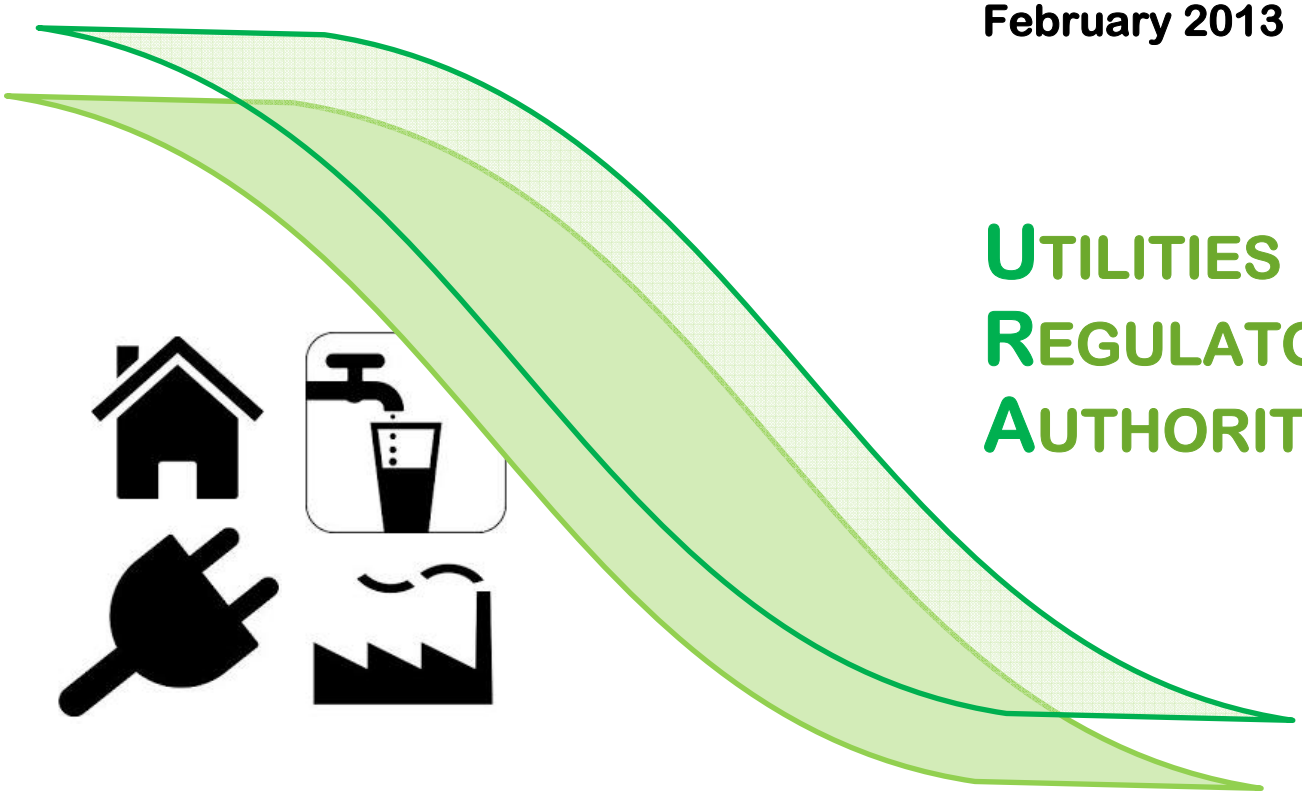
# Luganville Water Tariff Review

## Draft Decision

**WATER SECTOR**

**February 2013**



**UTILITIES REGULATORY AUTHORITY**

# A letter from the Chairman

The key test used when a regulator estimates a fair price is that of "reasonableness". It is impossible to know with certainty the future performance of many factors in the market. Therefore the best thing that a regulator can do is to gather relevant information and use it to inform a set of assumptions of what can be reasonably expected in the future.

By openly sharing the data sources and analysis performed to arrive at its decision, all stakeholders are able to review and comment on any of the assumptions. Through the consultation and submissions process, additional information can be provided to the regulator that can improve the "reasonableness" of the decision made. In this way the regulator ensures that the final decision is the most reasonable view of the fair price possible at the time.

To this end we appreciate the active participation of all stakeholders in consultations we have conducted in Luganville and Port Vila.

It is worth noting that the definition of a "fair" price is one that enables the utility to cover its reasonable costs of providing the service. Another factor that the regulator in Vanuatu is obliged to consider is the affordability of the service for consumers. One option available to the regulator is to set prices at different levels for different customers, for example based on consumption levels. Any such cross-subsidy between customer groups can cause distortions in incentives for the utility, and so must be handled carefully to try and avoid creating imbalances in the market.

If the review finds that levels of quality are not satisfactory for consumers and should be improved, it is possible that the result could be a tariff increase. It would not be reasonable for a regulator to allow higher prices on the assumption of quality improvement without ensuring that an adequate monitoring and compliance regime is put in place to ensure the improvement is delivered.

Given all these considerations, the continued active participation of all stakeholders is vital in order for the regulator to determine a reasonable price. I strongly urge any interested stakeholders to review this document and participate fully in the consultation process.

Yours sincerely,

Johnson NAVITI Matarulapa Marakipule

*Chairperson*

# Executive Summary

At the request of the Ministry of Infrastructure and Public Utilities, the Utilities Regulatory Authority is conducting a review of water prices in Luganville. Based on the agreed methodology, information provided by the Public Works Department, all submissions received and other external information sources, the Authority has calculated a draft tariff level for consultation. The table below shows the draft new tariff for water in Luganville.

| Type of fee | Proposed tariff (VUV) |
|---|---|
| Fee per $m^3$ used (local customers) | 59 |
| Fee per $m^3$ used (ships) | 74 |
| Deposit fee | 5,000 |
| Reconnection fee | 3,000 |

Key assumptions used to calculate this tariff level are listed in the table below:

| Metric | Assumed value |
|---|---|
| **Demand forecast** | |
| Annual water production | Constant at current levels due to capacity constraints |
| Quarterly consumption at start of period | 208,707 $m^3$ |
| Increase in $m^3$ consumed | Equal to $m^3$ leakages repaired |
| Leakages repaired | 14,485 $m^3$ per quarter, spread over 5 years |
| Reconnections | n.a. |
| Billing losses | 0% |
| **Operating costs forecast** | |
| Electricity consumed per month | Main pumping station = 48,165 kWh<br>Booster pump = 468 kWh |
| Annual increase in kWh consumed | 0.25% |
| Number of staff | 2013 = 8<br>2014-17 = 10 |
| Average annual salary per staff | VUV 882,768 |
| Overtime per month | VUV 312,000 |
| Fuel used per month | 720 litres |

| | |
|---|---|
| Fuel price per litre | VUV 150 |
| Chlorine used per day | 40 litres |
| Chlorine price per litre | VUV 178.875 |
| Office equipment & supplies cost per quarter | VUV 48,279 |
| Water and safety boots cost per quarter | VUV 7,251 |
| **Infrastructure** | |
| Regulated Asset Base at start of forecast | VUV 86,589,216 |
| Average asset life | 25 years |
| Total investment over forecast period | VUV 16.5m |
| **Cost of Capital** | |
| Weighted Average Cost of Capital | 6.36% |
| **Required Revenue** | |
| Provisions | n.a. |
| Bad debt | 1.00% |

The implementation of the tariff increase will be conditional on the Government providing a clear commitment to undertake certain actions to improve the management and performance of Luganville water services, including:

- Ring-fencing Luganville water services revenue and expenses;
- Establishing an annual performance audit of Luganville water services; and
- Securing funding for a significant infrastructure upgrade.

All stakeholders are invited to provide comments on this draft tariff level and the assumptions used in its calculation. All comments provided will be taken into account in the formulation of the Authority's Final 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 Final Decision.

The Authority will be seeking responses as part of its public consultation process which will include visits to stakeholders and an outreach to communities. In addition to these public consultations, stakeholders can file submissions directly with the Authority.

Submissions can be made until

**22 March 2013**

Submissions can be:

- made in person at the
  Office of the Utilities Regulatory Authority
  on the Ground Floor of the VNPF Building in Port Vila

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

- emailed to
  Maureen Malas
  *Project Manager – Luganville Water Tariff Review*
  Utilities Regulatory Authority
  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.

# Contents

# 1. Introduction

## 1.1 Purpose of this paper

This paper sets out the Authority's draft decision for the Luganville Water Tariff Review. As well as describing the proposed new tariff level, this paper shows all the assumptions used in the calculation of the tariff, and provides supporting evidence for those assumptions. The aim of this paper is to share the draft decision with all stakeholders so that responses and submissions can be taken into account in the formulation of the Authority's Final Decision.

## 1.2 Structure of this paper

This paper is structured into the following sections:

- Chapter 2, 'Draft tariff,' describes the new tariff level and compares with the existing tariff.
- Chapter 3, 'Draft tariff assumptions,' describes the assumptions used in the calculation of the proposed tariff, and provides all supporting evidence.
- Chapter 4, 'Tariff implementation,' describes the proposed process to implement the new tariff.
- Chapter 5, '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 this water 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:

**Table 1: Tariff review process**

| 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 | Published 21 December 2012 |
| Tariff application | Initial proposal of new tariff level from the utility with supporting evidence | Published 21 December 2012 |
| Consultation Stage 2 | Stakeholders are invited to comment on the Framework Paper and Tariff Application | Closed 21 January 2013 |

| | | |
|---|---|---|
| Draft decision | Draft tariff determination by the Authority | This paper |
| Consultation Stage 3 | Stakeholders are invited to comment on the Authority's draft tariff decision | Planned to close 22 March 2013 |
| Final decision | Stakeholders are informed of the Authority's final tariff decision | Planned for 8 April 2013 |

After the final decision has been published, the new tariff will be implemented following the process described in Chapter 4 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 20*07 (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

All sources of external information and data quoted in this paper are provided in subscript or footnotes. All other information originates from the Authority.

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:

- Utilities Regulatory Authority Luganville Water Tariff Review Consultation Stage 2 Report, February 2013.
- Utilities Regulatory Authority Luganville Water Tariff Review Tariff Application Report, December 2012.
- Utilities Regulatory Authority Luganville Water Tariff Review Framework Paper, 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. Draft tariff

The URA has arrived at a draft decision for a new tariff level for water services in Luganville. The tariff calculation consists of a financial model containing a five-year forecast of demand, costs, and infrastructure investment for the water network in Luganville. All information used to inform each of the assumptions used in the financial model is described in this document.

## 2.1 Proposed tariff

The table below compares the proposed tariff with the current level.

**Table 2: Draft tariff summary**

| Type of fee | Current tariff (VUV) | Proposed tariff (VUV) | Change |
|---|---|---|---|
| Fee per $m^3$ used (local customers) | 52 | 59 | 13.2% |
| Fee per $m^3$ used (ships) | 65 | 74 | 13.2% |
| Deposit fee | 5,000 | 5,000 | 0% |
| Reconnection fee | 3,000 | 3,000 | 0% |

The following table shows the absolute value change for different customers based on different levels of consumption.

**Table 3: Impact of new tariff on customer bills**

| Percentile | Quarterly consumption ($m^3$) | Old bill, VUV | New bill, VUV | Difference, VUV |
|---|---|---|---|---|
| 10th | 11 | 572 | 663 | +91 |
| 30th | 25 | 1,300 | 1,507 | +207 |
| 50th | 43 | 2,236 | 2,591 | +355 |
| 80th | 105 | 5,460 | 6,327 | +867 |
| 90th | 185 | 9,620 | 11,148 | +1,528 |
| 97th | 500 | 26,000 | 30,131 | +4,131 |
| 99.78th | 3,000 | 156,000 | 180,785 | +24,785 |
| 99.96th | 6,000 | 312,000 | 361,571 | +49,571 |

### 2.1.1 Affordability analysis

In order to consider the affordability of such a tariff increase for domestic customers, the quarterly absolute increase in bills is compared to the average quarterly household income for Luganville.

**Table 4: Affordability analysis**

| Item | Amount |
|---|---|
| Average monthly household income[1] | VUV 64,200 |
| Average quarterly household income | VUV 192,600 |
| Comparison with 30th percentile bill increase | 0.11% |
| Comparison with 50th percentile bill increase | 0.18% |
| Comparison with 80th percentile bill increase | 0.45% |

[1] *Source: Vanuatu Household Income and Expenditure Survey 2006, National Statistics Office*

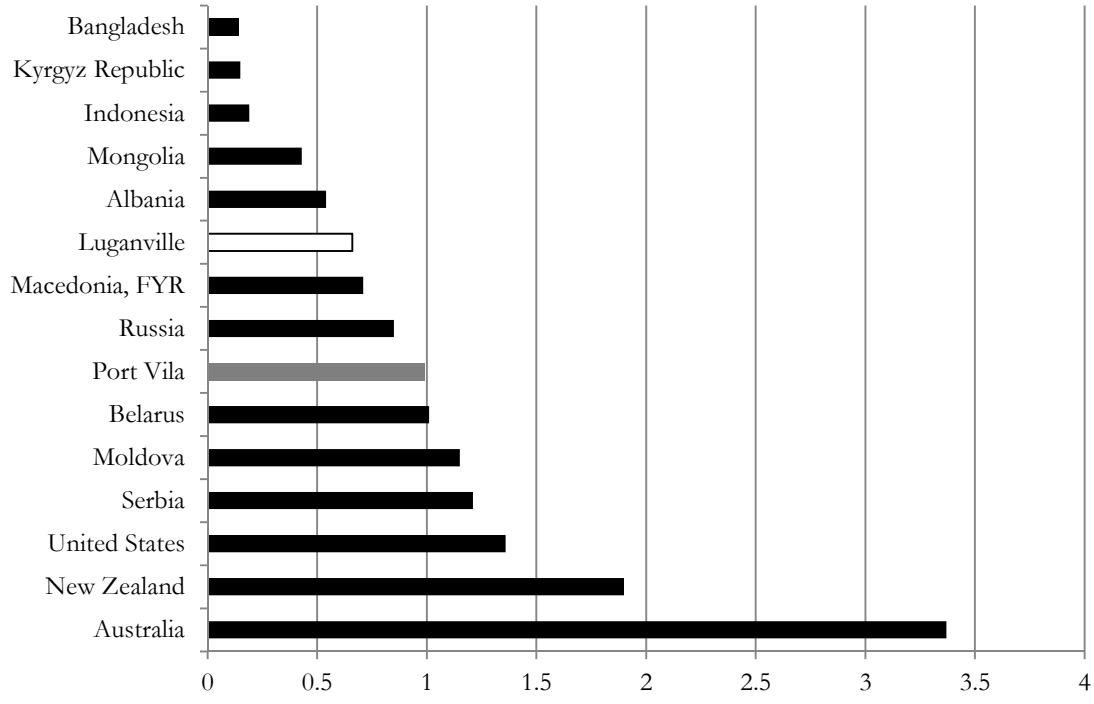
The table above shows that the increase in bills reflects an impact of less than half of one percent of quarterly income for 80% of all water customers. It is the Authority's position that this increase is within any reasonable definition of affordable for domestic customers.

For commercial customers, data is less available to provide information on affordability. In order to inform its decision, the Authority has compared the impact on bills for a number of customers who are presumed to be relatively water intensive. The results were a range of impact of between 0.11% and 0.3% of reported net income (profit). This also appears to be an affordable increase in the view of the Authority.

### 2.1.2 International comparison

The following chart shows the new tariff level in comparison with water tariffs from other utilities in Vanuatu and other countries. It shows that the new tariff level is in line with other utilities, and remains lower than the current water tariff in Port Vila.

**Figure 1: Average revenue per m³ delivered, USD**




*Source: International Benchmark Network for Water and Sanitation Utilities*

There was no available data on regional operating water utilities to benchmark the new tariff level against.

## 2.2 Proposed adjustment formula

In addition to the tariff level described above, an adjustment formula has been suggested that will change the tariff according to fluctuations in the cost of electricity.

The proposed formula is:

$$P = P_0 \times \left[ 0.53 + \left( 0.47 . \frac{E}{E_0} \right) \right]$$

Where:

P = The base price for the quarter
$P_0$ = 60 vatu
E = The average base price of electricity for the three months prior to the quarter
$E_0$ = 52.22 vatu

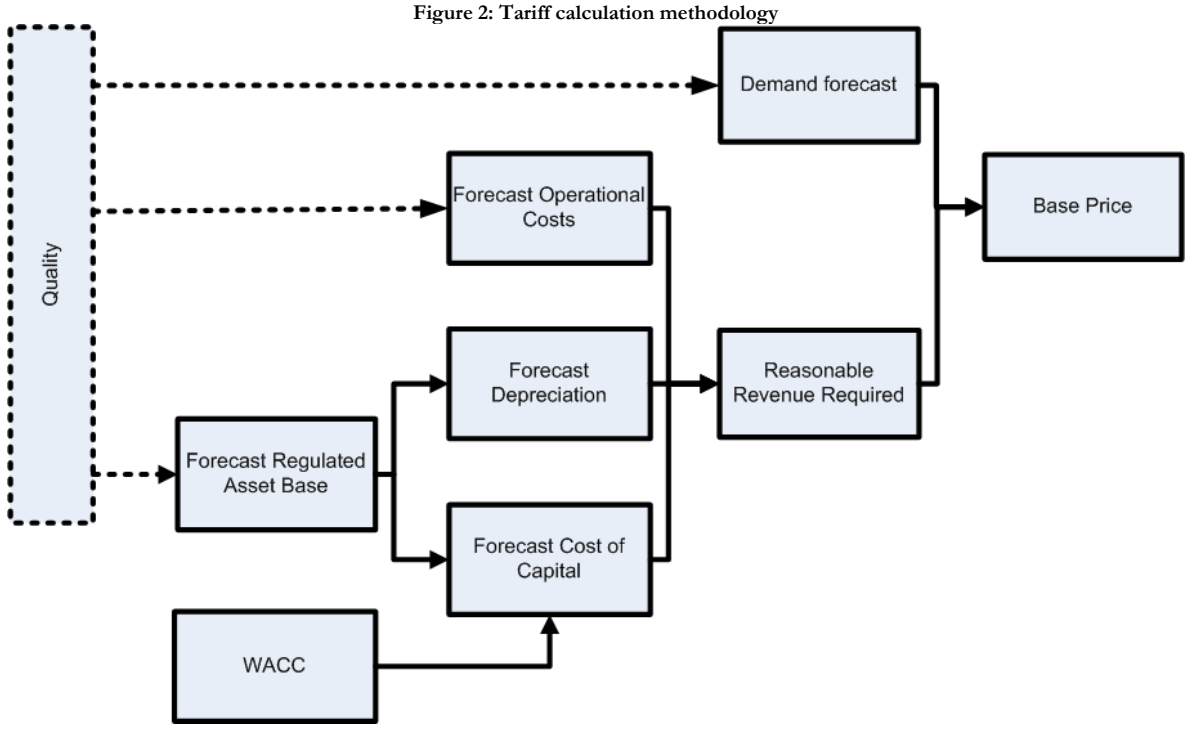
Using this formula, water prices for customers will change according to future changes in the price of electricity. For example, a 10% increase in the price of electricity will result in a 4.7% increase in the price of water.

# 3. Proposed tariff assumptions

## 3.1 Elements of the tariff methodology

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

**Figure 2: Tariff calculation methodology**




The tariff calculation methodology is described in detail in the *Luganville Water Tariff Review Framework Paper*. The tariff is calculated based on a set of forecasts for the five-year period 2013-2017.

## 3.2 Quality

The Authority's investigations of water quality in Luganville have shown that there is a need for improvement. The public survey carried out as part of Consultation Stage 1 indicated that customers are concerned with the current quality levels and have a desire for better quality water. (The full results of the survey are available in the *Luganville Water Tariff Review Consultation Stage 1 Report*.)

Given the structural constraints of the current infrastructure, major investment is required in order to achieve a significant improvement in water quality. Such investment is currently planned within the tariff period, but it is unclear when quality improvements will be delivered to customers.

One issue that has impacted water quality in the past has been inconsistent chlorination. This tariff assumes the correct level of chlorination throughout the period.

While the Government has adopted World Health Organisation (WHO) standards of water quality, there has not been regular testing in Luganville, nor have there been any sanctions imposed when quality has dropped below the required standard. Proposals for ensuring quality standards are more effectively complied with are described in Chapter 4 of this document.

## 3.3 Demand forecast

The tariff is calculated based on a forecast of the demand for water. The Authority's demand forecast for the amount of water to be sold by PWD over the five-year forecast period is described below.

### 3.3.1 Capacity constraint

Information from PWD has indicated that the water network in Luganville is currently operating at capacity, i.e. it is not possible to pump any more water than is currently being pumped. This means that if new customers are connected, or the existing customers attempt to draw more water from the system, water pressure will be reduced and the same total amount of water will be delivered. The demand forecast used in this tariff review assumes that this capacity constraint will exist throughout the tariff period.

### 3.3.2 Leakages

A significant amount of water is lost daily through leakages. It has not been possible to obtain a consistent estimate for the amount of total leakages. An investigation of the "billing losses" described in the *Luganville Water Tariff Review Tariff Application Report* has shown that these are caused by leaks in customer properties after the meter. The average total amount of this type of leakage for the period 2008-2012 is 14,485 $m^3$ per quarter. It has been assumed that this leakage amount can be repaired over the next five years.

### 3.3.3 Initial demand

Demand at the start of the forecast period has been estimated based on the number of customer connections and the historic average consumption per customer. The following table shows the number of customer connections, based on PWD's records. It is assumed that all the customers not yet connected will be connected by the start of the forecast period.

**Table 5: Number of customers**

| Current active customers | Customers not yet connected | Total number of customers |
|---|---|---|
| 2,106 | 25 | 2,131 |

*Source: PWD records*

In addition to customer connections, water is supplied to ships. Data has been provided on the number of ships supplied to from 2008 to 2012. It is assumed that the number of ships is equal to the average for the period 2008-2012.

**Table 6: Average number of ships supplied with water, 2008-2012**

| 2008 | 2009 | 2010 | 2011 | 2012 | 2008-2012 |
|---|---|---|---|---|---|
| 4 | 3 | 2 | 5 | 2 | 3 |

*Source: PWD meter reading database*

The average consumption per customer has been estimated using the historical average for the period 2008-2012. Separate assumptions are used for ships and for customer connections. The table below shows the average consumption per customer for the period 2008-2012

**Table 7: Average quarterly m³ consumed per customer, 2008-2012**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2008-2012 |
|---|---|---|---|---|---|---|
| Customers | 100 | 97 | 97 | 100 | 94 | 98 |
| Ships | 138 | 166 | 176 | 159 | 347 | 174 |

*Source: PWD meter reading database*

The total water consumed at the start of the forecast period is calculated in the table below.

**Table 8: Quarterly consumption at start of forecast period**

| | Number | Quarterly consumption per customer or ship | Quarterly consumption |
|---|---|---|---|
| Customers | 2,131 | 98 | 208,186 |
| Ships | 3 | 174 | 521 |
| Total | 2,134 | - | 208,707 |

### 3.3.4 Consumption growth

As previously noted, the water network is currently operating at full capacity. The repair of leaks through the period will allow for customers to consume more water. Total consumption growth, therefore, is based on the assumed rate of leakage repair. This is equivalent to an annual growth rate of 1.35%.

Based on additional information gathered the water supply network in Luganville is currently operating at maximum capacity. The Authority is assuming the network will not be able to supply additional demand growth over the tariff setting period.

### 3.3.5 Reconnections

Reconnection fees are charged to customers who have been previously disconnected. These fees constitute a revenue stream for the utility. No information on reconnection rates have been provided by PWD, so reconnection fees have not been included in the model. The Authority is continuing to investigate this and expects to adjust the tariff to account for reconnection fees in its Final Decision.

### 3.3.6 Billing losses

In the *Luganville Water Tariff Review Tariff Application* Report, billing losses was defined as the difference between the amount recorded on water meters and the amount billed to customers. Following an investigation by the Authority, it was found that this was largely a result of significant leakages in government properties that have not been repaired. Rather than charging for the amount of water wasted, a fixed charge was assumed for these customers. It is the Authority's view that there is no valid reason for customers to be billed a different amount than is metered. If there is significant leakage on a customer's property, it is the responsibility of the customer to repair the leak. Therefore no allowance is made in the tariff for billing losses.

## 3.4 Operating Costs Forecast

The operating cost forecast estimates the reasonable costs of providing water services in Luganville. It is a summation of the forecasted electricity costs, staff costs, and materials costs.

The table below summarises the total operating costs for the forecast period.

**Table 9: Total operating cost forecast, VUV**

| 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 39,140,116 | 41,323,122 | 41,593,598 | 41,864,209 | 42,134,955 |

### 3.4.1 Electricity costs

Electric pumps are used to extract water from boreholes and transfer it to reservoirs. The cost of the electricity required is determined by the kilowatt hours (kWh) consumed, charges associated with the connection and the electrical efficiency of the system. There are two pump stations: the main pumping station with a high voltage connection and a booster pump with a low voltage connection.

PWD have supplied historical monthly electricity bills for the years 2011-2012 for the main pumping station and for 2012 for the booster pump. The average electricity consumed and monthly bill is shown in the table below.

**Table 10: Average monthly electricity consumption and costs**

| | Main pumping station | | Booster pump | |
|---|---|---|---|---|
| Year | Avg monthly kWh consumed | Avg monthly electricity bill, VUV | Avg monthly kWh consumed | Avg monthly electricity bill, VUV |
| 2011 | 48,044 | 1,762,425 | n.a. | n.a. |
| 2012 | 48,165 | 1,820,578 | 468 | 30,666 |

*Source: PWD*

Due to unavailability of genuine leakage data and data defining the amount of water pumped from the pump station and through the booster pump, the historical amount of kWh used per $m^3$ ($kWh/m^3$) of water pumped could not be determined. Therefore, the electricity cost could not be forecasted using the method proposed in the *Luganville Water Tariff Review Framework Paper*.

It is assumed that the total kWh consumed by both pump stations during the first quarter of 2013 will be the same as the average monthly consumption in 2012. As the pumping infrastructure continues to age, it is expected that there will be a gradual decrease in the electrical efficiency of the system. The average growth rate in electricity consumption from 2011 to 2012 was 0.25%. This rate is assumed to continue through the forecast period due to continued reduction of electrical efficiency of the system.

**Table 11: Summary of electricity cost assumptions**

| Item | Quantity |
|---|---|
| Main pumping station monthly kWh consumed | 48,165 |
| Subscribed kVA | 135 |
| Transformer charge, VUV | 8,125 |
| Booster pump monthly kWh consumed | 468 |
| kWh annual growth rate | 0.25% |
| Electricity base price (P) | 52.22 |

The subscribed power and electricity connection contractual conditions for both pumping stations are assumed to remain the same over the 5 year tariff period, meaning that any transformer charges and monthly fixed charges will remain constant. There are currently no plans to change the electrical infrastructure at either pump station. The forecasted electricity cost over the tariff period is:

**Table 12: Forecast electricity costs, VUV**

| 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 23,615,767 | 23,669,442 | 23,723,252 | 23,777,196 | 23,831,275 |

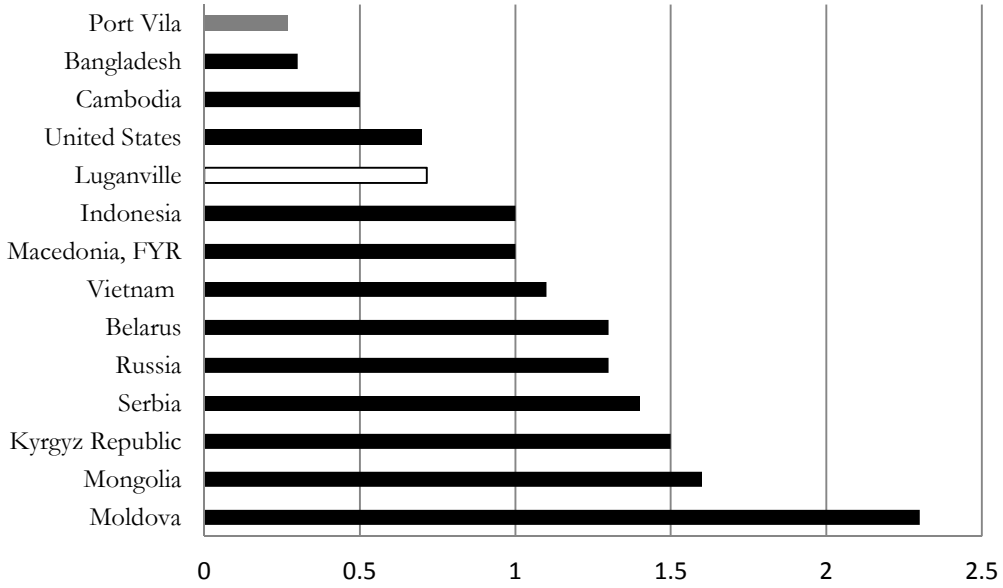
### 3.4.2 Staff costs

Staff costs are the wage, overtime costs and severance allowance of staff directly involved in the provision of water.

In accordance with the PWD 5-year plan the URA forecasts an increase in the number of designated staff from 6 to 10 by 2014. It is assumed that the number of staff will increase to 8 in 2013 and then to 10 in 2014. This amount of staff will remain to the end of the forecast period.

Number of staff per 1000 population served is an indicator that measures the level of staffing relative to the population that is serviced by the water supply network. This is shown in the graph below.

**Figure 3: Number of staff per 1000 population served**




*Source: International Benchmarking Network for Water Sanitation Utilities*

When comparing the indicator of number of staff per 1000 population served by PWD to international data, the current number of designated staff is below average. To achieve a quality of service that is higher than the current level of quality, an increase in the number of designated staff is required. Therefore the Authority finds the proposed increase by PWD to be reasonable.

There was no available data on regional operating water utilities to benchmark the indicator of number of staff per 1000 population served by PWD against.

The estimated average annual salary for PWD staff is VUV 882,768. It is assumed that each year half of staff will receive an incremental salary increase of VUV 40,000.

Overtime allowance per staff is estimated to remain the same at VUV 312,000 per quarter through the forecast period. PWD do not anticipate any changes to the shift schedule meaning that the same number of total hours overtime will be required through the forecast period.

In order to allow for severance costs, 1/12 of quarterly salary cost is included.

The total staff costs included in the model are shown in the table below:

**Table 13: Forecast staff costs, VUV**

| 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 11,394,656 | 13,523,987 | 13,740,653 | 13,957,320 | 14,173,987 |

### 3.4.3 Materials costs

Material costs are the costs of consumable materials used for operating and maintaining the water supply system that are not capital investments. This includes fuel costs, water treatment costs, and other materials costs.

Fuel costs are estimated based on an assumed monthly usage of 720 litres and a cost of VUV 150 per litre.

Chemicals such as sodium hypochlorite are used to treat the water. The cost of these chemicals has been estimated based on information provided by PWD.

**Table 14: Summary of water treatment chemical assumptions**

| Item | Value |
|---|---|
| Amount of chemicals used per day | 40 litres |
| Price of chemicals | VUV 178.875/ litre |

*Source: PWD*

Due to the capacity constraints described above, the amount of treatment chemicals used is assumed to remain constant.

The office equipment cost is estimated to be VUV 48,279 per quarter and is assumed to remain the same during the tariff period.

The cost of water and safety boots for the PWD team is forecast to be VUV 7,251 per quarter.

The forecast total materials cost is shown in the table below:

**Table 15: Forecast materials costs, VUV**

| 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 4,129, 693 | 4,129, 693 | 4,129, 693 | 4,129, 693 | 4,129, 693 |

## 3.5 Infrastructure

In order to provide a level of service at a reasonable level of quality, the Authority assumes a certain level of infrastructure to be installed. The cost of infrastructure assets is treated differently to operating costs, as infrastructure assets retain usefulness and value across many years. Each type of infrastructure asset has a useful life, and at the end of its useful life the value is assumed to be zero. This reduction in asset value is referred to as "depreciation", and is calculated as an equal portion of the value of the asset for each year of its life. This method of calculating depreciation is referred to as "straight line" depreciation.

The assets of the utility that are included for consideration in the tariff calculation are referred to as the Regulated Asset Base (RAB). The Regulated Asset Base should include all assets required to provide and manage the water supply that have been funded by the utility, in this case the Government of Vanuatu. Any assets that have funded by other parties (such as aid donors, private developers or assets inherited at the time of independence) are not included, as the utility has not had to bear the cost of financing these assets.

Depreciation of the RAB represents a real cost of doing business, and is included in the tariff calculation. Estimating a reasonable level of depreciation costs requires the following assumptions to be made:

- The remaining value of the installed infrastructure at the start of the tariff period;
- The lives of the installed assets;
- The value of investment in new infrastructure installed during the tariff period; and
- The sources of funding for the investment (i.e. from the Government or from other parties).

### 3.5.1 Installed infrastructure

The current assets of the water service in Luganville includes the source well, pumping stations, reservoirs, mains pipes, connecting pipes, valves, fixtures, meters as well as other assets required to provide the service. These installed assets have been installed for various periods of time and have various useful lives. Different sources of funding have been used to finance these assets. This section describes the assumptions that have been used to estimate the current value of installed assets in Luganville water service.

In independent assessment has been carried out by infrastructure valuation experts to estimate the current value of assets. This assessment has been carried out using all available information on the current network and the dates of installation. The valuation has been calculated according to a Depreciated Replacement Cost (DRC) methodology. This means that the cost of replacing the existing assets has been estimated, and then adjusted according to the age of the assets and inflation. The result should give a reasonable indication of the current net value of the installed infrastructure.

**Table 16: Estimated value of installed infrastructure, VUV**

| Replacement cost of infrastructure | Depreciated Replacement Cost (DRC) of infrastructure |
|---|---|
| VUV 541,182,600 | VUV 216,473,040 |

*Source: Asset and Operations Assessment of Luganville water supply*

The DRC of assets at the start of the tariff period must also be adjusted to take into account the historic sources of funding for the infrastructure. Anecdotal evidence from the local PWD team describes significant portions of the network as dating to pre-independence. There are records of a VUV 106m investment made in 2001, financed by the Government of Vanuatu through a subsidised loan from the Asian Development Bank (ADB). Based on this information, a rough estimate is made that 40% of the current infrastructure was funded by the Government of Vanuatu.

Table 17: Calculation of Regulated Asset Base (RAB)

| Total DRC of installed infrastructure | Proportion of existing network financed by the Government | Asset value funded by other parties | RAB at start of tariff period |
|---|---|---|---|
| VUV 216,473,040 | 40% | VUV 129,883,824 | VUV 86,589,216 |

### 3.5.2 Asset lives

The assumed lifetime of assets indicates the associated depreciation costs for the utility. Different classes of assets have a wide range of useful lives. As the tariff calculation only requires a total depreciation amount, a weighted average asset life is used to estimate depreciation costs of the total RAB.

Table 18: Estimated average useful life of assets

| Weighted average useful life of water infrastructure assets |
|---|
| 25 years |

### 3.5.3 Investment

It is expected that additional investment will be required during the tariff period in order to renew and replace the existing network, as well as to deliver improvements in service delivery and water quality. The value of investment that is funded by the Government of Vanuatu will be added to the forecast RAB. The cost of new investment is included in the tariff through the forecast depreciation costs of the new assets.

Forecasts of required investment have been received from PWD, and are listed in the table below. The amounts quoted for a major infrastructure upgrade are proposed to be funded through a grant from the Japanese International Cooperation Agency (JICA), and therefore will not impact the RAB.

Table 19: Forecast investment in water assets

| Year | Planned investment |
|---|---|
| 2013 | Equipment for revenue support = VUV 1.5m<br>Replacement of meters = VUV 2.4m |
| 2014 | Equipment for operation support = VUV 3m<br>Replacement of meters = VUV 2.4m |
| 2015 | Replacement of meters = VUV 2.4m<br>JICA infrastructure upgrade = VUV 100m |
| 2016 | Replacement of meters = VUV 2.4m<br>JICA infrastructure upgrade = VUV 200m |
| 2017 | Replacement of meters = VUV 2.4m<br>JICA infrastructure upgrade = VUV 200m |

*Source: PWD 5 year plan*

### 3.5.4 Regulated Asset Base

Based on the above figures and assumptions, the following table shows the forecasts for the RAB and related depreciation costs.

**Table 20: Forecast RAB calculation**

| Year | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Opening net total asset value | 216,473,040 | 211,714,118 | 208,645,554 | 302,699,732 | 492,991,742 |
| Closing net total asset value | 211,714,118 | 208,645,554 | 302,699,732 | 492,991,742 | 675,672,073 |
| Average asset life | 25 | 25 | 25 | 25 | 25 |
| % utility funded | 40% | 41% | 43% | 29% | 18% |
| Opening 3rd party value | 129,883,824 | 124,688,471 | 119,700,932 | 214,912,895 | 406,316,379 |
| 3rd party depreciation | 5,195,353 | 4,987,539 | 4,788,037 | 8,596,516 | 16,252,655 |
| 3rd party investment | 0 | 0 | 100,000,000 | 200,000,000 | 200,000,000 |
| Closing 3rd party value | 124,688,471 | 119,700,932 | 214,912,895 | 406,316,379 | 590,063,724 |
| Opening RAB value | 86,589,216 | 87,025,647 | 88,944,621 | 87,786,837 | 86,675,363 |
| RAB depreciation | 3,463,569 | 3,481,026 | 3,557,785 | 3,511,473 | 3,467,015 |
| RAB investment | 3,900,000 | 5,400,000 | 2,400,000 | 2,400,000 | 2,400,000 |
| Closing RAB value | 87,025,647 | 88,944,621 | 87,786,837 | 86,675,363 | 85,608,349 |

## 3.6 Cost of Capital

The tariff-setting methodology assumes that funding used for investments has an associated cost. For example, bonds may be issued or loans taken in order to provide the cash to finance infrastructure investment. The interest due on such bonds or loans is an example of the cost of capital. The tariff must include an assumption for the cost of the capital required to fund the RAB.

Standard regulatory practice is to use a capital asset pricing model (CAPM) to estimate the weighted average cost of capital (WACC) for a particular market. These are described in more detail in the Luganville Water Tariff Review Framework Paper. The only precedent for calculating a WACC for utility markets in Vanuatu is from the tariff review of electricity carried out in 2010.

Two assumptions in the WACC calculation have been changed from the 2010 precedent. The risk free rate has been updated based on the latest data available, and calculated using the same methodology as used in 2010. The new risk free rate reflects the significant reduction in government bond yields since 2010. The

market risk premium is assumed to be 6%. This is consistent with all recent reviews of water utilities by Australian regulators.

The components used in the calculation of the WACC are shown in the following table.

**Table 21: WACC assumptions**

| Item | Value |
|---|---|
| Nominal risk free rate | 2.45% |
| Market risk premium | 6.00% |
| Country risk premium - equity | 4.10% |
| Country risk premium - debt | 2.70% |
| Debt margin | 2.00% |
| Corporate tax rate | 0.00% |
| Gearing ratio | 50% |
| Inflation rate | 3.00% |
| Equity beta | 0.9 |
| | |
| Post-tax nominal WACC | 9.55% |
| **Post-tax real WACC** | **6.36%** |

## 3.7 Revenue

### 3.7.1 Provisions

The current PWD budgeting cycle makes no allowances for any kind of provisions, so a zero value has been assumed in the model. The Authority will continue to work with PWD and other government stakeholders to establish a process to enable provisions to be made in case of unforeseen expenses required for Luganville water services.

### 3.7.2 Bad debt

Bad debt is defined as lost revenue from bills that are not paid by customers. It is normal to expect some level of bad debt for any utility, but it is the responsibility of the utility to ensure that payments are effectively collected from customers.

The revenues collected by PWD from water customers go to the general public fund. The amount of revenue generated has not directly impacted the budget assigned to PWD to deliver water services in Luganville. The result of this arrangement is that PWD have not had a strong incentive to be effective in collecting revenue from customers.

In the tariff calculation, losses from bad debt result in a higher tariff for customers. It is not acceptable for bill-paying customers to bear an unfairly high cost of customers who do not pay.

A comparison has been made with the provisions for bad debt made by UNELCO assumed in the electricity tariff review. These represent 0.5% of revenue. This is significantly lower than the figure currently estimated for Luganville water services. It is therefore assumed that PWD will be able to move towards the performance level currently achieved by UNELCO.

**Table 22: Summary of bad debt assumptions**

| Item | Value |
|---|---|
| PWD Losses on bad debt, 2008-2012 | 5.68% |
| UNELCO average bad debt losses 2010 | 0.5% |
| Assumption used in draft decision | 1% |

### 3.7.3 Revenue forecast

The estimated revenue required to finance water services in Luganville is calculated according to the following table, and is compared with the revenue that would be generated by the current tariff.

**Table 23: Forecast required revenue calculation**

| | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Operating costs (VUV) | 39,140,116 | 41,323,122 | 41,593,598 | 41,864,209 | 42,134,955 |
| Depreciation (VUV) | 3,463,569 | 3,481,026 | 3,557,785 | 3,511,473 | 3,467,015 |
| Cost of Capital (VUV) | 5,534,155 | 5,656,187 | 5,582,561 | 5,511,880 | 5,444,026 |
| Provisions (VUV) | n.a | n.a | n.a | n.a | n.a |
| Bad debt (VUV) | 481,378 | 504,603 | 507,339 | 508,876 | 510,460 |
| **Total required revenue (VUV)** | **48,619,218** | **50,964,938** | **51,241,284** | **51,396,438** | **51,556,455** |
| Revenue from current tariff (VUV) | 43,376,563 | 43,525,701 | 43,674,838 | 43,823,976 | 43,973,114 |

## 3.8 Tariff Structure

The tariff structure proposed is unchanged from the current structure. This is a flat-rate tariff for all types of customers, with a separate tariff to supply water to ships. There are no fixed charges for any type of customer.

**Table 24: Tariff structure summary**

| Type of fee | Tariff rate |
|---|---|
| Fee per $m^3$ used (local customers) | 1 x P per $m^3$ |
| Fee per $m^3$ used (ships) | 1.25 x P per $m^3$ |

Fees charged as a deposit for new connections (VUV 5,000) and reconnections (VUV 3,000) are to remain unchanged.

## 3.9 Adjustment formula components

The proposed adjustment formula is designed to adjust the tariff according to fluctuations in the price of electricity. Electricity costs represent the only input cost that has potential price variability that may have a significant impact on the tariff level.

**Table 25: Impact of variable input costs**

| Input cost | % of revenue | Comment |
|---|---|---|
| Electricity | 47% | Potentially variable, and significant impact on the tariff |
| Staff | 26% | Cost changes already included in the tariff calculation |
| Chlorine | 5% | Small potentially for variability, and will not have a significant impact on the tariff |
| Fuel | 3% | Potentially variable cost, but will not have a significant impact on the tariff |
| Other operating costs | 0.4% | Insignificant |

# 4. Proposed tariff implementation

The fair tariff estimated in this Draft Decision represents an increase in prices for customers. This tariff has been calculated based on assumptions around a level of performance on the part of PWD, and a level of quality delivered to customers. Before approving a tariff increase, the Authority wishes to ensure that it is reasonable to assume that improvements in performance and quality will be delivered.

The current quality monitoring and compliance regime is not adequate to ensure incentives to deliver improvements. The nature of Luganville water services as a government-operated utility means that a simple financial penalty regime is not appropriate. Therefore, the Authority intends to make the tariff increase conditional on the Government of Vanuatu making a clear commitment to a set of actions that will start the process of delivering service improvements for customers.

Based on consultations with government stakeholders during this tariff review, the Authority intends to develop a set of conditions that must be met before the tariff increase is applied. These conditions are in the following areas:

- PWD and other government departments put in place processes to ensure that the finances and operations of Luganville water services are fully ring-fenced from other activities.
- PWD submit to an annual performance audit which will provide a detailed assessment of performance and be presented to senior government officials and the public.
- Funding is confirmed for a programme to significant upgrade infrastructure and increase the capacity of the system.

## 4.1 Financial and operational ring-fencing

Currently, the revenue generated from customers' water bills in Luganville is absorbed into the general public fund. It is the Authority's view that this revenue should be used to provide water services in Luganville, including necessary investment to improve performance and quality. In addition, in previous years PWD have not requested a specific budget for water services in Luganville. It is important that the revenue and expenditure of Luganville water services is considered separately to other government revenues and PWD activities. The Authority is seeking commitment from the Government to take action to resolve this. Such actions include:

- Separating revenues from Luganville water services from the general public fund;
- Requesting a separate budget for Luganville water services;
- Accounting for all expenses separately from other PWD activities;
- Providing a separate organisation structure for Luganville water services;
- Keeping and managing a register of assets of Luganville water services separate to other government assets; and
- Passing any required legislative changes to enable any of the above actions (if any).

These actions will make it possible to create a complete set of accounts for Luganville water services. The Authority will require clear evidence of the above actions having been taken before approving any tariff increase.

## 4.2 Performance Audit

There is currently no effective monitoring or compliance regime in place for water services in Luganville. As the utility is a government-operated service, financial penalties are unlikely to incentivise adequate performance improvement. In order to provide a suitable compliance and monitoring regime, the Authority will require the government to establish an annual performance audit before any tariff increase will be approved. Such an independent audit will enable suitable Key Performance Indicators (KPIs) to be established within the organisation to reward good performance. The following areas would be included in such a Performance Audit:

- Review of revenue collected, expenditure and investment against budget and plan;
- Water quality, treatment and reliability of supply;
- Review of organization structure against plan;
- Review of issues register;
- Review of complaints register;
- Review of work programmes (i.e. maintenance, investment, training); and
- Review of annual report.

The results of the performance audit should be presented to senior Government officials, including relevant Ministers, Director-Generals and Directors for scrutiny, and also made public. The Authority will require clear evidence of the establishment of such a Performance Audit before the tariff increase will be approved.

## 4.3 Infrastructure Funding

Given the current state of the network, a significant programme of infrastructure investment is required to increase the capacity to the required level, repair leaks, and improve water quality. The Authority considers that funding for such a programme should be secured before the tariff should be increased, and will require evidence of such funding before approving any tariff increase.

# 5. 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:

**Table 26: Consultation activities**

| Approximate date | Activity | Description | Target stakeholder group |
|---|---|---|---|
| 4-8 March 2013 | Government briefing (Port Vila) | Meeting in Port Vila with the Public Works department and other relevant Government departments to provide any required explanation of this paper and to receive submissions. | Public Works Department and other interested Government departments in Port Vila. |
| 13-15 March 2013 | Government briefing (Luganville) | Meeting in Luganville with the Public Works Department and other relevant Government departments to provide any required explanation of this paper and to receive submissions. | Public Works Department and other interested Government departments in Luganville. |
| 13-15 March 2013 | Community forums (Luganville) | Series of half-day public forums to explain this paper, answer questions and receive any submissions. | Public, commercial and industrial water customers in Luganville. |
| 13-15 March 2013 | Public survey | A short structured questionnaire will be provided during community forums and also by direct surveying of a sample of water customers across Luganville. | Domestic and commercial water customers. |

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 Draft Decision Report February 2013 on our website www.ura.gov.vu, or by contacting us by telephone (+678) 23335, email: mmalas@ura.gov.vu or regular mail at Luganville Water Tariff Review, Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.