2011 MTEF: Budgeting for infrastructure and capital expenditure guidelines

1. Introduction

The capital expenditure guidelines below provide departments and entities with information to make budget submissions for capital projects and programmes. They are designed to promote efficiency in infrastructure planning and budgeting, supporting a better allocation of resources across government.

Large and mega projects will now be evaluated throughout the year and the budget process provides the opportunity for evaluated projects which are ready for funding to be submitted for appraisal. In preparing budget submissions for the 2011 medium-term expenditure framework (MTEF), departments and public entities will prepare their bids for large and mega projects based on the capital budget guidelines that are designed to ensure that funding is directed to projects that offer maximum economic and social benefits.

Project evaluation for large and mega projects for the 2011 medium term expenditure framework (MTEF) will based on the project cycle. The framework and the project cycle for the appraisal of projects supports the Government Immovable Asset Management Act (2007) through assisting departments with the information requirements in compiling an asset management plan for the acquisition and maintenance of immovable assets. The information contained in the capital request will provide insight into where in the appraisal cycle the project is located and should match a department's requirements from the budget. Funding requests for the construction of a capital project should be based on the results of a full socio economic feasibility study in the appraisal cycle.

Leading up to the 2011 Budget, departments and public entities are required to carefully assess infrastructure and capital projects to ensure that they will be effective in delivering on priorities and, where possible, to realise savings.

Project proposals with detailed supporting documentation, should be submitted to the National Treasury by **7 July 2010**.

The type and depth of information required for appraisal will depend on the size and nature of the project being considered. Resources spent on compiling proposals should be proportionate to the likely cost of a project, keeping in mind its nature and complexity. All infrastructure projects and major capital acquisitions must be classified according to the broad categories described below.

1.1. Classification of capital projects and programmes

- **Mega projects or programmes** are estimated to cost more than R350 million per year for a minimum of three years, or a total project cost of at least R 1 billion. All mega projects require a comprehensive National Treasury evaluation.
- **Large projects or programmes** are estimated to cost between R70 million and R350 million per year for a minimum of three years – totalling at least R200million but less than R1 billion over the MTEF. Large projects require detailed information and a feasibility study for scrutiny by National Treasury.

- **Small projects or programmes** are estimated to cost less than R70 million per year and not more than R200 million over the MTEF. Small projects with the same outputs may be grouped together in a programme for evaluation.

All projects extending beyond the MTEF period, regardless of medium-term funding needs, must outline future funding requirements in the submission. Full project costs, including annual operational costs over the lifetime of the asset, must be reported.

1.2. Funding motivation for existing/new projects or programmes

Extension of existing infrastructure projects or programmes

Funding should be based on the need to complete or to extend existing projects or programmes. Multiple small projects with the same outputs may be grouped together and motivated as an infrastructure programme requiring extension. Ongoing infrastructure transfers to public entities and other spheres of government that require further support may also be motivated under this category. Departments and entities are required to provide information on service delivery performance of the projects and programmes as part of their capital submissions.

New infrastructure projects or programmes

All new infrastructure projects or programmes require appraisal.

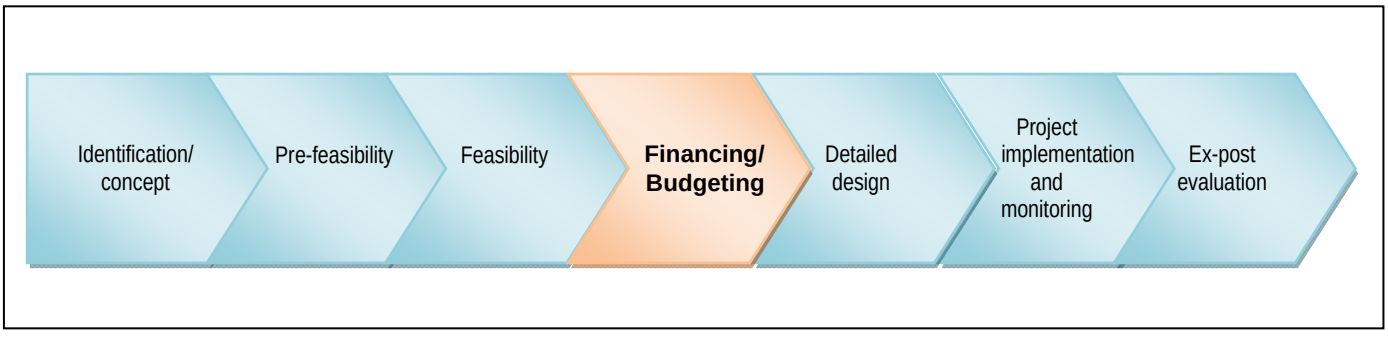
2. Appraisal for capital projects or programmes

Departments and entities are responsible for the appraisal of projects and programmes that require funding. The appraisal guidelines are designed to promote efficient project planning across government by assessing the underlying assumptions, cash flows and calculations to reach the best decision. Project appraisal is necessary to:

- Develop and formulate potential projects precisely and concisely
- Promote value-for-money projects
- Identify and mitigate risks
- Promote transparency.

All projects go through a series of distinct stages between the initial idea for the project and the time when the project is completed. Figure 1 illustrates the stages that can be identified in the project cycle.

Figure 1: Infrastructure project cycle



It is important for departments to understand the project stages and the analysis that has to be carried out at each stage. This allows for a logical approach to project planning that will assist in the appraisal and evaluation of a project and provide the necessary information and rationale to justify an entity's funding request. Cognisance should be taken of where the project is in the appraisal cycle relative to the department's or public entity's requirements from the budget. This guideline provides a general approach to the planning and preparation of a project and details the requirements at each stage of the project. It also highlights the inter-relationships between the project phases.

2.1. Concept/ Identification stage

This is the first stage in the project cycle and it identifies and clarifies the service need. It is important to demonstrate a clear need for a particular project and why government should become involved. The underlying rationale is usually found in some form of market failure or where there is a clear distributional objective of government. The needs analysis should clearly demonstrate alignment with government's policy direction and the fit with a department and public entity's strategic objectives and priorities. The analysis should describe clearly:

- The problem that has given rise to the need
- The statistical data, baseline information and service-delivery indicators pointing to the need at this time
- The extent and urgency of the need
- The consequences if the need is not met
- The proportion of the need a given request is intended to meet
- How the project fits into the department's long-term strategic delivery plan.

The output from this stage is a clear articulation of the service need, its scope, the objectives to be met and an indication of the likely solution.

2.2. The Pre-Feasibility Study

The pre-feasibility study is a short, focused and low cost assessment of a project's viability. It precedes the feasibility and the detailed design stage in a project cycle. The basic aim of the pre-feasibility report is to carry out a preliminary analysis of alternative project option(s), and compare their likely feasibility, costs and benefits. A pre-feasibility study must also make a preliminary identification of likely risks to feasibility and benefits and assess the importance of these risks and how they can be managed.

The options analysis is part of the pre-feasibility study as its purpose is to evaluate alternative options and select the option that would provide the best value for money. At the pre-feasibility stage of the appraisal all the preliminary work necessary to enter into the feasibility study is completed.

Options Analysis

An Options Analysis is undertaken after the Needs Analysis has clearly laid out the rational for the project proposal and the objectives which the project needs to meet. The purpose of an options analysis is to evaluate all feasible options to achieving the identified objective in order to provide information that aids early decision making on proposals that are likely to be successful. The options analysis provides decision

makers with a consistent approach to decision making that is well-informed and transparent. This high level analysis of options empowers departments and entities to channel resources into proposals with a high chance of being successful before undertaking detailed and costly analysis.

The following principles should guide the options analysis for capital projects:

- All feasible options should be evaluated
- Preferred option should achieve value for money
- The analysis should consider lifecycle costs and benefits.
- Preferred option should manage or transfer risks associated with project proposal.
- An examination of the validity of options and their sensitivity to changes in key assumptions should be carried out.

This guideline provides details on how an options analysis will be carried out. The output of this phase of analysis is one preferred option or a short-list of viable potential options. This will enable decision makers to understand the range of options that they may take and to make an informed decision on whether to approve or reject the proposal. If there is merit in moving the proposed project forward, the potential option goes for further analysis in the Feasibility study.

Step 1: Identifying Options

This step involves the identification of a full arrange of possible alternative options that satisfy the objectives or meets the needs identified and is basically seen as a brainstorming session in which all potential options should be listed even if only one or a few will be taken forward for further analysis. Attention should be given to alternative approaches which might not otherwise have been considered. It is advisable early on in the process to consult widely with relevant stakeholders as this is often the best way of creating a realistic set of options. The options should include a 'do nothing option' in which government does nothing or does the minimum. There is need to assess whether the "do nothing option" is optimal otherwise it will not serve as a comparable base case when assessed against other options.

Generic options that may be considered include:

- Extension.
- New build, rent, purchase
- New location or site
- Refurbishment or lease
- Temporary accommodation.
- Outsource or partnering
- Provision of the service or facility by the private sector
- Varying time and scale e.g. through phasing or deferral
- Varying technologies

Step 2: Appraise and evaluate options

The second step of the options analysis consists of analysing the list of options and choosing the most viable option that meets the need. The 'do nothing/minimum' option should always be carried forward to allow comparability between the shortlist of options. This analysis should identify the advantages and disadvantages of each option and examine critically the risks and benefits to government of each of them. The options analysis should be based on quantifiable data. Datasets typically used in options analysis include:

- Present and forecasted demand for the goods/services
- Pricing structures over the life of the project
- Full-life-cycle cost estimates and benefits including social and environmental costs and benefits
- Revenue projections over the life of the project
- Technical information based on technical/engineering studies and preliminary design estimates
- Site characteristics and
- Constraints associated with reaching the desired objective (cost, regulatory, technological, environmental factors, administrative or managerial)

The evaluation of options entails a preliminary analysis of the viability of options from a technical and operational perspective and from a financial and economic viability perspective. The economic perspective also considers the social and environmental costs and benefits of each option. A preliminary cost-benefit analysis (CBA) or cost effectiveness analysis (CEA) is undertaken for each option. The CEA will assist in valuing costs and benefits of an option for which it is difficult to get a market value. The information below provides guidance on how to carry out a CBA and CEA analysis in the appraisal and evaluation of options.

Cost-Benefit Analysis

All possible solution options need to be identified and costs and benefits to government and society quantified. All costs and benefits must be considered from a socio-economic viewpoint. *All assumptions made while valuing costs and benefits must also be clearly specified and where benefits cannot be quantified, a detailed description of those benefits is required*.

Costs and benefits should be extended to cover the useful lifetime of a project under consideration. Based on the net result of economic benefits minus economic costs, decision-makers will determine whether a particular project or programme is a worthwhile investment – keeping in mind that benefits need to be maximised for society.

Measuring costs

Departments must take account of the extent to which projects incur costs over a period of years. Costs should reflect the value of resources displaced (i.e. opportunity cost[1] to society) as a result of the project. Departments must identify and calculate life-cycle costs associated with the planned investment; these should include but should not be limited to:

- **Capital or construction costs** (e.g. land, buildings, equipment, labour costs, consultancy fees, contractors, any other pre-production expenses)
- **Annual operating costs** (e.g. purchases of additional equipment, personnel costs, loan repayments and associated interest, any other operational costs)
- **Annual maintenance costs**
- A description of *non-quantifiable* costs and benefits.

When gathering data on the cost of inputs local contractors should be consulted and only where the inputs do not exist locally should the imported cost be used.

[1] The value of a resource in its next best alternative use – e.g. suppose a department wants to use a piece of land for a park. In calculating the cost of the park, the department should include the value of the land in its next best use.

Inflationary and exchange rate factors should also be accounted for as costs escalate over time.

Measuring benefits

Benefits should be a measure of all the direct social and economic benefits as a result of the project. This measures the *direct effects* that result from the project, usually in the form of revenue earned, cost savings and direct employment created. All non-quantifiable benefits should be described in detail.

Discounting

The economic desirability of a project is determined by the net present value (NPV) of its incremental net economic benefits. Costs and benefits occurring at different times must thus be discounted. Departments and public entities are required to provide any assumptions and calculations in the determination of the discount rate used in calculating the NPV.

Calculating NPV

The NPV of a future stream of net benefits, $(B_0 - C_0)$, $(B_1 - C_1)$, $(B_2 - C_2)$, … $(B_n - C_n)$ can be expressed as follows:

$$NPV^0 = \frac{B_0 - C_0}{(1+r)^0} + \frac{B_1 - C_1}{(1+r)^1} + \ldots \frac{B_n - C_n}{(1+r)^n}$$

$$= \sum_{t=0}^{n} \frac{(B_t - C_t)}{(1+r)^t}$$

where B represents benefits, C represents costs and r is the discount rate.

Cost-Effectiveness Analysis

Cost-effectiveness analysis (CEA)[2] is a tool that can help to ensure efficient use of investment resources in sectors where benefits are difficult to value in monetary terms. It is used for the selection of alternative projects with the *same objective* (quantified in physical terms), and has been most commonly used to evaluate health or education sector.

When conducting a CEA the following steps need to be undertaken:

- Identify and quantify the expected result/benefit of the project in physical terms (e.g. number of road accidents avoided, number of patients lives saved, etc.).
- Identify and rank the programme outputs
- Determine the total cost of the project or programme or the Cost-Effectiveness ratio (CER)

$$CER = \frac{Costs}{Effective\ Benefit}$$

Examples:

[2] CEA can identify the alternative that, for a given output level, minimises the actual value of costs, or, alternatively, for a given cost, maximises the output level.

Cost-effectiveness of three independent programmes

1. Health sector

Programme	Cost (R thousands)	Health effect (life-years gained)	CER
A	150 000	1850	81.08
B	100 000	1200	83.33
C	120 000	1350	88.89

Whilst programme A is the most cost effective, it has the highest benefits and is also the most expensive.

2. Road maintenance projects

Programme	Cost (Rand per km)	Increase in expected life (years)	CER
A	210 000	8	26 250
B	140 000	6	23 333
C	250 000	10	25 000

Project B is the most cost-effective. It is also the cheapest programme and provides the lowest benefits.

An analysis of the risks and uncertainties associated with each option should be undertaken to provide an understanding of the impact these might have on the final outcome of the project. Risks to the project should be recognized and evaluated to test the robustness of the choice of a preferred option. The assessment of risks and uncertainties provides confidence that a project remains viable even if there are variations in some of the key assumptions. Some of the risks that may be encountered include delays in the timing of a project; funding applications may be unsuccessful, construction costs over-runs; etc. The point here is to assess which options have a higher risk and as such a higher probability of not succeeding.

Once all the above has been completed a department should be able to determine which options are feasible and it must then **select its preferred option/s** based on the CBA and CEA. Given the fact that this is a preliminary study, cost estimates may not be as accurate or reliable but they should be within an acceptable error margin in order to guide decision making.

In order for the options analysis to be as objective as possible it is important to check that:

- Critical or unique options proposals have not been underrated in the ranking process
- Consistent assumptions and processes have been applied
- The preferred option has the right feel, based on intuition.

Step 3: Report Compilation

The last step of the pre-feasibility study is to compile a report that details the analysis and evaluation of options. The reasons for rejecting listed options should be recorded as part of the appraisal process as well as the rationale for taking an option forward to detailed appraisal. The results of the pre-feasibility study will indicate the viability of the preferred option, its major costs and benefits; project uncertainties and risks and highlight any outstanding work required to complete the project preparation. The results of the pre-feasibility study enable decision makers to reach a conclusion on whether to reject the project if it does not show potential viability or to recommend the project for a detailed feasibility study. Terms of Reference for the feasibility study are worked out if the conclusion of the pre-feasibility study is that the project is feasible.

2.3. The Feasibility Study

The feasibility study builds on the information from pre-feasibility study and provides a more detailed evaluation of the project. The feasibility study confirms the need for the service and the strategic alignment with broad objectives of the department or entity. The project option must be examined to determine whether it is technically feasible and meets the agreed financial, economic, and social criteria. This includes a comprehensive cost benefit analysis or cost-effectiveness analysis of the short-listed options based on full life cycle costs.

Demand Analysis

The first step is to confirm that there is demand for the goods and services that will be produced by the project. This is important because levels of current and forecasted demand should be sufficient to meet the financial and economic feasibility of the project. There is need to ensure that constraints governing the volume of sales or pricing are factored into the demand forecasts.

The outcome of this analysis will give confidence on the following

- Forecast quantities of sales and prices over the life of the project
- Constraints such as government regulations (administered prices, ceilings, quotas including arrangements for making future adjustments to prices
- Other variables that affect the volume of sales or prices such as technological developments impacted on the product life cycle, subsidies

Technical Engineering Analysis

This is an important step that determines the scale, the design, location and technology that will be adopted by the proposed project. The input parameters necessary for the construction, operation and maintenance of the project are identified, quantified and costed over the life of the project. To be able to do this it is necessary to come up with a production/implementation schedule that sets the output levels. The most cost effective procurement procedures are also considered at this stage. The outcomes of the analysis include:

- The technology choice for the project including designs, prototypes
- Project size and location
- Production schedule and output targets
- Input parameters and their prices including labour for the construction and operation and maintenance of the project
- Procurement procedures.

Environmental Analysis

The proposed project may have externalities which are not reflected in the direct costs and benefits of the project. Externalities are costs and benefits to society that arise from a project but that are not experienced directly by either the project owner or the direct project beneficiaries. They can include environmental, economic and social impacts. Negative externalities should be included as economic costs and positive externalities should be included as economic benefits – only externalities that result in a significant effect should be included.

An example of a negative externality is environmental pollution or degradation as a result of the project. Displacement effects can also be seen as a negative effect (and

should be included as a cost). These are the extent to which a project takes market share, labour or land from existing local firms.

Positive externalities can be both social and economic. An example of economic positive externality is the additional value-add generated from direct effects (i.e. multiplier effects). These initial effects result in additional effects known as indirect effects, and induced effects.

- Indirect effects occur when local businesses benefit from increased purchases of production materials and services due to the project.
- Induced effects arise when those households who benefit from an increase in direct or indirect expenditures spend a portion of their income locally.

Indirect and induced effects thus expand direct spending by a multiple. The *multiplier* measures the extent to which initial expenditure on a project or programme leads to additional expenditures in the local economy. The multiplier is calculated by dividing the total change in economic activity by the change in initial direct spending. They must be discounted by an appropriate rate.

Outcomes from this analysis include:

- An Environmental Impact Analysis (EIA) report
- Positive and negative externalities and economic value
- Mitigation or displacement cost

Manpower and Administrative Requirements

This step details the manpower requirements for the construction and operational phases of the project. It integrates with the technical analysis. The administrative support required to implement and manage the project is critical for the success of the project, and must be identified and not assumed that it exists. Key skills requirements must be determined and matched with the availability in the labour markets.

Institutional Requirements

There is need for an institution that will manage the different phases of the proposed project, identify issues that need to be resolved and ensure their early resolution; ensure that the required approvals and direction are obtained at each appropriate stage of the project; ensure an open information flow between stakeholders and that the necessary policies and procedures are followed. Outcomes from this step include:

- Project governance structure
- Staffing requirements
- Relevant policies and procedures
- Necessary approvals and permits

Financial Analysis

The objective of this analysis is to establish the financial viability of the project. The financial analysis is carried out in accordance with the discounted cashflow method highlighted in the pre-feasibility section although at this stage the analysis is more

rigorous. It must be noted that the financial analysis is also the starting point for the economic analysis as it identifies the key input variables to be used in the analysis.

The information gathered in the steps above is compiled and used to construct a cashflow profile that identifies all the receipts and expenditure over the life of the project. This is based on the operating costs (including working capital requirements) and revenues; investment costs and residual value (in last year of project) and sources of financing (their characteristics and implications). Expenditure includes all investment and operating costs and revenues include any possible income plus the residual value. By calculating the balances, discounted at an appropriate rate, it is possible to define a financial net present value for the project that will determine the financial viability of the proposed project.

The financial analysis must also determine the minimum net cashflow requirement over the life of project. This will demonstrate that the project is financially sustainable and will not require supplementary funding. If the proposed project or option is not financially viable, it is important to check whether it is viable from an economic and social point of view. If it is then consideration is given to other sources of additional funding.

Since capital projects are long-term in nature, there is uncertainty with regards to some of the assumptions used in the calculation of costs and revenues. Costs should be readjusted to reflect different scenarios based upon variations in key assumptions – e.g. what is the effect of a 10% increase in costs, or what is the effect on the cost of imported inputs if there is 5% devaluation in the exchange rate? This is an essential part of the capital bid as it will assist the project planners to be aware of how costs vary with changes in the underlying assumptions.

Example of a scenario analysis for variations in inflation

Risk Variable	**Cost Variations**		
	Pessimistic scenario (6%)	**Baseline Case (4,7%)**	**Optimistic scenario (4%)**
Inflation	R102 000	R100 000	R98 000

Economic Analysis

The economic analysis integrates the environmental analysis and the financial analysis. The purpose of the economic analysis is to appraise the project from a national point of view. It follows exactly the same steps as the financial analysis and applies both the cost benefit analysis and the cost effectiveness analysis in the evaluation of options. The economic analysis builds on the financial analysis that serves to identify all the income and expenditure items at relative market prices. There is then need to adjust costs and benefits for the following distortions in order to come up with the economic cashflow of the project:

- Positive and negative externalities: The adjustment for positive and negative externalities has been covered in detail in the environmental analysis.
- Fiscal effects: All fiscal items (taxes, subsidies) are eliminated and market prices are modified whenever they reflect effects of a fiscal nature, such as duty, VAT and other indirect taxes. These are transfers and not cashflows.
- Shadow prices: In order to calculate the opportunity cost that reflects the true value to society. Shadow prices are used to value inputs and outputs.

Having calculated the economic cashflow, it is now possible to discount it at the social discount rate and to derive the economic net present value (ENPV). A project is desirable from an economic point of view if the ENPV > 0.

For sectors where costs and benefits are difficult to quantify such as in health and education the cost effectiveness is used. Details on using the CEA technique have been detailed in the pre-feasibility analysis.

Risks and Contingencies

Departments must identify and assess the main areas of risk that might prevent a project from delivering anticipated results/outputs. The feasibility study will identify all major impacts and areas of risk so that there is a good appreciation of the uncertainty and risk surrounding the choice of the preferred option. An outline of the approaches to mitigate and manage the risk is provided.

In carrying out feasibility study there are other important issues that have to be considered. A feasibility study is costly and usually done by an independent consultant. The cost of a feasibility study depends on the size and complexity of the project but a generally accepted rule is that it should cost between 1-2 % of the total cost of the project. However, it is advisable to spend more money on a feasibility study as it will result in a cost effective solution that prevents future operational and performance problems.

Project Funding

The results of the feasibility study will indicate the viability of the preferred option, its major costs and benefits and uncertainties and risks. Having gone through the processes above, project planners have done a good appraisal and the project proposal is ready to be considered for funding. The project is submitted for the necessary evaluation process before funding is granted.

3. Implementation readiness

Departments and entities are required to outline their readiness and capacity to implement the project/programme. Details on when construction of the project is expected to commence, construction duration and end date should be specified. Timelines for environmental impact assessments, land acquisition and development approvals should be outlined in the supporting documentation. Cognisance should be taken of industry interest and materials availability in outlining the department/entity's readiness to implement the project/programme.

4. Monitoring and evaluation

The progress of projects appraised, evaluated and funded within the baseline or above baseline will be monitored separately on a quarterly basis in a format prescribed by the National Treasury.

Project Concept Note

PROJECT CONCEPT NOTE

Name of department/public entity

Project name

Name and contact details of project officer

New project or extension of existing project

Project goal/objective

Project description

Delivery outputs *(included in the expected delivery outputs, provide an indication of whether the other approvals have taken place, e.g. EIA approval, municipal approvals and council resolutions and state whether the project forms part of another infrastr*

Project location **Project stage** **Project size**

Expected construction start date **Estimated construction duration** *(months)*

Estimated project cost before tender *(R million)* **Project useful life** *(years)*

Implementing agent [1]

Contracting parties

Sources of funding

Expected socio-economic and environmental benefits

NPV - Cost Benefit Analysis **CER - Cost Effective Analysis**

1 Supporting documents should be attached to the bid.