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James Cox
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Independent Pricing and Regulatory Tribunal
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15 October 2004

Jim

Dear Mr Cox

**NSW RAIL ACCESS REGIME – REVIEW OF RATE OF RETURN**

In reference to your letter dated 11 August 2004 please find attached a hardcopy of Pacific National's submission regarding the *Review of Rate of Return*. This submission was emailed to IPART's Adrian Kemp on Friday 8 October in accordance with the extension granted by Mr Kemp.

Pacific National engaged the consultants NECG to prepare the attached submission. If you have any questions regarding the content, analysis or assumptions in the attached document, Pacific National and NECG would be pleased to discuss these with you.

Yours sincerely

**Robert Jeremy**
General Manager Commercial

Cc: Adrian Kemp

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# NSW Rail Access Regime – Review of Rate of Return

**Submission on behalf of Pacific National**

8 October 2004

## Executive summary

This report is framed broadly by the questions IPART posed to Pacific National in a letter of 11 August 2004. Our view on these questions can be summarised in the following terms:

- In the absence of an alternative method that is likely to be implementable in the short term, the Capital Asset Pricing Model should continue to be used to determine the rate of return for RIC, given the familiarity of industry and regulatory economists with that approach;
- Other than beta, the WACC parameters used in IPART's 1999 decision are broadly appropriate, although obviously the risk-free rate, corporate tax rate, and inflation rate should all be updated to current values;
- In light of empirical evidence reflecting experience since the Regime came into force, the asset beta (and the equity beta) previously employed by IPART is clearly too high. This report highlights this issue and suggests a range of alternative values;
- Non-systematic risks have the potential in theory to be important, but given the many protections against down-side outcomes that are built into the Regime (it involves essentially a profit cap with provision for future recovery of sub-ceiling profits in any year) these types of risks should not make any material addition to the permitted WACC; and
- Some investments nominated for the "high risk" category involve mainline investments and therefore do not appear to create any additional risk for the investor. Where new infrastructure investments genuinely involve particular risks for the investor, it would be more appropriate to permit accelerated depreciation rather than an increased rate of return.

We conclude that there are no grounds for the WACC to be increased from the 1999 level. In fact, there are grounds to believe it could be reduced to a level closer to the cost of debt without impairing the infrastructure owner's ability to earn a reasonable return on investments. In real pre-tax terms, we recommend that the WACC to be used for the Category 1 Hunter coal rail infrastructure access prices should be 6.23%, rather than the 8.0% previously adopted by IPART. This choice reflects an asset beta of 0.3, current values for the risk-free rate, corporate tax rate and inflation, as well as an increase to the market risk premium relative to the value

previously adopted by IPART. In this analysis, we have adopted a 7% market risk premium, consistent with other NECG regulatory submissions. It is important to recognise, however, that IPART adopted a 5.5% value in its 1999 decision, and that regulators generally tend to adopt a 6% value. Had our recommendation been based upon a 6% market risk premium, the resulting pre-tax real WACC would have been 5.88%.

In light of the need for capacity augmentations to match the expected growth in the Hunter coal task, we have not advocated the most radical choice of asset beta that would be justified by the empirical evidence presented here. In investment situations that involve stranding risk or differ in other ways from the risks intrinsic to existing mainline assets, there are methods of providing incentives for such investments without allowing a higher rate of return. These methods, such as a modified depreciation treatment, should be preferred.

# 1 Introduction

NECG has prepared this report to IPART on behalf of Pacific National. It responds to the questions posed by IPART in a letter dated 11 August 2004 concerning IPART's review of the rate of return under the NSW Rail Access Regime.

## 1.1 Key issues for review

In undertaking the current review, IPART has invited submissions on a number of issues relating to the rate of return applicable to RIC:

- Is the capital asset pricing model (CAPM) the most appropriate methodology to determine the rate of return?
- Are the parameters IPART used in 1999 reflective of prevailing market conditions and more specifically:
  - Does the equity beta appropriately reflect the systematic risks faced by the RIC, and
  - What unsystematic risks warrant a move above the mid-point of the feasible WACC range?
- Any other matters interested parties consider might be relevant to an analysis of an appropriate rate of return applicable to rail infrastructure assets.

This report presents an empirical analysis of RIC's returns and implications for the asset beta. Following that work, we provide our recommended parameters for the CAPM and WACC, noting the sensitivity of WACC to parameter choices within the likely ranges. We conclude with a brief observation on the concept of high risk investments and how best to accommodate them within the regulatory framework—by modifying the depreciation life applied to them rather than the WACC.

## 1.2 Background

The NSW Rail Access Regime (the Regime) requires the Independent Pricing and Regulatory Tribunal (IPART) to review specific aspects of the NSW Rail Access Regime.

In accordance with Section 2.1 of Schedule 3 of the Regime, IPART is required to review the rate of return every five years. In its 1999 Final Report IPART decided to allow for a maximum rate of return of 8.0 per cent (real, pre-tax) on rail infrastructure assets for the period 1 July 1999 to 1 July 2004. Schedule 3, Clause 2.1 specifies that:

> *Rate of return means a rate of return in percentage terms approved by IPART for a period of five years to be applied to the average of the opening and closing regulatory asset base. The rate of return approved by IPART for the period from 1 July 1999 is 8.0 per cent on a real, pre-tax basis.*

In a submission to the 1999 Review of the Access Regime, the Rail Infrastructure Corporation (RIC)[1] proposed that the Regime should specify both a ceiling and an average rate of return. IPART subsequently determined a real pre-tax maximum rate of 8.0 per cent, which was towards the upper end of the parameters presented in Table 1 below.

Table 1 **IPART's WACC Parameters for RIC (1999)**

| | Low | Mid | High |
|---|---|---|---|
| Nominal risk free rate (10 year) | 5.37% | 5.37% | 5.37% |
| Real risk free rate | 3.52% | 3.52% | 3.52% |
| Inflation | 1.79% | 1.79% | 1.79% |
| Market risk premium | 5.0% | 5.5% | 6.0% |
| Debt margin | 1.0% | 1.0% | 1.0% |
| Equity beta | 0.70 | 0.85 | 1.00 |
| Asset beta | 0.29 | 0.41 | 0.55 |
| Debt beta | 0.10 | 0.09 | 0.08 |
| Debt to equity | 60% | 55% | 50% |
| Gamma | 0.5 | 0.4 | 0.3 |
| Tax rate | 36% | 36% | 36% |
| Cost of equity (nominal post tax) | 8.90% | 10.06% | 11.39% |
| WACC (nominal post tax) | 5.23% | 5.94% | 6.91% |
| Nominal pre-tax WACC (market practice method) | 8.71% | 9.28% | 10.80% |
| Real pre-tax WACC (Macquarie method) | 5.26% | 6.37% | 7.86% |
| Real pre-tax WACC (market practice method) | 6.27% | 7.36% | 8.84% |
| **Real pre-tax WACC** | **5.3%** | **7.1%** | **8.8%** |

[1] At the time of the 1999 Review RIC was known as the Rail Access Corporation.

**Source:** IPART, *Aspects of NSW Rail Access Regime*, Final Report, Table 9, p.63.

# 2 Appropriateness of CAPM

The cost of equity component of the WACC was determined using the Capital Asset Pricing Model (CAPM). The general formula for the CAPM is:

Re = Rf + [ße (Rm-Rf)]

Where:

Re = return on equity, being the return after corporate tax but before personal tax

Rf = risk free rate of return

Rm-Rf = market risk premium

ße = levered equity beta, a measure of systematic risk of an investment, relative to the systematic risk of the market as a whole.

The CAPM has been widely adopted by infrastructure regulators, in Australian and the UK, as the most appropriate model to estimate the cost of equity capital associated with regulated assets. The use of the simple CAPM has generally received support from interested parties. Further, the model is widely used by financial market practitioners when valuing assets.

Other methods are available to estimate the cost of capital. One arguably preferable method is the dividend growth model, which is commonly used, in utility regulation in the US. However, the ability to use this model, and others like arbitrage pricing theory, in Australia is constrained by data limitations at the present time.

While it is recognised that the CAPM has some theoretical and empirical shortcomings, and attracts some debate about the parameters to be applied, it is not clear that a more appropriate alternative methodology has emerged since IPART undertook the 1999 review. Moreover, there is a substantial amount of information available that can be drawn upon to assist in the application of the CAPM, which may not be the case for other models of asset returns.

# 3 Asset beta

Systematic risk is the only risk factor that is incorporated in the Capital Asset Pricing Model (CAPM). It represents the co-variation (that is, the tendency to vary together) of the return on a project with the return on a diversified portfolio as a whole. It is represented by the parameter beta (ß) in the CAPM. The asset beta represents the risk arising from the sensitivity of the operating cash flows generated by an entity's assets compared with the market in general, that is, the market risk associated with an entity's business. Asset betas vary with the volatility of free cash flows and are driven by the sensitivity of those cash flows to fluctuations in the economy.

The equity beta incorporates the additional financial risk to shareholders arising from the use of debt to finance the entity's assets.

Generally, for a *listed* firm, the approach used to estimate the equity beta of a security is to examine how the return of the security has varied in the past, relative to variations in the market return. This process commonly involves computing the return from the investment in a security and the return from investment in the market index for each month over the past three to five years.[2] A regression line can then be fitted to the observed returns, with the slope of this line being the estimate of the equity beta.

The task becomes more difficult for firms which, like RIC, are not listed on the stock exchange. In this case it is not possible to directly observe the equity returns of the company. However, it is generally possible to make some estimate of a suitable beta to apply, based on the observed betas of comparable listed firms or using first principles.

In order to assess the appropriate beta for RIC, given the potential lack of comparable listed companies, an estimate has been calculated. The estimated beta was determined on the basis of available information regarding RIC's financial accounting performance over the past three years and adopting various assumptions to compare the accounting returns to market returns over the same period.

The intended outcome of this work was not to estimate an exact beta value, but rather to assess the appropriateness of the equity beta adopted by IPART in its 1999 rate of return review.

## 3.1 Empirical assessment of IPART 1999 RIC beta

As discussed above, estimating the asset beta of an unlisted firm creates some difficulties because beta is generally estimated on the basis of the observable security returns of a listed firm against market returns. However, with the appropriate data on monthly accounting returns of an unlisted firm and by adopting plausible assumptions, it is possible to use the accounting returns as an empirical proxy of security returns to estimate an asset beta.

### Estimation Approach

The following observable RIC accounting information and market data pertaining to Category I coal access in the Hunter Valley was used in the analysis:

- monthly RIC 'pre-' and 'post- cusp' revenues received from access charges applied to Pacific National between July 2000 to the end of August 2004;[3]

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[2] This is the approach adopted by the Australian Graduate School of Management (AGSM) Risk Measurement Service.

[3] During this period Pacific National was the only access seeker in the Hunter Coal network. Therefore, RIC's monthly revenue achieved from Pacific National's coal transporting accounted for the total RIC monthly revenue from access charges.

- monthly RIC 'pre-' and 'post- cusp' transported coal volumes between July 2000 to the end of August 2004;
- annual RIC asset values, depreciation and operating costs for of the relevant years;[4]
- monthly market returns based on the *All Ords Accumulation Index* between July 2001 and end January 2004.[5]

In keeping with IPART's approach in 1999, the analysis was only undertaken for RIC's Category 1 assets so only the revenues, asset values, costs and volumes specific to these assets were used.

The RIC monthly returns for the period July 2000 to August 2004 were calculated using accounting data as follows:

$$\text{Monthly RIC return} = \frac{[\text{Revenue - Operating costs - Depreciation - Tax payable}]_{\text{per month}}}{\text{Average annual RIC asset value}}$$

where;

- monthly operating costs were calculated under the assumption that the costs are relatively fixed and therefore constant across each month of the year;
- monthly tax payable was determined as follows:

$$\text{Monthly tax payable} = \text{Statutory corporate tax rate} \times [\text{Revenue - Operating Cost – Depreciation}]_{\text{per month}}$$

where,

- annual depreciation costs were assumed to be constant across each month of the year, and
- the statutory corporate tax rate for the financial year 2000/01 was 34% and 30% from July 2001.

The estimation of a proxy asset beta was then undertaken for the following two scenarios:

1. Scenario 1 - Monthly accounting revenues as reported. In this case the regulatory 'pre-cusp' and 'post-cusp' pricing rule has the affect of introducing a statistical volatility that is not inherent in the economics of returns to RIC, as the end months of a financial year generally experience a significant decline in revenue as a result of the 'post-cusp' price being invoked.

2. Scenario 2 - Monthly accounting revenues adjusted based on monthly transport volumes and the average annual price. In this case, the volatility created by the 'pre-' and 'post-'cusp

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[4] Actual reported Category 1 asset values, depreciation and operating costs were known for the financial years 2001/02 and 2002/03. Given the relative constant nature of these values and costs, the 2000/01 Category 1 asset value, depreciation and operating costs were assumed to be the same as the actuals accounting data for 2001/02. For the 2003/04 period and the first two months of 2004/05 these values were assumed to equal to the forecasts for period 2003/04.

[5] As the accumulation index incorporates not only capital security returns, but also returns from dividends it is considered more suitable than the All Ords Index.

regulation has being removed. This case is likely to be provide a better proxy of the asset beta as in a fully informed market the 'pre-' and 'post-' cusp pricing effect would be reflected in the long term security price. This scenario reflects the more accurate proxy of the expected market outcomes.

In order to justify using accounting returns to proxy for equity sharemarket returns several assumptions and caveats must hold:

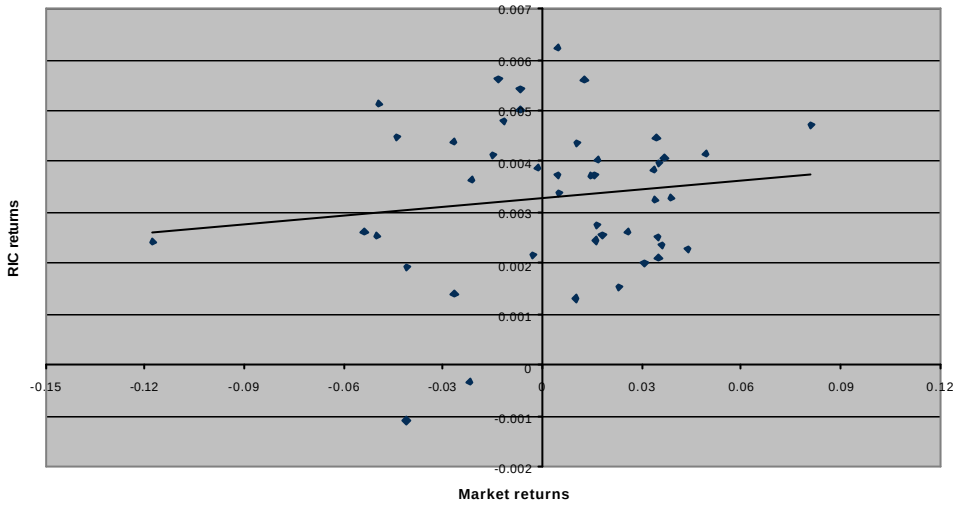
- The Category 1 assets under analysis have no significant growth opportunities. Potential growth adds volatility that would not be reflect in the RIC historic accounting data.
- RIC Category 1 asset values incorporate virtually no intangible assets, hence the ratio of book value to market value is approximately one. Among other things, this means that total assets is an approximation of total market value.
- Interest rates are stable over the period.
- There are no changes in the riskiness of rail transport over the period (e.g., no regulatory surprises).
- Book value of operating expenses is approximately equal to the market value (cash flows) of operating expenses.
- Annual depreciation is a proxy for annual capital expenditure.

Given the type of established infrastructure to which the review applies, and the fact of a stable regulatory framework, these assumptions should are reasonable in the present case.

### Outcomes of asset beta analysis

The outcome of the empirical analysis of the volatility of the RIC's monthly returns compared to the market returns is discussed below. Chart 1 highlights the outcomes of the Scenario 2 comparison of the proxy return from the RIC investment compared to the return from investment in the market index for each month between July 2000 and January 2004. A regression line has been fitted to the observed returns (the slope of which indicates the asset beta estimate, refer to Table 2).

Chart 1 **Scenario 2: RIC versus market monthly returns (July 2000 – Jan 2004)**

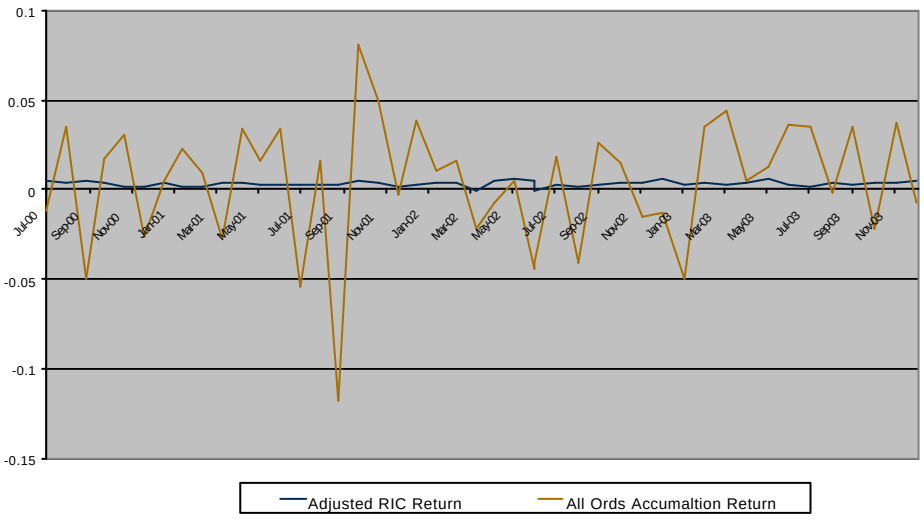



**Data source:** Based on RIC accounting data supplied by Pacific National and market data from Securities Industry Research Centre of Asia-Pacific (SIRCA)

This chart indicates that the volatility of RIC's monthly returns over the period analysed is significantly less than that of the market. In fact, over the period analysed in scenario 2, the analysis indicated that RIC did not experience any negative returns[6] while for the same period the market experienced negative monthly returns on more than a third of the occasions (18 of the 45 data points).

Chart 2 further highlights the significantly lower volatility of the RIC monthly returns.

Chart 2 **Scenario 2: Comparison of RIC & Market Monthly Return (July 2000 – Jan 2004)**




**Data source:** Based on RIC accounting data supplied by Pacific National and market data from Securities Industry Research Centre of Asia-Pacific (SIRCA)

6 On the basis of the assumptions adopted for the analysis (and outlined in section 3.1).

For the two scenarios RIC's asset beta was calculated using the following commonly used formula:

$$\beta_i = \frac{\rho_{i,m}\,\sigma_i\,\sigma_m}{\sigma_m^2}$$

Where,

- $\beta$ RIC estimated asset beta
- $\sigma$ standard deviation of the market (m) and RIC (i) returns
- $\sigma_m^2$ variance of market (m) returns
- $\rho$ correlation coefficient of market (m) and RIC (i) returns

The asset beta estimates resulting from the scenario analysis, calculated as the slope of the regression line shown in Chart 1 based on the above formula, are shown in Table 2.

Table 2 **RIC's estimated asset beta based on empirical accounting data**

| | *Scenario 1* *Non-adjusted monthly revenue* | *Scenario 2* *Adjusted monthly revenue* |
|---|---|---|
| Asset Beta (estimate) | 0.012 | 0.006 |
| Standard deviation | 0.004 | 0.003 |
| R-squared | 0.016 | 0.019 |

These estimated asset betas are significantly below the asset beta range of 0.29 to 0.55 adopted by IPART to determine RIC's WACC range in 1999 (as outlined in Table 1).

However, given the caveats and assumptions required in order to justify using the empirical RIC accounting data to proxy equity sharemarket returns, it is not intended that the asset betas in Table 2 be adopted by IPART in determining RIC's rate of return. Rather the analysis is intended to highlight that an appropriate asset beta to apply in determining RIC's rate of return is likely to be significantly below the 0.4 previously used to estimate the 1999 mid-level WACC.

## 3.2 Summary on asset beta

The outcome of the analysis of the RIC empirical accounting data suggests the need for IPART to reduce the asset beta range from that adopted during the previous rate of return review in 1999. We have not sought to estimate the most appropriate asset beta to apply to the RIC assets. Nevertheless, this analysis demonstrates that the prior IPART-suggested range of 0.29 – 0.55 is significantly above any figure supportable by the empirical evidence. Given the poor fit of the regression line shown in Chart 1 (and demonstrated by the low R-squared figure in Table 2), a null hypothesis—that is no correlation between RIC's Category 1 access returns and the market—cannot be ruled out. The null hypothesis corresponds to an asset beta close to zero.

Our empirical work establishes that RIC's Category 1 returns are highly stable, and poorly correlated with market returns. On the strength of these findings a reduction in the current RIC asset beta would be justified. The recommended reduction will be quantified below after consideration of the sensitivity of WACC values to the choice of beta.

# 4 Other WACC Parameters

Since IPART undertook its last rate of return review of the Regime in 1999, substantial debate about the parameters adopted for many of the inputs to the WACC has continued amongst regulators and interested parties around Australia. Generally speaking, the outcome of these debates has been the development of a considerable degree of consistency across regulators on most parameters.

The following contains a commentary on the various remaining parameters, other than beta, of the CAPM and WACC calculations.

### Risk-free rate, real risk-free rate and forecast of inflation;

In its previous decision, IPART used the 20-day average of the 10-year Commonwealth Bond rate calculated at the time of its final decision as a proxy for the nominal risk-free rate.

The 20-day average of the 10-year Capital Index Bond rate, at the time of the decision, was used as a proxy for the real risk-free rate.

The forecast of inflation was determined as the difference between the rate of nominal and inflation-indexed bonds that have a term to maturity of 10 years.

This is now a commonly accepted approach amongst regulators in Australia, including other IPART decisions, and we support the continuation of this approach.

### Market risk premium

IPART's 1999 final decision used a range for the Australian market risk premium lying between 5.0 percent and 6.0 percent. In the majority of recent regulatory decisions around Australia, 6.0 percent has been approved as the appropriate market risk premium to apply to the WACC estimate. NECG has consistently advocated the use of a 7% market risk premium for regulatory WACC estimates.

### Appropriate gearing level

In 1999, IPART supported the use of an assumed optimal capital structure for calculating the WACC. Following consideration of all the available evidence in 1999, IPART supported a gearing level of 50 percent to 60 percent.

A gearing level of 60 per cent has been commonly used in regulatory decisions since 1999 and we support the continued use of 50 percent to 60 percent as a suitable range to estimate low, mid and high WACC for RIC.

### Debt margin

In 1999, IPART came to the view that the cost of debt for RIC is approximately 1 percent above the risk free rate of return. The basis of this view was that RIC had no debt, yet was confident it can borrow at approximately 1 percent above the 10 year Commonwealth Bond rate.[7]

Since this time Australian regulators have adopted assumptions about the financial gearing and credit ratings of regulated firms in order to use these inputs to base the cost of debt on market evidence (in the form of, for example, predicted yields derived from Australian corporate bonds from the CBASpectrum service). Common assumptions of an efficiently financed infrastructure firm that have been adopted in some recent regulatory decisions are:

- a benchmark gearing assumption of 60 per cent debt to assets based on observation of the gearing ratios of Australian listed entities;
- for such a gearing ratio regulators have assumed that an entity could maintain a credit rate between BBB and A- (depending on the regulator); and
- that an assumed term to maturity of 10 years was appropriate, although some regulators have used a term of 5 years.

### Setting the tax rate

In the 1999 final decision, IPART decided to utilise the statutory tax rate of 36 percent. At the time, IPART noted that altering access prices for changes in RIC's tax position might cause an undesirable increase in price volatility. IPART expressed the belief that it is for utilities to manage their own tax affairs.

However, since this time several regulators within Australia have utilised effective tax rates rather than statutory tax rates to determine the rate of return to the regulated entity. There may be some advantages for IPART in following the lead of other regulators, such as the Victorian ESC and the QCA, who use a 'Vanilla WACC' approach.[8]

Since the previous RIC decision the Australian statutory corporate tax rate has reduced to 30%.

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[7] RAC submission to IPART, 27 November 1998, Appendices p 11.

[8] The term 'vanilla WACC' has become a relative common term used in Australia to refer to the simplified weighted average cost of capital formula which does not incorporate any treatment of tax. This approach assumes the treatment of tax is incorporated in the cash flows (in the revenue requirement).

### Estimating the value of franking credits (gamma)

Due to some uncertainty on the best estimate of gamma, in 1999 IPART decided to utilise a range for gamma of 0.3 to 0.5. Since this time, regulators around Australian have commonly used gamma of 0.5 in numerous regulatory decision.

### Asymmetric risk

Some regulators in Australia, the ACCC and ESCOSA, have recognised that asymmetric risk is a valid issue that should be incorporated into the regulatory process. However, a strong burden has been put upon the infrastructure provider to establish the appropriateness of any such claim.

We are of the view that where such risks can be established, these should be addressed through the RIC cash flows rather than as a premium in the WACC. Addressing asymmetric risks through cash flows is a more transparent approach.

## 5 Validating estimates of the cost of debt

The cost of debt estimated within the WACC model is driven by the estimate of the risk-free rate and the debt beta, or equivalently, the debt margin. The estimate can be compared directly to benchmark borrowing costs to test the reasonableness of the underlying suppositions. Pacific National would be pleased to provide IPART with information on its own cost of borrowling on a commercial in confidence basis to confirm the debt cost derived from the WACC model. Pacific National's cost of borrowing would represent an upper limit to the debt cost likely to be faced by the infrastructure owner in the Hunter Valley coal system.

In light of the very low correlation between RIC's Category 1 Hunter coal returns and those of the stock market generally, an argument could be made that RIC's true cost of capital would approach the level of a corporate bond rate. Another way of saying this is that RIC's asset beta is effectively zero, so it would be capable of funding almost all of its capital through borrowing. While this point is arguable, we do not press it here. The methodological difficulties with this study suggest a degree of caution in adopting extreme (near zero) values for beta.

# 6 Impact on the WACC

The following section looks at the impact of varying the key parameters of the WACC. This sensitivity analysis compares the impact of amending one parameter at a time for a low and high WACC range whilst keep all other parameters constant at the base case. The base case represents the IPART mid-point WACC estimated for the 1999 review with some minor amendments (such as updating the corporate tax rate), as shown in Table 3. For simplicity and to save time the nominal and real risk-free rates, as determined by the 20-day average Commonwealth and Capital Index Bond rates at the time of a decision, have been kept as they were in the 1999 review.

Table 3 **Base Case for Scenario Analysis of RIC WACC Parameters**

| | Base Case |
|---|---|
| Nominal risk free rate (10 year) | 5.37% |
| Real risk free rate | 3.52% |
| Inflation | 1.79% |
| Market risk premium | 5.5% |
| Debt margin | 1.0% |
| Debt beta | 0.09 |
| Asset beta | 0.41 |
| Equity beta | 0.85 |
| Debt to equity | 55% |
| Gamma | 0.4 |
| Tax rate | 30% |
| Cost of equity (nominal post tax) | 10.16% |
| **WACC (nominal post tax)** | **6.35%** |
| **Nominal pre-tax WACC (market practice method)** | **9.08%** |
| **Real pre-tax WACC (market practice method)** | **7.16%** |

## NOTE: IPART's 1999 NSW rail review final decision of 8.0 percent as the maximum allowable rate of return was based on a combination of the results from the mid-point and high parameter cases. IPART examined two different methodologies (Macquarie method & market practice method) for determining real pre-tax WACC. For simplicity we have only compared the results from market practice methodology in the following sensitivity analysis.

The results of the sensitivity analysis are summarised in Table 4, which shows the individual parameter that was varied in the base case (both high and low scenarios) and the resultant WACC (nominal post tax).

Table 4 **Scenario Analysis – Results when vary one parameter at a time from Base Case**

| | Base Case | Low case | High case | Difference b/w High & Low Case |
|---|---|---|---|---|
| Market risk premium | 5.50% | 5.00% | 7.00% | |
| Real pre-tax WACC (market practice method)## | 7.16% | 6.92% | 7.86% | 13.6% |
| Debt margin | 1.00% | 0.80% | 1.20% | |
| Real pre-tax WACC (market practice method)## | 7.16% | 7.05% | 7.27% | 3.1% |
| Debt beta | 0.09 | 0.0 | 0.20 | |
| Real pre-tax WACC (market practice method)## | 7.16% | 7.01% | 7.34% | 4.7% |
| Asset beta | 0.41 | 0.0 | 0.30[9] | |
| Equity beta | 0.80 | 0.05 | 0.56 | |
| Real pre-tax WACC (market practice method)## | 7.16% | 4.73% | 6.51% | 37.6% |
| Debt to value (% gearing) | 55% | 60% | 50% | |
| Real pre-tax WACC (market practice method)## | 7.16% | 7.12% | 7.19% | 1.0% |
| Franking credit (gamma) | 40% | 50% | 30% | |
| Real pre-tax WACC (market practice method)## | 7.16% | 7.01% | 7.37% | 5.1% |

**## NOTE: IPART's 1999 NSW rail review final decision of 8.0 percent as the maximum allowable rate of return was based on a combination of the results from the mid-point and high parameter cases. IPART examined two different methodologies (Macquarie method & market practice method) for determining real pre-tax WACC. For simplicity we have only compared the results from market practice methodology in the following sensitivity analysis.**

This sensitivity analysis clearly demonstrates that beta is the most significant parameter impacting estimates of the appropriate WACC to apply to RIC. Therefore, it is important that significant regard be given to the empirical analysis undertaken in section 3 of this report when setting the asset beta range appropriate for RIC.

Given the importance of the selected beta value, we present, in Table 5 below, five sensitivity cases in which the IPART 1999 WACC parameters are adopted, apart from the risk-free rate and corporate tax rate (which are set to today's values), the market risk premium (which is set to the NECG-preferred value of 7.0%), and the asset beta which is the independent variable.

[9] A 'high case' asset beta of 0.3 was chosen on the basis that this is consistent with our empirical findings, as discussed earlier in this paper, that the present IPART asset beta of 0.4 is probably too high.

Table 5 **WACC Sensitivity Analysis to Varying Asset Betas (with MRP = 7.0%, tax = 30%)**

| | IPART 1999 Mid Case^^ | Asset beta = 0.0 | Asset beta = 0.1 | Asset beta = 0.2 | Asset beta = 0.3 | Asset beta = 0.41 |
|---|---|---|---|---|---|---|
| Nominal risk free rate (10 year) | 5.37% | 5.39% | 5.39% | 5.39% | 5.39% | 5.39% |
| Real risk free rate | 3.52% | 2.74% | 2.74% | 2.74% | 2.74% | 2.74% |
| Inflation## | 1.79% | 2.58% | 2.58% | 2.58% | 2.58% | 2.58% |
| Market risk premium | 5.5% | **7.0%** | **7.0%** | **7.0%** | **7.0%** | **7.0%** |
| Debt margin | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| Debt beta | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 |
| Asset beta | 0.41 | **0.00** | **0.10** | **0.20** | **0.30** | **0.41** |
| Equity beta | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
| Debt to equity | 55% | 55% | 55% | 55% | 55% | 55% |
| Gamma | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Tax rate | 30% | 30% | 30% | 30% | 30% | 30% |
| Cost of debt (nominal post tax) | 6.37% | 6.39% | 6.19% | 6.59% | 6.39% | 6.39% |
| Cost of equity (nominal post tax) | 10.16% | 5.74% | 7.14% | 8.54% | 9.94% | 11.49% |
| **WACC (nominal post tax)** | **6.35%** | **4.67%** | **5.13%** | **5.82%** | **6.28%** | **6.87%** |
| **Nominal pre-tax WACC (market practice method)** | **9.08%** | **6.67%** | **7.32%** | **8.31%** | **8.97%** | **9.82%** |
| **Real pre-tax WACC (market practice method)** | **7.16%** | **3.98%** | **4.62%** | **5.59%** | **6.23%** | **7.06%** |

**^^ This "IPART 1999 Mid Case" has been taken from the previous 1999 NSW Rail Regime review but adapted to take account of the new corporate tax rate of 30%, rather than 36%. The 1999 risk free rates and inflation have been maintained in the base case.**

**## The inflation rate for 2004 has been based on the difference between the 20 day average of Commonwealth and Capital Index linked bonds to 6 October 2004.**

Given these sensitivity results, we would recommend the use of an asset beta value of 0.3 for several reasons. First, it represents a significant, but not extreme, reduction from the value of 0.41 previously chosen by IPART. In light of the empirical work presented here, a reduction is required. Second, by not selecting the most extreme value that the empirical data would support—namely a beta of zero—we have recognised the infrastructure owner's need to earn a sufficient return to enable it to fund investments in the Category 1 Hunter coal system. Third, the recommended value of 0.3 is within the asset beta range originally nominated by IPART in 1999 (range: 0.29 to 0.55). This last point, along with the fact that we have recommended the use of a market risk premium higher than the value traditionally adopted by Australian regulators, attests to the reasonableness of the proposed WACC for the NSW Rail Access Regime. In this analysis, we have adopted a 7% market risk premium, consistent with other NECG regulatory submissions. It is important to recognise, however, that IPART adopted a 5.5% value in its 1999 decision, and that regulators generally tend to adopt a 6% value. Had our recommendation been based upon a 6% market risk premium, the resulting pre-tax real WACC would have been 5.88%. If IPART's 1999 asset beta of 0.41 were used with the 6% market risk premium, the real pre-tax WACC would have been 6.59%.

# 7 Any other matters

A final issue, that is relevant to the question of asymmetric risks, concerns the appropriate regulatory treatment of high risk infrastructure investments. We understand that some mainline capacity investments are candidates for special treatment under this "high risk" label. Such special treatment for mainline capacity investments appears highly questionable. There is little risk of stranding for such investments.

There are some investments, such as new spur lines to new mines, that may warrant special consideration, owing to the particular risk profile that such investments face. Rather than approving a higher rate of return for such "riskier" investments, however, it would be more appropriate to deal with the stranding risk through the depreciation treatment.

This could be accomplished most easily, and with least disruption to existing arrangements under the NSW Rail Access Regime, by permitting the depreciation life of single-mine assets to be shortened to reflect a realistic estimate of the economic life of the resource that supports them. Rather than applying the standard 40 year mine life to such new, single-mine assets, a shorter life could be applied for the purpose of calculating depreciation. That would suffice in most cases to make the investment business case work, without having to introduce a special one-off WACC for each investment.

# 8 Conclusion

We conclude that there are no grounds for the WACC to be increased from the 1999 level. In fact, there are grounds to believe it could be reduced to a level closer to the cost of debt without impairing the infrastructure owner's ability to earn a reasonable return on investments. In real pre-tax terms, we recommend that the WACC to be used for the Category 1 Hunter coal rail infrastructure access prices should be 6.23%, rather than the 8.0% previously adopted by IPART. This choice reflects an asset beta of 0.3, current values for the risk-free rate, corporate tax rate and inflation, as well as an increase to the market risk premium relative to the value previously adopted by IPART. In this analysis, we have adopted a 7% market risk premium, consistent with other NECG regulatory submissions. It is important to recognise, however, that IPART adopted a 5.5% value in its 1999 decision, and that regulators generally tend to adopt a 6% value. Had our recommendation been based upon a 6% market risk premium, the resulting pre-tax real WACC would have been 5.88%.

In light of the need for capacity augmentations to match the expected growth in the Hunter coal task, we have not advocated the most radical choice of asset beta that would be justified by the empirical evidence presented here. In investment situations that involve stranding risk or differ in other ways from the risks intrinsic to existing mainline assets, there are methods of providing incentives for such investments without allowing a higher rate of return. These methods, such as a modified depreciation treatment, should be preferred.