



New South Wales
TREASURY

July 07

tpp
07-4

**Commercial Policy Framework:
Guidelines for Financial Appraisal**

OFFICE OF FINANCIAL MANAGEMENT

Policy & Guidelines Paper

Preface

The *Guidelines for Financial Appraisal* is a policy document prepared to ensure a best practice financial management framework for all Government agencies and is a component of the NSW Government's *Commercial Policy Framework*.

The purpose of these *Guidelines* is to outline a consistent approach to the financial assessment of potential projects across all public sector organisations drawing on best practice methods in the private sector.

This publication updates the previous *Guidelines for Financial Appraisal* (TPP97-4). The *Guidelines* have been revised but there are no significant differences in the technical aspects of conducting financial appraisal from the 1997 version.

The revised *Guidelines* capture the requirements of the Government's asset management and procurement policies, identify situations requiring routine submission of financial appraisals to Treasury and provide greater guidance in ascertaining an appropriate discount rate.

These *Guidelines* are designed to be read in conjunction with the *NSW Government Guidelines for Economic Appraisal, Working with Government – Guidelines for Privately Financed Projects, Total Asset Management (TAM) Policy* and *NSW Government Procurement Policy*. Government businesses must also be guided by the policies and guidelines of the *Commercial Policy Framework*.

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July 2007

Treasury Ref: TPP07-4
ISBN: 978-0-7313-3363-9

Note

General inquiries concerning this document should be initially directed to: Commercial Sector Performance and Reform Branch (Tel: (02) 9228 3095). This publication can be accessed from the Treasury's Office of Financial Management Internet site [<http://www.treasury.nsw.gov.au/>]. For printed copies contact the Publications Officer on Tel: 9228 4426.

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1. Background

1.1 Introduction

NSW Government agencies are required to conduct a financial and/or economic appraisal as part of the business case supporting the capital investment planning process. This requirement is based on best-practice standards and is part of Government policy.

The purpose of the *Guidelines for Financial Appraisal* is to provide assistance in the financial assessment of projects.

Financial appraisals are required for:

- capital projects of Government businesses¹, and
- all projects of General Government agencies which involve a financing decision (e.g. outsourcing projects and joint public/private sector infrastructure projects).

NSW Treasury may request a financial appraisal be undertaken for projects that are outside the above categories.

In some instances both an economic and financial appraisal may be required, as General Government agencies must conduct economic appraisals for capital projects. The *NSW Government Guidelines for Economic Appraisal*² provide guidance on when an economic appraisal is required and the methodology for conducting this type of appraisal.

NSW Government agencies must routinely submit copies of their financial appraisals to Treasury. If agencies are unsure what analysis needs to be undertaken or routine material to be provided to Treasury, they should contact their NSW Treasury analyst.

¹ For the purposes of these *Guidelines*, **Government business** refers to:

- Public Trading Enterprises (or Public Non-Financial Corporations under ABS classifications). State Owned Corporations (SOCs) are included in this classification, and are distinguished by their corporatised status,
- Public Financial Enterprises (or Public Financial Corporations under ABS classifications), and
- General Government businesses or business units (or General Government agencies under ABS classifications) which are also non-Budget dependent and to which the *Commercial Policy Framework* applies.

² *NSW Government Guidelines for Economic Appraisal*, TPP 07-5, July 2007

1.2 Relationship to other policies

As an integral component of best practice financial management, these *Guidelines* are closely related to the asset management and procurement, financial management and other commercial policies issued by the NSW Government.

Asset Management and Procurement

The *Total Asset Management Policy*³ outlines the Government's strategic approach to physical asset planning and management to ensure that an agency's physical assets support its service delivery objectives. The *Procurement Policy*⁴ outlines Government requirements to ensure that procurement activities achieve best value for money in supporting the delivery of Government services. This objective is explicitly pursued through the Gateway Review Process outlined in the policy.

The *Guidelines for Privately Financed Projects*⁵ cover the requirements for privately financed capital projects aimed at improving public service delivery.

Financial Management

NSW Treasury issues accounting policies on the treatment of assets, including valuation and impairment. Financial appraisals should follow these policy requirements, as appropriate.

Commercial Policy Framework

The *Commercial Policy Framework* seeks to replicate appropriate disciplines and incentives that lead private sector businesses towards efficient commercial practices and promotes the principles of competitive neutrality between Government businesses and private sector enterprises of similar risk.

An important task for the management of Government Businesses is to ensure that their capital allocation processes achieve the best long term potential for shareholder value creation. In this respect, these *Guidelines* are an important part of the Commercial Policy Framework.

Procurement for major or sensitive Government business projects is guided by the *Guidelines for Assessment of Projects of State Significance*.⁶ Other policies and guidelines under the Commercial Policy Framework which may affect financial appraisals include: the *Statement of Corporate Intent/Statement of Business Intent (SCI/SBI) Guidelines*, *Capital Structure Policy for Government Businesses*⁷, *Government Guarantee Fee Policy for Government Businesses*⁸ and the tax-equivalent policies.⁹

³ NSW Treasury, *Total Asset Management (TAM) Policy*, TPP 04-3, August 2004

⁴ NSW Government *Procurement Policy*, TPP 04-1, July 2004

⁵ *Working with Government – Guidelines for Privately Financed Projects*, December 2006

⁶ NSW Treasury, *Guidelines for Assessment of Projects of State Significance*, TPP 02-4, June 2002

⁷ NSW Treasury, *Capital Structure Policy for Government Businesses*, TPP 02-7, September 2002

⁸ NSW Treasury, *Government Guarantee Fee Policy for Government Businesses*, TPP 04-2, July 2004

⁹ NSW Treasury, *Tax Equivalent Regime for Government Businesses*, TPP 03-4, June 2003 and Australian Taxation Office, *Manual for the National Tax Equivalent Regime*, October 2001

2. Financial Appraisal

2.1 What is a Financial Appraisal?

A financial appraisal is a method used to evaluate the financial viability of a proposed project. It assesses the extent to which a project will generate revenues sufficient to meet its financial obligations as measured by the Net Present Value (NPV) of its cash flows. All revenues resulting from and expenditures incurred under the project are taken into account.

Primarily, financial appraisal assesses:

- project cash flows
- the sensitivity of financial projections to key project risks
- the adequacy of the estimated investment cost, and
- the financial impact of alternative projects.

Projects may involve asset construction, purchase, lease or sale and may be financed in a wide variety of ways through grants, borrowings, revenues, supplier finance or a combination of these mechanisms.

2.2 When is a Financial Appraisal required?

Financial appraisals should be undertaken as part of an agency's normal management practice. A preliminary financial appraisal should be completed during the service delivery option evaluation stage and updated at the project definition stage as an integral business case component.

A financial appraisal is required to support the business case for all relevant projects valued at over \$1 million.

Financial appraisals should be reviewed by senior management and, where relevant, assessed by Boards in determining capital allocation. Independent peer review is also required (see section 3.8).

2.3 When is a Financial Appraisal required to be submitted to Treasury?

Where a financial appraisal needs to be undertaken, there are specific requirements for when agencies need to submit documentation to Treasury.

For capital projects that are specifically State Budget funded¹⁰, documentation must be provided in line with the *Procurement Policy*¹¹ assessment and monitoring requirements. A **summary** of the financial appraisal must be provided where a project is assessed as:

- low or medium risk under the Gateway Risk Profile Assessment Tool¹², or
- between \$1 million and \$10 million in value.

If the project is assessed as high risk or valued at over \$10 million, then a **full** financial appraisal is to be submitted.

¹⁰ A State Budget funded project is any project which is funded either in part or full by a NSW Government appropriation.

¹¹ *NSW Government Procurement Policy*, TPP 04-1, July 2004

¹² Accessible from the NSW Department of Commerce website, www.commerce.nsw.gov.au

For State Owned Corporations (SOCs), documentation must be provided in line with the *Reporting and Monitoring Policy*.¹³ The full financial appraisal must be submitted to Treasury for projects:

- valued at more than \$50 million
- defined as a Project of State Significance¹⁴, or
- assessed as high risk under the *Reporting and Monitoring Policy*.

Treasury may also request financial appraisals as part of its monitoring responsibilities or upon Ministerial request. In addition, the Audit Office may request financial appraisals as part of its audit function.

2.4 How does a Financial Appraisal differ from an Economic Appraisal?

Financial appraisals differ from economic appraisals in the scope of their investigation, the range of impacts analysed and the methodology used. In general, a financial appraisal is more relevant to commercial proposals while an economic appraisal is more relevant for State Budget funded proposals.

A financial appraisal essentially views investment decisions from the perspective of the organisation undertaking the investment. It therefore measures *only* the direct cash flow effects of an organisation's investment proposal.

By contrast, an economic appraisal considers not only the impact of a project on the organisation sponsoring the project, but the external benefits and costs for other Government agencies, private sector enterprises and individuals, regardless of whether or not such impacts are matched by monetary payments.

Financial appraisals also differ from economic appraisals in that:

- market prices and valuations are used in assessing benefits and costs, instead of measures such as willingness to pay and opportunity cost,
- the discount rate used represents the weighted average cost of debt and equity capital, rather than the estimated social opportunity cost of capital, and
- the discount rate and the cash flows to which it is applied are usually specified on a nominal post tax basis, as the cost of debt and equity are observed only in nominal terms.

¹³ NSW Treasury, *Reporting and Monitoring Policy for Government Businesses*, TPP 05-2, November 2005, p.11

¹⁴ NSW Treasury, *Guidelines for Assessment of Projects of State Significance*, TPP 02-4, June 2002

3. Steps in Preparing a Financial Appraisal

The steps to be undertaken in conducting a financial appraisal are as follows:

3.1 Define the objectives of the project

Project objectives should align with the objectives and commitments in the Agency's *Results and Services Plan* or, in the case of Government businesses, the *Statements of Corporate or Business Intent*. The need for physical asset procurement should be outlined in agencies' Asset Strategies. Proposed project service delivery objectives need to be clearly thought out and specified as a statement of outcome rather than ways of achieving the outcome. Alternative service delivery mechanisms should also be assessed.

The overall objective of any commercial project proposed by a Government business is to increase net worth within its defined service delivery role. In order to increase an agencies net worth, investments should only be made where the expected rate of return on the assets over the project life exceeds the agency's cost of capital.

3.2 Define the scope of the project

Correctly defining the scope of the project is important when conducting a financial appraisal. Projects should not be broken into very small components so as to destroy essential links between elements, without which the project would not be complete. Similarly, distinct projects should not be aggregated to form a program where individual parts could proceed independently.

Excessive disaggregation may result in a financial appraisal suggesting that a certain project component should proceed, whereas another component, which commences later and is integral to the project, may not be commercially viable.

Similarly, the risk of assessing overly aggregated projects is that some financially non-viable projects may only proceed if other projects in that program have rates of return well in excess of the hurdle rate.

3.3 Identify options

A range of genuine feasible project options should be identified early in the appraisal. The following checklist provides a guide as to the type of cost reducing or revenue enhancing options that should be considered:

- non-build options that meet the same service delivery objective
- optimal investment size
- alternative design possibilities or construction techniques
- alternative service delivery methods including possible private sector involvement, non-ownership options, and the ability to contract out activities, and
- the project commencement date impact on cash flows.

3.4 Identify and measure cash flows

Project incremental costs, revenues, risks and best alternatives should be identified and initially measured as nominal cash flows in the period they occur. Financial impacts should be excluded where they would have occurred regardless of whether the particular project was selected or not.

Cash flows should then be estimated on an after tax basis over the project's economic life. For long lived assets, whose economic lives extend beyond the financial analysis period, the appraisal term can be restricted to 20 years with an estimate of the asset or project's residual value included at the end of year 20 to represent the asset's remaining service potential. It is not mandatory for financial appraisals to be limited to 20 years and where warranted approvals can be conducted for the full life of the project.

A financial appraisal must specify the approach used in estimating residual (or terminal) asset values. Special care needs to be taken to ensure this calculation correctly values assets at the end of the appraisal term.

Periodical cash flows should be estimated using periods no longer than one year increments and should be estimated using practical time periods which are most relevant to the analysis (eg, six-monthly, quarterly or monthly). Generally, shorter time periods should be used where the appraisal is more detailed or where the overall project life is relatively short (eg, a 3-year project may warrant estimation of monthly cash flows, whereas a 30-year project may warrant annual or six-monthly cash flows).

3.4.1 Effects to be considered in a financial appraisal

Typical cash inflows which should be considered in a financial appraisal include:

- operating revenues
- subsidies from outside parties
- operational cost savings in other areas resulting from the proposed project
- surplus asset sales
- the value of options gained as a result of the project, and
- residual asset or project values at the end of the appraisal term.

Conventional cash outflows which should be incorporated in a financial appraisal include:

- all capital and operating costs (including incremental working capital requirements)
- taxes (with due allowance for depreciation tax shields)
- operating lease payments
- worker redundancy payments
- existing contract termination payments
- revenue losses to existing operations from the proposed project; and
- the opportunity cost of resources (including land) which would otherwise have been available for sale or lease.

3.4.1.1 Cost savings

All financial appraisals need to incorporate reasonable estimates for the magnitude and timing of cost savings. For example, it will be important for all labour saving projects to accurately estimate cost savings and their expected timing. Employee numbers and total labour hours may be unaffected in the short term, but a strategic estimate can be made as to when the savings will be realised.

3.4.1.2 Option valuation

A proposed project may present options for the organisation. These options may have a real value to the organisation and should be included in the financial appraisal. The value of these options will depend on many factors including the likelihood that the option will be exercised.

The types of options that may arise from acceptance of the project include:

- options to expand the project or extend the project life
- options to abandon the project, and
- contracted / financial options.

3.4.1.3 Residual value

Estimating residual values can be difficult and is greatly assisted by familiarity with the asset class. A residual value needs to be estimated whenever the project life is:

- shorter than the asset's useful life and the business intends to dispose of the asset; or
- greater than the appraisal period and a residual / terminal value needs to be included in the final year of the appraisal.

Examples of methods used for estimating residual values include:

- Observation of a traded market

Where the asset being considered has an active second hand market, the appraiser may be able to easily observe the market residual value of assets of a similar age. For example, certain assets may be routinely sold second hand at auction, in which case a readily observable residual value market exists from which to form an estimate.
- Professional residual value appraisal

For certain asset classes there are professional appraisers / valuers who can be engaged to estimate a residual value for a particular asset. These appraisers usually are specialists in a particular asset class and have knowledge of the second hand market for those assets.
- Valuation of an annuity

For a very long life project, it may be impractical to estimate all cash flows (revenues and expenses) for the entire project life beyond 20 years. It may, however, be possible to forecast an annuity stream representing the net cash flow of the project. After 20 years a project may achieve a 'steady-state' with net cash flows estimated to continue in line with the current trend for the remainder of the project life. In this case the net cash flow can be calculated as an annuity. The present value of this annuity stream can then be included as a cash inflow in the final year of the appraisal period (and discounted along with other cash flows accordingly). If there is additional uncertainty surrounding the estimation of the annuity stream the appraiser may like to use a higher discount rate in calculating the value of the annuity.

Where the project life exceeds 20 years, the simplest approach may be to extend the appraisal term for the full life of the project rather than estimate a discrete residual value to apply to the financial appraisal in year 20.

3.4.1.4 Capacity utilisation

Where an agency operating with excess capacity cannot theoretically sell the spare capacity to a third party, projects involving capacity depletion should assume that capacity consumption does not have any value for financial appraisal purposes.

However, if a project results in early consumption of spare capacity which requires augmentation works to be brought forward, then this impact should be included as part of the project analysis. In this situation, financial appraisals will need to occur over the duration of the investment program, especially prior to commencing subsequent investment tranches. For projects with these characteristics it will be important to accurately estimate and document assumed capacity depletion rates.

3.4.2 Financial Appraisal effects to be excluded

Private sector organisations enjoy the advantage of tax shields, which arise due to the tax deductibility of interest on debt and the depreciation of assets. The interest tax shield in effect minimises the private sector's cost of debt capital and thereby their opportunity cost of capital. By using a post tax Weighted Average Cost of Capital (WACC) agencies will capture project interest expense (and associated tax benefit) impacts in the project discount rate. Therefore, to avoid double counting, interest impacts should not be included in project cash flows.

Accounting depreciation, economic multiplier effects and sunk costs should also *not* be included in this analysis as they do not impact on a project's viability.

Project cash flows will, however, need to include any annual depreciation tax shields in order to properly value prospective projects.¹⁵ This treatment is required because depreciation tax shield benefits are not incorporated in the post tax WACC formula.

3.4.3 Tax rate to apply

Agencies should apply the prevailing Australian corporate tax rate when undertaking a financial appraisal.¹⁶ Government businesses should apply this rate to operating income (earnings before interest and taxes) to avoid possible investment decision distortions caused by certain tax treatments.

3.4.4 Treatment of imputation

Financial appraisals need to take into account the effect of dividend imputation, despite the fact that the Government as shareholder is unable to use imputation credits. Including imputation effects will promote competitive neutrality because private sector entities enjoy a lower cost of equity (and hence WACC) to the extent that their shareholders can make use of these credits.

Under an imputation tax system, shareholders receive tax credits (franking credits) for tax paid by the company. These credits can then be applied to any other shareholder tax liabilities.

¹⁵ Calculated by depreciation multiplied by the corporate tax rate.

¹⁶ At the time of publication this rate was 30 per cent.

Imputation tax effects are generally handled by either adjusting the cost of capital formula, or by adjusting cash flows. For the purpose of these guidelines, it is suggested that the cost of capital formula be adjusted for dividend imputation (see Appendix 1).

It is difficult to estimate the value of franking credits for the purpose of adjusting the cost of capital. Various studies have placed the fractional value of dividend imputation between zero and one.¹⁷ A value of 0.5 is recommended, in line with the value used by regulators.¹⁸

3.4.5 Treatment of operating and finance leases

Projects should initially be assessed on a stand-alone basis before agencies consider the appropriate financing strategy. Once a project is found to have a positive Net Present Value (NPV), agencies should then assess whether it should be financed internally (either through debt or equity) or if operating and financing leases will be more suitable.

Operating leases should be evaluated as cash outflows, occurring as a series of regular payments and must be compared to an outright purchase alternative. Where options such as renewal or purchase rights are present, consideration needs to be given to their value. Finance leases do *not* form part of a financial appraisal as they merely represent an alternative project financing option.

3.4.6 Treatment of inflation

All cash flows should be estimated in nominal terms (ie, cash flow estimates should include inflationary escalations) and not in 'real' terms. This is consistent with the nominal discount rate as shown in Appendix 1.

In conducting the financial appraisal, the business should use judgement as to what is the most appropriate rate by which the project cash flows should escalate. For example, agencies may consider that the project cash flows escalate consistent with Consumer Price Index (CPI) estimates or, another published index or applicable rate. The reasons for the basis chosen and the rates assumed should be clearly outlined in the appraisal.

3.5 Discount cash flows

To assess and compare estimated project after-tax cash flows and options, all cash flow streams should be discounted by the post tax WACC to calculate the discounted cash flow (DCF). The post tax WACC represents the opportunity cost of capital or the returns that could have been earned in alternative investments. A discussion of the calculation of WACC is contained in Appendix 1.

A financial appraisal should discount all the project cash flows to the present day even if the proposed project is not intended to begin for some period of time. This is because the appraisal should calculate the project's NPV at the time the investment decision is made (even if the project will not commence for some time).

¹⁷ Bruckner, Kris; Dews, Nigel and White, David, *Capturing Value from Dividend Imputation*, McKinsey & Company Inc., 1994; Gray, Stephen, *Using Stock Price Changes to Estimate the Value of Dividend Franking Credits*, Macquarie University, April 2004; Officer, R., *The Cost of Capital of a Company under an Imputation Tax System*, University of Melbourne, 1994

Care should also be taken with capital expenditure costs, which are not necessarily all incurred at time zero, particularly where capital expenditure / construction costs are incurred over a long period of time or are delayed for a period of time.

3.6 Calculate the net present value for each option

The most important measure of project financial viability is the NPV of the cash flows. This is calculated by summing together the discounted project cash flows and subtracting capital costs.¹⁹

In most instances the highest NPV project will be the most favourable investment option for an organisation. However, where an organisation has more positive NPV investment projects available than it can fund in a particular period, then the profitability index should be adopted. This investment performance measure is the most appropriate method for ranking positive NPV projects where capital is constrained and organisations cannot fund all projects. The profitability index is calculated by dividing the present value of post-initial investment cash flows by the initial investment amount.

In addition to the NPV and Profitability Index, an array of other project viability measures could be examined, including the Internal Rate of Return.

3.7 Analyse the sensitivity associated with the cash flows for each option

All project based assumptions should be identified and explicitly specified. For regulated Government Businesses these include critical assumptions as to the expected future price path. As far as practicable, assumptions should be based on empirical data. The critical assumptions subject to uncertainty should then be altered one at a time to test their impact on final project outcomes.

The types of variations examined should include:

- changes to key variables, and
- different combinations of key variables which, taken together, represent an alternative, plausible and consistent view of the future.

Summary financial measures should be calculated and presented for the best and worst scenarios and highly probable key variable movements. Break even points for critical assumptions, at which the project becomes NPV negative, should also be specified. Different variables should have different sensitivities applied to them during testing, as is appropriate.

Risk categories which should be considered include market, completion (on time, on budget), operating, financial, environmental and/or political and private sector partner risks (nature of contractual obligations). Risk simulation through modelling programs may be conducted, if reliable data exists to estimate the error distributions of key parameter values.

The *Total Asset Management - Risk Management Guidelines*²⁰ is a helpful reference to assist analysts in identifying relevant project risks.

¹⁸ Independent Pricing and Regulatory Tribunal, *Discussion Paper: Weighted Average Cost of Capital*, August 2002; Independent Pricing and Regulatory Tribunal, *NSW Electricity Distribution Pricing 04/05 to 08/09*, January 2004.

¹⁹ Capital costs which occur after the first project time period commences should be discounted by the Weighted Average Cost of Capital (see Appendix 1).

²⁰ NSW Treasury, *Total Asset Management – Risk Management Guidelines*, TAM 04-12, September 2004

3.8 Independent review of appraisal

The sponsoring agency should undertake a structured internal but independent review of the project's expected returns. The reviewer should be satisfied with the treatment of:

- project objectives, outputs, outcomes and scope
- range and realism of options considered
- completeness of the list of costs and the impact on their appropriate valuation
- adequacy and reasonableness of the sensitivity analysis and the impact on NPV
- risks faced by the project as well as the implications of such risks to equity and debt parties
- forecast project impacts and timing
- rate at which post tax cash flows have been discounted, and
- identification of the parties responsible for project implementation and for monitoring project execution and results.

Projects requiring a mandatory business case gateway review under the *Procurement Policy*²¹ will also be subject to external independent review.

Agencies may also wish to engage the services of external advisors such as the Corporate Finance unit within NSW Treasury Corporation (TCorp) when undertaking financial appraisals. This service may be useful particularly where an independent external adviser would be beneficial or agencies do not have sufficient in-house expertise or resources to conduct financial appraisal.

3.9 Post implementation review

In addition to reviewing the appraisal, the project and its results should be assessed after implementation. While a large number of factors (including changes and shifts in demand, technological change, and movements in relative prices and asset values) may influence successful project objective achievement, a review of the estimates underlying project cash flows may assist future projections.

Reviews should be conducted by someone other than the original appraiser and should typically occur about two years after operating phase commencement.

²¹ NSW Government Procurement Policy, TPP 04-1, July 2004

4. Private Sector Partnerships in the Provision of Public Infrastructure

If the sponsoring business wishes to consider the project for delivery as a private sector partnership, they should refer to the *Working with Government – Guidelines for Privately Financed Projects*.²²

A comprehensive business case incorporating a financial appraisal should be submitted to Treasury prior to agencies seeking approval from the Cabinet Standing Committee on the Budget to procure new infrastructure in this manner.

5. Checklist

The following checklist may help assist in completing a financial appraisal:

- have the service objectives and scope of the project been adequately defined?
- have all feasible options been explored?
- have all cash flows been accurately estimated for the recommended project and the next best alternative?
- has the NPV sensitivity to variations in key parameters been tested?

5.1 Where can I get help?

The principal contact for further advice and assistance in NSW Treasury is the relevant Treasury Agency Analyst at:

NSW Treasury
Governor Macquarie Tower
1 Farrer Place
SYDNEY 2000

²² NSW Treasury, *Working with Government - Guidelines for Privately Financed Projects*, December 2006

Appendix 1: Weighted Average Cost of Capital

A1.1 Formula for calculating NPV

NPV is the sum of the discounted project revenues less discounted project costs.²³ Formally it can be expressed as follows:

$$NPV = \sum_{n=0}^N \frac{R_n - C_n}{(1+r)^n}$$

Where R_n = project revenues in year n

C_n = project costs in year n

r = post tax WACC

N = number of years that costs and / or revenues are produced

Under this decision rule, a project is potentially worthwhile (or viable) if the NPV is greater than zero; i.e. the total discounted revenues are greater than costs. If projects are mutually exclusive, the project which yields the highest NPV would be chosen.²⁴

A1.2 Formula for calculating the WACC

The appropriate hurdle rate to be used in assessing projects is the post tax WACC. This represents the expected financial market rate of return that investors would require in order to supply debt and equity capital for investment in a similar asset. It also reflects the market returns that could have been earned with this capital (the opportunity cost of capital). For a firm to maintain its value, it must accordingly earn at least this level of return.

The post tax WACC given by the formula below²⁵, should be used as the discounting factor to be applied to the after-tax nominal cash flows.

$$WACC = (1-t) \left[r_d \frac{D}{V} + r_e \frac{E}{V} \frac{1}{1-t+\gamma t} \right]$$

where:

r_d = pre tax cost of debt

r_e = pre tax required rate of return on equity

D = target debt

E = target equity

V = (D+E), the value of the organisation's target debt and equity

t = the corporate tax rate

γt = dividend imputation effect²⁶

Agencies may also wish to receive external advice in relation to the appropriate WACC estimates for particular projects.

²³ Project revenues and costs should be assessed on a post tax basis.

²⁴ This assumes there are no constraints on the availability of capital.

²⁵ There are a number of versions of the WACC formula depending on whether cash flows are pre-tax, post-tax, nominal or real. The WACC formula recommended here is consistent with the cash flow methodology in these *Guidelines* and the taxation environment facing Australian corporations.

²⁶ A value of 0.5 should be used for this parameter in line with the value used by regulators.

A1.3 Components of the cost of capital

Apart from the tax and imputation terms, there are three basic components in the after-tax WACC formula as stated in the WACC equation above:

- cost of debt
- cost of equity; and
- capital structure or leverage (the mix of debt and equity).

The cost of debt

The appropriate cost of debt measure is the opportunity cost of debt. This concept refers to the marginal rate payable on debt of comparable risk and duration as the class of debt held by the organisation.²⁷

To estimate this rate, Government businesses should use the long term bond rate adjusted by the debt premium calculated by the long term guarantee fee rate. This debt premium adjustment, which is based on the agency credit rating, ensures competitive neutrality between the private and public sectors.

Government businesses outside the Government guarantee fee regime should request assistance from TCorp when estimating the cost of debt. Agencies, which are not part of the *Commercial Policy Framework*, should consult with their Treasury analyst to determine the appropriate cost of debt parameter for projects financed from debt sources.

The cost of equity

The cost of equity should be calculated using the Capital Asset Pricing Model (CAPM). This model relates the expected or required rate of return on equity to the market rate of return on a risk free asset plus a premium reflecting the risk of the business.

The expected rate of return on equity derived from the CAPM is defined as follows:

$$r_e = r_f + \beta_e (r_m - r_f)$$

where:

r_e	=	expected or required return on equity
r_f	=	risk-free rate of return
β_e	=	the equity beta ("beta factor"), a measure of the sensitivity of an investment's return to the hypothetical market portfolio return
r_m	=	expected nominal return on the market portfolio (approximated by the yield on the market portfolio of common equity shares)
$r_m - r_f$	=	the market risk premium, a measure of the expect return above the risk free rate of return.

To make this formula operational, it is necessary to estimate the risk free rate, the market risk premium and the appropriate beta factor for the particular investment.

²⁷ The actual rate of debt secured in the past may be different to the rate that can be obtained for a new project. The cost of debt for existing projects is therefore irrelevant as an opportunity cost of debt measure.

i The Risk Free Rate

The most appropriate measure of the risk free rate is the 10 year Commonwealth Government Bond yield. In order to smooth short-term volatility, a 20-day average of the historical daily yield should be used.²⁸

ii The Market Risk Premium

The equity market risk premium is the difference between the gross return on the market portfolio and the return on the risk free rate. A number of empirical studies have estimated this premium at between 5 and 7 per cent²⁹ in post-tax terms. A market risk premium of 6 per cent is recommended, or as updated by NSW Treasury.

iii Equity Beta

An asset beta is a measure of an asset's return sensitivity to variations in the market portfolio return.

Betas for individual projects, however, are generally unquantifiable, as the project risks and returns are not easily isolated from business risks and returns. Therefore, a proxy for the project beta must be obtained. Agencies may also wish to receive external advice in relation to the appropriate project beta estimate for a particular project.

The proxy beta value for the project can be estimated in three ways:

1. Organisational Beta

An organisation's beta should be used as a proxy for the project beta where the project's return and risk position is similar to the risk and return position experienced by the organisation's overall project portfolio.³⁰

2. Divisional Beta

For a diversified business, the organisational beta is generally not a good indicator of the risk associated with any of that organisation's individual projects. In this situation, separate divisional betas may need to be determined and used as a proxy for the project beta where the project has a similar risk position as a typical project from that particular division.

3. Project-Specific Beta

If the project has a risk and return position that is significantly different from either the organisation or division's overall risk and return position, the project's proxy beta value will need to be estimated from (external) firms with project portfolios with similar risk and return characteristics as the proposed project. For example, to accurately reflect the high risk nature of certain proposals, such as Information and Communication Technology (ICT) projects, beta factors may need to be obtained from external firms in the sector (eg ICT firms).

²⁸ Historical daily yields are obtainable from the Reserve Bank of Australia website (<http://www.rba.gov.au>) under "[Interest Rates and Yields: Money Market and Commonwealth Government Securities](#)"

²⁹ See estimates on market risk premium by Gray, Ibbotson, Siegel, Cornell and Merton in Lally, M., *Structural breaks and the estimation of the market risk premium in Australia*, April 2005

³⁰ Beta estimates are not exact because fine distinctions between assets may not be possible. Small variations in perceived risk are best treated through cash flow sensitivity analysis.

Calculation of the Equity Beta for a Government Organisation

Companies listed on the Australian Stock Exchange are able to calculate enterprise betas based on market information. For unlisted entities, such as Government businesses, this is not possible.

To arrive at a beta factor measure for a particular Government organisation, it is necessary to estimate a beta based on the betas of comparable listed companies.

One approach for estimating beta is to:

1. Select a group of comparable firms that have publicly available 'sector' equity betas.

When estimating an organisational beta, the comparator firms should have a portfolio of projects with similar risk and return characteristics as the government organisation. For divisional beta estimation, comparator firms should have a portfolio of projects with similar risk and return characteristics as the division. Project-specific beta estimation should rely on comparator firms with a portfolio of projects with similar risk and return characteristics as the project.

If comparable firms for beta value estimation cannot be found, the project risk may be handled by sensitivity testing the assumptions underlying the project's estimated post tax cash flows. This analysis should be conducted over a range of values, capturing project cash flow variability.

2. Obtain the sector observable equity betas³¹ and gearing levels for each of the comparator firms.
3. Convert the sector equity beta (of each of the individual comparator firms) to an asset beta using the following formula in order to neutralise the effect of capital structure on volatility (the unlevered beta).

$$\beta_a = \frac{\beta_e}{\left[1 + \frac{D}{E}(1 - t + \gamma)\right]}$$

where:

β_a	=	asset beta
β_e	=	average of observable equity betas from sector representative firms
$\frac{D}{E}$	=	sector gearing ratio
t	=	tax rate
γ	=	dividend imputation effect ³²

4. Calculate an average asset beta from the group of comparator firms.

³¹ Sectoral equity betas are published by the Australian Graduate School of Management and may also be available from Bloomberg and other financial data providers. Alternatively, it can be determined based on the beta of particular firms or group of firms with a similar risk. The choice of asset beta is a matter of judgement.

³² A value of 0.5 should be used for this parameter in line with the value used by regulators.

5. Estimate the equity beta of the entity using the following formula³³ to 're-lever' the asset beta into an equity beta.

$$\beta_{entity} = \beta_a + \beta_a \frac{D}{E} \left(1 - \frac{r_d}{(1+r_d)t} \right)$$

where:

β_a	=	Average asset beta calculated above (in step 4) from sector representative firms
$\frac{D}{E}$	=	target gearing ratio of the organisation
r_d	=	pre-tax cost of debt
t	=	tax rate

A1.4 Capital Structure (Debt to Equity Ratio)

Where possible, Government businesses should use the future expected target debt to equity ratio as the appropriate debt to equity ratio proxy in both the WACC and beta formulas. Agencies, which are not part of the *Commercial Policy Framework*, should consult with their Treasury analyst to determine the appropriate target debt to equity ratio where projects are financed from debt sources.

The use of the target debt to equity ratio, instead of the actual debt to equity ratio, is consistent with the cost of capital theory which requires that a project's viability is independent of the financing method used. Therefore it is important that these calculations utilise the organisation's overall target debt to equity ratio regardless of the proposed funding method for the individual project. The target level best represents the long-term leverage of an organisation and is appropriate for organisations with long asset life project proposals.

The target ratio for Government businesses will be specified in the Statements of Business or Corporate Intent and should be determined under the *Capital Structure Policy for Government Businesses*.³⁴

Where a Government business has not completed a capital structure study, the actual debt to equity ratio can be used as a "starting value" in estimating the target rate.

Note on WACC

While the above steps to calculate WACC are seemingly mechanical, judgement is required, for example, in selecting comparable firms to determine betas. The determination of an appropriate post tax WACC should be done in consultation with Treasury and scenario sensitivity analysis should also include sensitivity to changes in WACC parameters.

³³ This formula is widely used among regulators and implicitly sets debt betas equal to zero.

³⁴ NSW Treasury, *Capital Structure Policy for Government Businesses*, TPP 02-7, September 2002

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