock using weekly observations rather than monthly

observations over the same sample period we would obtain the same estimate.[4] But the longer the sampling interval the less pronounced will be any thin trading effects.

The AGSM results are derived using a four-year (or shorter) sampling period and a monthly sampling interval (ie, a maximum of 48 observations). The AGSM appears to have taken the view that a relatively short sampling period (4 years) is an appropriate compromise between the desirability of maximising observations while preventing bias as a result of changing beta values over time.

The AGSM may well have correctly calculated this trade-off taking into account the purpose for which its average customer base wants these values. However, the AGSM's approach is a mass produced product aimed at delivering equity beta estimates for around 1,400 entities. The ACCC requires data on equity betas for a highly specialised purpose and where accuracy is of great importance to the operation of the essential infrastructure industries in Australia. It is by no means obvious that the AGSM data strikes the appropriate balance given the ACCC's intended use of the data.

For example, many users of the AGSM data are interested in calculating the average beta of a large portfolio of investments while the ACCC is interested in calculating the individual betas of a small number of 'comparables'. In a large portfolio inaccuracies tend to 'cancel out' and the overall accuracy of the portfolio's beta estimate will be little affected. This is not the case under the ACCC's preferred approach. Moreover, there may be many reasons why the equity beta of unregulated businesses can change over time (eg, changes in the nature of operations/acquisitions and changed market structures such as the entry of competitors). The reasons why a regulated businesses equity beta may change over time are fewer. Moreover, in the process of selecting comparable companies it would, in theory at least, be possible to determine whether there was any reason to expect its equity beta had changed over the desired sampling period.

3.3.3 Conclusions

The above are important issues in establishing the appropriate statistical procedures to use in the ACCC's preferred position. They also serve to highlight the problems associated with the ACCC simply adopting beta estimates from 'an independent source'.

In the context of something as important as setting regulated returns, if the ACCC were to implement its preferred position it could reasonably be expected to develop an understanding of the statistical procedures that it believes best serves the purpose to which it intends to put the results. The ACCC would then be expected to acquire the relevant raw data and to provide this publicly alongside its statistical analysis for all interested parties to replicate. Relying on published AGSM results without the raw data would lack an

[4] Continuously compounded returns are such that the total return over a given year is equal to the sum of the monthly returns which is equal to the sum of the weekly returns and the sum of the daily returns over that year.

appropriate level of transparency and would run the risk of problems in the AGSM results not being subject to scrutiny by affected parties.

3.4 Circularity and Feedback

The use of statistical procedures to set the equity beta for regulated firms may introduce circularity/feedback into the regulatory process. This will be true where the firms included in the sample used to determine the regulated beta have that regulated beta applied to them.[5] There are three implications of such an approach:

- first, there is an artificial incentive created for regulated businesses in the sample to take on more systemic risk;
- second, the possibility exists that regulatory decisions/announcements will affect the beta that is later observed; and
- a cycle will be established where the equity beta will be high in one period and low in the next and so on through time.

3.4.1 Incentive to take on systemic risk

Under the ACCC's preferred approach it would appear that if regulated businesses take on systemic risk, which increases their observed beta, then they will be fully compensated for this. If this is the case, regulated businesses will have a strong incentive to take on systemic risk. This is because they would effectively be compensated twice for the same risk.

By way of example, imagine a regulated business negotiating the contract for supply of particular inputs into the business. The price they have to pay in that contract will depend on, amongst other things, the systemic risk properties of the contract. If the contract leaves the supplier with the majority of the systemic risk (eg, the contract stipulates the contract price varies with the price of copper on the world market and there is no minimum quantity the regulated business must purchase) the regulated business will have to pay a higher price for the inputs than if the regulated business took on the systemic risk (eg, a fixed price and a fixed quantity contract). In this situation the regulated business would have an incentive to take on the systemic risk because not only would it receive a lower (expected) price on the contract[6] but would also receive a higher compensation for WACC (as its observed equity

[5] In the ACCC's current core sample, the ACCC directly regulates only APT. However, GasNet is an obvious candidate for future inclusion in the core sample as its trading history extends over time. Moreover, if a future energy regulator were to also adopt such a statistical approach then all firms in the core sample would have their equity beta set according to, at least partially, their observed equity beta.

[6] Under incentive regulation it should benefit from this lower price in the form of a lag between when it is achieved and when it is passed to customers.

beta would tend to increase). The same issues would apply to contracting with regulated businesses' customers.

Of course, the most obvious way to increase a company's observed beta would be to trade in financial derivatives. While taking significant trading positions in financial derivatives should render such companies as 'non comparable', this would require the ACCC to understand what these positions were. For example, how would the ACCC determine whether AGL's electricity market hedging position in Australia and New Zealand meant that it no longer qualified as a 'comparable'?

3.4.2 Regulators creating the beta they observe

The possibility would also exist for the timing of regulatory decisions to have an important affect on the observed beta. If the regulator happened by chance over a four-year sampling period to time announcements that had a negative impact on businesses' share prices in months when the market was 'up' then this would tend to create a negative beta that the regulator would later observe (and vice-versa). Similarly, the timing of news released to the market by regulated businesses could have effect their estimated betas. While 'may be unlikely, the possibility of its existence could create unwanted tensions in the regulatory process.

Attachment A to this report provides an example of statistical analysis carried out by NERA in the UK that suggests that removing the impact of a number of regulatory decisions from beta estimates of UK electricity distributors would substantially increase the estimated beta values over the last 5 years

3.4.3 Creating a cycle in returns

To understand the potential for a cycle in returns, consider how the WACC relates to the risk of a business. Consider a company that is initially worth $100. That company will last one period and is expected to generate an end-of-period net cash flow of $116. The return required by its shareholders given its risk (its WACC) is 16%. The risk-free rate is 10%. If the MRP is 6% and required returns are determined by the CAPM, then our firm's β is 1.

Now suppose the firm's expected future net cash flows double to $232. What will the company now be worth? If the reason that the firm's expected future net cash flows have doubled is that all its future net cash flows will be twice as large as originally anticipated, then logically the company's value will double. Its WACC is unaffected at 16% and the β of the company is unaffected. Where a $100 company might have earned, say, a 13% return under a given set of conditions and paid off $113 at the end of the period, the new company (now worth $200 today) will payoff $226 (exactly twice as much) under the same conditions and will again earn a 13% rate of return. Its returns are unchanged, their covariance with the market is unchanged and hence β and WACC are unchanged.

But if instead the reason that the firm's expected future net cash flow has doubled is that the firm has all its initial future net cash flows plus an extra $120 for certain, then its value will have more than doubled. The value will have more than doubled becuase the extra $120 is risk-free and when discounted at 10% is worth more than $100. This firm now has risky assets and risk-free assets. The beta of its portfolio of assets will have declined, as will the company's WACC. [7] The WACC declines since a portion of the firm's value is now risk-free.

Now turn to the valuation of a regulated company. Like any firm its future net cash flows have an expected component and a random component. A decrease in the allowed rate of return will decrease the expected component, but will not change the random component. Thus a decrease in the allowed rate of return is equivalent to removing some risk-free future payoffs from the regulated firm. The result that the firm's value will be lower is obvious. What is less obvious, but is equally true, is that the risk of the firm is increased by the reduction in the allowed rate of return. The sensitivity of the rate of return on this less-valuable firm to market-wide economic conditions will have increased. The firm's beta will have increased.

Suppose that at the end of a regulatory cycle, a regulator estimates a firm's historical beta over that cycle and concludes that the allowed rate of return going into the next cycle should be reduced relative to its past value. The regulated firm's value will decline and its true beta in that next cycle will be higher than it previously was. Now at the end of that next cycle the regulator will likely observe that the beta estimated from returns during that cycle was higher then the regulator has assumed when setting the allowed rate of return. In response to the higher beta, the regulator will then allow a higher rate of return in the third cycle. But that will mean that the firm's value will increase and its true beta in the third cycle will be lower. Given rational expectations by market participants, this cycle in beta will be smoothed as the market anticipates the implications of allowed rates of return in one period for likely betas in that period and hence allowed rates of return in the next period and hence likely betas in the next period, etc., etc. But the cycle induced through circulatory is none the less there, and is an unanticipated result of using a firm's past beta to determine its future allowed rate of return. This result is formally established within a CAPM setting in Attachment B.

3.5 Replicability of AGSM Results

As observed in section 3.2.2 the purposes for which the AGSM data is marketed are much broader than the regulation of TNSPs. The set of regulated firms will want to be able to replicate any measures derived from the AGSM data. For example, measures of the standard deviation of monthly returns on the AGSM data base do not exactly match the measures

[7] The value of the company will be $\$100 + \frac{\$120}{1.1} = \$109.09$. The WACC will be $\frac{\$100.00}{\$209.09}\times 16\% + \frac{\$109.09}{\$209.09}\times 10\% < 16\%$. The beta of the firm will be $\frac{\$100.00}{\$209.09}\times 1 + \frac{\$109.09}{\$209.09}\times 0 < 1$.

obtained by directly calculating the standard deviation of the returns reported by DATASTREAM. The difference appears to be due to the calculation of returns when dividends are paid. The AGSM recognizes the dividend, but assumes that it is held in cash until the end of the month when it is then used to purchase more of the paying company's stock. DATASTREAM also recognizes the dividend, but DATASTREAM assumes that the dividend is immediately reinvested in the company's stock. Both series of returns are returns that include dividends, but in one case one is sometimes looking at the return from a share plus a little cash, while in the other one is always looking at the return on the share itself. These effects are likely to be trivial, but will not necessarily be well-understood. Of more importance is that sometimes the AGSM risk measures are calculated over a shorter sample period (i.e., with less observations) than one might have thought. The website of the AGSM's Risk Measurement Service states that:

> This sample period is normally the four years preceding the quarter to which the figures relate. If, however, the stock did not trade for this whole period, then only the period for which it did trade is included. If this period is less than two years, then no statistics can be computed. The number of months of data used in the computations is specified in the statistical report.

Alintagas began trading in October 2000. Its first month-end to month-end return was November 2000. Alintgas had experienced 20 monthly returns at the end of June 2002. The ACCC discussion paper uses the AGSM-calculated beta for the period ended June 2002. Yet the AGSM website states that no such statistic "can be computed." Clearly it can. But it is unlikely to be an accurate estimate of Alintgas's true beta. The June 2002 AGSM statistical report confirms that the beta was calculated on the basis of 20 monthly returns only; i.e., AGSM risk measures are not always calculated using even the apparent minimum of two years of data.

The AGSM calculates its own variant of the return on the market. It is a value-weighted combination of the return on all ASX-listed stock returns. In performing the calculation of returns it is again assumed that dividends are reinvested at the end of the month but held in cash over the month. But investors will be benchmarking to a publicly available measure of the return on the Australian market. A common benchmark is the return on the All Ordinaries Accumulation Index. The term "Accumulation" simply means including dividends. The All Ordinaries Accumulation Index is calculated assuming that dividends are immediately reinvested. More importantly, this index is based on only the 500 largest stocks. Thus those stocks that are most likely to suffer from thin trading are not included in the index. The AGSM monthly market return will reflect many stocks that don't trade in the month, or whose trades reflects information that was announced in the preceding month. Different market return series can give rise to different beta estimates. OLS betas of companies in the core sample can differ by as much as 0.12 when the beta is calculated relative to the All Ordinaries Index rather than the AGSM-determined variant of the return on the market.

4 *A PRIORI* BELIEFS AND STATISTICAL INFERENCE

The ACCC and some of its consultants have made a number of comments to the effect that an *a priori* view exists that that the true equity beta for TNSPs is significantly below the average for the market (ie, significantly below 1). This follows from the view that the regulatory framework delivers relative certainty of revenues over time and these returns are relatively secure irrespective of market conditions.

Without necessarily disagreeing with such an *a priori* view we do think that it is pertinent to note two factors that suggest caution should be exercised before acting on such views for the reasons outlined below.

4.1 Variance as Opposed to Covariance

Whether investors regard the regulatory framework as providing certainty is best tested by the variance of regulated businesses returns not by co-variance. If the variance of returns on a regulated business is similar to the variance of returns on a 5-year bond then the *a priori* view that the regulatory framework delivers certainty is supported. However, examination of the variance of returns on individual regulated businesses over time suggests that this is not the case. Consequently, the *a priori* view of certainty of returns (on which the belief that the equity beta should be low is based) does not appear to be borne out by empirical examination.

The Table below shows the monthly standard deviation of returns on two accumulation indices of default-free Australian government securities. The standard deviations are calculated from the returns over the 48 months preceding June, September and December 02. One index contains bonds with maturities between 3 and 5 years and the other contains bonds with between 5 and 7 years to maturity. If at the start of a regulatory interval the regulated firm really has the risk characteristics of a five-year bond, then the implicit duration of the firm (the time to maturity of the equivalent bond) will decline over the regulatory cycle. Hence the 3 to 5 year index should provide the better benchmark.

The Table also shows the average of the standard deviations of monthly returns on the five core firms as reported by the AGSM Risk Measurement Service. The standard deviations of each one of the five core firms exceeded that of the bond indices.

Table 6: Comparison of Variance on Core Sample and on Risk Free Bonds

	June 02	Sept 02	Dec 02
Standard Deviation of monthly return on 3-5 year bonds	3.7%	3.4%	3.3%
Standard Deviation of monthly return on 5-7 year bonds	3.8%	3.5%	3.4%
Average of the AGSM Standard Deviation of monthly returns on the Core Sample of firms	6.5%	6.3%	6.3%

4.2 Why the Regulatory Framework may not Deliver Low Covariance

A basic assumption underlying an *a priori* view that regulated businesses have low systemic risk is that regulatory decisions are uninfluenced by the state of the economy. That is, it is assumed that investors believe that regulators will ignore wider economic circumstances when setting prices/revenues equal to cost recovery for each firm. Under these circumstances it is argued that investors will tend to view equity in regulated businesses more like investment in risk free bonds than investment in the market portfolio (ie, will have a beta significantly below 1). In fact, a comparison of the variance of returns on equity for regulated businesses and the variance on returns for risk free bonds identified above suggests that investors have not experienced, and are unlikely to believe, that they hold the similar levels of risk as do investors in Commonwealth bonds.

If asked, it is likely that most investors would believe that regulators when setting a revenue path are cognisant not simply of the evidence on a business's costs but also of the price impact that would result from allowing recovery of those costs. Indeed, it is common for regulators to set explicit 'side constraints' on how prices to individual customers can change over-time in order to prevent 'price shocks'. The ACCC does not impose side constraints on TNSPs as TNSP's prices are not set at the level of the individual customer. However, we feel confident that many investors would regard as naïve the idea that the ACCC would pay no attention to 'price shocks' when it makes its five year regulatory decision. Indeed, a cursory examination of ACCC press releases could lead to the conclusion that price impacts are given a great deal of weight by the ACCC.

Given this background, it would appear to us reasonable for investors in a regulated business to place a lower probability on 'generous' regulatory decisions in periods when full cost recovery requires significant price increases (say due to falling volumes). By contrast, investors in a regulated business may well reasonably believe that when growth is expected to be high and there is low pressure on prices then the regulator may be more inclined to be generous/less harsh in its regulatory decisions. This would create a positive expectation of covariance with the market, ie, a positive beta expectation by investors.

Moreover, if it is believed that in periods of recession the pressure on regulators is at its greatest not to allow significant price increases then this would further increase the investor's expected beta.

While the ACCC may well believe that it is immune to such political pressure, the critical question is whether investors believe this. We believe that it would be a strong assumption to act as if this is the case. Rather, this expectation can only be expected to be created over long periods of experience under regulation that is immune to such pressures.

5 NERA CONCLUSIONS

In order to assess the merits of attempting to implement the ACCC's preferred position it is necessary to have some form of criteria by which it is assessed. It appears to us that the appropriate criteria by which to assess the process used to determine the allowed equity beta would include:

- stability of results;
- neutrality of incentives; and
- transparency of process.

Stability of results appears a reasonable criterion given that there is little reason to expect the equity beta associated with regulated assets to vary significantly over time. Moreover, stability of results also tends to reduce the range of outcomes expected by regulated businesses and this can help prevent a wedge being driven between what businesses expect to earn over an investments life and what they are actually earning at the beginning of that investment's life. Neutrality of incentives is required to achieve economically efficient outcomes and transparency of process increases the ability of stakeholders to engage in informed consultation.

We believe that the ACCC's preferred position scores poorly on all three criteria.

In terms of stability in the allowed equity beta, the ACCC's own analysis in Table 5.2 of the discussion paper (reproduced above) shows how the regulated equity beta can change dramatically over time. For example, with only two quarters of different data, the equity beta calculated by the ACCC for the four years ending June 2002 is around 60% higher than the equity beta calculated for the four years ending December 2002. The ACCC's preferred position may also involve the introduction of cycles in the returns for regulated businesses.

In terms of transparency, it will be very difficult for the ACCC to carry out the necessary statistical procedures in a transparent manner. Inevitably, there will be great debate over such issues as what businesses are comparable and what is the appropriate sampling period/interval? It is unlikely that it would be possible to set out sufficient detail in advance of regulatory decisions as to how such debates should be answered at the time of each regulatory decision. Moreover, at the time of a decision it would be unlikely that even truly independent experts would agree on how these questions should be resolved. Consequently, a degree of arbitrariness must inevitably enter the estimation process.

In relation to the neutrality of incentives we note in section 3.4.1 that the ACCC's approach would create incentives for businesses regulated in the core sample to take on additional systemic risk to the extent that their observed equity beta would affect their allowed equity beta (this will be most likely to be true in a small sample). This would create non-neutral

incentives and some businesses may take on systemic risk that is most efficiently held by other businesses. In addition, by creating instability in expected returns, the ACCC's preferred position would widen the range of expectations businesses held about future returns. This would increase the risk that businesses investment actions are driven by an expected WACC that is different to the WACC they are currently receiving. That is, the price signal businesses base their supply decisions on would not be consistent with the price signal customers face to consume.

Of course, simply adopting an equity beta of 1.0 on the basis of historical practice is itself arbitrary. However, it does have the advantage of providing stability of returns over time. The ACCC could deliver the same certainty of returns if it adopted any other level of the equity beta and committed not to deviate from that level unless exceptional circumstances arose. For example, if the ACCC, after reviewing all the arguments and evidence, truly believed that the equity beta required to be "Y%" sure of adequately compensating businesses for systemic risk was "X" then it could simply adopt this value and incorporate it into the SRP.

The ACCC could potentially use statistical procedures to assist it in arriving at its estimate of "X" but it would, in NERA's view, be inappropriate to continually update that estimate over time based on statistical procedures that deliver highly variable results. In this regard we note that adopting the 95% confidence level for the upper bound equity beta in the ACCC's combined sample over the periods the ACCC reports provides a rationale for setting the allowed equity beta at 1.0 or above.

ATTACHMENT A – NERA TOPIC #25 – RECENT EVIDENCE ON BETA AND THE COST OF CAPITAL FOR UK ELECTRICITY COMPANIES

ATTACHMENT B – CYLICITY IN RETURNS

Let us assume that, aside from the Cost of Capital, the ACCC's estimates of costs and quantities are unbiased.

Let *A* denote the valuation of the regulated entity's assets on which it will be allowed to earn a return, *R*. In theory *R* should reflect the beta risk of the regulated entity's future net cash flow.

For simplicity assume a one-period world. A tilde denotes a random variable. The allowed revenue of $A(1+R)+E\{\tilde{Costs}\}+E\{\tilde{Taxes}\}$ determines the price, *p*, such that given the expected quantity, $E\{\tilde{q}\}$,

$$p \times E\{\tilde{q}\} = Allowed\ Revenue = A(1+R)+E\{\tilde{Costs}\}+E\{\tilde{Taxes}\}.$$

The regulated entity's actual end-of-period net cash flow will be:

$$\begin{aligned}
&p \times \tilde{q} - \tilde{Costs} - \tilde{Taxes} \\
&= p \times (\tilde{q} - E\{\tilde{q}\}) + p \times E\{\tilde{q}\} - E\{\tilde{Costs}\} - (\tilde{Costs} - E\{\tilde{Costs}\}) - E\{\tilde{Taxes}\} - (\tilde{Taxes} - E\{\tilde{Taxes}\}) \\
&= p \times E\{\tilde{q}\} - E\{\tilde{Costs}\} - E\{\tilde{Taxes}\} + p \times (\tilde{q} - E\{\tilde{q}\}) - (\tilde{Costs} - E\{\tilde{Costs}\}) - (\tilde{Taxes} - E\{\tilde{Taxes}\}) \\
&= Allowed\ Revenue - E\{\tilde{Costs}\} - E\{\tilde{Taxes}\} + \left[p \times (\tilde{q} - E\{\tilde{q}\}) - (\tilde{Costs} - E\{\tilde{Costs}\}) - (\tilde{Taxes} - E\{\tilde{Taxes}\}) \right] \\
&= Allowed\ Revenue - E\{\tilde{Costs}\} - E\{\tilde{Taxes}\} + \tilde{\varepsilon} \\
&= A(1+R) + \tilde{\varepsilon}, \\
&\text{where } \tilde{\varepsilon} \equiv p \times (\tilde{q} - E\{\tilde{q}\}) - (\tilde{Costs} - E\{\tilde{Costs}\}) - (\tilde{Taxes} - E\{\tilde{Taxes}\}).
\end{aligned}$$

The regulated entity's expected end-of-period net cash flow will be $A(1+R)$.

ε is the mean-zero random component of returns that reflects the randomness in whether realized costs and quantities were more or less than initially expected when the ACCC determined the fixed price for the good produced by the regulated entity. It is the covariance between this random component of net cash flows and the market returns that in part determines the beta of the regulated entity. The beta will also be affected by the ACCC's determination of the quantity *R*.

In this one-period setting the value of the regulated entity, *V*, is given by:

$$V = \frac{E\{\widetilde{Net\ Cash\ Flow}\} - cov(\widetilde{Net\ Cash\ Flow}, R_m)\dfrac{E(R_m) - r_f}{\sigma^2(R_m)}}{1 + r_f}$$

$$= \frac{A(1+R) - cov(A(1+R) + \varepsilon, r_m)\dfrac{E(R_m) - r_f}{\sigma^2(R_m)}}{1 + r_f}$$

$$= \frac{A(1+R) - cov(\varepsilon, R_m)\dfrac{E(R_m) - r_f}{\sigma^2(R_m)}}{1 + r_f}.$$

Now $V = A$ if and only if

$$R = r_f + \frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}\left(E(R_m) - r_f\right). \qquad \text{(I)}.$$

If R exceeds the right-hand-side of (I) then V will exceed A.

If R is less than the right-hand-side of (I) then V will be less than A.

The beta, β, of the regulated entity will be

$$\beta = \frac{cov\left(\frac{\widetilde{Net\ Cash\ Flow}}{V}, R_m\right)}{\sigma^2(R_m)}$$

$$= \frac{cov\left(\frac{A(1+R)+\varepsilon}{V}, R_m\right)}{\sigma^2(R_m)}$$

$$= \frac{cov\left(\frac{\varepsilon}{V}, R_m\right)}{\sigma^2(R_m)}$$

$$= \frac{cov\left(\frac{\varepsilon}{A(1+R) - cov(\varepsilon, R_m)\frac{E(R_m)-r_f}{\sigma^2(R_m)}}{1+r_f}, R_m\right)}{\sigma^2(R_m)}$$

$$= \left(\frac{1+r_f}{(1+R) - \frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}\left(E(R_m)-r_f\right)}\right)\frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}.$$

If R exceeds the value on the right-hand-side of in (I), then V exceeds A and the beta of the regulated firm is less than $\frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}$.

If R is less than the value on the right-hand-side of in (I), then V is less than A and the beta of the regulated firm is greater than $\frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}$.

If R equals the value on the right-hand-side of in (I), then V is equal to A and the beta of the regulated firm is greater than $\frac{cov\left(\frac{\varepsilon}{A}, R_m\right)}{\sigma^2(R_m)}$.

If, in a multi-period setting, the regulator overestimates beta in one cycle, he/she will set R too high, but this will cause V to rise above A and the actual beta will then be low. In fact, so low that if that beta were accurately estimated in that cycle and used to set R in the next cycle, that next R would be too low and V at the start of the next cycle will be less than A, but then in that next cycle beta would be too high, etc. Thus errors in forecasting betas will

affect subsequent betas in the opposite direction and set up a cycle of over/under-estimates followed by under-estimates. The ACCC needs to be alerted to this consequence of using data on a given firm's beta to determine the future WACC of that same firm.

Appendix D

NERA Report: A Line in the Sand for Regulatory WACC

DRAWING A LINE-IN-THE-SAND FOR THE REGULATORY WACC

A Report for TransGrid

Prepared by NERA

November 2003
Sydney

Project Team:
Tom Hird (Ph.D.)
Brendan Quach

n/e/r/a
National Economic Research Associates
Economic Consultants

Level 6, 50 Bridge Street
Sydney NSW 2000
Australia

Tel: (+61) 2 8272 6500
Fax: (+61) 2 8272 6549
Web: http://www.nera.com

An MMC Company

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1 INTRODUCTION AND BACKGROUND

TransGrid has asked NERA to examine statements made by the ACCC and its consultants in the last 5 years and to determine from these statements what the ACCC's likely view is of the true WACC for electricity transmission companies. TransGrid has also asked NERA to review the extent to which the ACCC's views have been reflected in changes in allowed rates of return for regulated businesses.

The context for this analysis is that there has been a public debate between the ACCC, regulated businesses (and a debate by proxy between the ACCC, its consultants and regulated businesses' consultants) over whether the current level of the regulated WACC is reasonable. During this debate a number of claims and counter claims have been made in both regulatory proceedings and in other forums – including the opinion pages of the Australian Financial Review.

During this debate the ACCC has made a number of comments concerning the conservatism of its approach to the regulated WACC that are likely to have influenced businesses' expectations of future levels of the regulated WACC. However, in order to form an accurate expectation of the WACC the ACCC intends to allow in the future it is necessary for businesses to distinguish between:

- statements made "in the heat of argument" by the ACCC that purely reflect a defence against external attack on the reasonableness of its current values of regulatory WACC; and

- statements that signal a future change in the ACCC's position of the WACC.

Another important context to this analysis is that regulated rates of return allowed by the ACCC have been falling over the last five years and this was itself preceded by statements that, in hindsight, can be viewed as clear signals that the WACC would fall. If businesses expect that this will continue to be the case then they will rationally base their investment decisions not on the currently allowed regulatory WACC but on the average expected WACC over the life of an investment.

The purpose of this report is twofold:

- to attempt to determine an objective range for the rate of return regulated businesses can reasonably expect to receive over the life of long lived assets; and

- to assess the relative merits of reducing the level of uncertainty concerning the future WACC by drawing a "line-in-the-sand" around a particular level (more specifically, drawing a line-in-the-sand around a particular level of the margin above the risk free rate.

The structure of this report is as follows:

- Section 2 analyses statements/decisions made by the ACCC or its consultants in relation to each CAPM parameter and 'tracks' changes in those parameters over recent years. On the basis of these statements a range is determined for the ACCC's view of the value of each parameter. This is then used to determine the range for the average value of regulated returns a business can expect over the life of long lived assets. Attachment A provides a non-exhaustive list of statements relied on in this section;

- Section 3 discusses the policy implications of the empirical work in section 2. It is argued that, in the presence of asymmetric costs associated with setting the WACC too high/low, customers interests are best served by the ACCC acting to significantly reduce the range of future WACC businesses can expect. In particular, it is argued that in the current situation customers have the worst of both worlds. That is, customers pay a WACC at the top of the range businesses currently expect but get investment incentives at the bottom/middle of the range. A line-in-the-sand can only improve things for customers – as long as that line in the sand is above the current expectations of businesses.

2 ACCC COST OF CAPITAL STATEMENTS

The Australian Competition and Consumers Commission (ACCC) sets the rate of return on invested capital by reference to a "vanilla" post-tax weighted average cost of capital (WACC). The aim of this paper is not to comment the reasonableness of the ACCC's current WACC parameter values, but to identify a range of values that a TNSP could reasonable expect in future regulatory periods given the statements made by the Commission.

Table 2.1 below summarises the plausible future parameter values that a TNSP could reasonably expect from the ACCC in future decisions. These expectations of future returns on assets will influence TNSP's decision to invest today.

Table 2.1: Summary of Plausible Future Parameter Values

	TransGrid 1999	Transend (draft) 2003	High	Expected	Low
Term to maturity of risk free rate (difference with 10 year bond rate)	10 years (0.00%)	5 years (-0.20%)	5 year (-0.20%)	5 year (-0.20%)	1 year (-0.61%)
Debt margin	1.20%	0.80%	1.08%	0.68%	*less* than 0.68%
Equity Beta	1.0	1.0	1.0	0.8	0.5
MRP	6.0%	6.0%	6.0%	6.0%	5.0%
Value of Gamma	0.5	0.5	0.5	1.0	1.0
Total expected margin above the 10 year risk free rate*	3.69	3.26	3.49	2.21	1.11

*Calculated assuming 60 percent gearing with the impact of gamma on the total margin above the risk free rate calculated consistent with the officer post tax and the WACC parameters allowed in the Transend draft decision.

In the following sections, we review the ACCC's statements on each of these variables. On the basis of these statements we explain why we reached the above range for the expected value of each parameter.

2.1 Risk Free Rate (R_f)

The chosen term to maturity of the risk free rate proxy can significantly affect the allowed rate of return. The ACCC had previously used the 10 year Commonwealth bond rate but now uses a 5 year bond rate to set the risk free rate. The ACCC has firmly rejected arguments in favour of returning to the use of a 10 year bond rate. Furthermore, the ACCC has also published comments suggesting that a 1 year bond rate may be the most appropriate bond rate. We therefore conclude :

	High	Expected	Low
Term to Maturity	5 year	5 Year	1 year
Difference with 10 year bond rate	-0.20%	-0.20%	-0.61%

The risk free rate (R_f) represents the return that investors could earn from investing in a risk free asset. R_f is therefore the starting point for determining both the return on equity and debt.

In TransGrid's 1999 determination the ACCC, consistent with practice of Australian state regulators, used the 10-year Commonwealth bond rate. In all decisions since then the Commission has set the term of the risk free rate equal to the term of the regulatory period (ie, around 5 years). In the recent discussion paper by the ACCC on the Statement of Regulatory Principles the ACCC has stated that because the revenue cap is adjusted annually to adjust for outturn inflation it would be:[1]

> *"…more appropriate to adopt as a R_f the rate of return on a one-year government bond."*

Therefore, we conclude that a TNSP observing recent ACCC decisions and statements could reasonably expect that the term to maturity of the proxy risk free rate would most likely remain 5 years but may in the future change to a 1 year bond rate.

On this basis it appears unlikely that the ACCC will revert, of its own accord, to the use of the 10 year bond rate as the proxy for the risk free rate. However, we note that an appeal of the ACCC's WACC determination for GasNet may force such a change for the businesses regulated under the Gas Code. Our high and expected estimates of the term to maturity of the risk free rate are therefore 5 years. Our low estimate is 1 year consistent with the quoted statement from the SRP discussion paper.

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[1] ACCC, Discussion Paper, *2003 Review of the Draft Statement o Principles for the Regulation of Transmission Revenue*, p72.

The effect of moving to a shorter term to maturity was discussed by Professor Kevin Davis, a ACCC consultant, who suggested that:[2]

> *"long term interest rates will, on average, exceed short term interest rates for reasons other than expectations of future increases in interest rates, the use of the longer term interest rate as a proxy for the risk free rate will lead to higher regulatory cash flows than if the short term rate were used. "*

Using statistics provided by the Reserve Bank of Australia, Table 2.2 shows that on average yields are higher on longer term bonds.

Table 2.2: Monthly Risk Free Rates
July 1992 – Oct 2003

	Bank Bill	Commonwealth Treasury Bonds		
Term	**180 day**	**3 Year**	**5 Year**	**10 Year**
Oct-03 (%)	5.10	5.53	5.67	5.76
Average (%) Jul 92–Oct 03	5.70	6.28	6.57	6.94
Margin above the 10 year bond rate (%pts)	-1.24	-0.67	-0.37	0.00

Source: Reserve Bank of Australia Monthly Statistics

A similar trend would be expected to be seen in margins between indexed bonds with a term to maturity of 5 year and 10 year.[3] Although no 1-year bond rate is published by the Reserve Bank it is reasonable to assume that the rate would fall somewhere between the 180 day bank bill and the 3 year bond rate, this would imply an average discount on the 10 year bond rate of between 0.67 and 1.24 percentage points. Interpolating this value to estimate the discount on the 1 year bond rate relative to the 10 year bond rate gives a value of 1.13.

The ACCC has stated that the average historical difference in yields between 5 and 10 year bonds has been between 20 and 25 basis points. While we do not have the data series to confirm whether this is the difference between 5 and 10 year nominal or indexed bonds, we nonetheless adopt the lower end of this range in our analysis of the impact of adopting different maturities of the *indexed* risk free rate We calculate the impact of moving to a one year rate by assuming that the margin between 1 and 10 year indexed bonds is proportional to the margin between unindexed bonds in the same proportion as applies to the margin between 5 and 10 year bonds. That is, the margin between indexed bonds is equal to 1.13*0.20/.37=0.61.[4]

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2 Ibid, p72.

3 Potentially the relative riskiness of 10 year to 5 year indexed bonds is less than the risk differences observed in nominal bonds due to the greater variance of inflation estimates in more distant periods.

4

2.2 Debt Premium (D_m)

Current ACCC practice is to benchmark the credit ratings of TNSPs against a set of 'comparable' regulated electricity and gas businesses. This benchmarking process does not adjust for government ownership or gearing within the sample. From this process the ACCC has, to date, derived a benchmark credit rating of A. This is then used to determine the debt premium that a regulated business would have to pay if they issued all their debt at a maturity of five years on a particular day. Many commentators have argued that this approach is unreasonable and the ACCC has not yet addressed their concerns in any meaningful manner. Consequently, we must give some probability to the ACCC altering its methodology. In doing so we arrive at the following range of potential expectations

	High	Expected	Low
Approach	Adjust for government ownership in benchmark sample and reflect commercial debt maturity in calculating debt margin.	Continue current approach	Continue current approach except estimate a margin 'as if' regulated businesses re-issues their entire debt annually
Likely current margin	1.08%*	0.68%*	*less* than 0.68%*

*All estimates based on the letter by Westpac attached to TransGrid's revenue reset application.

The debt margin represents the premium above the risk free rate that lenders would require to lend to regulated business.

In the recent draft Transend decision the ACCC arrived at an A credit rating by reference to a sample of ten credit ratings of electricity companies. This rating was then used by the Commission to estimate the premium on 5 year corporate debt over the corresponding Commonwealth bond. That is, the ACCC set the cost of debt 'as if' Transend could re-issue its entire debt portfolio every five years and still maintain an A credit rating on all that debt.

However, future expectations would need to weigh three potential changes to this current methodology:

(1) Re-sampling the companies used to benchmark the industry credit rating to correct for Government ownership bias.

(2) Calculating the debt margin to acknowledge that, as a matter of commercial reality, firms do not issue all debt in 5 year bonds.

(3) The possible move to the use of a 1 year risk free rate and the Commission then adopting a debt margin equal to the premium on 1 year corporate debt over the corresponding Commonwealth bond.

The ACCC arrived at an A benchmark credit rating in each decision by reference to a sample of ten credit ratings of Australian electricity lines companies. This sample is populated by both private and public companies which introduces potential biases. The Commission includes both as:[5]

> *"By simply using stand-alone and private entities, it would provide too small a sample to obtain an average credit rating for the electricity industry."*

As a result, the four companies with the highest credit ratings are all owned by their respective State governments. Removing these companies would lower the average credit rating to "A-" or "BBB+". The possibility that the ACCC corrects for this inconsistency has been included in our high debt margin estimate. However, our "expected" and "low" debt margin scenarios assume the ACCC continues with the current A credit rating.

The second uncertainty about future practice relates to the term to maturity of corporate debt upon which the debt margin is calculated. The Transend draft decision calculated the debt margin as the difference between 5 year corporate debt with an A credit rating and the corresponding Commonwealth bond yield. This methodology has also been specifically endorsed in the ACCC's discussion paper on the Statement of Regulatory Principles.[6] However, as a matter of commercial reality regulated Australian businesses do not issue all debt in the form of 5 year corporate bonds – despite the fact that, under CPI-X regulation, they have an incentive to do so if it would lower their costs. On this basis we assume that there is a reasonable possibility that ACCC will reverse this methodology in subsequent decisions.

Were the ACCC to do so, we would imagine that it would also perform a one-off calculation of the credit rating that a privately owned regulated business could be expected to achieve. This would involve providing an independent credit rating agency with pertinent assumptions concerning cash flows, debt ratio and the regulatory regime and asking that agency to provide a 'hypothetical' credit rating. The assumptions provided could based on TNSPs current cash flows. Once such a credit rating was provided we would not expect that there would be any need to revisit the issue unless a major change to the regulatory regime occurred.

Our high estimate of the debt margin assumes the ACCC calculates the margin on debt issued with a ten-year maturity and an A- credit rating (which is our estimate of the credit rating an independent rating agency would give a hypothetical stand-alone privately owned TNSP). , Our most likely estimate of the ACCC's future approach to the debt margin involves the assumed continuation of the current practice of setting the debt margin equal to the margin on five year debt with a credit rating of "A".

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5 ACCC, Discussion Paper, *2003 Review of the Draft Statement o Principles for the Regulation of Transmission Revenue*, p83.

6 Ibid, p83.

As discussed in section 2.1 the ACCC has suggested that the appropriate risk free rate is the 1 year bond rate. Adopting the ACCC current reasoning it could then be reasonable anticipated that the debt margin would be calculated as the difference between the yields on 1 year corporate bonds and 1 year Commonwealth bonds. This possibility has been incorporated in our estimate of the potential low range debt margin.

2.3 Equity Premium (β_e)

In all recent electricity transmission decisions the ACCC has set the equity beta equal to one. However, in the recent discussion paper on the SRP the ACCC has stated that its preferred position is "to move towards benchmarking an equity beta from current market evidence and incorporating an upper confidence interval". In that document the highest quoted estimate of the equity beta for a regulated business was 0.39. When the ACCC applied a 95% upper confidence interval the estimated range spread from 0.8 to below 0.5. As a result it would be reasonable to conclude that future ACCC decisions will incorporate a equity beta within the following range:

	High	Expected	Low
Equity Beta	1.0	0.8	0.5

ACCC revenue decisions for electricity transmission companies had previously set regulated electricity transmission firms an equity beta of one. This has compensated equity holders in transmission companies 'as if' they had the same systematic risk as holders of the market portfolio.

Nonetheless, the ACCC has consistently suggested that the current value of the equity beta is generous as:[7]

> "*electricity transmission businesses are less risky as their earnings are more stable than the market portfolio—suggesting an equity beta of less than one.*"[8]

The discussion paper on the SRP suggests that a sample of market data can be used to indicate a substantial reduction from the typical assumed β_e of one. As a conservative approach the Commission has suggested that statistical upper confidence interval of 95% and 99% based on the sample data.

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7 Also see supporting statements attached below.

8 ACCC, *Draft Decision Tasmanian Transmission Network Revenue Cap 2004 – 2008/09*, September 2003, p 83.

In table 5.2 of the discussion paper the Commission analyses market data for an appropriate β_e.[9] Notwithstanding our criticism of statistical methods, the analysis suggest that with an upper confidence of 95% the equity beta would range between 0.5 and 0.8.

Prior to the release of this discussion paper the ACCC has consistently quoted its consulatants, the Allens Consulting Group, who have stated that market data suggests that the equity beta of regulated Australian gas businesses is less than 0.7.

> *"ACG recommended that a conservative approach to beta estimation be retained by Australian regulators with an equity beta estimate of 1.0. ACG noted:*[10]
>
> > 'In the future, however, it should be possible for greater reliance to be placed upon market evidence when deriving a proxy beta for regulated Australian gas transmission activities.'
>
> *For the reasons indicated by ACG, the Commission considers that it may be premature to rely on market data exclusively when determining the equity beta. Accordingly, the Commission considers that an equity beta of 1.0, while biased in favour of the service provider, is appropriate for ElectraNet." Page 37 of ElectraNet Decision 2002.*

Given the persistence of ACCC comments in this regard it would be reasonable to expect that in the most optimistic scenario for regulated businesses would be that current β_e of one is maintained into the future. The ACCC comments suggest that the more likely scenario is that the current market sample will be used to estimate the β_e this would imply a likely fall of the equity beta to 0.8 but may potentially fall as low as 0.5.

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[9] ACCC, *Discussion Paper 2003 Review of the Draft Statement of Principles for the Regulation of Transmission Revenues*, p77.

[10] ACG, Empirical evidence on proxy beta values for regulated gas transmission activities, Final report for the ACCC, July 2002, p43.

2.4 Market Risk Premium (MRP)

In past regulatory decisions the ACCC has consistently set the MRP at 6%. It has reaffirmed this position in its discussion paper on the SRP. Nonetheless, in that same document and in earlier documents it has stated that this approach appears to be conservative with evidence that the currently expected MRP by the market is below 5%. On this basis we assume the following range of expectations for the regulated MRP.

	High	Expected	Low
MRP	6.0%	6.0%	5.0%

The market risk premium represent the return, above the risk free rate, investors require to compensate them for the non diversifiable risks of the market as a whole.

The ACCC's assessment, based on historic data, is that the MRP lies between 5.0% and 7.0%.[11] In all electricity revenue decisions the ACCC has set the MRP at the mid point of this range, which is consistent with a comprehensive study by Lally commissioned by the ACCC, which recommended a MRP of 6% as reasonable.[12]

The ACCC, however, has indicated in recent decisions and the draft SRP their belief that MRP has recently fallen. To support this view they have relied on a survey by Jardine Fleming Capital Partners that which found that:[13]

> *"on average these participants thought the historic MRP for Australia was 5.87%. The survey also found the expectation for the future MRP is approximately 1.0% below this figure."*

The draft SRP states that the Commission's preferred position is for no change in the current approach for estimating the MRP. We take this statement on face value and conclude that the most likely outcome would be for the ACCC to maintain the MRP at 6%. We also conclude that there is little evidence to support the view that the ACCC may increase the MRP in the future, however, the ACCC continues to make statements that suggest a reasonable possibility that the it may lower MRP values to say 5%, at some future time.

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11 ACCC, *South Australian Transmission Network Revenue Cap 2003-2007/08*, December 2002, p29.

12 Lally M., *The Cost of Capital Under Dividend Imputation*, June 2002, p 34.

13 Ibid, p 29.

2.5 Gamma (γ)

The cost of company tax is not explicitly incorporated into the ACCC's WACC/CAPM calculation. However, decisions on the value that shareholders attach to franking credits (gamma) have significant impact to the returns to capital owners. Based on the recent ACCC decisions and statements it would be reasonable to expect future decisions to value gamma in the following range:

	High	Expected	Low
Value of Gamma	0.5	1.0	1.0
Compensation for tax (percentage pt in crease in WACC*)	0.56%	0.0%	0.0%

* Based on a post-tax nominal WACC proposed by Officer and the WACC parameters allowed in the Transend draft decision.

Under the imputation tax system, Australian resident taxpayers can claim a credit against income tax payable on dividends received from Australian companies, to the extent of the income tax that has been paid by those companies. Gamma (γ) is the assumed value placed by equity investors on imputation credits earned by companies when they pay corporate tax. A value of γ=1 implies that equity investors do not regard company tax as a 'cost' and, consequently, do not require any compensation for company tax in their regulated revenue streams.

To date the Commission in all regulatory decisions has set γ at 0.5. This means that equity owners are only compensated for half the firm's payable company tax liability.

The value of γ is a matter of considerable discussion by the ACCC. In 2002, the Commission commissioned Lally to conduct a comprehensive study of the impact of the imputation system on the cost of capital.[14] Lally concluded that in light of the changes introduced under the Ralph reforms γ should be at or close to 1 for most firms.

In its 2002 ElectraNet decision the ACCC stated that:

> *"The Commission believes that a more appropriate value for γ is closer to one. However, it recognises that further research is required and no consensus has yet developed among Australian academics and practitioners for adjusting the rate of use of tax credits. It is therefore inappropriate for the Commission to lead in this area and further work is required before altering its current position on γ. Accordingly, in line with recent Commission decisions, a γ of 0.5 is used in this decision."*

[14] Lally M., *The Cost of Capital Under Dividend Imputation*, June 2002.

The ACCC concluded that in the discussion paper on the SRP that, due to the lack of a clear consensus on how to adjust for the use of tax credits, their preferred position is to retain the assumed value of 0.5 for γ. We have adopted this value of 0.5 as the most optimistic value regulated businesses can expect in the long run based on ACCC statements to date. That is, we conclude that there is little evidence to support the view that the ACCC will increase the value γ in the future. Given the ACCC's repeated statements that it believes the true value of gamma is closer to one we have adopted this value as our expected and our low estimate of gamma's future contribution to regulated revenues.

In order to estimate the effect of changing γ we have used the Officer post-tax WACC combined with the other WACC parameters given in the Transend draft decision.[15] The Officer post tax WACC is expressed by the following formula:

$$WACC = R_e * \frac{(1-T)}{(1-T(1-\gamma))} * \frac{E}{V} + R_d * (1-T) * \frac{D}{V}$$

where:

R_e = required risk adjusted rate of return on equity, after company tax;

R_d = cost of debt;

T = company tax rate (30%);

γ = the value of imputation credits (gamma);

E = market value of equity;

D = market value of debt; and

V = market value of debt and equity.

Compensation for company tax has been calculated as the increase in the WACC relative to the case where γ equals one.

15 ACCC, *Draft Decision Tasmanian Transmission Network Revenue Cap 2004 – 2008/09*, September 2003, p 88.

3 POLICY IMPLICATIONS

3.1 Customers Aren't Getting What They Pay For

The allowed WACC plays two roles in the regulatory framework. The first is to provide a 'fair and reasonable' rate of return on sunk investments and the second is to provide sufficient incentive to undertake efficient new investments. Sunk investments are, by definition, unaffected by the WACC received on them (although the willingness to incur new sunk investments can be affected by the perception of whether previously sunk investments have been treated fairly by the regulator). However, in relation to new investments, if the WACC is set too low there is a risk that inefficiently low levels of investment will occur while if the WACC is set too high there is a risk that inefficiently high levels of investment ("gold plating") will occur.

It is important to note that it is the expected WACC over the life of an asset that determines the incentive to invest and not the WACC allowed in any given 5-year determination. Recognition of this fact mean that the ACCC influences TNSPs' incentives to invest *today* by:

- setting the level of the allowed WACC in a business's current regulatory period; and
- making comments on the WACC that inform businesses' expectation about what the allowed WACC will be in future determinations.

In industries where the economic lives of investments are very long (in excess of 40 years) it is clear that a business's expectations of the future WACC will be more important than the business's expectations of the WACC for the current regulatory period. On average, with five year regulatory periods, the current WACC is received on an investment for 2½ years. For an asset that has a 40-year life span this represents only 6% of its life. Moreover, it will often be more appropriate to treat the true life of many investments by TNSPs as infinite. This is because once invested in a meshed system it is likely that the asset will have to be replaced at the end of its life in order for the safe operation of the wider system to continue.

Unfortunately, in recent times regulated businesses and the ACCC have engaged in what may be regarded as an unhelpful public debate over whether the allowed WACC has been set too high or too low. Regulated businesses, or their consultants on their behalf, have made the case that regulated returns are below the level necessary to encourage sufficient investment in infrastructure industries. The ACCC has defended its position, in part, by making a number of comments suggesting that the ACCC believes that the allowed WACC is currently considerably above the true WACC for regulated businesses. It is important to recognise that defending the current WACC by stating that the true WACC is considerably below this level will, even if the intention is otherwise, reduce businesses' expectations about the future. The effect has almost certainly been to dampen investment incentives by regulated businesses. The effect of the ACCC 'talking down the WACC' is much the same as the effect the Reserve Bank Governor could be expected to have on financial markets if he

'talked up' interest rates or the Australian dollar. In NERA's view it would be appropriate for the ACCC to use the same level of circumspection in making comments about whether the current allowed WACC was too high as would be expected of the Reserve bank Governor when discussing the current level of the Australian dollar.

The importance of this issue can be highlighted by repeating the summary of the findings of section 2.

Table 3.2: Summary of Plausible Future Parameter Values

	TransGrid 2000	Transend (draft) 2003	High	Expected	Low
Term to maturity of risk free rate (difference with 10 year bond rate)	10 years (0.00%)	5 years (-0.20%)	5 year (-0.20%)	5 year (-0.20%)	1 year (-0.61%)
Debt margin	1.20%	0.80%	1.08%	0.68%	*less* than 0.68%
Equity Beta	1.0	1.0	1.0	0.8	0.5
MRP	6.0%	6.0%	6.0%	6.0%	5.0%
Value of Gamma	0.5	0.5	0.5	1.0	1.0
Total expected margin above the 10 year risk free rate*	3.69	3.26	3.49	2.21	*less* than 1.11

*Calculated assuming 60 percent gearing with the impact of gamma on the total margin above the risk free rate calculated consistent with the Officer post tax and the WACC parameters allowed in the Transend draft decision.

It is clear from the above table that the ACCC allowed WACC has fallen considerably between the ACCC's 2000 TransGrid decision and its 2003 Transend draft decision. In the three-year period the margin above the 10-year bond rate has fallen by over 40 basis points (or over 10 percent). More importantly, a reasonable interpretation of ACCC public comments on the WACC would create the expectation that the WACC will continue to fall in the future and that the margin provided above the ten-year bond rate will be, on average, over 100 basis points lower than it currently is. This amounts to a fall of around 33% in the margin above the risk free rate. When compared with the 2000 TransGrid decision the fall is even larger. Moreover, a credible lower range estimate for the expectation of the ACCC's future allowed margin above the ten-year bond rate is around 200 basis points lower than is currently allowed (or around 66% lower).

Unfortunately for customers, this creates a situation where they are currently paying prices based on a margin above the ten-year risk free rate of around 3.26% (based on the Transend draft decision) but are receiving investment incentives potentially based on a perceived margin above the ten-year risk free rate of something lower than 2.21%. That is, the uncertainty created by the ACCC's public comments has created a wedge between what customers pay for and what they actually receive in the form of investment incentives.

The only way to ensure that customers actually "get what they pay for" is to minimise the range of expectations businesses have concerning the future allowed WACC parameters.

One way to do this would be for the ACCC to set the WACC on an asset-by-asset basis. This would involve the ACCC setting the WACC[16] associated with a particular asset and guaranteeing that this would be the return received on the depreciated value of that over its economic life. Such an approach would require a significant change to the regulatory framework and regulatory reporting arrangements.

A less radical and more practical way to achieve this result would be for the ACCC to, in the SRP process, clearly enunciate the values of the CAPM parameters and/or the process by which those parameters will be determined in future decisions. It could be made clear that the ACCC's intention is that these values/processes will not change over time except under exceptional circumstances and where extensive consultation on any changes is made. The ACCC would also make clear that evidence referred to in previous statements made by the ACCC would not in the future constitute 'exceptional circumstances'.

For example, the ACCC could state clearly that it intends to rely exclusively on the long run historically observed MRP and that the value it has estimated on this basis is 6.0%. Accordingly, it would make equally clear that its previous references to such evidence as the Jardine Fleming Capital Partners survey and its belief that the MRP is falling would not sway its decision on the MRP.

In NERA's view unless such a commitment is given the ACCC's 2003 statement in the discussion paper on the SRP that:

> *"The Commission considers no changes should be made to the current approach of estimating the MRP" p. 75*

Will run the risk of being ignored by regulated businesses who will focus on the statements that:

> *"The Commission notes a Jardine Fleming Capital Partners survey of professional market participants' MRP expectations, which found that on average these participants thought the historic MRP for Australia was 5.87%. The survey also found the expectation for the future MRP is approximately 1.0% below this figure."* ElectrNet 2003 p.29
>
> *The Commission recognises that the market risk premium has fallen over recent years, however the Commission is wary that this may reflect short-term market trends."* SPI PowerNet 2002 p27

[16] Or the margin above the risk free rate if it was considered desirable for customers to bear the interest rate risk associated with an investment.

3.2 Asymmetric Costs and a Line-in-the-Sand

A distinct reason for reducing the range for the expected WACC is that the costs of under and over investment are asymmetric. It generally recognised that the costs associated with under-investment in essential infrastructure are, in a probabilistic sense, higher than the costs associated with over-investment. This is a reflection of the fact that failure in an essential infrastructure, such as electricity transmission, will result in damage to a large number of downstream enterprises and households.

The ACCC appears to accept this view and is at pains to point out that it is conservative in the WACC provided to businesses. Unfortunately, such statements go a long way to undermining the benefits of any purported conservatism – unless they are accompanied by a commitment that the ACCC will continue to be conservative into the future. To date it is this commitment that has been missing from ACCC discussion of it 'conservative' approach to the WACC. As already discussed, the relevant expected WACC is that over the life of new investments and not the allowed WACC in any single decision. The ACCC's 'proofs' of its conservatism do little to engender the benefits that are intended to flow from conservatism if they simply lower businesses' expectations about the future WACC.

The asymmetric costs of under and over investment mean that it is vital that the *expected* regulatory WACC over the life of an asset is at least set equal to the true cost of capital. However, with the current range for the expected WACC as outlined in Table 3.2 above there is a real danger that some businesses currently expect to receive a WACC that is below their true WACC. If this were the case then more damage to investment incentives may be occurring at the moment than a casual observations of allowed rates of return would suggest.

ATTACHMENT A – ACCC STATEMENTS

Return of Equity

Beta

ElectraNet 2002

A report prepared by Allen Consulting Group (ACG) for the Commission suggested an equity beta for Australian gas transmission companies of just below 0.7.

ACG recommended that a conservative approach to beta estimation be retained by Australian regulators with an equity beta estimate of 1.0. ACG noted:[17]

> *In the future, however, it should be possible for greater reliance to be placed upon market evidence when deriving a proxy beta for regulated Australian gas transmission activities.*

For the reasons indicated by ACG, the Commission considers that it may be premature to rely on market data exclusively when determining the equity beta. Accordingly, the Commission considers that an equity beta of 1.0, while biased in favour of the service provider, is appropriate for ElectraNet. p37

SPI 2002

Repeats ACG statements in ElectraNet. p22.

Murrylink 2003

Repeats arguments put forward in the ElectraNet decision quoting the Allen report. However, maintained the equity beta at 1.0 due to immature Australian market data.

Transend 2003

However, there is a view that gas and electricity transmission businesses are less risky as their earnings are more stable than the market portfolio—suggesting an equity beta of less than one. p83.

The ACCC notes the sample betas calculated in Transend's application. It also derived betas from comparable Australian firms, using data from the Australian Graduate School of Management (AGSM) for December 2002 and March 2003.

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[17] ACG, Empirical evidence on proxy beta values for regulated gas transmission activities, Final report for the ACCC, July 2002, p43.

To derive equity betas, the ACCC first started with unadjusted betas of a small sample of companies. It de-levered and then re-levered the equity beta, assuming the debt beta to be zero and using Standard and Poor's[43] (corresponding) gearing levels. The resulting estimates, shown in table 6.5 (Equity beta average in 2002 of 0.19 and 0.17 in 2003), suggest that the ACCC has been generous in its previous decisions. p85

Discussion Paper: Draft Statement Transmission Pricing Principles 2003

Although the sample of comparable firms is still relatively small, the market evidence suggests that the Commission has been generous in its previous decisions. This generosity is evident given current market beta estimates, which are lower than those adopted by the Commission. In determining past revenue caps for TNSPs, the Commission has sought not to deter new investment and has been biased towards the TNSP.

Market Risk Premium

ElectraNet 2002

The Commission has noted the research indicating that the MRP has fallen over recent years. However, the Commission is wary that this may only reflect short-term market trends. Based on the more traditional views, the Commission's assessment of the MRP suggests that it lies between 5.0% and 7.0%. For this decision, the Commission chooses the mid-point of this range, which is a MRP of 6.0%.

The Commission also maintains that the current MRP of 6.0% is on the high side and therefore sufficient to compensate for the difference between the five and 10-year bond yields.

The Commission notes a Jardine Fleming Capital Partners survey of professional market participants' MRP expectations, which found that on average these participants thought the historic MRP for Australia was 5.87%. The survey also found the expectation for the future MRP is approximately 1.0% below this figure. However, the Commission acknowledges that these expectations reflect substantial uncertainty. If the Commission is satisfied that the MRP is trending downwards in the longer term, it will adopt a lower MRP. p29.

GasNet 2002

The paper from MIC referred to by Amcor, PaperlinX and EUCV was prepared for the ESC. MIC noted that while it does not generally provide advice on market risk premium to clients, an implied ex-ante premium could be determined from its forecast of returns for Australia shares over the next 10 years. As a result, MIC derived an estimate of the market risk premium of 3.0%. While MIC noted that this is much lower than estimates derived from historical data, it did not argue that one method is more correct than the other. In fact, MIC considered that there is considerable divergence of opinions in regard to estimating the market risk premium and 'there is as yet no emerged consensus'.

The Commission [ESC] remains of the view that the weight of evidence discussed above provides a sound basis for adopting an estimate of the equity premium that is below the point estimate provided by the average of the historical premia, but which otherwise is within the range provided by historical returns, given the variability associated with this measure. Indeed, the evidence discussed above (including the new information received since the Draft Decision) would suggest that many market practitioners would adopt an assumption about the equity premium that is lower than the assumption of 6% that the Commission has adopted in previous decisions and in the Draft Decision.[18]

In determining an appropriate estimate of the market risk premium for this Final Decision the Commission has carefully considered the additional information provided in recent submissions. In addition, the Commission has considered GasNet's legitimate business interests pursuant to section 2.24(a) of the Code. The Commission acknowledges the studies that suggest that the appropriate estimate of market risk premium is less than the 6.0% the Commission has generally used to date in its regulatory decisions. However, the impact of altering the estimate at this time to 3.0%, for example, may be unduly harmful to GasNet's legitimate business interests. p97.

SPI 2002

Under a classical tax system, conventional thinking suggests a value for the MRP of around 6.0%. In a consultancy to the Commission, Kevin Davis derives figures based on a dividend growth model of between 4.5% and 7.0% with further indication that the MRP may be trending downward……

The Commission recognises that the market risk premium has fallen over recent years, however the Commission is wary that this may reflect short term market trends. p27

Repeats the Jardine Fleming Capital Partners tthe historic MRP was 5.87. p28.

Powerlink 2001

Further, the Commission believes that the current market risk premium of 6.0% is on the high side and therefore sufficient to compensate for the difference between the five and ten year bond yields. p20.

NSW and ACT 2000

Professor Bob Officer also provided support for the view that the MRP may be trending downward.[19] Evidence from outside Australia obtained at the time also suggested that the

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18 ESC, Final Decision: review of gas access arrangements, October 2002, p. 336.

19 ACCC, 'Access Arrangement by Transmission Pipelines Australia, Final Decision,' Octover 1998, p53.

premium had fallen as investors' perception of risk changed. For example, OFWAT, the UK water regulator, had asserted that the MRP was in the region of 2.75 to 3.75 percent. p18.

Murrylink 2003

Repeats arguments from ElectraNet 2002.

Transend 2003

Repeats arguments from ElectraNet 2002 but adds that the 6% MRP is:

- This is consistent with the Lally study for the ACCC, which recommended an MRP of 6%.

- A number of surveys have supported the ACCC's MRP estimate. For example, the Jardine Fleming capital markets survey on professional market practitioners' MRP expectations found that it was 5.87% on average.[20] The survey also found the expected future MRP is about 1% below this figure. However, the ACCC considers that these reduced expectations reflect substantial uncertainty and are not persuasive enough to revise its estimate.

Murrylink 2003

Repeats arguments from ElectraNet that MRP is currently to high but additional research is still necessary.

Return on Debt

Debt Margin

ElectraNet 2002

- credit rating of A was deemed appropriate, but included Government and private companies actual credit ratings,
- noted that gas companies rating of BBB+, which is lower than electricity companies, could be explained by a wide range of factors. Including, regulatory risk, counter party risk and overall volume risk.

Murrylink 2003

[20] Jardine Fleming Capital Partners, *The Equity Risk Premium – An Australian Perspective*, September 2001.

- The Commission has included both private and government entities in its sample in determining the average credit rating for the electricity industry. The Commission considers that simply using stand alone and private entities would provide too small a sample to obtain an average credit rating for the electricity industry.
- Accordingly, the Commission considers that an A credit rating represents an appropriate proxy credit rating for the benchmark electricity company.
- As the Commission has adopted a 10-year regulatory control period, it considers it appropriate to determine the debt margin based on a 10-year term. Therefore the current 10-day moving average benchmark spread over the government bond yields, for A rated corporate bonds with a maturity of 10-years, is 086 bp.

Transend 2003

- Accordingly, the ACCC considers that an A credit rating represents an appropriate proxy for the benchmark electricity company.
- The term of the bond should match the length of the regulatory period. In the case of Transend it is five-and-a-half years.

Gamma

ElectraNet 2002

the Commission believes that a more appropriate value for γ is closer to one. However, it recognises that further research is required and no consensus has yet developed among Australian academics and practitioners for adjusting the rate of use of tax credits. It is therefore inappropriate for the Commission to lead in this area and further work is required before altering its current position on γ. Accordingly, in line with recent Commission decisions, a γ of 0.5 is used in this decision. p31

GasNet 2002

This last point is to be expected when a significant portion of the shareholder base is not subject to Australian taxation. However, the observation is essentially irrelevant to the regulatory framework which consistently maintains the assumption that the equity investor is domiciled in Australia. This allows for consistency in applying the CAPM in the context of the Australian market and the fact that regulated services are provided to the Australian market. If the assumption were to be relaxed, it is not sufficient to merely adopt a different value of gamma. Instead, the whole CAPM framework would need to be revised to recognise the international context in which the foreign investors are operating. As a first step this involves the adoption of an international version of the CAPM model and reconsideration of the relevant CAPM parameters. Lally considers this issue in detail and

provides strong evidence to show that reducing the value of gamma as a means of recognising the existence of foreign investors provides a perverse result.[21] Instead, his analysis shows that the costs of capital for foreign investors is somewhat less than their Australian counterparts and that setting gamma to 1.0 would not compromise the benchmark returns they require if their foreign status is fully considered.

Lally June 2002

Model that assumes that national equity markets are segmented rather than integrated (such as the Officer model) is recommended. It follows that foreign investors must be completely disregarded. Consistent with the disregarding of foreign investors, most investors recognized by the model would then be able to fully utilize imputation credits. p42

Powerlink 2001

This approach ensures the optimal utilisation of tax deductions and franking credit rebates. Therefore, in line with these changes, the Commission believes that a more appropriate value for gamma would be closer to 1.0. p 21

21 M Lally, *The cost of capital under dividend imputation*, a paper commissioned by the ACCC, April 2002.

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