



Project to Revise the Pricing Strategy for Water Use Charges and Develop a Funding Model for Water Infrastructure Development and Use and a Model for the Establishment of an Economic Regulator

Financial Model and User Manual

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1 Introduction

1.1 Background

The Department of Water Affairs (DWA) has undertaken a project to revise the Pricing Strategy for water use charges and to develop a Financing Model for water infrastructure development and use. As part of the same project the Department wants to develop a model for the establishment of an Economic Regulator for the water sector.

The Terms of Reference (ToR) for this project stated that:

“The (financing) model will have to . . . develop a coherent funding model for water resources infrastructure to feed into the raw water pricing strategy element of the project. It would also be aligned to models for water services infrastructure funding to develop a unified ‘cost accumulation and management model’ that informs the pricing of raw, bulk and potable water and will inform the basis for the policy for economic regulation of the sector.”

Under the required output/outcome of the infrastructure financing model section of the ToR of the project it clearly states that the PSP must

“develop models for financing new water resources infrastructure development, including refurbishment and betterment of existing infrastructure, considering fiscal and off-budget sources of funding”.

After listing this and other required outputs/outcomes of the infrastructure financing model work-stream, the ToR goes on to state that

“In summary the funding model needs to determine the resources requirements (capital and operating expenses) necessary to manage, maintain, rehabilitate, replace and expand water resources infrastructure and how these resources requirements are to be funded”.

The content of the ToR clearly indicates that the scope of the work-stream is limited to raw water infrastructure.

1.2 Purpose of this document

This document serves to describe the Financial Model developed in terms of Activity 2.4 in the Inception Report. The Model is not the final product of the work-stream. Instead it is the working tool that helps the team achieve the following:

- Evaluation of the impact of changes proposed in the Pricing Strategy work-stream
- Modelling of the different financing approaches – at the macro (institutional or portfolio) level
- Modelling of the financing of a particular scheme (micro level).

1.3 Process to date

Figure 1 below shows the process adopted for the ‘infrastructure funding’ work-stream.

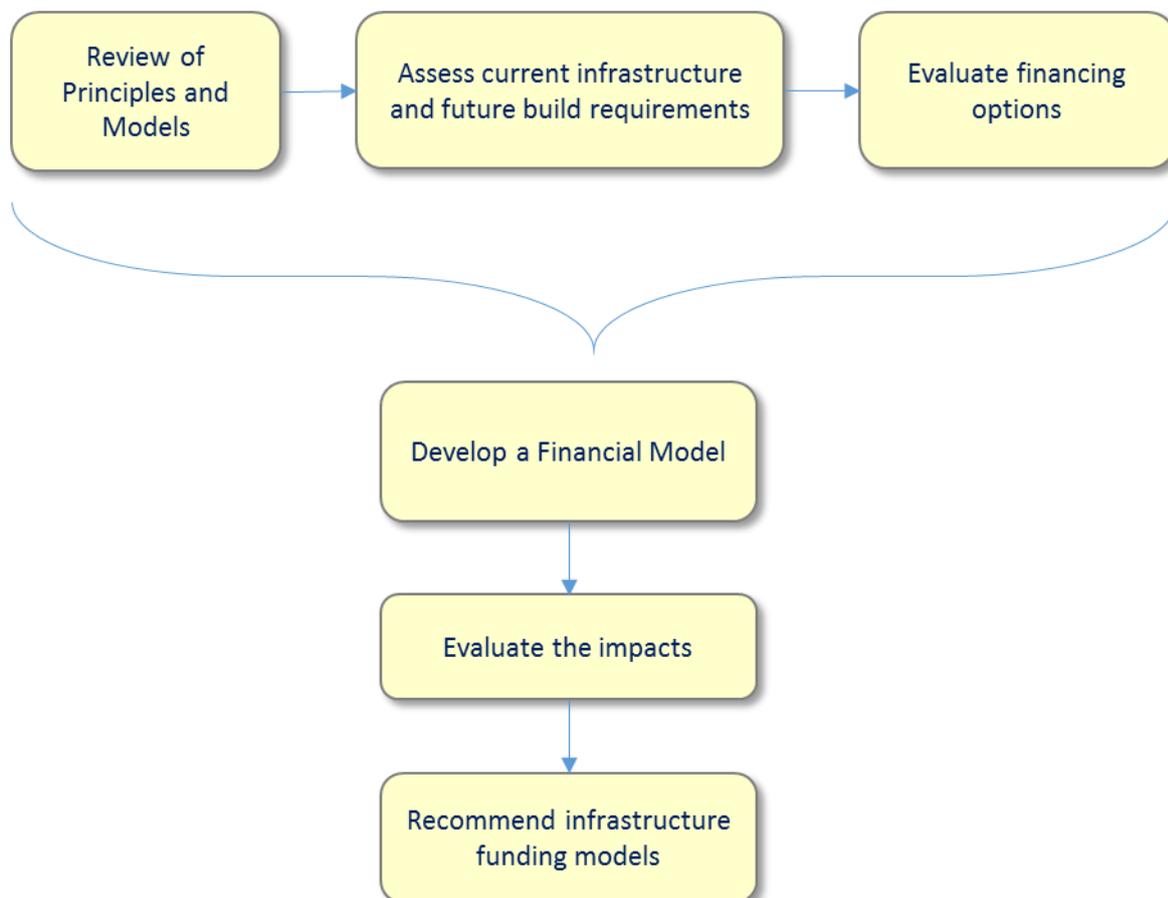
The first deliverable was a summary of case review of South African and international experience with infrastructure financing, together with relevant theoretical and practical principles for water infrastructure financing in South Africa.

Whilst this review was being conducted, a database of infrastructure – both current and developed – was compiled. It provides base information on the existing water resource assets, and the associated operating costs, revenue (and volumes), as well as future water resource infrastructure (capital) requirements and associated operating costs and revenue.

At the same time a Concept Note was prepared describing the different financial-institutional options, including institutional arrangements, financing mechanisms and sources of funding required to develop, refurbish and operate water resources infrastructure.

These three deliverables have helped to develop the current deliverable – namely the Financial Model.

Figure 1 Infrastructure Funding Activity flow



2 Overview of the Financial Model

The Model serves to conceptually link the following five elements:

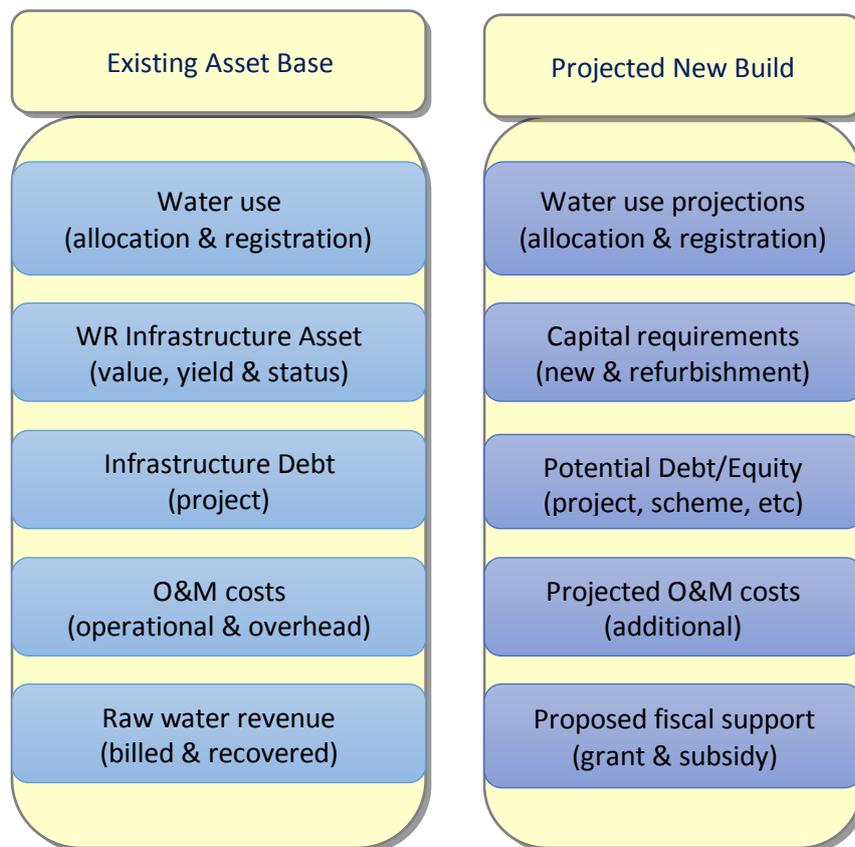
- Infrastructure required to provide the water resource.
- Capital and operating costs required for this existing, new and refurbished infrastructure.

- Institutional-funding model to enable the development and operation of that infrastructure.
- Sources of capital associated with the financing option for infrastructure development.
- Sources of operational financing for capital repayment and operational costs, including prices.

The model is a live document which is subject to change based on changes in input variables and assumptions. The financial model has been designed to be receptive to either a scheme based approach to infrastructure financing or a system based approach. It is also possible to model a national charge.

At its core, the model consists of a database with the following information.

Figure 2 Core data contained in the database



The model combines the above data with inputted assumptions to produce scenarios for pricing and financing individual schemes as well as the broader infrastructure requirement.

The broad conceptual flow of the model is illustrated in Figure 3 below.

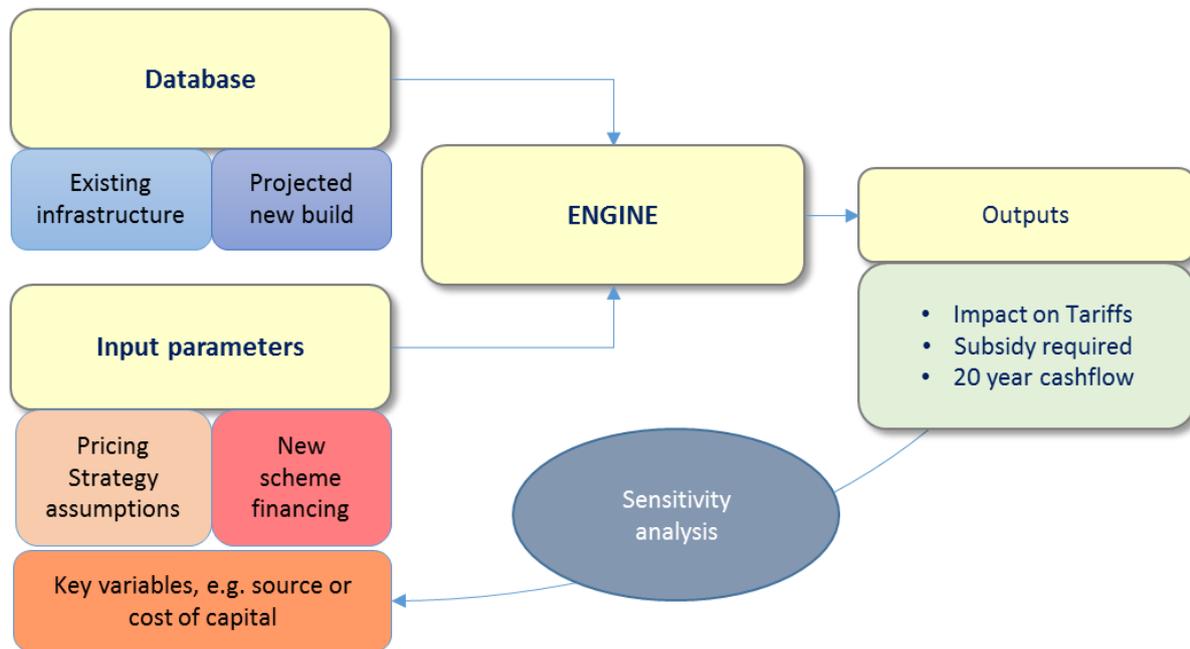


Figure 3 Broad conceptual flow of Financial Model

As can be seen, there are two underlying inputs to the model: the database that stores information on the existing and projected infrastructure, and the input parameters that allow users to define or alter the Pricing Strategy assumptions, projections for new schemes, and other key variables such as inflation, cost of capital, debt tenure, etc.

The automated outputs of the model will focus on the tariffs required to fund the infrastructure base, along with the subsidy required to cover social infrastructure or any (affordability) caps that may be applied to tariffs. It will also generate a 20 year cash flow.

Testing the model for sensitivity to different variables will allow policy makers to assess the impact of changes in Pricing Strategy assumptions and other parameters.

3 Understanding the base data

The deliverable entitled 'Assessment of Infrastructure and Financing' describes what data has been collected and incorporated into the model, and the methodology used for collection. The base data is maintained in 6 subsidiary spreadsheets, containing the core data relating to:

- Volumes

Volumes have been provided at a Scheme Management Parameter (SMP – abstraction point) level for each user type

- Asset base

The Department of Water Affairs asset register contains details of the Net book Value and condition of the asset at an asset class and cost centre level at the DWA year-end 31 March 2012. The Current Replacement Cost (CRC) and Depreciated Replacement Cost (DRC) have been obtained from the DWA asset register that contains the Sakhile Asset values at 31 March 2008 and 31 March 2010. This

data is also provided at an asset class level and includes details of the scheme and condition of the asset.

TCTA's Asset base is also included in the register. It is at an asset class and project level based on CRC only.

- Refurbishments

An annual budget has been provided at a scheme level.

- Projected capital works

New projects planned by the department have been obtained for all the operating areas at a scheme level.

- Operations and Maintenance

The Operating and Maintenance budget costs for 2013 have been obtained at an SMP level.

- Tariffs

Tariffs have been provided at an SMP level for each user type.

These subsidiary spreadsheets are maintained in their original format so that any electronic updates received from DWA can be relatively easily captured into the database. As far as possible, data is captured at an SMP level (SMP stands for Scheme Management Parameter. It represents an abstraction point. One scheme may have more than one SMP with widely divergent abstraction costs (and tariffs) related to each.)

The subsidiary spreadsheets link into the main Financial Model, which contains summary data from all the sheets. The model also contains an input page allowing users of the model to change key variables or assumptions. Behind the model is an engine that combines the various input pages and produces an output page that displays the results.

4 Modelling the impact of a new scheme

A key function of the model is to determine the impact of a new scheme on:

- The tariffs to be charged (split between Irrigation and Domestic & Industrial) and as determined by the Pricing Strategy
- The grant funding required (determined by policy considerations relating to social versus economic infrastructure), and resulting from any short-fall on tariffs.
- The projected cash flows over twenty years, demonstrating debt utilisation and distinguishing between capital, operating and debt repayment flows. The cash-flow should also distinguish between sources of revenue (tariffs, up-front payment from users, loans and grants).

The following inputs are required by the model to generate the above outputs:

- ✓ The projected capital costs (including timing of cash flows),

- ✓ Operations and maintenance costs (for twenty years)
- ✓ Cost of capital (Weighted Average Cost of Capital – WACC)
- ✓ Expected growth rates in utilisation of water supplied by the scheme (Year 1 usage plus expected growth rate thereafter). The volume utilised will need to be split per SMP and per Irrigation and D&I. As a default, the existing system ratio will be applied to the new scheme.
- ✓ Available funding. As a default the model will assume that no grant funding is available. However if it is indicated that a percentage of the scheme is for social users who cannot afford to pay, then this percentage of the capital costs should be indicated as a grant requirement, with the remaining balance allocated to the tariff calculation. The model can also incorporate the input of a maximum tariff. An output generated will then be the grant funding required to make the project sustainable.

5 Modelling the impact of changes to the Pricing Strategy

Whilst the modelling above is the key long-term benefit of the model, it is already being used to model changes in approach proposed by the revised Pricing Strategy. This is an iterative process, rather than an automated process that allows instant review of proposed changes.

Examples of changes that have been modelled are:

- The implications of a national charge relative to a system charge or scheme charge
- The impact of a change in the Return on Asset calculation
- The impact of removing the cap on agricultural charges.

At the end of the project, once the Pricing Strategy has been stabilised, the new assumptions will be built into the model to allow it to be utilised for future financing evaluations based on the new Pricing Strategy.

6 Modelling the impact of Portfolio financing

One of the outputs of the project is the identification of the full range of financing sources, and the recommendation of institutional models that enable access to these sources. Once the revised Pricing Strategy has stabilised, the financial model will be used to test the impact of portfolio financing (as opposed to project based financing) on the broader financing requirements for water resources. This will primarily relate to the impact of different costs of capital, and the impact of pooled cash flows to finance debt repayments.

The model will also enable DWA to demonstrate to potential investors the risks that investors may be exposed to with respect to the virtual (or real) balance sheet of an infrastructure utility that is afforded control over the asset base and related cash inflows and outflows.

7 Way Forward

As stated earlier, the model remains a working document which will continue to be updated and refined during the course of the project, and as the Pricing Strategy evolves to its final form.