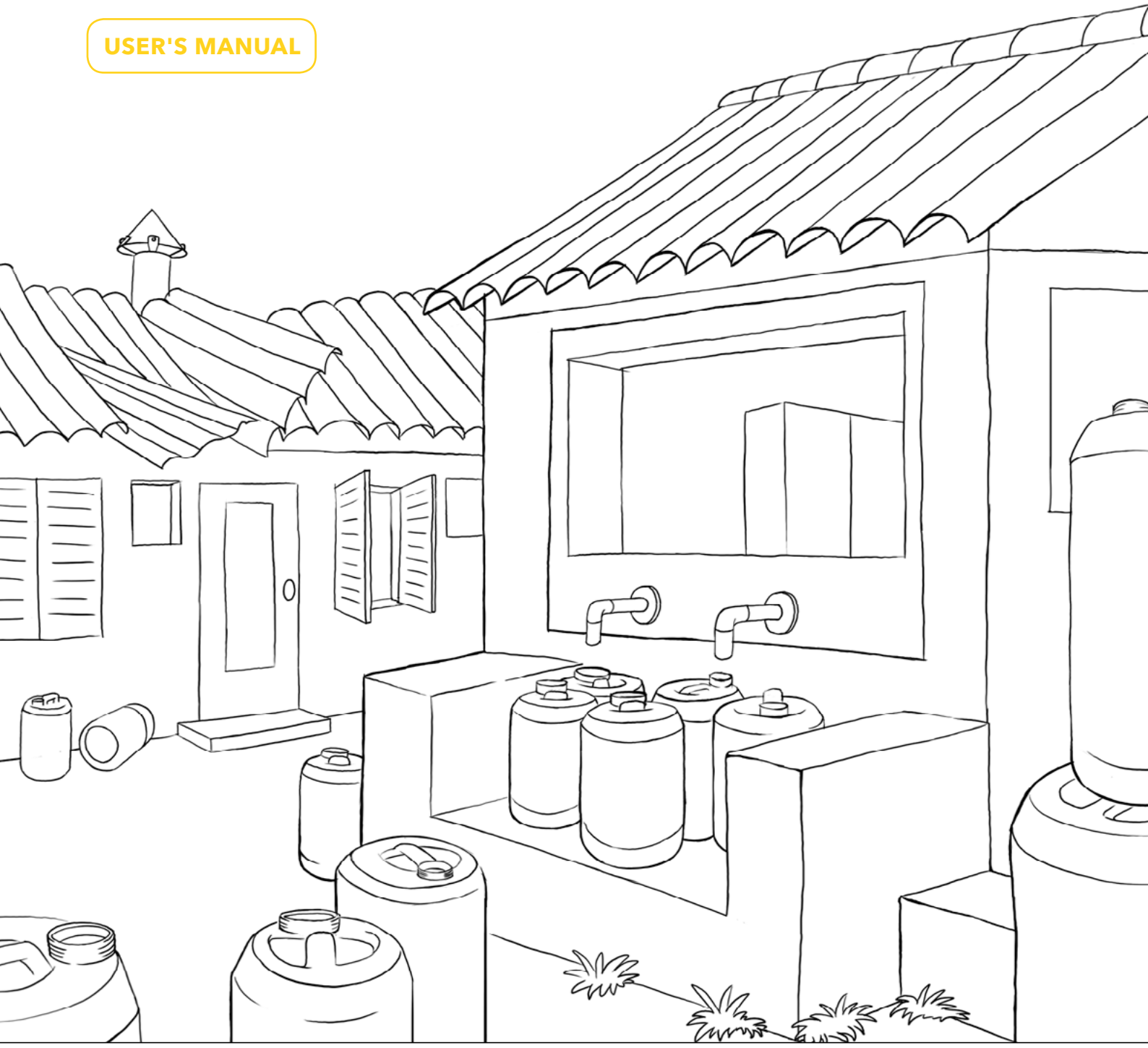
BEWOP

TOOL SERIES

Financial Toolkit

OPERATIONAL TOOL

USER'S MANUAL



GWOPA Global Water Operators' Partnerships Alliance

UN HABITAT FOR A BETTER URBAN FUTURE

UNESCO IHE DELFT

A joint initiative of GWOPA/ UN-Habitat and IHE Delft Institute for Water Education

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BEWOP

Water Operators' Partnerships are peer support arrangements between two or more water and sanitation operators, carried out on a not-for-profit basis with the objective of strengthening operator capacity.

The Boosting Effectiveness of Water Operators' Partnerships (BEWOP) initiative is producing a series of guidance materials, tools and games to help WOP partners expertly plan and implement WOP partnerships and effectively learn and share knowledge with one another.

Two types of products feature in the second phase of this BEWOP initiative. Process Tools support WOP participants prepare for, design, implement and follow through with their WOPs. Operational Tools support in the transfer of knowledge on specific operational topics relevant for water utilities.

Find out more

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Introduction to the Toolkit

Serving low income areas (LIAs) with appropriate quantity and quality of water has received increased attention, at political and utility levels, in many countries of the developing world. Pre-paid meters constitute the go-to measure when implementing strategies of water supply extension in urban and rural LIAs. By allowing an affordable up-front payment for water services, pre-paid meters contribute to the revenues and cash flows of water utilities, which in turn helps ensure their financial sustainability.

To better understand the financial incentives for water utilities in operating pre-paid meters as an initiative to serve LIAs, IHE Delft Institute for Water Education (IHE DELFT) developed the accompanying Pre-Paid Meter Financial Toolkit. The toolkit consists of a financial model running on Excel and this User's Manual – aimed at guiding experienced and new water professionals into the financial decision-making process related to the pre-paid meter program implementation.

This toolkit is a financial model that projects the cash flows for the utility's pre-paid meter program, based on a set of assumptions made by the user, and computes the project's internal rate of return (project IRR). By working with different sets of assumptions, the user will understand the major factors that contribute to the financial viability of using pre-paid meters as a pro-poor strategy. This manual helps the user navigate through the financial toolkit.

Access the full Tool here
http://bit.ly/BEWOP-FTS_Tool

Contents

Matumaini Water and Sewerage Corporation

Matumaini Water and Sewerage Corporation (MWSC), a water utility in the Sub-Saharan city of Matumaini, is responsible for providing water and sanitation services for the city's 450,000 residents. Like other cities in Sub-Saharan Africa, Matumaini is experiencing an average population growth rate of 5% per annum due to rural-urban migration, as people from the rural areas try to escape the problems of extreme poverty, lack of employment opportunities and the effects of man-made and natural disasters.

Of Matumaini's total population, around 65% live in low-income areas, mostly in unplanned and informal settlements. In these informal settlements, the urban poor are unable to access adequate supply of clean water because of property rights issues coupled with MWSC's inability to expand its water system due to a shortage of funds. Thus, most of the poor consumers are forced to connect illegally to MWSC's networks for their daily water requirements. Aside from problems of unpaid water consumption, such practices also lead to high incidences of leaks as well as higher operating and maintenance costs, which further contribute to the financial losses of the water utility. In the long term, the twin effects of lower revenues and higher costs result in MWSC's inability to expand its water network.

Heeding the directive of the Ministry of Water, MWSC implemented a LIAs water supply program using different types of interventions, given the actual conditions on the ground. Currently, MWSC provides water to low income areas through the following mechanisms: in-house connections – 10%; yard taps – 60%; water kiosks – 25%; pre-paid meters – 5%. Previously, pre-paid meters served a higher percentage of the low income population, but the utility encountered problems in repairing the meters, which ultimately caused a reduction of their usage.

MWSC's Pre-Paid Meter Program

As part of its program to provide water services to low income areas, MWSC installed pre-paid meters to replace the communal standpipes, which required consumers to line up for long hours just to fill up their 20-liter pails. As seen in Figure 1, pre-paid meters use an electronic mechanism that allows consumers with pre-paid recharge cards to avail of a certain volume of water. The use of pre-paid meters allows residents to get water at any time of the day, thus eliminating the long queues that arise when water supply is available only during such periods of time when the caretaker is present. For MWSC, the volume of water consumed is more accurately measured and paid for in advance.

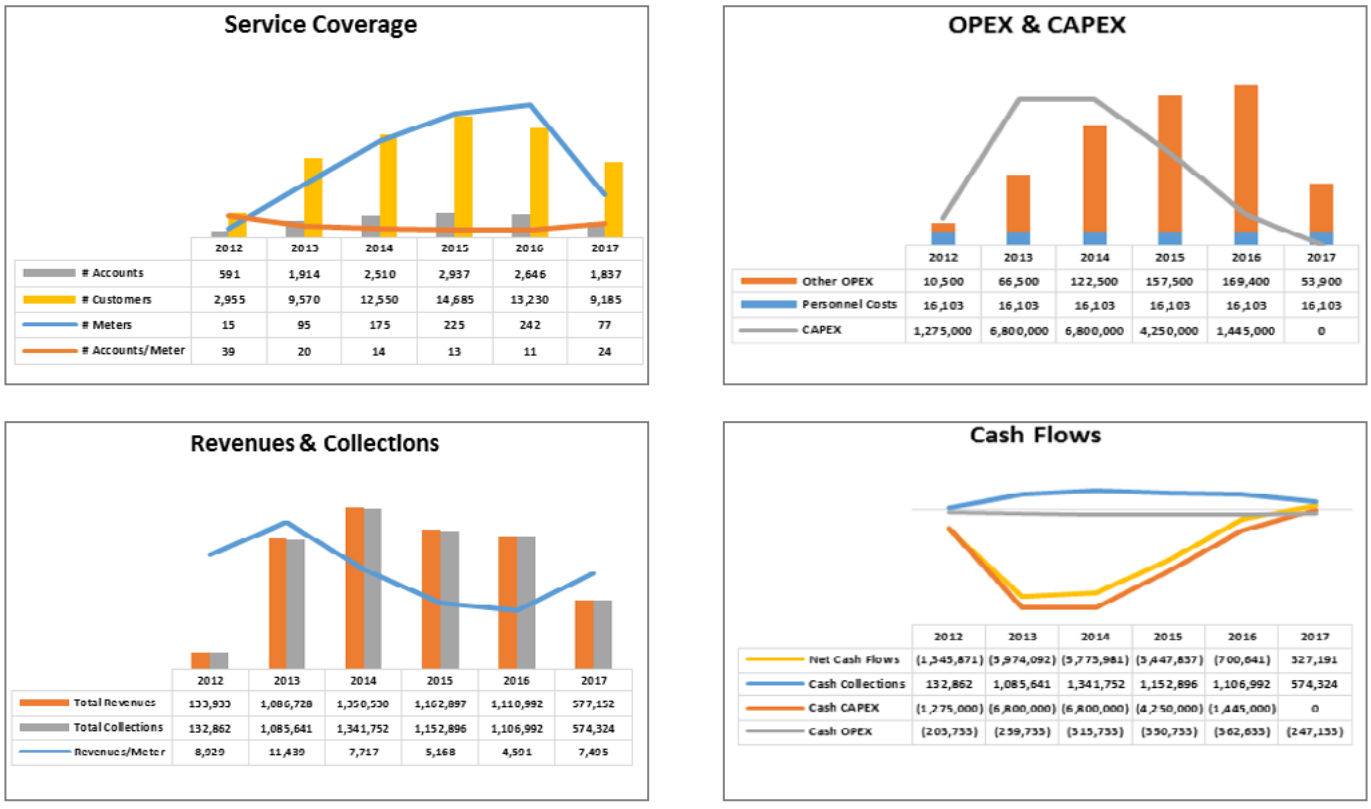
Figure 1. Photo of pre-paid meter

A few years into the program, MWSC was able to install 242 pre-paid meters in its low income areas, each costing 85,000 Shillings. **Figure 2** shows the capital expenditure (CAPEX) build-up over the first five years of the program. However, the lack of adequate skilled labor for their maintenance and non-availability of spare parts in the local market resulted in a significant reduction of the number of functioning meters to 77, by year 6. While the first two years showed promising results in terms of number of accounts per meter and revenues per meter, the maintenance problem affected the availability for use of the meters and subsequently, caused a reduction of these revenue factors.

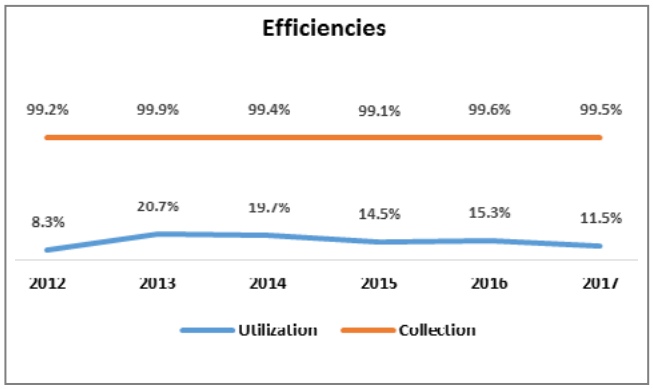
Looking at the efficiency graphs in **Figure 2**, the utilization efficiency, which was already low at the start, even sank below previous levels, from year 3 onwards. For the first 5 years, MWSC's capital expenditures on pre-paid meters coupled with frequent breakdowns and low utilization (when operational) negatively affected the company's cash flows as seen in **Figure 2**.

Given the other over-riding reasons for implementing this LIAs service extension strategy[1], beside its financial viability, the company's senior management decided to continue with the program. This meant rehabilitating all the meters that were no longer functioning and making sure the operation of all meters was self-sustaining, at the least. Thus, the base case for this program is one where the project IRR is equal to zero.

Figure 2. Historical Data on the Pre-Paid Meter Program



1. Please take time out to think of and enumerate the other over-riding reasons for implementing LIAs service extension strategies.



The lack of adequate O&M reduced the number of functioning meters and affected the program's effectiveness.

Utilization efficiency plummeted after year 3. Do you think MWSC should continue the pre-paid meter program? What strategies would you recommend to improve the overall financial situation?

Place yourself in the shoes of the MWSC's financial manager and think of ways to improve the financial viability of the pre-paid meter program. ***What factors may affect the program's ability to be self-sustaining? Moreover, what factors are within the company's control that can improve the program's cash flow and increase the project IRR?***

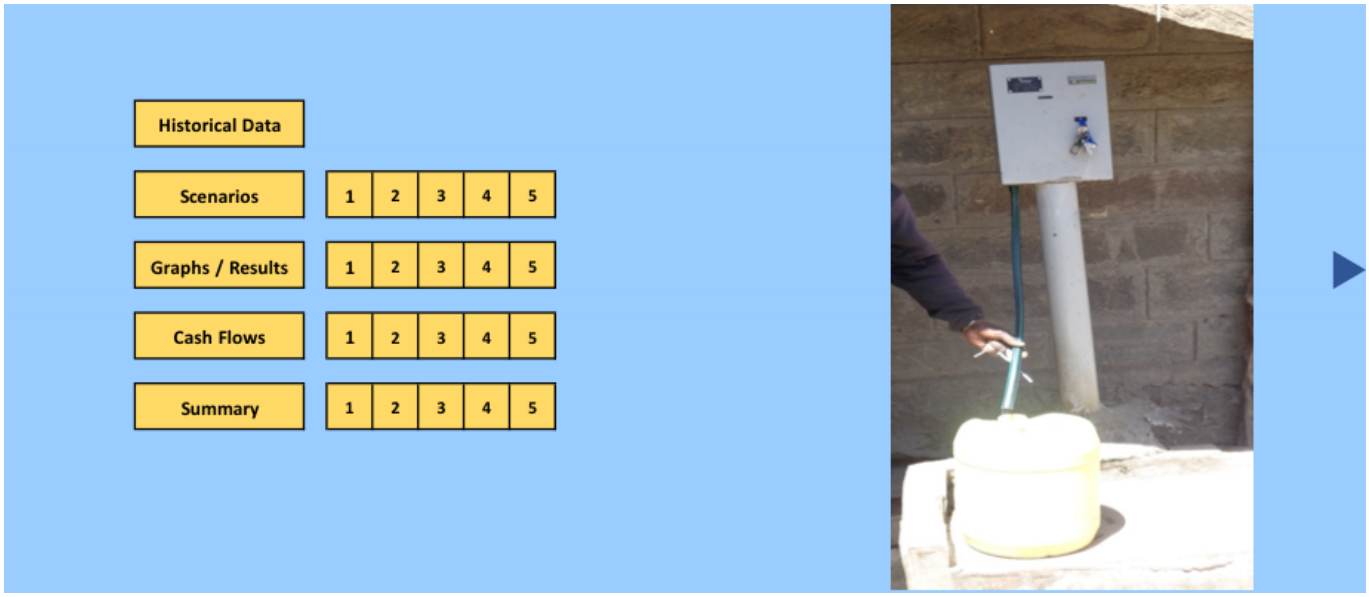
Fortunately, the Pre-Paid Meter Financial Toolkit is available to help you answer these questions and come up with a plan of action to increase the program's viability while meeting the other major objectives of the company.

Main Menu

The Main Menu **(Figure 3)** page gives an overview of the tool's components. If you click on the Historical Data button you will be taken to the page where you can find all of the previous data for MWSC's pre-paid meter program.

From the base case, you may look at several scenarios. For each scenario, the financial toolkit will provide several graphs of the results, present the cash flows, and update the summary page **(Figure 3)**.

Figure 3. Main Menu Page



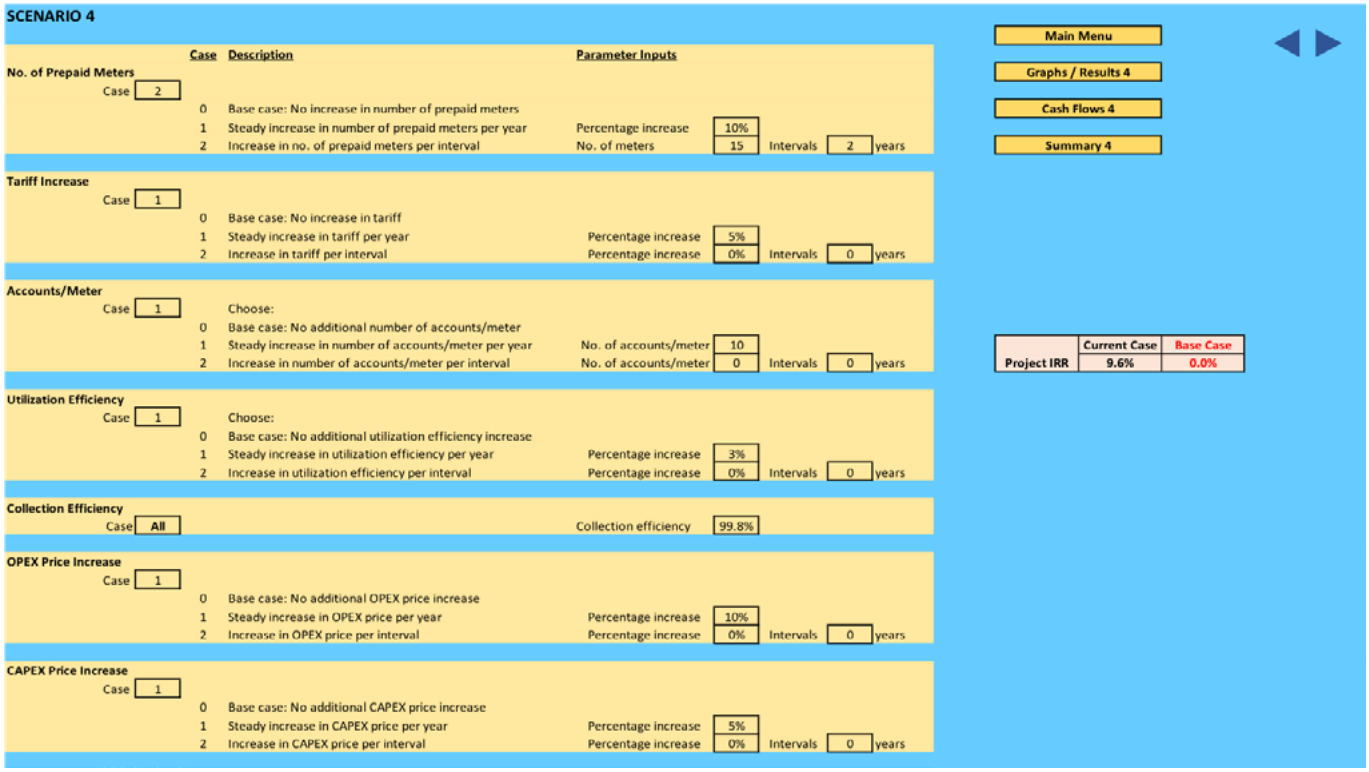
To go directly to the next page or the previous page, please click on the blue arrows.

Scenarios

Let's start by exploring what the Scenarios page looks like. Figure 4 shows the full display of Scenario 4. Note that each scenario has seven parameters, each one covering 3 available cases of decision-making.

Next to the case description you will find the parameter inputs, which you can change according to what you believe would be the best scenario for the financial sustainability of the pre-paid meter program of MWSC

Figure 4. Scenario Page



The Scenario page allows you to make assumptions for the different parameters. For most of the parameters, several cases may be considered with different sets of assumptions per case. Note that the base assumes that there will only be 242 operating pre-paid meters for the next ten years, with no increases in tariff, number of accounts per meter, utilization efficiency, collection efficiency, OPEX and CAPEX price increases.

Keep in mind that the base case is just a self-sustaining case, with project IRR equal to zero.

Table 1. Assumed Parameters and their Cash Flow Effects

Parameter	Type of Cash Flow	Effect
No. of Pre-Paid Meters	Outflow	Increase
Tariff Increase	Inflow	Increase
Accounts / Meter	Inflow	Increase
Utilization Efficiency	Inflow	Increase
Collection Efficiency	Inflow	No change, one level used
OPEX Price Increase	Outflow	Increase
CAPEX Price Increase	Outflow	Increase

As shown in **Table 1**, the assumptions made for the parameters influence either the cash inflow or outflow, which, depending on the parameter, may drive the net cash flows for the next ten years either in the positive or negative direction. In turn, the resulting net cash flows will become the basis for the calculation of the project IRR using a discounted cash flow methodology. Note that there are generally three cases to choose from:

- Case # 0: Base case
- Case # 1: Steady increase in parameter per year
- Case #2: One-time Increase in parameter per interval of years

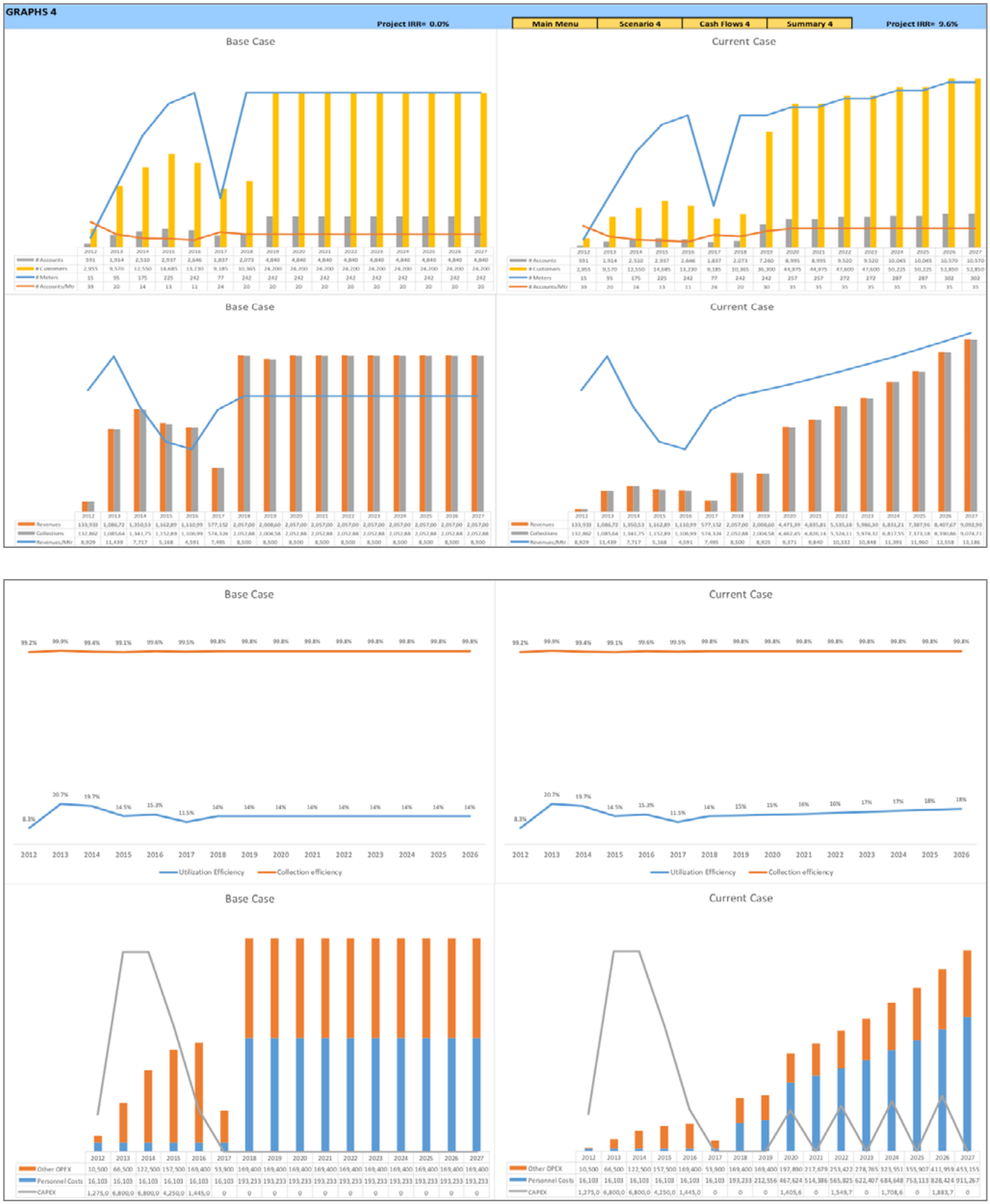
When choosing either Case # 1 or Case #2, always remember to input the parameter increase and the number of years per interval, specifically for Case #2.

The project IRR is basically the rate of return of the project as a whole, irrespective of the source of funding. Even if the LIAs water service extension program is fully funded by the donors, these donors would have to make sure that the project is financially sustainable, given competing uses for their funds. Moreover, if water utilities view donor funds as having zero cost of funding for them, there is no incentive for them to make sure that the program is sustainable, at the least. Conversely, if the program is internally funded by the water utilities, then they will have to make sure that the program is financially viable, as financing is usually difficult for most water utilities in the developing world.

Graphs / Results

Next, we will explore the chosen scenarios appear in the graphs and results page. **Figure 5** provides you with an overview of how this page looks like for the parameters presented in **Figure 4**. This page shows the graphs and results for the specific scenario under consideration, which are presented side by side with those obtained for the base case. This allows visual comparison of the two cases and points out the major reasons for the increase or decrease in project IRR vis-à-vis the base case.

Figure 5. Graphs / Results Page



Summary

The Summary page provides a list of the scenarios you have considered, together with the assumptions used, and compares the project IRRs for these different scenarios (See **Figure 6**). Currently, the financial toolkit allows you to work with a set of five different scenarios at a time. A graph of the project IRRs vis-à-vis the different scenarios is shown at the bottom of the summary spreadsheet

More scenarios may be investigated by working on new sets of five scenarios. **Table 2** provides a spreadsheet which may be used to record the assumptions used for each scenario considered, as well as the resulting project IRR.

Moving Forward

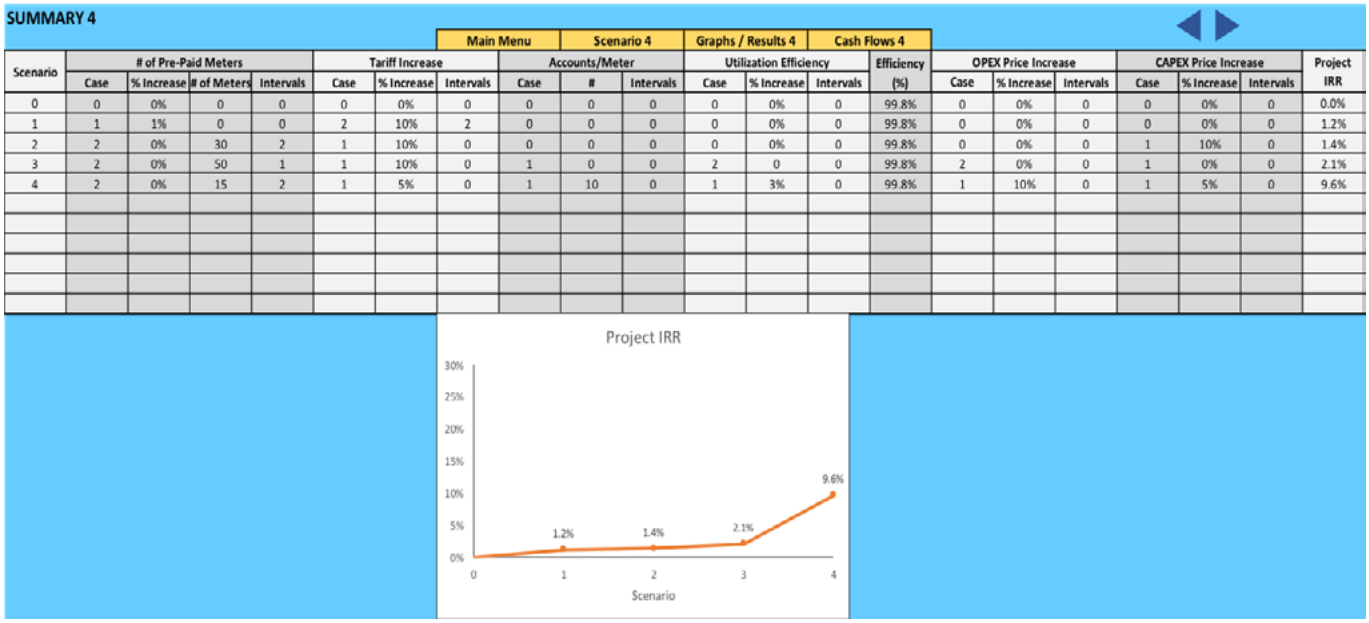
Analyze the results of the different scenarios you investigated and identify the factors that contribute to the financial sustainability of operating pre-paid meters as a pro-poor program. Based on these factors:

1. Discuss the measures you think are necessary to sustain the financial viability of the pre-paid meter program.
2. If you were asked to optimize the financial returns, what measures would you implement?
3. Note that there are social considerations for implementing pre-paid meters. What measures should you undertake to ensure that the financial objectives are balanced with these social considerations?

Using the Financial Toolkit for Pre-Paid Meters: Quick Steps

1. Decide on the parameter(s) to be changed.
2. Decide on the case to be used.
3. If not base case, provide necessary parameter inputs:
    a. % increase (for % decrease, add a negative sign)
    b. No. of meters (whole numbers)
    c. Intervals (years)
    d. No. of accounts/meter (whole numbers)
4. View Graphs/Results page.
5. View Cash Flows page
6. View Summary page
7. Repeat for five scenarios.
8. For more scenarios:
    a. Record the assumptions in the Scenario Summary Spreadsheet (Table 2)
    b. Delete previous entries.
    c. Repeat steps from 1 – 8.

Figure 6. Summary Page



SUMMARY 4

Main Menu | Scenario 4 | Graphs / Results 4 | Cash Flows 4

Scenario	# of Pre-Paid Meters				Tariff Increase			Accounts/Meter			Utilization Efficiency			Efficiency	OPEX Price Increase			CAPEX Price Increase			Project
	Case	% Increase	# of Meters	Intervals	Case	% Increase	Intervals	Case	#	Intervals	Case	% Increase	Intervals	(%)	Case	% Increase	Intervals	Case	% Increase	Intervals	IRR
0	0	0%	0	0	0	0%	0	0	0	0	0	0%	0	99.8%	0	0%	0	0	0%	0	0.0%
1	1	1%	0	0	2	10%	2	0	0	0	0	0%	0	99.8%	0	0%	0	0	0%	0	1.2%
2	2	0%	30	2	1	10%	0	0	0	0	0	0%	0	99.8%	0	0%	0	1	10%	0	1.4%
3	2	0%	50	1	1	10%	0	1	0	0	2	0	0	99.8%	2	0%	0	1	0%	0	2.1%
4	2	0%	15	2	1	5%	0	1	10	0	1	3%	0	99.8%	1	10%	0	1	5%	0	9.6%

Table 2. Scenario Summary Spreadsheet

Scenario	# of Pre-Paid Meters				Tariff Increase			Accounts / Meter		
	Case	% Increase	# of Meters	Intervals	Case	% Increase	Intervals	Case	#	Intervals
0	0	0%	0	0	0	0%	0	0	0	0
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Utilization Efficiency			Collection Efficiency (%)	OPEX Price Increase			CAPEX Price Increase			Project IRR
Case	% Increase	Intervals		Case	% Increase	Intervals	Case	% Increase	Intervals	
0	0%	0	99.8%	0	0%	0	0	0%	0	0.0%
			99.8%							
			99.8%							
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IMPLEMENTING THE NEW URBAN AGENDA

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