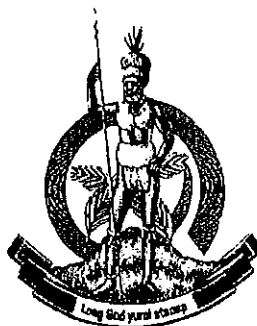


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28 SEPTEMBRE 2018

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28 SEPTEMBER 2018

**SONT PUBLIES LES TEXTES SUIVANTS**

**NOTIFICATION OF PUBLICATION**

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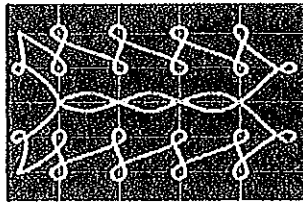
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**Utilities  
Regulatory  
Authority**

**UTILITIES**

**REGULATORY AUTHORITY  
ACT NO.11 OF 2007**

**Electricity Reliability Standards  
NOTICE NO. 150 OF 2018**

In exercise of the powers conferred upon the Authority under subsections 17 (1) of the Utilities Regulatory Authority Act No. 11 of 2007 (as amended) and in accordance with subsection 15(8) of the Interpretation Act [CAP 132], the Authority makes the following order.

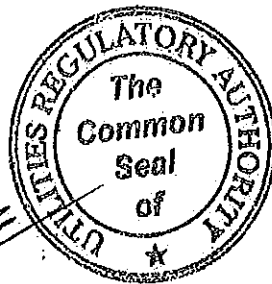
**1 Electricity Reliability Standards**


The Authority issues the Electricity Reliability Standards (Case S-0002-15).

**2 Repeal**

The Authority's Electricity Reliability Standards of 2011 is repealed.

Made at Port Vila this 13<sup>th</sup> day of September 2018.



  
John Obed Alilec  
Chief Executive Officer

  
Johnson Naviti Matarulapa Marakipule  
Chairman



# **Final Decision and Commission Order**

**Case S-0002-15**

## **Electricity Reliability Standards**

The Authority's Electricity Standards for monitoring availability and quality of electricity supplied by utilities in Vanuatu

**August 2018**

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## Foreword

The Utilities Regulatory Authority Commission (The Authority) is pleased to issue this Final Decision and Commission Order prescribing the Electricity Reliability Standards for electricity services in Vanuatu. Pursuant to the Preliminary Decision in June 2016, the Authority staff has held consultations and received valuable comments and feedbacks from respective electricity utilities.

Section 17 of the URA Act mandates the Authority to issue reliability standards in relation to the reliability of a regulated service. According to utility regulatory practices, reliability standards obligates entities such as an electricity utility to provide electricity service to its customers that is reliable and minimise as much as possible the occurrence of service disruptions. With the expansion of electricity services to both the urban and rural areas, increased demand of electricity throughout Vanuatu and the government focus on increasing grid connected renewable energy technologies, the Authority is convinced that a set of Standards is required to ensure the continuous provision of quality electric power to customers by utilities..

The Authority is aware that reliability beyond certain levels can be cost prohibitive. Hence in establishing these Standards, proper consultations and researches have been conducted to ensure that they are measurable, enforceable and assist in resolving disputes associated with the reliability of the service. The willingness of the customer to pay for the service also depends on the required level of reliability of the service. To address this, provisions within the Standards are aimed at measuring service quantity and quality to ensure a reasonable level of service reliability that resonates with customer's expectation is achieved. In determining the Standards, the Authority took into consideration the cost of compliance by utilities to make certain that it did not have any significant impact on the overall cost of service.

Hence it is the Authority's view that the introduction of these Standards will encourage electricity utilities to invest in a reasonable service level towards ensuring an electricity service that is reliable, affordable and reflects the approved tariffs in place. It is also the Authority's view that these Standards are clear, transparent and fairly applicable to both the utility and the customer.

The Authority urges the Government, UNELCO, VUI and all interested persons to support the Final Decision and its implementation.

Johnson Naviti Matarulapa Marakipule, Chairman

John Obed Alilee, CEO and Commissioner

# Definition

## 1 Terms and Definitions

Terms used in these Standards shall have the same meaning as assigned to them in the Authority's Act. The following terms shall have the meaning as set out below:

- (a) **Act of God:** An event that is beyond human control such as natural disasters whereby no one can be held responsible or accountable.
- (b) **Consumer:** Consumer has the same meaning as in the URA Act.
- (c) **Customer:** 'Customer', for the purpose of these Standards, has the same meaning as 'consumer'.
- (d) **Feeder:** A circuit in the electrical distribution system used to distribute power from the power station to substations for distribution to customer. The feeder transformer steps up voltage from the generation side to levels suitable for transmission to Sub-stations.
- (e) **Interruption:** An interruption is an occurrence in which the continuity of supply of electricity to a customer is broken.
- (f) **Interruption duration:** The time elapsed to restore supply when an interruption occurs.
- (g) **Interruption frequency:** The number of times that a customer or a group of customer experiences supply interruptions.
- (h) **Local Interruption:** An interruption of the supply of electricity at a single transformer or isolation equipment that affects all customers who are connected directly to it.
- (i) **Sectional Interruption:** An interruption of the supply of electricity that affects a sub-station plus distribution transformers and customers who are connected directly to the substation.
- (j) **Universal Interruption:** An interruption of the supply of electricity that affects the whole utility network – the main electrical power generation is down usually due to a major fault, thus affecting all sub-stations, feeders and transformers. Also commonly referred to as a Total Blackout.
- (k) **Switchgear:** A combination of protection equipment on an electrical network or installation such as fuses, switches and circuit breakers used for protection, isolation and control of power systems.
- (l) **Sub-station:** A substation is a part of an electrical generation, transmission, and distribution system. Substations transform voltage from high (Transmission voltage) to low (Distribution voltage) or perform any of several other important functions such as maintaining power quality at acceptable levels within the regulatory requirements.
- (m) **Transformer:** A transformer is a static machine used for transforming electrical power from one electrical circuit to another without changing frequency. It is generally used for stepping up or stepping down the voltage level in transmission and distribution power networks.



(n) **Utility:** Utility has the same meaning as in the URA Act.

(o) **Vandalism:** An intentional act of destruction to public or private property.

# Introduction

## 2 Case information

Table 1: Case information

|  |   |
|--|---|
| <b>Case number</b>                                 | S-0002-15   |
| <b>Sponsor</b>                                     | Utilities Regulatory Authority (URA)  |
| <b>In the matter of</b>                            | URA electricity standards for monitoring availability and quality of electricity supplied by utilities in Vanuatu |
| <b>Case opened</b>                                 | 21 <sup>st</sup> January 2015   |
| <b>Date of Preliminary Decision</b>                | 17 <sup>th</sup> June 2016  |
| <b>Deadline for comments</b>                       | 18 <sup>th</sup> July 2016  |
| <b>Date of Final Decision and Commission Order</b> |   |

## 3 The need for Standards

Under the Utilities Regulatory Authority Act (URA Act), the Authority has the responsibility to ensure the provision of safe, reliable and affordable regulated services; maximize access to regulated services throughout Vanuatu and promote the long term interests of consumers.

In 2011, the Authority issued the Electricity Reliability Standards (2011 Standards) in accordance with Section 17 of the Authority's Act. The 2011 Standards were established to incorporate Reliability of Supply, Quality of Supply and Customer Service Standards. Since the issuance of the 2011 Standards, the Authority has developed specific Rules related to utility customer service standards such as the "Billing and Collection Rules" and "Customer Complaints and Dispute Resolution Rules".

In these Standards the Authority is proposing to update the reliability of supply standards alone, separate from the Customer Service Standards. As such, these Standards are designed to replace and supersede the 2011 Standards, incorporating prevailing industry reliability norms, so as to promote and encourage the reliability and quality of electricity service under the current and developing network infrastructure.

It is necessary to issue the Electricity Reliability Standards that is practically relevant and applicable to all electricity utility networks in Vanuatu; firstly for the generic purpose of holding utility networks on a common benchmark; secondly, to be able to enforce reliability measures already practiced by the utilities; and thirdly, to provide clear and transparent procedures as to the treatment of electricity service interruptions with respect to interruption notices, restoration times and actions for utility non compliance to the Standards.

The Standards will assist the Government in achieving the aims set out under its updated National Energy Roadmap (2016 – 2030), with respect to safety, reliability, affordability and accessibility of electricity throughout Vanuatu.

#### **4 Legal Overview**

The legislation that empowers the Authority to issue and implement these Standards is the Utilities Regulatory Authority Act No.11 of 2007 (as amended).

# The Rules

## **1 Overview**

To ensure that these Standards are effective and lawfully implemented, the Authority has highlighted the following items as its guidance.

- (a) The Authority's Objectives in issuing the Standards;
- (b) Application of the Standards; and
- (c) Measures taken to address any contraventions.

## **2 Objective**

The Authority is issuing the Electricity Reliability Standards to:

- (a) Highlight utility's performance requirements by setting norms to ensure cost effective availability and quality of supply;
- (b) Promote the availability and quality of electricity supply to customers, while balancing costs versus benefits of expected reliability; and
- (c) Apply measurable rules to ensure fairness, and consistency when addressing complaints regarding service reliability.

## **3 Applicability**

This Standard applies to:

- (a) Utilities supplying commercial electricity in Vanuatu; and
- (b) Any future utility that will provide electricity services to consumers in Vanuatu.

## **4 Contravention of the Standards**

A contravention of any provision of this Standard constitutes an offence under paragraph 21(1) (b) of the URA Act No.11 of 2007 (as amended).

## **5 Availability of Supply**

A utility is to ensure that the availability of electricity supply to customers is maintained and the occurrence and duration of interruptions is kept to a minimum.

## **5.1 Classification of Electricity Interruptions**

### **5.1.1 Standard**

Electricity interruption is classified into Planned, Unplanned, Emergency, and Major interruptions, subject to the following definitions.

**(a) Planned Interruption.**

An interruption is classified as Planned if it is part of the regular maintenance program or necessitated by the circumstances. In such circumstances affected consumers are to be notified with a "Planned Interruption Notice" pursuant to Rule 8.1.

**(b) Unplanned Interruption.**

When the electricity supply is disconnected unexpectedly without notice, usually due to technical failure, the interruption shall be regarded as an unplanned interruption.

**(c) Emergency Interruption.**

When supply is intentionally disconnected by a utility without proper customer notification subject to Rule 8.1 to mitigate an electricity safety threat to the public or the network, the interruption shall be regarded as an emergency interruption.

**(d) Major Interruption.**

A Planned, Unplanned or Emergency interruption subject to Rule 5.1.1 **Error! Reference source not found. Error! Reference source not found.** and (c) is considered as a Major Interruption if supply to all customers on the network has been interrupted continuously for more than 1 hour.

### **5.1.2 Determination of compliance**

When reporting an interruption, the utility must ensure that the interruption is classified in accordance with Rules 5.1.1.

### **5.1.3 Action for non compliance**

Any outage event not classified in accordance with Rule 5.1.1 will be considered as an unjustified outage and addressed as such in accordance with these Standards unless proper justification as to the class of the outage is provided by the utility concerned.

## **5.2 Justification of Electricity Interruptions**

### **5.2.1 Standard**

- (a)** All Emergency Interruptions as defined in Rule 5.1.1(c) are to be considered as Justified.
- (b)** A Planned Interruption shall be considered justified if it is done in accordance with Rule 8 and does not affect the reliability of service to other areas of the network other than the intended affected areas specified in the Planned Interruption Notice subject to Rule 8.1.
- (c)** Justification of an Unplanned Interruption is to be determined in accordance with the following terms and conditions.

- (1) An unplanned interruption is regarded as justified if;
  - (i) The interruption occurred as a result of an Act of God;
  - (ii) The interruption occurred as a result of an act(s) of vandalism;
  - (iii) The interruption occurred as a result of a non utility related accident on the network; or
  - (iv) The interruption occurred as a result of an action by a person(s) on the network without the utility's consent or supervision such as customer overload, surge or faulty wirings.
- (2) An unplanned interruption is regarded as unjustified if;
  - (i) The interruption occurred as a result of a fault(s) on the network or at the power station;
  - (ii) The interruption occurred as a result of utility related accident on the network;
  - (iii) The interruption occurred as a result of damage caused during works undertaken on the network or power station by the utility or person acting on behalf of the utility, including utility employees, agents, representatives and/or contractors;
  - (iv) The interruption occurred as a result of damage to the network caused by obstacle or building located within the safe distances as specified in the Electricity Safety Standards and Guidelines (Case S-0001-14) implemented in Vanuatu; or
  - (v) The utility could not determine the cause of the outage.

#### **5.2.2 Determination of compliance**

When reporting an interruption, the utility must clearly indicate the justification for the interruption in accordance with Rules 5.2.1.

#### **5.2.3 Action for non-compliance**

Any outage event not clearly justified will be considered as an unjustified outage and addressed as such in accordance with these Standards.

### **5.3 Expected restoration time for Planned Interruptions**

#### **5.3.1 Standard**

Any planned interruption as described in Rule 5.1.1(a) should be restored within the expected outage duration indicated in the Planned Interruption Notice as described in Rule 8.1.

#### **5.3.2 Determination of compliance**

Justification has to be provided by the utility in the Interruption Report described in Rule 8.2 for a planned interruption that is in excess of the estimated outage duration in the Planned Interruption Notice described in Rule 8.1.

#### **5.3.3 Action for non-compliance**

Failure to provide justification in accordance with Rule 5.3.2 is considered as a contravention to these Standards.

## **5.4 Expected restoration time for Unplanned Interruptions**

### **5.4.1 Standard**

Any unplanned interruption, subject to Rule 5.2.1(c) should be restored within 2 hours for a local or sectional interruption and 1 hour for a universal interruption.

### **5.4.2 Determination of compliance**

Justification has to be provided by the utility in the Interruption Report described in Rule 8.2 for any unplanned interruptions that are in excess of the expected restoration period described in Rule 5.4.1.

### **5.4.3 Actions for non compliance**

Failure to provide justification in accordance with Rule 5.4.2 is considered as a contravention to these Standards.

## **5.5 Expected restoration time for Emergency Interruptions**

### **5.5.1 Standard**

For any Emergency Interruption under Rule 5.1.1(c), a utility is required to restore power within reasonable time, taking into account the extent of damage and repair work needed.

### **5.5.2 Determination of compliance**

A utility is not required to notify customers with a power cut notice for an emergency interruption. However, the utility must inform the Authority in writing of the emergency interruption within 2 hours of interruption occurring, providing details of;

- (1) The areas that are being affected or likely to be affected;
- (2) The cause of interruption;
- (3) The time and estimated duration of interruption; and
- (4) A brief narration of the mitigation efforts.

If practically possible, the utility must inform affected customers prior to an emergency interruption.

### **5.5.3 Actions for non compliance**

Failure to provide notification to the Authority and justification in accordance with Rule 5.5.2 is considered as a contravention to these Standards.

## **5.6 Expected restoration time for major interruptions**

### **5.6.1 Standard**

For any Major Interruption under Rule 5.1.1 (d), a utility is required to restore power within reasonable time, taking into account the extent of damage and repair work needed.

### 5.6.2 Determination of compliance

- (a) Within 24 hours of a Major Interruption a utility shall provide to the Authority a notification, confirming the cause of the Major Interruption and immediate remedial actions.
- (b) Subject to Rule 8.3, a Major Interruption Report shall be provided to the Authority within 30 working days from the time and date from which the major interruption was restored.
- (c) The utility must notify all customers via available media outlets, of the interruption and its plans to restore the service.
- (d) Regular updates of its mitigation actions shall be provided to the public by the utility, until such a time that service is restored to all of its customers.

### 5.6.3 Actions for non compliance

Failure of the utility to comply with Rule 5.5.2 is considered as a contravention to these Standards.

## 5.7 Electricity Reliability Indices

### 5.7.1 Standard

A utility must apply and determine the following indices per interruption event for all types of interruptions as defined in Rule 5.1.1.

(1) SAIDI: System Average Interruption Duration Index.

This index measures the time customers were without electricity in a given time relative to the total number of customers connected to the network. It is a measure of the extent across customers and length of interruptions

To calculate SAIDI, each interruption during a given time period is multiplied by the duration of the interruption to find the customer-minutes of interruption. The customer minutes of all interruption are then summed to determine the total customer minutes. To determine SAIDI, the total customer minutes are divided by the total number of customers. The formula is;

$$SAIDI = \sum (r_i \times N_i) / N_T$$

$\sum$  - Summation

$r_i$  - Restoration time, minutes

$N_i$  - Total number of customers interrupted

$N_T$  - Total number of customers served

(2) SAIFI: System Average Interruption Frequency Index.

This measures the average number of interruptions customers experienced in a given period relative to the total number of customers on the network. SAIFI is calculated by dividing the total number of customers interrupted by the total number of customers served. The formula is;

$$SAIFI = \sum (N_i) / N_T$$

$\sum$  - Summation



$N_i$  – Total number of customers interrupted per event

$N_T$  – Total number of customers served

(3) CAIDI: Customer Average Interruption Duration Index.

This index measures the time taken to restore supply relative to the total number of customer interruptions, or duration of interruptions per customer. It is simply measured by dividing SAIDI by SAIFI.

$$CAIDI = \frac{SAIDI}{SAIFI}$$

**5.7.2 Determination of compliance:**

Electricity Network Reliability Indices shall be determined for every interruption event with the result reported in Interruption Reports subject to Rule 8.2.

**5.7.3 Action for non-compliance**

Failure of the utility to comply with Rule 5.7.2 is considered as a contravention to these Standards.

**6 Quality of Supply –Voltage**

**6.1 Nominal Voltage and Variation**

**6.1.1 Standard**

- (a) Nominal voltage distributed to low voltage customers must be equivalent to:
- (1) 230 volts for a single phase customer connection; and
  - (2) 410 volts for a three phase customer connection.
- (b) Nominal voltage distributed to high voltage customers must be equivalent to 5500 volts at three phases.
- (c) The regulated tolerance level for nominal low voltage subject to Rule 6.1.1(a)(1) and 6.1.1(b) measured at the demarcation point between the distribution network and the customer installation to the utility network shall be +/- 10%.
- (1) At least 95 % of the 10 minute mean rms value of the supply low voltage shall be within the tolerance level highlighted in Rule 6.1.1(c) for each one-week period; and
  - (2) All rms voltage averaged at 10 minute shall be within the range of + 10% and - 15%.
- (d) The regulated tolerance level for nominal high voltage subject to Rule 6.1.1(b) measured at the utility's power station or demarcation point between the distribution network and the customer installation to the utility network shall be +/- 7%. At least 95% of the 10 minutes mean rms of the supply high voltage shall be within the tolerance level highlighted in Rule 6.1.1(d) for each one week period.

**6.1.2 Determination of compliance**

Nominal Voltage applicable to a customer must be provided within the tolerance level of Rule 6.1.1.

### **6.1.3 Action for non compliance**

If it is determined by a certified electrician that the effect of variations in a customer supply voltage resulted in damages, the utility responsible will be liable to costs of the damages.

## **7 Quality of Supply-Frequency (Hz)**

### **7.1 Nominal Frequency and Variation**

#### **7.1.1 Standard**

- (a) Subject to Rule 6.1, voltage is to be supplied to customers at a single fundamental frequency of 50 Hertz (Hz).
- (b) Maximum deviation from nominal frequency of 50 Hertz as measured at the utility's power station must be +/- 2%.

#### **7.1.2 Determination of compliance**

For frequency stability in accordance with Rule 7.1.1, a utility must ensure that frequency correction mechanisms are in place at the power station and on the network;

- (1) To rapidly respond to sudden mismatches between active power generation and consumption; and
- (2) Follow variations in demand.

#### **7.1.3 Action for non compliance**

Any interruption in supply that resulted from instability in system frequency will be considered as an unjustified interruption unless the cause of the instability is beyond the control of the utility.

## **8 Reporting related to Reliability of Supply**

### **8.1 Planned Interruption Notice**

- (a) Planned interruptions notice must be issued by the utility within a minimum of 3 days prior to undertaking any planned interruption. A utility is required to broadcast the Planned Interruption Notice through any practical and efficient means of media available (e.g. the local TV and radio stations, the local newsletters, handouts, email, social media, SMS through existing mobile networks).

Planned Interruption Notice shall contain the following information.

- (1) Time and date of planned interruption;
  - (2) Customer Areas that will be affected by the planned interruption;
  - (3) Estimated duration; and
  - (4) Nature and reasons for the planned interruption.
- (b) If a planned interruption is to be rescheduled, the utility shall utilize any practical and most efficient means of media available, to inform customers that will be affected accordingly.

- (c) When scheduling a planned interruption, the utility must ensure that its impact on customers is minimal by scheduling major planned outages during off peak periods such as night times or during the weekends and holidays.
- (d) A copy of a Planned Interruption Notice shall also be provided to the Authority within the period specified in Rule 8.1(a).

## **8.2 Interruption Report**

- (a) The utility must provide to the Authority an “Interruption Report” for every electricity interruption that occurs on its network on a quarterly basis, except for Major interruptions.
- (b) The interruption report must contain the following information:
  - (1) Date and time of interruption;
  - (2) Classification of interruption subject to Rule 5.1;
  - (3) Customer Areas affected by the planned interruption;
  - (4) Whether or not the interruption was caused by an event in the generation, transmission or distribution segment of the system;
  - (5) Network location of the fault that may include feeder number, transformer number and the number of any switchgear de-energised to allow work done and clear faults downstream of the network;
  - (6) Supply restoration time per feeder, per transformer and per any switchgear de-energised to allow work done and clear faults downstream of the network during the interruption;
  - (7) Average restoration time;
  - (8) Electricity Reliability Indices as highlighted in Rule 5.7;
  - (9) Total number of customers not supplied as a result of the interruption;
  - (10) Total number of kWh not supplied as a result of the interruption;
  - (11) Description of the cause of interruption;
  - (12) Corrective actions undertaken;
  - (13) Preventative actions undertaken.

## **8.3 Major Interruption Report**

- (a) Further to a Major Interruption event, a utility is required to provide a report to the Authority subject to Rule 5.6.2(b) that is separate to the Interruption Report described in Rule 8.2.
- (b) The report highlighted in Rule 8.3(a) shall be referred to as the Major Interruption report and shall contain the following information.
  - (1) Date and Time of the Major Interruption.
  - (2) Detail description of the cause of interruption
  - (3) Detail description of the impact of the interruption on the physical network
  - (4) Details of the Mitigation Actions taken or yet to be taken

## **9 Complaints and Disputes**

Any customer grievance that arises as a result of the implementation of this Standard must be referred by the relevant customer to the utility to resolve. In the event that a customer is not satisfied with the utility's response, the customer may then request for the Authority's assistance in resolving the matter in accordance with the Authority's Customer Complaints and Dispute Resolution (CCDR) Rules.

## **10 Revocation of 2011 Reliability Standards**

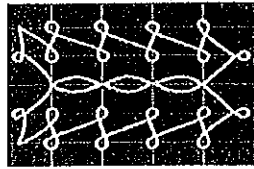
The 2011 Reliability Standards is hereby revoked and replaced by these Standards.

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**Utilities Regulatory Authority**

**Vanuatu**

You can access the S-0002-15 Final Decision, August 2018 on our website [www.ura.gov.vu](http://www.ura.gov.vu) or by contacting us by telephone (+678) 23335, email: [breuben@ura.gov.vu](mailto:breuben@ura.gov.vu) or regular mail at S-0002-15, Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.



**Utilities  
Regulatory  
Authority**

**UTILITIES REGULATORY AUTHORITY  
ACT NO.11 OF 2007**

**DETERMINATION OF MAXIMUM PRICE OF ELECTRICITY FOR VANUATU  
UTILITIES AND INFRASTRUCTURES LIMITED (VUI)**

**NOTICE NO. 151 OF 2018**

In the exercise of the powers conferred upon the Authority by section 18 of the Utilities Regulatory Authority Act No.11 of 2007 (as amended), the Authority makes the following electricity maximum price Determination.

**1 Maximum Price of electricity to be charged by Vanuatu Utilities and Infrastructures Limited (VUI)**

The new base price that VUI is allow to charge to its electricity customers is set at 38.52 VT/kWh.

**2 New Tariff Structure**

VUI is to adopt the new tariff structure and prices set out in section 8 (Table 28) of *"Authority's Final Decision Order (Case – U-0002-17) in the Matter of VUI Electricity Tariff Review"* attached to this Determination.

**3 Application of the determined price**

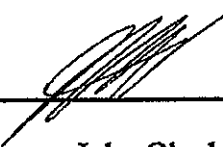
The new tariff is to be applied to Luganville and Port Olry electricity customers as of the next billing cycle from the effective date of this Determination.

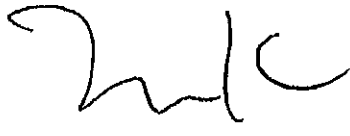
**4 Commencement date**

This Determination becomes effective on the date on which it is published in the Official Gazette.

Made at Port Vila this 13<sup>th</sup> day of September, 2018.



  
**John Obed Alilee**  
Executive Commissioner

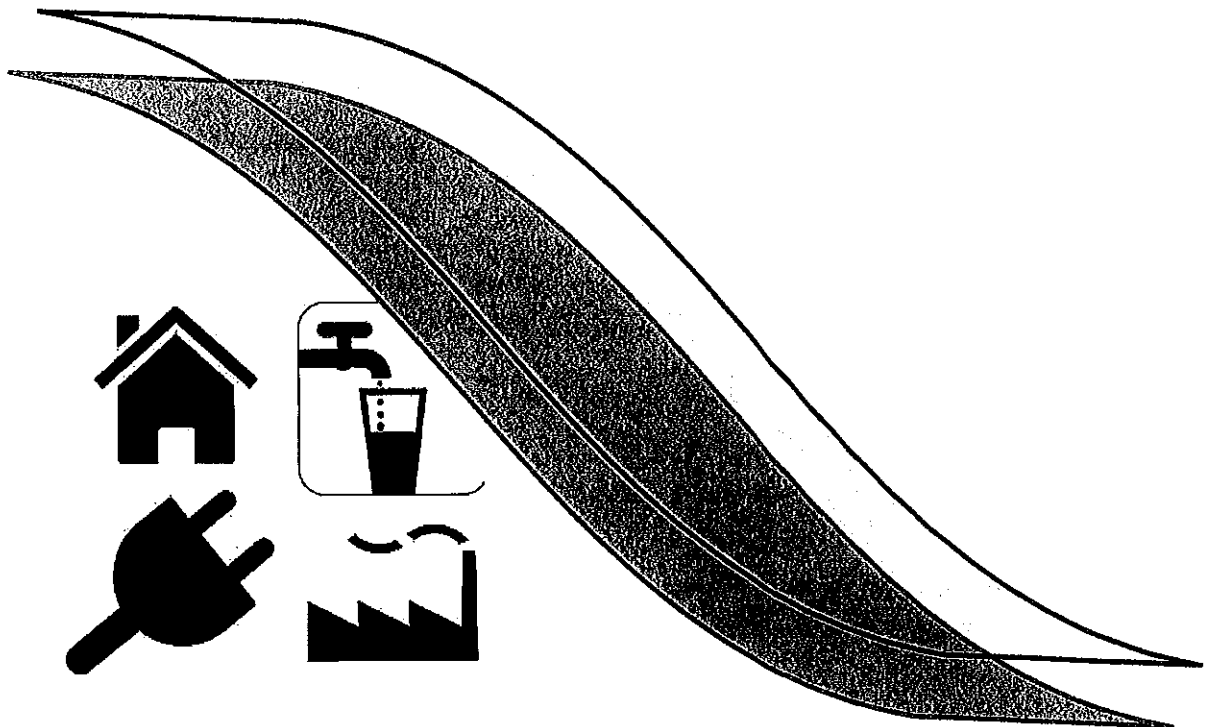
  
**Johnson Naviti Matarulapa Marakipule**  
Chairman

# **Authority's Final Decision Order**

**Case U-0002-17**

**In the Matter of VUI's Electricity Tariff Review**

**September 2018**



## Foreword

The Vanuatu Utilities and Infrastructure Limited (the 'VUI') submitted its application for a tariff review on 6<sup>th</sup> of January 2018. The Utilities Regulatory Authority (the 'Authority') has issued its Preliminary Decision on the matter on 20<sup>th</sup> of August 2018, after which ensued a period of comments from interested stakeholders via correspondences from VUI and responses obtained from electricity consumers in Luganville during public consultation undertaken in Luganville on the matter from 27<sup>th</sup> – 31<sup>st</sup> of August 2018.

VUI responded to the Authority's Preliminary Decision providing no major comments that would warrant adjustment to the proposed base rate nor raise any significant issues. On the other hand while constructive discussions and responses were obtained from electricity customers during consultation, the major issues and concerns raised by the Luganville Customers were merely on the extensions, street lights, electricity meters, understanding customer monthly bills and energy efficiency appliances etc. No major issues or discussions gave rise to adjusting the Authority's Preliminary Decision. A brief summary of customer responses and comments are highlighted under Section 7.4 of this Final Decision and Order.

Following the Preliminary Decision and the comments received during the public consultation and from the utility, the Authority orders that the tariff base rate for the period 2018/2019 be set at 38.52 Vatu/kWh. This represents an increase of 6.14% from the current tariff of 36.29 Vatu/kWh. This new base price includes the continuation of the Santo fund for electricity related projects with customer contribution of 1.00 Vatu/kWh, a 2.00 Vatu/kWh payment towards the Government Asset Contribution fee and the fuel adjustment of 4.98 Vatu/kWh for the year 2016. As detailed in the Preliminary Decision, the 2016 operations saw a very low output from hydro due to the El Nino impact resulting in significant loss to the utility to continue to maintain the required level of supply by increasing diesel output. The Hydro performance and fuel price are the factors which are beyond the control of the Utility and thus require a full recovery in the tariffs. Therefore, the increase in the current tariff of 6.14% is the direct result of the increases in the fuel cost via higher requirements for diesel generation in 2016. In response to other building blocks of tariff, the Authority has reduced average cost of Non Fuel Revenue Requirement by 0.08%. However, in the absence of the EL Nino Impact in 2016, the proposed new tariff would actually record a 7.60% decrease.

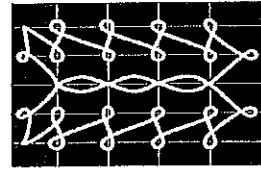
The Authority approves the revised price of 38.52 Vatu per kWh and orders this new base price to be effective following the next customer billings in Luganville and Port Olry using the revised tariff structure presented in Section 8 (Table 28) of this Order upon gazettal of this Order. The base price as set by the Authority will be effective for an annual period.

The annual reconciliation provision established in the Final Order of Case U-0001-14 shall remain in place to track variations in fuel prices, hydro operations and other variable costs estimates.

**Johnson Naviti Matarulapa Marakipule, Chairman**

**John Obed Alilee, CEO and Commissioner**





**Utilities  
Regulatory  
Authority**

## **Staff Report**

**Case U-0002-17**

**In the matter of VUI's Electricity Tariff Review**

**September 2018**

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# 1. Introduction

Table 1: Case Information

|                                     |  |
|-------------------------------------|--|
| <b>Case number</b>                  | U-0002-17  |
| <b>Applicant</b>                    | Vanuatu Utilities and Infrastructure Limited (VUI) |
| <b>In the matter of</b>             | VUI's Electricity Tariff Review                    |
| <b>Commencement date</b>            | 6 <sup>th</sup> January 2018                       |
| <b>Date of Preliminary Decision</b> | 20 <sup>th</sup> August 2018                       |
| <b>Date of Final Order</b>          | 13 <sup>th</sup> September 2018                    |

## 1.1 Purpose of this document

The purpose of this document is to present the results of the Authority's analysis and evaluation of the Vanuatu Utilities and Infrastructure Limited's (the 'VUI') electricity tariff review for the period 2018/2019 and to set out the Authority's Final Decision Order and the underlying principles which form the basis for these decisions.

The aim of the review is to determine the revised base rate that will ensure efficient and reliable electricity services to the consumers in Santo, while at the same time ensuring the financial viability and sustainability of the service provider, VUI.

Feedback from VUI and electricity consumers during public consultation on the Authority's Preliminary Decision were collected accordingly and based on Staff's review of these responses, the Authority issues its Final Decision and Order on the case.

## 1.2 Background

Since 2014, the Commission has reviewed electricity tariffs for VUI on an annual basis. The scope of this interim review is similar to the previous reviews undertaken by the Authority through the cases U-0001-14 issued in March 2014, U-0001-15 issued in June 2015 and U-0001-16 issued in January 2017 where the review assessed the changes in generation mix, customer demand and operational costs based on VUI's performance and hydro conditions.

The previous tariff reviews undertaken for VUI were based on its operations in Luganville. In December 2015, VUI signed a Memorandum of Understanding with the Vanuatu Department of Energy to rehabilitate the micro-grid in Port Olry and operate the system as an interim arrangement. Therefore, the contemporary tariff review for VUI incorporates the Port Olry operations as well and is designed to consolidate and calculate a uniform base rate for all electricity customers VUI is serving, thus Port Olry customers included.

## 1.3 Legal context

The legislations governing the regulation of generation, supply and sale of electricity in Santo are the Electricity Supply Act No.13 of 2010, the Utilities Regulatory Authority Act No.11 of 2007 (the Act) including amendments and the Port Olry Memorandum of Understanding (MOU-PO).

Section 18 of the Act specifically provides that 'the Authority may determine maximum price which may be charged to consumers in relation to any aspect of a regulated service in any place.'

Following the Supreme Court's judgement of 2014, VUI had been awarded extended right to operate the Luganville Electricity system.

## 2. Tariff Recommendations

### 2.1 Current base rate and tariff structure

The current base rate authorized for VUI is 36.29 vatu per kWh. This was the approved tariff of January 2017 Final Decision and Commission Order which became effective from February 2017 customer billings and is currently effective.

VUI's tariff is adjusted yearly to capture changes in operations, external economic and climatic factors that have impacted VUI's performance during the tariff review period. However, the Commission also has authority under the Act to require prospective changes in the rates charged by regulated utilities if it can be demonstrated that the rates are no longer reflective of the Cost of Service, nor just and reasonable.

The revised customer tariff structure as detailed under Section 8 should be applied along with application of this tariff. The onus is on VUI to adjust its billing system accordingly to reflect the tariff structure highlighted in this order.

### 2.2 Test Year and Methodology

The staff has used year 2016 as the test year to conduct the tariff review and to develop rates based on current costs, adjusted for known and measurable changes. Under the "test year period cost of service" the Staff determined the total costs incurred in conducting operations over a twelve month period and have proposed base rates that will produce revenues to match costs of that period.

The Authority has adopted the Cost of Service approach to determine the Revenue Requirements for VUI. The maximum allowable cost has been determined through an in-depth analysis of VUI's past financial performance, additional information/data provided by VUI upon Staff's request, changes in customer demand, the projected fuel price and the hydro performance. The Cost of Service ratemaking approach remains the primary methodology used by the Authority to establish just and reasonable rates.

### 3. Final Demand Forecast

The demand forecast is the projected number of customers and kWh energy consumption for the test period or the period the new tariff computed will be effective for. It is essential in estimating the revenues, generation capacity needed as well as the fuel and other costs for producing energy to meet customers' projected electricity demand in the tariff period. This forecast will also contribute in deciding on future investments in the network. The following section details how the demand is estimated for the effective tariff period.

#### 3.1 Data Acquisition

On a monthly basis, VUI furnishes to the Authority a concession report outlining components of basic technical and financial information on the electricity services in Luganville. The monthly evolution of electricity sold, new added customers and total number of connected consuming customers are sourced from this report. While the report consolidates information (e.g. electricity sold are consolidated and presented rather than by customer type), VUI was also requested by the Staff to provide details of these information that assisted in the staff's demand projection for the tariff period.

The full tariff review done in 2010 and interim tariff review performed in 2014, 2015 and 2016 on the electricity services in Luganville enabled the Staff to analyse the appropriate data and evaluate the electricity trend in Luganville. The staff also had the benefit of reviewing and analysing the Annual Technical and Financial Reports/data for prior years to assist in the demand projections.

#### 3.2 Analysis and Findings

The sales demand projection is developed to determine the billing determinant for the tariff period 2018/2019. The billing determinant is used to calculate the average base rate of electricity based on the determined net Revenue Requirements.

The staff has derived the demand forecast by defining the electricity consumption as a function of the growth in the average number of customers and growth in the level of average usage per customer. The number of customers and average usage per customer are detailed by customer type and by monthly intervals to produce a forecast highly probable to be reflected in the tariff period.

Table 2 below presents a summary of the staff analyses on projections of customer numbers.

**Table 2: Annual Customer Number by Type Projections**

| Demand Data - Customer Numbers Projection by Type |              |              |              |              |   |
|---|--------------|--------------|--------------|--------------|---|
|   | 2015         | 2016         | 2017         | 2018/2019    | Compound Annual Growth Rate (2016 - 2017 Monthly) |
| <i>Small Domestic</i>                             | 1,921        | 2,163        | 2,287        | 2,325        | 0.14%   |
| <i>Low Voltage</i>                                | 293          | 322          | 402          | 474          | 1.82%   |
| <i>Business</i>                                   | 357          | 364          | 469          | 486          | 0.29%   |
| <i>High Voltage (HV)</i>                          | 17           | 20           | 20           | 20           | 0.00%   |
| <b>Total</b>                                      | <b>2,588</b> | <b>2,870</b> | <b>3,177</b> | <b>3,305</b> |   |

For each year in Table 2 above, the customer numbers are presented as annual average. Up-to-date data (April-18) for 2018 was utilized as starting point for projecting customer in the 2018/2019 period. While the table above is showing annual figures, the actual projections undertaken by the staff were on a monthly basis.

The compound annual growth rate approach (periods in months) was utilized in deriving the growth rates used in projecting customer numbers monthly. The historic period used in deriving the growth rates was the

2017 monthly customer number data. As a forecasting technique, the most recent trend is likely the possible future progression and as such the staff's position on electing this period of time to derive the growth rates utilized in the forecast. Overall, it is benefitting to note escalating customer numbers for all customer types with exception for the HV customers throughout the respective years. In all, the staff's projections in total customer number results in an annual growth of 4.9% for the tariff period (2018/2019) from 2017 total customer number.

The staff believes this level of customer number projection is achievable given the Global Partnership on Output-Based Aid (GPOBA) has been granted extension by the World Bank until end of 2018 and the usual network extensions undertaken by VUI through the 'Connections and Extensions Material Cost' provisions allowed in the tariff and further from the Santo fund contributions all being catalyst for adding new customers. To substantiate this consideration, past trend in adding new customers is very much align with the projection given the three catalyst for growth in customer number as above mentioned.

**Table 3: Annual Average Consumption per Customer by Type Projections**

| Annual Average Consumption per Customer by Type (kWh) |         |         |         |           |
|---|---------|---------|---------|-----------|
|   | 2015    | 2016    | 2017    | 2018/2019 |
| <i>Small Domestic</i>                                 | 798     | 841     | 898     | 898       |
| <i>Low Voltage</i>                                    | 2,376   | 2,515   | 2,139   | 2,139     |
| <i>Business</i>                                       | 9,403   | 9,783   | 7,338   | 7,338     |
| <i>High Voltage (HV)</i>                              | 144,654 | 147,748 | 124,936 | 124,936   |

As depicted and notable in table 3 above, overall annual average consumption per customer increased in 2016 from 2015 and decreased in 2017 with exception for the Small Domestic Customers showing consistent growth in the average consumption per customer. This evolution in customer consumption can be held to be influenced largely by the improved efficiency in appliances (energy efficiency appliances consuming less energy) and customers' behavioural patterns and appreciating consumption and understanding their electricity bills. While this is true for most customer types, the small domestic customers however show the contrast.

In projecting the sales demand for the tariff period, the staff has utilized the annual average consumption per customer by type for 2017 to forecast electricity sales for the tariff period. As above mentioned, the notion of using the latest trend in forecasting is to - as close as possible - forecast fair electricity sales for the tariff period. Over or under forecasting will have detrimental effect on utility and customers respectively. Table 4 below presents the staff's electricity sales projections for the tariff period.

**Table 4: Final Sales Demand Projections for Tariff Period**

| Projected Annual Sales by Customer Type |                  |                  |                  |                  |
|---|------------------|------------------|------------------|------------------|
|   | 2015             | 2016             | 2017             | 2018/2019        |
| <i>Small Domestic</i>                   | 1,548,207        | 1,834,410        | 2,050,719        | 2,086,561        |
| <i>Low Voltage</i>                      | 700,217          | 809,780          | 863,686          | 1,014,359        |
| <i>Business</i>                         | 3,365,141        | 3,563,545        | 3,447,678        | 3,566,068        |
| <i>High Voltage (HV)</i>                | 2,458,535        | 2,769,188        | 2,561,528        | 2,497,959        |
| <b>Total Sales</b>                      | <b>8,072,100</b> | <b>8,976,923</b> | <b>8,923,611</b> | <b>9,164,947</b> |

The Staff determines the final projected electricity sales demand for the tariff to be 9,164,947 kWh a 2.7% increase from 2017 electricity sales.

## 4. Final Total System Requirement

The generation mix, distribution losses and the generation plant's own use will have to be estimated in order to forecast the total electricity generation required to meet the customer demand.

### 4.1 System losses

System losses is the difference between the kWh generated and the kWh sold to consumers. Table 5 below details the final projected system loss assumed for the tariff period.

Table 5: Final System Losses

| Operating Data Past Performance Analysis |        |        |        |        |                   |           |
|--|--------|--------|--------|--------|-------------------|-----------|
|  | 2014   | 2015   | 2016   | 2017   | Average (4 Years) | Projected |
| <i>System Losses</i>                     | 13.97% | 13.65% | 11.25% | 13.80% | 13.18%            | 11.25%    |

Based on the historical data performance, the Staff estimate that the quantity of kWh lost between generation and sale of energy to be **11.25%** of the total energy generated. This projection is based on the actual system loss of 2016. In the stated year, VUI's total electricity sales was the highest among the comparative years of 2015 and 2017 and concomitantly recording the lowest level of system loss at 11.25%. The Staff sees no reason as to why VUI cannot maintain this level of system loss in the tariff period. By using this proportion of loss is effectively assuming that the utility must become efficient in ensuring that should there be losses, these would be those truly warranted such as technical losses, internal usage and street light consumptions. In addition, this projection is on the assumption by staff that the utility has the capacity to keep losses as much as possible at minimum level, in doing so, promoting utility efficiency and which is beneficial to customers.

### 4.2 System Requirement

The total system requirement for the period under review is **10,326,338 kWh** which is calculated as per the following:

Table 6: Total System Requirement

|  | 2018/2019e |
|--|------------|
| Sales ( in kWh)                          | 9,164,947  |
| Losses on generation, %                  | 11.25%     |
| System losses in kWh (including own use) | 1,161,391  |
| Total system requirement, kWh            | 10,326,338 |



## 5. Final Generation Supply Mix

VUI's existing Generation Supply mix consists of Hydro, Diesel and Solar generation plant. VUI has a gross generation capacity of 4,090 kW. The total generation capacity consists of the hydro plant with a capacity of 1,200 kW, diesel generators with 2,850 kW and solar panels installed on various institutions' roofs for a total solar capacity of 40 kW. Table 7 below provides the performance measurement of VUI's electricity generation supply mix for the past three years:

**Table 7: Generation Capacity and Contribution Rate**

| Generation Source | Capacity(kW) | 2015                 |                   | 2016                 |                   | 2017                 |                   |
|-------------------|--------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
|                   |              | Energy Produced(kWh) | Contribution Rate | Energy Produced(kWh) | Contribution Rate | Energy Produced(kWh) | Contribution Rate |
| Diesel Generation | 2,850        | 2,366,756            | 24.93%            | 5,007,610            | 49.47%            | 3,298,817            | 31.47%            |
| Hydro Generation  | 1,200        | 7,069,830            | 74.48%            | 5,053,900            | 49.93%            | 7,134,970            | 68.07%            |
| Solar Generation  | 40           | 55,631               | 0.59%             | 60,190               | 0.59%             | 48,453               | 0.46%             |
| Total             | 4,090        | 9,492,217            | 100%              | 10,121,700           | 100%              | 10,482,240           | 100%              |

Table 7 above shows that major generation source of electricity is usually from Hydro, followed by Diesel and then Solar. However in 2016, almost half of electricity produced was from diesel (49.47%). This anomaly was due to the long lasting 'El Nino/dry' season that affected the country from late 2015 to 2016. Typically, hydro capacity is sufficient to meet most of VUI's system base load except when the hydro units are down for maintenance or due to bad weather conditions as was experienced in 2016. The efficiency of the generation supply mix directly correlates with the fuel cost which is one of the major cost components in determining the base price. Therefore, reasonable projections by the staff of the changes in generation supply mix for the test year period is very important to ensure a smooth operation by VUI during unpredictable weather conditions and the changes in diesel fuel prices.

That said, the Authority during its annual tariff reviews ensures that the utility is protected and compensated accordingly for the losses it assumes when actual operations shows a contrasting image of what was assumed during a tariff review.

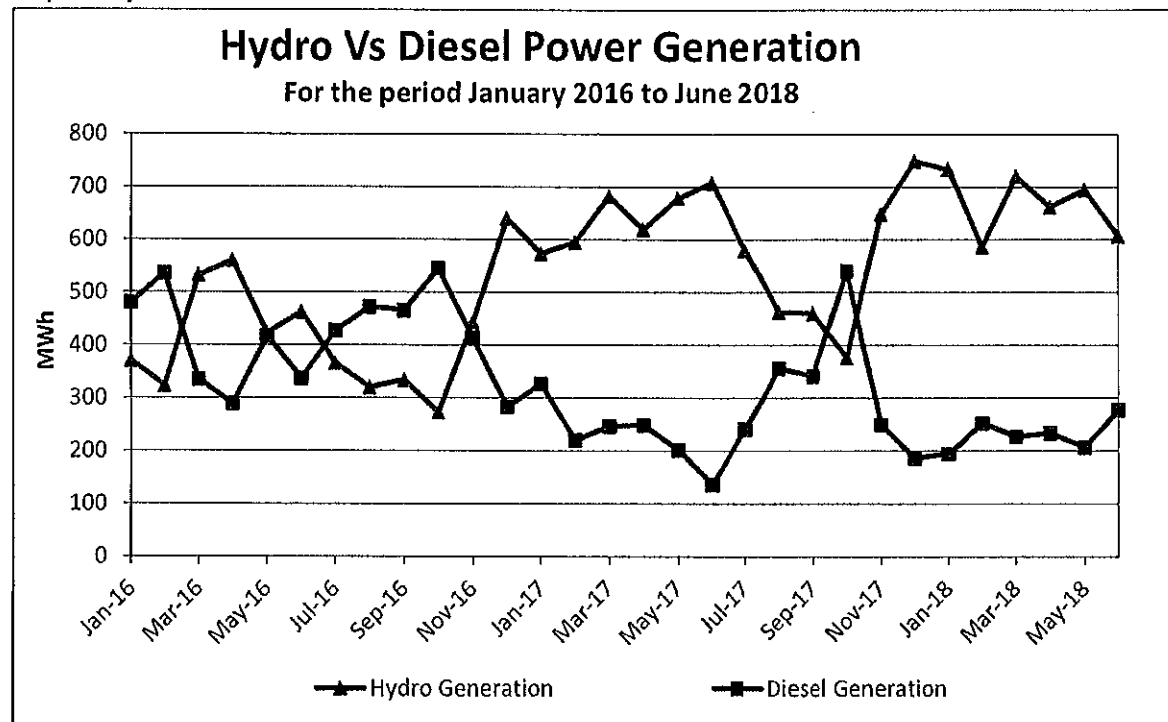
## 5.1 Hydro Generation Supply

As mentioned, VUI's Hydro performance has been significantly affected by the recent "El Nino" which has led to the prolonged period of minimum rainfall, thus decreasing VUI's hydro contribution rate from 74.48% of the total electricity generation in 2015 to 49.43% in 2016 (25.05% decrease in hydro performance). After 2016, hydro contribution rate increased to 68.07% in 2017.

For the tariff period, it is anticipated that the El Nino season is over and weather conditions are normalized and will persevere.

Graph 1 below depicts the comparison for 'VUI's Hydro Vs Diesel Power Generation Supply' over a 30 months period from January 2016 to June 2018.

Graph 1 – Hydro Vs Diesel Power Generation



Graph 1 above shows that there has been a continued decline in the Hydro power generation supply from April to October 2016 where it reached its lowest generation point and from November 2016, generation spike to early January 2017. The 2017 period reveals high level of hydro performance with a downfall from June to October 2017. The months of November and December 2017 shows an increase again in hydro output performance with steady momentum in hydro output in the first semester of 2018. It is expected this high hydro performance will preserve to be only affected by months with lower rainfall (June – October).

In determining total energy production from hydro generation for purpose of this review, Staff has computed an average hydro utilization rate from January 2017 to June 2018.

Table 8 below shows the staff computation of the hydro utilization rate for the tariff period.

## Hydro Performance – 2018

Table 8: URA Final Hydro Utilization Rate

| Month          | Hydro Gen. (kWh) | Total Gen. (kWh) | Hydro Contribution Rate | Hydro max. output (excluding 3% of downtime) (kWh) | Hydro Utilization Rate |
|----------------|------------------|------------------|-------------------------|--|------------------------|
| Jan-17         | 573,660          | 906,010          | 63%                     | 866,016.00   | 66.24%                 |
| Feb-17         | 595,420          | 820,242          | 73%                     | 782,208.00   | 76.12%                 |
| Mar-17         | 681,740          | 933,721          | 73%                     | 866,016.00   | 78.72%                 |
| Apr-17         | 619,910          | 872,876          | 71%                     | 838,080.00   | 73.97%                 |
| May-17         | 678,810          | 883,877          | 77%                     | 866,016.00   | 78.38%                 |
| Jun-17         | 707,630          | 839,950          | 84%                     | 838,080.00   | 84.43%                 |
| Jul-17         | 580,070          | 816,364          | 71%                     | 866,016.00   | 66.98%                 |
| Aug-17         | 463,060          | 814,951          | 57%                     | 866,016.00   | 53.47%                 |
| Sep-17         | 460,380          | 797,799          | 58%                     | 838,080.00   | 54.93%                 |
| Oct-17         | 376,980          | 913,995          | 41%                     | 866,016.00   | 43.53%                 |
| Nov-17         | 648,620          | 894,712          | 72%                     | 838,080.00   | 77.39%                 |
| Dec-17         | 748,690          | 931,843          | 80%                     | 866,016.00   | 86.45%                 |
| Jan-18         | 733,800          | 931,967          | 79%                     | 866,016.00   | 84.73%                 |
| Feb-18         | 586,910          | 844,556          | 69%                     | 782,208.00   | 75.03%                 |
| Mar-18         | 720,370          | 952,245          | 76%                     | 866,016.00   | 83.18%                 |
| Apr-18         | 662,400          | 900,402          | 74%                     | 838,080.00   | 79.04%                 |
| May-18         | 694,430          | 905,998          | 77%                     | 866,016.00   | 80.19%                 |
| June-18        | 607,280          | 888,312          | 68%                     | 838,080.00   | 72.46%                 |
| <b>Average</b> |                  |                  |                         |  | <b>73.07%</b>          |

Table 8 above provides the analysis for the hydro utilisation rate for VUI from January 2017 to June 2018. The 2017 utilization rates demonstrate that weather patterns have normalized since the 'El Nino' in late 2015 to 2016. The utilization rates in the first half of this year shows same pattern from 2017. The utilization rate projected above takes into consideration hydro downtime for maintenance periods and under-load during off-peak hours at a rate of 3%.

Therefore the Staff assumes a hydro utilization rate of 73.07% to be reasonable for the tariff period. With this projection, the anticipated energy to be generated by the hydro plant is 7,681,130 kWh contributing 74.38% towards the total generation requirements. Table 9 below provides the detail.

Table 9: Final Hydro Generation (kWh)

| Based on projected hydro generation (kWh) |                  |
|---|------------------|
| Projected Total Energy Generation         | 10,326,338       |
| Projected Hydro Contribution Rate         | 74.38%           |
| <b>Projected Hydro Generation(kWh)</b>    | <b>7,681,130</b> |

In 2016 the hydro performance level of VUI was uncertain, due to the El Nino. For this tariff review the staff has taken into account the impact of the El Nino in 2016 relieving VUI for the unplanned purchases of extra fuel that was needed to make up for the total electricity generation demanded during that period. This is covered under the Fuel Cost Reconciliation under section 7.2.3.

Overall, the staff's final projection of the hydro utilization rate is 73.07% (which results in a Hydro Contribution rate of 74.38% towards the total generation requirements) used in determining the final revenue requirements for the tariff period.

## 5.2 Diesel Generation

The maximum hydro power output is 10,512,000 kWh (assuming hydro is performing at its maximum capacity on an annual basis) which can cater for the total projected total required energy for the tariff period. However, due to technical failures, unpredictable weather conditions, peak demands and high operating costs, diesel units are used as a back-up and to match the demand that cannot be covered by hydro and solar during unfavourable weather conditions. Therefore, the quantity of energy to be produced by the diesel units is calculated by subtracting the quantity estimated to be generated by the renewable energy sources (Hydro & Solar) from the total generation.

Table 10: Final Projected Diesel Generation (kWh)

| Projected Diesel Generation (kWh) |            |
|-----------------------------------|------------|
| Projected Total Energy Generation | 10,326,338 |
| Projected Hydro Generation        | -7,681,130 |
| Projected Solar Generation        | -54,343    |
| Projected Diesel Generation(kWh)  | 2,590,865  |

Additionally, the staff has projected an annual output from solar of 54,343 kWh based on the solar capacity 40kW. This represents 15% of solar output at full capacity in a given year.

## 6. Final Cost of service

Cost-of-service is defined as the amount of revenue a regulated utility must collect from rates charged to its consumers in order to recover fair and reasonable cost of doing business. These costs include operating and maintenance expenses, fuel expenses, depreciation expense, taxes and a reasonable return (management fees). While 2016 is utilized as the test year period, the staff has analyzed the 2016 financial and technical data in determining the reasonable cost of service for the tariff period.

This section is devoted to defining each major element of the cost-of-service, explaining how each element is computed and explaining the relationship between the various components used to compute the cost-of-service.

### 6.1 Fuel and lubricants

A significant portion of VUI's monthly operating expenses is the cost of fuel consumed by the diesel generating plants in the production of electricity supplied to its customers. The total fuel cost depends on the following factors:

- 1) The price VUI pays for diesel fuel (cost per liter);
- 2) The fuel conversion efficiencies (heat rates) of the diesel generating plants;
- 3) Total liters of fuel required to generate the required level of electricity based on the anticipated power to be produced by diesel generators.

Fuel cost change whenever one or more of the above factors are altered.

#### 6.1.1 Fuel Price

The fuel prices are largely influenced by international fuel markets and, as such, are subject to large variability and unpredictability. Therefore, the prices of fuel oil used for electricity generation are largely outside the control of VUI. The diesel price in Dec-17 was 77.31 and in Jun-18 stands at 87.45 vatu per litre. The fuel price is deemed to increase but on a slow momentum through the half of this year into early next year. From staff's fuel projection, the forecasted fuel price for the tariff review period is 92.13 vatu per liter. This projection is based on the short term energy outlook data reported by the World Bank Forecast and the Knoema projections<sup>1</sup>. The projections undertaken by the staff includes the time lag between when the local diesel price reflects international trend.

#### 6.1.2 Heat Rate

Heat rate is a measure of the technical efficiency of a thermal power plant or generating unit. It is defined as the amount of fuel energy input used by a generating unit or power plant to generate one kWh of electricity. The Staff assumed a heat rate of 0.2927 liter/kWh for the tariff review period. The projection is based on the overall annual average performance of 2015, 2017 and 2018 year-to-date. 2016 is regarded as an outlier due to the El Nino impact resulting in more reliance on fuel and therefore increases the heat rate efficiency. A 1% efficiency factor is applied to the assumed heat rate for the tariff period to determine the level of fuel cost. The rationale for applying 1% efficiency is that the utility has the benefit of the repair and renewal provisions allowed through the tariff to ensure all generators are in good working conditions. In addition, it is important mentioning that from reviewing monthly data despite high hydro contribution, heat rates achieved by the diesel plants are lower than the average derived as detailed in Table 11 below.

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<sup>1</sup> <https://knoema.com/infographics/yxtpab/crude-oil-price-forecast-2017-2018-and-long-term-to-2030>  
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Table 11: Final Heat Rate

| Actual Heat rate : Litre/kWh 2015-2017 |               |               |               |               |
|--|---------------|---------------|---------------|---------------|
| Year                                   | 2015          | 2016          | 2017          | 2018          |
| January                                | 0.3285        | 0.2752        | 0.2960        | 0.2876        |
| February                               | 0.2959        | 0.2834        | 0.2989        | 0.2976        |
| March                                  | 0.2919        | 0.2828        | 0.3031        | 0.2807        |
| April                                  | 0.2954        | 0.2911        | 0.3053        | 0.3055        |
| May                                    | 0.2984        | 0.2769        | 0.2985        | 0.3153        |
| June                                   | 0.2954        | 0.2832        | 0.2923        | 0.2859        |
| July                                   | 0.2928        | 0.2795        | 0.2931        | -             |
| August                                 | 0.2956        | 0.2903        | 0.2908        | -             |
| September                              | 0.2807        | 0.2886        | 0.2965        | -             |
| October                                | 0.2855        | 0.2861        | 0.2902        | -             |
| November                               | 0.2831        | 0.2888        | 0.2959        | -             |
| December                               | 0.2933        | 0.2990        | 0.2996        | -             |
| <b>Average</b>                         | <b>0.2947</b> | <b>0.2854</b> | <b>0.2967</b> | <b>0.2954</b> |
| Average Heat Rate, 2015-2017 = 0.2947  |               |               |               | 0.2947        |
| Apply Efficiency Factor of 1%          |               |               |               | 0.2927        |

### 6.1.3 Fuel Cost

Table 12: Final Fuel &amp; Lubricant Cost

| Projected Fuel & Lubricant Cost            |                   |
|--|-------------------|
| Projected Diesel Generation(kWh)           | 2,590,865         |
| Projected Heat Rate                        | 0.2927            |
| Diesel Used in Generation(litres)          | 758,346           |
| Forecasted Fuel Price(Vatu/Litre)          | 92.13             |
| Projected Fuel Cost                        | 69,851,245        |
| Projected Lubricant Cost                   | 1,563,723         |
| <b>Projected Fuel &amp; Lubricant Cost</b> | <b>71,414,968</b> |

Table 12 above provides the final computation of the projected fuel and lubricant cost<sup>2</sup> for the tariff review period which is based on the justifications and analysis provided above. Therefore, the Staff has recommended an allowable expense of **71,414,968 VT** for fuel and lubricant cost.

## 6.2 Labour Cost

The labour cost component of the cost of service should and must only include the salary, allowances and benefits of the local labour. The labour cost and other related expenses (travel, accommodation etc) of the expat staff are included in the man month fee which is calculated separately and is discussed in the following sections. Table 13 below provides the final labour cost calculation for the tariff review period.

<sup>2</sup> Lubricant cost is based on the price of 284 vatu per litre and on the assumption that 0.0018 litres of lubricant is required to generate 1 kWh of energy.

**Table 13: Final Labour Cost**

| Labour Cost per 2016 Audited Financial Statement                    |                   |
|---|-------------------|
| Actual Salary Cost - 2016 Audited financial statements              | 63,008,585        |
| Number of staff - 2016 Audited Financial Statement                  | 37                |
| Cost per Employee (including salary, Benefits, Severance and Bonus) | 1,702,935         |
| Allowed Projected Labor Cost for Tariff Period                      |                   |
| Total Number of Employees - information provided by VUI             | 37                |
| Total Base Salary   | 32,805,205        |
| Seniority   | 9,480,748         |
| Benefits & Allowances   | 8,063,896         |
| Severance   | 3,523,829         |
| Vanuatu National Provident Fund (VNPF) Employer Contributions 4%    | 1,691,438         |
| Vacation Leave  | -                 |
| Bonus (6%)  | 3,020,991         |
| <b>Total Allowed Annual Cost of Local Labour</b>                    | <b>58,586,107</b> |
| Cost per Employee   | 1,583,408         |
| Total Number of Employees - information provided by VUI             | 37                |
| Projected Salary Cost   | 58,586,107        |
| Add : 3% provision for staff increments & additional Hire           | 3%                |
| 3% for increment and additional hire in Vatu                        | 1,757,583         |
| <b>Total Projected Labor Cost</b>                                   | <b>60,343,691</b> |

In calculating the local labour cost for the tariff period, Staff scrutinized each component of the labour cost in order to determine a fair and reasonable cost to be passed through the tariff. The labour cost components which are being reviewed and adjusted to a reasonable and prudent level are discussed in detail below.

### 6.2.1 Severance Allowance

Severance pay, allowance or package is benefits employees receive when they leave employment at a company given employees have served the same employer for periods not less than 12 months. This is a statutory requirement as well under the Vanuatu's Employment Act.

The staff recalculated the severance allowance to only reflect one year of severance provision for each employee. This is to align the expected severance to be collected through revenues for the tariff period. For every 12 months an employee is supplying service to its employer, severance allocation is computed as a month per annum salary at current rate. The staff has undertaken similar approach in the calculations for the severance provision.

In addition, VUI clarified that the seniority allowance is part of the base salary as it holds respective increments appropriated to its staff. This was taken into account to arrive at the annual severance allocation as detailed in Table 13 above.

### 6.2.2 Employer's Contribution to Employee's Provident Fund

The contribution to this fund is required under the Vanuatu National Provident Fund Act obligating the employer to contribute 4% of the employees' salaries. The staff has recomputed this 4% contribution derived from the base salary and seniority (which also forms part of base salary) to arrive at the employer's contributions presented in Table 13 above.

### 6.2.3 Vacation Leave

VUI has requested a total of VT 696,036 per year as an additional cost allowance for its employees vacation leave. The staff does not consider such expense to be allowed as the annual leaves already form part of the employees' base salary and should not constitute another separate allowance/expense for such purpose.

### 6.2.4 Bonus

Bonus payment is usually made to employees in addition to their base salary and is typically a compensation for employees' performance throughout a given year remunerated to employees once (naturally at end of each year). It is ordinarily a management decision on what basis the bonus package should be computed on based on profitability and performances provided there are no specific standards on how the bonus allowance should be computed. Clarifications from the utility revealed that all employees are entitled to bonus package and not necessarily performing staffs.

In addition, VUI commented on the low turnover of its staff and the high level of competency and efficiency of its employees as grounds for awarding bonus to all its employees. However, there was no evidence provided by VUI to validate the maximum level of efficiency and competency of all its employees. Furthermore, in a normal business environment, it is not necessarily a fact that all employees are being paid bonuses and thus such practise by VUI is perceived to be unjustified.

The staff performed certain analysis to assess the efficiency level of VUI's employees since its inception in Luganville from 2013 to 2016. Based on the available technical and financial data, the following indicators were assessed as detailed in Table 14 below:

Table 14: Employees' Performance Assessment

| Employee Performance Assessment            |          |             |             |             |             |
|--|----------|-------------|-------------|-------------|-------------|
|  | Unit     | 2013        | 2014        | 2015        | 2016        |
| Number of Customer/employee                | No       | 56          | 58          | 62          | 69          |
| Power Sold/employee                        | kWh      | 187,687     | 186,385     | 195,147     | 213,886     |
| Network Length (HV)/employee               | Meters   | 1,652       | 1,699       | 1,812       | 1,882       |
| Assessment: Change in % from previous Year |          |             |             |             |             |
| Number of Customer/employee                | %        | 4.7%        | 2.2%        | 8.6%        | 10.8%       |
| Power Sold/employee                        | %        | 4.2%        | -0.7%       | 4.7%        | 9.6%        |
| Network Length (HV)/employee               | %        | 2.8%        | 2.9%        | 6.7%        | 3.8%        |
| <b>Average</b>                             | <b>%</b> | <b>3.9%</b> | <b>1.5%</b> | <b>6.6%</b> | <b>8.1%</b> |
| <b>Overall Average from 2013 to 2016</b>   | <b>%</b> | <b>5.0%</b> |             |             |             |

The indicators above reveal progressive movement in employee efficiency level and utility as a whole. However, the increases in the above productivity levels are not necessarily as a direct result of the improved employee performance. Factors such as effective management controls, technological innovations and changes in economic conditions also affect the productivity levels of the Utility. Thus, the Staff believes and wishes to reiterate that bonuses should and must be appropriated to employees based on annual performance appraisal of individual employees. In the absence of concrete evidences provided by VUI, the staff has applied a 6% allowance to the total bonus package (1 month's remuneration inclusive of allowance) for all local employees as the bonuses allowance for the tariff period.

### 6.3 Management Fee (Man month)

As per section 3(I) of the MOU, VUI is allowed to earn a fee of US\$30,000 per man-month (which will be paid pro rata for periods of less than a month) and such fee includes all salaries, accommodation, travel and other allowances of the staff member. In order to calculate the Man Month fee, the staff projected the salary cost of all expat staff of VUI for the tariff period and added a 10% as overhead/margin (10% of Net



Revenue Requirement) to determine the overall Man Month fee. The final salary cost of VUI expat staff was determined based on the following calculations:

- Monthly base salary for each Expat Staff (information provided by VUI);
- Provision for accommodation allowance, VNPF and Home passage for each expat staff;
- Provision for immigration allowance as most of the Expat staffs are recruited from abroad thus are obliged under the immigration Act for the employer to satisfy cost of employing these Expats locally; and
- Provided an additional 10% of Net Salary for each expat staff to allow for other benefits and travelling expenses.

Table 15 below provides the summary of the final Man Month Fee which is projected at 58,409,594 vatu (18.43 man months) for the tariff period:

**Table 15: Final Man Month Fee**

| Projected Man Month Fee                                      |                   |
|--|-------------------|
| Projected Expat Salary Cost(including benefits & Allowances) | 31,221,542        |
| Man Month Fee (10% of Net Revenue Required 2016)             | 27,188,052        |
| <b>Total Man Month Fees</b>                                  | <b>58,409,594</b> |
| <b>Total Number of Man Months determined</b>                 | <b>18.43</b>      |

## 6.4 Repair and Renewal Expenses

The actual expenses for repair and renewal have remained almost the same for the year 2015 and 2016. Therefore, the staff has allowed the final repair and renewal expenses to be the actual repair and renewal expenses in 2016.

**Table 16: Repair and renewal provisions**

|                                     | 2013       | 2014       | 2015       | 2016       | 2018/2019e        |
|-------------------------------------|------------|------------|------------|------------|-------------------|
| Repair and renewal provisions, vatu | 27,039,696 | 16,782,971 | 16,653,748 | 17,111,013 | <b>17,111,013</b> |

## 6.5 Depreciation Expense

As per section 3(j) of the MOU, VUI must maintain all assets in good working order but shall not be responsible for any major Capital Investments. For that reason, VUI's Capitalised Fixed assets mainly include assets such as office furniture, fixtures and equipments, Computer & Accessories, 2 Generators and Leasehold improvements. The Net Book Value of these assets is 9,583,364 with an annual depreciation of 1,040,505 in year 2016. This annual depreciation expense has been allowed for the tariff period.

Furthermore, it is important to note that VUI has purchased a number of Motor Vehicles used in the course of service. The 2016 annual depreciation expense for these motor vehicles have been appended to the overall depreciation expense abovementioned to arrive at a total depreciation expense of VT 2,167,026. Section 6.10 on Motor Vehicle Leases elaborates further on these vehicles.

## 6.6 Connections & Extensions Material Cost

**Table 17: New Installations provisions**

|  | 2013       | 2014       | 2015       | 2016       | 2018/2019e        |
|--|------------|------------|------------|------------|-------------------|
| Connections & Extensions Material Cost, vatu | 15,990,445 | 16,641,660 | 20,107,616 | 17,640,691 | <b>18,769,827</b> |

It can be concluded from table 17 above, that the connections and extensions material cost has been increasing since year 2012 up until 2015 when it was reduced to VT 17,640,691. The decreased cost in year 2015 may be the result of the introduction of the GPOBA project which is designed to provide subsidies for low income consumers to connect to the electricity grids. While the average cost of connections and extension material cost for the years 2012 to 2016 is VT 17,830,048 the staff perceives the real 2016 cost is at an appropriate level and is accepted to be included into the new tariff period.

## 6.7 Provisions for Doubtful Debts

The Authority will only recognise the actual bad debts written-off for rate making purposes. Upon analysing the 2016 audited financial statement of VUI, it was identified that VUI has not recorded any actual bad debt expenses, however has created provisions for doubtful debts. VUI was separately requested to provide bad debts written off if any in the 2016 financial year. VUI did not provide any amount as bad debts written off for the 2016 financial year.

The total trade debtors as at year end 2016 is VT 30,323,292 increase of 7% (VT 1,995,311) from previous year. The doubtful debt provision for 2016 is VT 15,980,542 reflecting an addition of VT 3,515,317 (28% increase) to the 2015 annual provisions.

The staff has allowed 5% of the 2016 trade debtors balance (VT 30,323,292m) as the final bad debts expenses. Therefore, for the tariff period the final projected bad debts expense is **VT 1,516,165m**.

## 6.8 Street Lighting

As ordered in the Final Order of case U-0001-14 on Luganville Tariff Review dated March 2014, the operation and maintenance of Street Lighting have been taken over by the utility and will be managed and financed by the utility. The Staff's findings are that the management of the Street Lighting has improved considerably. With more than half of the street lights changed to donated LED bulbs (energy saving bulbs), the energy use and cost of the street light operation has significantly fallen in 2015 and 2016 as well (41% and 49% respectively when compared to 2014 cost). The Staff assumes the level of street lighting costs for the tariff period to be at similar level as in 2016.

VUI during preliminary discussions argued at the level of street lighting expense allowed for the tariff period to be low and not reflective of current cost. However, no current or up-to-date street lighting cost was provided by VUI thus the 2016 cost were assumed for the tariff period.

The projected energy consumed by the Street Lights for the tariff period is excluded from the final projected energy sales demand and are included in the final total system requirements as losses.

**Table 18: Final Street Lighting Cost**

|                 | 2012 | 2013 | 2014      | 2015      | 2016      | 2016 (Final)     |
|-----------------|------|------|-----------|-----------|-----------|------------------|
| Street Lighting | -    | -    | 2,680,353 | 1,576,769 | 1,339,528 | <b>1,339,528</b> |

## 6.9 Insurance

The Staff has not noted any major increase in the insurance cost for the past four years. The average insurance cost for the period 2012 to 2016 is VT 17,876,036. With the absence of any new development forecasted for 2016, the Staff assumes that the cost of insurance should be in line with the past year. It is unlikely that insurance premiums may go up during the tariff period; therefore the final insurance cost for the tariff review period is as per the actual cost of insurance in year 2016.

**Table 19: Final Insurance Expenses**

|                       | 2011       | 2012       | 2013       | 2014       | 2015       | 2016       | 2017-2019 |
|-----------------------|------------|------------|------------|------------|------------|------------|-----------|
| Insurance costs, vatu | 18,419,329 | 17,237,283 | 18,431,304 | 18,740,263 | 16,552,000 | 16,552,000 |           |

## 6.10 Motor Vehicle Leases

The staff noted a significant increase in the cost of motor vehicle lease in 2016 of VT 15,600,000 as compared to 2015 motor vehicle leases of VT 5,562,000 an increase by 180%. Staff performed investigation into the motor vehicle leases and identified that the total vehicle lease expense for 2016 was in fact VT 24,288,000 with VT 8,688,000 captured under the cost of sales.

Upon further examination conducted by the staff to scrutinize the cause of the significant increase, it was identified that VUI decided to purchase 8 motor vehicles utilized in the course of service provision and lease those vehicles to the concession because of the inability to invest under the current MOU arrangements with the Government. The decision for such practise as clarified by VUI was due to high vehicle repair cost that is even beyond the cost of purchasing new vehicles. VUI claimed that the lease rates applied are lower than market rates for comparable lease terms and type of assets.

Staff performed research and analyses to compare the lease rates applied by VUI with average market rates. It was identified that market lease rates are well below the lease rates VUI is applying for these vehicles. An example, for a Toyota Hilux dual cabin, VUI's lease rates is approximately VT 15,215/day (assuming 265 working days per annum) while market average rates for comparable vehicle is VT 7,000/day for a year. It is less than half of what VUI proposes to claim in the tariffs. Furthermore, it can be noted that annual lease charges are way over the vehicles' historical costs provided most of these vehicles are second hand vehicles.

Table 20 below outlines the details for 3 of those leased vehicles:

**Table 20: Motor Vehicle Annual Lease and Historical Cost**

|                  | Vehicle Annual Lease and Depreciation Cost |                 |   |
|------------------|--|-----------------|---|
|                  | Annual Lease Cost                          | Historical Cost | % of annual lease cost over historical cost |
| Toyota Hilux     | 4,032,000                                  | 3,231,667       | 125%  |
| Hyundai Galloper | 2,304,000                                  | 500,000         | 461%  |
| Cherry Picker    | 4,032,000                                  | 1,244,444       | 324%  |

The Staff considers such management decision and business arrangement to be costly and imprudent.

To apply a fair and reasonable cost through the tariffs and simultaneously uphold fairness to the utility and customers, the Staff has disallowed the vehicle annual lease cost for the tariff period. However to compensate the utility for the vehicle cost incurred in providing the electricity services, the 2016 annual depreciation expense for these vehicles are incorporated into the depreciation expense as covered above under section 6.5. The staff has recalculated the vehicles depreciation expenses taking into consideration the historical cost and purchased dates of these vehicles. The total 2016 depreciation cost was VT 1,126,521. In addition, a repair and maintenance allowance was provided to VUI computed as 20% of the total historical cost of all motor vehicles amounting to VT 2,244,439.

A 10% of the net book value of all motor vehicles as at 2016 year end was further granted to compensate VUI on the cost of capital incurred to purchase those vehicles. This amounts to VT 90,293. Total amount allowed in the tariffs to be borne by customers is VT 3,461,242 in place of the Motor Vehicle Lease.

## 6.11 Goods and Other costs

Goods and other costs include expenses such as Communication expenses, postage & shipping, travel & accommodation and Transmission & Distribution pruning management expenses. An assessment of this cost item shows no significant deviation for years 2015 to 2016.

Nonetheless, Port Olry expense of VT 2,154,287 has been excluded from the Goods and Other Costs as Port Olry expenses are analysed separately. This has reduced the overall Goods and Other Costs of VT 29,926,675 in 2016 to VT 26,926,675 a 7% reduction. The 2015 real Goods and Other Costs is VT 24,178,098.

Therefore the final Goods and Other Costs for the tariff period determined by the staff is VT 26,926,675.

## 6.12 Port Olry Operations

As aforementioned, the Port Olry cost of service is incorporated into the Luganville cost of service enabling a uniform tariff to be charged to all Luganville and Port Olry customers.

In amalgamating the Port Olry and VUI Luganville operations from previous tariff review exercise, the agreement initiated between the Authority and VUI has seen continual benefits to the Port Olry customers. The Port Olry customers were being subsidized by the Luganville customers in the sense that a uniform tariff which is lower than the initial Port Olry tariff of 150vt/kWh is shared among the Port Olry and Luganville customers. This also enables the Utility to recover its cost of service for operating the Port Olry micro grid.

Therefore in this current review, the Staff shall have this arrangement remain in effect. It is however, anticipated that this arrangement shall be incorporated in the ongoing tender process for Luganville concession bid.

**Table 21: Port Olry Operations – Final Cost of Service**

| Projected Cost of Service – Port Olry Operations       | (Vatu)           |
|--|------------------|
| Local Labor Salary Cost(including Allowances/Benefits) | 2,415,674        |
| Man Month Fees   | -                |
| Fuel & Lubricant Expenses                              | 2,904,129        |
| 250 Hours Maintenance                                  | 214,769          |
| T&D Installation Material Cost                         | 330,908          |
| Office Supplies  | 521,081          |
| Customs Duty   | 463,468          |
| Motor Vehicle  | 418,391          |
| Other Expenses(below 100k vatu)                        | 2,318,877        |
| <b>Total Cost of Service</b>                           | <b>9,587,296</b> |

**Table 22: Port Olry Operations – Final Demand Forecast**

| Projected Demand Forecast – Port Olry Operations | Annual Forecast | Justification                               |
|--|-----------------|---|
| Total Generation (kWh)                           | 92,212          | Monthly Average $\times$ 12 months          |
| System Losses                                    | 9%              | Monthly Average (Jan 17 to Dec 17)          |
| Energy Sold (kWh)                                | 83,909          | Total Generation $\times$ (1-System Losses) |

Table 21 and 22 above provides the final projected cost of service and demand forecast for the Port Olry operations which will be factored into the overall tariff model for VUI to determine the average base rate to be charged to all VUI customers (Port Olry and Luganville customers).

### 6.13 Final Cost of Service Summary

**Table 23: Final Cost of Service Summary**

| Cost of Service Summary         |                    |                    |
|---------------------------------|--------------------|--------------------|
| Cost of Service Component       | 2016/2017          | 2018/2019          |
| Labor                           | 54,567,989         | 60,343,691         |
| Man Month Fee                   | 56,420,252         | 58,409,594         |
| Fuel and lubricant              | 60,244,827         | 71,414,968         |
| Repair & Renewal Fund/Provision | 16,653,748         | 17,111,013         |
| Goods and Other Cost            | 21,821,498         | 26,926,675         |
| Depreciation Expense            | 1,637,172          | 2,167,026          |
| Insurance                       | 18,740,263         | 16,552,000         |
| New Installation Materials      | 17,640,691         | 18,769,827         |
| Projected Bad Debt Expenses     | 1,416,399          | 1,516,165          |
| Street Lighting                 | 1,576,769          | 1,339,528          |
| Other Operating Expense         | 22,086,108         | 14,930,791         |
| Port Olry- Cost of Service      | 8,046,236          | 9,587,296          |
| <b>Total</b>                    | <b>280,851,953</b> | <b>299,068,574</b> |

## 7. Final Revenue Requirement and Base Rate Adjustments

### 7.1 Revenue Requirement

Revenue Requirement represents the total annual revenues required by the utility to recover its reasonable and necessary cost incurred in providing the electricity services to the customers and to allow the utility to earn a fair rate of return in order to be financially viable.

In order to calculate the Revenue Requirement for VUI, the Staff has applied the formula below:

$$\text{Revenue Requirement} = \text{Cost of Service} - \text{Non Electricity Sales Revenue}$$

The cost of service component of the Revenue Requirement is already discussed and determined as per section 6 of this report. Section 7.1.1 below will discuss the calculations for Non Electricity sales revenue.

#### 7.1.1 Non Electricity Sales Revenue

The tariff base rate for VUI computed should incorporate only those costs incurred by the utility in providing the electricity services to the customers (regulated services). However, the utility also generates revenues from non – regulated services for which the corresponding cost is included in the tariff base price (through cost of service component) and borne by the customers. Therefore, it is important that revenues from non-regulated activities are excluded from the Revenue Requirement in order to determine the Net Revenue Requirement which reflects the prudent cost of providing the electricity services only. Table 24 below provides the summary of the revenues from non-regulated services (Non-electricity sales revenue) for the past 4 years.

Table 24: Revenue from Non-Regulated Services

| Solomon Islands Electricity Corporation Revenue Requirement 2013/2014/2015/2016 |                   |                   |                   |                   |                      |
|---|-------------------|-------------------|-------------------|-------------------|----------------------|
|   | 2013              | 2014              | 2015              | 2016              | Average(2013 - 2016) |
| Revenue from Transmission & Distribution Services                               | 5,959,197         | 18,008,490        | 11,508,276        | 15,047,398        | 12,630,840           |
| Reconnection & Late Payment Fees  | 1,141,580         | 1,392,362         | 988,593           | 1,400,836         | 1,230,843            |
| Interest Income (Term deposit)  | 1,962,115         | 2,178,221         | 1,700,229         | 1,518,178         | 1,839,686            |
| Other Miscellaneous Income  | 2,693,821         | 884,731           | 155,921           | 201,135           | 983,902              |
| <b>Total</b>  | <b>11,756,713</b> | <b>22,463,804</b> | <b>14,353,019</b> | <b>18,167,547</b> | <b>16,685,271</b>    |

The Staff has used the average of the non-electricity sales revenue for the past 4 years (2013 – 2016) to project the non-electricity sales revenues for the tariff review period 2018/2019. Therefore, the average revenue for non-electricity sales of **16,685,271 Vatu** will be deducted from the Gross Revenue Requirement to determine the Net Revenue Required for tariff determination.

Table 25: Net Revenue Requirement

|  | 2018/2019          |
|--|--------------------|
| Gross Revenue Requirement ( Cost of Service) | 299,068,574        |
| Revenues from Non-Regulated Services         | 16,685,271         |
| <b>Net Revenue Requirement</b>               | <b>282,383,303</b> |

### 7.2 Base rate adjustment

The following adjustments are made to the final determined base rate:

### 7.2.1 Government asset contribution fee fund

The Commission established the Government asset contribution fee fund (the Government fund) in June 2015 through VUI's Final Decision and Commission Order of Case U-0001-15. This fund was initiated to partially reimburse the Government for use of the Government assets by VUI in providing electricity services throughout Santo at a rate of 2 Vatu per kWh billed/sold.

The Fund has been used in the initial setting up of the National Green Energy Fund (NGEF) Unit as per Council of Minister's (COM) decision 91 of 2017 allocating VT 7.3m towards NGEF. In addition, VT 15m has been set aside to financially assist with kick-starting the operations of the 5 Bio-Fuel projects on Ambae and Sola as outline in COM's decision of September 29 of 2016. While the volcanic activities in Ambae remains uncertain, more focus is now diverted to Sola to ensure mini-grids are operating. The current net balance of the Fund available to the Government stands at Vatu 40,196,076 incorporating April-18 billings.

While there are no further proposals to date by the Government in the use of this fund to the Authority's knowledge, the Staff has maintained the 2 Vatu per kWh adjustment to the base price and will monitor the use and necessity of this contribution. The conditions and rules around the administration and usage of the fund remain.

A monitoring and evaluation report on the use of the Government Fund in 2016 was issued in October 2017 to make public the management and use of this fund from July 2016 to June 2017. The Authority will issue its next evaluation report on the use of the Government Fund in the second half of this year.

### 7.2.2 Santo Fund

In VUI's tariff review of 2014 (Authority Case no.U-0001-14), the Commission established the Santo Fund for electricity related projects (the 'Santo Fund') whereby Luganville electricity customers were required to contribute 1 Vatu per kWh billed into the fund.

The Santo fund was purposely created to assist in maximising access to electricity services throughout the peri-urban areas of Luganville. Usage of the fund in meeting non electricity related projects is not permitted. Since 2014, the objective of the fund to extend electricity services throughout Santo has been fulfilled and the fund has proven successful. This is primarily due to the positive support and cooperation received from VUI.

The Authority has published details of completed projects that have been financed by the Santo fund with respective individual total project cost reimbursed to VUI from the Santo Fund (Authority's Santo Fund Biannual report for July 2015 to July 2017). The next report on the fund will be issued covering a period from August 2017 to July 2018. These reports present how the funds have been used and managed in each of the respective years and highlights the extensions undertaken by the utility and the total number of customers connected as a result.

For this tariff review, the Staff sees it reasonable to continue with the 1 Vatu per kWh billed in VUI's tariff computation. Thus the final base price is adjusted by an additional 1 Vatu per kWh billed. The conditions and rules around the monitoring, usage and reimbursement of the Santo Fund remain.

The Staff is also mindful of the Luganville concession retender in process. With this in mind, if the Luganville retender is finalised and awarded, the unused balance in the Santo fund is entirely customer funds and should be utilized to the benefit of the Luganville customers.

### 7.2.3 Fuel Cost Reconciliation - 2016

VUI's fuel expense for the year 2016 has been significantly affected by the unexpected decline in the hydro performance as a result of the El Nino impact which took place effective from August 2015 through to

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### 7.2.3 Fuel Cost Reconciliation - 2016

VUI's fuel expense for the year 2016 has been significantly affected by the unexpected decline in the hydro performance as a result of the El Nino impact which took place effective from August 2015 through to



October 2016. During the period of January to October 2016, there was on-going requirement for diesel generators to drive generation for the low hydro performance due to the El Nino. Even though the average price of diesel decreased over the period, the litres of fuel required to meet the excess diesel generation increased substantially. The total energy from diesel generation approved by the authority was projected at 2,849,111 kWh for the 2016 period. However, the actual diesel generation output by VUI in 2016 was 5,007,610 kWh, an increase of 75.76%. Therefore, VUI should be compensated for the increased reliance on diesel generation and the under collection of fuel cost in 2016 as the circumstances were beyond the control of the utility. Table 26 below provides the detail of the fuel cost recovery factor embedded into the final base rate.

**Table 26: Adjustment for the Under Collection of Fuel Cost in Year 2016**

| VUI Fuel Cost Recovery Factor                              |                   |                     |                   |
|--|-------------------|---------------------|-------------------|
|  | 2016-VUI Actual   | 2016 - URA Approved | Variance          |
| Fuel and lubricant cost                                    | 107,748,821       | 60,244,827          | 47,503,994        |
| kWh diesel generated                                       | 5,007,610         | 2,849,111           | 2,158,499         |
| kWh Hydro generated  | 5,053,900         | 6,842,564           | -1,788,664        |
| kWh Solar Generated  | 60,190            | 57,839              | 2,351             |
| <b>Total Energy(kWh) Generated</b>                         | <b>10,121,700</b> | <b>9,749,514</b>    | <b>372,186</b>    |
| Total Energy Sold(kWh)                                     | 8,983,224         | 8,604,673           | 378,551           |
| Energy Losses  | 1,138,476         | 1,201,483           | -63,007           |
| System Losses percentage                                   | 11.25%            | 12.32%              | -1.07%            |
| Diesel Used in Generation(liters)                          | 1,426,685         | 800,727             | 625,958           |
| Heat Rate  | 0.285             | 0.281               | 0.004             |
| Diesel Price   | 73.71             | 73.59               | 0.12              |
| Cost of Fuel per kWh Sold                                  | 11.99             | 7.00                | 4.99              |
| <b>Cost of Fuel per kWh Sold (adjusted for Efficiency)</b> |                   |                     | <b>4.98</b>       |
| <b>Fuel Cost Recovery Allowed</b>                          |                   |                     | <b>44,780,325</b> |
| Fuel Cost Recovery Disallowed                              |                   |                     | 2,723,469         |
| <b>Total Variance Fuel Cost (Actual/URA Approved)</b>      |                   |                     | <b>47,503,994</b> |

As detailed above, VUI is entitled to a fuel cost adjustment of 4.98 vatu/kWh, which will be added to the final base price determined for the tariff period. This will allow VUI to recover its under collection of fuel cost in year 2016. This is just a one-time adjustment which will only be effective for the first 12 months of the tariff review period commencing October 2018.

As aforementioned, this recovery is essential to compensate the utility for the significant loss it incurs to meet customer demand through diesel generation in 2016.

### 7.3 Customer Responses/Feedbacks pursuant to Public Consultation

The Authority has had the benefit of getting first hand responses and comments from Luganville and Port Olry customers during the 1 week public consultation conducted in Santo for the purpose of this tariff review. The public consultation was conducted from 27<sup>th</sup> – 31<sup>st</sup> of August targeting areas around the Luganville electricity concession area and ended at the Port Olry village.

The Authority has given due consideration for the all comments and feedbacks received during the consultation to assess their level of significance in relation to its Preliminary base rate. During review of the public comments, almost all feedbacks were not significantly related to prompting base rate adjustments while a few are worth mentioning which the Authority wishes to formally respond to in this Final Decision and Order are follows:

- One customer suggested reducing the fuel cost recovery factor (4.98 Vatu/kWh) by compensating VUI for the 2016 loss through the Santo Fund. While this is a plausible approach, the 2.23 Vatu/kWh increase in the currently applied base rate is deemed by the Authority as affordable to customers as history shows that previous electricity prices were higher but yet affordable for Luganville and Port Olry electricity consumers. Furthermore, as outlined in the Authority's Order (Case U-0001-14 of March 2014) establishing the Santo fund, purpose is to financially support electrification extensions in the underlying areas of Luganville to the low income earners to assist the Government in achieving the NERM's targets. Furthermore given no investment opportunity provided under the arrangements guiding VUI's operation in Luganville supporting the establishment of such fund. Thus having to deviate away from the purpose of establishing the Santo fund would not be encouraged;
- Most customers acknowledge and appreciates the utility's commitment in 2016 when hydro performance was low and intention for the increase in the contemporary base rate compensating the utility for its commitment resulting in the significant loss;
- The majority of responses from customers were related to the different aspect of the electricity services rather than the Authority's Preliminary base rate to which the staff responded accordingly; and
- Finally almost one customer in every consultation sites raised concern in relation to the poor Water Services in Luganville.

The Authority appreciates the electricity customers who have committed their time in attending the public consultations and participate in the discussions. There were other vital feedbacks and insights provided by customers in relation to the electricity services in Luganville which the Authority will put forwards for the utility's attention and consideration.

## 8. Authority's Final Decision Order

The final base rate is calculated by dividing the Net Revenue Requirement by the forecasted quantity of energy sold (in both Luganville and Port Olry) for 2018/2019 period and adjusting the resulting base rate according to the adjustments detailed above.

**Table 27: Final Base Rate**

|   | 2018/2019(Vatu) |
|---|-----------------|
| Net Revenue Requirement                             | 282,383,303     |
| Forecasted sales of energy, kWh                     | 9,248,856       |
| Required revenue per kWh sold, Vatu                 | 30.53           |
| Adjustment for Under Collection of Fuel Cost - 2016 | 4.98            |
| Special fund for energy development in Santo, Vatu  | 1.00            |
| Governmental asset contribution fee, Vatu           | 2.00            |
| <b>Final Base Rate (Vatu/kWh)</b>                   | <b>38.52</b>    |

The final base rate as recommended by the staff for provision of electricity services by VUI in Luganville and Port Olry for 2018/2019 period is:

**VUV 38.52 / kWh**

This final new tariff represents an increase of 6.14% from the current base rate determined in the Final Order of January 2017. This new tariff shall be applied to compute the revised tariff in each block of the tariff structure as detailed under Section 8 of this final order.

The Commission therefore orders that:

- 1. The New Base price for VUI is set at VT 38.52 kWh, an increase by 6.14% from the currently applied base price of VT 36.29 kWh;*
- 2. VUI shall adopt the new tariff structure and prices set in Section 8 (Table 28) below of this Order;*
- 3. New tariff is to be applied to customers as of the next billing cycle after the issue of this Final Order;*
- 4. The utility to keep track of the collection from the fuel cost recovery factor of 4.98 Vatu/kWh embedded into the base rate calculation which the Authority will require when a next review is due. Reconciliations will be conducted to ensure the utility has recuperated its losses and customers do not over-refund the utility; and*
- 5. Port Olry customers are also to be billed under the new tariff structure and prices as set in Section 8 (Table 28) of this Order.*

## 9. Final Tariff Structure

The Authority has revised the current tariff structure in light of the increase in the base price. The objective of this revision is to ensure efficient price signals to consumers to guide short run and long run consumption decisions, to encourage efficient consumption patterns, to avoid unnecessary bill impacts and to develop tariff charges which are just and reasonable and not fairly discriminatory.

In the absence of a “Cost Allocation Study” that rationally apportions cost responsibility to each customer class – a crucially initial step in effectively determining a practical tariff structure which should be provided by the utility– the Authority has conducted alternative analyses to arrive at the tariff structure presented below in Table 28.

The staff considered different tariffs structures during the review and what impact it will have on the different customer categories, individual customers and the utility’s ability to achieve its approved revenue requirements. The Authority also noted that under the current tariff structure, customers consuming from the tranches 0 – 60 and 61 – 120 kWh are subsidised. Thus the staff has allocated a higher percentage of tariff increase for these blocks to reduce moderately the subsidies delivered from customers typically consuming from the 121 kWh tranche and above to contain the rate for this tariff block at bay. The Authority has assessed this tariff structure to be adequate which ensures the utility collects the revenue it is entitled to receive.

Based on the extensive staff analyses and review, the Authority has determined the new tariff structure as outlined below. This new base rate and tariff structure will be applied to next customer billing cycle following the issue of this Final Order.

Table 28: Customer charges

| Customer category   | Charge                               | Tariff of July-2018   | New Tariff  | Change |
|---|--------------------------------------|---|---|--------|
| <b>Low Voltage Users</b>  |                                      |   |   |        |
| Low Voltage (including small domestic, business license holders, and other low voltage customers) | Unit charge per kWh                  |   |   |        |
|   | Up to 60 kWh                         | 15.78 vatu per kWh  | 17.72 vatu per kWh  | 12.50% |
|   | 61-120 kWh                           | 36.14 vatu per kWh  | 38.49 vatu per kWh  | 6.50%  |
|   | Over 120 kWh                         | 52.44 vatu per kWh  | 55.11 vatu per kWh  | 5.10%  |
|   | Monthly fixed charge                 | None  |   |        |
|   | Security deposit for new connections | 2,836 vatu for connections up to 2.2kVA<br>6,078 vatu per subscribed kVA for connections over 2.2 kVA | 2,863 vatu for connections up to 2.2kVA<br>6,078 vatu per subscribed kVA for connections over 2.2 kVA | None   |
| <b>High Voltage Users</b>   |                                      |   |   |        |
| High Voltage  | Unit charge                          | 29.00 vatu per kWh  | 30.78 vatu per kWh  | 6.14%  |
|   | Monthly fixed charge                 | 962.35 vatu per subscribed kVA  | 1,021.49 vatu per kWh   | 6.14%  |
|   | Security deposit for new connections | 6,078 vatu per subscribed kVA   | 6,078 vatu per kWh  | None   |

## 10. Notice of Grievance

If the utility is aggrieved by this Order, it may request the Authority to reconsider the decision on issues aggrieved upon. A Notice of Grievance must be submitted within 30 days of the Order. The Notice should contain:

- The issue or issues being contested
- A detailed description of any facts or matters supporting the grievance
- Copies of any documents supporting the grievance
- A detailed description of any alleged error of law or fact
- A detailed description of any relevant change in facts or circumstances since this Order

A Notice of Grievance can be received until 15<sup>th</sup> of October 2018 and addressed to:

Mr. John Obed Alilee  
Chief Executive Officer  
Utilities Regulatory Authority

The Notice may be:

- Delivered in person at:

| Port Vila Head Office   | North Branch Office   |
|---|---|
| Utilities Regulatory Authority (URA)<br>VNPF Compound<br>Corner Pierre Lamy & Andre Ballande Street<br>Port Vila, Vanuatu | Utilities Regulatory Authority<br>Level 2 of VNPF building<br>Luganville, Santo |

- Or mailed to:  
Case U-0002-17  
Utilities Regulatory Authority (URA)  
P.M.B 9093  
Port Vila
- Emailed to:  
[breuben@ura.gov.vu](mailto:breuben@ura.gov.vu) or [FAAD@ura.gov.vu](mailto:FAAD@ura.gov.vu)

if the Authority receives a timely Notice of Grievance, it will conduct a review in accordance with Section 27 of the URA Act. If upon review the Authority determines that the grievance is justified, then it shall revoke, amend or vary the decision on the matter complained of.

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**Utilities Regulatory Authority**

**Vanuatu**

You can access the case U-0002-17 Final Decision and Commission Order September 2018 on our website [www.ura.gov.vu](http://www.ura.gov.vu), or by contacting us by telephone (+678) 23335, email: [FAAD@ura.gov.vu](mailto:FAAD@ura.gov.vu) or request via regular mail at Case U-0002-17, Utilities Regulatory Authority, PMB 9093, Port Vila, Vanuatu.