



# *Economic Regulation Authority*

Western Australia

---

## **Determination of the preferred methodology for calculating the weighted average cost of capital for covered electricity networks**

**ECONOMIC REGULATION AUTHORITY**

**25 February 2005**

**DETERMINATION OF THE PREFERRED METHODOLOGY FOR CALCULATING THE WEIGHTED AVERAGE COST OF CAPITAL FOR COVERED ELECTRICITY NETWORKS**

**DETERMINATION** ..... 1

**STATEMENT OF REASONS**..... 2

*ACCESS CODE* ..... 2

*PUBLIC CONSULTATION*..... 3

*PUBLIC SUBMISSIONS* ..... 4

*WACC METHODOLOGY*..... 7

*Return on assets* ..... 7

*Treatment of inflation*..... 7

*Treatment of tax* ..... 8

*Debt premium*..... 9

*Risk free interest rates*..... 10

*Financing structure*..... 11

**APPENDIX 1** ..... 12

## DETERMINATION

1. Section 6.65 of the *Electricity Networks Access Code 2004* (**Access Code**), established under section 104 of the *Electricity Industry Act 2004*, allows the Economic Regulation Authority (**Authority**) to make and publish a determination of the preferred weighted average cost of capital methodology (**WACC methodology**).
2. On 14 January 2005, the Authority published a discussion paper, prepared by the Allen Consulting Group (**ACG**), on the WACC methodology to apply to covered (or regulated) networks (**Discussion Paper**). Submissions were invited in accordance with Appendix 7 of the Access Code.
3. The public consultation period on the Discussion Paper closed on Wednesday 2 February 2005. Three submissions were received.
4. As required by section A7.10 of the Access Code, the Authority has considered each submission. The Authority has also had regard to the discussion paper prepared by the ACG.
5. The Authority's determination, pursuant to section 6.65 is that:
  - the capital asset pricing model (**CAPM**) be the methodology used for calculating the return on assets;
  - financial modelling be applied in real terms;
  - the weighted average cost of capital (**WACC**) be formulated on a pre-tax basis, using the Officer formula with the taxation adjustment calculated using a forward transformation;
  - the debt premium be based on market evidence of debt costs for businesses with a credit risk profile consistent with a BBB or BBB+ credit rating (sources of relevant market evidence may include CBASpectrum and Bloomberg estimates of corporate bond yields);
  - nominal risk free rates to be derived from Commonwealth 10 year bond rates with terms of 10 years, calculated on the basis of a 20 trading day average of the yields, taken at the final day of the month prior to a decision on an access arrangement;
  - real risk free rates to be derived from a 20 trading day average of the yields on Commonwealth index-linked bonds with terms of 10 years, taken at the final day of the month prior to a decision on an access arrangement;

- the inflation forecast for the relevant period is the difference between the nominal risk free rate and real risk free rate (calculated using the Fisher equation<sup>1</sup>); and
  - an appropriate benchmark gearing assumption be adopted to encourage efficient financing decisions.
6. The determination of the preferred WACC methodology has effect for five years, commencing on 25 February 2005.
  7. Pursuant to section 6.69 of the Access Code, this determination is effective for the first access arrangement submitted for Western Power Corporation's (**Western Power**) South West Interconnected Network (**SWIN**) within the South West Interconnected System.
  8. It is noted that the figures in Appendix 1 to this determination do not represent a pre-determination of the WACC by the Authority, but are intended to represent a reasonable depiction of the cost of capital at the time of publication of this determination. Appendix 1 sets out the inputs into the WACC calculation considered by the Authority to be an effective means of achieving the objectives in sections 2.1 and 6.4 of the Access Code for the SWIN.

## **STATEMENT OF REASONS**

9. The following paragraphs in this determination detail the Authority's reasons for decision.

### ***Access Code***

10. Section 6.65 of the Access Code provides:

The Authority may from time to time make and publish a determination (which subject to section 6.68 has effect for all covered networks under this Code) of the preferred methodology for calculating the weighted average cost of capital in access arrangements.

11. Section 6.66 then provides:

A determination under section 6.65:

- (a) must represent an effective means of achieving the Code objective and the objectives in section 6.4; and
- (b) must be based on an accepted financial model such as the Capital Asset Pricing Model.

12. An access arrangement proposed by a service provider must set out the WACC for its particular covered network. If a determination has been made pursuant to section 6.65, then 6.64(a)(i) applies:

---

<sup>1</sup> Brearley, R.A. and Myers, S.C., 1996. *Principles of Corporate Finance*, fifth edition, New York McGraw-Hill, pp 642, 643.

for the first access arrangement for the covered network that is covered under section 3.1 — may use any methodology (which may be formulated without any reference to the determination under section 6.65) but, in determining whether the methodology used is consistent with this Chapter 6 and the Code objective, regard must be had to the determination under section 6.65....

13. Section 3.1 of the Access Code provides that the SWIN is a “covered network” from the “Code commencement date” (30 November 2004). The SWIN is currently the only covered network.

14. Section 6.69 is relevant, as this determination is made prior to the lodgement of the first proposed access arrangement:

For the covered network that is covered under section 3.1, a determination under section 6.65 has effect in relation to the approval of the first access arrangement if it is published at least 3 months before the submission deadline.

For the first access arrangement for Western Power’s SWIN, the Authority’s determination of the WACC methodology is required to be published by the end of February 2005 to be effective.

15. Consequently, and as required by section 6.64(a)(i) of the Access Code, regard must be had to the Authority’s determination in paragraph 5 in considering whether the WACC methodology proposed by Western Power in its access arrangement for the SWIN is consistent with section 2.1 and chapter 6 of the Access Code.
16. If another network becomes covered while this determination is in effect, this determination will also apply to that network unless the determination is revoked or amended.

### ***Public consultation***

17. Before making a determination, the Authority is obliged to undertake a public consultation process in accordance with Appendix 7 of the Access Code. Appendix 7 provides a flexible process, as it includes a series of steps that the decision-maker *must* take, and steps that the decision-maker *may* take.
18. The Authority engaged the ACG to make recommendations regarding the appropriate WACC methodology, and to explore potential WACC parameter values, based on contemporary approaches.
19. The parameters in the Discussion Paper were intended to assist public consultation and to assist the owners of covered networks. It is noted that the Access Code requires owners of covered networks to submit proposed WACC parameters for the Authority’s subsequent approval.
20. The Authority published the Discussion Paper on its website on 14 January 2005, inviting submissions from interested persons to be received by 2 February 2005.

***Public submissions***

21. The Authority received submissions on the Discussion Paper from:
- Newmont Australia Ltd;
  - Envestra Ltd; and
  - Western Power.
22. Newmont noted the importance of selecting an appropriate WACC to ensure that fair and reasonable network access charges result. While in general support of the formulation, Newmont submitted that some assumptions in the Discussion Paper err on the high side, and that it would not wish to see higher values used. The Authority acknowledges the concern raised by Newmont, but also recognises the uncertainty that exists in the estimation of values and the need to ensure that regulated rates of return are sufficient to achieve economically efficient outcomes.
23. Newmont requested that the Authority provide a table of WACC figures, as derived on different bases (Eg. Inflation and taxation treatment), to aid comparison. The Authority agrees there is value in doing so, and considers that the creation of a comparative table will aid comprehension of decisions made under the auspices of the Access Code.
24. Western Power questioned the scope of the Discussion Paper. Western Power was concerned that the Authority had incorrectly broadened the scope of section 6.65 of the Access Code by allowing the ACG to delve into the assumptions underlying the preferred methodology. In response, the Authority states that the ACG was asked to explore parameter assumptions and make recommendations by reference to current evidence from financial markets. The Authority engaged ACG on this basis to assist interested parties in commenting on the preferred WACC methodology.
25. The Authority wishes to make specific comment on an aspect of the Western Power submission which referred to a decision of the Australian Competition Tribunal<sup>2</sup>. Western Power alludes to paragraph 29 of this decision which states, in part:
- ... where the AA proposed by the Service Provider falls within the range of choice reasonably open and consistent with Reference Tariff Principles, it is beyond the power of the Relevant Regulator not to approve the proposed AA simply because it prefers a different AA, which it believes would better achieve the Relevant Regulator’s understanding of the statutory objectives of the Law.
26. At the outset, the Authority notes that the *GasNet* decision was made in respect to the provisions of the *National Third Party Access Code for Natural Gas Pipeline Systems*. However it is appropriate to comment upon this decision as Western Power relies upon it as providing a basis for what it terms is the “propose-respond” model embodied in the Access Code. The Authority considers it pertinent to consider this

---

<sup>2</sup> *Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6.*

issue in the context of the preceding part of the same sentence (in paragraph 29 of the *GasNet* decision):

However, where there are no conflicts or tensions in the application of the Reference Tariff Principles, and...

And the Tribunal's following paragraph (30), which further reflects upon the regulator's role:

This follows because the power of the Relevant Regulator to require amendments, or to itself draft and approve its own AA, does not arise until it is of the opinion that the AA proposed by the Service Provider does not comply with the Code...

The Authority considers that this principle is of key importance; where the regulator considers that an access arrangement proposed by a service provider does not comply with the Access Code, then it is not beyond the power of the regulator to refuse to approve the service provider's proposal, even if the access arrangement proposed is otherwise "reasonable".

27. In the case of the pricing principles, a service provider's proposal must comply with the objectives set out in sections 6.4 and 2.1 of the Access Code. It is significant to note that section 2.1 of the Access Code clearly requires the service provider's proposal to promote an "economically efficient" outcome. As discussed in the following paragraphs, this objective is not necessarily achieved by the service provider making proposals which fall within a [reasonably open] range of choice.
28. The paramountcy of compliance with the "Code objective" in section 2.1, rather than an obligation upon the Authority to approve where the proposed arrangements fall within reasonable and acceptable ranges, is further supported by section 4.28 of the Access Code which provides:

Subject to section 4.32, when making a draft decision, final decision or further final decision, the Authority must determine whether a proposed access arrangement meets the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable) and:

- (a) if the Authority considers that:
  - (i) the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable) are satisfied — it must approve the proposed access arrangement; and
  - (ii) the Code objective or a requirement set out in Chapter 5 (or Chapter 9, if applicable) is not satisfied — it must not approve the proposed access arrangement;
- and
- (b) to avoid doubt, if the Authority considers that the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable) are satisfied, it must not refuse to approve the proposed access arrangement on the ground that another

form of access arrangement might better or more effectively satisfy the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable).<sup>3</sup>

29. Western Power submits that the CAPM formulation as applied in the Discussion Paper is inconsistent with commercial practice and does not capture all of the commercial risks associated with undertaking regulatory activities. Envestra makes similar comments and draws particular attention to “regulatory risks” faced by service providers.
30. While the concerns raised by Western Power and Envestra do not relate to the CAPM methodology but to the application of that methodology, the Authority does not consider that its application is in a manner inconsistent with normal commercial practice. The CAPM has been applied in a manner consistent with its use by financial analysts examining the capital value of businesses for reasons unrelated to regulation. Indeed, there is evidence that financial analysts have used lower values of, for example, equity betas and market risk premia in applying the CAPM relative to those assigned by ACG as potential parameter values.<sup>4</sup>
31. Western Power and Envestra submit that the CAPM should be applied in such a way as to take into account the specific risks of a business rather than, for example, accounting for such risks in projections of cash flows.
32. The Authority notes that, under generally accepted finance theory and commercial practice, non-systematic risks are not relevant to the calculation of a rate of return because it is assumed that they are diversifiable in a portfolio of investments. In this, it is not the diversification opportunities of the utility that are relevant, but those of investors. That is, since investors who could purchase the assets of the utility are capable of diversifying investment portfolios, the returns that these investors require and therefore the amount they are willing to pay for the regulated asset will depend only on the non-diversifiable risk of the asset.
33. More generally, Western Power comments on the “*need, in light of the above, to err on the side of encouraging investment*” in the context of determining cost of capital. The Authority notes that section 2.1 of the Access Code provides:

The objective of this Code (“Code objective”) is to promote the economically efficient:

- (a) investment in; and
- (b) operation of and use of,

---

<sup>3</sup> The following “note” appears following section 4.28(b): The effect of section 4.28 is to make the Authority’s decision in relation to a proposed access arrangement a “pass or fail” assessment. The intention is that, if a proposed access arrangement meets the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable), the Authority should not refuse to approve it simply because the Authority considers that some other form of access arrangement might be even better, or more effective, at meeting the Code objective and the requirements set out in Chapter 5 (and Chapter 9, if applicable).

<sup>4</sup> For example, see UBS valuation for Australia Gas Light Company (UBS Investment Research, 31 January 2005) in which a market risk premium of 5% was adopted for valuation purposes (together with an equity beta equivalent to 1.06 when converted to a 60 per cent gearing assumption, but noting that AGL with its retail businesses would be expected to have a higher equity beta than a distribution business).

networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks.

In the view of the Authority, the overriding objective of the Access Code is to achieve an economically efficient outcome.

***WACC methodology***

34. The Authority has determined its preferred WACC methodology, detailed in paragraphs 35 to 60 which follow, and considers that the preferred WACC methodology complies with the requirements imposed by section 6.66 of the Access Code.

*Return on assets*

35. The Authority's preferred financial model for determining the return on assets is the CAPM. As discussed by the ACG in the Discussion Paper, a range of models may be available, but only the CAPM has to date been adopted in Australia for calculating rates of return in utility regulation.
36. There is substantial precedent for use of the CAPM for calculation of a WACC under the Access Code. This use of the CAPM in all Australian utility regulatory determinations to date causes the CAPM methodology to have the advantage over other approaches. This includes, because it is widely used and understood by both the finance community and industry; and there is a substantial amount of information available that can be drawn upon to assist in the application of the CAPM, which is not generally the case for the other models of asset returns. Use of the CAPM is also generally supported by regulated businesses, as no regulated utility business in Australia has yet proposed use of a different financial model.
37. It is also noted that, in its submission to the Authority on the Discussion Paper, Western Power "broadly accepts" the use of the CAPM.
38. The Access Code itself also asserts that the CAPM is an appropriate financial model, through a specific reference to that methodology in section 6.66(b).
39. As noted earlier (paragraph 32), the Authority does not accept it as reasonable to provide for non-systematic risks within the CAPM. This is because, under the CAPM, risks associated with returns to a particular asset could be eliminated through the holding of a well diversified portfolio of assets, and hence there is no reason to compensate for these risks. The Authority notes that appropriate parameters to the WACC calculation will be selected to give the service provider the opportunity to earn a return commensurate with the commercial risk involved.

*Treatment of inflation*

40. An estimate of the WACC may be made in real (adjusted for inflation) or nominal terms. The choice to use a real or nominal WACC in the calculation of access charges depends upon the choice of whether to model costs and returns in real or nominal terms. In respect of accounting for inflation there are three general

methodologies used for financial modelling.

- Historical cost accounting. Here asset values are expressed in terms of dollar values at the time that the cost was incurred and a return on assets calculated using a nominal WACC. Other costs are also expressed in money of the day terms, with forecasts of costs accommodating a forecast of inflation. When conventionally applied, this modelling methodology would produce a time path of regulated access charges in nominal terms for a regulatory period.
  - Real cost accounting. Asset values are expressed in dollar values at a particular date (constant price terms) and a return on assets calculated using a real WACC. Other costs and the time path of regulated prices are also expressed in current price terms. Regulated access charges are then periodically (typically quarterly or annually) escalated for realised inflation, usually as measured by an economy wide indicator such as the Consumer Price Index. Under this approach, the regulated business is sheltered from inflation risk.
  - Current cost accounting. This is a hybrid approach in which asset values and costs are expressed in terms of dollar values of each period in which a price is calculated (current cost terms), and a return on assets calculated using a real WACC. The asset value in each period and forecasts of costs accommodate a forecast of inflation. This approach provides the same approach as real cost accounting, but introduces additional complexity.
41. All three modelling approaches have been used in utility regulation in Australia, typically depending upon the preferences of the service provider. The Authority has a preference for undertaking financial modelling in real terms.
42. In its submission to the Authority on the Discussion Paper, Western Power has itself indicated a preference for a real approach to financial modelling.

#### *Treatment of tax*

43. As indicated by the ACG in the Discussion Paper, the CAPM and WACC models generally deliver an estimate of the required after-tax (or “post-tax”) WACC. To achieve consistency with cost forecasts that are typically made in pre-tax terms, the calculation of regulated access charges require assumptions about the expected taxation liabilities of the service provider and corrections to either the rate of return or the cost forecasts to reflect these liabilities.
44. The ACG indicates that there have been two broad approaches adopted by Australian regulators to date:
- transforming the post-tax WACC derived from the CAPM and WACC models into a pre-tax WACC (reflecting an assumption about the effective tax rate of the service provider) and thus making an allowance for tax by using a higher regulated WACC; or
  - including an allowance for the cost of tax directly in the cash flows (or revenue

benchmarks) of the service provider, based upon an explicit projection of the taxation liabilities for the regulated activities, typically based upon benchmark assumptions for the service provider rather than attempting to forecast the actual taxation liabilities for the business.

45. In all decisions on regulatory pricing made to date by the Authority and its predecessor agencies (the Office of Gas Access Regulation and the Office of Rail Access Regulation), the first of these two approaches has been used. In doing so, the Authority has given primacy to the advantages of simplicity inherent in the pre-tax approach.
46. The Authority has a preference for the “Officer” expression of WACC:

$$WACC = R_e \frac{E}{V} \frac{1 - T_c}{(1 - T_c(1 - \gamma))} + R_d \frac{D}{V} (1 - T_c)$$

The WACC is an estimate of the post-tax (cash) return on assets; where  $T_c$  is the corporate tax rate and  $\gamma$  is the value of franking credits created (as a proportion of their face value). The Authority’s preference is for the post-tax formulation above to be converted into a pre-tax estimate based on a forward transformation, or market practice, calculation.

47. The Authority reviews its approach to regulatory determinations on an ongoing basis and may in the future determine to adopt a post-tax approach to the calculation of regulated prices. However, for the purposes of this determination, the Authority will adopt a pre-tax approach in regulatory practice under the Access Code.
48. Western Power has indicated in its submission on the Discussion Paper that it prefers to use a pre-tax approach in the calculation of regulated prices.

### *Debt premium*

49. The calculation of a debt premium from observed yields requires characterisation of the regulated business in terms of credit rating, and then selection of observations on yields for corporate entities that are comparable in terms of activities and credit rating. Generally, regulators have estimated a benchmark margin on the basis of the weighted average cost of debt for a typical debt portfolio rather than a regulated utility’s actual cost of debt, so as to provide an incentive to minimise inefficient debt financing.
50. The benchmark margin has typically been based on observing recent BBB+ and BBB rated bond issues and CBASpectrum and Bloomberg estimates of corporate bond yields.
51. Some service providers have argued that this approach for estimating debt margin potentially understates the true cost of capital (e.g. including government-owned businesses in the sample could bias the “average” credit rating, or basing the debt margin on current market data rather than long-term average could bias the estimate since interest premiums are at historically low levels, etc.). However, given other countervailing influences (e.g. access to overseas debt markets at lower interest

premiums, availability of credit wrapping facilities to improve credit rating and hence reduce premiums, etc.) it is considered that on balance this approach is appropriate.

52. The Authority therefore determines that its preferred methodology for estimating a debt premium is to base the estimate on market evidence of debt costs for businesses with a credit risk profile consistent with a BBB or BBB+ credit rating, immediately prior to the making of a decision under sections 4.12, 4.17, 4.21 or 4.24 of the Access Code, as the case may be. The Authority considers sources of relevant market evidence may include CBASpectrum and Bloomberg estimates of corporate bond yields.

*Risk free interest rates*

53. Australian regulators have adopted similar approaches to deriving a proxy measure of nominal and real risk-free rates of return, based on one or other of the following methods:
  - deriving the nominal risk free rate from a recent average (20, 30 or 40 days) of the yields on Commonwealth bond rates, the real risk free rate from a recent average of the yields on Commonwealth index-linked bonds over the same period, and calculating the inflation forecast as the difference between these yields; and
  - using the yield on bonds with either 5 year or a 10 year yield to maturity.
54. This averaging approach has been applied extensively by other regulatory bodies in Australia, including the Australian Competition and Consumer Commission, Essential Services Commission of Victoria, the Independent Pricing and Regulatory Tribunal of New South Wales, the Queensland Competition Authority, as well as the Authority's predecessor agencies. Variations in this approach (with different averaging periods and different terms to maturity) normally would not have a material effect on the proxy risk free rate.
55. The Authority has determined that the appropriate methodology to utilise in providing for nominal risk free rates in the estimation of the rate of return is to use Commonwealth bond terms of 10 years and yields from a 20 trading day average taken at the final day of the month immediately before the Authority makes a decision under sections 4.12, 4.17, 4.21 or 4.24 of the Access Code, as the case may be.
56. Similarly, the Authority has determined that the appropriate methodology to utilise in providing for real risk free rates in the estimation of the rate of return is to use index-linked Commonwealth bond terms of 10 years and yields from a 20 trading day average taken at the final day of the month immediately before the Authority makes a decision under sections 4.12, 4.17, 4.21 or 4.24 of the Access Code, as the case may be.
57. The difference between the nominal risk free rates and real risk free rates (calculated using the Fisher equation) provides an inflation forecast over the relevant period.

*Financing structure*

58. It is a general principle of regulation that regulated access charges should be set, to the extent possible, independently of the financing decisions of the particular service provider. “Financing decisions” in this context might include all decisions related to the financing of the asset (‘below the line’ items), including the amount that an entity pays for an asset, and the level and form of debt finance employed. The main reasons for adopting this approach, under which benchmark assumptions are applied, are that the approach is consistent with encouraging efficient financing decisions by the service provider and protecting customers from inefficient financing decisions.
59. In accordance with this principle, the Authority is of the view that in determining the WACC a benchmark assumption should be employed for the level of gearing of the business (that is, the proportion of regulatory asset value that is assumed to have been financed by debt).
60. The Discussion Paper prepared by the ACG cites evidence on gearing of Australian utility businesses that are comparable to Western Power and notes that this evidence supports adopting a gearing assumption of 60 percent debt to asset value, taking into account that most of these comparable businesses comprise a combination of regulated network activities with other activities.

## APPENDIX 1

### POSSIBLE PARAMETER VALUES FOR ESTIMATING THE WACC FOR WESTERN POWER'S SOUTH WEST INTERCONNECTED NETWORK

The Discussion Paper examined possible methodologies for estimating the weighted average cost of capital (WACC) for an electricity networks business, and recommended a preferred methodology that was considered an effective means of achieving the objectives of the Access Code.

The Discussion Paper also explored assumptions for financial model (CAPM) parameter values by reference to current financial market evidence and provided an indicative estimate of the WACC that may apply to Western Power's South West Interconnected Network (SWIN) as a result of the application of the recommended methodology. This was included in the Discussion Paper to assist interested parties in commenting on the preferred methodology.

In accordance with section 6.65 of the Access Code, the preceding determination of a WACC methodology is not intended to extend to an application of that preferred methodology to a particular electricity networks business. However, the Authority has attached this appendix to the WACC methodology determination to provide guidance as to appropriate parameter values for estimating a WACC that reflect prevailing market circumstances and, in the Authority's view, would represent an effective means of achieving the objectives of the Access Code.

The Authority's views regarding appropriate parameter values are set out in Table 1 below. It is acknowledged that the remaining values for input into the estimation of the WACC are market dependent and will be calculated at the end of the month immediately prior to a decision on an access arrangement.

**Table 1: Possible parameter values for estimating the WACC for the SWIN**

CAPM Parameter	Notation	Possible Parameter Value
Market risk premium (%)	<i>MRP</i>	6.0
Equity beta <sup>1</sup>	<i>β<sub>e</sub></i>	1.0
Allowance for debt issuance costs (%)	<i>DM</i> <sup>2</sup>	0.125
Corporate tax rate (%)	<i>t</i>	30
Franking credit value	<i>γ</i>	0.50
Debt to total assets ratio (%)	<i>D/V</i>	60%

1. At an assumed gearing of 60%

2. Debt margin consists of the debt premium and an allowance for debt issuance costs

The Authority's current view of appropriate financial model parameter values for estimating the WACC does not in any way represent a pre-determination of the cost of capital applying to the SWIN, or to any other network which may subsequently become covered.