



TOWARDS A DECISION SUPPORT MECHANISM FOR BALANCING INFRASTRUCTURE SPENDING

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ABSTRACT

South African municipalities are faced with competing infrastructure needs requiring tough spending choices. Budget allocations should balance closing existing infrastructure gaps and maintenance needs, with project investment yielding longer term transformational benefits or profit. Spending on infrastructure supporting businesses, employment growth and rates generating residential developments should be weighed up against social spending on addressing the needs of the poor.

Although the Integrated Development Plan (IDP) provides a comprehensive mechanism for identifying infrastructure projects, existing procedures are often cumbersome in responding to investment opportunities emanating from the private sector, and does not provide a clear road map for objectively assessing competing projects across sectors. Existing guidance for balancing service delivery funding needs is therefore typically inadequate when it comes to providing a practical appraisal framework for rapidly assessing specific spending choices.

This paper offers a project and programme decision support framework considering all financial (budget), economic, social, and environmental considerations. We have distilled a best practice approach from literature and local and overseas examples, augmented by the outcomes of actual professional advice, studies and projects by the authors. We will offer a practical decision support framework which is ready for further refinement through additional local field testing and application.

INTRODUCTION

Municipalities in South Africa, as in many developing countries, are typically faced with conflicting priorities when aiming to balance the provision of infrastructure and services to grow the primary economy (economic projects) with projects required for social or environmental sustainability (developmental projects). This conflict could be resolved by ensuring that developmental projects are strategically defined and selected to translate social and environmental benefits in the short term into economic benefits in the long term. It also assumes that projects are selected to unlock and support growth, rather than only addressing backlogs or averting crises. Powell (2012: 11) argues that local government objectives in South Africa changed from forward looking (including economic and developmental projects) to a crisis management and turnaround agenda in a 5-year period between 2007 and 2011. He further argues that national policy goals consistently exceed local government's capacity to deliver them and the economy's skills base. Hence, the desires and standards espoused by national government policies appear to diverge from the achievable reality of many municipalities in the country.

The cost of adhering to regulations or achieving higher minimum standards increases the cost of service delivery. The result is often that the higher standards are achieved for a portion of the community, while a much larger group receives either no or highly sub-standard service delivery. This problem calls for tough decisions about the setting of realistic standards, rather than desirable, but unattainable standards.

The role of an IDP should be to describe a path through the maze and dichotomy of developmental vs economic as well as repair vs growth objectives and imperatives. There are several reasons and factors that contribute to why many local governments are unable to navigate their way through this very complex task. One of these is in the manner projects are selected, prioritised and budgeted.

CONTEXT

The main challenge for developing an Integrated Infrastructure Plan is to propose a coherent and fully funded Prioritised Infrastructure Implementation Framework which reconciles the sustainable long term socio-economic development targets with the specific requirements of the following statutory planning horizons:

Authorities have to comply with annual budget reporting and fiscal accounting. The Medium Term Expenditure Framework together with the annual Budget Framework Paper provides the basis for annual budget planning.

The Medium Term Expenditure Framework (MTEF) is an annual, rolling 3-year expenditure planning programme which sets out the medium-term expenditure priorities and hard budget constraints against which sector plans can be developed and refined. Preparing an MTEF is a statutory requirement by the National Treasury to support efficient and sustainable public financial management for promoting of economic development, good governance, social progress and a rising standard of living. MTEF also contains outcome criteria for the purpose of performance monitoring.

The goals and objectives of the Integrated Development Plan (IDP) has a 5-year planning horizon. It represents the planning process, which combines legislative requirements, stakeholder needs, political priorities, intergovernmental alignment, budget parameters, institutional capacity, strategic management and implementation. The result is a single, coherent document representative of all these components. An Infrastructure Strategy should not only recognise the provincial and national objectives, but it should also dovetail with the IDPs of the various local authorities in the province.

The National Development Plan Vision 2030 (NDP) sets out the long term development goals over a 15-year time frame (National Planning Commission, 2011). Broadly, the objectives of the NDP includes:

- creating jobs and livelihoods
- expanding infrastructure
- transitioning to a low-carbon economy
- transforming urban and rural spaces
- improving education and training
- providing quality health care
- building a capable state
- fighting corruption and enhancing accountability
- transforming society and uniting the nation.

PROBLEM STATEMENT

Whilst the above strategies and plans set out socio-economic development goals, objectives and targets, it is important to recognise that there are three primary drivers of developing the cross-sector Infrastructure Implementation Framework:

- from a value for money perspective, all the projects may not be required from the outset
- budget constraints could constrain the rollout of the programme by delaying implementation of projects, even if their implementation is justified for immediate implementation
- delivery or operational constraints could make it impractical to implement the projects in an incoherent sequence.

To account for these, implementation programme development in South Africa has traditionally followed a linear process of project identification, project appraisal (usually through a multi-criteria appraisal), project prioritisation, and selecting projects for implementation from the prioritised list depending on annual availability of funds (see Figure 1). Such a linear approach invariably leads to incoherent planning, disconnect between the requirements of different service sectors, and disregard for the affordability of the overall programme. This has the following specific constraints:

- Individual projects may be considered a priority in delivering NDP and IDP objectives, but the programme in its entirety may be unaffordable and could not be achieved in a reasonable time frame if all projects with excessive service standards are to be rolled out.
- Service standards are often set arbitrarily according to unfunded goals, or on an ad hoc project-by-project basis.
- Sector and region specific targets are set without offering a holistic approach to determining equitable funding distribution across all sectors and regions.
- There is no feedback loop between the overall programme costing and affordability of level of service and access standards.
- A lack of funds usually leads to a funding gap, as components could not be delivered when required. This causes community frustration, social unrest and political embarrassment.

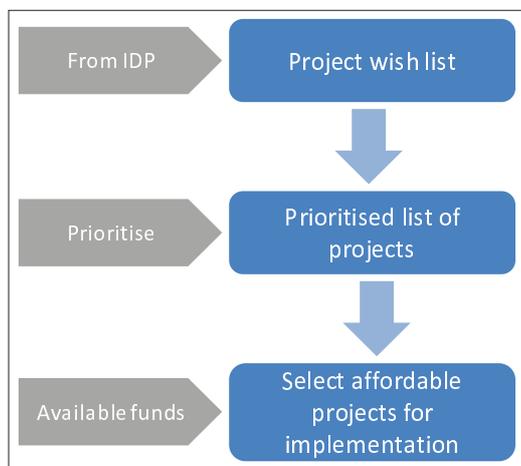


FIGURE 1 Traditional linear approach to project selection

- Many challenges that are facing local authorities contribute to the difficulty in addressing this problem, in a vast number of municipalities:
- Many local authorities lack the strategic planning capacity to deal with the complexity of service delivery among conflicting priorities and limited resources for implementation and operations.
- Short term budgeting and planning cycles are often unable to translate long term strategic objectives into programmes for multiple planning cycles.
- Instead of public participatory planning that culminate in an affordable and viable vision, IDP's often reflect a wish list of service standards that would be difficult to attain and unlikely to sustain.
- Immediate needs and historic backlogs often consume all available resources to the detriment of forward looking growth programmes.
- Attention is often dispersed between sector or geographic priority areas, rather than focusing on projects that build on the strength of doing strategic projects simultaneously; e.g. building an access road with the construction of a new school.
- Receiving external capital funding through grants increases the operational and maintenance burden that has to be sustained from internal sources such as the rates base. Arguably capital projects should only be provided once maintenance and operating budgets for that infrastructure have been secured.

PROPOSED APPROACH

Overview

It is proposed that a two-tier approach, based on the World Bank's Public Expenditure Management Handbook (1998), is followed for developing the Infrastructure Framework. According to this approach an expenditure framework should consist of a 'top-down' resource envelope and

a 'bottom-up' sector-specific project identification and project costing. Ultimately, the programme costs should be matched with the available resources in the context of the annual budget process.

The 'top-down' resource envelope is fundamentally a macroeconomic model that indicates fiscal targets and estimates revenues and expenditures, including government recurring financial obligations, and overall costing of the programme's level of service and access standards. To complement the macroeconomic model, the individual sectors (water, electricity, transport, storm water, sanitation, solid waste, health and education) engage in sector specific "bottom-up" reviews by identifying and costing specific projects to meet the sector policies and activities (similar to the zero-based budgeting approach).

Ultimately intra-sectoral and geographical project allocations should be merged to form a coherent and fully funded Phased Implementation Programme.

In order to merge the 'top-down' fiscally prudent level of service and access standards, and 'bottom-up' sector based project identification and costing into a coherent and equitable Phased Implementation Programme, we propose to follow the approach outlined in Figure 2. The Programme development is undertaken at the following three levels, each of which consist of a number of discrete but integrated steps:

- **Level 1:** Establishing affordable levels of service and access ('top-down' resource allocation):
 - Identify service regions (e.g. urban and rural), and a range of level of service and access standards.
 - Develop medium (3-5 year) and long term (15-40 year) programme fiscal resource targets.
 - Develop a 3-D cost matrix, allocating budget across service sectors, regions and service standard scenarios.
 - Select affordable level of service and access standards by sector and region.
- **Level 2:** Developing funded Prioritised Implementation Programme ('bottom-up sector specific reviews):
 - Prepare a long list of projects.
 - Prepare a short list of projects by subjecting projects to the Level 1 affordability test.
 - Prioritise the shortlisted projects.
 - Select projects for the annual project rollout programme to tie in with 3-year MTEF.
- **Level 3:** Monitoring, evaluation and adjustment.

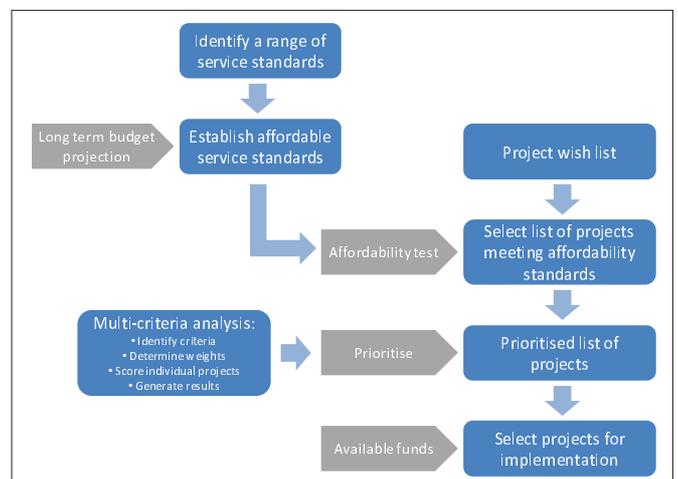


FIGURE 2 Two-tier approach to Infrastructure Framework development

**TABLE 1** Example of level of service and access standard

Functional area	Service	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Urban	Water	100% household	80% household 20% communal taps	75% household 15% communal taps	65% household 10% communal taps	55% household 10% communal taps
	Sanitation	All households have flush toilets	90% flush toilets 10% pit latrines	85% flush toilets 15% pit latrines	75% flush toilets 25% pit latrines	65% flush toilets 35% pit latrines
	Electricity	60 Amp in all households	70% 60 Amp 30% 20 Amp	50% 60 Amp 50% 20 Amp	40% 60 Amp 60% 20 Amp	20% 60 Amp 45% 20 Amp 35% 2.5 Amp
	Solid Waste	Weekly curb side collection	95% curb side 5% communal containers	93% curb side 7% communal containers	90% curb side 10% communal containers	85% curb side 15% communal containers
	Roads	All roads maintained to good standard	70% good standard 30% reasonable std.	50% good standard 50% reasonable std.	20% good standard 80% reasonable std.	10% good standard 90% reasonable std.
	Public transport	100% of HH <500 m Avg time <70	90% of HH <500 m Avg time <80	80% of HH <500 m Avg time <90	80% of HH <500 m Avg time <100 min	70% of HH <500 m Avg time <110
	Health	Full services	Full services	Partial services	Partial services	Partial services
Rural	Water	50% household 50% communal taps	45% household 40% communal taps 15% remote tap	45% household 15% communal taps 40% remote tap	35% household 20% communal taps 45% remote tap	25% household 25% communal taps 45% remote tap
	Sanitation	60% septic tank 40% pit latrine	50% septic tank 50% pit latrine	45% flush toilets 50% pit latrine	40% flush toilets 50% pit latrine	35% flush toilets 50% pit latrine
	Electricity	20% 60 Amp 80% 20 Amp	20% 60 Amp 50% 20 Amp 30% 2.5 Amp	20% 60 Amp 45% 20 Amp 35% 2.5 Amp	20% 60 Amp 40% 20 Amp 40% 2.5 Amp	20% 60 Amp 35% 20 Amp 45% 2.5 Amp
	Roads	All roads maintained to good standard	70% good standard 30% reasonable std.	50% good standard 50% reasonable std.	20% good standard 80% reasonable std.	10% good standard 90% reasonable std.

TABLE 2 Example of costing matrix by expenditure scenario

Service	Example of expected expenditure per Scenario (R'million)									
	Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5	
	Capital	O&M	Capital	O&M	Capital	O&M	Capital	O&M	Capital	O&M
Water	90.3	34.8	70.2	33.8	66.4	33.0	59.1	32.2	51.2	30.6
Sanitation	98.9	14.9	95.8	14.8	71.8	13.6	63.4	12.8	60.2	11.9
Electricity	121.3	66.1	124.3	63.9	123.3	61.1	120.4	59.5	98.2	56.1
Solid waste	0.1	14.3	0.1	13.9	0.1	13.6	0.1	11.8	0.1	11.5
Roads	325.4	23.5	268.6	22.8	232.9	22.3	179.3	21.6	172.6	21.5
Other	0.7	22.7	0.7	22.7	0.3	16.6	0.3	16.6	0.3	16.2
TOTAL	637	176	560	172	495	160	423	155	383	148

Note 1: "Capital" = cumulative 10 year expenditure

Note 2: "O&M" = Annual operating and maintenance per year

LEVEL 1: ESTABLISHING AFFORDABLE LEVELS OF SERVICE AND ACCESS

Identify regions, level of service and access standards

Levels of service scenarios should be set for each sector, covering the full spectrum from maintaining existing standards to achieving highly inspirational standards. Service scenarios should cover the full spectrum of standards, including maintaining current level of service and access standards, medium (3-5 year) term MTEF and IDP planning horizons, and long term (15 year) NDP planning objectives into account. Table 1 provides an example of service standards for a variety of municipal service delivery sectors around which a budget could be built.

Fiscal resource targets

Develop medium (3-5 year) and long term (15-40 year) programme fiscal resource targets. Programme fiscal resource targets should tie in with the level of service and access standard scenarios with a view of measuring affordability. Budget projections should consider realistic income from the full spectrum of funding sources. Availability of capital would, in itself, impact on the roll-out process. It should also be considered that delaying implementation of operationally and economically justified

programme components is inefficient from an economic perspective, as the foregone benefits that could have been achieved by the project exceeds the marginal investment in such a component. The emphasis should therefore also be on considering accessing new revenue generators to accelerate the implementation programme. This may include private sector contributions and Public Private Partnership (PPP) delivery solutions.

Develop a 3-D cost matrix

Develop a 3-D cost matrix, allocating budget between sectors, regions and service standards. The point of departure for the costing is the current service and access standards, determined through a Status Quo assessment. A full lifecycle cost estimate should be prepared to establish the budget

requirements for bridging the funding gap between the status quo and each of the service level scenarios. The lifecycle cost estimate includes capital, as well as recurring operating and maintenance costs. Although some of the services, such as electricity and water supply, would generate revenue, investing in public transport services and hospitals will increase the operating and maintenance budgets. Budgets should be desegregated by sector and geography as is shown by the example in Tables 2 and 3.

Select affordable service standards by sector and region

An affordable service level scenario can be selected by reconciling the income projections to the lifecycle cost. It should, however, be borne in mind that the selected scenario is not static, and rollout could be accelerated or delayed depending on real revenue generation. Acceleration would typically occur if the authority decides to invest more aggressively in economic growth projects which generate greater income, whereas a higher social spending would advance social equity, but could lead to a lower revenue generation trajectory. A balance between social and economic growth objective should therefore be struck in the actual selection of projects.

TABLE 3 Example of a cumulative capital budget for service standard Scenario 3

10 year cumulative capital budget (R million) for service standard Scenario 3					
	Urban	Suburban	Settlement	Rural	Total
Water	24	25	2	16	67
Sanitation	26	27	2	17	72
Electricity	44	46	4	30	124
Solid waste	0.023	0.024	0.002	0.016	0.1
Roads	84	86	7	56	233
Health	0.1	0.1	0.01	0.1	0.3
TOTAL	178	183	15	119	495

LEVEL 2: DEVELOPING FUNDED IMPLEMENTATION PROGRAMME

Prepare a long list of projects

This represents a project 'wish list' of all projects for each sector. This is often a combination of projects identified by officials, the community and politicians.

It is important that the long list of projects should all have been independently justified in terms of economic and social criteria.

Prepare a short list of projects

A short list of projects should be prepared by subjecting projects to the affordability test. All projects must conform to affordable service standards before they would be considered for implementation. The total cost of short listed projects should comply with cost criteria for each region and sector under the selected service standard discussed in the 'top-down' macroeconomic model in Section 3.2, i.e. the costed shortlist should not exceed the long term fiscal targets.

Prioritise the shortlisted projects

Short listed projects could be evaluated through an multi-criteria appraisal (MCA) process to establish the order in which projects should ideally be implemented. MCA facilitates integration of the multiple social, environmental, economic, design and transport system objectives into a common options selection framework. It is therefore a good tool to incorporate both tangible and intangible costs and benefits in an objective options selection process. Developing a set of measurable key performance indicators (KPIs) is essential for testing the infrastructure projects. It is important that the KPIs are aligned with development

TABLE 4 Example of objectives, measurable key performance measures and project scoring

Category	Description	"KPI"	Score					Weight	Max
			0	1	2	3	4		
Infrastructure	Financial contribution by the community or private sector	% cost that can be recovered from the community or private sector	<5%	5- 20%	20-50%	50 - 80%	80- 100%	0.5	4
	Huidige terugbetalingskoers	Huidige terugbetalingskoers	<5%	5 - 20%	20 - 50%	50 - 80%	80 - 100%	0.5	
Economy	Number of beneficiaries	(Population)/(Project cost) x 1000	Add the real result of the factor to the final score.					0.5	
	BCR	BCR	Add the BCR to the final score.						
	Number of jobs created	Number of permanent jobs Number of temporary jobs	0 0	1 1-10	2 10-20	3-4 20-30	≥5 >30	0.5	
Social	Location of the project	% households earning <R1500 per month	-	<30%	30-50%	50-60%	>60%	0.5	4
		Functional area	-	Urban	Town	Settlement	Rural	0.5	
Human resource	Benefiting local business	% of project that is delivered locally	<5%	5- 20%	20- 50%	50-80%	80-100%	1	4
Safe environment	Project description	Type of project	Airport	Road of PT project	Telecom or electricity	Solid waste, pedestrian or PT project	Health, sanitation or water project	1	4
Cooperation	Part of a larger scheme or plan	(Project cost)/(Cost of larger scheme)	<5%	5-20%	20-50%	50-80%	80-100%	0.5	4
	Project description	Contribution to basic service delivery	Airports and other non essential projects	According to specific guidelines				0.5	
Natural environment	Listed in terms of NEMA	Environmental impact	Other projects				Project improve the environment	1	4
			EIA not completed	EIA completed. Negative impact, but can be mitigated.	EIA completed – no negative impact.	EIA not required			



planning (IDP, NDP, etc.) objectives, and the MCA evaluation criteria. The typical KPIs would include measures of capital cost, benefits, user satisfaction, environmental and social impacts and risks, deliverability, attractiveness to private sector investment, flexibility to adjust to timing and staging opportunities, as well as the addition of new trades over time.

A transparent MCA Appraisal Framework should be managed through a participatory approach which gives a rapid feedback loop to the options appraisal team. Rather than being a one-answer black box, the approach should help decision makers to understand the implications of different choices and decisions, and guide them to a series of preferred solutions from a range of acceptable options and scenarios. Given that the future is uncertain, it gives the assurance that the project and infrastructure expansion paths are sufficiently flexible, by allowing adjustment and adaptation to changing circumstances.

The outcome of MCA is a set of credible and objective assessment results, incorporating all triple bottom line (social, economic and environmental) sustainability criteria, on which a project short-list or preferred project ranking could be selected.

The MCA options selection process follows the following format:

- Initial information session. Stakeholders involved in the process are given an initial briefing on the project objectives, results of work done on defining options and the decision making framework, and the MCA process. The aim of this step is to ensure a common understanding of the issues and process, and streamline subsequent steps.
- Identifying and selecting criteria. Selection criteria consist of headline criteria and assessment criteria. Headline criteria are the main groupings of assessment criteria, and include strategic, financial and economic, technical and operational. Assessment criteria are the specific technical criteria used for assessing each particular component.
- Weighting headline criteria and assessment criteria. Headline criteria and assessment criteria should have separate sets of weights to avoid an inherent weighting bias when there are varied numbers of assessment criteria under each headline. It is recognised that the final project selection would be influenced significantly by the relative importance attached to specific issues. For the process to be effective, the weights attached to individual assessment criteria should reflect diverse and, in some cases, conflicting interests.
- Setting weights and option ranking maximising the value of input by high-level decision makers, and keeping face-to-face time to a minimum while maximising engagement in the process and recognising the value of alternative viewpoints.
- Projects should be evaluated and scored in terms of a set of measurable KPIs (see example in Table 4). Scores should be weighted and aggregated to determine the final project score. Projects are ranked according to scores.

Select projects for implementation

The final step would be to select projects for each year of the annual project rollout programme to tie in with the 3-year MTEF. This is an ongoing process which is dependent on funding availability in a particular year that would guide the selection of projects for actual annual rollout.

LEVEL 3: MONITORING, EVALUATION AND ADJUSTMENT

Due to changes in development goals, project rollout constraints and changes in fiscal circumstances, the programme has to be monitored and periodically adjusted to remain relevant.

Annual reviews are required to reconcile and adapt the 3-year implementation plan to actual expenditure deficits or surpluses, while strategic direction would be adapted every five years during the IDP review process.

SUMMARY

Creating a system to assist in prioritising projects for budgeting purposes requires dedicated skills with adequate capacity. Very often this function is left to one or few individuals that are under pressure to accommodate specific requests, or to push the envelope of what can be delivered safely within the fiscal constraints. Councils should be made aware that prudence in early years could result in surpluses in later years that would receive much more reward from local communities.

The authors believe that the mechanism described here can be tailor made to a municipality in a short period, and can be run effectively by dedicated and trained officials, with the necessary political oversight and protection from undue pressure.

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