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GOVERNMENT OF THE REPUBLIC OF VANUATU

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Performance Report

Vanuatu Utilities and Infrastructure Ltd (VUI)

July 2011

The Utilities Regulatory Authority reports on the performance of regulated utilities in Vanuatu. This report sets out the Authority's analysis of how well Vanuatu Utilities & Infrastructure Ltd has provided services to their customers in the Luganville concession. This report brings transparency to the performance of the utility and provides government with an independent review of the utility. The period of this review is 1 January to 30 June 2011.

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Executive Summary

The Utilities Regulatory Authority monitors and reports on the performance of electricity utilities in Vanuatu. These reports bring transparency to the performance of the energy providers. This report describes how well Vanuatu Utilities and Infrastructure Ltd (VUI) provided services to its customers in Luganville during the period 1 January to 30 June 2011.

Network Performance

VUI has implemented its operation and maintenance program to address defects and shortfalls identified during inspections of the generation plant and network equipment within the concession. The Authority found that a number of generators, plant and equipment had been transferred in poor condition from the previous concessionaire. Technical assessments of the generation plant by Takaoka Engineering indicated that the poor state of the plant was due to the lack of adequate maintenance.

A review of the inventory, including stores and stocks, were found to be depleted and not replaced prior to the transition to VUI. Inspection reports provided by VUI indicated that diesel generator number 4 was found to be inoperable; the automatic voltage regulator was inoperable; and the Sarakata hydro generators 1 and 2 were found to be out of service.

In January 2011 Sarakata hydro power station was operating at around 50 percent generation capacity as a result of generator 1 and generator 2 being out of service for repairs and maintenance.

VUI carried out the necessary repairs and maintenance on the plant resulting in generation capacity being fully restored in February. VUI has continued to operate the Sarakata hydro power station at its capacity since performing the necessary repairs and maintenance.

Improvements in communication to the Sarakata hydro facilities have been made by VUI with the installation of a new telephone radio communication system. This is designed to improve the response time to emergencies and faults at the power station.

VUI is continuing to address these and other issues in consultation with the Energy Unit, Ministry of Lands Geology Mines and Water Resources and the Authority.

In addition, VUI is developing its capital expenditure 'investment' plan for approval by the Authority.

Further, the Authority considers VUI's operational, repair and replacement program will continue to address plant defects and supply security issues identified during the transition of the concession.

Safety Performance

VUI recorded no industrial accidents for the period 1 January to 30 June 2011. To reduce the likelihood of accidents, VUI has implemented its safety program to minimize the number of incidents and accidents occurring in the work place. VUI has introduced its Health Safety and Environment Policy, undertaken a 'walk-through survey and activity observation' program to identify safety risks and issues and provided safety training to its staff.

The Authority found that VUI is ensuring safety standards are being implemented; ensuring employees comply with the standards and providing the required safety equipment for its employees to perform their tasks safely.

Fire evacuation procedures have been implemented. VUI has implemented a record management system to monitor and control public access into its facilities. Safety inductions for its visitors have also been implemented to ensure public safety.

Network inspections have been carried out to identify, inter alia, risks to the public by trees, recreational areas adjacent power lines and electrical facilities operated and maintained by VUI. In addition VUI has implemented an awareness program to educate the public on the risks associated with electrical supply and installations.

A safety management system has been put in place by VUI to manage contractor safety and work activities. VUI has implemented health and safety familiarisation training for its employees and contractors. This training included safety manual familiarisation, electrical safety, fire safety and evacuation system, familiarisation of the *Health and Safety at Work Act 1988*, environmental and disaster response training.

Public access and security improvements have been put in place by VUI to restrict access by the public to facilities that pose a risk to public safety and disaster management procedures have been put in place by VUI, including an Operational Business Continuity Plan.

Customer Service

VUI continued to provide electricity services to customers in the Luganville area. VUI reconnected 139 customers who previously were supplied electricity.

The Authority noted that VUI has assisted customers to help them avoid disconnection by assessing their service needs and billing requirements, offering them reasonable payment plans and assistance, and providing energy efficiency advice.

No disputes between the customer and VUI were referred to the Authority.

VUI manages its customer complaints by utilising its “Service Order Process” to investigate all complaints including enquiries. Service orders are issued by the Customer Service group to VUI meter readers or the line crew for investigation and actioning.

VUI has consulted with local communities and leaders in the Pepsi, Capricorn, Bon Bon, Showground and Fanafo areas surveying network requirements and customer needs.

VUI implemented the Authority’s Tariff Decision May 2010 to electricity customers in Luganville. The Authority set the tariff for electricity during the tariff review process undertaken with the previous concessionaire. At 1 January 2011, the new tariff for the other concessions, Port Vila, Tanna and Malekula could not be applied due to the pending arbitration between the Government and UNELCO.

Concerns raised by customer over the tariff:

The Authority sets the tariff for electricity (P); however actual P is not necessarily paid by all customers. This is reflected in the tariff structure where the rate (P) is adjusted for the different customer categories. The tariff structure can be used as an instrument to award different customer categories with different tariffs.

The Authority agreed to the tariff structure in its Tariff Review Final Decision May 2010 on the basis of customer information provided to it by UNELCO in its submissions during the review. The information provided by UNELCO was unclear on actual demand as data outlined averages that led to a tariff structure which caused high prices for various tariff groups when it was applied in Luganville.

The Authority sought VUI's current customer billing data and found that many customers were in tariff categories that did not match their consumption levels. This resulted in high bills for some customers, low bills for others with same consumption in the Luganville concession. With VUI's cooperation, the Authority issued an interim tariff that removed fixed charges, and created one "fair" tariff category vs previously confusing three, with customer being placed in optimal categories.

The Authority conducted a number of public forums in Luganville and has assisted customers understand their accounts and energy usage. Customers have responded positively to VUI's management of this issue.

Reliability and Quality of Supply

Customers in Luganville experienced a number of supply outages during the period under review. Unplanned outages i.e. outages due to cyclones, thunderstorms and vandalism accounted for the majority of interruptions to supply experienced by customers in Luganville. A small portion of unplanned outages were due to trees and vegetation encroaching into the minimum clearance zone. VUI implemented its Vegetation Clearance Program to mitigate the risk of further interruptions due to trees and vegetation.

A low number of unplanned outages were caused by technical faults on the system and equipment. Plant and equipment maintenance reports held by the previous concessionaire had not been provided to VUI during the transition period.

VUI reported that no customer complaints were received regarding quality of supply. However, VUI has identified voltage irregularities on the high voltage network which VUI is investigating and identifying options to resolve these issues. A preventative maintenance program has been developed and implemented by VUI.

VUI conducted a Health and Safety Environment (HSE) survey to assess the condition and operation customer's meters and connections. As a result of the survey, VUI is preparing its meter replacement program for approval by the Authority.

Legislative and Regulatory Compliance

No breaches of statutory or regulatory instruments have been identified by the Authority. VUI has complied with all relevant legislative and regulatory requirements since commencing operation in Luganville.

The Memorandum of Understanding sets out the key terms and conditions agreed between the Government and Pernix (VUI) relating to VUI taking over the concession. VUI has provided operating and maintenance services in accordance with the MOU. It has worked cooperatively with the Ministry of Lands Geology Mines and Water Resource Energy Unit and the Authority.

VUI is actively planning and developing its Annual Business Plan for approval by the Authority. The Annual Business Plan will detail VUI's proposed investments, financing, operation and maintenance, and staffing requirements.

In the review period, VUI has implemented the Authority's Final Tariff Decision May 2010, and assisted the Authority in addressing the concerns of customers during its implementation. The Authority, in consultation with VUI is working to finalize the Luganville Operator Electricity Tariff to apply to VUI upon commencement of the concession contract.

1. About Our Report

1.1 About this report

The Utilities Regulatory Authority (the Authority) reports on the performance of regulated utilities in Vanuatu since 2008. These reports bring transparency to the performance of the utilities. By focusing on indicators that show how utilities serve their customers, we can better understand the Vanuatu electricity market.

The report sets out the Authority's analysis and conclusions on how well the utility, Vanuatu Utilities and Infrastructure Ltd has provided services to their customers in Luganville, Santo.

We give particular attention to how VUI has dealt with the more vulnerable customers, such as those experiencing short or long term difficulties with paying their bills. These customers are often less confident in negotiating their options and rights with their energy utility.

We particularly monitor the assistance that the utility provides to ensure these customers stay connected to supply.

This report includes the Authority's assessment of the technical, economic and financial performance of the utility during the period 1 January to 30 June 2011.

1.2 What the report covers

This report provides information on the following areas of performance of Vanuatu Utilities and Infrastructure Ltd:

- Chapter 3, '*Network Performance*', evaluates the effectiveness of VUI's operations and maintenance program for electricity assets within the Luganville concession.
- Chapter 4 '*Safety Performance*' examines VUI's effectiveness in ensuring employees; the public and environment are kept safe when performing its work activities including its facilities.
- Chapter 5 '*Customer Service*' considers VUI's customer management system and performance in managing customer enquiries, complaints and disputes.
- Chapter 6 '*Reliability and Quality of Supply*' details VUI's management and operation of the network ensuring supply interruptions are kept to a minimum and quality of supply is maintained within set limits.
- Chapter 7 '*Legislative and Regulatory Compliance*' considers VUI's compliance with relevant legislative, regulatory and contractual requirements.

Appendix A '*Status Report and Corrective Action Log – VUI*' provides a summary of network issues identified during the transition and handover of the concession and the corrective action taken by VUI to resolve these issues.

A separate Authority report, *Utilities comparative performance report – electricity services 2011*, is being prepared to provide a comparative analysis of the energy services provided by UNELCO and Vanuatu Utilities and Infrastructure Ltd and the state of the electricity market in Vanuatu.

1.3 Vanuatu electricity sector

The Vanuatu electricity sector has changed dramatically over the last 3 years. The Vanuatu Government has put in place significant reforms to improve the sustainability and efficiency of the electricity markets while increasing the benefits to customers. The reforms include:

- setting up an independent economic regulator for pricing, improving access, issuing standards and monitoring of concession agreements;
- introducing competition to the electricity market through the establishment of an open, transparent and competitive tender for the Luganville concession; and
- introducing legislative change to improve access to the monopoly electricity businesses.

The Vanuatu Government further reformed the energy market by awarding the Luganville electricity operations to Vanuatu Utilities and Infrastructure Ltd from 1 January 2011, thereby introducing an additional utility operator into the energy market.

Vanuatu has 2 utility operators, serving 12,900 customers. UNELCO has a long history in the previously franchised market while VUI has only recently entered the market on 1 January 2011.

Table 1.1 breaks down the key statistical network and customer numbers in the Vanuatu electricity markets.

Utility	Customers	Installed Capacity (MW)	High Voltage Network (km)	Low Voltage Network (km)
VUI	2,339	4.1	67	61
UNELCO	10,580	26.6	234	267

1.4 Other data sources

We primarily collected the data in this report from the regulated utilities. Additional data are from the Energy Unit, Ministry of Lands Geology Mines and Water Resources, technical reports provided to VUI by Takaoka Engineering and information held by the Authority on the energy sector.

The *Utilities Regulatory Authority Act No 11 of 2007* and the *Electricity Supply Act* require the utilities to comply with service standards and procedures. These service standards and procedures are set out primarily in regulatory instruments, including the Safety and Reliability Standards issued by the Authority including specific concession agreements.

The performance indicators address key obligations under these regulatory instruments, and the utilities are required to report against these indicators. These documents are available on the Authority's website (www.ura.gov.vu).

The data in this report was not audited at the time of publishing. The Authority has commenced regulatory audits of the utilities and the results will be considered by the Authority in Q4 of 2011.

2. Introduction

The Utilities Regulatory Authority was established on the 11 February 2008 under the *Utilities Regulatory Authority Act No 11 of 2007* (the Act).

The Act established the Authority as an independent economic regulator for pricing, access, standards and monitoring of concession agreements.

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

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

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

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

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

- to exercise the functions and powers conferred by this Act or by any other Act in furtherance of the purpose of this Act;
- to provide advice, reports and recommendations to the Government relating to utilities;
- to inform the public of matters relating to utilities;
- to assist consumers to resolve grievances;
- to investigate and act upon offences under this Act ;
- when requested by the Minister to do so, to conduct an inquiry into any systemic reliability of supply issues related to a regulated industry or other regulated service specified by the Minister in the request;
- to conduct public education programs for the purpose of promoting its objectives under the Act and the relevant legislation and in relation to significant changes in the regulation of a regulated industry;
- to advise the Minister on any other matter referred to the Authority by the Minister; and
- to administer and monitor compliance of Concession Agreements under the Act

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

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

2.1 Background

The power supply concession in Luganville commenced on 23 January 1990 and expired on 31 December 2010. In accordance with the concession agreement, the Government advised the incumbent concessionaire of its intention to re-tender the Luganville concession in accordance with the *Government's Contract and Tenders Act*.

The tender process commenced in June 2009, the selection and engagement of a transaction advisor by the Ministry of Lands Geology Mines and Water Resources.

In March 2010, following approval by the Central Tenders Board, a two stage process for the tender was implemented to appoint the next concessionaire for the Luganville electricity concession.

In accordance with the tender rules, the Government completed negotiations with and awarded the Luganville electricity operations to Vanuatu Utilities and Infrastructure Ltd (VUI) a subsidiary of the Pernix Group.

The establishment of a Memorandum of Understanding (MOU) between the Government and VUI set out to ensure:

- safe, reliable and secure electricity supply for consumers in Luganville;
- the operation and maintenance to high standards the electricity assets;
- network extensions to new customers within the concession area;
- the provision of quality customer care and service;
- compliance with all legislative requirements including regulations and standards issued by the Authority; and
- capacity building and development of local staff

3. Network Performance

3.1 What we found

VUI has implemented its operation and maintenance program to address defects and shortfalls identified during inspections of existing generation plant and network equipment within the concession.

The Authority found that a number of generators, plant and equipment had been transferred in poor condition from the previous concessionaire.

Technical assessments of the generation plant by Takaoka Engineering indicated that the poor state of the plant was due to the lack of adequate maintenance.

A review of the inventory, including stores and stocks, were found to be depleted and not replaced prior to the transition to VUI. Inspection reports provided by VUI indicated that:

- diesel generator number 4 was found to be inoperable;
- automatic voltage regulator was inoperable;
- Sarakata hydro generators 1 and 2 were found to be out of service;
 - Generator 2 stator was found to be in poor condition due to lack of maintenance;
 - Generator 1 stator had also failed and the seals had deteriorated and were subsequently replaced by VUI following repairs to the generator unit.
- diesel generator number 1 was found to be approaching its 20,000 hour overhaul;
- diesel generator number 3 was found to have already exceeded 47,000 hours of operation and nearing the end of its life, which is considered to be approximately 40,000;
- A replacement generator had been purchased by the previous concessionaire but had failed to replace the older unit. The replacement unit was found to be incompatible and not used by VUI and returned to the previous concessionaire;
- radiators for the diesel generators were found to be in poor condition;
- housing facilities were found to be substandard, requiring maintenance and upgrading;
- black start generator for the Sarakata power station was found to be inoperable;
- voltage regulation issues on the high voltage line between the Sarakata hydro station and the Luganville diesel station have been identified by VUI;
- lack of lightning protection of critical high voltage lines were identified by VUI; and
- low level of stocks, stores and spares were identified, placing security of supply at risk.

In January 2011 Sarakata hydro power station was operating at around 50 percent generation capacity as a result of generator 1 and generator 2 being out of service for repairs and maintenance.

VUI carried out the necessary repairs and maintenance on the plant resulting in generation capacity being fully restored in February.

VUI has continued to operate the Sarakata hydro power station at its capacity since performing the necessary repairs and maintenance.

Improvements in communication to the Sarakata hydro facilities have been made by VUI installing a new telephone radio communication system. This is designed to improve the response time to emergencies and faults at the power station.

VUI is continuing to address these and other issues in consultation with the Energy Unit, Ministry of Lands Geology Mines and Water Resources and the Authority.

VUI is currently developing its capital expenditure 'investment' plan for approval by the Authority.

Further, the Authority considers VUI's operational, repair and replacement program will continue to address plant defects and supply security issues identified during the transition of the concession.

3.2 Generation

Generation	
<i>Installed Capacity (kW)</i>	4150
<i>Monthly Peak Demand (kWh)</i>	1509
<i>Gross Diesel energy (kWh)</i>	977348
<i>Gross hydro energy (kWh)</i>	2372603
<i>Total Gross energy (kWh)</i>	3349951
<i>Generation efficiency (%)</i>	97.04

Renewable generation capacity

Hydro Generation	Turbine #1	Turbine #2	Turbine #3	Total
<i>Installed Capacity (kW)</i>	300	300	600	1200
<i>Commissioning year</i>	March 95	Nov 95	Jan 09	
<i>Make</i>	Kubota	Kubota	Kubota	
<i>Model</i>	Francis	Francis	Francis	

Diesel generation capacity

Diesel Generation	G1	G2	G3	G4	G5	Total
<i>Installed Capacity (kW)</i>	800	800	600	250	400	2850
<i>Commissioning year</i>	2001	1999	1992	2006	1999	
<i>Make</i>	Cummins					
<i>Model</i>	KTA50	KTA50	KTA38	NT855	VTA28	

Energy supplies since January 2011

Energy Supplies	January	February	March	April	May
<i>Monthly Gross Energy (Diesel)</i>	287890	149030	215710	199410	125308
<i>Monthly Energy Supplied (Diesel)</i>	280578	141695	206581	192501	117938
<i>Monthly Gross Energy (Hydro)</i>	409100	517380	511490	528690	405943
<i>Monthly Energy Supplied (Hydro)</i>	396746	503329	500561	514957	395868

3.3 Distribution Network

High voltage and low voltage networks

Distribution	
<i>High Voltage Ariel length (m)</i>	51107
<i>High Voltage Underground length (m)</i>	16226
<i>Total High Voltage length (m)</i>	67333
<i>Low Voltage Ariel length (m)</i>	50648
<i>Low Voltage Underground length (m)</i>	9978
<i>Total Low Voltage length (m)</i>	60626
<i>Distribution efficiency (%)</i>	98.94

Network length per high voltage line

Feeder (Line)	Underground (m)	Arial (m)	Total (m)
<i>Feeder 0 Hydro</i>	9,997	32,775	42,772
<i>Feeder 1 Industrial Zone</i>	4,145	5,887	10,032
<i>Feeder 2 Hospital</i>	1,321	10,265	11,586
<i>Feeder 3 Centre Town</i>	576	0	576
<i>Feeder 4 Sarakata</i>	187	2,180	2,997

Number of transformer stations per kilo-volt-ampere (kVA) rating

Public Distribution Transformers			Private Transformers			Total		
Power	Number	Total (kVA)	Power	Number	Total (kVA)	Power	Number	Total (kVA)
Single Phase 15	1	15	Single Phase 15	0	0	Single Phase 15	1	15
Tri-phase 15	-	-	Tri-phase 15	-	-	Tri-phase 15	-	-
20	1	15	20	0	0	20	1	15
25	0	0	25	0	0	25	0	0
25	3	75	25	0	0	25	3	75
50	22	1100	50	4	200	50	26	1300
100	7	700	100	5	500	100	12	1200
160	4	640	160	0	0	160	4	640
250	2	500	250	1	250	250	3	750
400	1	400	400	0	0	400	1	400
630	0	0	630	0	0	630	0	0
1000	0	0	1000	0	0	1000	0	0
Total	41	3445	Total	10	950	Total	51	4395

Energy efficiency chart

Total Production		3,349,976	Generation Efficiency	97.04	Energy Supplied/ Energy Generated
<i>Diesel</i>	2,372,603				
<i>+ Hydro</i>	977,348				
<i>-Auxiliaries</i>	99,196				
<i>Supplied Energy</i>		3,250,754	Distribution Efficiency (%)	94.77	Energy Distributed/Energy Supplied
<i>-Distribution Losses</i>	169,898				
<i>Energy Distributed</i>		3,080,856	Sale Efficiency (%)	98.94	Energy Sold/Energy Distributed
<i>-Not Invoiced</i>	32,704				
<i>Sold Energy</i>		3,048,152	Global Efficiency (%)	91.97	Energy Distributed/Energy Generated
<i>Low voltage</i>	2,059,937				
<i>High voltage</i>	988,215		Overall Efficiency (%)	90.99	Energy Sold/Energy Generated

Note: the above chart indicates losses accumulated through generation, distribution and sales as of May 2011

3.4 Sales Data

Monthly Energy sold since January 2011

Energy Sales	January	February	March	April	May
<i>Monthly energy sold since January 2011 (kWh)</i>	511084	633320	589070	674251	640427

Total number of customers per tariff category as of May 2011

Tariff Category	Interim low voltage	Sports fields	Public Lighting	High voltage
<i>Number of Customers</i>	2239	0	24	14

Monthly electricity consumption per customer tariff category

Monthly average electricity consumption per customer tariff category (kWh)					
	January	February	March	April	May
<i>Interim low voltage</i>	893	1175	1060	1224	1086
<i>Sports fields</i>	-	-	-	-	-
<i>Public lighting</i>	166	152	194	208	187
<i>High voltage</i>	13,122	14,135	13,878	14,270	15,182

4. Safety Performance

4.1 What we found

VUI recorded no industrial accidents for the period 1 January to 30 June 2011.

To reduce the likelihood of accidents, VUI has implemented its safety program to minimize the likelihood of incidents and accidents occurring in the work place.

VUI has introduced its Health Safety and Environment Policy, undertaken a 'walk-through survey and activity observation' program to identify safety risks and issues and provided safety .

The Authority found that VUI is ensuring safety standards are being implemented; ensuring employees comply with the standards and providing the required safety equipment for its employees to perform their tasks safely.

Fire evacuation procedures have been implemented. VUI is currently installing localised smoke and fire alarms at the power stations and constructing a fire escape at the Sarakata hydro power station for its employees.

VUI has implemented a record management system to monitor and control public access into its facilities. Safety inductions for its visitors have also been implemented to ensure public safety.

Network inspections have been carried out to identify, inter alia, risks to the public by trees, recreational areas adjacent power lines and electrical facilities operated and maintained by VUI.

VUI has implemented an awareness program to educate the public on the risks associated with electrical supply and installations.

A safety management system has been put in place by VUI to manage contractor safety and work activities.

VUI has implemented health and safety familiarisation training for its employees and contractors. This training included safety manual familiarisation, electrical safety, fire safety and evacuation system, familiarisation of the *Health and Safety at Work Act 1988*, environmental and disaster response training.

Public access and security improvements have been put in place by VUI to restrict access by the public to facilities that pose a risk to public safety.

VUI conducts regular safety and site inspections of the power stations ensuring compliance with legislative requirements and safety standards.

Disaster management procedures have been put in place by VUI, including an Operational Business Continuity Plan.

4.2 Employee & contractor safety

VUI has implemented its Health Safety and Environment Policy.

VUI noted that employees had limited formal safety training and were not aware of the Occupational Health and Safety Policy.

Personal Protective Equipment (PPE) was updated and issued by VUI to employees for their safety in the work place.

Inspections and audit of employee's safety gear have been carried out by VUI, identifying deviations from the safety standards set by VUI.

Hot work and smoking controls within compounds and facilities have been implemented by VUI. A hot work permit system has been introduced to ensure employee safety during hot work activities.

Designated smoking areas have been identified for employee use.

Fire alarms, response procedures and fire escape audit conducted by VUI found that there were no fire sirens or means of fire alert systems installed in the power station and building facilities. The audit identified deficiencies in fire evacuation procedures at the power station sites.

Site visits are conducted on a regular basis to inspect work safety by VUI's contractors.

A work safety planning sheet has been put into place for the work teams to use, which details all preparation activities, isolation points, tools, communication system and switching items for the work.

4.3 Public safety

The safety of the public is paramount when delivering electricity services to customers.

Inspection and audit of customer installations have been carried out by VUI. This inspection identified a number of customer connections to be unsafe.

An assessment of perimeter fences and security access to the power station facilities was carried out by VUI. The inspection found deficiencies in facility security which VUI has addressed by ensuring gates are effectively secured, access policy instigated and installation of security fencing and devices are installed.

Safety inspections carried out on the network include monthly inspections of the Sarakata hydro power station and weekly inspections of the Lukanville diesel power station.

4.4 Environment and facility security

VUI has put in place fuel containment procedures to mitigate the risk of loss or damage to the environment due to spillages of fuel and oil.

Fuel storage facilities and transformers are effectively 'bunded' to protect the environment in the event of a spillage. Locking mechanisms have been installed to prevent continuous drainage of contaminated water into the environment.

Vegetation has been cleared along perimeter fences at the Luganville diesel power station and security lighting has been repaired and upgraded. Additional security lighting has been installed at the Sarakata hydro power station.

Emergency and exit lighting facilities at the Luganville diesel power station was found to be ineffective. VUI has installed emergency lighting and is procuring battery back-up exit lighting for the facility.

5. Customer Service

5.1 What we found

VUI reconnected 139 customers who previously were supplied electricity. Customers requesting that their supply be reconnected did not provide reasons as to why they had not requested reconnection before 1 January 2011.

Disconnection of customers who continually fail to pay outstanding accounts should be a last resort for the utilities.

The Authority noted that VUI has assisted customers to help them avoid disconnection by assessing their service needs and billing requirements, offering them reasonable payment plans and assistance, and providing energy efficiency advice.

No disputes between the customer and VUI were referred to the Authority.

VUI manages its customer complaints by utilising its “Service Order Process” to investigate all complaints including enquiries. Service orders are issued by the Customer Service group to VUI meter readers or the line crew for investigation and actioning.

VUI has consulted with local communities and leaders in the Pepsi, Capricorn, Bon Bon, Showground and Fanafo areas surveying network requirements and customer needs.

5.1.1 Tariff structure issues and interim tariff solution for Luganville

VUI implemented the Authority’s Tariff Decision May 2010 to electricity customers in Luganville. The Authority set the tariff for electricity during the tariff review process undertaken with the previous concession.

At 1 January 2011, the new tariff for the other concessions, Port Vila, Tanna and Malekula could not be applied due to the pending arbitration between the Government and UNELCO.

The Authority sets the tariff for electricity (P); however actual P is not necessarily paid by all customers. This is reflected in the tariff structure where the rate (P) is adjusted for the different customer categories. The tariff structure can be used as an instrument to award different customer categories with different tariffs, for example:

- low income households receive a lower rate than P, while consumers with higher consumption are billed more than P in order to compensate; and
- the tariff structure is revenue neutral, meaning that overall, whether the utility charges the actual tariff P to all customers, or offers customers options under the tariff structure, the resulting revenue is the same for the utility.

The Authority had agreed to the tariff structure in its Tariff Review Final Decision May 2010 on the basis of customer information provided to it by UNELCO in its submissions during the review. The information provided by UNELCO was unclear on actual demand as data outlined averages that led to a tariff structure which caused high prices for various tariff groups when it was applied in Luganville. The Authority sought VUI's current customer billing data and found that many customers were in tariff categories that did not match their consumption levels. This resulted in high bills for some customers, low bills for others with same consumption in the Luganville concession.

With VUI's cooperation, the Authority issued an interim tariff that removed fixed charges, and created one "fair" tariff category vs previously confusing three, with customer being placed in optimal categories.

The Authority conducted a number of public forums in Luganville and has assisted customers understand their accounts and energy usage.

Customers have responded positively to VUI's management of this issue.

5.2 Customer Connections

Customers	
New connections	23
Reconnections	139
<i>Reasons for re-connections were not provided by customers</i>	
Disconnections	54
<i>Disconnections for non payment</i>	(25)
<i>Disconnection at customers request</i>	(29)
Connections per supply area	(Not Available)

5.3 Customer enquiries, complaints and disputes

Customers	
Customer enquiries received by VUI	1191
<i>Supply/ connection enquiries</i>	(191)
<i>Service Orders/ Other enquiries</i>	1000
Customer complaints received by VUI	3
<i>Electricity account complaint</i>	(1)
<i>Meter reading complaint</i>	(2)
Disputes	Nil
<i>Referred to the Authority by the customer for resolution</i>	(Nil)
Total	1194

6. Reliability and Quality of Supply

6.1 What we found

Customers in Luganville experienced a number of supply outages during the period under review.

Unplanned outages i.e. outages due to cyclones, thunderstorms and vandalism accounted for the majority of interruptions to supply experienced by customers in Luganville.

A small portion of unplanned outages were due to trees and vegetation encroaching the minimum clearance zone.

VUI implemented its Vegetation Clearance Program to mitigate the risk of further interruptions due to trees and vegetation.

A low number of unplanned outages were caused by technical faults on the system and equipment.

Plant and equipment maintenance reports held by the previous concessionaire had not been provided to VUI during the transition period.

VUI reported that no customer complaints were received regarding quality of supply. However, VUI has identified voltage irregularities on the high voltage network which VUI is investigating and identifying options to resolve these issues.

A preventative maintenance program has been developed and implemented by VUI.

Program	Objective
Distribution Transformer preventive maintenance	Maintenance work on every distribution transformer on the network to repair damaged transformer as well as to identify how to efficiently use transformers
Transmission and distribution line clearing program	Routine clearance of line paths to reduce vegetation damaging lines and poles during storms
Transmission and distribution line maintenance program	Program for regular maintenance on the transmission and distribution network
Meter maintenance program	Program is for maintenance, repair and identification of faulty meters. It is also an inventory measure and a means of response to customer complaints related to meters

VUI conducted a Health and Safety Environment (HSE) survey to assess the condition and operation customer's meters and connections. As a result of the survey, VUI is preparing its meter replacement program for approval by the Authority.

6.2 Reliability data

Planned Interruptions				Unforeseen Interruptions			
Generation	A.N.I.	A.D.I. (min)	Number	A.N.I.	A.D.I. (min)	Number	
Distribution	0.26	35.5	2	2.0	10.0	2	
Nature	0.19	22.9	2	1.5	11.4	2	
Total	0.45	58.3	4	7.5	186.9	14	
Total	A.N.I.:	11.4	A.D.I.:	266.7 minutes/customer	Energy not suppli	4058 kWh	
A.N.I. = Average number of interruptions per customer				A.D.I. = Average duration of interruption supply per customer in minutes			

Date	Reason	Duration	A.D.I.	ANI	E.N.S.	No. Customer	No. xfmr/s	Time	Date	Reason	Duration	A.D.I.	ANI	E.N.S.	No. Customer	No. xfmr/s	Time
2/27	Planned interruption to service Market xfmr	60	8.9	0.15	97	337	12	6:00	1/10	Lightning strike on 20 kV line	60	60.0	1.00	1000	2262	51	13:45
3/9	Tree cutting over line near Coral Quay	120	7.7	0.06	84	146	6	6:00	1/11	Tree Branches fell on secondary line, line broken	50	2.1	0.04	35	96	1	15:40
3/10	Tree cutting over line near Migotty Motel	120	15.1	0.13	164	285	10	6:00	1/14	Tree fell on Secondary in Fanafo	120	5.1	0.04	85	96	3	16:30
4/16	Service Breaker and insulate connections substation	240	26.5	0.11	287	250	18	6:00	1/16	Lightning strike on 20 kV line	45	45.0	1.00	750	2262	51	21:00
									1/26	Hospital feeder Loose wire at the disconnect	12	5.4	0.45	90	1021	17	13:37
		Total minutes off supply							1/31	Cyclone dropped coconut tree on power line	240	30.2	0.13	504	285	7	10:00
0	Hydro Feeder	541							2/1	Public Works dropped tree on line, Bon Bon	150	8.4	0.06	140	127	2	16:30
1	Industrial Feeder	671							2/13	Intentional shorting of 20 kV line by unknown	6	6.0	1.00	100	2262	51	12:20
2	Hospital Feeder	663							2/13	Lightning strike on Centreville 5.5 kV line	2	2.0	1.00	33	2262	51	16:28
3	Center Town Feeder	141							2/20	Tree fell on Secondary in Mango	300	6.5	0.02	108	49	1	10:30
4	Sarakata Feeder	141							2/21	Tree fell on line Sarakata line	60	5.1	0.09	86	194	1	9:30
									3/1	Lightning strike on 20 kV line	4	4.0	1.00	43	2262	51	0:15
									3/2	Intentional shorting of 20 kV line by unknown	4	4.0	1.00	43	2262	51	1:35
									3/4	Vines caused short on 20 kV line	4	4.0	1.00	67	2262	51	16:49
									3/4	Gen 2 at hydro failure in windings	5	5.0	1.00	83	2262	51	16:48
									4/12	Substation breaker tripped due to corona effect	6	6.0	1.00	100	2262	51	14:14
									4/28	Intentional shorting of 20 kV line by unknown	40	4.4	0.11	74	250	18	15:20
									5/10	Diesel #5 tripped due to high water temp	5	5.0	1.00	83	2262	51	10:55

7. Legislative and Regulatory Compliance

7.1 What we found

7.1.1 Compliance with legislation

No breaches of statutory or regulatory instruments have been identified by the Authority.

VUI has complied with all relevant legislative and regulatory requirements since commencing operation in Luganville.

7.1.2 Compliance with memorandum of understanding and draft concession deed

The Memorandum of Understanding sets out the key terms and conditions agreed between the Government and Pernix (VUI) relating to VUI taking over the concession.

VUI has provided operating and maintenance services in accordance with the MOU. It has worked cooperatively with the Ministry of Lands Geology Mines and Water Resource Energy Unit and the Authority.

During the period under review, VUI has:

- purchased and implemented a Customer Information and Billing System (CIS), Human Resource Management System, Stock Management and Accounting/Financial Management software and hardware; and
- assessing the requirements for a GIS system;

in compliance with key terms of the MOU.

VUI is actively planning and developing its Annual Business Plan for approval by the Authority. The Annual Business Plan will detail VUI's proposed investments, financing, operation and maintenance, and staffing requirements.

VUI has worked collaboratively and in a professional manner with the Authority.

In the review period, VUI has implemented the Authority's Final Tariff Decision May 2010, and assisted the Authority in addressing the concerns of customers during its implementation.

The Authority, in consultation with VUI is working to finalize the Luganville operator electricity tariff to apply to VUI upon commencement of the concession contract.

Appendix: Status Report and Corrective Action Log - VUI

A1: Occupational Health, Safety and Welfare (OHS&W)

Status	Corrective Action
Designated smoking area in place	Due to the high level of combustible items present both power plant designated smoking areas have been enforced to prevent the possibilities of a fire breakout this also complies with insurance regulation.
Fire extinguishers: There were insufficient numbers of fire extinguishers located in both power plants and no labeling of extinguisher types, no service records of extinguishers	Additional extinguishers were purchased with the proper singes to show the type of extinguisher. All extinguishers have also been clearly marked on evacuation plans.
Evacuation Plans: Absence of plans in the power plants	Evacuation plans drawn up and pasted at relevant locations
Training: Staff had some OHS training	All VUI employees attended a one day in house OHS training course conducted by OHSE officer from Fiji. The course covers all aspect of safety and also the introduction of new forms and procedures in making the work place a safer environment. All participants were presented with a certificate.
Introduction of new safety forms	Filling out of safety form for various high risk work, safety briefing of visitors to power plant etc. ensure good documentation for VUI records
Personal protective equipment (PPE)	all VUI employees have been supplied with PPE for all types of work related duties e.g. ear protection in diesel plant, safety shoes, etc.
No cyclone ration and proper drinking water system at the power plants	No such system was in place to ensure that workers working at power plants during a cyclone have sufficient food supply in case of a cyclone. Food ration were bought and are in place for both the power plant for this purposes
First Aid kit: Poor condition	Upgraded

A2: Luganville Diesel Power Station

Status	Corrective Action
Generator # 2 exhaust stacks was badly rusted and had big holes in it and was also a hazard as it could have fallen at any time. This was a result of poor fabrication practices using two different types of metals joint together	The existing exhaust stack was removed, taken to the workshop where the flange was removed for installation on the new stack. With exhaust pipes in spares, another stack was fabricated, and assembled back.
All diesel cooling radiator very dirty and fins are falling apart. G5 tripped on high water temperature due to the lack of maintenance on the radiators.	Maintenance done and G5 is currently available to the grid with a maximum load limit of 400Kw, until further works on thermostat valve has been carried out and tested.
Generator # 5 silencers have holes in the plant. This poses a risk to workers that are working inside the plant. Exhaust gases were found to be is leaking into the power generator when it is running.	Cutting of the rusted areas and patching is a short term solution to fix the problem, but purchasing two new silencers would be a better long term solution.
Gen # 3 has run in excess of 47000hrs and is due for rebuilding, a cheaper solution to this would be to purchase a second hand low running hour generator and replace.	Proposal for full engine overhaul on G3 (Diesel generator number 3)
Gen # 4 hasn't run in 12 months prior to VUI take over. No maintenance records submitted to identify the fault, the exciter was sent for rewinding as recommended by UNELCO.	G4 was faulty and put offline for the last 2 years. VUI did a complete electrical repair on the generator and a awaiting spare parts before putting the generator back online
There is only one Station Supply Transformer. Disadvantages: If it fails, the Station will have no power until the transformer is replaced. There will be no maintenance carried out on the transformer. Usually there are 2 Station Transformer in a Power Station	The investment plan calls for an additional Station Supply Transformer.
The location of the Earthing Transformer behind the Station Transformer is not the way it should be. Disadvantage: If maintenance is to be carried out on the Earthing Transformer, The Station Transformer will have to be switched OFF which means the Station to be off.	The investment plan calls for an additional Earthing transformer.

The feeders could not be connected in parallel from outside. Disadvantage: If one feeder circuit breaker fails, than that feeder will be out until the circuit breaker is repaired even if we have to source for parts.	The investment plan calls for paralleling of the feeders.
The Central/Hydro interconnector between Diesel and Hydro had no synchronizing facilities. Disadvantage: The consumers that are connected to the 20KV line will always have a power outage every time the two stations are to be connected together.	Synchronizing facility will be further studied by our electrical engineer and protection engineer.
There is no import and export kWh meter in the interconnector Disadvantage: Very hard to get the exact power consumed by consumers connected to the 20KV line.	Repair of this deficiency will require a very large investment to build new transmission and distribution to each of the transformers that currently take power from the HV line or the addition of substations at each transformer to add metering there. Both options would be very large investments with little return.
There are no spare parts for the 5.5KV switchgear panels.	Repair parts have been ordered.
There is no protection schedule for the 5.5KV switchboard.	Protection schedule will be developed by protection engineer during first year of concession.
There was no maintenance carried out on the three battery chargers for years.	Maintenance completed for the three battery charges. Corroded terminals were cleaned
There are no spares available for the battery chargers.	Investment plan calls for purchase of spares.
There are exposed wiring in the Control Room	Exposed wiring has been covered.
There were no maintenance carried out from the condition of: - All Generator and Exciter - Transformer - Radiator Motors - Compressor Motors - Workshop tools.	Maintenance complete on G4 and G5 diesel and underway on G1 and G2 hydro. Radiators being priced for replacement. Motor maintenance to be scheduled.
No maintenance record available	Maintenance records now being maintained.

No Engine protection test record.	Engine protection test records now being maintained.
MCC panel for portable pumps had rusted and need maintenance.	MCC panel to be replaced within first year of concession.
All Engine transformers cables (LV and HV) are exposed and need mechanical protection.	Transformer cables being mechanically protected as prime mover are maintained.
Generator G1 had 2 circuit breakers in series. The LV circuit breaker should be removed. And the 5.5 KV breakers only are to be used like the other generators.	Work to be completed in August.
The exhaust fans in the engine room are not working	Work to be completed in first year of concession.
Some engine control wiring covers are missing. They have to be covered.	Work to be completed as prime movers are maintained.
Workshop switchboard panel is to be upgraded.	Work to be completed within first year of concession.
Network single line drawings not understood by all relevant staff	New single line drawings have been drawn up to assist all workers in understanding the system better refer to links.
The black start generator from hydro has been removed from its location due to failed. It appears that no care was taken in trying to protect the unit from the elements of the weather condition.	Black start generator will be repaired or replaced within first year of concession.
Diesel Generator 1 was approaching its 20,000 overhaul and yet there were no spares in place.	Overhaul spares have been ordered.
The stock of spares and repair parts was seriously depleted and not replaced such that there are insufficient spares to weather a significant fault.	Many spares have been ordered including wire, meters, boxes, fuses, disconnects, transformers, substations switches, breakers, cable terminations.

A3: Sarakata Hydro Power station

Status	Corrective Action
Stator for Gen #1 not operational	Rewind of stator is complete and is currently being shipped back to Vanuatu.
Stator for Gen #2 not operational	Stator has been removed, cleaned and packaged for shipping and awaits ship availability.
No meter installed at the hydro for recording auxiliary readings.	Meter now installed.
Black start generator not working. The black start generator for the Hydro station had been removed and left inoperable in the diesel plant	Same as above
Generator 1 and 2 not operational	Both generators commissioned by the Japanese but with some technical issues limiting the hydro to operate at full capacity
Faulty hour meter on Turbine #1	Install a new running hour meter on Turbine # 1

A4: Distribution Network

Status	Corrective Action
There is a voltage regulation issue on the High Voltage line which causes voltage fluctuations for all of the Hydro Feeder customers.	Remote tap changer to be installed in first year of concession allowing control of voltage manually from diesel station control room.
There is a significant lightning fault issue on the High Voltage line which causes significant outages during the rainy season.	Protection engineer to recommend and install additional lightning protection during first year of concession.