



# Luganville Water Tariff Review

## Framework Paper

### WATER SECTOR

December 2012

**UTILITIES  
REGULATORY  
AUTHORITY**



### A letter from the Chairman

When carrying out the first tariff review of a particular utility, the regulator is faced with one of the key challenges of regulation: information asymmetry. This is a situation where all the information about costs, efficiency levels, and operational effectiveness are held by the utility. In this situation, the regulator can do three things: first, encourage data sharing and reporting routines with the utility; second, collect benchmark information from comparator utilities; and third, commission research and opinion from independent experts. Each of these activities will play a role in the tariff review of water services in Luganville.

The process of the tariff review is also designed in such a way as to address the issue of information asymmetry. First, the method of calculating the tariff is defined by the regulator (and is described in this paper). Then, the utility uses the methodology to apply for a certain tariff level. In its tariff application, the utility must provide evidence to support each of the assumptions used in the financial model. Then, in making its decision, the regulator can compare this evidence with any other available information to judge what the most reasonable assumptions are for the tariff.

At each stage of the tariff setting process, all the assumptions and supporting evidence are shared with all stakeholders to ensure transparency and to invite any additional evidence or comment. The consultation process is designed to engage with all stakeholder groups in such a way that they can most effectively provide useful input into the tariff setting process.

Given that this particular case is one of a government-run utility, an additional consideration is how the tariff should be implemented. Different incentive structures exist through the public fund budgeting process that need to be considered when implementing any new tariff.

In this way the regulator works with the utility and with stakeholders to create an estimate of the “fair” price that is based on the best information available in an open and transparent way. I continue to urge any interested stakeholders to participate fully in the ongoing consultation process

Yours sincerely,

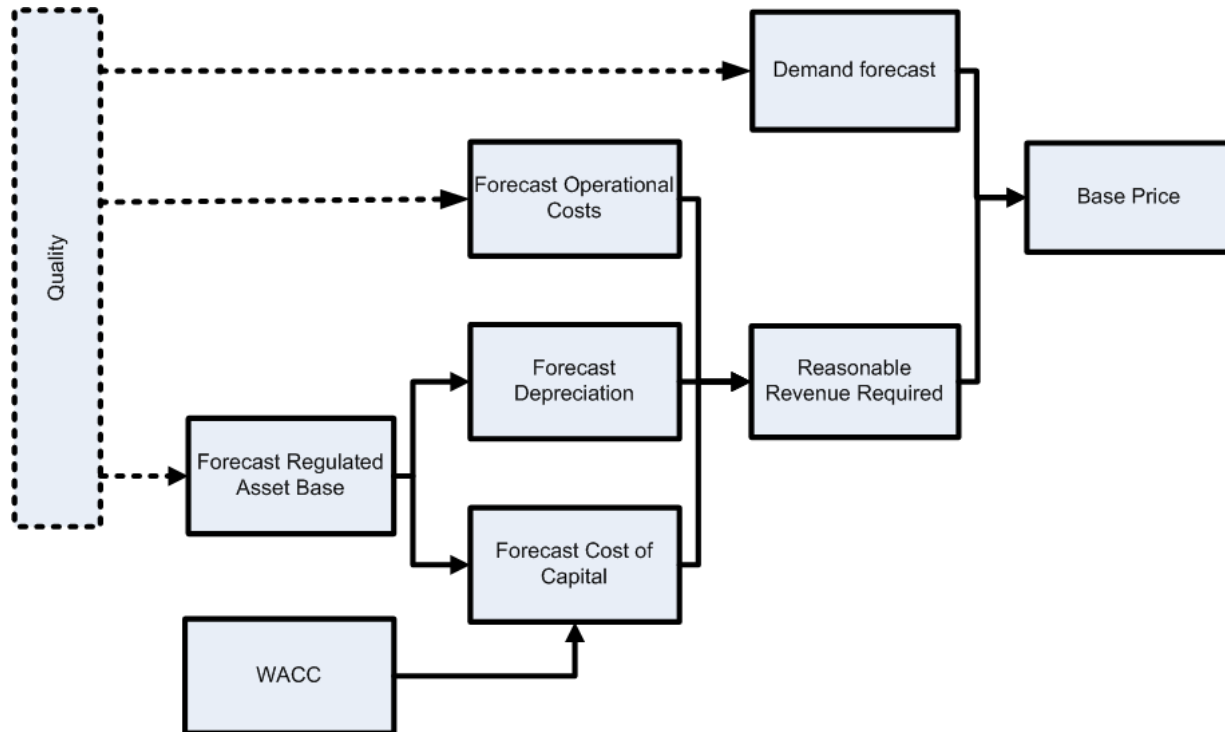
**Johnson Naviti Matarulapa Marakipule**

*Chairperson*

## Executive summary

As this is the first review of water tariffs charged by the Public Works Department in Luganville, a full review of the cost of operations and infrastructure will be performed. The tariff calculation is based on a financial model that includes forecasts of demand, operating costs, and infrastructure investment over the next five years. These forecasts should be consistent with the desired level of quality to be delivered to customers.

The following diagram illustrates the major “building-blocks” of the financial model and how they interact:



A five-year forecast will be estimated for each of the elements, based on a set of assumptions. Each assumption made will be supported by evidence from a range of sources including:

- historical data from PWD
- external benchmarks from comparable utilities
- assessment by industry experts

The assumptions used by PWD in their initial tariff application are described in the Luganville Water Tariff Review Tariff Application Report. These assumptions will be reviewed with all stakeholder submissions received to date and used to inform the Authority’s Draft Decision. Further submissions and information will then be gathered in order to inform the Authority’s Final Decision.

Once the fair price level has been estimated, the Authority will consider the planned government funding structures and processes in order to determine the most appropriate tariff implementation method. The tariff

implementation needs to be done in such a way so that PWD are assigned an appropriate budget level to invest in infrastructure, and that quality standards can be effectively enforced.

All stakeholders are encouraged to comment on this framework paper. Any comments received will inform the Authority's Draft Decision.

## How to respond to this paper

All stakeholders including the Government, the Public Works Department, other utilities, existing customers and other members of the public are invited to comment on this paper. Responses and information received will be considered in the formalisation of the Authority's Draft Decision.

The Authority will be seeking responses as part of its public consultation process. Stakeholders are encouraged to contact the Authority to file submissions or ask any questions.

Submissions can be made until

**21 January 2013**

and they can be made in person at the  
Office of the Utilities Regulatory Authority  
in the VNPF Building in Port Vila  
on the Ground Floor

mailed to  
Luganville Water Tariff Review  
Utilities Regulatory Authority  
P.M.B 9093  
Port Vila, Vanuatu

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Maureen Malas  
*Project Manager – Luganville Water Tariff Review*  
Utilities Regulatory Authority  
[mmalas@ura.gov.vu](mailto:mmalas@ura.gov.vu)

or called in by telephone to the  
Utilities Regulatory Authority at  
+678 23335

Submissions will be made available on the Authority's website in accordance with the Authority's submission policy. Any material that is confidential should be clearly marked as such.

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# 1. Introduction

## 1.1 Purpose of this paper

This report is the second stage of the tariff review of water services in Luganville. It sets out detailed tariff-setting methodology and process of how the URA will be conducting the tariff review. All interested parties are invited to submit comments on the methods set out in order to inform the ongoing tariff review process.

## 1.2 Structure of this paper

This paper is structured into the following sections:

- Chapter 2, ‘Tariff setting methodology,’ explains the way in which the Authority will calculate the appropriate price for the regulated service.
- Chapter 3, ‘Tariff Implementation,’ explains how the Authority will consider the implementation of the tariff once the appropriate price is determined.
- Chapter 4, ‘Consultation process,’ describes the consultation process that will be undertaken to facilitate stakeholder engagement with the tariff review.

## 1.3 Tariff review process

The process of the tariff review is designed to ensure that stakeholders are able to participate and contribute valuable comments at each stage of the review process. The different stages and timings of the tariff review process are:

Stage	Description	Status
Issues Paper	Description of key issues that impact the tariff review	Published 8 November 2012
Consultation Stage 1	Stakeholders are invited to comment on the Issues Paper	Closed 7 December 2012
Framework paper	Description of the tariff-setting methodology and process	This paper
Tariff application	Initial proposal of new tariff level from the utility with supporting evidence	Planned for 21 December 2012
Consultation Stage 2	Stakeholders are invited to comment on the Framework Paper and Tariff Application	Planned to close 21 January 2013
Draft decision	Draft tariff determination by the Authority	Planned for 1 February 2013

Consultation Stage 3	Stakeholders are invited to comment on the Authority's draft tariff decision	Planned to close 15 March 2013
Final decision	Stakeholders are informed of the Authority's final tariff decision	Planned for 1 April 2013

After the final decision has been published, the new tariff will be implemented according to considerations described in chapter 3 of this paper.

## 1.4 About the Utilities Regulatory Authority

The Utilities Regulatory Authority was established on the 11 February 2008 under the *Utilities Regulatory Authority Act No 11 of 2007* (the URA Act). The URA Act established the Authority as an independent economic regulator for pricing, access, standards and monitoring of concession agreements. The regulated services defined in the URA Act are the supply of electricity or water services.

The Authority provides continued and expanded support to the Vanuatu Government's microeconomic reform program. This program was designed to improve the efficiency and competitiveness of Vanuatu's economy through the reform of the electricity, water and other current and former government business enterprises.

The Government perceived the establishment of an independent regulatory body as necessary to ensure that the benefits of the industry structuring and concession arrangements were passed on to household, commercial and industrial customers.

The primary objective of the Authority is to 'improve access to electricity and water services and to protect the long-term interests of Vanuatu's consumers with regards to the price, quality and reliability of electricity and water services.'

This objective is central to the framework of economic regulation that facilitates the efficiency and financial viability of regulated utilities, prevents misuse of monopoly power and ensures that customers benefit from quality improvements and efficiency gains over the longer term.

The functions of the Authority, as expressed in the URA Act under which it is constituted, are:

- to exercise the functions and powers conferred by the URA Act or by any other Act in furtherance of the purpose of the URA Act;
- to provide advice, reports and recommendations to the Government relating to utilities;
- to inform the public of matters relating to utilities;
- to assist consumers to resolve grievances;
- to investigate and act upon offences under the URA Act ;
- to advise the Minister on any other matter referred to the Authority by the Minister; and
- to administer and monitor compliance of Concession Agreements under the URA Act.

In accordance with its Charter of Consultation and Regulatory Practice the Authority aims to be:



- independent, balanced and fair by ensuring its advice does not reflect undue influences and is consistent with its statutory objectives; and
- open and transparent by publishing its findings and conclusions.

Section 18 of the URA Act grants the Authority the power to determine the maximum price which may be charged in relation to any aspect of a regulated service in any place.

## 1.5 Useful documents and links

Readers of this report may also find it useful to review the following reports and documents, available on the Authority's website [www.ura.gov.vu](http://www.ura.gov.vu):

- Utilities Regulatory Authority Luganville Water Tariff Review Tariff Application Report, December 2012
- Utilities Regulatory Authority Luganville Water Tariff Review Consultation Stage 1 Report, December 2012
- Utilities Regulatory Authority Luganville Water Tariff Review Issues Paper, November 2012
- Utilities Regulatory Authority Annual Report 2011
- Utilities Regulatory Authority Act No. 11 of 2007 and Amendment (2010)
- Water Supply Act 1955 and Amendments
- Public Health Act 1994

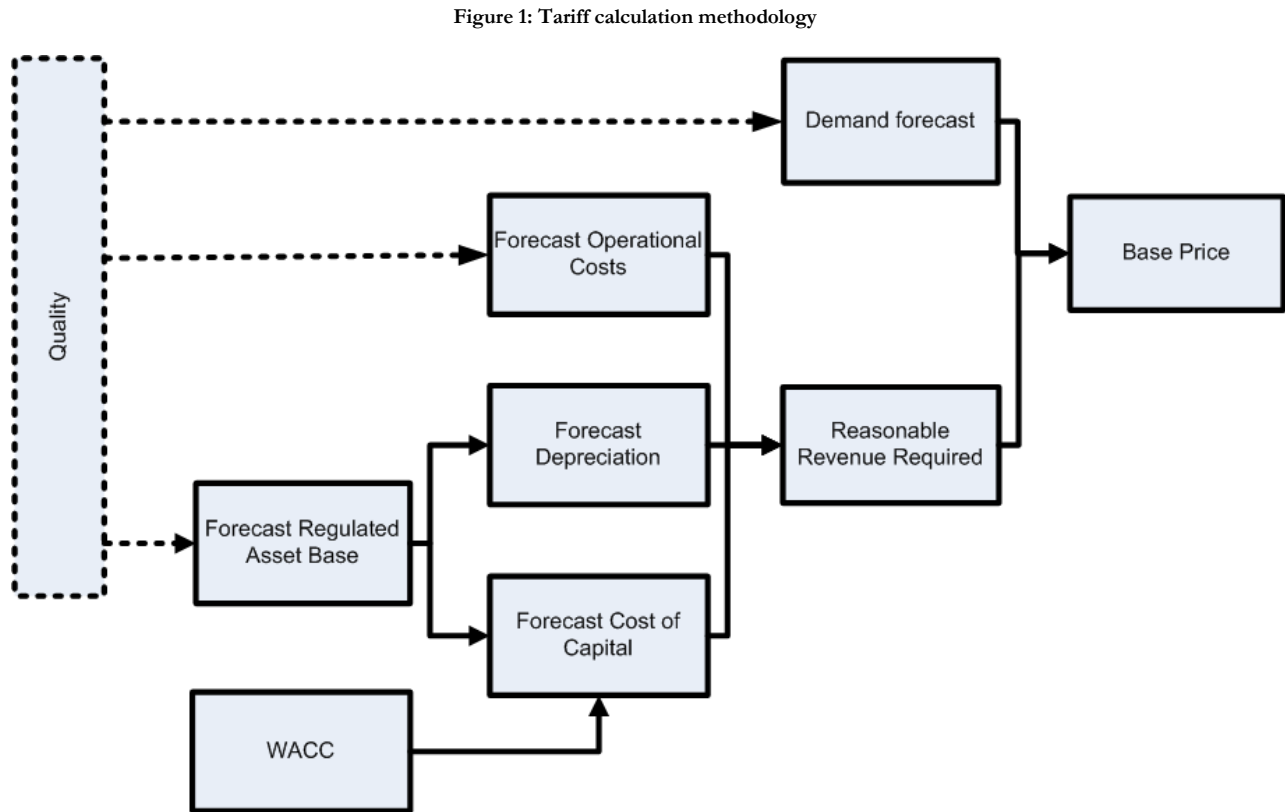
## 2. Tariff-setting methodology

The tariff-setting methodology is the way in which the Authority will calculate the “fair” price for the water supply service in Luganville. A “fair” price is one that enables the utility to make sufficient revenue to operate and finance appropriate investments without compromising service quality, and provides the basis of a sustainable business in the long term. Such a price ensures that the long-term interests of consumers are met by ensuring a water service of adequate quality is delivered in an efficient way.

The tariff setting process that the URA is now undertaking is done in consultation with all relevant stakeholders to ensure transparency.

### 2.1 Elements of the tariff methodology

The diagram below illustrates the different components of the tariff setting methodology and how they interact.



The tariff level is calculated as follows:

- Although quality does not have a direct mathematical relationship to the base price calculation, the assumed level of quality does inform assumptions around demand, operational costs and asset levels

- The reasonable revenue required is calculated as the sum of forecast operational costs, depreciation and the cost of capital. The cost of capital is based on an estimate of the value of infrastructure assets (Regulated Asset Base, or RAB), and an estimated Weighted Average Cost of Capital (WACC)
- The base price is set to ensure that the revenue generated by the forecasted demand equals the forecast required revenue

## 2.2 Forecast period

The forecast period is the period of time over which demand, operational and infrastructure characteristics of the water supply service in Luganville will be forecasted to calculate a reasonable tariff. The forecast period is set at 5 years, in accordance with standard international regulatory practice.

## 2.3 Quality

Quality is defined as the characteristics of the water delivered, reliability, and service levels experienced by customers. Any forecast change in the level of quality should be reflected in the forecast of demand, operational costs and infrastructure in the following ways:

- Any increase in water quality is likely to result in an increase in demand as customers will be more willing to use tap water rather than alternatives;
- Any increase in water quality will likely require additional staff and/or other operating expenses; and
- Any increase in water quality may also require improvements to installed infrastructure

The utility's overall operations will be benchmarked with local and international water companies in setting the quality standards. Water service monitoring, reliability and safety standards will also be issued by the Authority to ensure that consumers are receiving a reasonable level of service commensurate with the price they are paying.

One issue with the government ownership of water service in Luganville is that financial penalties for sub-standard quality will not be viable, as any payments will be due to the public fund. In order ensure that quality levels are maintained, the Authority will work to ensure an appropriate monitoring and compliance regime is in place.

## 2.4 Demand forecast

The demand forecast estimates water consumption in Luganville for the period 2013 to 2017. The level of demand determines the amount of water that needs to be produced. Total number of customers, consumption and losses are key inputs into the demand forecast. These are described below.

### 2.4.1 Number of customers

The number of customers forecasts the total customers that will be connected to the water network over the regulated period. If there are different types of customers identified or different tariffs to be set for different customers, forecasts will be required for each customer group.

Factors that are likely to affect the number of customers are:

- income, population and household growth of Luganville;
- number of cruise ships visiting;
- business and industrial growth in Luganville; and
- new potential areas to connect to the PWD grid.

### 2.4.2 Consumption

Consumption is the amount of water customers will consume. If there are different types of customers identified or different tariffs to be set for different customers, forecasts will be required for each customer group.

Factors that are likely to affect consumption levels are:

- water quality levels;
- household income growth in Luganville;
- changes in average household size;
- tourist arrivals growth;
- impact of climate change on average temperatures in Luganville; and
- the overall economic activity of Luganville.

### 2.4.3 Losses

Losses are defined as differences in the amount of water pumped from source and the amount delivered to customers (leakages/theft), and the amount billed for (billing losses).

The proportion of losses in Luganville will be compared to local and international benchmarks. It may be reasonable to assume that any forecast change in the level of losses may require additional operational costs or investment in infrastructure.

## 2.5 Operational Costs

The operational cost forecast estimates the reasonable costs of providing water services in Luganville. Operational costs include all costs associated with providing water services to the desired level of quality. These costs are broken down into three areas: electricity costs, staff costs, and materials costs.

### 2.5.1 Electricity costs

Electric pumps are used to extract water from the source and deliver it into reservoirs at elevation. Electricity costs are calculated on the basis of kilowatt hour (kWh) per cubic metre pumped. The demand forecast estimates the total amount of water to be supplied. By forecasting the amount of water consumption, it is then possible to estimate the cost of electricity required to pump the water. Electricity is supplied to PWD by VUI Pernix Group at a rate that is adjusted each month according to several factors, including the price of fuel.

An additional factor that will impact the forecast electricity cost would be any planned modifications to the network that will change the amount of electricity required per metre cubed of water pumped.

### 2.5.2 Staff costs

Staff costs are the wage and overtime costs of staff involved in the provision of water.

International and local benchmarks will be used to compare the number of staff per customer. Also, the wage costs will be compared against local benchmarks. This will inform any changes to the staff costs forecast.

### 2.5.3 Material costs

Material costs are the costs of consumable materials used for operating and maintaining the water supply system that are not capital investments. Such costs include chlorine for water treatment, vehicle fuel, safety boots, water boots, office supplies, etc. These costs are estimated and forecast on a quarterly basis.

## 2.6 Infrastructure

The condition and value of installed infrastructure is a crucial factor that impacts the appropriate tariff level. While capital expenditure (CAPEX) is not directly included in the revenue forecast, a fair price does need to take into account depreciation costs of infrastructure assets and also the cost of raising capital required to invest in infrastructure.

### 2.6.1 Regulated Asset Base

The value of the installed infrastructure of the water supply system is referred to as the Regulated Asset Base (RAB). To forecast the required RAB, the asset values of the current water supply infrastructure will be informed by any historical cost of investments made by PWD, and also by means of an independent Asset Audit. In addition, the Authority is seeking expert advice on the required level of investment to upgrade the network such that the quality level set out by the Authority may be achieved.

### 2.6.2 Depreciation

The depreciation costs faced by the utility are included in the tariff estimation. All installed assets will be assigned a “standard” asset life and depreciated an equal amount for the life of the asset (straight-line depreciation).

### 2.6.3 Assets funded by other parties

Any assets or investments that are not financed by the utility (e.g. financed by aid grants or by other third parties) are not included in the RAB nor are the depreciation costs included in the tariff estimate. Any associated operational costs that must be borne by the utility as a result of these assets being installed should be included in the operational cost forecasts.

## 2.7 Cost of Capital

A fair price must include in its calculation an amount for the cost associated with raising the capital required to invest in the infrastructure. It is common regulatory practice to use an estimate of the Weighted Cost of Capital (WACC) rate and apply it to the RAB.

As water services in Luganville are provided by the government, there are implications for how the WACC should be treated in this tariff review. The sections below describe how the WACC is normally calculated.

### 2.7.1 Weighted Average Cost of Capital

Capital can be raised in two ways: through debt or equity. Both methods have an associated cost – interest payments and dividends respectively. The level of cost for each type of capital is influenced by the perceived riskiness of the investment: the higher the risk, higher returns must be offered to sources of capital, resulting in a higher cost of capital. The process of determining a reasonable return estimates the appropriate return for each source of capital. The cost of capital is weighted by their respective contributions to the total capital base.

$$WACC = (Re \times \% \text{ of capital that is equity}) + (Rd \times \% \text{ of capital that is debt})$$

Where

Re = return on equity capital

Rd = return on debt capital

The method of estimating the appropriate returns from each type of capital is the Capital Asset Pricing Model (CAPM), explained below.

### 2.7.2 Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) provides an estimate of the required return for risky assets as the sum of the return from risk-free assets and an appropriate risk premium. The calculation is slightly different for debt and equity:

#### Cost of Equity

$$Re = Rf + \beta(MRP)$$

Where

Re = required return on equity

Rf = the risk free rate of return is the return an investor could reasonably expect if they invested their money in a riskless investment. As the market rarely offers a riskless investment, a proxy for the risk free rate is applied

$\beta$  = is the scaling factor beta ( $\beta$ ) to be applied to the market risk premium, it measures the volatility of the specific assets relative to the entire market. If the assets are more volatile than the market average, then the beta to be applied is greater than one

MRP = the market risk premium is the rate of return earned on a well-diversified portfolio of assets over the risk free rate for a business similar to the business in question

#### Cost of Debt

$$Rd = Rf + DRP$$

Where

Rd = required return on debt

Rf = the risk free rate of return is the return an investor could reasonably expect if they invested their money in a riskless investment. As the market rarely offers a riskless investment, a proxy for the risk free rate is applied

DRP = is the Debt Risk Premium based on the credit risk of the debt for a business similar to the business in question

## 2.8 Required revenue

The total required revenue is calculated as the sum of the operational cost forecast, depreciation, cost of capital, and the items described below

### 2.8.1 Provisions

The revenue generated by the “fair” price should allow for any necessary provisions that the utility should reasonably be expected to account for. These may include provisions for events such as cyclones, floods and other natural disasters. The Authority will use benchmark information from comparable utilities to determine the reasonable level of such provisions for water services in Luganville.

### 2.8.2 Bad Debt

A certain proportion of revenue will be lost as bad debt, due to customers being unable to pay their bill. The Authority will use benchmark information from comparable utilities to determine the reasonable level of bad debt for water services in Luganville.

## 2.9 Tariff Structure

The tariff structure defines different tariff categories between different types of customers or different consumption levels, proportionate to a base price P. Currently in Luganville, the tariff structure for consumption is defined as follows (P is currently VUV 52):

Customer group	Tariff rate
Foreign ships	1.25 x P per m3 (currently VUV 65)
All other customers	1 x P per m3 (currently VUV 52)

Separate demand forecasts are required for each customer group in order to calculate the forecast base price.

The current rates for other fees and charges applicable for water services are listed in the table below:

Service	Tariff rate
Deposit for connection	96 x P (currently VUV 5,000)
Reconnection fee	58 x P (currently VUV 3,000)

Forecasts of new connections and reconnections are required to be able to estimate the revenue generated by these activities.

If there are to be any changes to the tariff structure, the following points must be considered:

- the affordability of water services for each customer group;
- the impact on new connections of any structure that offers different rates for different groups; and
- the impact on demand growth of a tariff that offers different rates for different levels of consumption.

## 2.10 Tariff Adjustment Formula

The purpose of the tariff adjustment formula is to change the tariff according to changes in the price of certain costs that are difficult to predict (for example electricity costs, which are linked to the price of imported diesel fuel). Adjusting the tariff in this way ensures that the utility can collect sufficient revenue to continue to operate should input prices increase, and also that customers can benefit when input prices fall.

A tariff adjustment formula effectively transfers the risk from fluctuations in certain prices from the utility to customers. This can be reasonable in circumstances where the utility has no alternatives to a particular cost (for example electricity costs or fuel), although there is an impact on the incentives for the utility to negotiate better prices or drive efficiency.

The tariff adjustment formula is defined by assigning a coefficient to each selected input cost. Each coefficient is calculated as the proportion of required revenue represented by the costs associated with a particular input price.

The tariff adjustment formula can also be designed to effectively adjust the tariff for inflation specific to the utility.

Tariff adjustment formulas are currently applied to electricity prices in Port Vila, Luganville, Tanna and Malekula, and also to water prices in Port Vila. There is currently no tariff adjustment formula applied to water prices in Luganville.



## 3. Tariff Implementation

### 3.1 Implementation method

The legislative mechanism for changing water prices charged by the government is the Water Supply Act. Under the URA Act, price setting powers are assigned to the Authority with written approval of the Minister responsible for water supply. In order for a new price to be implemented once approved, an Order to amend the *Water Supply (Fees and Charges) Order No. 5 of 1991*, must be signed by the URA Commission and the Minister and then published in the Gazette, at which point the new price will take effect.

### 3.2 Implementation considerations

The aim of the tariff review is to ensure that customers pay a fair price for the service they receive. The current financial arrangements are that all revenues collected from water customers in Luganville are passed to the general public fund. Each year, PWD apply for a budget to cover the costs of operations. Currently, this budget is for all of the operations of PWD, which includes road maintenance and providing water services in other areas of Vanuatu.

A fundamental assumption of this tariff review is that the revenue generated from water bills in Luganville is used to fund water services in Luganville. Under the current funding arrangements this is not directly the case, as the funding is part of a broader budget set at the discretion of the Ministry of Finance.

The Authority will consider the following points in order to determine the most appropriate implementation plan for any new tariff:

- whether there is a specific budget line for water services in Luganville requested from the public fund;
- whether appropriate accounting and control procedures have been put in place by PWD to monitor any specific budget for water services in Luganville;
- whether any form of revolving budget (where the budget assigned is determined by the receipts from water bills) is put in place for water services in Luganville;
- whether appropriate monitoring and enforcement procedures for maintaining standards of quality are established for water services in Luganville;
- whether government has formulated an urban water policy;
- any proposed review and/or changes to legislation relevant to water services in Luganville; and
- the timing of any planned upgrades to the water sources and network in Luganville.

## 4. Consultation Process

In order to actively gather the views of stakeholders, the Authority will conduct an extensive consultation process. This is in line with the Authority's Charter of Consultation and Regulatory Practice, and will include the following activities:

- Published papers will be made available in the Authority's office and on the website: [www.ura.gov.vu](http://www.ura.gov.vu);
- A press release explaining all published papers and inviting responses from the public will be sent to media organisations;
- Papers will be emailed to all stakeholders that have provided an email address;
- Text message alerts will be sent to all stakeholders who have provided mobile phone contact details; and
- Meetings will be requested with senior government stakeholders including the ministers, Director-Generals and Directors of relevant government departments.

All stakeholders will be requested to provide any comment and ask any questions through a range of communication channels. Based on the response from stakeholders, the Authority may arrange further briefing sessions to facilitate the gathering of feedback from interested stakeholders.

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**Utilities Regulatory Authority**

**Vanuatu**

You can access the Luganville Water Tariff Review Framework Paper December 2012 on our website [www.ura.gov.vu](http://www.ura.gov.vu), or by contacting us by telephone (+678) 23335, email: [mmalas@ura.gov.vu](mailto:mmalas@ura.gov.vu) or regular mail at Luganville Water Tariff Review, Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.