Utilities Regulatory Authority

Luganville Electricity Tariff Setting

Final Determination (Stage 1)

August 2010
1 Preface

The Utilities Regulatory Authority (the URA) is Vanuatu’s economic regulator of electricity and water services throughout Vanuatu. The Government of Vanuatu established the Utilities Regulatory Authority on 11 February 2008 under the Utilities Regulatory Authority Act No. 11 of 2007 (the Act).

The URA is responsible for the regulation of certain services in the electricity and water sectors. Our role differs in each regulated industry but generally involves regulating prices, service standards, and market conduct and consumer protection. We also investigate and advise the Government on regulatory matters that affect Vanuatu’s regulated utilities.

The Act states that our primary objective is to regulate these utilities to ensure the provision of safe, reliable and affordable regulated services and maximise access to regulated services throughout Vanuatu.

The power supply concession in Luganville commenced on 23 January 1990 and will expire on 31 December, 2010. In accordance with the concession contract the Government has re-tendered the concession, which is currently underway and is expected to be completed prior to the expiration of the Luganville concession.

The Act empowers the URA to set the maximum level of tariff for the Luganville concession.

This document sets out the URA’s Luganville Electricity Tariff Setting Final Determination (Stage 1) August 2010 for the tariff for the Luganville concession, including Tariff Equalisation Mechanism and Indexation Formula. The URA will publish Luganville Electricity Tariff Draft Determination (Stage 2) following an asset audit and review of investment plans.

Johnson Naviti
Chairperson
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2 Executive Summary

2.1 Overview and Introduction

The Utilities Regulatory Authority (the URA) has made its Luganville Electricity Tariff Setting Final Determination Stage 1 on the prices and services levels applying to the Luganville electricity concession for the period 2011 to 2015.

The Act empowers the URA to set the maximum level of tariff for the Luganville concession. Based on the methodology outlined in the recent URA Luganville Tariff Setting Framework Paper July 2010, this document sets out the Stage 1 tariff for the Luganville concession.

The URA has undertaken a consultative approach with stakeholders and information gathering and analysis in reaching this stage 1 final determination.

Consultation began in early 2010 and has taken the form of consultation papers, workshops, conferences and public information sessions in Port Vila and Luganville including submissions from stakeholders.

The URA released its Luganville Tariff Setting Framework Paper in July 2010 that provided stakeholders the opportunity to comment on the URA’s views before it made its stage 1 draft determination.

Further, stakeholders were invited to comment on the URA’s views set out in its Luganville Electricity Tariff Setting Draft Determination Stage 1 August 2010 before it made its stage 1 final determination.

This paper sets out the URA’s final determination stage 1 regarding the electricity tariffs applying to the concession area of Luganville over the period 2011 to 2015.

In accordance with the Act, the maximum price determined under section 18(1) will be effective on the day on which the determination is published in the Gazette.

2.2 Outcomes of Stage 1

The outcome of the stage 1 tariff determination is a base price Po set at Vatu 26.73, which is forecast to generate revenues of Vatu 980,963,202 over the period 2011 – 2015.

Key components in this stage 2 tariff determination for 2011- 2015 are as follows:

**Demand**

The kWh are forecast to grow at 3% per annum with kVA at 2.0% for a total demand in terms of ‘P’ of 36,699,466.

**Generation**

Hydro production is forecast at 5,614,000 kWh per annum for a total of 28,070,000 kWh over the period. Diesel is expected to generate 12,386,253 over the tariff period requiring 3,451,604 lires of diesel.

**Costs**

Total cost including fuel, staff and materials is forecast at Vatu 9836,769,701. In the stage 2 determination these costs will be adjusted for insurance, provisions and depreciation.
Weighted Average Cost of Capital

The weighted average costs of capital for the Luganville concession was determined to be 6.82%. This will be used to calculate the reasonable return once investments plans have been reviewed in stage 2.

Other Components

This stage 1 determination also defined the tariff structure described in section 10, the tariff equalisation mechanism in section 9, and the tariff indexation formula in section 11.

This tariff will be adjusted stage 2, following the completion of an asset audit and a review of the investment plan.
3 How to respond to this paper

This paper sets out the URA’s Luganville Electricity Tariff Setting Final Determination Stage 1 August 2010.

Stakeholders are invited to comment on the issues still outstanding for the stage 2 final determination on the pricing level to be applied to the Luganville electricity concession.

Submissions are due on 24 September 2010 and can be emailed to tmael@vanuatu.gov.vu or mailed to:

Luganville Electricity Tariff Setting Draft Determination (Stage 2)
Utilities Regulatory Authority
PMB 9093
Port Vila, VANUATU

Submissions may also be made in person at the Office of the Utilities Regulatory Authority located on the ground floor of the VNPF Building, Port Vila, Vanuatu.

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

4.1 Background

The Utilities Regulatory Authority Act Number 11 of 2007 (the Act) establishes the Utilities Regulatory Authority (URA) of Vanuatu. The URA is a body corporate with perpetual succession, acting independently from the Government. The URA’s Commission consists of three Commissioners, a Chairperson and two part time Commissioners of which one is the Chief Executive Officer of the Authority.

The Act empowers the URA to regulate certain utilities, in particular, the provision of electricity and water services in Vanuatu.

The URA’s core functions with respect to the existing water and electricity utility include:

- Monitoring and enforcing existing concession contracts which include checking monthly price adjustments made by the utility, monitoring service standards and technical performance, reviewing yearly financial reports and auditing operating report processes;
- Renegotiating tariffs with the utility in accordance with the relevant concession contracts;
- Manage consumer complaints by assisting consumers resolve grievances and/or complaints with the utilities;
- Advise Government on utility-related matters as requested; and
- Communicating with the Government, utilities, customers and the general public in order to provide information about matters or updates relating to utilities.

The Act empowers the URA to set the maximum level of tariff for the Luganville concession. Based on the methodology used in the recent URA Final Decision paper on all concessions tariff this document sets out the tariff for the Luganville concession.

As part of the Luganville electricity tariff setting, the URA will also provide for the establishment of a tariff equalization mechanism to enable uniform tariffs to be maintained across the electricity concession areas in Vanuatu.

Therefore, the URA proposes to:

- review the current costs to develop an estimate of the efficient cost of electricity service in Luganville and the associated revenue requirement for the utility;
- review the structure of equalised tariffs across concession areas;
• review the tariff adjustment formulae and recommend a method of indexation that ensures the viability of the operator, a fair price for consumers, and expectations of Government;

• develop a view as to the reasonableness of service standards for electricity specified in the concession contracts, and the possible cost implications of any changes to the service standards, to inform its decision on whether to request changes in service standards in conjunction with any tariff setting;

• develop a financial model needed for reviewing tariffs; and

• develop in consultation with stakeholders, the information needed for electricity tariff setting, including accounting and technical definitions.

4.2 Electricity tariff setting regulatory framework

Under Division 3 section 18 (1) of the Act, the URA is empowered to determine the maximum price which may be charged in relation to any aspect of a regulated service throughout Vanuatu. In determining the maximum price under section 18(1) the URA must have regard to the price of similar services in any comparable location.

Further, the URA is empowered to do all things that are necessary or convenient to be done for or in connection with the performance of its functions.

The maximum price determined under subsection (1) will be effective on the day on which the determination is published in the Gazette.

4.3 Electricity tariff setting process

In developing its position on the Luganville electricity tariff the URA has;

• **Established the methodology** for the tariff calculation and highlight issues relevant to the Luganville concession. The URA established the method to be used to calculate the level of the tariff in consultation with stakeholders through this the Framework Paper – Luganville Electricity Tariff July 2010;

• **Sought submissions from Stakeholders**. The URA has received submissions from stakeholders on the issues raised in the Framework Paper and these are incorporated in this document;

• **URA’s Luganville Electricity Tariff Draft Determination Stage 1**. The URA has published its draft tariff determination for the Luganville concession. This document described the assumptions that the URA believes are appropriate for the setting of the tariff, the tariff level, structure of an equalisation mechanism and indexation formula.

• **Consultation**. Luganville Electricity Tariff Draft Determination was made available to the public and all interested stakeholders. The URA received submissions on this paper and these are incorporated in this document.

• **URA’s Luganville Electricity Tariff Determination Stage 1 (this paper)**. The URA proposes to publish its Tariff Determination in two stages. Following consultation on the URA’s Luganville Electricity Tariff Draft Determination Paper, the URA will publish its Luganville Electricity Tariff Final Determination Stage 1 in August 2010.
The URA will carry out the following next steps as part of the Luganville electricity tariff setting review:

- **Asset Audit and Valuation.** As part of the tariff review process the URA will undertake an audit of all the assets of the Luganville concession. The Audit results will be used to determine the appropriateness of replacement provisions, to allow costing of the insurance cover required in the concession agreement and identify all government owned assets.

- **Receipt of Bidders Investment Plans.** The URA will review the investment plans submitted by bidders, to assist it in reaching its final determination as part of its stage 2 tariff setting.

- **URA’s Luganville Electricity Tariff Final Determination Stage 2.** The URA proposes to expeditiously assess the investment plans submitted by the tenderers and in consultation with the successful bidder make its determination on insurance costs, provisions, the regulated asset base, depreciation and resulting reasonable return.

  The URA will publish its Luganville Electricity Tariff Final Determination Stage 2 which will take effect upon gazettal and applied to the new Luganville concession agreement.

### 4.4 Purpose of this paper

The purpose of this paper is to set out the URA’s Luganville Electricity Tariff Final Determination Stage 1.

The paper sets out the URA’s position in relation stage 1 of setting an appropriate tariff level, structure, the indexation formula and the Price Equalization Mechanism of the Luganville electricity concession.

In addition, the URA will seek stakeholder comment on outstanding matters relating to its Luganville Electricity Tariff Setting Determination Stage 2 which includes the cost and structure of insurance cover, appropriate depreciation rates, provisions for repair and renewal, and the application of a reasonable return rate to the investment plans.
4.5 Structure of this paper

Section 5 sets out the URA’s rationale for establishing tariff and methodology for undertaking a two stage tariff setting process.

Section 6 outlines the URA’s approach to assessing the service standards for electricity services in Luganville.

Section 7 describes the URA’s principle in setting the tariff and the methodology is assessing the reasonable level of service and reasonable rate of return that underpin the tariff decision.

Section 8 sets out the URA’s position on the base price of the tariff for the Luganville Electricity Tariff Setting Stage 1 Determination.

Section 9 outlines the URA’s proposed tariff equalization mechanism.

Section 10 gives the URA’s tariff structure to be applied to the Luganville concession.

Section 11 describes the URA’s position on the indexation formula to be applied.

Section 12 presents the URA’s position on the methods used for fuel procurement and the price paid.

Section 13 describes the URA’s approach and methodology in relation to the promotion of renewable energy.

Section 14 seeks stakeholder comment on the URA’s stage 2 tariff elements of asset audit and submission of investment plans.

Appendix A provides an indicative timeline for completing the tariff setting and review.

Appendix B sets out the forecast generation data for the Sarakata Hydroelectric power station.

Appendix C describes the terms used in the Reasonable Return Calculation.

Appendix D Stakeholder submissions to the URA Draft Determination Stage 1 August 2010.
5 Tariff Setting Methodology

In undertaking this tariff review, the URA’s methodology for establishing tariffs is that which meets the standards for good regulatory practice.

The URA’s methodology has been developed in consultation with key stakeholders in a manner that takes into account the need for openness and transparency, while also being reasonably efficient.

5.1 Rationale and Objective

The rationale for the tariff review is to assess the appropriateness of tariffs, both in terms of their level and their indexation method. The URA’s aim is to find the balance between the interests of the consumers of Vanuatu, of the utility, and of the Government. In short,

- consumers should not pay more than necessary to receive electricity service of a given standard;

- the utility should be able to charge tariffs in such a manner that it can cover all its costs, and this includes operating, maintenance and investment costs; and finally,

- the government need to keep the long-term growth and economic development of Vanuatu in view and thus requires present tariffs to support improvements and future investments in electricity supply.

The methodology the URA has used, to assess whether tariffs are appropriate to balance the concerns of all stakeholders takes the following form:

- the costs of the utility have been reviewed in order to determine what the minimum revenue requirement is for electricity supply to operate in a commercially viable manner;

- the cost information gathered by the URA in relation to its recent Electricity Tariff Review Final Decision May 2010, as to what level of expenses have been associated with the provision of services in Luganville has been considered;

- the appropriateness of costs is intimately linked to the quality and reliability of service that consumers request, and the level of safety that is imposed. Safety and Reliability standards have therefore been reviewed for their appropriateness at the same time as utility costs;

- in order to determine whether the medium to long term growth and development concerns are addressed, a forecast of consumer demand (commercial and residential) has been undertaken.

- a reasonable rate of return has also been calculated that will be applied to the investment plans of the successful bidder. These will be reviewed in stage two and the reasonable return given on approved investments.
Given all elements above, required revenues to cover future costs of electricity supply have be assessed by the URA. A financial and economic model tailored to Vanuatu based on the model used in its Electricity Tariff Review Final Decision May 2010 has been used to assess the required revenues.

Required revenues in stage 1 indicate the total amount of money the utility is anticipated to need to meet its cost obligations for operations, and maintenance. Stage 2 will adjust the tariff for forward-looking investment in terms of depreciation and compensation for investors who have put their capital at disposal for the construction of the network.

A regular tariff adjustments mechanism (indexation) method has been determined to pass through cost changes on a regular basis.

5.2 Two Stage Tariff Setting Process

Given that the initial level of planned investment and insurance costs are unknown, a two stage tariff setting process is being used. The stage 1 tariff set in this paper is set assuming a regulated asset base of zero as all government assets will be taken over free of charge by the winning bidder. This will be the tariff that is used for the Luganville tender final bid.

The URA will review the investment plans, and the ongoing asset audit and will set the stage 2 tariff, which will cover depreciation and a reasonable return on capital required for the investment plan. If the plan is not carried out as scheduled then the excessive tariff paid will be clawed back with interest at the next tariff review.

As insurance costs are dependent on an asset audit and valuation currently under way, the cost of insurance as required by the concession agreement will also be included at the second stage. The successful bidder will be required to supply three competitive quotes for the required insurance.

5.3 Supply outside the Concession Area

The URA makes a distinction in its regulatory approach between grid connected and non grid connected supply outside the concession area. The URA’s approach is described below.

5.3.1 Tariff

Under the Act the URA may determine the maximum price which may be charged in relation to a regulated service in or outside the Luganville concession area.

With existing small electricity supplies outside concession areas such as Port Olry the URA has to date exercised its discretion and not set a maximum tariff for the community based electricity supply. Similarly, for small water utilities outside the existing concession areas the URA has not imposed a regulatory burden upon these utilities.

The URA is of the view that its light handed regulatory approach will continue to be applied where electricity and water services are provided in rural communities outside the existing concession areas. The requirement for tariff setting will be assessed on a case by case basis in consultation with the relevant utility.

For guidance, the URA is of the view that in calculating the applicable tariff, for non grid connected electrification outside the concession, would be on the basis of ‘least cost of supply’. If the electricity is supplied via off grid methods the utility will be required to demonstrate it has used the least cost method of providing that supply. The URA would require the utility to show that it is, in the long run, at a lower cost than a grid extension that supplied the same area.

For clarity any customers inside or outside the concession area connected to the exiting grid will be charged the uniform tariff.
5.3.2 Service Standards

Reliability standards issued by the URA are provided for under the Utilities Regulatory Authority Act No 11 of 2007, and are issued in relation to the reliability of regulated services in any place. The URA may issue further standards to be applied in relation to non grid connected supply within and outside the existing concessions.

5.3.3 Regulated Asset Base

Where the existing grids, within a concession area, are extended either inside or outside the concession area; and where this is financed by the concessionaire, it will form part of the regulated asset base. As part of the regulated asset base the grid extensions will receive a depreciation allowances and a reasonable return on the capital invested, through the tariff.

Assets outside the concession area, that are not grid connected will have to be funded by the concessionaire through whatever means they deem financially viable, for example through a charge to those individual consumers outside the concession, via cross subsidisation or donor funding.
5.4 Building blocks methodology

The building blocks approach has been applied by regulators in many different countries, including Australia, New Zealand, and other Pacific Island Countries such as Tonga. This approach gives the service provider a reasonable amount of certainty that it can stay profitable, while also giving the provider an incentive to improve performance. The provider has this incentive because the tariff is locked-in for the regulatory period (five years) based on forecast efficient costs and forecasted demand—if the provider can reduce costs below forecasts or increase demand, then it can keep the difference. After five years (in normal circumstances) the tariff will be reviewed again, taking into account the efficiency gains made by the provider.

The building blocks approach consists of setting a price cap on tariffs so that over the regulatory period, the service provider's forecast revenue is equal to the provider's forecast reasonable operating costs plus a forecast reasonable return on capital. This approach is shown below.

Figure: 5.4.1 The building blocks approach to setting the price controls

The building blocks approach can be characterised by three steps:

**Step 1 Determining Service Levels**

The first step to determining the price controls is to decide upon the service outcomes that the concessionaire is required to deliver over the period. These outcomes will reflect the service standards that are set as part of this tariff review as well as legislative and functional obligations that the concessionaire must meet in accordance with concession requirements. In setting these service outcomes, it is also necessary to consider anticipated future peak demand and customer numbers.
Step 2: Determining the revenue required

Having determined the outcomes that must be delivered, the revenue requirements are then determined that are sufficient to enable the concessionaire to deliver these outcomes efficiently. The building blocks approach involves building up the concessionaire’s revenue from key components that reflect their operating and maintenance costs and financing requirements, the concessionaires’ financing costs (return on and of capital) are built up with reference to the rolled forward value of their regulatory asset bases and the capital expenditure that they must undertake. The return on the regulated asset base will take place at stage two of the tariff setting process as described in Section 5.2.

Step 3: Translating the revenue requirement into a price control

Having determined the revenue required, it is then translated into unit prices using forecasts of energy consumption and customer numbers across the various customer categories. This is then translated into specific tariff which in accordance with an indexation mechanism specifies how prices will be adjusted monthly.
Service Standards

In this section, the URA sets out its Final Determination and reasons on the level of service reliability, quality of supply and customer service measures that underpin the tariff decision.

The utility is held accountable for their performance through monitoring and compliance with the concession contract and publicly reporting on their performance against targeted levels as well as through incentive arrangements that the URA has set in place.

The URA has assessed the reliability of the service provided by the current utility. Reliability of supply is a key measure of performance of an electricity operator. In its simplest terms, reliability of supply is defined as whether or not electricity is available when sought by a customer. Reliability measures typically focus on the extent of availability, or non-availability, of electricity to customers.

The purpose of this analysis was to understand if a change in reliability should be factored in to the new tariff level, as a change in reliability would require a change in the cost of providing the service. The URA also examined whether any changes to service standards would be required as part of this tariff review.

The URA has benchmarked the utilities’ reliability performance against three indicators:

1. System average interruption duration index (SAIDI)
2. Peak load per kVA of transformer benchmarked
3. Number of customer complaints per thousand customers

6.1 System average interruption duration index (SAIDI)

The system average interruption duration index (SAIDI) is the total minutes, on average, that a customer could expect to be without electricity in a year due to supply interruptions. The current utilities performance on this benchmark when compared to international data is very good. As shown in Figure 6.1.1. The service in Luganville has been provided with very little interruptions in Port Vila and Luganville.¹

Figure 6.1.1: System Average Interruption Duration Index (SAIDI) (Hours per customer per year)

¹ Data for Tanna and Malekula Islands concession has not been provided by the Utility
6.2 Peak load per kVA of transformer

The capacity of transformers on a utility’s network relative to the load on its network affects the performance of the network and provides an indication of the amount of investment in the network that has been undertaken.

An indicator that describes this, peak load per kilovolt-ampere (kVA) of transformer capacity is shown in Figure 6.2.1.

A high ratio indicates that there is less capacity relative to load, which will result in poorer network performance. A low ratio can indicate over investment in the network. Luganville’s average performance sits in the middle of the range when compared to other similar utilities which suggests that it has avoided over or under investment in the network.

Figure 6.2.1: Peak load per kVA of Transformer (MW/kVA)
6.3 Number of complaints per thousand customers

Based on the data that was made available, very low levels of complaints per thousand customers have been received when compared to other utilities in island countries. It is not clear if the very low level of reported complaints is due to an exceptionally low number of complaints or difficulties with the utilities complaints recording and reporting system.

![Figure 6.3.1: Number of Complaints per Thousand Customers](image)

Source: UNELCO and audited financial reports (2004) of other utilities

6.4 Submissions by Stakeholder and Discussion

In relation to service and reliability standards referred to in the URA’s Draft Luganville Electricity Tariff Setting Draft determination Stage 1 no comments were received from stakeholders.

However, the URA has published its draft safety and reliability standards for consultation and has received a number of submissions on these. The URA will consider these submissions in its next publication of the draft standards and following further consultation will issue the final standards to be applied to the various electricity concessions and respective utilities.

6.5 Final Determination

It would appear that the current utility is providing a reasonably good level of service when compared to comparable industry benchmarks. For the purposes of setting the tariff, it is assumed that any new operator will be able to provide at least the same level of service as is currently being achieved.

Customers have emphasised the importance that they place on a reliable electricity supply, the URA has received little indication that customers value further improvements in average reliability levels.

The utility will be required to report against the following average reliability measures, by network type: annual duration of unplanned interruptions (unplanned SAIDI), annual frequency of unplanned interruptions (unplanned SAIFI), annual duration of planned interruptions.
(planned SAIDI), annual frequency of planned interruptions (planned SAIFI), and frequency of momentary interruptions (MAIFI).

The URA has issued Electricity Reliability Standards in relation to regulated services. The targeted levels for these reliability measures are provided in these standards. Additionally the URA will publish reports on the utilities performance. These reports will include measures of reliability, quality of supply and customer service.

The service standards should be kept under review and should the quality of service begin to fall, the URA will act to adjust or introduce new standards as necessary.

One of the key features of the URA’s decision on the tariff level to apply for 2011 – 2015 regulatory period is to ensure that customers receive the service that they pay for. This is to be achieved through identifying and measuring the level of service that is expected to be provided, and outlining clear reporting requirements, and by providing financial rewards and penalties for the service outcomes delivered.

This section provides the URA’s final determination on the service levels customers should receive and the reporting requirements in respect of those services.
7 Building Block Components

The tariff has been set based on the principle that a fair price for consumers is one where the operator covers the reasonable costs of providing a reasonable level of service and makes a reasonable return. The calculation is performed using a financial model developed by the URA based on the building block methodology.

The methodology is applied in the following way:

- The first stage Base Tariff ($P_0$) is set at a level to ensure that the utility covers the reasonable costs of providing electricity at the required level of service.
- The Cost Forecast is based on predictions of the costs associated with providing a forecast level of generation, in order to meet the forecast demand.
- The level of capital invested in electricity is referred to as the Regulated Asset Base (RAB). The second stage tariff is set to ensure the utility earn a reasonable level of return on capital they have invested in this asset base. The reasonable rate of return is estimated as the weighted average cost of capital (WACC).
- The Indexation Formula allows the passing through of some external cost changes, for example fuel, wage, and materials cost inflation. The price calculated each month using the Indexation Formula is referred to as $P$.
- The Tariff Structure creates the final electricity prices that will be paid by the different groups of customers for fixed monthly fees and per kWh based on the price $P$.
- A Price Equalisation Mechanism allows uniform tariffs across Vanuatu while earning the Luganville concessionaire a tariff appropriate for that concession’s costs.

The methodology has been designed to calculate a price for five calendar years from 2011 to 2015. Each of the elements shown above is described in detail below.

**Note:** The $P$ defined in the Electricity Tariff Review Final Decision May 2010 differs to the use of $P$ in this document. In this document $P$ refers to the base price received by the concessionaire in Luganville which may be different to the base price charged to consumers in Luganville due to the government’s uniform tariff policy.
7.1 Demand Forecast

7.1.1 Definition
Energy consumption, peak energy demand and customer numbers are important inputs into the derivation of the tariff level. Future expenditure requirements are driven partly by expected growth in peak demand and customer numbers while the translation of the revenue requirement into the tariff level relies on forecasts of energy consumption, and customer numbers.

7.1.2 Data Source
GDP forecasts have been taken from the Vanuatu Government Budget Papers 2010.

Historical electricity demand data across different customer groups has been taken from the URA’s Electricity Tariff Review Final Decision May 2010.

7.1.3 Detailed Methodology
The demand growth forecast set out in the URA’s Electricity Tariff Review Final Decision May 2010 was derived based on the Government of Vanuatu’s overall GDP forecast for the next five years given the strong historical correlations of GDP growth and electricity consumption growth. This method is applied to kWh and kVA growth forecasts. This same methodology is applied to the Luganville concession for the tariff period 2011 to 2015.

The URA has taken a top-down approach to estimating future electricity demand growth rates. This means that the demand is estimated at an overall level, rather than for individual groups of customers.

The URA notes that electricity demand and GDP growth has been more volatile in Luganville as compared to all concessions thus applying the same growth forecasts as for the all concession models may appear aggressive. Given that the tender process for Luganville requires the growth of connections the URA believes there will be a strong incentive to grow demand in Luganville beyond what there is in other concession areas. Thus demand is forecasted as per the Electricity Tariff Review Final Decision May 2010.

It is also noted that given the level of electricity supplied by the Sarakata hydroelectric power station that the Luganville base tariff is less sensitive to demand growth forecasts than the all concessions tariff.

The tariff financial model uses the following methodology:

- It takes monthly historical demand in each customer group for both kWh and kVA
- It applies a demand growth rate to the previous years total demand for both kWh and kVA
- It calculates the proportion of the total years demand in kWh and kWh that falls in each month (using 2009 as a base year)
- It applies the month proportions (2009) to the total demand forecasts to give the monthly demand in each customer group
- kWh and KVA are represented in terms of P (via the new tariff structure) and combined for a total demand in P
- This is summed into annual demand
7.1.4 Draft Determination
The URA’s draft determination for demand for the Luganville concession 2011 to 2015 is shown below.

Table 7.2.1 – URA forecast of demand growth rate

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

Table 7.2.2 – URA forecast of electricity demand in kWh

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>7,102,582</td>
<td>7,386,686</td>
<td>7,682,153</td>
<td>7,989,439</td>
<td>8,309,017</td>
<td>38,469,877</td>
</tr>
<tr>
<td>2012</td>
<td>7,386,686</td>
<td>7,682,153</td>
<td>7,989,439</td>
<td>8,309,017</td>
<td>38,469,877</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>7,682,153</td>
<td>7,989,439</td>
<td>8,309,017</td>
<td>38,469,877</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>7,989,439</td>
<td>8,309,017</td>
<td>38,469,877</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>8,309,017</td>
<td>38,469,877</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.2.3 – URA forecast of electricity demand in kVA

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>99,765</td>
<td>103,756</td>
<td>107,906</td>
<td>112,222</td>
<td>116,711</td>
<td>540,361</td>
</tr>
<tr>
<td>2012</td>
<td>103,756</td>
<td>107,906</td>
<td>112,222</td>
<td>116,711</td>
<td>540,361</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>107,906</td>
<td>112,222</td>
<td>116,711</td>
<td>540,361</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>112,222</td>
<td>116,711</td>
<td>540,361</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>116,711</td>
<td>540,361</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.2.4 – URA forecast of electricity demand in terms o ‘P’

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>7,131,123</td>
<td>7,416,055</td>
<td>7,712,385</td>
<td>8,020,568</td>
<td>8,341,079</td>
<td>38,621,211</td>
</tr>
<tr>
<td>2012</td>
<td>7,416,055</td>
<td>7,712,385</td>
<td>8,020,568</td>
<td>8,341,079</td>
<td>38,621,211</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>7,712,385</td>
<td>8,020,568</td>
<td>8,341,079</td>
<td>38,621,211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>8,020,568</td>
<td>8,341,079</td>
<td>38,621,211</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>8,341,079</td>
<td>38,621,211</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prime de transfo
Prime de transfo is revenue paid by high voltage customers to rent a transformer from the utility, rather than have their own transformer. The URA has assumed the growth in Prime de transfo to be in line with the 10 year average growth, which is 2.07% in Luganville. As Prime de transfo revenue cannot be translated in terms of P it is managed separately at the total required revenue stage.

7.1.5 Submissions by Stakeholder and Discussion
In their submission UNELCO argued that the URA overestimated the demand growth in Luganville based on:

1. Previous overall growth in electricity demand in Luganville has been slow
2. Industrial demand has grown slower
3. There has been a recent decline in tourism arrivals
4. Urban population growth has been significantly slower than Port Vila
5. Growth is likely to be focused in small domestic customers.
Though demand growth in Luganville has been distorted by the loss of a single large industrial user the URA does agree with some of UNELCO’s arguments especially the slower urban population growth, and long term growth trends, and likely focus of growth on small domestic customers.

On the balance of the evidence the URA has adjusted down its kWh growth forecast to 3% per annum and kVA growth rate to 2% per annum.

7.1.6 Final Determination
The URA’s final determination for demand for the Luganville concession 2011 to 2015 is shown below. Changes from the draft determination are due to a lower kWh growth rate of 3% and a lower kVA growth rate of 2%.

<table>
<thead>
<tr>
<th>Table 7.2.2.1 – URA forecast of kWh demand growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>3.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.2.2.2 – URA forecast of kVA demand growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>2.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.2.2.3 – URA forecast of electricity demand in kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>6,926,689</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.2.2.4 – URA forecast of electricity demand in kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>95,415</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 7.2.2.5 – URA forecast of electricity demand in terms of 'P'</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
</tr>
<tr>
<td>6,933,890</td>
</tr>
</tbody>
</table>

Prime de transfos
Prime de transfos revenue is calculated as per the draft determination.
7.2 Generation Forecast

7.2.1 Definition
The Generation Forecast calculates how power will be generated to meet the forecasted demand as described in section 7.1. It forecasts the energy required from each output source, system loss, generator efficiency, and the forecast fuel usage over 2011 to 2015. This fuel requirement in litres is then used in calculating fuel costs.

7.2.2 Data Source
Historical system losses, generator efficiency, and hydro production has been taken from the URA’s Electricity Tariff Review Final Decision May 2010.

7.2.3 Detailed Methodology
The Luganville concession has the following generation sources:

<table>
<thead>
<tr>
<th>Concession area</th>
<th>Generation sources (capacity, megawatts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luganville</td>
<td>Luganville diesel (2.9 MW)</td>
</tr>
<tr>
<td></td>
<td>Sarakata hydro (1.2 MW)</td>
</tr>
</tbody>
</table>

The Sarakata hydroelectric power station consists of 2 x 300kW and 1 x 600kW generators. These are supplemented by diesel generation capacity made up of 2.9MW, located at the Luganville power station.

Peak demand is considered to be 1.2MW during the day and 650kW during the night. During periods, when the peak demand exceeds 800kW of load, the demand is supplemented by diesel generation.

The estimated amount of power generated by the Sarakata hydro plant is considered to be 5,614,000 kWh per annum from 2010 to 2014 as described in Appendix B.

The cheapest sources are assumed to be scheduled first to meet demand that is the hydroelectric station. The remaining power requirements are assumed to be generated from the fuel-based sources.

Fuel efficiency is estimated and the amount of fuel required calculated. The diesel fuel efficiency for the Luganville diesel generators is based on historical averages and efficiency gains given in the URA’s Electricity Tariff Review Final Decision May 2010.

Losses are calculated as the difference between the electricity generated (gross energy) and the amount of electricity invoiced to customers based on historical averages.

Peak demand has not been explicitly modelled for this tariff review given the extent of the excess capacity. The use of coconut oil is also not explicitly modelled as none is currently use in Luganville, though the indexation formula will allow for its introduction.

The tariff financial model uses the following methodology for forecasted generation:

- Total energy sold on a monthly basis is taken from demand forecast;
- This is grossed up using average system losses to give Total Energy needed to be produced;
Total Energy to be produced each month is applied first against hydro based on forecast hydro production; The remaining energy requirements are applied against diesel generation; Diesel efficiency is calculated on historical numbers; Total litres needed to generate the required kWh is calculated based on this conversion ratio; Total fuel cost per month is calculated assuming Vt 85 / litre (the model is not sensitive to this price as it is adjusted in the indexation formula); and All these above numbers are summed to a Annual Generation forecast.

7.2.4 Draft Determination
The components of the generation forecast are shown below:

**System losses**

**Table 7.3.4.1 – URA forecast of system losses**

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>System losses</td>
<td>7.66%</td>
<td>7.66%</td>
<td>7.66%</td>
<td>7.66%</td>
<td>7.66%</td>
</tr>
</tbody>
</table>

**Gross energy required**

**Table 7.3.4.2 – URA forecast of Gross energy requirements (kWh)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross energy required</td>
<td>7,691,772</td>
<td>7,999,443</td>
<td>8,319,421</td>
<td>8,652,198</td>
<td>8,998,286</td>
<td>41,661,119</td>
</tr>
</tbody>
</table>

**Hydro utilisation**

**Table 7.3.4.3 – URA forecast of Hydro production (kWh)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro utilisation</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>28,070,000</td>
</tr>
</tbody>
</table>

**Diesel generator utilisation**

**Table 7.3.4.4 – URA forecast of Diesel electricity production (kWh)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel generator utilisation</td>
<td>2,077,772</td>
<td>2,385,443</td>
<td>2,705,421</td>
<td>3,038,198</td>
<td>3,384,286</td>
<td>13,591,119</td>
</tr>
</tbody>
</table>

---

2 See Appendix B for Hydro forecasts
Generator efficiency

Table 7.3.4.5 – URA forecast for generator efficiency (litres/kWh)

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.269</td>
<td>0.269</td>
<td>0.269</td>
<td>0.269</td>
<td>0.269</td>
</tr>
</tbody>
</table>

Litres of Diesel required

Table 7.3.4.6 – URA forecast for diesel use

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>558,588</td>
<td>641,303</td>
<td>727,325</td>
<td>816,789</td>
<td>909,831</td>
<td>3,653,836</td>
</tr>
</tbody>
</table>

7.2.5 Submissions by Stakeholder and Discussion

System Losses

The URA seeks to estimate system losses at the level of an efficient network and international benchmarks not just based on historical system losses.

UNELCO’s submission identified historical losses at 9.1% and increasing to 11.9% with the introduction of the 3rd hydro turbine.

On the balance of information available the URA considers system losses of 9.1% to be reasonable for the existing Luganville network.

7.2.6 Generator Efficiency

In UNELCO’s submission they requested the generator efficiency be set at 0.286 as per the all concession tariff review for Luganville. UNELCO argue this based on:

1. Obligations to maintain voltage and frequency of a small scale non interconnected grid with thermal generators, with the ability to react rapidly to the frequent variations of load and avoid black out. These conditions of operation are leading to an average load of the engines far from their best performances, and inconsistent with an optimisation of their specific consumption.

2. Existing engines are also designed and sized to provide backup in case of maintenance, breakdown or loss of water flow at the hydro plant.

Based on these arguments the URA reviewed its generator efficiency calculations as follows.

In UNELCO’s submission they requested the generator efficiency be set at 0.286 as per the all concession tariff review for Luganville. In the all concession tariff review the 0.286 figure does not include the fuel efficiencies offered by UNELCO of Vatu 154,553,637 across all concessions. Based on Loganville’s share of diesel use, 4.27% of this efficiency gain is allocated to Luganville. That is equivalent to 2.565% of Luganville’s forecast diesel costs over the 2010-2014 period. Thus the efficiency rate of 0.286 is adjusted down to 0.279.

7.2.7 Final Determination

The components of the generation forecast are shown below, the differences to the draft determination are due to a new system loss figure of 9.1% and generator efficiency adjusted to 0.279 and lower demand growth rates.
### System losses

**Table 7.3.7.1 – URA forecast of system losses**

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss</td>
<td>9.1%</td>
<td>9.1%</td>
<td>9.1%</td>
<td>9.1%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

### Gross energy required

**Table 7.3.7.2 – URA forecast of Gross energy requirements (kWh)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>7,620,120</td>
<td>7,848,724</td>
<td>8,084,186</td>
<td>8,326,711</td>
<td>8,576,512</td>
<td>40,456,253</td>
</tr>
</tbody>
</table>

### Hydro utilisation

**Table 7.3.7.3 – URA forecast of Hydro production (kWh)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>5,614,000</td>
<td>28,070,000</td>
</tr>
</tbody>
</table>

### Diesel generator utilisation

**Table 7.3.7.4 – URA forecast of Diesel electricity production (kWh)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>2,006,120</td>
<td>2,234,724</td>
<td>2,470,186</td>
<td>2,712,711</td>
<td>2,962,512</td>
<td>12,386,253</td>
</tr>
</tbody>
</table>

### Generator efficiency

**Table 7.3.7.5 – URA forecast for generator efficiency (litres/kWh)**

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>0.279</td>
<td>0.279</td>
<td>0.279</td>
<td>0.279</td>
<td>0.279</td>
</tr>
</tbody>
</table>

### Litres of Diesel required

**Table 7.3.7.6 – URA forecast for diesel use**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Litres</td>
<td>559,034</td>
<td>622,737</td>
<td>688,352</td>
<td>755,935</td>
<td>825,546</td>
<td>3,451,604</td>
</tr>
</tbody>
</table>
7.3 Cost Forecast

The Cost Forecast estimates the reasonable costs of providing electricity services in the concession areas. Fuel costs are calculated on a monthly basis from the Generation Forecast.

All other costs are calculated on an annual basis and forecasted over the 5 year concession period. Costs are based on the URA’s cost forecasts as part of the Electricity Tariff Review Final Decision May 2010.

The utility will be expected to report detailed cost information by category to the URA on an annual basis.

The Cost Forecast consists of several categories of costs:

- Fuel Costs
- Staff Costs
- Goods and Other Costs
- Depreciation
- Provisions

7.3.1 Fuel Costs

Detailed Methodology

The Generation Forecast described above estimates the amount of diesel and/or copra required to meet the forecast electricity consumption. By assuming the prices of diesel, it is then possible to estimate the cost of fuel. The global price of fuel is highly volatile, so the Indexation Formula described in Section 0 is designed to adjust the price of electricity to allow the utility to cover the reasonable cost of fuel.

The fuel cost no longer includes a “Theoretical Diesel Cost” for the fuel equivalent amount of the Sarakata savings as occurred under the previous concession agreement. Hydroelectric generation forecasts are incorporated into the overall generation forecast.

Fuel costs are one of the largest costs in generation of electricity. As the weighted average price for diesel and copra fuel is passed through to electricity customers through the indexation formula, the supply of fuel by a related entity has the potential to create a situation where unfair gains are being retained within the total corporate group.

Thus the URA is particularly mindful of the methods used for fuel procurement and the price paid this is discussed further in Section 10.

7.3.2 Data Source

Litres used are taken from the above generation forecast. The base fuel price of diesel is estimated as Vt85 per litre. The model is not sensitive to the starting price as fuel costs are adjusted through the indexation formula.
7.3.3 Draft Determination

Table 7.4.3.1 – URA forecast of fuel and oil costs in Vatu

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50,256,440</td>
<td>57,395,268</td>
<td>64,819,536</td>
<td>72,540,656</td>
<td>80,449,249</td>
<td>325,461,150</td>
</tr>
</tbody>
</table>

7.3.4 Stakeholder Submissions and Discussion

As per the discussion section 7.5 and 8.5 fuel costs have been adjusted to reflect the changed demand forecast, and changes system losses and generator efficiency.

7.3.5 Final Determination

Table 7.4.5.1 – URA forecast of fuel and oil costs in Vatu

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50,294,301</td>
<td>55,817,226</td>
<td>61,506,807</td>
<td>67,368,080</td>
<td>73,284,986</td>
<td>308,271,400</td>
</tr>
</tbody>
</table>

7.3.6 Staff Costs

Definition

Staff costs are the wage and salary costs of staff, and the labour related on-costs directly incurred in the provision of electricity.

Where under previous concession agreements the Sarakata component of staff where handled separately they are now included. That is costs that were included in the fuel costs are now striped out and are included in staff costs, as with the maintenance costs below. The theoretical diesel cost used for Sarakata has been removed.

7.3.7 Data Source

The URA has used data on actual staff costs used in its Electricity Tariff Review Final Decision May 2010 for the Luganville concession.

7.3.8 Detailed Methodology

Historical staff costs are used to forecast staff costs over the proposed tariff period 2011 to 2015. The Indexation Formula is designed to adjust staff costs for changes in the Vanuatu CPI.

7.3.9 Draft Determination

Table 7.4.9.1 – URA forecast of staff costs in Vatu

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>381,569,553</td>
</tr>
</tbody>
</table>
7.3.10 Stakeholder Submissions and Discussion
In UNELCO submissions requested staff costs to be index to electricity production growth. No evidence or explanation of this growth rate was given thus the URA’s initial determination has not changed.

7.3.11 Final Determination
As set out in section 7.4.9 above.

7.4 Goods and Other Costs
7.4.1 Definition and why it is important
These costs included:

- Goods & materials purchased
- Purchases non-stocked (e.g. sub-contracting)
- Taxes

Goods and other purchases includes all other current costs other that fuel and staff costs, incurred in the provision of electricity. The Indexation Formula is also designed to adjust the price of electricity for changes in general goods prices. The utility pays no corporate profit taxes but does pay other duties taxes and levies. Where theses are incurred in the provision of electricity they form part of the utilities costs.

7.4.2 Data Source
The data on costs are taken from Electricity Tariff Review Final Decision May 2010.

7.4.3 Detailed Methodology
Historical costs from previous tariff review are used to forecast costs over the proposed tariff period 2011 to 2015. Adjustments to these historical costs have been made for the removal of the Sarakata fund and the previous concession agreements Article 6 provisions.

Performance Bond
The new draft concession agreement under Section 14 requires a performance bond of Vt50m. The tariff will cover the estimated costs of financing this bond. This will be calculated using the Weighted Average Cost of Capital times VUV 50M vatu.

Insurance Costs (Stage 2)
The new draft concession agreement under Section 19 requires various insurance cover. The cost of insurance forms part of the utility’s costs. The URA proposes to conduct an audit of all Luganville concession assets and the results of this will be available after the tender is decided. The valuation of assets under this audit is required to obtain insurance quotations. Thus the insurance costs will form part of the final tariff determination (stage 2) and the winning bidder will be required to supply competitive quotes for the required coverage.

Given the potential high cost of the insurance cover required, the URA will review quotes with the option to provision for larger insurance excesses in the tariff, to achieve more affordable premiums if appropriate.
7.4.4 Draft Determination

Table 7.5.4.1 – URA forecast of Goods and Other Costs in Vatu (Stage 1)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>233,928,748</td>
</tr>
</tbody>
</table>

7.4.5 Stakeholder Submissions and Discussion

Indexation of Maintenance Costs to Demand Growth

UNELCO in their submission requested that maintenance costs be index to demand growth. No maintenance schedule, plans or cost estimates were provided. As no evidence or explanation of the requested growth rate was given the URA’s initial determination has not changed.

Insurance Costs

UNELCO in their submission claim that there is no insurance available for electricity supply networks against cyclones, earthquake and tsunami. Though this may be true for local insurance companies coverage is available from overseas syndicates. Though as this coverage maybe restrictively expensive the URA will consider a compromised mix of insurance and provisions to achieve an appropriate coverage. This will form part of the Stage 2 determination.

In its submission UNELCO estimated a provision of Vt15 million per annum is required but provided no material to demonstrate how this number was calculated.

7.4.6 Final Determination (Stage 1)

As set out in section 7.5.4 above.

The URA will continue to review these costs and provide its assessment and determination on insurance cost as part of its stage 2 tariff setting process.

7.5 Depreciation (Stage 2)

7.5.1 Definition

Depreciation is used to spread the cost of an asset over the span of its useful life. Depreciation is included in the tariff for all concession based assets required to supply the service and on approved extensions of the grid outside the concession area.

Provisions for the renewal of exiting assets are described below in section 7.7 Provisions.

7.5.2 Data Source

Depreciation will be based on the investment plan provided by winning bidder.
7.5.3 Detailed Methodology
Depreciation of assets purchased by the concessionaire that form part of the RAB will be on a straight line basis from the time of commissioning to the end of their useful life. The useful life of equipment shall be:

- Civil Works 35 years
- High and low voltage distribution network 35 years
- Transformer stations and individual connections 20 years
- Electrical installations in power stations 15 years
- Medium speed generators (less than 1500rpm) 15 years
- High speed generators (equal or greater than 1500rpm) 8 years

As part of the URA’s asset audit an assessment will be made of the depreciation method and appropriate assets life.

7.5.4 Draft Determination
Given the initial investment in the Regulated Asset Base will be zero. The first stage tariff does not include any depreciation. Provisions for repair and renewal of existing assets are covered in the provisions section below.

Following review of the investment plans by the URA, and if approved the tariff will be increased to cover depreciation and a reasonable return on capital required for the investment plan.

7.5.5 Stakeholder Submissions and Discussion
UNELCO in their submission claim that the rates of depreciation are very high and do not reflect the economic lives of the assets of this type of business. UNELCO offered no evidence in support and suggest no alternative rates.

As part of its asset audit and valuation the URA will review appropriate depreciation rates based on industry benchmarks.

7.5.6 Final Determination (Stage 2)
As set out in section 7.6.4 the initial investment in the Regulated Asset Base will be zero. The first stage tariff does not include any depreciation. Provisions for repair and renewal of existing assets are covered in the provisions section below.

Following review of the investment plans by the URA, and if approved the tariff will be increased to cover depreciation and a reasonable return on capital required for the investment plan.

Stakeholders are invited to comment on URA’s position on depreciation as it relates to the Stage 2 tariff.
7.6 Provisions (Stage 2)

7.6.1 Definition

Provisions are monetary estimates of the expected value of costs whose occurrence is expected in the future, but for which it is now known when the cost will occur or how large it will be.

7.6.2 Data Source

Requirements as set out in the draft Luganville concession agreement currently tabled.

7.6.3 Detailed Methodology

The new draft concession agreement under Section 16 requires the concessionaire pay Vt 12 million per year into a Repair and Replacement Fund. This is covered for in the tariff.

Other provisions included in the Electricity Tariff Review Final Decision May 2010 for Luganville concession have been removed such as the provision for termination benefits as all employment contracts will be terminated with ending of the existing concession.

The URA will consider increase provisions for insurance excess as part of its review of insurance cover in stage 2. The URA will also consider the adequacy of the Repair and Renewal fund based on the results of the asset audit in the Stage 2 determination.

7.6.4 Draft Determination

Table 7.7.4.1 – URA forecast of Provisions in Vatu

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>60,000,000</td>
</tr>
</tbody>
</table>

7.6.5 Stakeholder Submissions and Discussion

Repair and Renewal Fund

UNELCO’s submission states that the fund size of Vt12 million per annum is insufficient. Using the depreciation schedule described in section 9.4 and based on an asset valuation of Vt 2,200,000,000 UNELCO calculates an annual depreciation of Vt 23 million. The URA will wait for the results of the ongoing asset audit and valuation before determining an appropriate size of the renewal fund. This will form part of the stage 2 determination.

Other Provisions

UNELCO’s submission request additional provisions for “customer debt provision” and “stock depreciation” of Vt 2 million per annum. No evidence or explanation of this amount is given so the URA’s initial determination has not changed.

UNELCO also request provisions for retirement packages stating that the “Employment Act does exempt a new company from paying a retirement package to its employees unlike stated by the Regulator in its paper.” UNELCO estimate these costs at Vt13million to 2015. No evidence or explanation of this amount is given so the URA’s initial determination has not changed.
7.6.6 Final Determination
The URA will consider increase provisions for insurance excess as part of its review of insurance cover in stage 2. The URA will also consider the adequacy of the Repair and Renewal fund based on the results of the asset audit in the Stage 2 determination.

Stakeholders are invited to comment on URA’s provisions related to the Stage 2 tariff.

7.7 Costs Not Included in the Tariff
Finances charges such as interest are not included in costs recovered by the tariff as they are covered in the Reasonable Return paid on the Regulated Asset Base.

The concession fee as per Section 13 of the draft concession agreement is not included in the tariff.

7.7.1 Stakeholder Submissions and Discussion
UNELCO’s submission recommended a change to the structure of the concession fee. The draft concession contract of Luganville provides that a Concession Fee to be paid to the Concessionaire based on the Turnover of the Company this is highly related to the current fuel price. As the fuel prices rise the fee would rise but total profits of the utility would not. For example, UNELCO’s turnover has increased to 30% between 2007 and 2008 without a significant impact on its profits due to oil price changes.

UNELCO suggests that the fee be based on the gross margin of the utility calculated as the difference of the turnover of energy and the direct costs of fuel.

The URA agrees that there are some short comings of a fee based on a percentage of turn-over and considers that a simpler process would have been a flat fee per annum index to inflation. Though given the late stage of the bidding process and finalisation of the concession agreements the URA considers the impact is not significant enough to change the fee structure.

7.7.2 Final Determination
As set out in section 7.7.6 the URA will consider increase provisions for insurance excess as part of its review of insurance cover in stage 2.

The URA will also consider the adequacy of the Repair and Renewal fund based on the results of the asset audit in the Stage 2 determination.
7.7.3 Draft Determination on Total Costs
The total of all the above costs include in the draft tariff determination stage 1 are shown below:

Table 7.9.1 – URA forecast of Total Costs in Vatu

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>185,356,100</td>
<td>192,494,929</td>
<td>199,919,197</td>
<td>207,640,316</td>
<td>215,548,909</td>
<td>1,000,959,451</td>
</tr>
</tbody>
</table>

7.7.4 Stakeholder Submissions and Discussion
No further submissions were received on overall costs. Submissions received have been discussed in the individual cost items in the preceding sections.

7.7.5 Final Determination on Total Costs (Stage 1)
Total costs we adjusted up for changes in generator efficiency and system losses but overall costs are lower as demand forecasts have been reduced.

Table 7.9.2.1 – URA forecast of Total Costs in Vatu

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>185,393,961</td>
<td>190,916,887</td>
<td>196,606,467</td>
<td>202,467,740</td>
<td>208,384,646</td>
<td>983,769,701</td>
</tr>
</tbody>
</table>

Stakeholders are invited to comment on URA’s position in relation to the costs to be included in stage 2 of the tariff.
7.8 Regulated Asset Base

7.8.1 Definition
The Regulated Asset Base represents the level of investment held by the operator in assets required to provide electricity generation, transmission, distribution and supply within the concessionaire area and any extension of the existing grid beyond the concessionaire area. This is calculated as the Net Book Value of all concessionaire-funded assets in the regulated asset base. It does not include any intangible assets, assets funded by third parties, financial assets or works in progress.

The URA will index the RAB valuation for inflation via the Vanuatu CPI. This revaluation of assets means that a real, rather than a nominal, rate of return will be applied to calculate the Reasonable Return.

The initial RAB is set as zero for the first stage tariff setting as the concessionaire has made no initial investment in productive assets. Once the successful bidder has been determined their investment plan (including grid extensions beyond the concession area) will be reviewed by the URA and if approved the tariff will be increased to cover depreciation and reasonable return on capital required for the investment plan.

7.8.2 Draft Determination
The Stage 1 Regulated Asset Base is zero.

7.8.3 Submissions by Stakeholders and Discussion
In their submission UNELCO states that the draft determination does not provide a method of remuneration of the concessionaire outside the concession area. The URA refers to its approach to regulation outside concession areas described in section 5.3.

7.8.4 Final Determination (Stage 1)
As set out in section 7.10.2 the Stage 1 Regulated Asset Base is zero.

The regulated asset base will be adjusted to reflect the investment plans in the Stage 2 determination.

Stakeholders are still invited to comment on URA’s stage 2 Regulated Asset Base.
7.9 **Reasonable Return**

7.9.1 **Definition**

One of the primary aims of the methodology is to allow for a reasonable return on investment in the concession. This creates the incentive for further investment in expanding the electricity supply. This reasonable return is set to be equal to an estimate of a reasonable cost of capital for the concession. This also incentivises the operator to raise capital efficiently, as there is a financial benefit of minimising capital costs.

The method of estimating a reasonable return is the Weighted Average Cost of Capital (WACC) and is described in sections 3.6.1 and 3.6.2 of the URA’s ‘Electricity Tariff Review – Tariff Application Report’. The generally accepted method of estimating the WACC is the Capital Asset Pricing Model (CAPM).

The WACC described below will be applied against the investment plan determined in Stage 2 of the tariff setting process.

7.9.2 **Data Source**

Identifying the reasonable value for each of the inputs into the CAPM model poses a challenge in the Vanuatu context; as there is limited data on business risks and thinly or non-traded financial markets. Consequently, the URA has emphasized the need to have primary regard to objective market evidence when estimating the cost of capital, as well as the consistent application of models drawn from finance theory and established regulatory practice.

The sources for each input variable are described in the draft determination section below.

The URA has considered Cost of Capital decisions globally and in neighbouring Pacific countries, including further consideration of stakeholder submissions and has drawn on the URA’s previous Cost of Capital Decisions.

7.9.3 **Detailed Methodology**

The objective of this methodology is to arrive at a reasonable Weighted Average Cost of Capital for an efficient and competitive firm operating the Luganville concession as a standalone business. The aim is not to replicate the utilities actual cost of capital and as the business is different in terms of risk to the combined all concession business then the WACC may also differ.

7.9.4 **Weighted Average Cost of Capital (WACC)**

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, the higher returns that 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.

\[
WACC = (R_e \times \% \text{ of capital that is equity}) + (R_d \times \% \text{ of capital that is debt})
\]

where

- \( R_e \) = return on equity capital
- \( R_d \) = 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.

7.9.5 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 different for debt and equity:

**Cost of Equity**

\[ R_e = R_f + \beta (MRP + CRP) \]

Where

- \( R_e \) = required return on equity
- \( R_f \) = 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 difference between the expected return on a market portfolio and the risk-free rate
- \( CRP \) = Country risk premium refers to an increment in return that would have to be paid for loans and investment projects in a particular country compared to a risk free standard

**Cost of Debt**

\[ R_d = R_f + DRP + CRP \]

where

- \( R_d \) = required return on debt
- \( R_f \) = is the risk free
- \( DRP \) = the risk that a company defaults on their debt obligations ie credit risk

For a detailed description of the inputs into the CAPM model as used in the URA’s all concessions final decision see Section 4.15 of the Final Decision Paper.

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3 See ‘URA Electricity Tariff Review Final Decision May 2010’ section 4.15 for a detailed description of the inputs into the CAPM model
7.9.6 Draft Determination

The URA’s draft determination on the inputs into the CAPM model is shown below. More detailed definitions of all the variables can be found in Appendix E.

Nominal Risk Free Rate (RFR) is the average real yield over June 2010 of 5 year United States Treasuries⁴ of 0.41 percent. This is grossed up using the Vanuatu inflation estimate described below to give a Vanuatu Nominal Risk Free rate of 3.42 percent.

Market Risk Premium (MRP) is estimated at 5.00 percent which is consistent with the long term historical MRP.

Country Risk Premium (CRP) is considered to be 3.0 percent. The CRP was calculated in the URA’s previous position paper as the difference between the real yield of 5 year United States Treasuries (1.02 percent at April 2009) and Vanuatu Government bonds (2.07 percent) at the time of the last Vanuatu Government bond tender (April 2009). The CRP was thus calculated at 1.05 percent. This method used for calculating a country risk premium is common where an active bond market is available (none is available in Vanuatu). The results from this method are low compared to similar countries risk premium so as part of previous Cost of Capital decisions the URA conducted further analysis comparable countries CRP. This analysis is described below.

Comparable Countries

In the URA’s previous Cost of Capital decision comparisons were made with Fiji and PNG. Though they are geographically close to Vanuatu they have very different economies and associated risks. Different enough that with no common traded financial markets it is difficult to quantify the relative CRP’s except to state, that the risk premium is less in Vanuatu than in PNG and Fiji.

In Fiji the military has been either ruling directly, or heavily influencing governments since 1987 with four coups to date. In September 2009, Fiji became only the second country to be suspended from the Commonwealth of Nations. Self-appointed prime minister Commodore Frank Bainimarama has overturned the constitution, fired all judges, imposed widespread media censorship, expelled foreign journalists and arrested people that oppose him. Australia, the EU and others have place sanctions on Fiji.

PNG has very rich mineral and oil deposits and a volatile economy and crime⁵ that comes with their development. The neighbouring Indonesian province of Papua has undergone a separatist conflict since the mid-1980s with the flight of thousands of Papuans into Papua New Guinea. The 1990’s saw the Bougainville conflict with the shutting of the copper mine and up to 20,000 people killed. HIV/AIDS is on the rise. Some experts fear that Papua New Guinea is heading for a crisis similar to that in sub-Saharan Africa. Chronic law and order issues remain a major problem in PNG. The Economist magazine, in ranking of Worlds Most Liveable Cities ranked Port Moresby the lowest in the world. Transparency International Corruption Perception Index⁶ ranked PNG 154th out of 180 countries, worse than Nigeria and Zimbabwe.

Vanuatu by contrast was ranked⁷ the Happiest Country on Earth. This is despite the high cost of electricity. Vanuatu also ranked 95th on Transparency’s Corruption Index.

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⁵ http://www.alertnet.org/thenews/newsdesk/SGE60O0AJ.htm
⁶ www.transparency.org (higher ranking is more corrupt)
⁷ http://news.bbc.co.uk/2/hi/uk_news/magazine/5172254.stm
Despite the relatively high risks described in PNG, the Independent Consumer and Competition Commission of PNG has been handing down detailed Cost of Capital decisions since 2004 with PNG’s Country Risk Premium determined to be 3.0%. This included the 2009 Final Report ‘Review into Water and Sewerage Pricing Arrangement’ and the recent January 2010 Final Report ‘Review of PNG Harbours Regulatory Contract’.8

The URA examined Ducroire-Delcredere Country Risk Data. The ONDD9 country risk data can be used to gain a clearer picture of an appropriate country risk premium for Vanuatu. Rather than comparing similar geographical countries, the URA compares countries with similar risk rankings to Vanuatu according to the ONDD data.

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP/Capita2</th>
<th>Political risk</th>
<th>Commercial Risk</th>
<th>Direct Investments</th>
<th>Country Risk Premium1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short Term</td>
<td>Long Term</td>
<td>Special Transaction</td>
<td>War risk</td>
<td>Expropriation</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>4,334</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>B</td>
</tr>
<tr>
<td>Guatemala</td>
<td>4,882</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>Jordan</td>
<td>5,662</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>B</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>11,369</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>C</td>
</tr>
<tr>
<td>Croatia</td>
<td>17,876</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>C</td>
</tr>
<tr>
<td>PNG</td>
<td>2,175</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>B</td>
</tr>
<tr>
<td>Fiji</td>
<td>4,121</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Source: www.ondd.be

1: Country Risk Premium estimated by Damodaran  2: GDP Data from IMF 2009

| Risk assessments that are equal to or worse than Vanuatu's; a higher number indicates higher risk.

Outside of War Risk all the countries at the top of the table have equivalent or worse risk measures to Vanuatu in all areas. All of these comparison countries have Country Risk Premiums that average around 3 percent. The URA considers this a stronger comparison methodology than a comparison against a neighbouring but higher risk country such as PNG.

On the balance of evidence presented above the URA’s draft determination on a reasonable CRP for Vanuatu is 3.0 percent the same as in its previous Cost of Capital decisions.

Gearing ratio is estimated to be 50 percent. The URA took into consideration a gearing ratio of 60 percent from the recent decision of the Australian Energy Regulator on WACC parameters as being the efficient capital structure for a regulated Australian electricity or gas distribution or transmission businesses.

8 www.iccc.gov.pg
9 www.ondd.be
Table 4.15.2 below shows reported gearing levels for Australian utilities:

<table>
<thead>
<tr>
<th>Year</th>
<th>Bloomberg (market)</th>
<th>Bloomberg (adjusted)</th>
<th>Standard &amp; Poor's</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>66.3</td>
<td>67.4</td>
<td>61.6</td>
<td>65.1</td>
</tr>
<tr>
<td>2003</td>
<td>63.9</td>
<td>63.7</td>
<td>66.7</td>
<td>64.8</td>
</tr>
<tr>
<td>2004</td>
<td>62.2</td>
<td>58.2</td>
<td>64.7</td>
<td>61.7</td>
</tr>
<tr>
<td>2005</td>
<td>62.8</td>
<td>63.3</td>
<td>67.8</td>
<td>64.6</td>
</tr>
<tr>
<td>2006</td>
<td>60.3</td>
<td>62.1</td>
<td>66.4</td>
<td>63.0</td>
</tr>
<tr>
<td>2007</td>
<td>58.7</td>
<td>57.8</td>
<td>65.1</td>
<td>60.5</td>
</tr>
<tr>
<td>Average</td>
<td>62.4</td>
<td>62.1</td>
<td>65.4</td>
<td>63.3</td>
</tr>
</tbody>
</table>

Source: Australian Energy Regulator (2009), Electricity Transmission and Distribution Network Service Providers – Statement of the Revised WACC Parameters (Transmission), Statement of Regulatory Intent on the Revised WACC Parameters (Distribution), May, p.113.

The URA notes that access to funds through the usual financing sources maybe more difficult in a less developed country and may expose the utility to increased exchange rate risk, thus applying the gearing level applied by Australian regulators may not be appropriate. Balancing this, however, the URA notes that:

1. The utility may have access to its parent group to act as guarantor for loans and to source it capital.
2. Operating in a less developed country has given Vanuatu based utilities generous access to donor subsidized debt.

On the balance of evidence the URA’s draft determination is a gearing ratio of 50 percent is appropriate for a competitive and efficient firm operating the concession.

**Inflation Rate** is forecast at 3.0 percent per annum based on forecasts in the 2010 Budget of Vanuatu. This leads to a Nominal Risk Free Rate for the WACC of 3.42 percent.

**Corporate Tax Rate** is zero in Vanuatu as there is no corporate tax, and other taxes such as business license fees are accounted for in operating expenses.

**Asset beta** reflects the systematic business risk in the markets where the company operates before gearing. In the URA’s determination for the all concessions Final Decision it calculated an Asset Beat of 0.4. The URA considers the Luganville concession as a stand-alone business to be more risky than the business of all concessions combined and thus a higher asset beta of 0.45 is appropriate.

This level of Asset Beta is also consistent with Martin’s analysis\(^{10}\) and the higher end of Damadoran’s\(^{11}\) data shown in Table 4.15.3.

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\(^{11}\) [http://pages.stern.nyu.edu/~adamodar/](http://pages.stern.nyu.edu/~adamodar/)
<table>
<thead>
<tr>
<th>Country</th>
<th>Industry Group</th>
<th>No. of Firms</th>
<th>Unlevered Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>Electric Util. (Central)</td>
<td>n.a</td>
<td>0.4676</td>
</tr>
<tr>
<td>United States</td>
<td>Electric Utility (East)</td>
<td>n.a</td>
<td>0.4870</td>
</tr>
<tr>
<td>United States</td>
<td>Electric Utility (West)</td>
<td>n.a</td>
<td>0.4687</td>
</tr>
<tr>
<td>Europe</td>
<td>Utility (General)</td>
<td>18</td>
<td>0.3800</td>
</tr>
<tr>
<td>Global Average*</td>
<td>Utility (General)</td>
<td>66</td>
<td>0.3000</td>
</tr>
</tbody>
</table>

*5 year average of monthly values

**Equity Beta** is assessed to be 0.90. The Equity beta of a company reflects only its systematic risk and not its total risk. Regulated electricity companies are considered to be less risky than the market as a whole. Given all other factors that affect a firm’s risk, higher financial leverage increases the firm’s risk profile. Thus, higher financial leverage (gearing) increases the beta of the equity of the firm. Equity beta reflects the combined effects of business and financial risk (gearing) that the shareholders of a company are faced with.

Thus an asset beta of 0.45 translates to an Equity Beta of 0.90 given the determined gearing of 50 percent.

**Debt Risk Premium** (DRP) is assessed to be 3.0 percent. With the addition of the CRP the total DRP is calculated at 6.0 percent. Again in light of the potential that Luganville may be operated as a standalone business the URA considers it would require a higher debt risk premium than the all concessions business thus the premium is higher than applied in the previous URA decision.

The DRP is the margin the regulated business must pay to borrow over the nominal risk free rate. The total debt risk premium consists of the appropriate premium for the benchmark rating of the firm plus the country risk premium.

The utility has the privileged position of being a government-protected monopoly with the ability to pass through a large proportion of input costs thus is expected to have a strong credit rating. The rating also falls well with the distribution of credit ratings for utilities across Asia Pacific as shown in Table 4.15.4.
Table 7.11.6.4 – Distribution of credit ratings for Utilities – Asia Pacific region

<table>
<thead>
<tr>
<th>Rating</th>
<th>Number of Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA+</td>
<td>1</td>
</tr>
<tr>
<td>AA</td>
<td>2</td>
</tr>
<tr>
<td>AA</td>
<td>1</td>
</tr>
<tr>
<td>A+</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>BBB+</td>
<td>1</td>
</tr>
<tr>
<td>BBB</td>
<td>2</td>
</tr>
<tr>
<td>BBB</td>
<td>1</td>
</tr>
<tr>
<td>BB</td>
<td>2</td>
</tr>
<tr>
<td>BB</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Standard & Poor’s

After including the country risk premium of 3.0 percent the URA thus estimates the total debt risk premium at 6.0 percent.
7.9.7 Draft Determination for the Weighted Cost of Capital

Table 7.11.7.2 below summarises the URA’s WACC calculation.

<table>
<thead>
<tr>
<th>Cost of Capital Calculation</th>
<th>Vanuatu</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Treasury Real risk free rate</td>
<td>0.41%</td>
</tr>
<tr>
<td>Vanuatu Inflation rate</td>
<td>3.00%</td>
</tr>
<tr>
<td>Vanuatu Nominal risk free rate</td>
<td>3.42%</td>
</tr>
<tr>
<td>Corporate tax rate</td>
<td>0.00%</td>
</tr>
<tr>
<td>Gearing</td>
<td>50.00%</td>
</tr>
<tr>
<td>Equity proportion</td>
<td>50.00%</td>
</tr>
<tr>
<td>Rate of imputation credit utilisation</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**Nominal Return on equity calculation**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal risk free rate</td>
<td>3.42%</td>
</tr>
<tr>
<td>Market risk premium</td>
<td>5.00%</td>
</tr>
<tr>
<td>Country risk premium</td>
<td>3.00%</td>
</tr>
<tr>
<td>Market rate of return</td>
<td>11.42%</td>
</tr>
<tr>
<td>Asset beta</td>
<td>0.45</td>
</tr>
<tr>
<td>Equity beta</td>
<td>0.9</td>
</tr>
<tr>
<td>Return on equity (before imputation)</td>
<td><strong>10.62%</strong></td>
</tr>
</tbody>
</table>

**Nominal Return on debt calculation**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Free Rate</td>
<td>3.42%</td>
</tr>
<tr>
<td>Credit premium</td>
<td>3.00%</td>
</tr>
<tr>
<td>Country Risk Premium</td>
<td>3.00%</td>
</tr>
<tr>
<td>Return on debt (pre-tax)</td>
<td>9.42%</td>
</tr>
</tbody>
</table>

**Post-tax nominal WACC**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.02%</td>
</tr>
</tbody>
</table>

**Post tax real WACC**

|                                      | 6.82%  |
7.9.8 Submission by Stakeholders and Discussion
In their submission UNELCO requested that the remuneration (reasonable return) for the concessionaire for the Luganville concession be that decided by the currently ongoing arbitration process related to the previous all concessions tariff review.

7.9.9 Final Determination for the Weighted Cost of Capital
As set out in section 7.11.6 above.

The URA considers the Luganville electricity tariff setting process a separate tariff review. The arbitration process as outlined in the existing Port Vila, Malekula and Tanna Island concession agreements do not apply to the new Luganville concession.

The URA also considers the risks faced by the Luganville concession to be different and thus result in a different Weighted Average Cost of Capital (WACC).

The tariff and related parameters described in this stage 1 tariff determination is required to be issued by the URA prior to bidders submitting their final bids. Thus tenders may adjust their bids accordingly.
8 Base Price

8.1 First Stage Base Tariff

8.1.1 Definition

The first stage Base Tariff is set at a level where the utility earns revenue from electricity sales equal to the Cost Forecast. It is calculated as an average over five years, assuming constant input prices (fuel, wages, and materials). It is applied via the tariff structure and indexation formula to determine the total revenue of the utility. It is on the basis of this tariff that the final tender bids are received.

Each month, $P_0$ is used to calculate the monthly price of electricity ($P$) through the indexation formula

8.1.2 Detailed Methodology

The Base Tariff is calculated by:

- the Total Demand forecast (kWh and kVA) is in terms of $P$
- Divide Forecast Costs (less transformer rental) by the forecast Total Demand to give the Base Tariff value of $P_0$.

$$P_{0_{\text{first stage}}} = \frac{\text{Forecasted Costs}}{\text{Total Demand}}$$

Insurance costs and any depreciation are not included in the stage 1 tariff as they are dependent on an asset audit currently underway.

8.1.3 Draft Determination

The URA has determined that the base price $P_0$ is to be set at 25.84 vatu. This results in the annual total revenue shown in Table 12.1.1 from the demand levels shown in Table 12.1.2.

| Table 8.1.1 – URA forecast of Required Revenue in Vatu (Stage 1) |
|------|------|------|------|------|-----------|
| 184,815,298 | 191,942,921 | 199,355,750 | 207,065,195 | 214,973,788 | 998,152,951 |

| Table 8.1.2 – URA forecast of Total Demand in P |
|------|------|------|------|------|-----------|
| 7,131,123 | 7,416,055 | 7,712,385 | 8,020,568 | 8,341,079 | 38,621,211 |
8.1.4 Submissions by Stakeholders and Discussion

In their submission UNELCO stated that “The profit (before interest) of the first 5 years for the Concessionaire will be less than 10,000,000 VUV.” The URA is of the view that this is not relevant.

The building block methodology does set a ‘profit’ level. It sets a tariff that covers reasonable costs, depreciation and gives a reasonable return for capital invested – a return is only earned when the concessionaire invests capital.


8.1.5 Final Determination Base Tariff Stage 1

Changes in demand forecasts and costs have led to the following final determination of the stage 1 tariff of base price $Po$ is to be set at Vatu 26.73.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>184,853,159</td>
<td>190,364,879</td>
<td>196,043,021</td>
<td>201,892,618</td>
<td>207,809,525</td>
<td>980,963,202</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>6,933,890</td>
<td>7,131,102</td>
<td>7,334,020</td>
<td>7,542,810</td>
<td>7,757,644</td>
<td>36,699,466</td>
</tr>
</tbody>
</table>

8.2 Second Stage Base Tariff

8.2.1 Definition

Given that the initial level of planned investment is unknown the stage one tariff above has been set assuming a regulated asset base of zero as all government assets will be taken over free of charge by the winning bidder. This will be the tariff that is used for the Luganville tender process.

Following a review of the investment plans by the URA the tariff will be adjusted to cover depreciation and reasonable return on capital required for the approved investment plan inside the concession area and for grid extensions outside the concession area. If the plan is not carried out as scheduled then the excessive tariff paid will be clawed back with interest at the next tariff review.
An asset audit is currently under way and when completed will be used by the URA to assess insurance costs and provisions and the stage 2 tariff will be adjusted accordingly.

8.2.2 Detailed Methodology

The Base Tariff is set at a level where the utility earns revenue from electricity sales equal to the Cost Forecast plus a Reasonable Return. It is calculated as an average over five years, assuming constant input prices (fuel, wages, and materials).

The Base Tariff is calculated by:

- Forecasting the Total Demand (kWh and kVA)
- Applying the WACC to the Regulated Asset Base to give the Reasonable Return
- Adding the Reasonable Return and Costs (including insurance and provisions) to give a Total Required Revenue
- Divide Total Required Revenue by the forecast Total Demand to give the Base Tariff value of $P_0$

$$P_{0\text{FINAL}} = \frac{\text{Forecasted Costs} + \text{Reasonable Return on Regulated Asset Base}}{\text{Total Demand}}$$

Forecasted Cost at stage 2 includes insurance costs, depreciation and all provisions.

The Base Tariff is referred to as $P_0$. This is used in the tariff indexation formula to calculate the price of electricity each month earned by the concessionaire. The monthly calculated price is referred to as $P$ (not to be confused with $P_0$), and is used with the Tariff Structure to determine the total monthly revenue earned by the utility. The indexation formula is described in the Section 0.

The requirement for uniform tariffs results in the $P$ earned by the utility is not be the $P$ charged to consumers.

8.2.3 Draft Determination

No determination is made at this stage on the second stage base tariff. The stage 2 tariff adjustment will be set out in the URA’s Draft Tariff Determination Stage 2 and will include insurance costs, final determination on provisions, depreciation and a reasonable return on the Regulated Asset Base as per the approved investment plan.

8.2.4 Submissions by Stakeholders and Discussion

No submissions received.

8.2.5 Final Determination Base Tariff Stage 2

Determination will be made stage 2.

| Stakeholders are invited to comment on URA’s stage 2 base tariff as described in this section. |
9 Tariff Equalisation Mechanism

9.1 Definition
The Luganville tender process raises the possibility of multiple electricity operators in Vanuatu. Each concession has a different cost base thus a different tariff may be earned by the utility.

It is Vanuatu government policy that uniform tariffs be maintained across all four current concession areas. In order to maintain the uniform electricity tariffs across all of Vanuatu with the possibility of more than one operator, an explicit mechanism is required to balance the revenue across the operators.

9.1.1 Definition of Uniform Tariffs
Uniform tariff does not mean that all customers in the same category must pay the exact same price per kilowatt-hour. Rather the definition applied by the URA is a form that allows individual utilities to discount to specific customers or groups of customers. Uniform tariffs are thus defined as the average price paid by customers across the concessions \( P \) is the same. If one utility applies discounts below the recommended tariff the discounts comes out of their revenue.

9.1.2 Principles
The following principles have guided the design of this mechanism:

- It must allow for the possibility of multiple operators.
- It must allow for uniform tariffs across all of Vanuatu.
- It must allow all electricity operators to cover their reasonable costs and earn a reasonable return on their investment in the electricity concession.
- It must maintain incentives to increase electricity connections, operate efficiently, and use renewable energy.
- One operator must not be able to influence the results of another operator.

9.2 Draft Determination
The Tariff Equalisation Mechanism consists of the below components:

9.2.1 Automatic equalisation mechanism
In order to automatically balance the tariffs across all of Vanuatu, the adjust price charge to customers due to the equalisation mechanism is as follows

\[
P_C = \frac{D_{PV} \cdot P_{PV} + D_L \cdot P_L}{D_{PV} + D_L}
\]

Where;

\( P_C \) = is the price charge to all customers
\( P_{PV} \) = result of pricing formula for Port Vila, Malekula and Tanna
\( D_{PV} \) = total demand in Port Vila, Malekula and Tanna (in P)
\( P_L \) = result of pricing formula for Luganville
\( D_L \) = total demand in Luganville (in P)
In the case where Luganville has a lower utility earned tariff, the mechanism will result in

\[
\text{Payment to mechanism} = (P_c - P_L) \times D_L
\]

\[
\text{Payment from mechanism} = (P_{PV} - P_c) \times D_{PV}
\]

$P_c$ is set so that the payments to and from the mechanism are equal.

Given that $D_{PV}$ and $D_L$ are known at month end the equalised price charged to customer can be calculated by the URA prior to the issuing of monthly bills.

### 9.2.2 Timing of the equalisation mechanism payments

So as to not adversely impact the cash flow or working capital position of the operator that must pay into the equalisation mechanism, the payment are required after such a reasonable time as the operator can be expected to have collected the revenue from customers for that month. As such, payment into the equalisation mechanism is required within 35 days of the start of the month for which $P$ is set.

For example:

- Day 1: Start of the month. $P_c$ calculated based on previous month’s data.
- Day 10-15: Customer bills sent out using $P_c$
- Day 30: Customer payments due
- Day 35: Payment into equalisation mechanism due.
- Day 40: Payment out of equalisation mechanism due.

### 9.3 Submissions by Stakeholders and Discussion

No submissions were received by the URA on the tariff equalisation mechanism.

### 9.4 Final Determination

As set out in section 9.2 above.
10.1 Definition
This tariff structure applies to all inside concession area customers.

As part of the Governments uniform tariff policy and in line with their desire to reduce the electricity costs of low end customers, the URA will apply the same tariff structure for Luganville as applied in the all concessions final decision as shown below.

As described in section 9 the Tariff Equalisation Mechanism is used to determine Pc.

10.2 Draft Determination

<table>
<thead>
<tr>
<th>Customer group</th>
<th>Price per kWh</th>
<th>Monthly fixed charge</th>
<th>Security deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Domestic Customers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 60 kWh = 0.34 x Pc</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>61 to 120 kWh = 1.21 x Pc</td>
<td></td>
<td>70 x Pc</td>
</tr>
<tr>
<td></td>
<td>Over 120 kWh = 3.00 x Pc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Low Voltage Customers (Domestic)</td>
<td>1.21 x Pc</td>
<td>5 x Pc per subscribed kVA</td>
<td>150 x Pc per subscribed kVA</td>
</tr>
<tr>
<td>Business Licence Holders – Low Voltage</td>
<td>0.87 x Pc</td>
<td>20 x P per subscribed kVA</td>
<td>150 x P per subscribed kVA</td>
</tr>
<tr>
<td>Sports Fields</td>
<td>1.00 x Pc</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Public Lighting</td>
<td>0.54 x Pc</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>High Voltage Users</td>
<td>0.70 x Pc</td>
<td>25 x P per subscribed kVA</td>
<td>150 x P per subscribed kVA</td>
</tr>
</tbody>
</table>

Note though the utility charges Pc to customers based on the above tariff structure it earns the base tariff in revenue P. If Pc is greater than P it must pay into the Tariff Equalisation Mechanism. See section 0 for an explanation of the Tariff Equalisation Mechanism.

10.2.1 Submissions by Stakeholders and Discussion
In their submission UNELCO states that the draft determination does not provide a method of remuneration of the concessionaire outside the concession area.

The URA refers to its approach to regulation outside concession areas described in section 5.3

10.2.2 Final Determination
As set out in section 10.2 above.
11 Indexation Formula

11.1 Definition
The purpose of the indexation formula is to allow for fluctuations in certain input prices beyond the utilities control (fuel, wages and materials) to be passed through to electricity customers. The aim, therefore, is to link each component to an index that will reasonably accurately reflect the impact of input price changes on costs.

This allows the utility to collect sufficient revenue to supply electricity services should input prices increase, and allow customers to benefit when input prices fall.

The building blocks described in Section 0 above set the level of the base index price \( P_0 \). The base index price \( P_0 \) is then used with an indexation formula to calculate the monthly electricity price \( P \) that when applied to the tariff structure gives the revenue earned by the concessionaire in Luganville.

The formula indexes two components:
- All variable costs are index to the Vanuatu CPI\(^{12}\) published by the National Statistics Office. The variable costs refer to the Staff and Goods and Other Costs described in Section 7.3.
- Fuel costs are linked directly to the fuel price paid.

11.1.1 Objectives
The objectives of an indexation formula are:
1. To closely track the actually changes in costs faced by the concessionaire.
2. All indexes used need to exist and be updated regularly.
3. The indexes need to be independent.
4. The indexes are directly related to costs in Vanuatu.
5. It is simple and understandable.

The formula in the all concessions Final Decision has been changed given its failure to meet several of these objectives.

The CPI is used rather than a PPI index as no PPI index currently exists in Vanuatu.

11.2 Draft Determination
11.2.1 The Indexation formula

\[
P = P_0 \times \left( X_{FUEL} \times \frac{G}{G_0} \times \frac{N}{N_0} \right) + \left( X_{VARIABLE\ COSTS} \times \frac{CPI}{CPI_0} \right) + X_{OTHER}
\]

\( X_{FUEL} \) = the co efficient for fuel costs described below

\( G \) = average fuel price as described below

\(^{12}\) http://www.spc.int/prism/country/vu/stats/P_releases/CPI%20Release%202020Q1.pdf
\( G_0 = \) the base value for the price of fuel

\( N = \) the adjustment to fuel indexation to take account of non-fuel energy production as described below

\( N_0 = \) the base value for \( N \), set according to the five-year average forecast level of \( N \)

\( X_{VARIABLE\ COSTS} = \) the coefficient for Staff Costs and Goods and Other Costs as described in Section 7.3

\( CPI = \) the Vanuatu CPI index. The CPI index will be applied the month following the publishing of any update. This is done on a quarterly basis but there are occasionally delays in publication.

\( CPI_0 = \) the base value of the CPI index set to the value of the index for the quarter prior to the start of the tariff period.

\( X_{OTHER} = \) the coefficient for the remaining costs (fixed)

11.2.2 The fuel price formula

\[
G = \frac{G_L L_L + G_{LC} L_{LC}}{L_L + (L_{LC} K_{pci})}
\]

Where:

\( G_L = \) the diesel price in Luganville

\( L_L = \) the litres used

\( G_{LC} = \) the Copra price in Luganville

\( L_{LC} = \) the litres of copra used

11.2.3 Renewable Component

As per the all concessions Final Decision paper the renewable component is retained. The fuel component of the formula should be adjusted by the proportion of power generated by fuel (\( N \)), where

\[
N = \text{Average for previous twelve months of } \left( \frac{\text{Energy produced by diesel and copra}}{\text{Total energy produced}} \right)
\]

\( N_0 \) is set according to the five-year average forecast level of \( N \). Thus formula for calculating the fuel component of the price is:

\[
X_{FUEL} \times \frac{G}{G_0} \times \frac{N}{N_0}
\]

11.2.4 Formula Coefficients

The proportion of the tariff that each component represents is referred to as the coefficient of that component. For example, fuel costs make up 33.18% of the tariff revenue, then the coefficient of fuel costs \( X_{FUEL} \) = 0.3318. The coefficients are set based on the forecasts of the different areas of costs, with assumed constant input prices. The assumed constant input price forms the starting value for each index.
The URA draft determination of the formula coefficients are shown below:

Table 11.2.4.1 – URA forecast of Indexation Co-efficients

<table>
<thead>
<tr>
<th>$X_{\text{Fuel}}$</th>
<th>$X_{\text{Variable Costs}}$</th>
<th>$X_{\text{Fixed}}$</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3318</td>
<td>0.6099%</td>
<td>0.583%</td>
<td>1</td>
</tr>
</tbody>
</table>

These coefficients may change with the adjustment of the tariff in stage 2 for the investment plan and insurance costs.

The base values used in the financial model and used in the initial formula are:

Table 11.2.4.2 – URA base values for Indexation Formula

<table>
<thead>
<tr>
<th>$V_{\text{R}}$</th>
<th>$V_{\text{R}}$</th>
<th>$V_{\text{R}}$</th>
<th>$V_{\text{R}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>yet to be determined (the base tariff will be set at stage 2)</td>
<td>Vt 85.00</td>
<td>33%</td>
<td>As per Dec 2010 Qtr</td>
</tr>
</tbody>
</table>

11.3 Submissions by Stakeholders and Discussion

No submissions were received by the URA on the indexation formula.

11.4 Final Determination

As set out in section 11.2 above.

Coefficients and base values will be adjusted as part of the stage 2 tariff setting process and determination.

Stakeholders are invited to comment on the URA’s coefficients that will be set in the stage 2 tariff determination.
12 Fuel Procurement

12.1 Prices paid for fuel
Fuel costs forms a major cost component in the generation of electricity. As the weighted average price for diesel, copra, or other type fuel is passed through to electricity customers through the indexation formula, the supply of fuel by a related entity has the potential to create a situation where unfair gains are being retained within the total corporate group. Thus the URA is particularly mindful of the methods used for fuel procurement and the price paid for all types of fuel.

URA intends to monitor the Luganville diesel fuel price and its relationship to the Port Vila price and the Singapore fuel price and will require the utility to report on and give reasons for any anomalies in the price paid. The URA will also require the utility to publish the price it is paying.

The URA may also request to view supply contracts and invoices with all fuel supplier to ensure fuel purchasing is efficient and that any discounts or rebates are passed back through to the tariff.

12.1.1 Least Cost Generation
In relation to the use of alternative fuel used the URA is faced with several competing objectives:

1. To achieve long run least cost generation
2. To reduce the reliance on imported diesel fuel
3. To apply the government’s policy of supporting the local copra industry

The URA ranks the achievement of long run least cost generation above its other objectives.

12.1.2 Draft Determination

Copra purchasing
The URA intends to review and assess its competing objectives on the government policy to promote the coconut industry with its objective of least cost generation. If the cost of using alternative fuels were to rise dramatically above the cost of diesel the URA would reassess the utility’s continuing use of the alternative fuel.

Given the cost concerns and potential related party transactions the URA will include a copra purchasing clause as per the all concession Final Decision as shown below:

The price of coconut oil shall be deemed to be the lesser of:

a) The Actual Price paid by the Concessionaire therefor; or
b) $L$ as defined below converted to the equivalent volume of coconut oil in accordance with $Kpci$

The Actual Price shall be

a) the net price after all deductions, rebates and discounts whatsoever; or
b) when the coconut oil is purchased from a person who;

i. has not produced the coconut oil; and
ii. is a person in whom the Concessionaire has a direct or indirect financial interest
the net price after deductions, rebates and discounts whatsoever as paid by that person
c) when the coconut oil is purchased from a person who
   i. has produced the coconut oil and;
   ii. is a person in whom the Concessionaire has a direct or indirect financial interest

such CIF price as may be reasonably obtained from an alternative supplier.

Where:

\[ G_L \]

is the average price of a litre of diesel fuel delivered to the Luganville diesel power stations net of any deductions, rebates or discounts whatsoever, calculated by dividing the total amount of invoices received by the Concessionaire by the corresponding amount of diesel fuel delivered during the month preceding the date of adjustment of tariffs.

12.1.3 Submissions by Stakeholders and Discussion

No submissions were received by the URA on the fuel procurement.

12.1.4 Final Determination

As set out in section 12.1.2 above.
13 **Incentives to Promote Renewable Energy**

13.1 **Draft Determination**

In relation to renewable electricity generation the URA is faced with several competing objectives:

4. To achieve long run least cost generation
5. To reduce the reliance on imported diesel fuel
6. To apply the government’s policy of supporting the local copra industry

Renewable electricity supplies, when capital costs and costs of finance are included, may often be a more expensive supply sources than diesel. Thus the URA faces objectives that may by conflicting.

Reconciling these competing objectives may be achievable where donor and development bank funding of renewable electricity sources is available. The use of grants, subsidized loans and other mechanism can achieved competitive long run generation costs otherwise not possible.

The URA encourages the utility to seek these funding sources and will review each proposal on a project by project basis.

13.2 **Submissions by Stakeholders and Discussion**

In their submission UNELCO suggested two methods to promote renewable energy:

1. Incentive to invest where investment in renewable assets receive the WACC plus 4%.
2. Incentive to operate efficiently. This is a performance-based incentive scheme in the form of a bonus paid if generation exceeds an agreed benchmark.

The URA’s position on renewables incentives has not changed as the URA believes the burden on electricity consumers of the higher tariffs required to allow renewables at this stage is not justified. The URA will work actively with the utility to seek donor funding and where renewable sources can be used to reduce overall electricity costs the URA will support them.

13.3 **Final Determination**

As set out in section 13.1 above.

The URA will actively support the utility in seeking discount funding sources to apply to renewable energy sources.
14 Stage 2 Tariff Components

14.1 Asset Audit
The URA is currently conducting an asset audit and valuation. Based on its outcome the following components will be determined as part of the stage 2 tariff determination:

1. Appropriate depreciation rates
2. The size of the Repair and renewal fund provisions
3. Insurance costs and related provisioning (if required)

14.2 Investment Plans
As part of the tender process bidders will supply investment plans that the URA will analyze. Based on this analysis the following components will be determined as part of the stage 2 tariff determination:

1. The regulated asset base
2. Depreciation on concessionaire investments
3. Reasonable return on concessionaire investments

These draft determinations will be published in Luganville Electricity Tariff Setting Draft Determination (Stage 2)

Stakeholders are invited to comment on the URA’s stage 2 tariff components.
Appendix A: Proposed next steps and indicative timeline

As described in Section 4.3 the following table sets out the URA timeline* for the Luganville electricity tariff setting process.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish Luganville Tariff Setting Framework Paper</td>
<td>19 July 2010</td>
</tr>
<tr>
<td>Submission on Framework Paper due</td>
<td>28 July 2010</td>
</tr>
<tr>
<td>Draft Tariff Determination Stage 1 published</td>
<td>2 August 2010</td>
</tr>
<tr>
<td>Submissions on Draft Tariff Determination Stage 1 due</td>
<td>9 August 2010 (extended to 16 August)</td>
</tr>
<tr>
<td>Tariff Determination Stage 1 published</td>
<td>16 August 2010 (extended to 23 August)</td>
</tr>
<tr>
<td>Draft Tariff Determination Stage 2 published</td>
<td>12 September 2010</td>
</tr>
<tr>
<td>Submission on Draft Tariff Determination Stage 2 due</td>
<td>24 September 2010</td>
</tr>
<tr>
<td>Final Tariff Determination published</td>
<td>4 October 2010</td>
</tr>
<tr>
<td>New Luganville Tariff Gazetted</td>
<td>28 November 2010</td>
</tr>
</tbody>
</table>

*Proposed indicative timeline
Appendix B: Forecast of hydroelectric generation

This document was prepared as part of the all concessions tariff review.

Estimated Production for the Santo Hydro

The Santo hydro consists of:
2 x 300 kilowatts asynchronous machine
1 x 600 kilowatts synchronous machine

This is supplemented by diesel generators:
2 x 1000 kW
1 x 750 kW
1 x 400 kW
1 x 250 kW
All Cummins engine output synchronous generators

Peak demand is estimated at:
Maximum during the days = 1200 kilowatts
Minimum during the night = 650 kilowatts

During the day, when the peak exceeds 800 kilowatts of load, the demand is supplemented by the diesel generators. At night, the pattern of consumption does not require the diesel generators.

Method and Assumptions
We use the monotonic load shown below for 2008 to give a possible annual hydro production of 7,000,000 kWh.
This number is calculated by subtracting the diesel production of 200 kW and using the 800 kilowatts of load, which imposes a de facto nominal power of 1000.

We deduce the load curve of total production by the triangle of 4500 hours on 200 kilowatts (see chart): 

\[(4500 \text{h} \times 200 \text{kw}) / 2 = 450000 \text{kWh}\]

Assumptions

- 1 month full stoppage of the hydro to repair major damage to the step-down transformers, the cell departure and arrival, or the transmission line.

  This will reduce the hydro power supply to zero despite the potential dam capacity being available. Production will be based solely on the diesel generator on the basis of the average power of 900 kilowatts demand for 24hrs x 30days = 648000 kWh.

- 2 months a year period of low water flow causing a provision of 400 kilowatts a month, 600 kilowatts on the second month. This power demand must be supplied by the diesel generators which as above add 900 kilowatts per half day.

When the maximum hydro production is 400 kW the following diesel production is required: 500 kilowatts x 720 h / 2 = 180000 kWh by diesel generation

When the maximum hydro production is 600 kW:

300 kilowatts x 720 h / 2 = 108000 kWh by diesel generation
With the above assumptions the annual producible hydroelectricity is calculated as:

$7\,000\,000\,kWh$ (theoretical maximum)

- $450\,000\,kWh$ share of annual diesel
- $648\,000\,kWh$ due to major damage
- $288\,000\,kWh$ due to rainfall deficit.

$= 614\,000\,kWh$ production annually by hydroelectric power station.
**Appendix C: Terms used in the Reasonable Return Calculation**

<table>
<thead>
<tr>
<th>Capital Asset Pricing Model (CAPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The capital asset pricing model (CAPM) is used to determine a theoretically appropriate required rate of return of an asset, given that asset's non-diversifiable risk. The model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by beta ($\beta$), the return of the market and the return of a risk-free asset. The idea is you only get reward for taking un-diversifiable risk. The CAPM model described below is adjusted for Country Risk by the addition of a Country Risk Premium (CRP) to the returns.</td>
</tr>
<tr>
<td><strong>Return for Equity</strong> $R_e = R_{FR} + \beta (M_{RP} - R_{FR})$</td>
</tr>
<tr>
<td>where $R_e = \text{required return on equity}$</td>
</tr>
<tr>
<td>$R_{FR} = \text{the risk free rate}$</td>
</tr>
<tr>
<td>$\beta = \text{the scaling factor Beta (}\beta\text{) to be applied to the market risk premium, it measures the volatility of the specific assets relative to the entire market. If the assets are more volatile than the market average, then the beta to be applied is greater than one}$</td>
</tr>
<tr>
<td>$M_{RP} = \text{The market risk premium is the rate of return earned on a well-diversified portfolio of assets (the market), i.e. its return above the risk free rate.}$</td>
</tr>
<tr>
<td><strong>Return for Debt</strong> $R_d = R_{FR} + D_{RP}$</td>
</tr>
<tr>
<td>where $R_d = \text{required return on debt}$</td>
</tr>
<tr>
<td>$R_{FR} = \text{is the risk free}$</td>
</tr>
<tr>
<td>$D_{RP} = \text{is the Debt Risk Premium based on the credit risk of the debt for a business similar to the business in question.}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal Risk Free Rate (RFR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The risk-free interest rate is the theoretical rate of return of an investment with zero risk. The US Treasury rate is grossed up using the Vanuatu inflation to give a Vanuatu nominal risk free rate.</td>
</tr>
<tr>
<td>$R_{FR} = \left[ \frac{1 + UST_{\text{real}}}{1 + \Pi_{\text{Van}}} \right] - 1$</td>
</tr>
<tr>
<td>Where: $UST_{\text{real}} = \text{the average real yield over February 2010 of 5 year United States Treasuries of }0.42%.$</td>
</tr>
<tr>
<td>$\Pi_{\text{Van}} = \text{the Vanuatu inflation estimate described below}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Market Risk Premium (MRP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The difference between the expected return on a market portfolio and the risk-free rate. For clarity a country risk premium is added separately in this process thus when estimating the MRP country risk is not considered.</td>
</tr>
<tr>
<td>$M_{RP}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country Risk Premium (CRP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country risk premium refers to an increment in return that would have to be paid for loans and investment projects in a particular country compared to a risk free standard.</td>
</tr>
</tbody>
</table>
### CAPM adjusted for CRP

Re = RFR + β(MRP - RFR + CRP)
Rd = RFR + DRP + CRP

### Gearing Ratio

Gearing (also known as leverage) refers to the use of debt capital. The gearing ratio refers to the percentage of debt to overall firm value. Employing leverage amplifies the potential gain from a business, but also increases the potential loss (i.e., risk increases as gearing increases).

Gearing ratio = \( \frac{D}{D+E} \)

### Inflation Rate \( \pi \)

The Inflation Rate is the forecast annual increase in the Vanuatu Consumer Price Index. The forecast is taken from the Vanuatu Government Budget papers.

\( \pi \) Van

### Corporate Tax Rate

Corporate Tax Rate is zero for Vanuatu and there is no dividend imputation. Other taxes have been accounted for in the costs awarded under the tariff.

Na

### Equity Alpha

Equity Alpha is a measure of a company's volatility with respect to the market when the company has been financed entirely with equity. Alpha is the unleveraged (un-g geared) beta of the firm. Equity beta in contrast reflects both the operating and financial risks of a company.

\( \alpha \)

### Hamada Equation

The Hamada equation is used to convert Equity Alpha (unleveraged) to Equity Beta (leverage). It adjusts alpha by the level of gearing. In a zero tax environment the formula is straightforward as shown below.

\[ \beta = \alpha (1 + \frac{D}{E}) \]

### Equity Beta

Equity Beta is a measure of a company's volatility with respect to the market as a whole with the companies level of gearing. Equity beta reflects both the operating and financial risks of a company.

\( \beta \)

### Total Nominal Return on Equity

As per the CAPM model described above.

Re= RFR + \( \beta \)(MRP - RFR + CRP)

### Debt Risk Premium (DRP)

The risk that a company defaults on their debt obligations is credit risk. This is represented by a Debt Risk Premium.

DRP
## Total Nominal Return on Debt

As per the CAPM model above - the RFR and CRP is added on to credit risk to give the total return required by debt.

\[ \text{Rd} = \text{RFR} + \text{DRP} + \text{CRP} \]

## Nominal Weight Average Cost of Capital (WACC)

Capital can be raised in two ways: through debt or equity. Both methods have an associated cost: interest payments and dividends respectively. The method of estimating the appropriate returns from each type of capital is the Capital Asset Pricing Model (CAPM). The return of each component is then weighted by its share to give the Weighted Average Cost of Capital.

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

where

- \( \text{Re} \) = Return on equity capital
- \( \text{Rd} \) = Return on debt capital

## Real Weight Average Cost of Capital (WACC)

As the Regulated Asset Base is indexed for inflation a real rate of return is applied. Thus the Nominal WACC is adjusted for inflation.

\[ \text{Real WACC} = \left[ \frac{1 + \text{Nominal WACC}}{1 + \pi_{\text{Van}}} \right] - 1 \]
Appendix D: Stakeholder submissions to the URA Stage 1 Draft Determination August 2010

§ 7.4 Demand growth rate:

To determine the demand growth, the Regulator’s Final Decision of May 2009 is based on 4 essential growth vectors: the overall GDP growth, the industry and service sector performance, the tourism arrivals and the urban population growth.

1 – GDP Growth rate
A GDP per Island and per Province would be required to make a separate evaluation of the growth in Luganville. However the National Statistics Office does not publish a GDP per Island and Province.
In its Final Decision in Section 4.3.1, the Regulator has proved a very high correlation between the historic growth in real GDP and the sales of energy in all the concessions.

Based on this methodology, the GDP of Luganville may then be estimated from the sales history of KWh in Santo.

In particular demand growth during the last 8 years in Luganville was only 1.2 %, whereas growth of overall GDP during the same period never goes below 4 % per year!
GDP growth for Santo must thus be taken far lower than the expected overall 4% growth as stated in the 2010 budget paper forecast.

2 – The industry and service sector
Furthermore, there is no statistics on the growth forecasts for industry per Island or Province.
In its Final Decision in Section 4.3.1, the Regulator states that « the more electricity-intensive sectors of industry and services expected to remain robust » and the Regulator is based on the growth of 7.7% in 2007 and the growth forecasts of 5 to 9% for the period of 2009 / 2011.
As a comparison, the sales history of medium voltage energy to industrial sector of Luganville since 2006 decreased from 1%.

3 – Tourism arrivals
Tourism industry is another sector which has a high demand of energy. The forecasted growth has not been achieved because the tourist arrivals have decreased by 7% for the first semester, with a decrease of 33% for Santo.
According to the data as of June 2010 published by the National Statistics Office, « the 8,035 visitor arrivals by air in June 2010 was 7%, a slight increase from that of June 2009. There were 285 visitors arriving in Luganville in June 2010, a decrease of 7% compared to the same period of 2009 ».
The 2009 optimistic forecasts are in the ‘Half year economic and fiscal update of 31 July 2010 published recently by the Ministry of Finance, adjusted downward as follows: « the reverse of short distance destinations by tourist from neighbouring Australia and New Zealand; in an economic environment packed with uncertainties and the nervousness, favouring Vanuatu, is now affecting the economy. By Way of competition advantage, the risk that Fiji could bounce
back in restoring its share of the tourist market, after successive years of bad tourists’ inflows will greatly influence the growth trend experienced by Vanuatu in the past years ».

4 – Urban population growth
As stated by the Regulator in its Final Decision, Port Vila’s population has been growing at an average of 4.7% annually for the period of 1999/2007. However, Santo’s population annual growth for the same period has been registered at only 2.4%.

One might think that the Government’s pro-active policy to develop access to electricity facilitates growth. However the target customers consume less than 60KWh per month and its contribution to the overall growth will be marginal.

Based on figures of the past years, one can notice that the upgrading of the network in Luganville financed by the Sarakata Funds and the promotion of access to power by UNELCO may have contributed to increase the number of customers. However the sales of energy have not increased significantly.

For these reasons, the growth rate for the demand in kWh for the period of 2011 / 2015 must be of 2%.
To put it simply, the growth rate of the demand in KVA will be fixed at 2% even if the following figures show a growth driven by the Small Domestic Customers who do not pay fixed premium and thus do not contribute the growth the contracted load.

§ 8.4 System losses:

The Luganville system losses from 1999 is 9,4 %.

The commissioning of the 3rd turbine in October 2009 resulted in an increase of the system losses due to the 20 kV line losses from the hydro plan in Fanafo to the city.
From January 1999 to September 2009 = 9.1 %
- From October 2009 = 11.9 %

Even on such a small period of time, we can assess the downward trend.

Theoretical calculation demonstrates (*) that HV 20 kV transportation line generates:
- Around 7 500 kWh/month with an average output of 550 kW (2 turbines)
- Around 22 000 kWh/month with an average output of 950 kW (3 turbines)

(*) With 26 km of 58mm² Almelec, U=20 kV, R=0.6 Ohm/km, with 550 kW output, active losses are P = 3 R I² = 3 x 0.6 x (550/20 x 1.73)² x 26 = 12 kW; With 950 kW output active losses are P = 12 x (950/550)² = 35 kW

Based on a monthly generation of 540 000 kWh and a system losses of 9.1%, before commissioning; the additional losses of 14 500 kWh (22 000 – 7 500 kWh) results in an increase of the system losses to 11.5 %, which is in line with the actual figures.

<table>
<thead>
<tr>
<th>Produced</th>
<th>sold</th>
<th>Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation from October 2008 and sept.2009</td>
<td>540 000 kWh</td>
<td>490 860 kWh</td>
</tr>
<tr>
<td>Theoretical generation with 20 kV line losses</td>
<td>554 500 kWh</td>
<td>490 860 kWh</td>
</tr>
</tbody>
</table>

UNELCO requests that the system losses of the Luganville operation be set at 11.5 %.

§ 8.4 Generator efficiency.

Over the period from July 2009 to July 2010, the actual figures were:
- Total generation = 8 540 010 kWh
- Hydro generation = 6 677 710 kWh
- Diesel generation = 1 862 300 kWh
- Fuel consumption = 558 223 litres
- Running hours of diesel = 6930 h.

During this period it is observed that Hydro generation represented 78 % of the energy produced, specific consumption was 0.29975 litres per kWh, and that the average load of the diesel generators was 55%, for an average load of 270 kW.

This significant consumption can be easily explained by 2 major factors:

1/ Obligation to hold and maintain voltage and frequency of this small scale non interconnected grid with thermal generators, the only means of production able to react rapidly to the frequent variations of load of the network during day time and avoid black out. (Sudden increase of load by industrial customers, starting of rotation machines, inductive load ...). These conditions of operation are leading to an average load of the engines far from their best performances, and inconsistent with an optimisation of their specific consumption.

2/ Existing engines are also designed and sized to provide backup in case of maintenance, breakdown, last of water of the hydro plant.

Indeed, the relatively low average load of these engines is inconsistent with an optimisation of their efficiency. For the small island grid of Luganville any increase in the proportion of hydro or other renewable energy, results in a degradation of the specific consumption of the diesel engines.
Unelco requests that specific consumption for the Luganville operation be taken to 0.286 litres per kWh, as already agreed by URA in its final decision of May 2010 § 4.6.2.

§ 9.2 Staff Costs

The simulation model used for the Tariff Review included in the theoretical costs, 129,000,000 VUV at the top of the chart which correspond to the Sarakata savings, staff costs and maintenance costs of the hydro-electrical power station. The Funds for personnel of 10,000,000 VUV per annum was omitted in the Staff Costs.

Based on the forecast annual growth of 4%, we do not understand why this growth cannot give rise to an increase of the wages in recruiting new personnel.

UNELCO is requesting that the cost of personnel be indexed to the growth.

§ 9.3 Goods and Other Costs

The above amount of 10,000,000 VUV corresponding to the overheads and maintenance costs is not re-included into the costs.

Based on the forecast annual growth of 4%, we do not understand why this growth cannot give rise to an increase of the maintenance costs.

UNELCO is requesting that the maintenance costs of the hydro-electrical power station be included in the wages and that the same be indexed to the growth.

§ 9.6 Costs not included in the tariffs

The draft concession contract of Luganville provides that a «Concession Fee» be paid to the Concessionaire based on the Turnover of the Company. This fee will be taken from the net profit of the Company, which is less correlated to the Turnover as far as our business is concerned. In fact, the weight of gasoil has an impact of more than 35% on the sales price of energy to our customers thus impacting on our turnover. For example, UNELCO’s turnover has increased to 30% between 2007 and 2008 without a significant impact on its profits. Therefore, we think that it is logic and equitable to indexe this fee on the gross margin of the Company calculated as the difference of the turnover of energy and the direct costs of fuel.

§ 9.4 Depreciation

The depreciation rates proposed are very high and do not reflect the economic lifes of the assets of this type of business. The fast depreciation will have a negative impact on the tariffs of our customers.
UNELCO is requesting that these rates be reviewed and be consistent with this type of business.

§ 9.5 Provision

The Regulator provides an annual provision of only 12,000,000 VUV for the Company.

Regulatory provisions:
The international accounting standards give provision to taken into account costs such as “customer debt provision” and “stock depreciation”.

UNELCO estimates these annual provisions at 2,000,000 VUV.

Cyclone provision.
There is no insurance available for electricity supply network against cyclones, earthquake and tsunami.
The value of the network assets, approved by the Auditor, is 487,000,000 VUV. It is responsible to provide a provision to cover that risk with our accounts.

UNELCO estimates the provision at 15,000,000 VUV per year.

Retirement provision
Employment Act does exempt a new company from paying a retirement package to its employees unlike stated by the Regulator in its paper.

UNELCO estimates this provision based on the age group of its Luganville employees will reach 13 million in 2015.

Based on the depreciation rate proposed in Section 9.4, the provisions to be provided for the renewal of the assets (without the new investments from the annual business plan) amount to 23,000,000 VUV per annum.
<table>
<thead>
<tr>
<th>Nouvelle Base</th>
<th>2 011</th>
</tr>
</thead>
<tbody>
<tr>
<td>222251 CONSTRUCTION</td>
<td></td>
</tr>
<tr>
<td>221301 EQUIPT ELECT CENTRALE</td>
<td>223 613</td>
</tr>
<tr>
<td>222353 MOTEURS/ ALTERNATEURS</td>
<td></td>
</tr>
<tr>
<td>222354 INSTALLATIONS DIVERSES</td>
<td>2 639 928</td>
</tr>
<tr>
<td>3ème TURBINE (*)</td>
<td></td>
</tr>
<tr>
<td>222551 LIGNE HAUTE TENSION</td>
<td>9 825 786</td>
</tr>
<tr>
<td>222552 LIGNE BASSE TENSION</td>
<td>3 109 063</td>
</tr>
<tr>
<td>222553 LIGNES MIXTES</td>
<td>1 013 714</td>
</tr>
<tr>
<td>222555 POSTE DE TRANSFORMATION</td>
<td>5 695 446</td>
</tr>
<tr>
<td>221556 BRANCHEMENT</td>
<td>43 511</td>
</tr>
<tr>
<td>215510 OUTILLAGE LONGUE DUREE</td>
<td></td>
</tr>
<tr>
<td>215530 COMPTEURS ELECTRICITE</td>
<td>626 209</td>
</tr>
<tr>
<td>218110 AGENCEMENT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Provision Renouvellement</td>
<td>23 177 270</td>
</tr>
</tbody>
</table>

The gross value of the assets of the new concession at commencement date is 2,200,000,000 VUV (Value of the 3rd turbine estimated at 600,000,000). A provision of only 12,000,000 VUV is not responsible.

As already mentioned in the Draft Concession Deed, eligible assets to the R&RF Fund must be clarified and detailed.
In fact, the Final Decision mentions planned expenditures whereas the definition in the deed also includes unforeseen costs such as repair.

10.1 Regulated asset base

This document does not provide for the method of remuneration of the Concessionaire outside the concession area. This is essential information for the Bidders Submissions since a very important part of the estimation (15%) is based of the undertakings of the Concessionaire to facilitate access to electricity outside the concession area.

11 – Reasonable return

UNELCO is requesting that the remuneration which will be paid to the new Concessionaire for the Luganville concession be that decided by arbitration.

12.1 Base tariff

Based on the assumptions, the figures and the proposed tariff by the Regulator, we have made up Profitability Analysis for the next 5 years.
### Profit & loss statement

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chiffre d'affaires Energie</strong></td>
<td>189,253,190</td>
<td>199,076,696</td>
<td>208,182,159</td>
<td>218,298,772</td>
<td>229,030,136</td>
<td>1,043,840,953</td>
</tr>
<tr>
<td><strong>Total turn over</strong></td>
<td>189,253,190</td>
<td>199,076,696</td>
<td>208,182,159</td>
<td>218,298,772</td>
<td>229,030,136</td>
<td>1,043,840,953</td>
</tr>
<tr>
<td>Fuel cost</td>
<td>50,256,440</td>
<td>57,395,268</td>
<td>64,819,536</td>
<td>72,540,656</td>
<td>80,449,249</td>
<td>325,461,149</td>
</tr>
<tr>
<td>Staff cost</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>76,313,911</td>
<td>381,569,555</td>
</tr>
<tr>
<td>Share of goods &amp; others costs</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>46,785,750</td>
<td>233,928,750</td>
</tr>
<tr>
<td>Primes de raccordement</td>
<td>-540,803</td>
<td>-552,008</td>
<td>-563,447</td>
<td>-575,122</td>
<td>-575,122</td>
<td>-2,806,502</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>172,815,298</td>
<td>179,942,921</td>
<td>187,355,750</td>
<td>195,065,195</td>
<td>202,973,788</td>
<td>938,152,952</td>
</tr>
<tr>
<td><strong>Excédent Brut Exploitation (EBE)</strong></td>
<td>16,437,892</td>
<td>19,133,775</td>
<td>20,826,409</td>
<td>23,233,577</td>
<td>26,056,348</td>
<td>105,688,001</td>
</tr>
<tr>
<td>Amortissement/Depreciation</td>
<td>3,165,300</td>
<td>4,734,830</td>
<td>5,342,600</td>
<td>6,871,450</td>
<td>8,711,200</td>
<td>28,825,400</td>
</tr>
<tr>
<td>Provision</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>12,000,000</td>
<td>60,000,000</td>
</tr>
<tr>
<td><strong>Total Prov &amp; Amort</strong></td>
<td>15,165,300</td>
<td>16,734,850</td>
<td>17,342,600</td>
<td>18,871,450</td>
<td>20,711,200</td>
<td>88,825,400</td>
</tr>
<tr>
<td><strong>Résultat Exploitation (Reasonnable Return)</strong></td>
<td>1,272,592</td>
<td>2,398,925</td>
<td>3,483,809</td>
<td>4,362,127</td>
<td>5,345,148</td>
<td>16,862,601</td>
</tr>
<tr>
<td><strong>Concession Fee (Base Marge Ciale)</strong></td>
<td>1,389,968</td>
<td>1,416,814</td>
<td>1,433,626</td>
<td>1,457,581</td>
<td>1,485,809</td>
<td>7,183,798</td>
</tr>
<tr>
<td><strong>Net Profit</strong></td>
<td>-117,376</td>
<td>982,111</td>
<td>2,050,183</td>
<td>2,904,546</td>
<td>3,859,339</td>
<td>9,678,803</td>
</tr>
<tr>
<td><strong>Cash flow</strong></td>
<td>5,841,296</td>
<td>1,875,737</td>
<td>-301,661</td>
<td>1,315,838</td>
<td>2,299,886</td>
<td></td>
</tr>
</tbody>
</table>

With a capital contribution of 25,000,000 VUV, a 100% financing by the Concessionaire (no loan which will degrade the P&L), the Concessionaire cannot invest more than 20,000,000 VUV per annum based on the proposed conditions.

The proposed tariff is inconsistent with the political wish of the Government set out by the Minister of Energy, the Honourable Paul TELUKLUK in the Information Memorandum §4.1 ‘energy policy and plans for the future » as well as Background of the Concession Deed section A (i), (iii), (iv) (v), (vi), such as Increasing access to electricity, promote renewable energy sources, reduce dependence on imported fuel, improve quality and efficiency etc..

The profit (before interest) of the first 5 years for the Concessionaire will be less than 10,000,000 VUV.

The annual concession fee cannot exceed 3,200,000 VUV per annum if the Concessionaire has no profit!! This amount must be compared to the revenues generated in the past by Luganville Concession to the Government of more than 100,000,000 VUV for Sarakata and 2,200,000 VUV by the Investment Fund (Section 6).

The Concession Deed and this document do not provide for any triggers for a tariff review. It is of great importance, based on the current contracts, that this be provided in the future contract for Luganville.

### 14 Tariff structure

This document does not provide for the method of remuneration of the Concessionaire outside the concession area. This is essential information for the Bidders Submissions since a very important part of the estimation (15%) is based of the undertakings of the Concessionaire to facilitate access to electricity outside the concession area.
17.1 Incentive to Promote Renewable energy

Despite the political wish to promote renewable energy as stated above, nothing is done in the deed to encourage the Concessionaire to invest and operate efficiently renewable means of generation.

UNELCO suggested to 2 different triggers to promote renewable energy :

1 – Incentive to invest.

**UNELCO proposes to remunerate investment in renewable assets at WACC + 4%**.

2- Incentive to operate efficiently

This proposal was previously made by UNELCO in its submissions but the regulator did not take it into account in its final decision of May 2010.

“UNELCO would also like to see a performance-based incentive scheme introduced for the promotion of renewable energy in the form of a bonus which would be calculated at the end of every year based on potential production (producible) and rated availability of the ENR assets. For example for Wind generation:
The producible and the availability would be determined by the manufacturer of the turbines on the basis of average wind conditions as measured on site and standard levels of availability. The incentive granted to UNELCO at the end of Year N could be 50% for every kilowatt hour generated over and above the rated producible and would be reflected in the rate for the following year by reducing the monthly generation levels of the Year N+1 by one twelfth.

Example:
Rated producible : 4 600 000 kWh.
Producible in year N : 5 240 000 kWh.
Difference : 640 000 kWh
Incentive for Unelco in year N+1 : 320 000 kWh
Monthly impact N+1 : -26 666 kWh per month”
Utilities Regulatory Authority
Vanuatu

You can access the Luganville Electricity Tariff Setting Draft Determination Stage 1 August 2010 by referring to our website www.ura.gov.vu, contacting us by telephone (+678) 23335, fax (+678) 27426, email: tmael@vanuatu.gov.vu or writing to us at Office of Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.