PACIFIC POWER UTILITIES

Benchmarking Report

2013 & 2014 Fiscal Years

PREPARED BY THE PACIFIC POWER ASSOCIATION (PPA) WITH TECHNICAL SUPPORT
FROM THE PACIFIC REGION INFRASTRUCTURE FACILITY (PRIF)

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PREFACE

The Pacific Power Association (PPA) is pleased to release the 2013/2014 Fiscal Year Benchmarking Report, based upon the 2013/2014 fiscal reporting year relevant to each utility. This report presents the results of the fourth successive annual assessment of Pacific electricity utility performance since 2011.

This round of benchmarking marks the final round of benchmarking supported by the Pacific Region Infrastructure Facility (PRIF). PPA and PRIF have had a productive relationship working together on benchmarking over the last few years and I thank PRIF for its support. The Association is committed to continuing the process and ready to do so.

In July 2015 at its annual conference in the Republic of the Marshall Islands, the Association held a two day benchmarking workshop (organized by the PPA and PRIF), which provided another opportunity for the utility technical staff and Benchmarking Liaison Officers to continue developing their capacity to understand the indicators, collect the data, and apply the findings of the benchmarking process in their day-to-day operations.

At the Board meeting last year, the Chief Executives of the Member Utilities agreed to start making financial contributions to cover the cost of the benchmarking initiative. This reflects the benefit we are getting from the process. We know this is a situation of continuous improvement and we know it takes time to reach the goals we have as utilities and members of the PPA. On behalf of the PPA, I thank all the Active PPA Members' management and staff and I encourage everyone to continue working on the benchmarking Initiative.

Kione Isechal
CEO, Palau Public Utilities Corporation
Chairman, Pacific Power Association
Koror, Republic of Palau

ACKNOWLEDGEMENTS

The PPA would like to acknowledge a number of groups and individuals who have contributed significantly to this benchmarking exercise.

The PPA Secretariat provided overall coordination and led the data collection and validation exercise, liaising with the participating PPA member utilities and putting together the report. In particular, the leadership of the PPA Executive Director, Andrew Daka, is recognised for his leadership in the process. His staff have also assisted with a range of tasks supporting the process, notably Gordon Chang (Deputy Executive Director), Paula Loga (Administrative Clerk), Mohini Chand (Finance Officer), and Ana Chan (Administration Officer).

PRIF provided funding and overall support in the preparation and implementation of the project. In particular, acknowledgement is given to:

- Christine McMahon, who managed the consultancy and provided support throughout the project, including in the production of this report
- Derek Atkinson, the PRIF consultant who analysed the data and also assisted in preparation of this report and the template for reporting that will be used in future years
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- Mike Trainor (ADB Manila) and Chris Russell (ADB Consultant) who supported the 2015 benchmarking presentations to the Chief Executives and others during the PPA Annual Conference in Majuro.

Staff members of the SPC – most notably Solomone Fifita and Frank Vukikomoala – were a part of the project's Implementation Review Committee and provided input at the inception stage of this round of the benchmarking.

Chief Executive Officers, the Benchmarking Liaison Officers and other utility staff have played a vital role in the project and, without them, this report could not have been completed. They have shown leadership at utility level, they have shared what they have learned with other utilities, and they have devoted time and attention to the important exercise of data collection. Their ongoing commitment is vital to the success of the process.

Acronyms

ADB	Asian Development Bank
AF	Availability Factor
APPA	American Public Power Association (of which PPA is a member)
ASPA	American Samoa Power Authority
AUS	Australia
CARICOM	Caribbean Community
CARILEC	Caribbean Electric Utility Services Corporation
CEO	Chief Executive Officer
CF	Capacity Factor
CPUC	Chuuk Public Utility Corporation
CoP	Community of Practice
CROP	Council of Regional Organisations of the Pacific
CUC	Commonwealth Utilities Corporation (Saipan)
DFAT	Australia's Department of Foreign Affairs and Trade
DSM	Demand Side Management
EDT	Electricité de Tahiti
EEC	Electricité et Eau de Caledonie
EEWF	Electricité et Eau de Wallis et Futuna
EIB	European Investment Bank
EN	European Standard
ENERCAL	Societe Neo-Caledonenne D'Energie
EPC	Electric Power Corporation (Samoa)
EU	European Union
Eurelectric	European Electrical Utility Association
FEA	Fiji Electricity Authority
FSM	Federated States of Micronesia
FTE	Full Time Equivalent
FY	Fiscal (or Financial) Year
GDP	Gross Domestic Product
GNP	Gross National Product
GPA	Guam Power Authority
GW, GWh	Gigawatt (1 GW = 1,000 MW); Gigawatt hour (1 GWh = 1,000 MWh)
HECO	Hawaii Electric Company
HFO	Heavy Fuel Oil
HV	High voltage
IBNET	International Benchmarking Network for water and Sanitation Utilities
IPP	Independent Power Producer, usually private sector
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standard
KAJUR	Kwajalein Atoll Joint Utility Resources
KEMA, DNV KL	KEMA was a consulting company, now DNV GL (PPA Allied Member)
kg	kilogram
km	kilometre
KPIs	Key Performance Indicators
KUA	Kosrae Utilities Authority
kV	kilovolt (1,000 Volts)
kWh	kilowatt; (1000kW = 1 MW); kilowatt hours; (1000kWh = 1MWh)
kWh/L	kilowatt hours per litre
LF	Load Factor
LTI	Lost Time Injury
LTIDR	Lost Time Injury Duration Rate
MEC	Marshall Energy Company
MOU	Memorandum of Understanding
MVA	Megavolt Ampere
MW, MWh	Megawatt (1 MW = 1,000 kW), Megawatt hour (1 MWh = 1,000 kWh)
NEC	National Electric Code
NESIS	Network of Experts of Small Island System Managers (European utilities)
NPC	Niue Power Corporation
NUA	Nauru Utilities Corporation
NZ	New Zealand
NZMFAT	New Zealand Ministry of Foreign Affairs and Trade
O&M	Operations and Maintenance
PCO	PRIF Coordination Office
PIAC	Pacific Infrastructure Advisory Centre
PICs	Pacific Island Countries
PICTs	Pacific Island Countries and Territories
PIPs	Performance Improvement Plans
PNG	Papua New Guinea

Acronyms, cont.

PPA	Pacific Power Association; also Power Purchase Agreement
PPL	PNG Power Ltd.
PPUC	Palau Public Utilities Corporation
PRDR	Pacific Regional Data Repository
PRIF	Pacific Region Infrastructure Facility
PUB	Public Utilities Board (Kiribati)
PUC	Pohnpei Utilities Corporation
PV	Photovoltaic
RE	Renewable Energy
RMI	Republic of the Marshall Islands
ROA	Return on Assets
ROE	Return on Equity
RORA	Rate of Return on Assets
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SEIDP	Sustainable Energy Industry Development Project
SIEA	Solomon Islands Electricity Authority
SFC	Specific Fuel Consumption
SOPAC	Applied Geosciences and Technology Division of SPC
SPC	Secretariat of the Pacific Community
T&D	Transmission and Distribution
TAU	Te Aponga Uira O Tumu-Te-Varovaro (Cook Islands)
TEC	Tuvalu Electricity Corporation
TPL	Tonga Power Limited
UNELCO	UNELCO Vanuatu Limited
USA	United States of America
USD	United States Dollar
WBG	World Bank Group
YSPSC	Yap State Public Service Corporation

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EXECUTIVE SUMMARY

Overview

Introduction

Benchmarking is recognised as a valuable instrument for comparing performance within and between organisations and across regions. It allows better understanding of performance gaps, fosters improved decision-making about priorities and use of available resources, and can result in increased efficiency and effectiveness. Key Performance Indicators (KPIs) are being used in the Pacific Power Association as the basis for utilities to monitor, assess and improve their performance over time by identifying areas of weakness and addressing them, and by comparing performance with other similar utilities elsewhere and learning from them about aspects of their operation that produce stronger performance.

This report presents the results of the latest benchmarking round, based on data collected for the 2013 and 2014 fiscal years for each utility. It includes the results of 46 KPIs plotted against 2012 fiscal year data to show trends. Like the 2012 fiscal year benchmarking round, the financial data has been fully disclosed following the decision made by the Chief Executives of the utilities at the 23th Annual Pacific Power Association Conference in Tahiti, French Polynesia, 7 – 11 July 2014. Disclosure of the financial data enhances the usefulness of the data, particularly in discussions pertaining to efficiency of operations and profit.

Governance Indicators

The Governance Indicators have not changed significantly from previous benchmarking periods. This is expected as there have been no noted major changes in ownership, regulations and standards in the participating utilities to impact on the indicators.

Technical KPIs

In terms of the core KPIs used in the benchmarking exercise, six have shown improvement since the last benchmarking period, five have had a decline in performance, seven show stable results, and 16 are variable (meaning that there are no definitive trends observed either because of the lack of sufficient utility data or the data submitted is unreliable. The indicators showing improved performance are:

- Planned Outage Factor
- Generation Operations and Maintenance
- Transmission Reliability
- Transmission System Average Interruption Duration Index (SAIDI)
- Debt to Equity Ratio, and
- Operating ratio.

Two of these also improved in the previous benchmarking period, namely planned outage factor and transmission reliability. The improvements can be brought about by improved maintenance planning and vegetation management.

The indicators showing declined performance are:

- Power Station Usage
- Forced Outage Factor
- Distribution Losses
- Distribution O&M
- Lost Time Injury Frequency Rate
- Customers per Distribution Employee
- Generation and Distribution System Average Interruption Frequency Index (SAIFI), and
- SAIDI (interruptions/customer)
- Debtor days.

The indicator on customers per distribution employee also declined during the last benchmarking period, reflecting a drop in number customer connected or an increase in the number of utility staff.

The indicators that remained stable are:

- Load Factor
- Capacity Factor
- Availability Factor

- Generation Labour Productivity
- Specific Fuel Oil Consumption (kWh/litre)
- Specific Fuel Oil Consumption (kWh/kg), and
- Average Supply Cost.

These are all generation factors, apart from average supply cost. Three were also stable in the previous benchmarking period (i.e. load factor, capacity factor and average supply cost).The fact that these indicators have remained stable is an indication of utilities just doing enough maintenance to maintain the level of operation with no significant expenditure to in new plant.

The full table of results for these indicators is Table 6.2 found on page 3. No regional comparisons were made this year as the Caribbean Electric Utility Services Corporation (CARILEC), which provides the most similarity to the PPA utilities, has not published its latest benchmarking indicators.

Data Reliability

The quality of data provided by the utilities has shown significant improvement with subsequent rounds of benchmarking as the BLOs become familiar with the data collected and the process of collecting data. However, there certain data such as generation outage hours, distribution outage hours and HR data that still needs improvement.

Gender

The percentage of females in utilities is unchanged from the previous benchmarking period remaining at 23% of the total workforce. This is also the case for females employed in the technical operations of the utilities, which remains at 2.9%.

Comparing Results from 2011, 2012, 2013, and 2014

The regional trends for the Pacific Utilities do not show a definitive overall pattern in the key performance areas over the number of benchmarking periods.

However, in general it is generally observed that the Generation KPIs have been stable over the years especially for the Load Factor, Capacity Factor, Specific Fuel Consumption and Availability Factor; indicators that reflect the generation plant in the utilities. There are fluctuations on a year by year basis for the rest of the indicators.

The year by year fluctuations are also observed for the Transmission, Distribution, SAIDI and SAIFI, Financial and Human Resource performance indicators.

For the participating utilities, the most important aspect is to look at their individual performance over the years and determine whether their performance improvement programs have made an impact on their operations in the targeted areas.

Recommendations

The key recommendations for improvement in the coming years are in the areas of performance improvement, knowledge sharing and capacity building. These recommendations are summarised below, along with relevant discussion points.

Performance Improvement Areas

In line with previous fiscal years, the recommendations for performance improvement have not changed significantly. This makes sense as there has been insufficient time for the effects of performance improvement that have been implemented to make an impact. As such, the key areas that require attention on a regional scale are still labour productivity, customer outages, safety reporting, financial performance and distribution and network delivery losses.

The recommendations are to improve:

- Labour Productivity
- Knowledge of Outages and Customer Experiences
- Safety and Incident Reporting
- Financial Performance
- Efficiency through reduction in Losses
- Transformer Utilisation

Further discussion on these points follows.

Low labour productivity, (as represented by customers per distribution employee and overall labour productivity) is a key concern, noting that productivity has been steadily declining over consecutive benchmarking periods. The recommendations of the previous report on actions to address the declining labour productivity are still valid (as summarised above) and utilities need to closely examine the recommendation and determine which recommendation would make the most improvement for their organisation.

Poor knowledge of outages and customer experience: Although capacity building efforts have improved data collection for the SAIDI and SAIFI indicators, there is still more work required in utilities on recording the data, using it to monitor the health of the system, and tracking the effectiveness of the response to outages in different utilities.

A better understanding of these indicators will assist the maintenance personnel in decision making and tracking service reliability. This monitoring needs to be done on a regular basis and does not need to wait until the end of the fiscal year.

Poor safety and incident reporting continues to be an issue. A high frequency of Lost Time Injuries can result in poor labour productivity. Yet despite the importance of monitoring safety, the process for recording relevant information relating to work place injuries is incomplete in some utilities. Utilities are encouraged to promote safety awareness and ensure appropriate procedures and processes are in place to record and monitor the data.

Poor financial performance: Pacific utilities continue to struggle financially with indicators such as operating ratio showing that approximately half of the utilities are unable to achieve a positive return. Tariff setting is heavily influenced by the national governments and, as such, tariffs continue to be at odds with the cost for producing electricity in many cases. Improvements in operational efficiencies and labour productivity will improve the situation. It is important that the issue of setting tariffs to ensure utility operations are financially sustainable continues to be discussed given the impact on the quality of service in a country.

High losses: It would seem that for a number of the utilities, the loss reductions achieved prior to 2014 have been reversed with both distribution losses and network delivery losses at 14% average. Reduction in losses results in direct fuel savings and, hence, has a direct impact on the 'bottom line' for a utility. Reduction in technical losses normally requires capital investment through changes to asset design or operation, or replacement of major infrastructure. Non-technical loss reductions are often easier to manage with lower investment through addressing metering issues and customer behaviour.

Transformer utilisation has improved marginally from the 2012 benchmarking round, though the Pacific average of 16% is still well below the benchmark target of 30% that was set in 2002. A number of factors including reduced generation demand, the often prohibitive cost of replacing distribution transformers, of correct sizing of transformers must be considered when designing and installing new transformers.

Performance Improvement Plans

With regional benchmarking now in its fourth round, the Pacific power utilities have become familiar with the concept of developing Performance Improvement Plans. With guidance from Chief Executive Officers and Benchmarking Liaison Officers, most utilities should now be in a position to clearly identify the priority areas to address and the interventions required to improve performance. A number of utilities are achieving improvements, particularly in reduced distribution losses, reduced debtor days and improved fuel efficiency. The support and involvement of the Chief Executive Officer is crucial to ensuring performance improvement programs are implemented and monitored.

Recommendations are as follows:

- Identify specific areas to focus on which will bring the most improvements
- Identify activities which will result in improvements
- Carryout cost-benefit analysis to prioritise the activities for implementation
- Implement the prioritise activities and monitor its impacts

Performance Based Contracts and Bonuses

Performance based Incentives have been recommended previously as a means of improving utility performance and getting utility staff to focus on the utility's strategic goals. However, to ensure that any performance based incentives are truly reflective of performance, the set targets need to be clear, there must be systematic efforts to collect and verify data, and rewards must be based on actual achievements.

Recommendations are as follows:

- That utilities consider introduction of performance based contracts and bonuses if they are not currently being implemented.
- That any such scheme by applied to the entire workforce.

Knowledge Sharing and Capacity Building

Recommendations in regard to knowledge sharing and ongoing capacity building are as follows:

- There are online benchmarking interest groups and the PPA with direction from the Secretariat will explore ways in which the PPA can benefit from being a member of the interest groups. One such interest group is IBNET, an international benchmarking network although this is targeting water utilities; the methodology still applies.

- Like other sectors in the Pacific, there is a very limited resource pool in the utilities, particularly in regard to technical and managerial expertise, and especially among the smaller utilities. This means that Benchmarking Liaison Officers undertake their benchmarking responsibilities as secondary roles and cannot devote a lot of time to the task. In this context, the opportunity to update and upgrade their skills through participation at the workshops on benchmarking becomes critical. Chief Executives are encouraged to support participation at the annual benchmarking training and to facilitate ongoing discussions with Benchmarking Liaison Officers in other utilities. It is also important to ensure a full handover and briefing if a Benchmarking Liaison Officer leaves the utilities and is replaced by another staff member. In some utilities, the role is shared among various staff members and coordination is important in this situation.

- It is encouraging that the PPA Board agreed that the benchmarking workshop will continue to be an annual event as part of Annual Conference. In the coming year, it is expected that additional training will be provided to the Benchmarking Officers so they understand the transition from using spreadsheets to online submission of data, as funded by the World Bank. This training will also include other utility staff, as required.

- It has been observed that the utilities are now at different stages in terms of the confidence and understanding of the progress in data collection, reporting and development of performance improvement programs for their respective utilities. Ongoing exchange between utilities is strongly encouraged, including sharing experiences and tips for improvement. During the next 12 months, the PPA as an organisation will be exploring the potential to provide opportunities for mentoring. This will include discussions with Chief Executives and development of a trial between two or more utilities.

1. INTRODUCTION

1.1 Benchmarking Overview

Benchmarking is a valuable instrument for comparing the performance of an organisation over time, as well as performance between similar organisations and between regions. It was introduced to the Pacific Power Association (PPA) to contribute to enhanced service delivery in the power sector by giving utilities the means to compare their own performance over time and in relation to other similar-sized utilities. A suite of Key Performance Indicators (KPIs) were agreed and these are used to monitor performance, identify performance gaps/weaknesses, and demonstrate trends over time.

This report provides the results of the fourth consecutive round of Pacific power benchmarking in the region. The report brings data collection up to date in the region by containing data for both the 2013 and 2014 fiscal years (FYs) for each participating utility, as collected throughout 2015. The 2015 exercise involves data from 22 power utilities for the 2013 FY and 20 for the 2014 FY. It is the first report to contain data from the Hawaii Electric Company (HECO) following its request to participate in the benchmarking exercises.
Table 1.1 shows a summary of the utilities that have participated in the Pacific benchmarking initiative since 2001.This current round of benchmarking covered data governance, technical/operational indicators, and data on gender composition of the workforce.

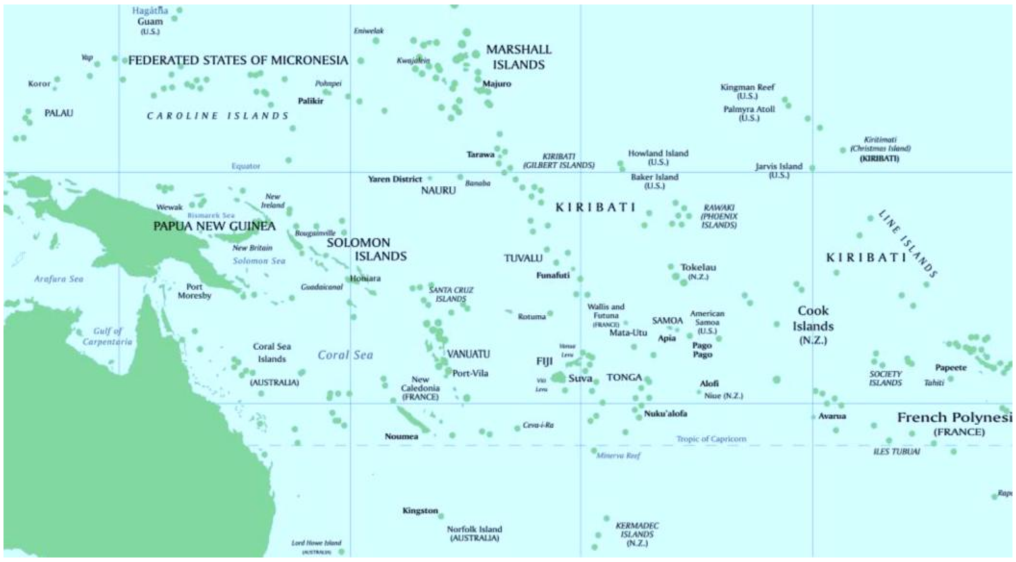
Table 1.1: Utility Participation in Benchmarking 2001, and 2010 - 2014 Data Periods

Utility			Data Period					
			2001	2010	2011	2012	2013	2014
			Year Data Collated					
Acronym	Name	Country / Territory	2002	2011	2012/13	2013/14	2015	2015
ASPA	American Samoa Power Authority	American Samoa	✓	✓	✓	✓	✓	✓
CPUC	Chuuk Public Utility Corporation	Fed States of Micronesia (FSM)	✓	✓	✓	✓	✓	✓
CUC	Commonwealth Utilities Corporation	Commonwealth of Northern Marianas	×	✓	✓	✓	✓	×
EDT	Electricité de Tahiti	French Polynesia	✓	✓	✓	✓	✓	✓
EEC	Electricité et Eau de Caledonie	New Caledonia	✓	×	×	✓	✓	✓
EEWF	Electricité et Eau de Wallis et Futuna	Wallis and Futuna	✓	×	×	×	×	×
ENERCAL	Societe Neo-Caledonenne D'Energie	New Caledonia	✓	×	×	×	×	×
EPC	Electric Power Corporation	Samoa	✓	✓	✓	✓	✓	✓
FEA	Fiji Electricity Authority	Republic of Fiji	✓	✓	✓	✓	✓	✓
GPA	Guam Power Authority	Guam	✓	✓	✓	✓	✓	✓
HECO	Hawaii Electric Company	Hawaii (USA)	×	×	×	×	✓	✓
KAJUR	Kwajalein Atoll Joint Utility Resources	Republic of Marshall Islands (RMI)	✓	✓	✓	✓	✓	✓
KUA	Kosrae Utilities Authority	Federated States of Micronesia (FSM)	✓	✓	✓	✓	✓	✓
MEC	Marshall Energy Company	Republic of Marshall Islands (RMI)	×	✓	✓	✓	✓	✓
NPC	Niue Power Corporation	Niue	✓	✓	×	×	×	×
NUA	Nauru Utilities Corporation	Republic of Nauru	×	✓	✓	✓	×	×
PPL	PNG Power Ltd.	Papua New Guinea (PNG)	✓	✓	✓	×	✓	✓
PPUC	Palau Public Utilities Corporation	Republic of Palau	✓	✓	✓	✓	✓	✓
PUB	Public Utilities Board	Republic of Kiribati	✓	✓	✓	✓	✓	✓
PUC	Pohnpei Utilities Corporation	Federated States of Micronesia (FSM)	✓	×	✓	✓	✓	×
SIEA	Solomon Islands Electricity Authority	Solomon Islands	✓	✓	✓	✓	✓	✓
TAU	Te Aponga Uira O Tumu -Te-Varovaro	Cook Islands	✓	✓	✓	✓	✓	✓
TEC	Tuvalu Electricity Corporation	Tuvalu	×	✓	✓	✓	✓	✓
TPL	Tonga Power Limited	Tonga	✓	✓	✓	✓	✓	✓
UNELCO	UNELCO Vanuatu Limited	Vanuatu	✓	✓	✓	✓	✓	✓
YSPSC	Yap State Public Service Corporation	Federated States of Micronesia (FSM)	×	✓	✓	✓	✓	✓
		Total	20	19	21	21	22	20

1.2 Regional Overview

The Pacific Island Countries and Territories (PICTs) have an estimated population of 10.0 million people living on 553,519 km^2 of land.[1,2] As Figure 1.1 illustrates, the key feature of the geography of the region is that it consists of many island countries that are dispersed across a wide area in some cases. This poses extreme challenges for the delivery of affordable electricity of reasonable quality. In total there are 24 utilities in 20 countries that are members of the PPA. In addition, data from HECO is included where appropriate throughout this report.

Figure 1.1: Map of the Area Served by the PPA



Source: Applied Geosciences and Technology Division of the Secretariat of the Pacific Community (SOPAC), *Member Countries* (2012), http://www.sopac.org/index.php/member-countries.

Table 1.2 summarises key economic and demographic characteristics of the PICTs in which the participating utilities operate. Great variance is observed between the countries in population and land area, as well as Gross Domestic Product (GDP). These differences ought to be kept in mind when comparing benchmarking KPI results for example land area having an impact of the cost of electricity.

Table 1.2 Economies and Populations of Independent Pacific Island Countries

Country	Population (2015 est.)	Land area (km^2)	GDP per capita	
			US$	Year
Cook Islands	15,575	237	9,100	2005
Fiji	909,389	18,273	7,900	2013
Kiribati	111,200	811	1,600	2013
RMI	72,191	181	3,300	2013
FSM	105,216	701	3,000	2013
Nauru	10,600	21	12,500	2013
Palau	17,700	444	13,500	2013
PNG	7,578,200	462,840	2,300	2013
Samoa	197,773	2,785	5,100	2013
Solomon Is.	611,500	30,407	1,900	2013
Tonga	106,501	650	4,800	2013
Tuvalu	11,000	26	3,200	2013
Vanuatu	271,100	12,281	2,500	2013

Sources: 1. Population and GDPs sourced from CIA, *The World Factbook* 2. ADB, *Pacific Economic Monitor* (2012), 3. http://www.asia-pacific.undp.org/content/dam/rbap/docs/Research%20&%20Publications/poverty/State_Human_Development_Pacific_report.pdf

1 Secretariat of the Pacific Community (SPC), Pacific Regional Information System. http://www.spc.int/prism/.

2 PNG dominates, with over two-thirds of the population and occupying nearly 84 % of the land area.

Table 1.3 provides the population, land area and GDP or the Pacific territories and dependencies. The territories and dependencies have far higher GDP per capita than the independent Pacific Island Countries (PICs). It follows that consumers are better able to afford higher electricity charges.

Table 1.3: Economies and Populations of Pacific Island Territories or Dependencies[3]

Dependency or Territory	Population (2015 est.)[1]	Land area (km)[2]	GDP per capita[1]	
			US$	Year
American Samoa	54,353	199	13,000	2013
Guam	161,785	541	30,500	2013
Niue	1,190	259	5,800	2003
Northern Mariana Islands	52,344	457	13,300	2013
New Caledonia	271,615	18,576	38,800	2012
French Polynesia	282,703	3,521	26,100	2012
Hawaii	1,431,806	16,636	49,479	2015

Sources: 1. Population and GDPs sourced from CIA, *The World Factbook* 2. ADB, *Pacific Economic Monitor* (2012)
http://www.deptofnumbers.com/gdp/hawaii/

3 French Polynesia is designated as an overseas territory. In 2003 it became an overseas collectivity (collectivités d'outre-mer or COM) and in 2004 an overseas country inside the French Republic (pays d'outre-mer au sein de la République, or POM), with considerable autonomy but without a legal modification of its status. New Caledonia was also an overseas territory but gained a special status (statut particulier or statut original) in 1999, with New Caledonian citizenship and a gradual transfer of power from France to New Caledonia itself.

2. GOVERNANCE

- **Eighty five percent (85%) of the utilities that participated in the benchmarking exercises in 2013 and 2014 FYs are government-owned.**
- **Practices vary in respect to composition of the Board in the utilities and whether the Chief Executive Officer (CEO) is a Board member or attends the Board meetings.**
- **Most CEOs are on performance-based contracts.**
- **The majority of utilities have internal audit processes, however, the utilities have different statutory reporting requirements regarding Annual Reports, ranging from three to nine months from the FY end.**
- **Most utilities have Strategic Plans, however, few are reporting on progress annually.**
- **Baseline analysis of the composite governance indicator continues to demonstrate a preliminary link between good governance and financial performance.**

2.1 Introduction

Good governance improves community confidence in the management and decision-making of an organisation. This includes ensuring there are ethical, reliable and accountable processes and that roles and responsibilities are clear and appropriate. Since the 2012FY report, utilities have been providing data on a number of governance indicators. Unlike the technical indicators, these are not verified independently, but simply reflect information provided by the utilities. Being able to compare this data between utilities can be useful in discussions about how governance can might influence the outcomes being achieved in the different utilities.

2.2 Ownership, Regulations and Standards

Of the 22 utilities that provided information on ownership, 19 are government-owned and three are privately owned (see Table 2.1). This means that, for most of the utilities, changes in governance arrangements generally require legislative and/or policy reforms by government and the pace at which these changes are introduced also depend on government reform programs.

Table 2.1: Ownership, Regulatory Structures of Utilities, and Quality Standards

Utility	Ownership	Regulation	Power Quality Standards
ASPA	Public	Self	None
CPUC	Public	Self	None
CUC	Public	External	USA
EDT	Private	External	None
EEC	Private	External	EN50160
EPC	Public	External	None
FEA	Public	External	AUS/NZ
GPA	Public	External	None
HECO	Public	External	USA
KAJUR	Public	Self	None
KUA	Public	Self	KUA
MEC	Public	Self	None
PPL	Public	External	AUS
PPUC	Public	Self	JIS,NEC
PUB	Public	External	AUS
PUC	Public	Self	USA
SIEA	Public	Self	AUS
TAU	Public	External	NZ Standard
TEC	Public	Self	AUS/NZ
TPL	Public	External	TPL Standard
UNELCO	Private	External	Concession Contract
YSPSC	Public	Self	NEC

As the Table shows, there are 12 utilities that self-regulate and 10 that have external regulation. Where utilities operate under a concession such as the French Territories and Tonga or where there exists a regulator, there will be external regulations for both technical and financial performance. The National Government owned utilities are more likely to have their tariffs approved by their Board of Directors or the responsible Ministry with technical regulation being the responsibility of the utility.

Most of the utilities refer to power quality standards in managing their operations. There are a variety of standards in place, including some developed in Australia, New Zealand and the USA. A couple of utilities have also developed their own standards, which are based on internationally recognised standards.

2.3 Composite Governance Scorecard

The composite governance scorecard, introduced in the 2012 FY Report, has been used again in this report for the purpose of monitoring whether good governance mechanisms are delivering tangible benefits to utilities in the form of improved financial performance.[4] The composite score is comprised of weighted indicators as shown in Table 2.1[5].

Table 2.2: Governance Scorecard

Governance Indicator	Good Governance	Poor Governance	Weighting
Are Ministers appointed to the Board?	No	Yes	12%
Are Ministers/ public servants representing the line/sector Ministry appointed to the Board?	No	Yes	12%
Is a Code of Conduct in place and implemented?	Yes	No	8%
Is a commercial mandate in place and implemented?	Yes	No	19%
Is the CEO on a performance contract with annual reviews?	Yes	No	8%
Has a Strategic Plan (at least 3 year forecasts) been adopted and implemented?	Yes	No	15%
Is the Annual Report (audited) completed within four months of end of reporting year?	Yes	No	19%
Does the Annual Report disclose performance against Plan?	Yes	No	8%
Total Score			**100%**

Note: A good governance score results in full marks for each indicator, whilst a poor governance result receives a zero for each applicable indicator. In regard to the indicator on Annual Reports being completed within four months of the end of the reporting year, this has been used as a good practice standard but it is acknowledged that several utilities have agreements with their regulators that allow for longer periods for production of Annual Reports.

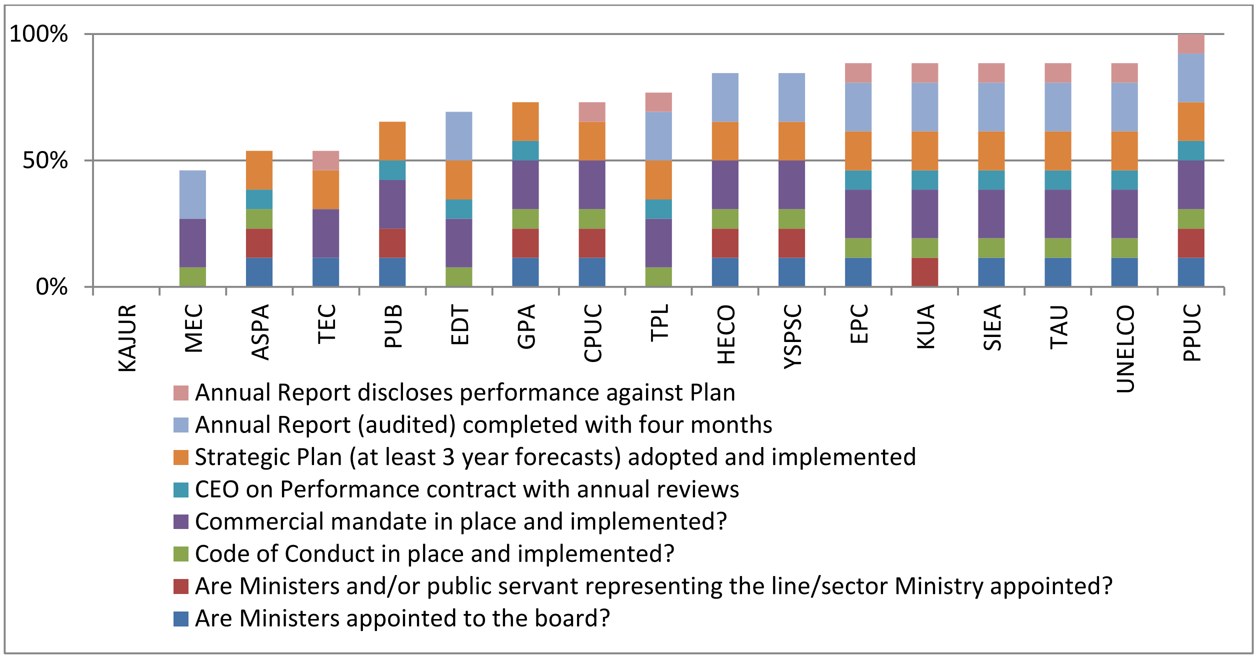
Composite governance scores were determined for utilities that had provided sufficient responses to enable the weightings to be calculated. These are shown in Figure 2.13, ranked from lowest to highest score (highest being that closest to 100%). As per previous reporting, there is a significant spread in terms of governance in the region, ranging from a low of 0% for KAJUR up to 100% for PPUC.

An organisation with governance structure would be seen as one which does not have any representation from the Government, has a recognised code of conduct, has a commercial mandate which guides its operations, has a plan and which is transparent in its reporting.

4 This is only the second time the utilities have reported on governance arrangements, so it is expected that the quality of the data may show some inconsistencies. As has occurred with other data collected for benchmarking, both reliability and validity of the information is likely to improve after utilities have discussed the information from a comparative perspective and also sought advice from regulators working with them. It may then be possible to develop reliability scores as is used for other indicators of this report.

5 The weightings reflect specialist advice from the Asian Development Bank about the comparative importance of the respective governance indicators and their impact on performance. For example, if a Board does not have up-to-date and reliable financial information it cannot undertake basic governance tasks, it cannot assess performance to date and does not have a financial foundation to plan for the future. Timely audited financial information is therefore given the highest equal weighting, along with having a clear commercial mandate. Robust forward planning is listed third followed by Board composition.

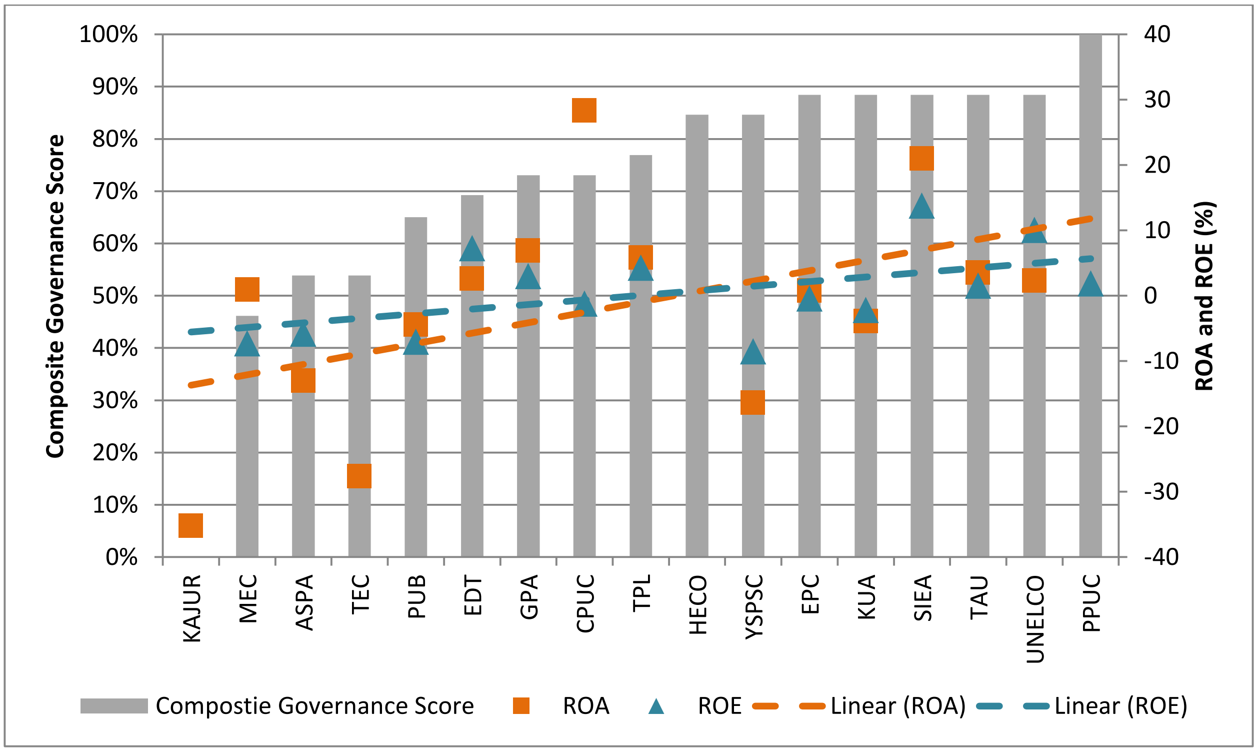
Figure 2.1: Composite Governance Score



As was done in the 2012 FY Report, the composite governance scorecard has been correlated with the Return on Equity (ROE) and Return on Assets (ROA) data (see Section 5.7 for a detailed ROE and ROA analysis). Consistent with the 2012 FY baseline results, there is a general correlation between a higher governance score and higher ROA's and ROE's (see Figure 2.14). A financially sustainable utility will tend to have high composite governance score.

In reviewing these results it should be noted that both governance and financial practices are dynamic and may change over time with delayed impacts upon associated analysis. Ongoing assessment in terms of comparison of these indicators is therefore recommended over subsequent benchmarking exercises in order to better assess the accuracy and impact of this correlation and trends over time.

Figure 2.2: 2014 FY Composite Governance Score compared with ROE and ROA



3. GENDER

- **Overall staffing of Pacific Power utilities is: 23% female, 77% male.**
- **The gender distribution of technical staff in utilities is: 3% female, 97% male.**
- **The CEOs and second-in-charge are all male at every utility.**
- **Senior managers reporting directly to the CEOs comprise 33% female and 67% male.**
- **Benchmarking Liaison Officers during this round of benchmarking consisted of four females and 17 males.**

3.1 Introduction

Gender dimensions were incorporated into the 2012 FY Report to raise awareness about gender representation in the power sector, including the involvement of men and women in decision-making roles in the utilities. Furthermore, a focused effort was made to ensure that both male and female Benchmarking Liaison Officers had access to information, support and leadership opportunities in the course of the project and at the Benchmarking Workshop.

3.2 Key Gender Statistics

Overall, the gender indicators have not changed since 2012, with the proportion of males and females employed being 77% and 23% respectively in the 2014 FY (see Table 3.1). This is similar to staffing patterns in the power and water sectors in Australia [6] where there is also a strong gender imbalance.

Table 3.1: Key Gender Statistics

Workforce by Gender	Regional Average
Total staff (male)	76.9%
Total staff (female)	23.1%
Technical staff (male)	97.1%
Technical staff (female)	2.9%
Senior staff (male)	67.3%
Senior staff (female)	32.7%
Senior female staff as a proportion of total staff by role	
Finance	26.6%
Procurement / Supply	5.5%
Human Resources	10.1%
Public Relations/Customer Service/Communications	38.5%
Administration	15.6%
Other	3.7%

The situation is most notable in regard to technical positions. In 2012 technical staff at utilities averaged at 93% male and 3% female. [If there are any utilities doing better than this you could name them and give their results]. Among senior staff of utilities, the percentage difference is less pronounced, though still significant, at 67.3% male and 32.7% female. The most common roles for women in senior positions were in public relations/customer service/communications or in finance-related functions.

6 Australian Government Department of Employment. *Employment by Industry by Gender*, November 2015. http://lmip.gov.au/default.aspx?LMIP/LFR_SAFOUR/LFR_IndustryGender.

At present this data is being monitored, but there are no regional initiatives to increase female participation in technical roles. However, the example of TPL is worth mentioning. After Cyclone Ian impacted on Ha'apai and as part of the Recovery Project, TPL recruited women from Ha'apai to work in the project with on-the-job training as line maintenance staff. Apparently it was so successful that TPL employed them permanently after that.

4. DATA RELIABILITY

- **Data reliability is high in the areas of generation, customer connections and financial information.**
- **Further work is still required to develop data quality for customer outage impacts and network demands.**

4.1 Introduction

Data reliability self-assessment was introduced to the benchmarking exercise in 2012. It is intended to help better understand data quality issues and encourage improvements in data reliability. Participating utilities are asked to provide a self-assessed reliability grade for six key components of the primary data, as set out in Table 4.1.

Table 4.1: Key Data Component Reliability Assessment Questions

Question	Description
(i)	How is fuel consumption calculated or derived?
(ii)	How are generation quantities calculated or derived?
(iii)	How are customer outages impacts calculated or derived?
(iv)	How are network demands and capacity utilisation calculated or derived?
(v)	How is the number of connections or customers calculated?
(vi)	Where is financial information sourced from?

As with previous benchmarking reports, a 'Grade A' score represents highly reliable data, 'Grade B' reliable data, 'Grade C' unreliable data, and 'Grade D' highly unreliable data. The definitions of each of these grades are provided below in Table 4.2.

Table 4.2: Grading Schema

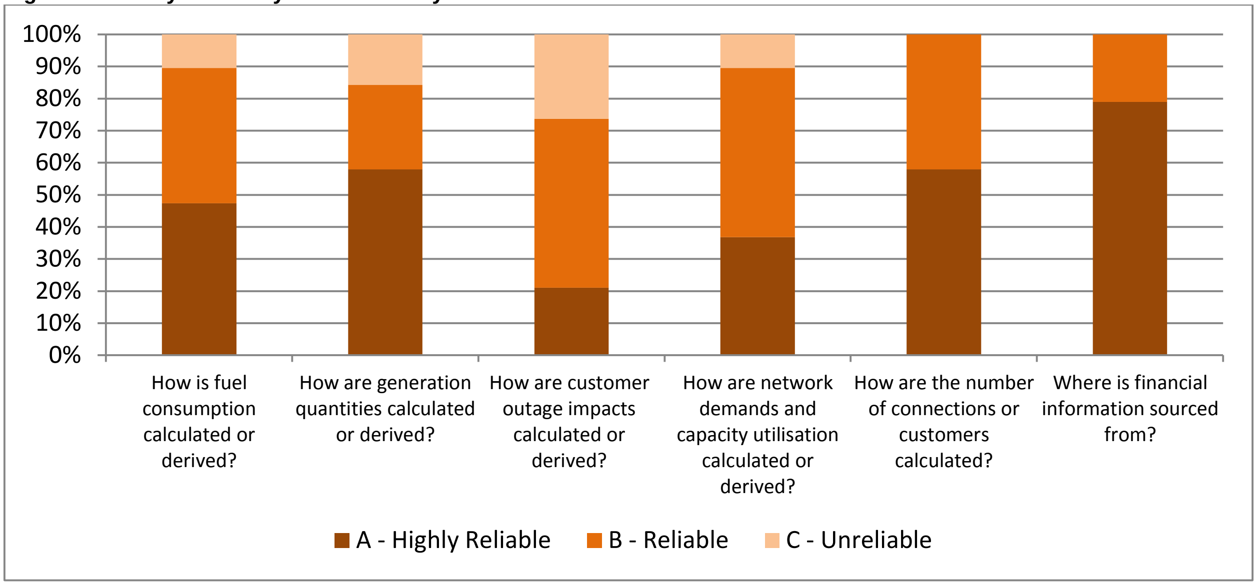
Question	Description	
A	Highly Reliable	Data is based on sound records, procedures, investigations or analyses that are properly documented and recognised as the best available assessment methods. Effective metering or measurement systems exist.
B	Reliable	Generally as in Category A, but with minor shortcomings, e.g. some of the documentation is missing, the assessment is old or some reliance on unconfirmed reports; or there is some extrapolation made (e.g. extrapolations from records that cover more than 50 % of the utility system).
C	Unreliable	Generally as in categories A or B, but data is based on extrapolations from records that cover more than 30 % (but less than 50 %) of the utility system.
D	Highly Unreliable	Data is based on unconfirmed verbal reports and/or cursory inspections or analysis, including extrapolations from such reports/inspections/analysis. There are no reliable metering or measurement systems.

4.2 Data Reliability Self-Assessment

Of the 20 utilities participating in the 2014 FY data exercise, 19 completed the data reliability scorecard. As shown in Figure 4.1, it can be seen that no utilities reported data as being Grade D (highly unreliable). Financial data and the calculation of customer connections are typically being the most reliable data submitted. This is as expected given the process for establishing and maintaining customer accounts in utilities and the importance of the related financial records that are well maintained.

Generation data is noted to be reliable given that utilities have established processes for recording generation operational data for generating plant.

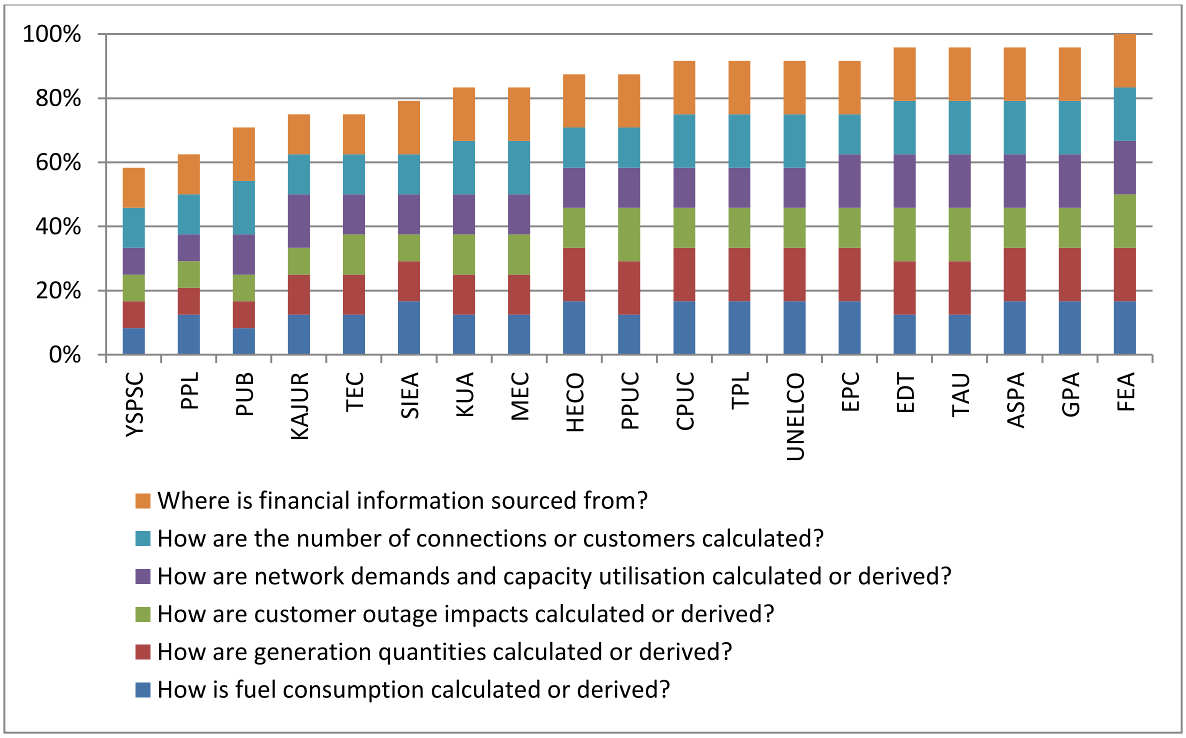
Figure 4.1: Utility Reliability Grades for Key Performance Indicators



The other three measures (i.e. calculation of fuel consumption, customer outages, network demands and capacity utilisation) show considerable variation across the utilities. Approximately 90% of utilities indicated that their data for fuel consumption, network demands and capacity utilisation could be considered reliable or highly reliable. The information on reliability of data on generation quantities is also good in many utilities. However, for customer outage data, only 20% of the utilities consider their data highly reliable and almost 30% consider it unreliable. There is also 10% or more of utilities that report unreliable data for fuel consumption, generation quantities, and/or network demands and capacity utilisation. This information is useful in considering capacity building work in utilities in the future.

Data reliability is important when considering relative performance between utilities, as readers of this report should take into account the credibility of submitted results before drawing conclusions. Figure 4.2 therefore aggregates the reliability scores submitted by each of the utilities in order to rank the relative reliability of the data that was submitted. These aggregate scores have furthermore been utilised as a weighting factor in this report in calculating the Composite Indicator for the 2014 FY.

Figure 4.2: Breakdown of Reliability Grades Assessment by Utility



The reliability of the data is determined based on what documentation and where the data is sourced from. The data graded A to D corresponding to scores range from 4 on a declining scale to 1 respectively.

The data receives a reliability score of “Highly Reliable” or “A” if the source from which the data is derived is based on sound records, procedures, investigations or analyses that are properly documented and recognised as the best available assessment methods. Effective metering or measurement systems exist.

A “B” grading or “Reliable” means that data is as in Category A, but with minor shortcomings, e.g. some of the documentation is missing, the assessment is old or some reliance on unconfirmed reports; or there is some extrapolation made (e.g. extrapolations from records that cover more than 50 percent of the utility system).

“C” or “Unreliable” grading is where data is as in Category B, but data is based on extrapolations from records that cover more than 30 per cent (but less than 50 per cent) of the utility system.

Where data is based on unconfirmed verbal reports and/or cursory inspections or analysis, including extrapolations from such reports/inspections/analysis or there are no reliable metering or measurement systems then the data is graded “D” or “Highly Unreliable”.

5. KPI RESULTS

- **46 KPIs are presented in this chapter covering both operational and financial areas.**
- **For the second year, financial data has been fully disclosed in this report.**
- **The composite indicator provides an overall indicator of technical performance, although the method for determining this has changed from the 2012 Report.**

5.1 Introduction

This section provides performance results for the utilities that participated in the data collections for 2013FY and 2014FY. The results from the previous 2012 FY reported have also been included for further longitudinal comparison, along with data from HECO which is included for the first time. The results are comprised of 46 KPIs, with data for each indicator graphically presented along with both the regional average (arithmetic mean) and median (middle) values. There is also comparison to 2012 results and Pacific benchmarks where available. A table showing how each of the 46 KPIs is calculated is provided in Appendix E. The table also states whether the indicator was calculated for the main grid only or for all grids combined.

An indication of utility size is provided throughout this section of the report via a colour coding of red, orange or yellow determined in accordance with the PPA's membership level categorisations (see Table 5.1 below): yellow indicates an annual peak load of less than 5MW (small); orange indicates an annual peak load of between 5MW and 30MW (medium); and red indicates an annual peak load of 30MW or greater (large). In order to facilitate comparison of results by size, all graphs are shown in the order of minimum to maximum demand.
Table 5.1 provides an overview of some key characteristics of the participating utilities, including the applicable colour coding. It is important in reviewing the data that any conclusions take account of the similarities and differences in the operating conditions of the utilities.

Table 5.1: Utility Key Characteristics

Utility and colour code	Peak Demand (MW)	Size Category (S / M / L)	Outer Islands Serviced (Y/N)
ASPA	22.9	Medium	Yes
CPUC	2.4	Small	Yes
CUC	40.5	Large	Yes
EDT	116.4	Large	Yes
EEC	94.1	Large	Yes
EPC	22.8	Medium	Yes
FEA	161.0	Large	Yes
GPA	249.0	Large	No
HECO	1727*	Large	No
KAJUR	2.1	Small	No
KUA	1.1	Small	No
MEC	8.7	Medium	Yes
NPC	0.6	Small	No
NUC	3.3	Small	No
PPL	209.6	Large	Yes
PPUC	12.0	Medium	Yes
PUB	4.2	Small	No
PUC	5.8	Medium	No
SIEA	14.1	Medium	Yes
TAU	4.4	Small	No
TEC	0.8	Small	Yes
TPL	9.8	Medium	Yes
UNELCO	11.4	Medium	Yes
YSPSC	2.3	Small	Yes

5.2 Generation Indicators

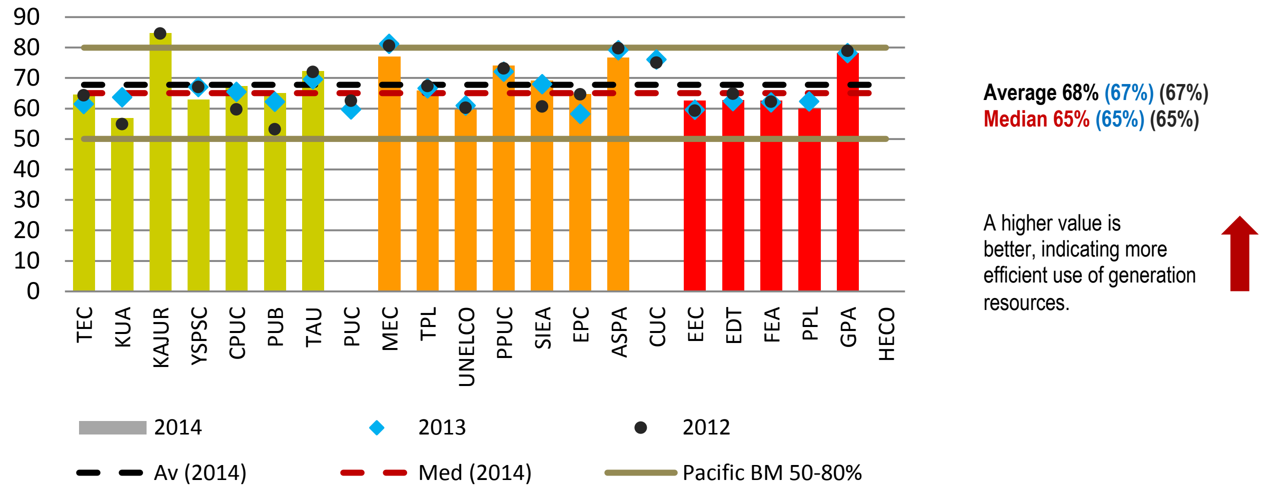
(i) Load Factor

Load factor (LF) measures the effectiveness of the use of utility generation resources. It is the ratio of system average power generated to peak power demand over a period of time. A lower LF indicates greater fluctuation in the use of generators throughout the reporting period, sometimes (but not necessarily) resulting in higher losses. A high LF is a good result implying a relatively flat demand for electricity and relatively constant and efficient utilisation of generators, transformers and related equipment operating at efficient levels. Utility CEOs selected "a high benchmark of 80% indicating that in the future, demand management should play an increasingly important part in Pacific power sector policies".

Figure 5.1 shows that LF has remained fairly stable over the last three years, with a current average of 68%. There is no apparent correlation between utility size and LF. Only one utility has reported achieving the agreed Pacific benchmark of 80% (i.e. KAJUR). Another five are over 70% (i.e. ASPA, GPA, MEC, PPUC and TAU). This suggests that it could be beneficial to review the benchmark and determine whether it needs adjustment or should be maintained as a 'stretch goal'.

Load Factor has remained fairly stable over the last three years, with a current average of 68%.

Figure 5.1: Load Factor (%) 2014 (2013) (2012)



(ii) Capacity Factor

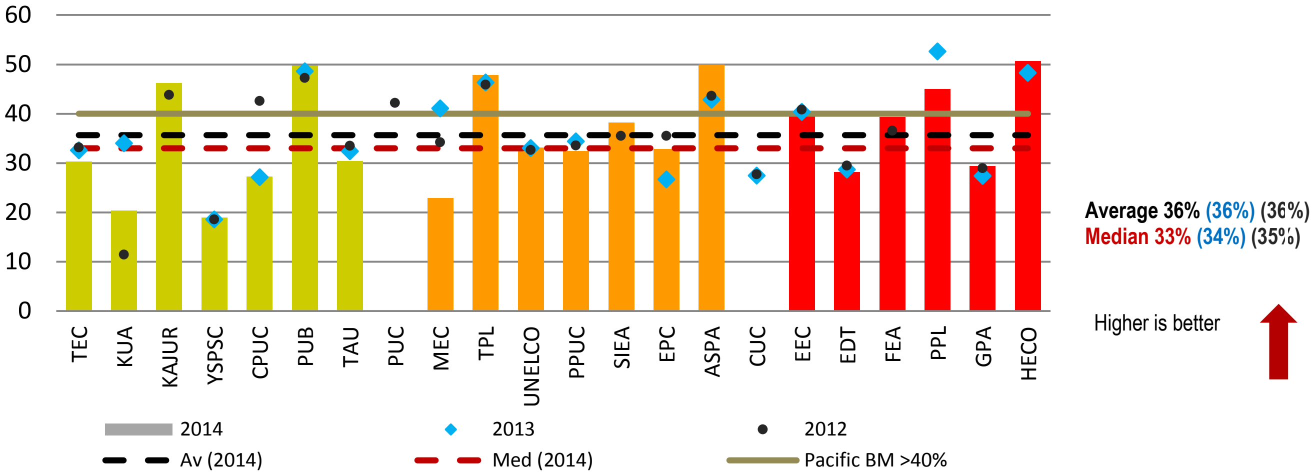
Capacity factor (CF) is also an indicator of effectiveness in relation to the use of generation resources. It is a similar measure to LF. Where LF measures average power as a percentage of maximum demand, CF measures average power demand as a percentage of installed capacity. A lower CF means that there is adequate reserve capacity to meet future load growth or demand when some generation is shut down for maintenance or down due to faults.

Capacity Factor has remained generally stable with an average of 36%.

A higher CF means demand is closer to available capacity, which can cause difficulties in scheduling maintenance of generating plants. Furthermore, available capacity may not meet future load increases. Improving the CF can require major capital investment in new generating plants. Utilities with a CF of nearly 100% tend to have an inadequate capacity to meet demand, which can result in power rationing.

As shown in Figure 5.2, the CF has remained stable between 2012 and 2014, with an average of 36%. This is below the Pacific benchmark of over 40%. However, some utilities like ASPA have seen notable improvement from 43.59% in 2012 to 49.88 in 2014. The CF for KUA, MEC, PPL, TAU, and TEC has declined. As occurred in previous years, there is a wide variation in results and there seems to be no strong correlation between utility size and the CF data.

Figure 5.2: Capacity Factor (%) 2014 (2013) (2012)



(iii) Availability Factor

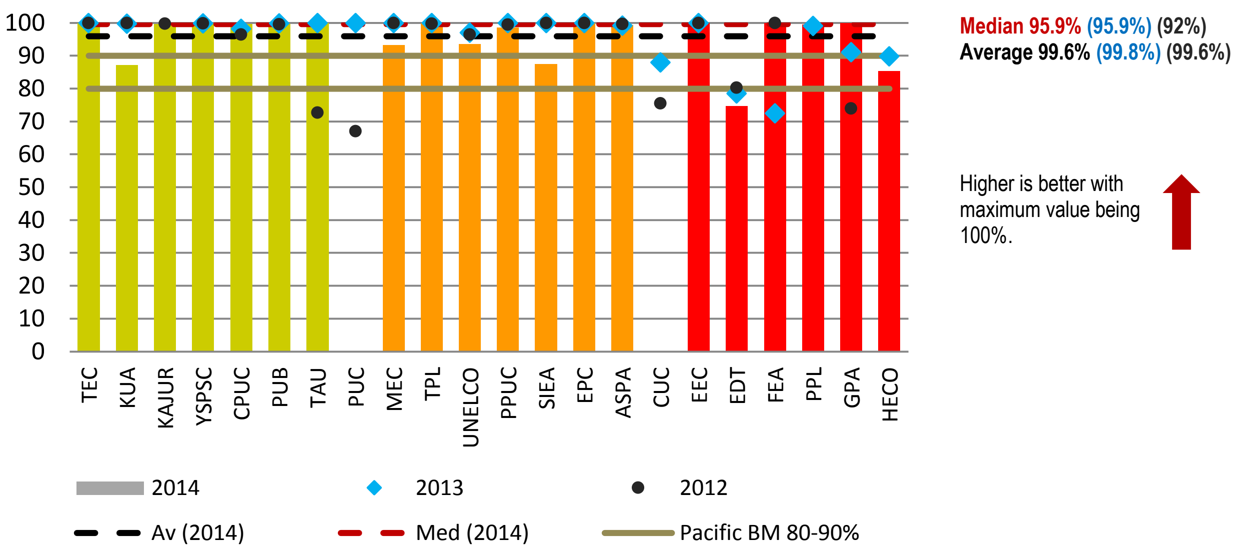
The **availability factor** (AF) is a measure of a power plant's ability to perform its operational function. The availability of a power plant varies depending on outages due to failure or maintenance. Newer plants or those that run less frequently (e.g. plants brought on line for meeting peak demand only) tend to have a higher AF because they are generally in good operating condition. Plants that frequently experience breakdowns would be expected to have a low AF. Thermal power stations generally have AFs between 70% and 90%[7].

The Pacific benchmark set by utility CEOs is 80% - 90% and typical international practice of 65%."[8] In 2012, the results reported by utilities averaged 92%, but the accuracy of this indicator is still doubtful since utilities have failed to take into account forced outages, planned outages and plant de-rating. In 2013 and 2014, as far as possible, the recording of these events has improved and the AF was based on firm continuous capacity.

As shown in Figure 5.3, the average and median AF was 99.6% and 95.6% for 2014 respectively, and is generally consistent with the results of 2013, having improved since the 2012 FY[9]. As with the 2012 round, utilities that were not able to provide all the information required to determine continuous capacity were excluded. Some utilities continue to struggle to provide capacity out of service hours due to forced, planned and especially de-rated events.[10]

The 2014 average and median scores for Availability Factor (i.e. 99.6% and 95.9%) are a noticeable improvement from the result in 2012.

Figure 5.3: Availability Factor (%) 2014 (2013) (2012)



7 http://en.wikipedia.org/wiki/Availability_factor.
8 PPA and ADB, Pacific Power Utilities, p. 5-2.
9 It should be noted that some utilities do not have the records available for the de-ratings and are simply reporting the nameplate ratings.
10 In a de-rated event, a generator's capacity is reduced from its full rated capacity for a period of time.

(iv) Generation Labour Productivity

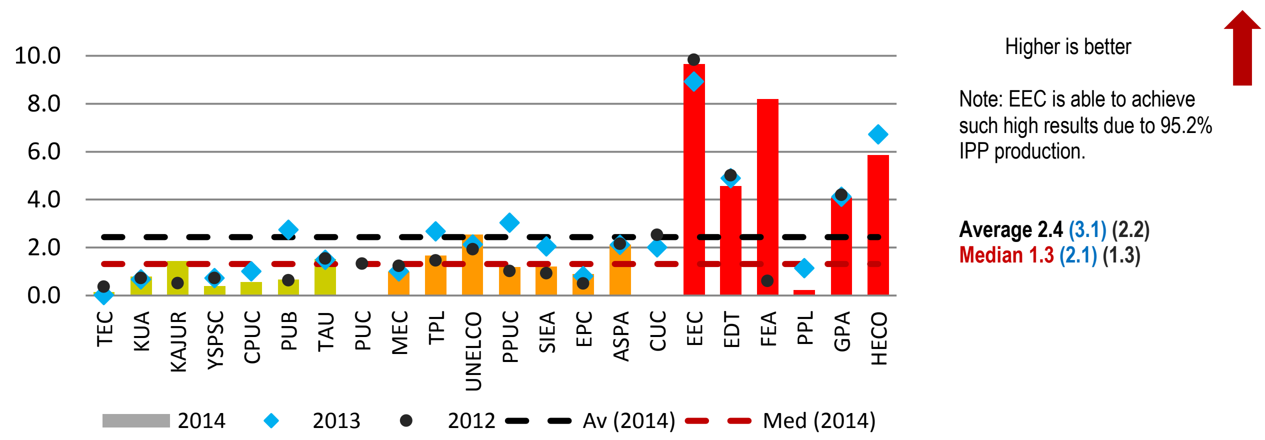
Generation labour productivity is a measure of the services produced per employee i.e. productivity of staff engaged to operate and maintain generating plants. It is a ratio of total electricity generation to the number of full-time equivalent (FTE) employees who operate and maintain the system's generating plant. For power utilities, the indicator of service has traditionally been the amount of electricity generated per employee, but this may change over time as Pacific utilities provide more energy efficient services to customers.

Smaller utilities and utilities serving outer islands will tend to have lower generation productivity due to the low level of generated gigawatt hours (GWh) but a high number of semi-skilled staff required for operating and maintaining the generating plant regardless of utility size. The results presented in order of increasing maximum peak demand in MW are consistent with this expectation.

Results for generation labour productivity continue to be below the Pacific benchmark and indicate this is an issue that needs attention for regional improvement.

Over the period since 2000 (when benchmarking was first undertaken by the power utilities in the Pacific region), there have been fluctuations in the data for this indicator and no firm trend. In 2000, the average reported productivity per FTE generation employee was 3GWh; in 2012 it was 2.2GWh; in 2013 it was 3.1GWh; and in 2014 it was 2.4GWh (see Figure 5.4). Even without the fluctuations, these figures are extremely low, especially when considering international best practice of 22GWh. There are some unique attributes in the Pacific region that need to be taken into account in regard to this, for example, utilities being required to serve small populations in the outer islands. Even so, with labour costs accounting for the next highest operational cost after fuel, this is an area where regional improvement is needed.

Figure 5.4: Generation Labour Productivity (GWh/FTE Generation Employee) 2014 (2013) (2012)



(v) Specific Fuel Consumption by Volume (kWh/L)

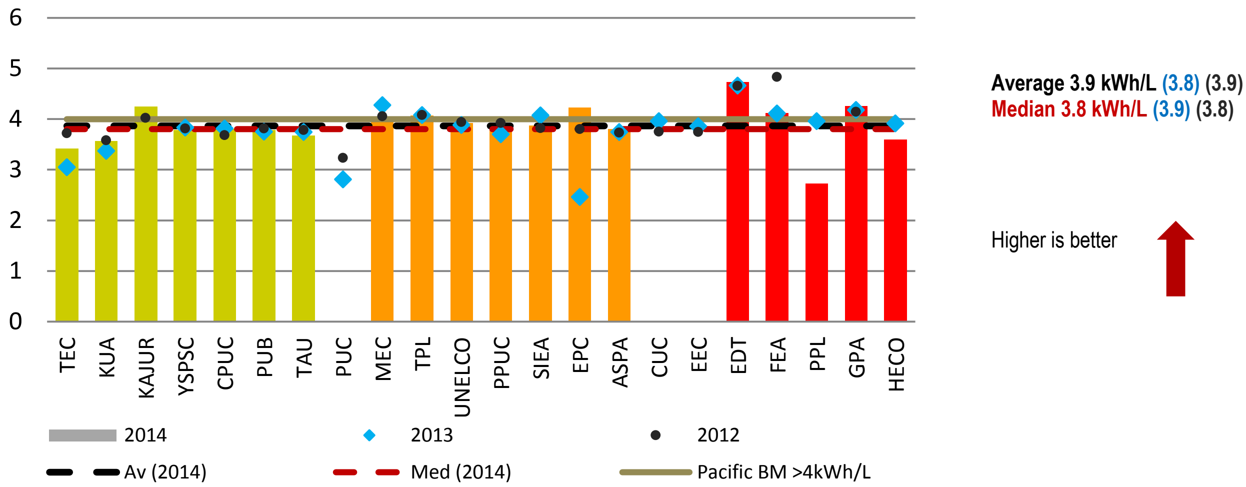
Specific fuel consumption (SFC) is a measure of the thermal efficiency of power generation, often reported in kWh/litre or kWh/gallon but more accurately as kWh/kg of fuel. It is a KPI because fuel accounts for the overwhelming bulk of generation costs in a typical PPA–member diesel based power utility. Importantly, SFC refers to the efficiency of utility generation only – it does not include purchased energy from independent power producers (IPPs).

Currently KAJUR, EPC, TPL, EDT, FEA and GPA are achieving fuel consumption over the Pacific target, with EDT and FEA achieving 4.65 and 4.83 kWh per litre.

SFC results (in kWh/L) are shown in Figure 5.5. Only petroleum fuel based generation is taken into account for this indicator. The Pacific benchmark was set at 4.0kWh per litre in 2002. The 2014 FY average SFC is 3.9kWh per litre with a median of 3.8kWh per litre, a slight improvement on the 2013 average but consistent with the 2012 FY. Only two utilities, EPC and KAJUR have markedly improved in their result since 2012. Currently EDT, EPC, FEA, KAJUR, GPA , and TPL are achieving fuel consumption over the Pacific target of 4.0kWh per litre, with EDT and FEA clearly performing at a high level with 4.25 kWh per litre, 4.22 kWh per litre, 4.73 kWh per litre, 4.12 kWh per litre and 4.26 kWh per litre respectively[11]. New low and medium speed engines should achieve 4.0-5.0kWh per litre.

11 It is notable that both FEA and EEC use Bunker Oil for fuel generation.

Figure 5.5: Specific Fuel Consumption (kWh/L) 2014 (2013) (2012)



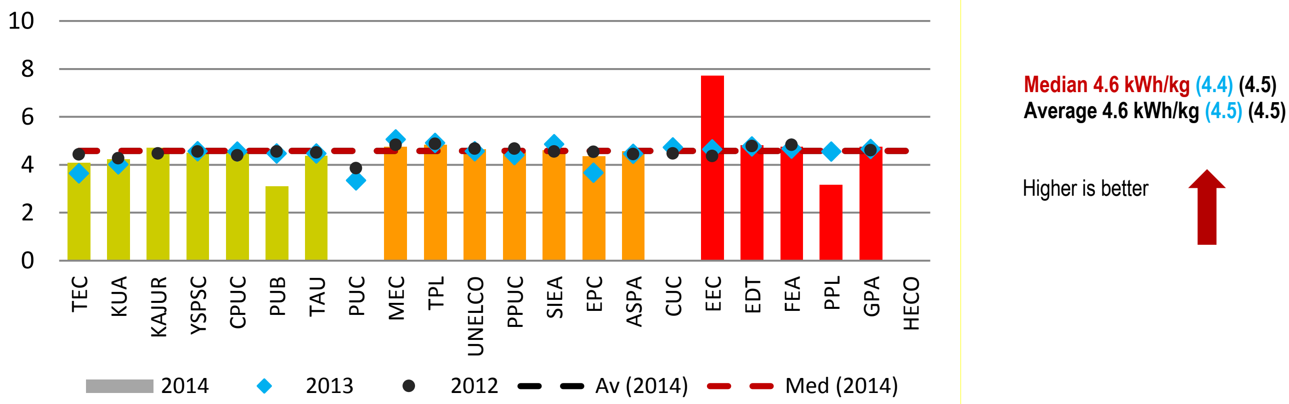
Since most PICT utilities use small high-speed diesel generators, the benchmark values for 2014 are considered reasonable. However, as fuel accounts for the highest cost in power utility generation, improvements in the specific fuel consumption are highly desirable.

(vi) Specific Fuel Consumption by weight (kWh/kg)

In technical specifications, fuel efficiency is generally reported in kilograms (kg) of fuel per kWh of energy produced. This takes into consideration the different densities and energy content of the different petroleum fuels. The type of fuel used thus has a bearing on SFC. SFC by weight was introduced in the 2012 benchmarking round. The results are shown in Figure 5.6. Very few utilities provided fuel by weight data. For the remainder a standard conversion table was used to convert litres to kilograms. Average SFC by weight is 4.5kWh/kg. EDT and TPL have the best results, at over 4.8kWh/kg.

SFC by weight was introduced in the 2012 benchmarking round. Average SFC by weight is 4.6 kWh/kg with five utilities reporting above average results.

Figure 5.6: Specific Fuel Consumption (kWh/kg) 2014 (2013) (2012)



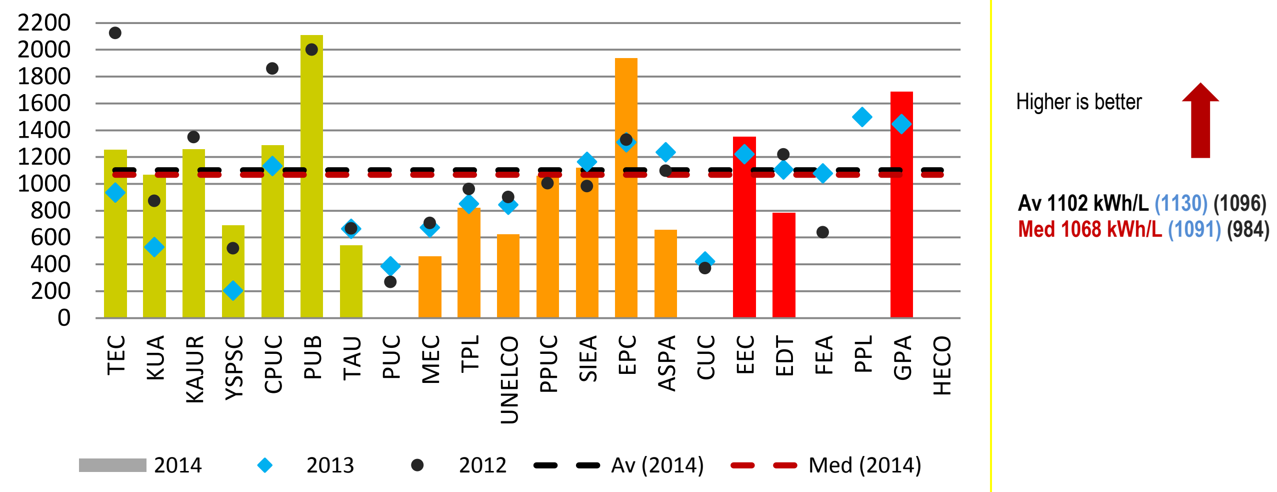
(vii) Lubricating Oil Consumption

In addition to SFC, petroleum-fuelled generation efficiency can also be assessed based on the number of kWh generated per litre of lubricating oil consumed. The benchmark varies according to the size and condition of the engine. Lower lubricating oil efficiency can be attributed to poor maintenance e.g. due to worn piston rings. Reasonable values are about 500–700 kWh per litre for generators up to 1 MW capacity and 1,000–1,300 kWh per litre for a 4–5 MW engine.

Average fuel oil consumption has fluctuated around 1,100 kWh/L for the past three years.

As Figure 5.7 shows, the lube oil consumption has been fluctuating in recent years, improving on average from the 2012FY to 2013FY, but reducing slightly in the 2014FY. CPUC, EEC EPC KAJUR, GPA, PUB and TEC have the highest consumption efficiency. CUC, MEC, TAU, UNELCO and YSPSC show the lowest efficiency as measured by this indicator.

Figure 5.7: Lubricating Oil Consumption Efficiency (kWh/litre) 2014 (2013) (2012)

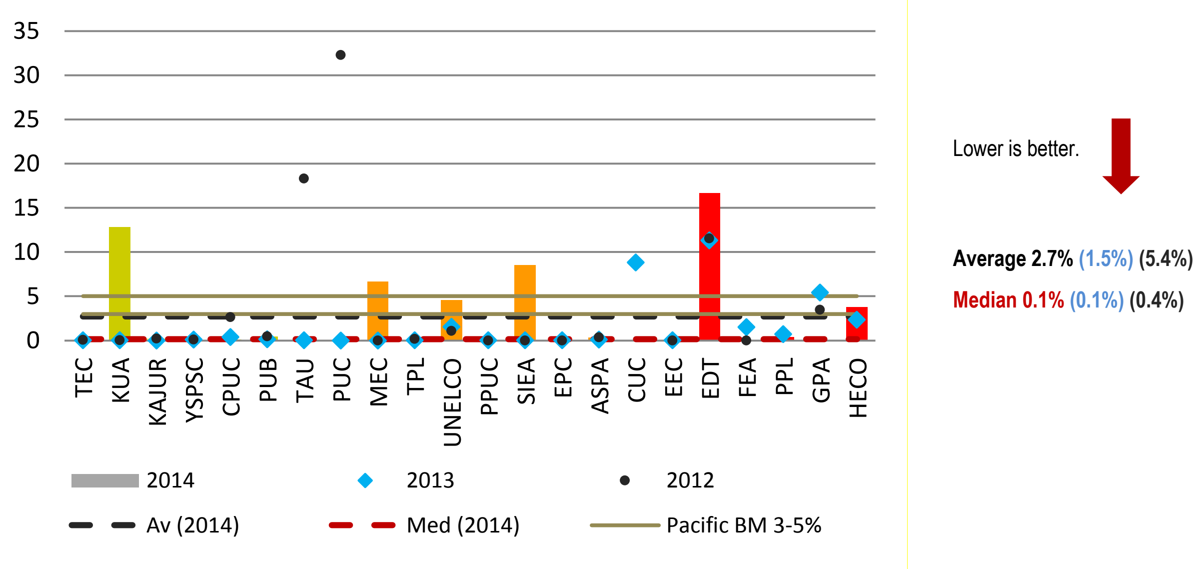


(viii) Forced Outage

While utilities are improving in providing outage data, significant information gaps remain.

A **forced outage** is an unplanned outage that has been forced on the utility (i.e. generator downtime). Unplanned outages are attributable to problems with generators that compelled the utility to take them out of service. Based on the data provided, the average forced outage rate for 2014 is 2.7% and the median is 0.1% (refer Figure 5.8). While some utilities have provided outage data, significant information gaps remain and the average and median shown here may not be representative of the true situation. This area of data collection requires continued attention in the coming year.

Figure 5.8: Forced Outage (%) 2014 (2013) (2012)



(ix) Planned Outage

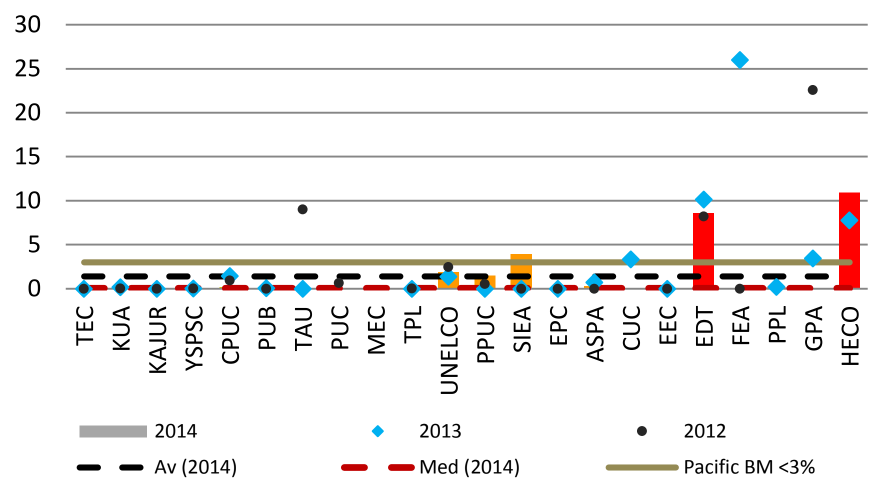
Implementation of Planned Maintenance regimes are still appropriate and effective.

Planned or scheduled outages measure the proportion of downtime for planned maintenance or other activities requiring equipment to be shut down. It is a scheduled loss of generating capacity as a percentage of installed capacity to generate energy.

Planned maintenance of generating equipment is often lacking in a number of small and medium Pacific utilities, due to insufficient reserve capacity to allow the shutdown of generators due for scheduled maintenance, a lack of spare parts, or lack of funds for major contracted service work. When maintenance intervals are extended, the probability that generators will break down increases. The circumstances and plant configuration for each utility will have a major impact on the planned outage rate.

Figure 5.9 shows, planned outages have decreased in the 2014FY from previous years. This is a good result and it lowers the indicator below the average within the Pacific benchmarking target. However, inadequate data was provided by 10 out of 20 utilities so this will need to be checked again in future data collections. This reinforces the need to ensure accurate record-keeping and regular review of maintenance regimes.

Figure 5.9: Planned Outage (%) 2014 (2013) (2012)



Lower is generally better although this is greatly dependent on individual utility circumstances and plant configuration. Some equipment must be shut down in order to be serviced.

Lower is better.

Average 1.4% (2.7%) (2.6%)
Median 0.03% (0.1%) (0.04%)

(x) Generation Operations and Maintenance Costs

Past three FY data sets show fluctuations in both the O&M average and median scores.

This indicator shows the level of expenditure on operations and maintenance (O&M) of generating equipment per MWh generated, expressed in USD. For operations during 2014, shown in Figure 5.10, the reported average was USD61 per MWh with a median of USD36, increasing from USD20 in 2013 whilst less than 2012 at USD47 per MWh. The large variability in results between consecutive years suggests there may be a lack of consistent allocation of costs or other financial data collection issues. However, the data set received appeared complete and comprehensive and reporting may have been restructured since the previous round.

Figure 5.10: Generation O&M Costs (USD per MWh) 2014 (2013) (2012)

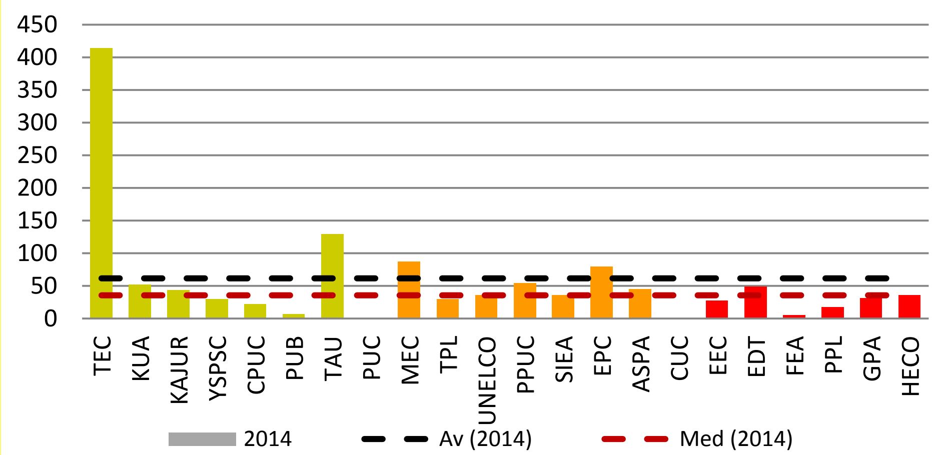


Figure 5.10 is based on data from 20 utilities, ranging from USD5 to USD414.

It is not meaningful to say higher or lower is better as circumstances differ for each utility.

Average USD61 (20) (47)
Median USD36 (12) (40)

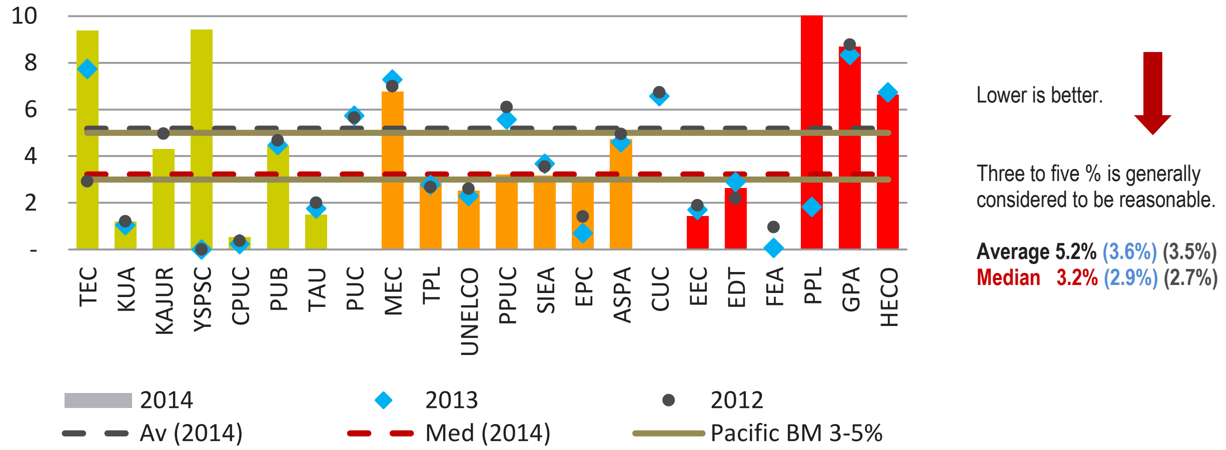
(xi) Power Station Usage / Station Auxiliaries

All generating stations require electricity to run auxiliary equipment to ensure that the plant functions as designed. A generating station's use of electricity internally for auxiliary is expressed as a percentage of energy generated. Three to five per cent is considered to be acceptable, however, lower is better. As shown in Figure 5.11, the average reported value for 2014 was 5.2% in 2014 and the median was 3.2%, compared to 3.5% and 2.7% respectively in 2012.

The average reported value for 2014 was 5.2% compared to 3.5% in 2012.

In considering these results, it should be noted that data reliability has been an ongoing concern for most utilities in regard to this indicator, especially if this consumption is not metered. Subsequent benchmarking rounds should therefore be able to more accurately reflect performances changes. This being considered, more consistent and/or narrow margins of consistent improvement can be attributed to efforts to reduce Station Auxiliaries.

Figure 5.11: Station Energy (Auxiliaries) Use for Pacific Utilities (%) 2014 (2013) (2012)



(xii) IPP Generation

In an effort to address generation capacity shortfalls, cost of energy and limited capital challenges faced by Pacific Island power utilities, IPPs are engaged by some utilities as a part of the solution. There is now widespread acceptance, based on experience in other parts of the world, that 'contracting out' power generation to other parties can produce better results than continuing utility ownership and control. As a result, power utilities across the Pacific are increasingly exploring IPP arrangements to help address the challenges they are facing.[12]

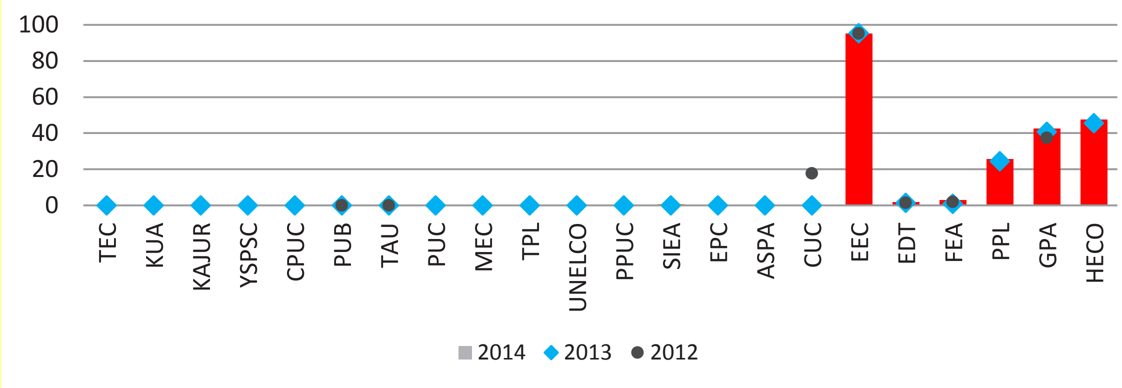
Six power utilities, all large in size with peak demand greater than 30MW, now have IPP generation arrangements (refer to Figure 5.12). The percentage of IPP generation ranges from 1% to 95%. EEC's generation is overwhelmingly from IPPs at 95.2%. This is followed by GPA at 37% and CUC at 18%.

Six power utilities, all those of large size, have IPP generation arrangements ranging from 1% to 95%.

EEC's predominant IPP generation has had a significant positive on the utility's performance in other areas, such as labour productivity and availability factor. There are no present examples of IPP arrangements for the small and medium utilities, but it is envisaged that the situation will change with a number renewable energy IPPs underway in utilities such as EPC in Samoa.

[12] Though the benefits of IPPs are noted, entering IPP contract arrangements are not without risk, and there are many international examples where contracts have failed, ultimately resulting in higher prices, less reliable supply and acrimonious disputes. To outsource power generation to IPPs, the framework for the arrangement needs to be set up and carefully managed. Source: Castalia, *Guidance Note for Pacific Power Utilities on Procuring Independent Power Producers (IPPs)*, July 2014.

Figure 5.12: IPP Generation (%) 2014 (2013) (2012)



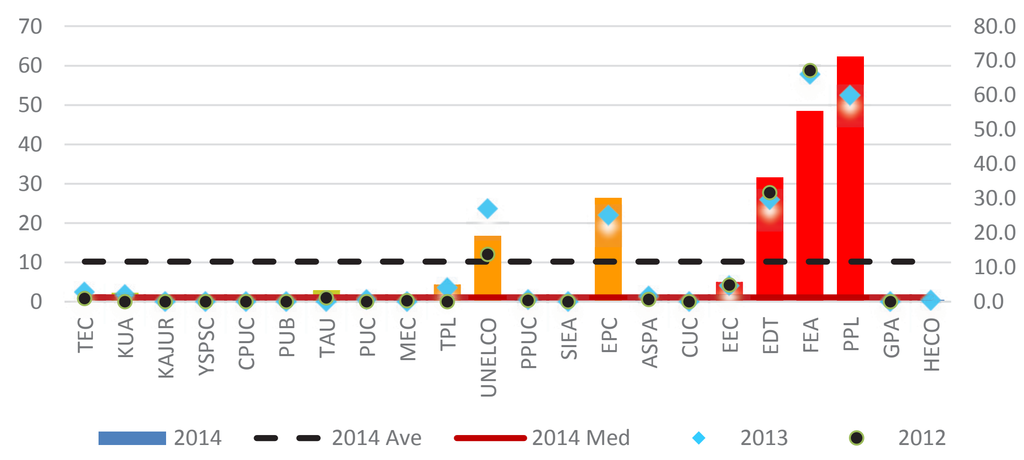
(xiii) Renewable Energy to Grid

The current analysis provides renewable energy share across all grids and the 2012 analysis only included data for the main grid). Renewable energy share which accounted for 22% of generation has not changed significantly with 97% of the renewable energy generation coming from hydropower and concentrated in the EDT, EPC, FEA and PPL. Small amounts of other renewable sources, including solar photovoltaic (PV), wind, bio-energy and bio-fuel generation were also reported.

Figure 5.13 shows the renewable energy proportion across all grids for each of the participating utilities in 2014. The available data for 2012FY and 2013FY is also shown for all grids. It can be seen that, EPC, EDT, FEA, PPL and UNELCO, have total renewable energy contribution above 10%. The major source of renewable energy continues to be larger hydro facilities, though 17 of the 22 participating utilities still produce 98% or more of their electricity from petroleum fuel.

17 of 20 utilities rely entirely on petroleum fuel to meet 98% or more of their electricity demand.

Figure 5.13: Renewable Energy Generation - All Utilities, Main Grid (%) 2014 (2013) (2012)



ASPA, EEC, KUA, MEC, NUC, PPUC TAU, TEC, TPL and YSPSC have small contributions of renewable energy generation shown for 2014 data. There continues to be an increasing number of renewable projects recently been commissioned recently in American Samoa, Federated States of Micronesia, Guam, Kiribati, Samoa, Solomon Islands, Cook Islands and Tonga which should reflect in increasing RE contribution in energy generated in subsequent reports.

5.3 Transmission Indicators

(i) Transmission (General)

For the purpose of the benchmarking exercise, the transmission network is defined as equipment operating at a voltage greater than 33kV. For utilities that have a transmission network, the benchmarking questionnaire requested data to determine transmission losses and outage statistics as a measure of transmission system reliability.

System reliability has been tracked based on transmission reliability (outage events per kilometre) and average transmission outage duration (in hours). This was expanded in the 2012 round of benchmarking, to include transmission (planned and unplanned) SAIDI[13] and SAIFI.[14]

Of the 26 Pacific power utilities (including HECO), five utilities have transmission networks: GPA, PPL, FEA, HECO and EDT. As was the case with previous benchmarking reports, there is an issue with limited data being provided. This makes it difficult to draw firm conclusions and attention will be needed to improve data quality for the next round of benchmarking. The results are shown in Table 5.2.

Table 5.2: Transmission Indicators 2014 (2013) (2012)

Utility	Transmission Losses (%)		Transmission Reliability (Outages/100km)		Transmission SAIDI (Min/Customer)				Transmission SAIFI (Events/Customer)			
					Unplanned	Planned	Unplanned	Planned	Unplanned	Planned	Unplanned	Planned
	2013	2014	2013	2014	2013		2014		2013		2014	
EDT	3.2	3.7	3.8	2.1	15	0	3.1	0	1.0	0	0.6	0
FEA		-	0	0	0	0	0	0	0	0	0	0
GPA	0.18	-	12.6	16.9	62.6	6,900	48	0	23.9	5.4	0.6	0
HECO	1.01	-	-	-	-	-	51	0.0005	-	-	1.9	0
PPL		-	23.0	21.7	107.8	31	77.6	1.0	0.04	0.08	25.4	0.5

Transmission losses averaged 1.5% in the 2013FY with insufficient responses in the 2014FY data to make any comparisons. SAIDI and SAIFI indicators were provided by four of the five utilities. SAIDI averaged 35.9 minutes per customer, while SAIFI averaged a total of 5.8 events per customers. In both cases this was wholly attributed to unplanned outages as the one of the utilities, PPL, reported only a very small number of planned outages.

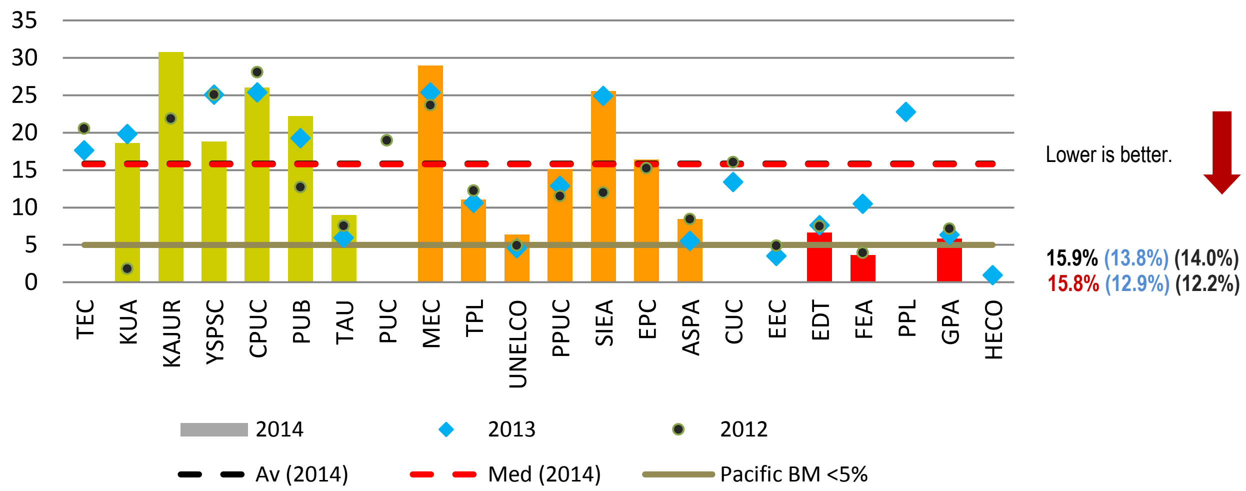
5.4 Distribution Indicators

(i) Network Delivery Losses

Network delivery losses are calculated by taking the electricity sold from the net generation, then dividing by the net generation, and expressing this as a percentage. Whilst it is included in this report, the number of responses has declined with 16 providing responses compared with 19 and 20 utilities for the 2013FY and 2012FY respectively.
The results are shown in Figure 5.14.

13 System Average Interruption Duration Average (SAIDI).
14 System Average Interruption Frequency Average (SAIFI).

Figure 5.14: Network Delivery Losses (%) 2014 (2013) (2012)



This represents an increase from 2012 and 2013 which is concerning with YSPSC and FEA the only utilities which that has shown a reduction in the losses. The 2014 average of 15.9% is much higher than the KEMA[15] system losses reported in 2010 with a 12.8% average and 11.7% median based on data from 19 utilities.

There appears to be a direct correlation between high network delivery losses and size of utility with small utilities having noticeably higher losses. Utilities need to put emphasis on quantifying the cost of system losses and understanding the benefit of improvement initiatives in reducing system losses for the region, especially with the increase in losses. This exercise may need some capacity building support, either through mentoring between utilities or via development partner inputs.

(ii) Distribution Losses

Distribution losses are those that occur in the transmission/distribution network between the high voltage (HV) substations and the consumer meters. For those utilities without HV transmission grids, distribution losses are those from circuit breakers of feeders inside power plants to consumer meters and this ratio is the same as the Network Delivery Losses. These losses can be either technical or non-technical losses. Technical losses are mainly caused by imbalances in the distribution system, internal energy losses of equipment and/or too high resistance in the system. This depends on distribution voltages, sizes and kinds of conductors or cables used, transformer types, condition and loading, and the wire sizes of service feeds to consumers' meters. Non-technical losses are those attributable to electricity used by a consumer but not paid for, including theft, computer programming errors, unmetered, metering errors, etc.

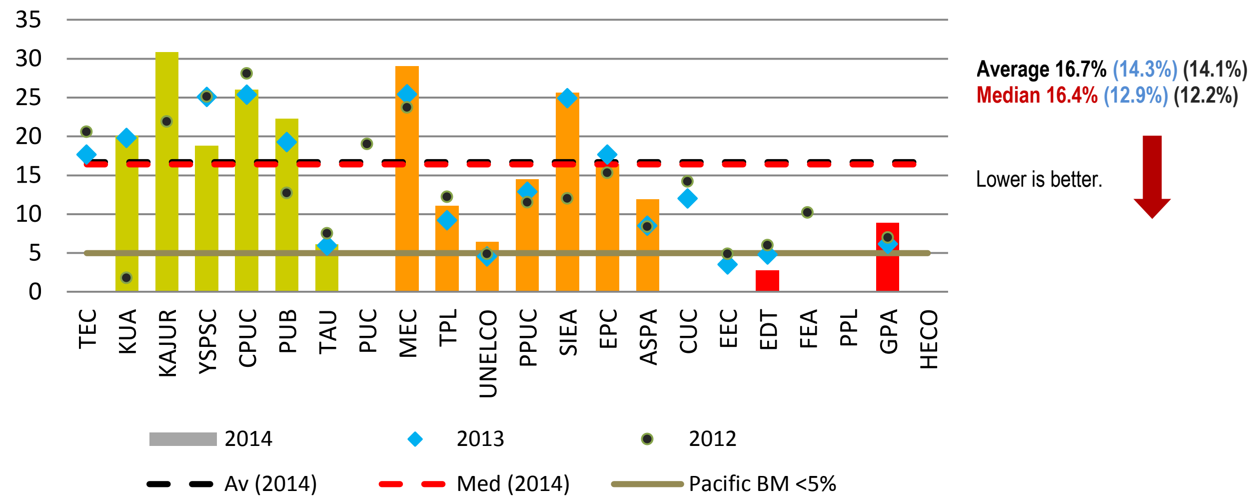
Distribution losses remain high and continue to increase, requiring closer attention in many of the utilities.

This category should not include the use of electricity within the utility itself (power station use, other facility use), free provision of street lighting, or electricity provided to the water, waste management or sewerage section of the utility but not paid for. These are financial, not non-technical, losses.

Utility performance in this area has always been poor with the initial report from the 2000FY stating that "Pacific distribution losses on average at 12% are far too high (compared with the regional and international benchmark of 5%)".[16] The reported distribution losses in 2014FY, as shown in Figure 5.15, remained high and in fact deteriorated to 16.7%, with a median value of 16.4%. Significantly, almost all of the smaller utilities have above average losses. This may be related to poor management of systems and processes and/or poor cash flow leading to inadequate maintenance of the system.

15 KEMA was a consulting company; now called DNV GL.
16 PPA and ADB, *Pacific Power Utilities,* p. 7-2.

Figure 5.15: Distribution Losses Reported by Utilities (%) 2014 (2013) (2012)



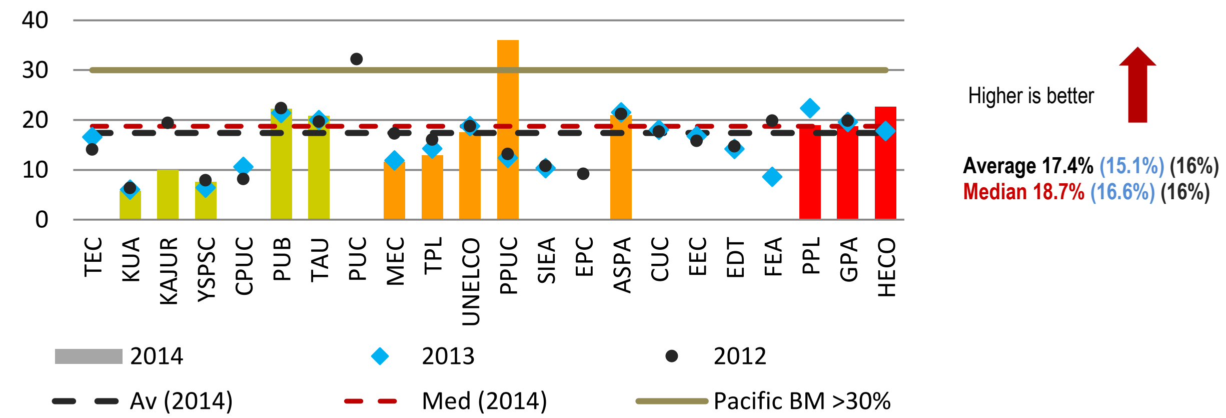
(iii) Distribution Transformer Utilisation

Distribution transformer utilisation has improved slightly from 16% in 2012 to 17.4% in 2014.

This indicator measures the transformer average load against the transformer capacity in megavolt amperes (MVA), i.e. the energy used by customers connected to the transformers as a percentage of distribution transformer capacity. High utilisation implies an efficient capital expenditure process for investing in distribution transformer capacity to meet the demands of customers. This process takes into consideration demand, demand growth and contingency requirements to improve supply security and reliability.

As seen in Figure 5.16, on average, transformer utilisation in Pacific utilities is low and currently stands at 17.4%. This has improved slightly from 16% in the 2012FY. The Pacific benchmark set for this indicator in 2002 was 30%. This benchmark can be achieved in the future as population and consumption grows in these areas already supplied by present network. PPUC is the only utility that is achieving the Pacific target of 30% with HECO being the only utility that has seen strong improvements since the 2013FY, having only started participating in the benchmarking in the 2013 Fiscal Year.

Figure 5.16: Distribution Transformer Utilisation (%) 2014 (2013) (2012)



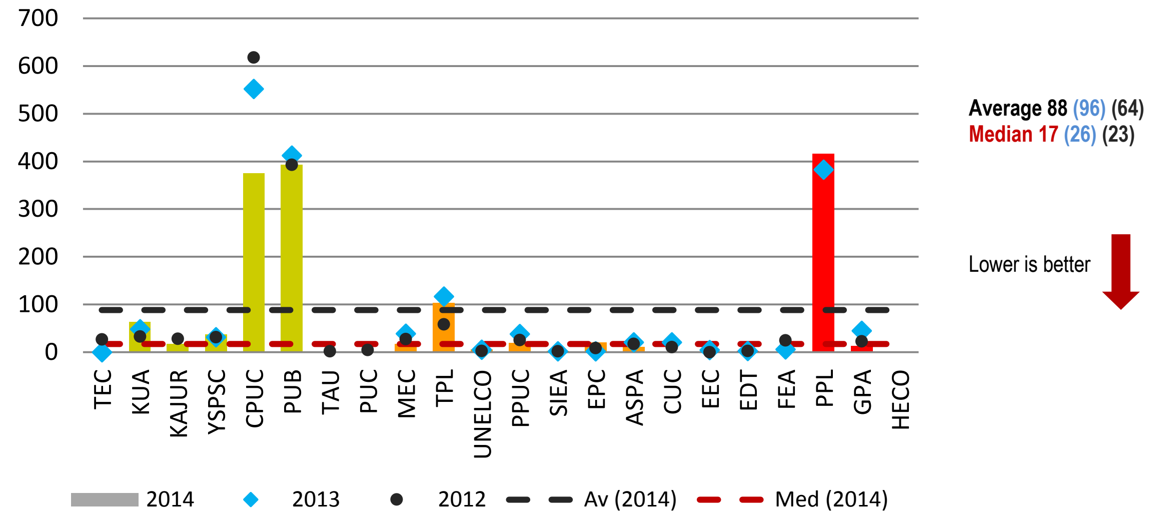
(iv) Distribution Reliability

Overall, distribution reliability results are mixed, with a decline in the average but improvement in the median.

This indicator looks at the number of forced outage events per 100kms of distribution line as a way of measuring the reliability of the distribution network. It is important because it shows how many times in a year customers expects their supply to be interrupted and how long the interruptions are expected to be.

The average and median for the 2014FY were 88 and 17 outages respectively compared to the 2012FY results when the average and median were 64 and 23 outage events per 100 km respectively (refer Figure 5.17). This indicates some reductions in performance, though there is a wide range of results among the utilities. To improve performance on this indicator, ongoing maintenance and a stringent vegetation management regime will be of paramount importance.

Figure 5.17: Distribution Reliability (Events per 100 km) 2014 (2013) (2012)



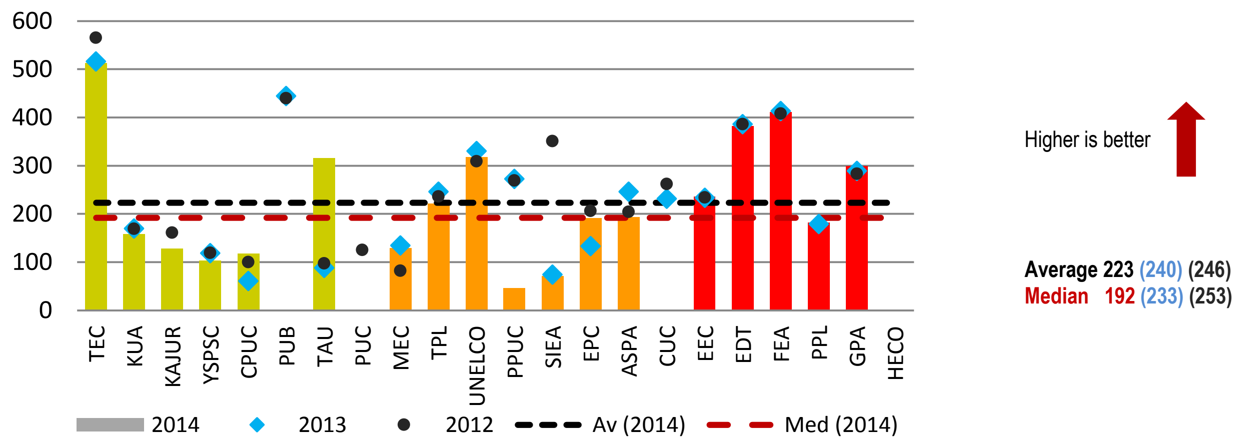
(v) Customers per Distribution Employee

Customers per distribution employee declined further, from 259 in 2012 to 246 in 2014.

The number of customers per distribution employee is another indicator of labour productivity. The benchmark survey did not require total labour hours (including contractors) to be taken into account for this indicator, whereas it was taken into account for total labour productivity (see Figure 5.34).

Figure 5.18 shows that, in 2014, there were on average 223 customers for each FTE utility employee working on distribution, a decline from the previous years. EPC and TAU are the two utilities that showed improvements in 2014. Whilst this continues to be an area of concern for the region and needs to be addressed, there are certain factors such as remoteness of islands and the low number of customers contributed to this low productivity.

Figure 5.18: Customers per Distribution Employee 2014 (2013) (2012)



Whilst there is significant variance between utilities during assessments over the three reporting years, the data is consistent for each utility, which suggests that data accuracy has progressively improved.

5.5 SAIDI and SAIFI

(i) System Average Interruption Duration Index

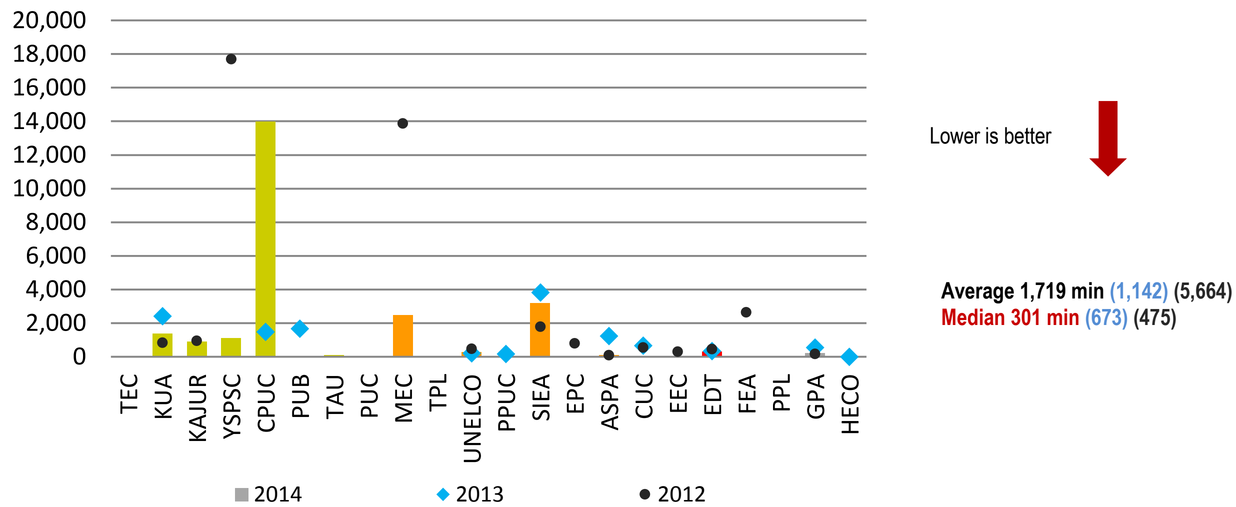
System Average Interruption Duration Index (SAIDI) is an internationally recognised reliability indicator measuring the average duration of interruptions per customer within a measurement period (typically one year). In the 2002FY report, SAIDI was considered to be:

> "A priority area for improvement considering that current performance is not good (average of 592 minutes per year compared to [the] Pacific benchmark of 200) and customers typically rank reliability of supply as very important."[17]

Here, SAIDI is shown for both generation and distribution. The average and median are 1,719 minutes (28.7 hours or approximately 1.2 days) and 301 minutes (5 hours) respectively. The trend for the indicator over the last three years is inconclusive showing great variability, which could reflect varying accuracy in the data rather than changes to levels of services (Figure 5.19).

More utilities are submitting data for SAIDI indicators and data quality is improving. However, continued improvement is required before confident assertions can be made.

Figure 5.19: SAIDI Interruptions (Minutes per Customer) 2014 (2013) (2012)



In the 2010FY, the SAIDI data was mostly estimated or only measured in part, so the reported results for some utilities were unlikely to be indicative of actual performance.[18] Shortfalls in collection procedures have been addressed through initiatives such as the annual Benchmarking Workshop, site visits (where possible), and provision of a Benchmarking Manual.. The resulting effect is that more utilities have been submitting data for this indicator and the quality of the data has also improved. Whereas outages were previously estimated, there is an increase in the number of utilities recording the time of the outage (to the minute) and using this in SAIDI calculations.

Several larger utilities that have sufficient resources and an established process to capture outage data, the quality and reliability of the data is higher than in some of the other utilities.

(ii) System Average Interruption Frequency Index

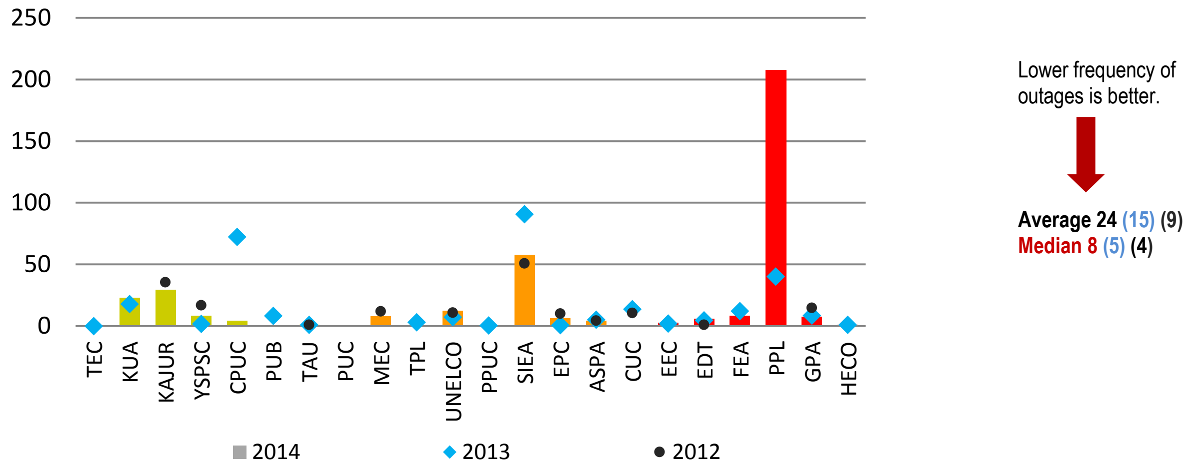
System Average Interruption Frequency Index (SAIFI) is also used as a reliability indicator, measuring the average number of interruptions per customer. In 2000FY, the reported average was 19 compared to a regional benchmark of 10 and international best practice of 0.9. As is the case with SAIDI data, reporting issues also affect SAIFI. The low data reliability score for this indicator occurs because many utilities do not have accurate records of how many customers are affected by failure of the system at given points, which is a critical element in the SAIFI calculations.

Until the utilities collectively lift the accuracy of SAIFI reporting, it is difficult to determine statistically valid conclusions.

Referring to Figure 5.20, the combined SAIFI shows an average of 24 outages per customer per year, with a median of 8. This is a significant decline in performance considering the improvements in the 2012 and 2014FYs.

17 PPA and ADB, *Pacific Power Utilities,* p. 7-2.
18 PPA and PRIF. *Performance Benchmarking for Pacific Power Utilities – Benchmarking Report*. December 2011, p. 39.

Figure 5.20: SAIFI Interruption Frequency (Interruptions per Customer) 2014 (2013) (2012)



Until the utilities collectively lift accuracy of SAIFI reporting, the conclusions that can be drawn from analysing the results are limited. However, this does not negate the usefulness of monitoring SAIFI data and setting targets for data collection, recording and overall service performance. Over the last few years, both SAIDI and SAIFI have been discussed in detail at the Benchmarking Workshops and it is intended to continue this given the importance of these indicators.

5.6 Demand Side Management

The engagement of utilities in Demand Side Management (DSM) initiatives indicates a proactive approach to changing consumer behaviours and reducing demand for electricity[19]. It can be applied to reducing unbilled electricity (e.g. a utility's own usage in a power station or head office), reducing use by domestic, commercial or industrial consumers, and reducing public lighting thereby reducing the load being placed on the generators. This can change the demand profile and achieve a demand that can be met with more efficient operation. Table 5.3 summarises the responses received from utilities in 2013FY and 2014FY to questions about DSM.

Only two of the 13 utilities that reported engaging in DSM activities linked such activities to MWh savings.

Table 5.3: Utility Demand Side Management Efforts in 2013FY and 2014FY

Response from Utilities	2013FY	2014FY
Number of responses	21	19
DSM activities reported	14	11
Average No. Staff assigned to DSM	0.001	0.002
Average Budget for DSM (USD)	418,741	160,629

The DSM section of the benchmarking spreadsheet was completed by19 utilities for the 2014FY data collection compared to 21 utilities in 2013FY. Out of the 19 utilities, 11 reported DSM activities but only six have a budget assigned to support the initiatives. The average DSM budget for the six utilities is USD 160,600 with PPL having the largest budget at USD755,400. Whilst it is important for utilities to develop renewable energy, utilities must also consider the equal importance of energy efficiency through DSM as they work towards achieving their respective national renewable energy generation targets.

Of the 11 utilities that reported engaging in DSM activities, only one utility (PPL) has them linked it to a MWh saving, and quantifying the saving. Measuring effectiveness of DSM activities by quantifying the savings is critical to evaluating the benefit being gained by the initiatives, and justifying their continuation. It is therefore highly recommended for all the utilities.

19 PPA and PRIF. *Power Benchmarking Manual: Performance Benchmarking for Pacific Power Utilities.* September 2012. Asian Development Bank: Sydney, p. 62.

5.7 Financial Indicators

(i) Introduction

The 2014 decision by CEOs to disclose financial data gives the benchmarking exercise greater transparency. This will increase the usefulness of benchmarking financial KPIs, as it will provide utilities with a basis for more targeted and detailed discussions about aspects of their operations that are producing good results or causing problems. However, it is important to bear in mind that any comparisons ought to take into account the differing circumstances in each utility, some of which have been summarised in Tables 1.2 and 1.3.

All utilities use accounting methods and principles that are in accordance with recognised international standards. The majority of the utilities are independently audited. With 80% of the utilities being owned by the national governments, it is common practice that they receive grants of equipment, cash or services. The treatment of these grants and varies from utility to utility and, hence, indicators that are affected by this data are indicative only, as are any comparisons between the utilities.

A significant number of utilities are multifunctional and, in some instances, the cost of these functions are not clearly identified. Where this is the case, the cost of the electricity services is apportioned for the purpose of the benchmarking study. Financial data is provided by the utilities in the currency of the country and converted to US dollars for the purpose of comparison, based on average rate for the utility's reporting period. More details are provided in Appendix G.

(ii) Tariff Analysis

General

Conducting tariff analysis for the Pacific utilities is complex because they use different tariff schedules and structures. Even so, an analysis of 2014FY tariffs was conducted for domestic and commercial (or industrial) consumers. This involved calculating the total cost paid by the consumers in a month, including service charges and any other fees.

The analysis for domestic and commercial consumer tariffs was based on varying monthly usage which were selected after reviewing the tariff schedules, to reflect the different points at which tariffs change in different schedules (i.e. the change in the block tariffs). As well as providing the total monthly charge to the consumer, the total cost was then divided by the monthly kWh consumption to provide an equivalent consumer cost per kWh.

Due to the extent of the analysis undertaken, only a subset of the results is provided here with a full table of results in Appendix H. Those detailed below are the:

- total monthly charge to domestic consumers for 50kWh/month usage (Figure 5.21)
- total cost and equivalent per kWh rate for domestic consumers for consumption of 200kWh/month (Figure 5.22), and
- total cost and equivalent per kWh rate for commercial consumer's 1000kWh/month usage (Figure 5.23).

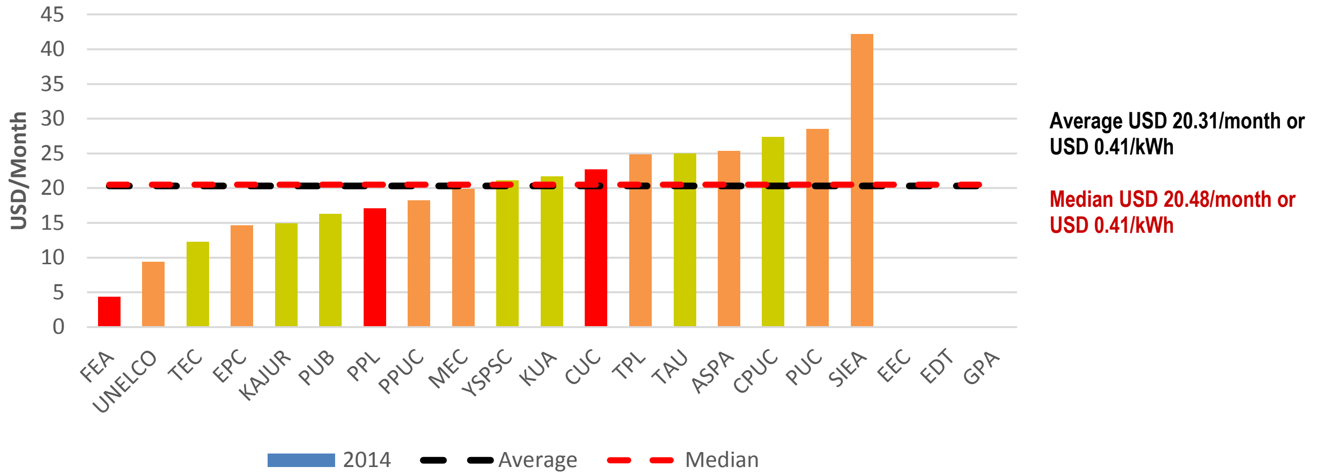
The tariff analysis included 18 of the utilities. Some of the utilities were excluded due to difficulty in interpreting tariff schedules or because information required for calculating the charge was not provided. As noted in a previous benchmarking report, "the price charged by a utility does not, of course, necessarily correlate with costs for the same utility. Most Pacific utilities charge consumers less than the full cost of supply".[20]

Domestic - 50kWh/month

Reflective of a lifeline tariff, Figure 5.21 shows the total cost paid by a domestic consumer for a minimal usage of 50kWh per month. The average and median are USD20.31 and USD 20.48 respectively, with FEA offering the lowest cost at just over USD4 for this usage, whereas consumers in the Solomon Islands pay USD42 for the same consumption. There is no clear relationship between the size of the utility and the amount consumers pay.

20 PPA and PRIF. *Performance Benchmarking for Pacific Power Utilities – Benchmarking Report*. December 2011, p.40.

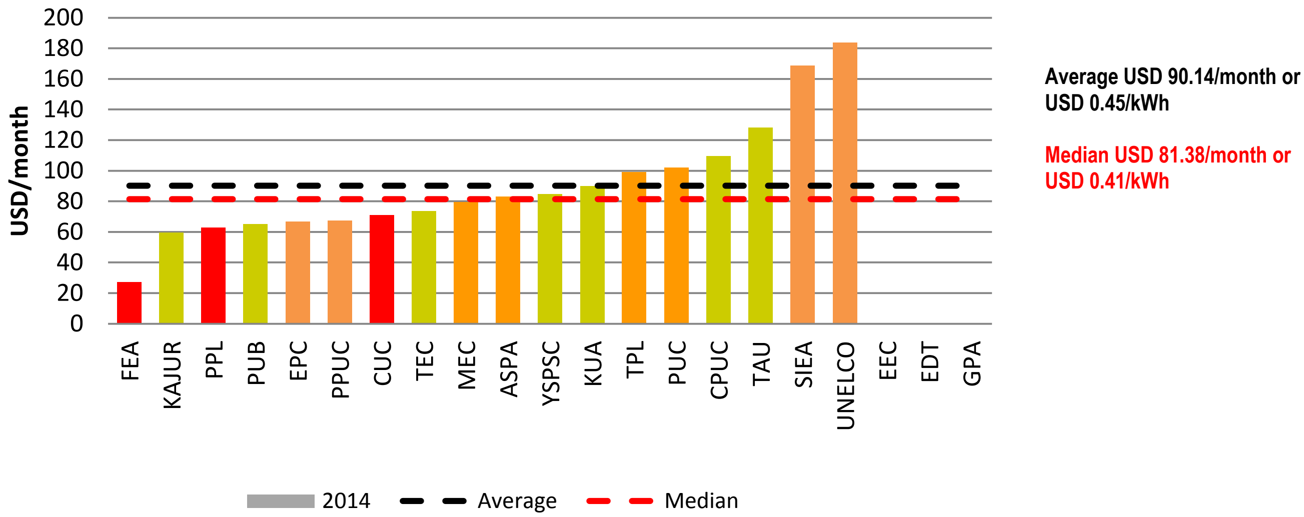
Figure 5.21: Domestic Consumer Cost (USD per month) 2014 FY for 50kWh Consumption



Domestic - 200kWh/month

Figure 5.22 presents the cost for domestic monthly consumption of 200kWh for each of the participating utilities inclusive of all monthly service fees, taxes and charges. The total monthly charge is expressed in USD equivalent.

Figure 5.22: Domestic Consumer Cost (USD per month) 2014 FY for 200kWh Consumption

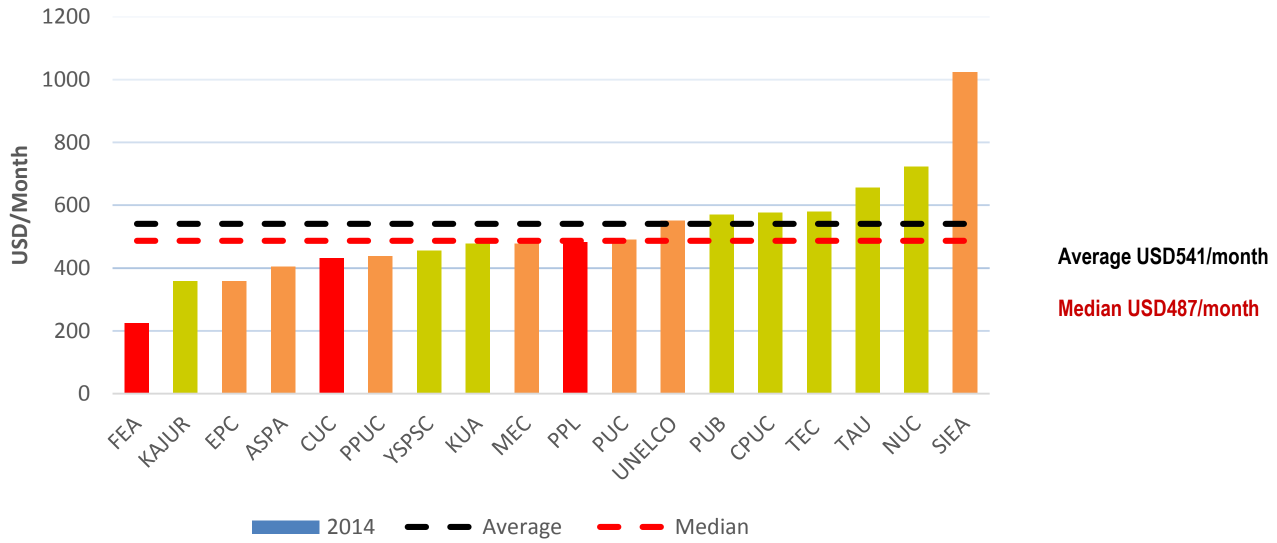


The average and median are USD 90.14 and USD 81.38 respectively for the total monthly charge and US0.45cents and US0.41 cents for the equivalent charge per kWh, factoring in all costs. FEA has the lowest cost for 50kWh consumption at USD27.18 per month or US0.16 cents/kWh, whilst UNELCO has the highest rates for this consumption point at USD183.86 per month, followed by SIEA at USD168.70 per month (or an equivalent US0.91 cents and US0.84 cents per kWh charge respectively. Again, the size of the utilities appears to have no bearing on pricing.

Commercial – 1,000kWh/month

Figure 5.23 presents the cost for commercial monthly consumption of 1,000kWh. It is expressed on the left hand y-axis as a monthly total charge in USD comprising a per kWh unit charge and factoring in monthly service fee, taxes and charges.

Figure 5.23: Commercial Consumer Cost (USD per month) 2014FY for 1,000kWh Consumption



The average and median are USD541 and USD487 for total monthly charges and US0.54 cents and US0.49 cents for the equivalent charge per kWh, factoring in all costs. FEA has the lowest commercial rates at this consumption level, at USD224 and US0.22 cents; SIEA has the highest rate with commercial consumers paying USD1,025 per month and an equivalent per kWh charge of USD1.03.

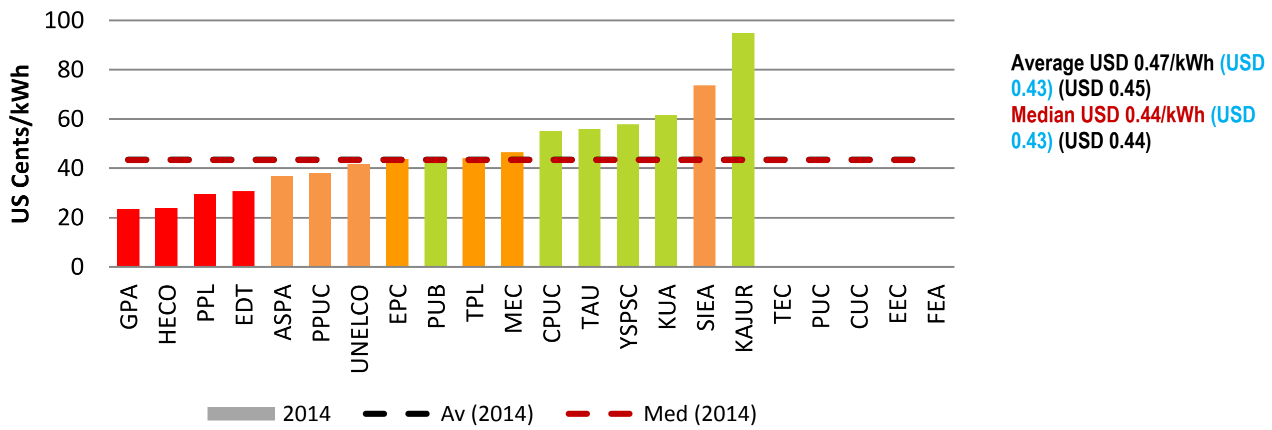
Again, size of the utility appears to have no bearing on price though there is some variation between the relative positions among utilities for commercial as compared to domestic rates. Note that the equivalent per unit charge is similar for commercial 1000kWh/month usage and domestic 200kWh/month usage. This is due to the efficiencies afforded by commercial utilities and because service charges are shared over a greater number of consumption units.

(iv) Average Supply Costs

The average supply costs for 2014FY are represented below in Figure 5.24, with average and median costs for the 2012 and 2013FYs. This is the unit cost of supplying electricity and it is calculated by taking the total operating expenses and dividing that by the total electricity sold.

Smaller utilities generally have higher supply costs than larger utilities. Larger utilities use Heavy Fuel Oil for Baseload Generation.

Figure 5.24: Average Supply Costs (US Cents/kWh) 2014 (2013) (2012)



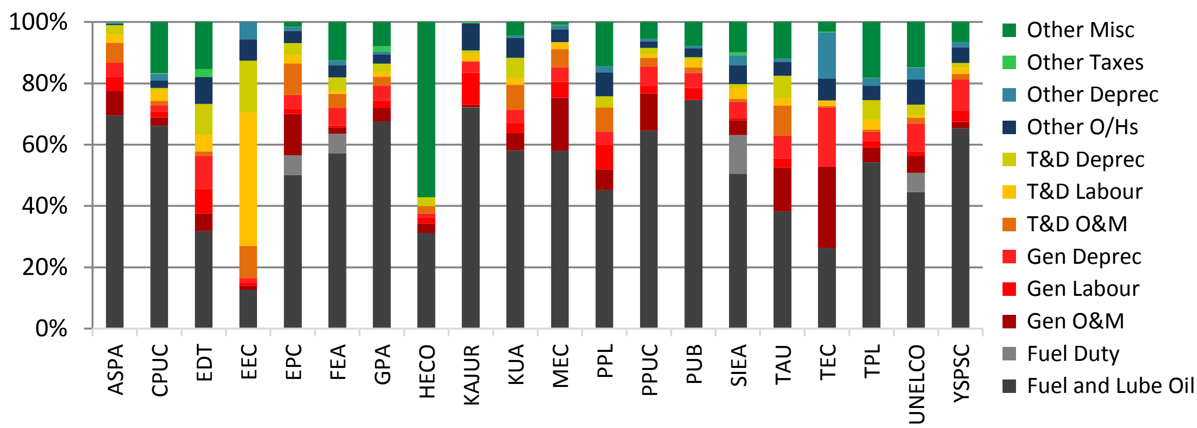
In Figure 5.24, the utilities are shown in order of lowest to highest average supply costs, from left to right. There is an obvious correlation between utility size, the generation mix and average supply costs. Smaller utilities have higher supply costs per unit, as would be expected due to their inability to harness efficiencies from economies of scale. NUC is the one exception with the second lowest average supply cost. This is due to grants received from donors to cover the major utility costs such as fuel, so the true expense would be more than what is shown in the data, with the data for NUC reflecting the expense incurred by the utility. This may also be true of other utilities, as has been noted in the introduction to this section of the report, though details are not clear.

In regard to the larger utilities, they have the lowest average supply cost for a number of reasons. First is their relative size and access to economies of scale in their pricing structures. Second is the benefit some of them get from hydropower resources (e.g. EDT and PPL), resulting in a lowering of electricity costs. The third relates to the use of heavy fuel oil (HFO) in the cases of EDT, GPA, and HECO to a certain extent. HFO has a higher energy content and is cheaper than diesel resulting in lower generation costs. Consistent with the tariff analysis results, SIEA has among the highest average supply costs even though it is a medium-sized utility. Other medium-sized utilities are quite consistently represented in the middle of the cost spectrum.

(iv) Utility Cost Breakdown

Utility costs comprise a number of key elements that are compared in detail below. The cost categories for which information was collected includes hydrocarbon based fuel and lubricant costs, duty on fuel and lubricants, generation O&M, labour and depreciation, transmission and distribution O&M, and other overhead expenditure such as duty, taxes and miscellaneous costs. The percentage contributions of each component are presented in Figure 5.25 for the utilities that reported sufficient data.

Figure 5.25: Utility Cost Breakdown (%) 2014FY



Fuel and lubricating oil costs dominate, as expected, with fuel duty regimes varying significantly. Cost structures vary with system topology, fuel mix and the other characteristics of the service area, customer base and organisational structure. TEC's fuel costs are paid by grants and therefore result in a different cost structure compared to other utilities. The other noticeably different cost structure is that of EEC which has 95% IPP generation. Excluding EEC and TEC, fuel and related duty accounts for between 31% and 75% of total utility costs, with a median of 58% - slightly down on the 2012 FY median of 66%.

The utility cost breakdown for each utility is an important factor when considering which KPIs to focus on for improvement. In this regard, it should be noted that utilities that have received grant funding must account for these grants so that the costs are truly reflective of the cost of operations.

(v) Debt to Equity Ratio

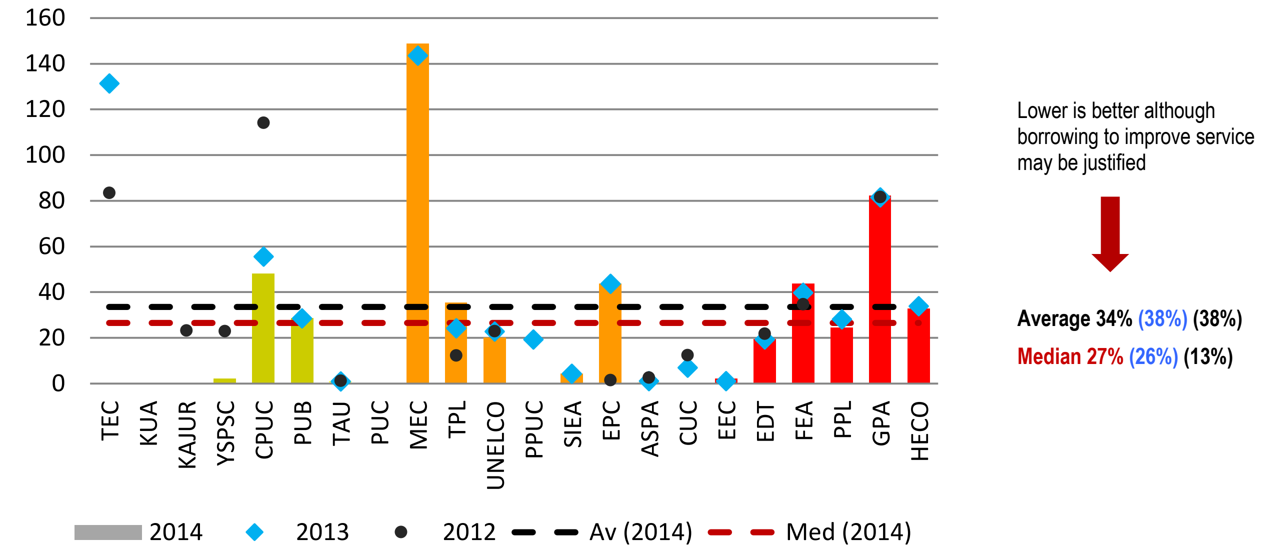
Debt to equity is low at 34% compared to a regional benchmark of 50% agreed to by the CEOs in 2000.

The indicator used for the level of utility debt is the ratio of long term debt to equity. Borrowing to improve services may be justified, but a high debt-to-equity ratio places a utility in a vulnerable position.

In the 2000FY, Pacific utilities generally had low levels of debt,[21] with an average ratio of 26% compared to a regional and international benchmark of a maximum of 50%. The 2014FY average debt to equity ratio is 34%, with a median of 27%. As can be seen in Figure 5.26, debt to equity rates have varied over the benchmarking years.

21 In some instances, it is important to note that a low debt equity ratio can also be a negative, as it can mean that a corporatized entity has under invested in assets.

Figure 5.26: Debt to Equity Ratio (%) 2014 (2013) (2012)[22]

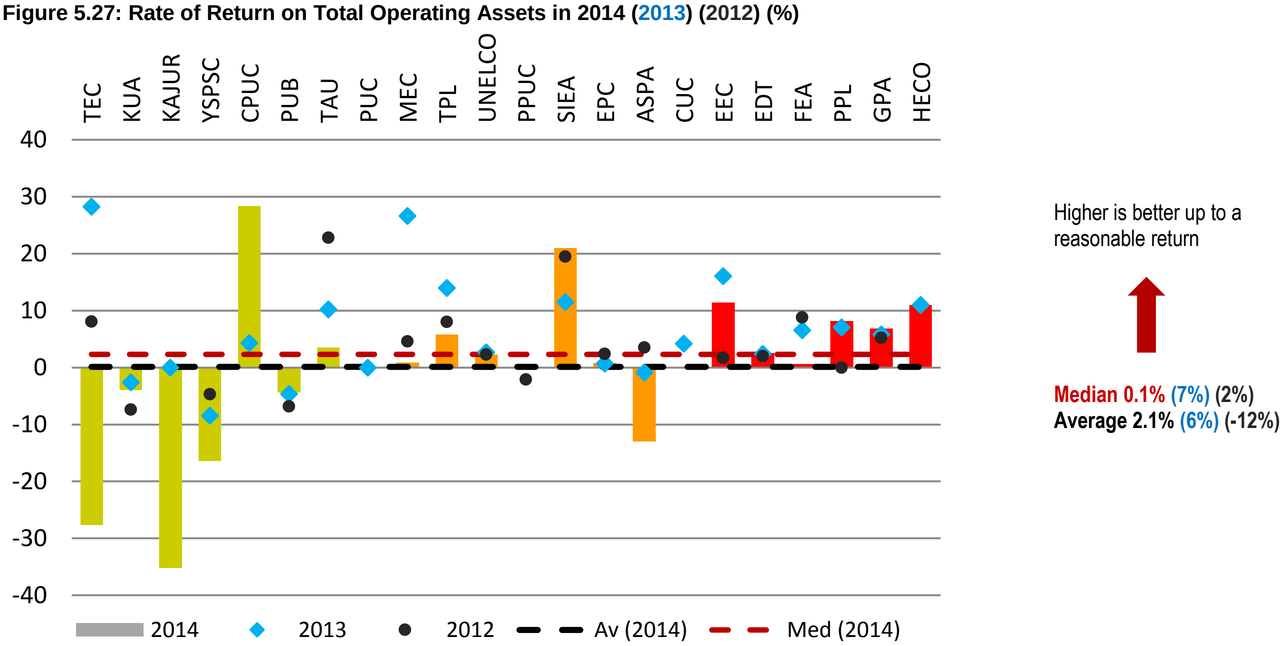


(vi) Rate of Return on Assets

Rate of Return on Assets (RORA) is the return generated from the investment in the assets of the business. RORA indicates how efficient management is at using its assets to generate earnings. Of major concern is the fact that most Pacific power utilities generally do not set this as a performance criterion and therefore do not earn commercial rates of return.

The Pacific benchmark has a target of a positive rate of return. As shown in Figure 5.27, in the 2014FY, ten of the utilities are currently achieving this. These are CPUC, EDT, EEC, GPA, HECO, PPL, SIEA, TAU, TPL and UNELCO. CPUC reported the highest rates of approximately 28%. The average RORA was 2.1%, with a median of 0.1%. This represents an improvement over the 2012FY where the average was minus 12% but it is less than the result of 6% in the 2013FY.

Figure 5.27: Rate of Return on Total Operating Assets in 2014 (2013) (2012) (%)

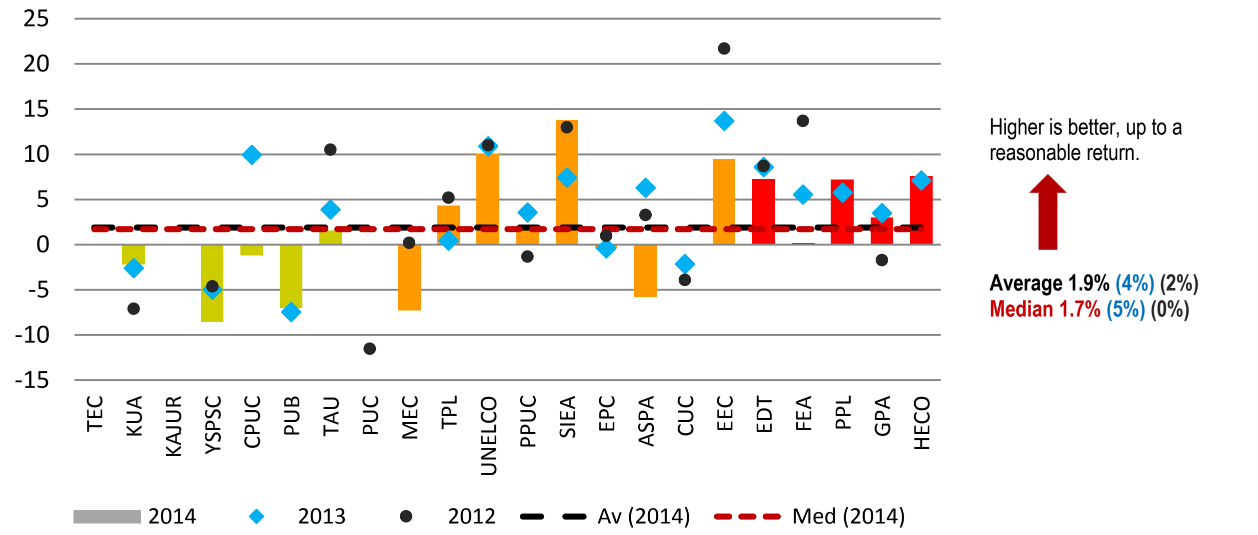


22 Average and median values taken from the data set differ from those reported in the 2012 report. This probably results from the elimination of outliers. The values from the full data set are used in this case.

(vii) Return on Equity

ROE measures financial returns on owners' funds invested. As Figure 5.28 shows, overall performance has deteriorated with a reduction in average return from 4% in the 2013FY to 1.9% in the 2014FY and a reduction in the median from 5% to 1.7%. Only two utilities (SIEA and UNELCO) reported a ROE of over 10%, with seven utilities showing a negative return as low as -8.5%. A high variability is seen between these results and those from previous years.

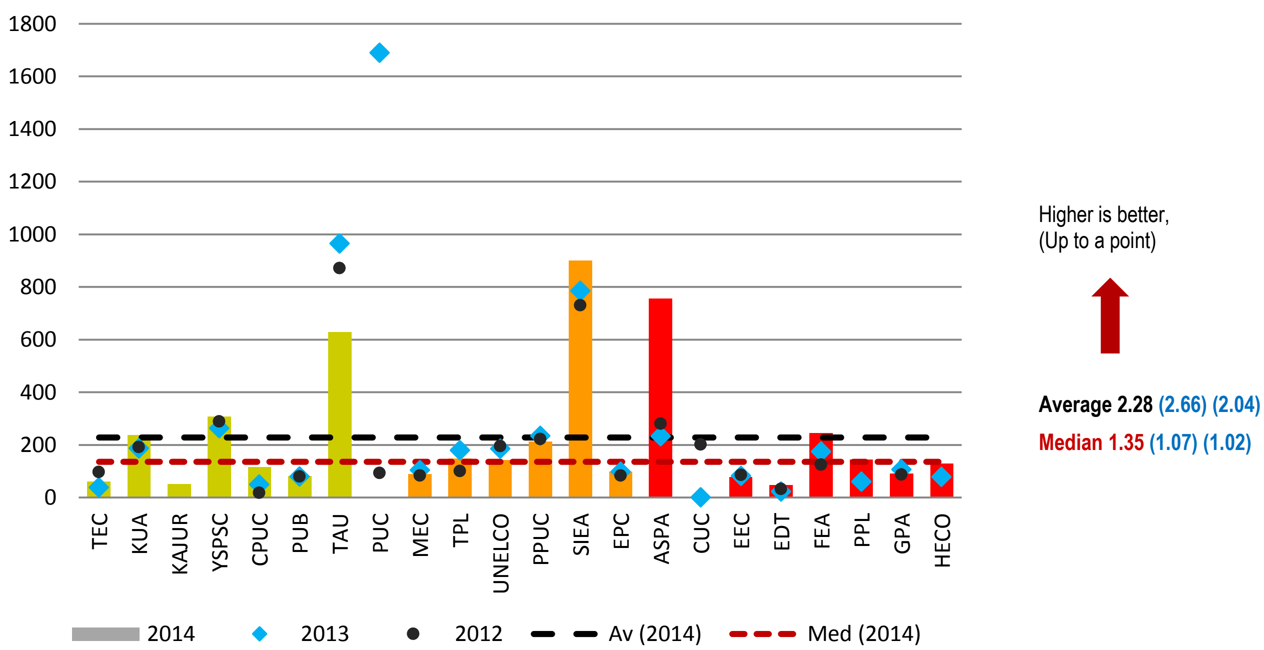
Figure 5.28: Return on Equity (%) 2014 (2013) (2012)



(viii) Current Ratio

The current ratio measures the ability of a business to pay any creditors within the following 12 months, In the 2014FY, as illustrated in Figure 5.29, the reported average current ratio reduced significantly to 2.28% from 2.66% in the 2013FY. However, the median increased from 1.07% in the 2013FY to 1.35% in the 2014FY. This indicates the ability of the utility to meet its current liabilities from current assets. ASPA and SIEA have very high current ratios due to the high value of current assets as compared to current liabilities.

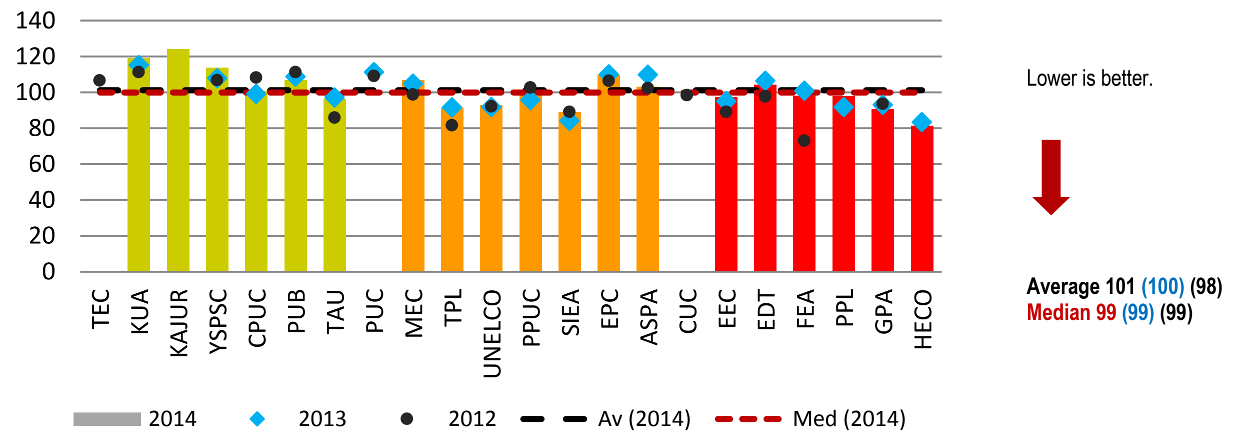
Figure 5.29: Reported Current Ratio (%) 2014 (2013) (2012)



(viii) Operating Ratio

The operating ratio is a measure of how efficiently a business is operating, in this case, providing electricity service. A smaller operating ratio indicates a more efficient operation. An operating ratio below 100 indicates a profitable operation and an operating ratio above 100 indicates that it is costing an organisation more to produce the service than is being returned by incoming revenue. This is often the case in Pacific power utilities.
According to the 2014 FY data provided (see Figure 5.30), 10 utilities have an operating ratio below 100 and nine utilities have an operating ratio above 100.[23] The average was 101, slightly up from both the 2012 and 2013FYs, indicating a marginal improvement in performance. The result does not appear to be directly related to size of the utility, though there are more large utilities operating at a profit than utilities operating at a profit in either the medium or small categories.

Figure 5.30: Operating Ratio in 2014 (2013) (2012) (%)

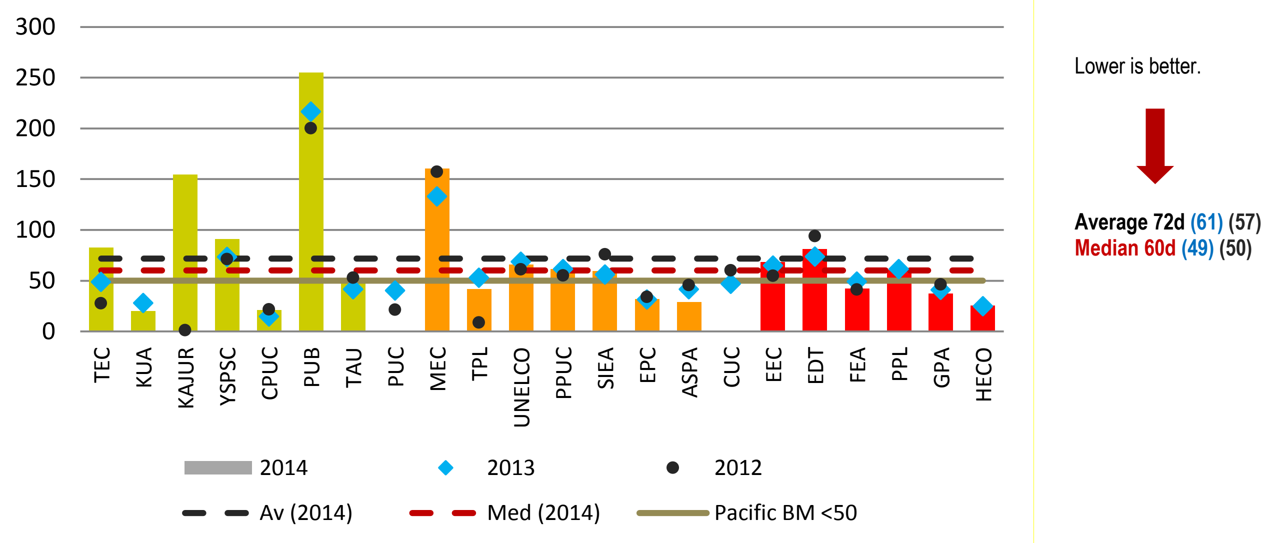


This indicator has been reported until now as a percentage; however, it will be presented as a ratio in future reports.

(ix) Debtor Days

This indicator measures how long it takes, on average, for the utility to collect payment for billed invoices from customers. In the 2000FY, the Pacific average was 79 days compared to the benchmark of 50. In the 2012FY (refer to Figure 5.31), the average number of debtor days had dropped to 57, in the 2013FY it increased to 61 days, and in the 2014FY it was 72 days. Median days also increased. This is of great concern. For the 2014FY, only ASPA, EPC, FEA, and TPL made notable improvements in reducing debtor days. KAJUR, MEC and PUB have the highest debtor days and well exceed the average.

Figure 5.31: Reported Debtor Days (Days) 2014 (2013) (2012)



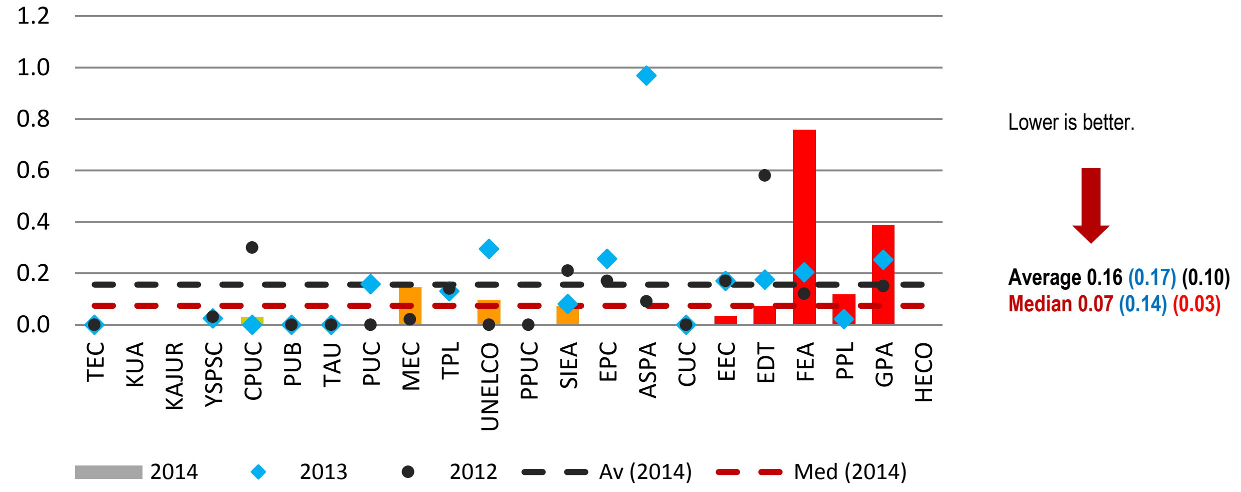
23 An extreme high value for KAJUR has been excluded.

5.8 Human Resources and Safety Indicators

(i) Lost Time Injury Duration Rate

When a staff member is away due to injury, there is a cost to the utility in payment of salary and additional benefits, as well as the loss in productivity. Lost Time Injury (LTI), as based on the Australian Standard AS18851, refers to an incident where an employee is absent from work for one day or one shift due to an injury that was incurred during the course of their work. The indicator Lost Time Injury Duration Rate (LTIDR) measures the average number of days or shifts lost to injury for employees (excluding contractors) during the reporting period. Results are shown in Figure 5.32.

Figure 5.32: LTIDR (Days per FTE Employee) 2014 (2013) (2012)

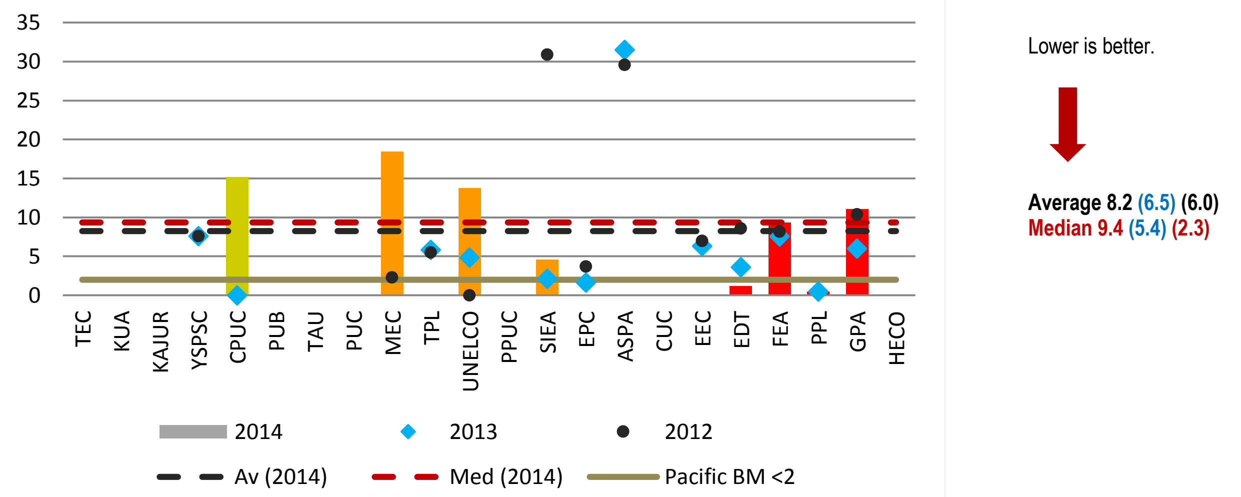


The average LTIDR for the 2014FY is 0.16 days per FTE employee, compared to 0.17 in the 2013FY and 0.10 in the 2012FY. The median is 0.07 days per FTE employee compared to 0.14 and 0.03 in the 2013 and 2012FYs respectively. However, as was the case in the last benchmarking report, there is not sufficient for drawing any strong conclusions. A significant number of participating utilities did not answer the question, indicating the information was not available. Recording the details of any injury incurred at work, and any subsequent leave taken, is essential to sound human resource management.

(ii) Lost Time Injury Frequency Rate

This indicator measures the number of LTIs for each one million hours worked. The average for the 2014FY is 8.2 and the median is 9.4 (see Figure 5.33).

Figure 5.33: LTI Frequency Rate (Number of Incidents per Million Hours) 2014 (2013) (2012)

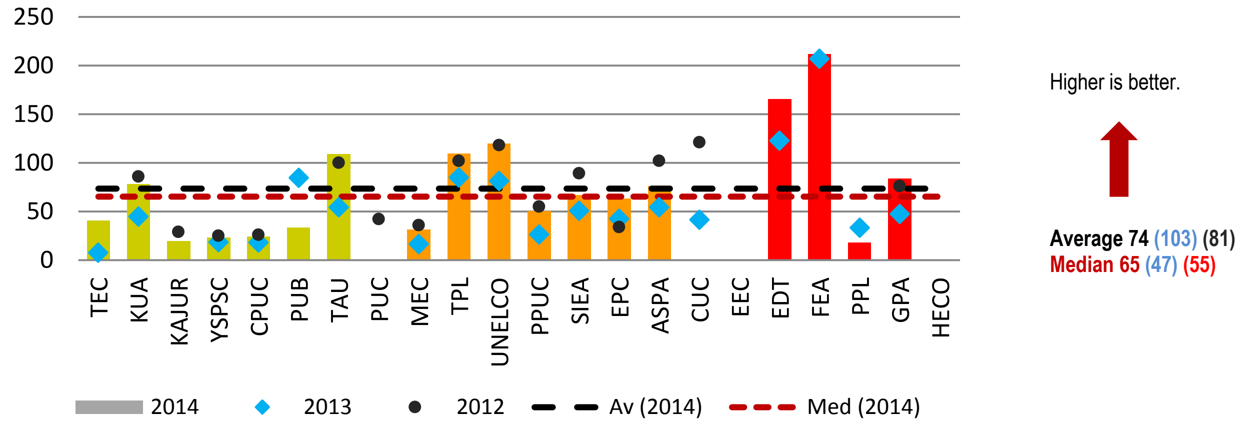


This has risen since the 2012FY, possibly because of an improved response rate and more accurate reporting rather than a drastic reduction in safety performance. However, if the data is reliable, it would reflect an increased number of workplace accidents which utility management would need to address. MEC has the highest number of workplace accidents at 18.4, followed by CPUC and UNELCO.

(iii) Overall Labour Productivity

Overall Labour Productivity is measured by the number of customers per total FTE utility employee. In 2010 the average was 85 customers per employee, with a median of 74. At the time, it was decided that this meant "productivity appears to be quite low compared to similar sized island utilities elsewhere".[24] Results since then have been mixed (see Figure 5.34).

Figure 5.34: Overall Labour Productivity 2014 (2013) (2012) (Customers per FTE Employee)



In the 2012FY, overall labour productivity averaged at 81 customers per FTE employee, with a median of 55. In the 2013FY, the average was 103 customers per FTE employee, with a median of 47. In the 2014FY, the average was 74 customers per FTE employee, with a median of 65. A higher productivity is expected of larger utilities that operate with some economies of scale. Even so, performance is not related directly to size of utility. EDT, FEA, TAU, TPL and UNELCO all have favourable performance as compared to expectations, while EPC, GPA and PPL continue to show relatively low productivity considering their size characteristics.

Importantly, productivity is also affected by the size of the supply area as defined by the geography of the country. Where there are multiple islands in a country or difficult terrain, it is expected that the workforce required to service small outer island or remote rural populations may be significant and this will have a negative impact on the overall labour productivity driving it downwards (refer Table 5.1). This, for example, provides some explanation for the results for PPL given the terrain in PNG.

Even so, this factor alone does not completely explain the results, with some of the utilities that service outer islands (such as CUC, SIEA and TPL) having relatively higher productivity while other utilities that only service one island, with higher peak demand such as GPA having labour productivity below the trendline.

5.9 Overall Composite Indicator

An overall composite indicator of utility performance was developed in 2011 and has proved useful in providing comparative information on overall performance of utilities. It is based on four components/indicators (see Table 5.4), selected. These were selected, as they were the four that were generally reported by all the participating utilities with the greatest reliability. The composite indicator has been changed in this 2013-2014FY Report due to the inclusion of data reliability as a weighting for the calculation of the final score. The utilities are ranked in order of reliability of data for this purpose, with an increasingly adverse weighting applied with reduction in reliability in comparison to all other utilities. Importantly, if there is any missing data for a utility, it is not possible to calculate an aggregate score.

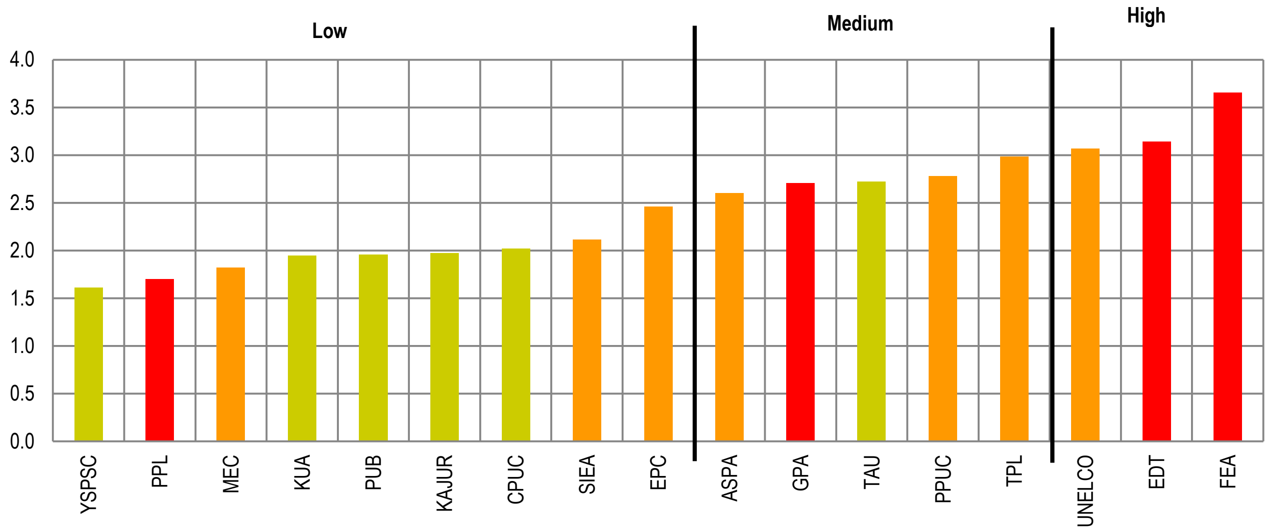
24 PPA and PRIF. *Performance Benchmarking for Pacific Power Utilities – Benchmarking Report*. December 2011, p. 49.

Table 5.4: Composite Indicator Components for 2014FY

Components of Composite Indicator (Maximum score 4.0)
▪ **Generation efficiency:** specific fuel consumption (25%)
▪ **Efficient utilisation of assets:** capacity factor (25%)
▪ **System losses:** network delivery losses (25%)
▪ **Overall labour productivity:** customers per full time utility employee (25%)
Final score weighted in terms of comparative data reliability

The results are summarised in Figure 5.35.

Figure 5.35: Composite Technical Indicator 2014FY



The scores for previous years have not been shown as the components of the indicator have changed (as mentioned above). For the 2014FY, FEA has the highest overall score of approximately 3.66, EDT is next with a score of approximately 3.14, and UNELCO is third in the rankings with a score of 3.07. All three are considered to have high composite scores. Those utilities ranked as having a 'medium' composite score are ASPA, GPA, PPUC, TAU, and TPL, which follow with scores of 2.5 and above. There are nine utilities considered to have a low overall composite score, with improvement anticipated over the coming years.

Incorporating data reliability as a weighting in the composite indicator had some influence on the final order of utilities. Those utilities with low composite scores tended to also have less reliable data, so more work on improving data quality may change these results. Even so, it is important to stress that benchmarking is a process of continual improvement and the openness and transparency being exercised by the utilities is proving enormously beneficial to the overall process.

6. COMPARING RESULTS

- **Planned Outage, Forced Outage, Transmission Reliability, Generation O&M, Transmission SAIDI, Operating Ratio, Lost Time Injury Duration Rate, Transformer Utilisation and Debt to Equity ratio have clearly improved**
- **A decline in performance has been observed in Customers per Distribution Employee, Lube Oil Consumption, Return on Equity, Debtor Days, Power Station Usage, Distribution O&M, Distribution Losses, Lost Time Injury Frequency Rate, SAIFI and SAIDI**
- **Load Factor, Capacity Factor, Availability Factor, Generation Labour Productivity, Specific Fuel Oil Consumption (kWh/litre), Specific Fuel Oil Consumption (kWh/kg) and Average Supply Cost remained stable.**

6.1 Introduction

In this chapter of the report a review is made of the results presented in Chapter 5, highlighting the performance indicators that are improving, stable or declining. The overall 2014 results are compared with that of previous years, noting that no comparison is made with other regions for this round.

6.2 Comparing 2011, 2012, 2013 and 2014 Results

Table 6.1 provides a summary of the 2014FY KPI results, highlighting which indicators utilities have improved overall, remained stable or declined in performance compared to the 2013FY data. The table shows that nine indicators have clearly improved, 11 have clearly declined, and the performance in seven indicators has remained stable overall.[25]

Table 6.1: Summary of Indicator Trends 2014FY[26]

Improved	Stable	Declined
Planned Outage Factor	Capacity Factor (%)	Customers per Distribution Employee
Transmission Reliability (Outages/km)	Availability Factor	Lubricating Oil Consumption (kWh/litre)
Transmission SAIDI	Load Factor	Return on Equity (%)
Operating Ratio	Generation Labour Productivity (GWh/FTE employee)	Debtor Days (days)
Generation O&M (USD per MWh)	Specific Fuel Oil Consumption (kWh/litre)	Power Station Usage (%)
Lost Time Injury Duration Rate	Specific Fuel Oil Consumption (kWh/ kg)	Distribution O&M (USD per MWh)
Transformer Utilisation (%)	Average Supply Cost (USD/kWh)	Distribution Losses (%)
Debt to Equity Ratio		Lost Time Injury Frequency Rate
Forced Outage		SAIFI (interruptions/customer)
		SAIDI (minutes/customer)
		Forced Outage Factor

Table 6.2 compares the average results of the current exercise (2014FY data) with that of the previous periods (i.e. 2010FY, 2011FY, 2012FY and 2013FY) and shows the trends over time. In the case that the result is inconclusive, this is stated. Where an increase or decrease has been observed but it cannot be said if this represents an improvement or decline in performance, 'increase' or 'decrease' is simply stated. For a number of indicators, especially for utilities with transmission networks where no comparative data is available, or where previous data is unreliable, the 'Trend' column is left blank.

25 Some KPIs do not clearly fit into the three categories as performance is rated according to a combination of factors and not just the KPI result alone. Also, some results are inconclusive with the average having declined while the median increased or vice versa. Where results are not clearly improved, stable or declined, the KPIs have been excluded from Table 7.1.

26 Results of KPIs that are not included in the table were inconclusive.

Table 6.2: Comparison of 2014FY Results with 2010FY, 2011FY, 2012FY and 2013FY

Key Indicators		2010 Results		2011 Results		2012 Results		2013 Results		2014 Results		Trend
		Av	Med	Av	Med	Av	Med	Av	Med	Av	Med	
Generation												
Load factor (%)	↑ better	64	65	67	68	67	65	66.8	64.6	67.7	65.1	Stable
Capacity factor (%)	↑ better	32	31	36	37	36	35	35.7	33.5	35.6	33.0	Stable
Availability factor (%)	↑ better	98	100	82	81	92	99.6	95.9	99.8	95.9	99.6	Stable
Generation labour productivity (GWh/FTE employee)	↑better	2.7	1.2	2.5	1.2	2.2	1.3	3.1	2.1	2.4	1.3	Stable
Specific fuel oil consumption (kWh/ litre)	↑ better	3.8	3.8	3.8	3.8	3.9	3.8	3.8	3.9	3.9	3.8	Stable
Specific fuel oil consumption (kWh/ kg)	↑ better					4.5	4.5	4.4	4.5	4.6	4.6	Stable
Lube oil consumption (kWh/litre)	↑better	1302	971	1084	936	1096	984	1130	1093	1102	1068	Varies
Forced outage factor (%)	↓ better	1	0.2	8.3	6.3	5.4	0.4	1.5	0.1	2.7	0.1	Declined
Planned outage factor (%)	↓better	1	0.1*	3.9	1.8	2.64	0.04	2.7	0.1	1.38	0.03	Improved
O&M (USD per MWh)	varies	148*	71*	214*	132*	47	40	20.0	11.5	61.4	35.5	Improved
Power Station Usage (%)	↓better	4.7	4.8	3.9	3.6	3.5	2.7	3.6	2.9	5.2	3.2	Declined
Renewable energy to grid (%)	varies	22% main grid*		26% of all grids*								
Transmission												
Transmission losses (%)	↓ better			5*	5*	0.9*	0.9*	1.9	2.0	n/a	n./a	Varies
Transmission reliability (outages/100km)	↓ better			41.8	18.2	11.5*	15.9*	9.8	8.2	n/a	n/a	Improved
Transmission SAIDI (min/cust) Unplanned	↓ better					52.7	60.9	46.4	38.8	35.9	48.0	Improved
SAIDI Planned	↑ better					0	0	1733.0	15.6	0.2	0.0	Varies
Transmission SAIFI (events/cust) Unplanned	↓ better					5.3	6.3	6.3	0.5	5.7	0.6	Varies
SAIFI Planned	↑better					0	0	1.4	0.0	0.1	0.0	Varies
Distribution												
Network delivery losses (%)	↓ better	12.8	11.7	11.8	9.2	14.0	12.2	13.9	12.9	15.9	15.8	Varies
Distribution losses (%)	↓ better	12	10.4	14.2	10.7	14.1	12.2	14.3	12.9	16.7	16.4	Declined
Transformer utilisation (%)	↑ better	19	21	18	19	16	16	15.1	16.6	17.4	18.7	Varies
Distribution reliability (events per 100km)	↓better	51	26	135	19	64	23	96	26	88	17	Varies
Customers per dist employee	↑ better	334	297	259	249	246	253	240	233	223	192	Declined
Distribution O&M (USD/km)	↑ better			5846	4648	8662	5574	13354	5001	10087	7122	Varies
Gen. and Dist. SAIDI and SAIFI												
SAIDI (mins/customer)	↓better	530*	139*	794*	583*	5664	475	1142	672.7	1719	301	Varies
SAIFI (interruptions/cust)	↓better	8*	4*	10*	6*	9	4	15.3	5.2	24.2	7.6	Declined
Financial												
Ave. supply cost (USD/kWh)						0.45	0.44	0.4	0.4	0.47	0.44	Stable
Debt to equity ratio (%)	↓better	10	18	47	24	38	13	38.2	26.2	34	27	Improved
Rate of return on assets (%)	↑ better	-4	1	3	0	-12	2	7.1	5.8	0	2	Varies
Return on equity (%)	↑ better	5.7	5.7	8.1	5.7	2	0	3.8	4.7	1.9	1.7	Varies
Current ratio (%)	↑ better			168	109	204	102	268.5	107.4	228	135	Varies
Operating ratio (%)	↑ better			100	99	98	99	99.9	99.1	101	100	Improved
Debtor days (days)	↓ better	115	56	62	51	57	50	60.6	49.3	72	60	Declined
Human Resources												
Lost Time Injury Duration Rate (days / FTE employee)	↓better			0.09*	0.04*	0.1	0.03	0.2	0.1	0.16	0.07	Varies
Lost Time Injury Freq Rate (number of incidents per million hours)	↓better			10	6.3	6.0	2.3	6.5	5.3	8.24	9.36	Varies
Labour Productivity (customers per employee)	↑ better	85	74	71	59	81	55	102.5	47.4	74	65	Varies
Technical Composite												
Composite Indicator	↑better	2.8	2.8	2.7	2.7	2.6	2.5					

In summary, of the **Generation indicators**, three showed improvements over the period since 2012FY, six were stable, and two declined. The areas of Capacity Factor, Availability Factor, Load Factor, Generation Productivity and Specific Fuel Consumption have remained stable over the years. Forced Outage and Planned Outage have improved, because of an increase in O&M spending. However, whilst the Generation O&M spending has increased in 2014, it is still well below the 2010 and 2011 levels, possibly indicating that the increased spending could be purely the increased cost of the same levels of maintenance in 2012 and 2013. Power station usage has increased for the 2014FY.

In regard to the **Transmission indicators**, any conclusions would have a high degree of uncertainty as there was insufficient data from the utilities with transmission networks. However, this area of operations will continue to be monitored over the coming years and CEOs will be reminded of the importance of submitting this data.

The **Distribution indicators** do not show the same level of progress over time as the generation indicators with all indicators either showing overall variable performance or decline. There are, however, noted improvements for a number of utilities such as TPL as a results of specific works targeting identified areas. For example, Distribution Losses have increased significantly with the average going up from 12 (in 2010FY) to 16.7 (in 2014FY). Likewise, Labour Productivity (as represented by customers per distribution employee) has declined overall going from an average of 334 customers to 223 customers. The average spending on Distribution O&M increased to an average of USD13,354 in the 2013FY, but has since declined to USD10,087 in the 2014FY. As well as considering this data collectively, each utility will need to review its data and associated operations in order to achieve the necessary improvements.

The overall **SAIFI** indicator has shown significant increase over the years, representing a decline in performance. The overall **SAIDI** performance varied during the period of comparison; with an average of 5,662 minutes per customer in the 2012FY, improving to 1,142 in the 2013FY and 1,719 in the 2014FY. Importantly, the quality of the data on these two indicators has been an area of concern, with specific attention at the annual Benchmarking Workshops. Hence, the trend will need to be monitored over coming years before final conclusions are drawn.

In the area of **Financial Indicators**, the Operating Ratio and Debt-to-Equity Ratio continued to improve, maintaining the trend from the previous benchmarking periods. Debtor Days, however, continue to move in the opposite direction. The Average Supply Cost remained stable whilst the Rate of Return on Assets, return on Equity, return on Equity and Current Ratio have fluctuated over the different years and remain inconclusive.

For **Human Resources and Safety Indicators**, all show fluctuations over time and will continue to be monitored into the future. There has been an improvement in lost time injury reporting, although more work is still needed in this area.

The **Composite Technical Indicator** for the utilities although calculated is not compared across the utilities with a new method of calculating the indicator using a weighting system for the performance indicator introduced for this round of benchmarking.

7. DISCUSSION

- **Disclosure of financial information is enhancing the usefulness of the data.**
- **Sustainability requires commitment from utilities coupled with capacity building support.**
- **Online data submission is a means for standardising data collection and improving the validation process, providing results to utilities more quickly than is currently possible.**

7.1 Introduction

This round of benchmarking has built on the experience of previous rounds. There has been considerable improvement in data collection, validation and reporting over the years. The key discussion points from the current round of benchmarking are summarised below.

7.2 Data Collection and Validation

(i) Benchmarking Manual

The Power Benchmarking Manual is an essential supplementary aide and tool for utility staff to participate in benchmarking. The Manual was last updated in August 2012, and is available on the PPA website at: www.ppa.org.fj and the PRIF website at: www.theprif.org/key-documents.

The Manual provides step-by-step support for completing the questionnaire and understanding what the individual KPIs represent and how they are calculated. It also provides templates and examples for the calculation of the different KPIs. All Benchmarking Liaison Officers should have access to a copy for their personal reference.

(ii) Online Data Submissions

Till now, the benchmarking data collection has been done using Microsoft Excel spreadsheets for Section 2 data and Word documents when Section 1 data needs to be collected. The task of reviewing, validating and analysing the data is labour intensive. A web-based data submission platform would provide a means for standardising data collection, speeding up the data validation process, and also provision of results. With the recently approved World Bank grant through the Sustainable Energy Industry Development Project (SEIDP), this initiative will be implemented within the next 12 – 18 months.

(iii) Pacific Regional Data Repository

PICT Energy Ministers have approved a regional initiative for a central data repository for the keeping of Energy Sector data, called the Pacific Regional Data Repository (PRDR)[27], of which SPC is the host. The PPA benchmarking will be the primary supply of power utility sector data for the data repository, reinforcing SPC as a key stakeholder and beneficiary of the benchmarking exercise. This arrangement also forms part of a Project Agreement between PPA, SPC and the PRIF through the PRIF Coordination Office (PCO).

7.3 Reporting

(i) Presentation of Results

This report used the 2013 and 2014FY data and mostly follows the format adopted in the 2012FY Report. It is envisaged that subsequent reports will concentrate on the indicators and the analysis and interpretation of these indicators, with less background information and definitions.

27 For more information go to: http://prdrse4all.spc.int/prdrse4all/about.

Also worth noting is the fact that utility data for the 2013 and 2014 FYs was collected in 2014/2015. This then brings the data collection and the benchmarking exercise up-to-date so that the 2015FY data will be collected in the next round. This addresses a concern expressed by utility CEOs that the data is out of date by the time the reports are released.

(ii) Disclosure of Financial Information

This report is the second following the agreement by the utility CEOs to provide full disclosure of the financial benchmarking data. It is a major development in the benchmarking process, reflecting the confidence CEOs now have in the process. In particular, it supports dialogue between utilities in sharing information about the results and their respective operations.

(iii) Distribution of Benchmarking Report

With limited time to produce this report, the review of the draft and the data has been limited. CEOs and Benchmarking Liaison Officers who commented have been able to provide important contextual information and interpretation of results, adding value to the exercise.

Electronic versions of all Benchmarking Reports are available on the PPA website at: http://www.ppa.org.fj/publication-report/. All participants are encouraged to access and review the reports.

7.4 Evaluating the Results

(i) Comparison of 2013/2014FY Results with Previous Years

Comparison of utility operations for 2010-2014FYs is presented in Table 6.2 and Table 6.1 summarises which indicators have improved, declined and remained stable in the last two years. Rather than repeating information which is in Chapter 6, just a few observations will be made here.

Firstly, the KPIs showing Improvement are in fewer areas than was the case in previous years. To some extent, this may be expected as it is difficult to maintain constant improvement. However, it will be important for CEOs and the PPA as a whole to consider the results, the key areas with ongoing problems, and to discuss them within utilities and as a group. Clearly, most improvements to operations results ultimately in improved service levels or savings, both of which are vitally important.

Productivity (as represented by generation labour productivity), customers per distribution employee and overall labour productivity have declined after showing improvements in the 2013FY and thus present a priority area to focus on in utility improvement plans. Skills training, multi-skilling and potentially remote monitoring of isolated systems could play a part. Incentivising performance with bonuses based on the utility achieving performance goals is also likely to improve output and enhance productivity.

Increases in the SAIDI and SAIFI indicators means customers are experiencing more frequent and longer outages which could be resulting from aged equipment, delayed or lack of maintenance or vegetation management. A concerted effort towards maintenance would result in fewer, shorter outages and improved reliability. Less spending on distribution O&M impacts on the reliability indicators and deferred generation O&M results in the decline of Specific Fuel Consumption (kWh/litre).

Declines in return-on-equity is also of great concern, reflecting the struggle in some utilities to run their operations to a net positive return.

The overall decline in the composite indicator (refer to Figure 5.36) is consistent with the overall results.

(ii) Comparing KPI Results Across Regions

Unlike the previous rounds of benchmarking, there is no comparison of the KPIs with those from any other region as it was not possible in the time frame for completing this report. The best comparative material to date has come from the Caribbean Electric Utility Services Corporation (CARILEC) and another comparison will be undertaken in the next round of benchmarking if the CARILEC report is available.

7.5 Capacity Development

(i) Capacity Building

A key issue for the sustainability of benchmarking is ensuring that capacity building support provided is appropriate and adequate for the requirements of the data collection exercise and the long-term sustainability of the benchmarking process. In this benchmarking, capacity building was focused on supporting the PPA Secretariat in its role of managing the benchmarking process independent of PRIF assistance as well as building the capacity of Benchmarking Liaison Officers to undertake data collection and validation, interpret benchmarking results and formulate Performance Improvement Plans capacity building will continue with the World Bank funding a technical person to work with the PPA Secretariat on the implementation of the web-based data submission platform and assisting capacity building of utility personnel.

(ii) Benchmarking Workshop

A two day Benchmarking Workshop was held on 13 - 14 July 2015, during the 24th Annual PPA Conference in Majuro, Republic of Marshall Islands. The workshop objectives were to report on preliminary findings of the benchmarking exercise and to support utilities in sharing information and developing their Performance Improvement Plans. It was well attended, with 18 attendees from 14 utilities[28].

The feedback received attested to the positive and valuable experience of the Benchmarking Liaison Officers who highly appreciated the opportunity to attend, to further develop their skills in benchmarking, have opportunity to discuss issues with personnel from other utilities and complete activities to develop their understanding, for example in the calculation of SAIDI and SAIFI.

Key points taken away from the workshop were to ensure consistency between Benchmarking Liaison Officers over reporting years (or at the least strong handover from one person to the next and support from the CEO), as well as continuing professional development though regular training and attendance at the annual Benchmarking Workshop. Importantly, this process should not be seen as a once-a-year exercise; rather, discussion of benchmarking and review of Performance Improvement Plans can be undertaken at utilities throughout the year.

28 In addition to power utility staff, there were also attendees from government, regional agencies and alliance partners, totalling 22 persons.

8. RECOMMENDATIONS

- **Data collection continues to be an issue despite the number of capacity building workshops provided to date, in part because of the turnover of Benchmarking Liaison Officers and the fact that this role is only part of their duties (and generally not the primary focus of their work).**
- **Performance-based contracts that are integrated into the Performance Improvement Plans are highly recommended.**

8.1 Data Collection

(i) Benchmark Calendar

At the 2015 Benchmarking Consultation with the CEOs in Majuro, the CEOs expressed the need for the benchmarking to utilise up-to-date data as there is little or no use for data that is years old. The 2013/2014 data collection is seen as the round that brings the data collection up-to-date with subsequent rounds using current data.

It is recommended that the next round of benchmarking data collection covering 2015FY data commence immediately at the end of the first quarter of 2016. This would mean that preliminary results could be presented to the 25th Annual Conference in Tonga from 1 – 5 August, with the draft report likely to be completed by December 2016.

8.2 Performance Improvement

(i) Performance Improvement Areas

In line with previous fiscal years, the recommendations for performance improvement have not changed significantly. This makes sense as there has been insufficient time for the effects of performance improvement initiatives to make an impact. As such, the key areas that require attention on a regional scale remain low labour productivity, poor knowledge of customer outages and poor safety reporting, poor financial performance and high losses.

Low Labour Productivity, (as represented by customers per distribution employee and overall labour productivity) is a key concern, noting that productivity has been steadily declining over the consecutive benchmarking periods. The recommendations of the previous report on actions to address the declining labour productivity such as the introduction of SCADA and multiskilling of staff are still valid and need to consider implementing the to make the most improvement for their organisation.

Poor knowledge of outages and customer experience across utilities: Although much capacity building work has resulted in improved data collection for the SAIDI and SAIFI, there is still much work to be done at utility level in understanding the impacts of these indicators and improving the recording of data that is used to monitor health of the system and track the effectiveness of the utilities response to these outages.

A better understanding of these indicators will assist the maintenance personnel in decision making and tracking the service reliability. Utilities can continuously track reliability on a regular basis and need not wait until the end of the fiscal year to do so.

Poor safety and incident reporting continues to be an issue. Whilst it is of paramount importance, the process and methodology of recording on relevant information relating to work place injuries is either non-existent or incomplete in some utilities. The high frequency of Lost Time Injuries and the absence of data contributes to the poor labour productivity.

With workplace safety being a high priority, utilities must be encouraged to promote safety through awareness and ensuring appropriate procedures and processes are put in place to capture the data.

Poor financial performance: As expected, Pacific utilities continue to struggle financially with indicators such as Operating Ratio showing that approximately half of the utilities are unable to achieve a positive return. Tariff setting is heavily influenced by the national governments and, as such, tariffs continue to be at odds with the cost for producing electricity in many cases, that is, it is not based on cost recovery. The importance of cost recovery lies in the ability to re-invest in maintenance and service provision to ensure that customers obtain reliable and efficient power supply and associated services.

High losses: It would seem that whatever loss reductions were achieved prior to 2014 have been lost with both distribution losses and network delivery losses at 14%. Reduction in losses result in direct fuel savings and hence have a direct impact on the 'bottom line' for a utility. Reduction in technical losses normally require capital investment through changes to asset design or operation, or replacement of major infrastructure. Non-technical loss reductions are the 'low hanging fruits' which are often easier to manage with lower investment through addressing metering issues and customer behaviour.

Transformer utilisation has improved marginally from the 2012FY benchmarking round, but the Pacific average at 16% is still well below the Pacific benchmark of 30% set in 2002. A number of factors including reduced generation demand, the often prohibitive cost of replacing distribution transformers, and correct sizing of transformers must be considered when designing and installing new transformers.

(ii) Performance Improvement Plans

Pacific power utilities are now familiar with the concept of developing Performance Improvement Plans. With guidance from CEOs and Benchmarking Liaison Officers, utilities are able to clearly identify the most immediate areas of concern/priority in their operations and the interventions required to improve performance.
It is recommended that CEOs continue to lead the process of preparing Performance Improvement Plans and monitoring their implementation.

(iii) Performance-Based Contracts and Bonuses

Performance-based incentives have been recommended previously as a means of improving utility performance and getting utility staff to focus on the utility's strategic goals. The performance-based incentives are useful for bringing together and blending the performance improvement programs and the outputs of the staff. However, it is important to ensure that the targets are clear, that there are systematic efforts to collect and verify data, and that the rewards are based on actual achievements.

It is recommended that utilities consider introduction of performance based contracts and bonuses if they are not currently being implemented and that any such scheme by applied to the entire workforce

8.3 Knowledge Sharing

There is opportunity for utilities to assist each other through the sharing of tools and processes for adoption in other Pacific nations as comfort level increase in the sharing of data.

(i) Communities of Practice and Webinars

The Annual PPA conferences provides an avenue for the CEOs, Benchmarking Liaison Officers, utility staff and expertise from the Allied Membership to discuss the benchmarking work in terms of the direction of the work, areas that need reinforcing and most importantly how the utilities can utilise the outcomes of the benchmarking.

There are online benchmarking interest groups and the PPA with direction from the Secretariat will explore ways in which the PPA can benefit from being a member of the interest groups. One such interest group is the IBNET although the focus is on water and sanitation, there are still lessons to learn from the processes and the development of performance improvement plans.

(ii) Learning from Caribbean Region

The PPA shares a close relationship the CARILEC which has had a benchmarking program in place since 2002. Furthermore, the members of the CARILEC are island utilities, a characteristic shared with the Pacific region. Unlike the previous rounds of benchmarking, no comparisons to the CARILEC have been made in this report as CARILEC has not published any reports apart from the 2012 report, which has already been used for comparison.

However, the opportunity for comparisons and future collaborations with the CARILEC exist, especially in the sharing of experience between the two organisations.

Therefore, ***it is recommended that the Secretariat of the PPA raise the issue of sharing experience and data with CARILEC and seek a formal agreement to do this on a regular basis over the next 10 years***.

(iii) Benchmarking Liaison Officers Exchange

Like other sectors in the Pacific, there is a very limited resource pool in the utilities and the number of staff adequately qualified to take up technical and managerial roles is small. It can particularly be an issue in the smaller utilities. In this context, it is understood that most of the Benchmarking Liaison Officers undertake this work as a secondary role, with a primary function where the majority of their time is spent. Even so, there is a need for them to regularly update and upgrade their skills through participation at the annual workshops on benchmarking. The knowledge and skills acquired should then be shared with other colleagues at the utility to ensure staff understand the importance of the data collection and benchmarking activities.

8.4 Capacity Building

(i) Benchmarking Training and Workshops

The PPA recognises the importance of capacity building to ensure sustainability of the benchmarking. In recognising this importance, the PPA Board re-emphasised its support for the work and furthermore agreed that the benchmarking workshop will now be an annual event as part of Annual Conference.

Additional training will be provided to the utility Benchmarking Liaison Officers once work on the transition from spreadsheet based data to the online submission, funded by the World Bank, has been completed.

The training will target current Benchmarking Liaison Officers as well as utility staff who are new to benchmarking to ensure that the knowledge and skills are developed in the utilities.

APPENDICES

Appendix A: PPA Member Utilities in 2015

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Appendix D: Data Reliability Self-Assessment Responses

Table D.1: Data Reliability Self-Assessment Responses 2014

DATA RELIABILITY	ASPA	CPUC	EDT	EPC	FEA	GPA	HECO	KAJUR	KUA	MEC	PPL	PPUC	PUB	SIEA	TAU	TEC	TPL	UNELCO	YSPSC
Fuel Consumption	A	A	B	A	A	A	A	B	B	B	B	B	C	A	B	B	A	A	C
Generation Quantities	A	A	A	A	A	A	A	B	B	B	C	A	C	B	A	B	A	A	C
Customer Outage Impacts	B	B	A	B	A	B	B	C	B	B	C	A	C	C	A	B	B	B	C
Network Demand & Capacity	A	B	A	A	A	A	B	A	B	B	C	B	B	B	A	B	B	B	C
No of Customers & Connections	A	A	A	B	A	A	B	B	A	A	B	B	A	B	A	B	A	A	B
Financial Information Sources	A	A	A	A	A	A	A	B	A	A	B	A	A	A	A	B	A	A	B

Appendix E: KPI Calculations

Table E.1: Key Performance Indicators 2012[1]

	KPIs	Definition	Main Grid / All Grids
	Generation		
1	Load Factor (%)	Gross Generation (MWh) * 100 / Maximum Demand (MW) * 8,760h	Main
2	Capacity Factor (%)	Gross Generation (MWh) * 100 / Total Installed Generation Capacity (MW) * 8,760h	Main
3	Availability Factor (%)	Total Installed Gen Capacity * 8,760h - Total Capacity Out Of Service (MWh) * 100 / Total Installed Generation Capacity (MW) * 8,760h	Main
4	Generation Labour Productivity (GWh/FTE generation employee)	Total Utility Generation (MWh) / 1000 / Number of FTE Generation Employees	Main
5	Specific Fuel Oil Consumption (kWh / litre)	Total Fuel Oil Generation (kWh) / Total Fuel Usage (L)	Main
6	*Specific Fuel Oil Consumption (kWh / kg)	Total Fuel Oil Generation (kWh) / Total Fuel Usage (kg)	Main
7	Lube Oil Consumption (kWh / litre)	Total Fuel Oil Generation (kWh) / Total Lubricants Used in Generation (L)	Main
8	Forced Outage (%)	MWh out of service due to forced outages and derated events * 100 / Total Installed System Generation Capacity * 8,760h	Main
9	Planned Outage (%)	MWh out of service due to planned outages events * 100 / Total Installed System Generation Capacity * 8,760h	Main
10	O&M Cost (USD / MWh)	Total Generation Operation and Maintenance Costs (USD) / Total Utility Generation (MWh)	All
11	Power Station Usage (%)	Power Station Usage (Station Auxiliaries) (MWh) * 100 / Total Utility Generation (MWh)	Main
12	IPP Energy Generation (%)	Total IPP Generation Purchased (MWh) * 100 / Gross Generation	Main
13	Renewable Energy to Grid (%)	Total Renewable Energy Generation (MWh) * 100 / Gross Generation (MWh)	Main and All
	Transmission**		
14	Transmission Losses (%)	[Net Generation (MWh) - Electricity Delivered to Dist Network (MWh)] * 100 / Net Generation (MWh)	Main
15	Transmission Reliability (Outages / 100km)	Number of Transmission Outage Events (events) * 100 / Length of Transmission (km)	Main
16	*Transmission SAIDI; Unplanned, Planned (min/customer)	Total Customer Interruption Duration Interrupted (cust mins) / Average Number of Customer Connections	Main
17	*Transmission SAIFI; Unplanned, Planned (events/customer)	Total Customer Interruptions (mins) / Average Number of Customer Connections	Main

[1]Net Generation = Gross Generation - Power Station Usage.

	Distribution		
18	**Network Delivery Losses (%)**	[Net Generation (MWh) - Electricity Sold (MWh)] * 100 / Net Generation (MWh)	Main
19	**Distribution Losses (%)**	[Electricity Delivered to Dist Network (MWh) - Electricity Sold (MWh)] * 100 / Electricity Delivered to Distribution Network (MWh)	Main
20	**Distribution Transformer Utilisation (%)**	Electricity Sold (MWh) * 100 / Total Distribution transformer Capacity (MVA)	Main
21	**Distribution Reliability (events per 100 km of dist line)**	Number of Distribution Forced Outage Events * 100 / Length of Distribution Line (km)	Main
22	**Customers per Distribution Employee**	Average Number of Customer Connections / Average Number of Distribution and Customer Service Employees	Main
	SAIDI and SAIFI		
23	**Total Interruption Duration SAIDI (min per customer)**	Sum of Generation, Transmission and Distribution SAIDI	Main
24	**Total Interruption Frequency SAIFI (events per customer)**	Sum of Generation, Transmission and Distribution SAIFI	Main
	Demand Side Management (DSM)		
25	**Actively Engaged in DSM (Y/N)**		All
26	**Staff Assigned to DSM**	Number of Staff	All
27	**Budget for DSM (USD)**		All
28	**DSM MWh Saving**		All
	Corporate / Financial		
32	**Tariff Analysis - Domestic 50kWh**	Based on tariff schedules	-
33	**Tariff Analysis - Domestic 200kWh**	Based on tariff schedules	-
34	**Tariff Analysis - Commercial 1000kWh**	Based on tariff schedules	-
35	**Average Supply Costs (USD / MWh)**	Total Operating Expenses (USD) / Electricity Sold (MWh)	All
36	**Utility Cost Breakdown (%)**	Proportionate Costs (%)	All
37	**Operating Ratio (%)**	(Total Operating Expenses + Total Depreciation) * 100 / Total Operating Revenue	All
38	**Debt to Equity Ratio (%)**	Long Term Debt (Non-Current Liability) * 100 / Equity + Long Term Debt (Non-Current Depreciation)	All
39	**Rate of Return on Assets (%)**	Earnings Before Interest and Tax (Operating Profit) * 100 / Average Non-Current Assets	All
40	**Return on Equity (%)**	Profit After Tax (Earnings After Tax) * 100 / Equity	All
41	**Current Ratio**	Current Assets * 100 / Current Liabilities	All
42	**Debtor Days (days)**	Debtors (Receivables at Period End) / Total Operating Revenue	All
	Safety and Human Resources		
43	**Lost Time Injury Duration Rate (days per FTE employee)**	Total Days Lost to Work During Period (days) / Total Number of Employees	All
44	**Lost Time Injury Frequency Rate (number of incidents per million hours)**	Number of Lost Time Injuries During Period (LTIs) * 1 000 000 h / Total Hours Worked (Hours)	All
45	**Labour Productivity (customers per employee)**	Average Number of Customers (customers) * 100 / FTE Utility	All
	Composite Indicator		
46	**Composite**	Equal proportions (Fuel Oil Consumption (kWh/litre) / Capacity Factor / Network Delivery Losses / Overall Labour Productivity)	Combined

* New KPIs

Appendix F: Data Tables

Table F.1: KPIs 2014 (Generation)

Utility	1	2	3	4	5	6	7	8	9	10	11	12	13
	Load Factor	Capacity Factor	Availability Factor	Generation Labour Productivity	Specific Fuel Oil Consumption (volume)	Specific Fuel Oil Consumption (weight)	Lube Oil Consumption	Forced Outage	Planned Outage	Generation O&M Costs	Power Station Usage	RE to Grid	IPP Energy Generation
	%	%	%	GWh/FTE gen employee	kWh/L	kWh/kg	kWh/L	%	%	US$/MWh	%	%	%
ASPA	76.7	49.9	99.41	2.12	3.80	4.58	657	0.29	0.30	45.10	4.73	1.57	0.00
CPUC	67.3	27.3	99.73	0.56	3.80	4.53	1288	0.08	0.19	21.73	0.52	0.58	0.00
CUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
EDT	62.7	28.1	74.78	4.57	4.73	4.82	786	16.67	8.56	48.78	2.63	31.60	1.87
EEC	62.6	40.4	100	9.65	-	7.72	1352	0	0	27.33	1.43	5.06	94.91
EPC	64.77	32.81	99.90	0.88	4.22	4.35	1940	0.09	0.01	79.42	2.98	26.34	0.00
FEA	62.57	39.23	100.00	8.19	4.12	4.76	NA	0	0	4.90	-	48.41	3.15
GPA	78.3	29.4	99.99	4.08	4.26	4.74	1689	0.002	0.005	31.01	8.68	0.00	42.61
HECO	-	50.7	85.28	5.86	3.60	-	-	3.80	10.92	35.56	6.64	0.51	47.58
KAJUR	84.8	46.1	99.73	1.43	4.25	4.72	1258	0.21	0.06	43.30	4.31	0.00	0.00
KUA	56.9	20.3	87.16	0.77	3.56	4.24	1068	12.84	0.008	51.71	1.19	2.29	0.00
MEC	77.01	22.87	93.30	1.00	4.00	4.74	461	6.65	0.05	86.91	6.77	0.44	0.00
PPL	59.99	40.72	99.50	0.21	2.73	3.17	3598	0.37	0.13	17.43	21.93	49.86	25.75
PPUC	74.1	32.5	98.49	1.17	3.80	4.52	1063	0.01	1.50	54.44	3.22	0.59	0.00
PUB	65.1	49.8	99.54	0.66	3.78	3.10	2109	0.46	0	6.94	4.44	0.00	0.00
PUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
SIEA	69.1	38.23	87.54	1.20	3.87	4.61	1120	8.517	3.947	35.53	3.17	0.04	0.69
TAU	72.2	30.4	100	1.53	3.68	4.38	541	0.003	0.0	129.48	1.48	2.87	0.00
TEC	64.6	30.3	100	0.14	3.42	4.07	1255	0	0	413.75	9.37	0.00	0.00
TPL	65.8	47.7	99.96	1.65	4.06	4.84	823	0.04	0	30.16	2.92	4.35	0.00
UNELCO	59.6	33.1	93.57	2.54	3.92	4.64	625	4.53	1.90	35.28	2.51	16.67	0.00
YSPSC	62.9	18.9	99.99	0.39	3.78	4.50	692	0.01	0.00	29.40	9.42	0.00	0.00

Table F.2: KPIs 2014 (Generation, Distribution)

Utility	13a	13b	13c	13d	13e	14	18	19	20	21	22	23
	Distillate Generation	Heavy Fuel Oil Generation	Biofuel Generation	Mixed Fuel Generation	LNG Generation	Enabling Framework for Private Sector	Network Delivery Losses	Distribution Losses	Customers per Distribution Employees	Distribution Reliability	Distribution Transformer Utilisation	Distribution O&M Cost
	%	%	%	%	%	Y/N	%	%		events/ 100km	%	US$/km
ASPA	100.0	0	0	0	0	Y/N	8.5	11.9	193	11.3	20.9	18,370
CPUC	99.4	0	0	0	0	Yes	26.0	26.0	118	375.4	10.6	9,084
CUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
EDT	0.6	65.7	0	0	0	Yes	6.6	2.7	382	2.7	0.0	5,416
EEC	0.0	-	0.01	-	-	Yes		-	235	-	-	-
EPC	73.6	-	-	-	-	Yes	16.4	16.4	191	21.2	n.av.	11,983
FEA	27.7	20.7749937	-	-	-	Yes	3.6	-	411	n.av.	n.av.	n.av.
GPA	2.1	97.9	0	0	0	Yes	5.8	8.9	299	12.6	18.7	17,904
HECO	0.2	51.7	0.51	-	-	-	1.1	-	-	-	22.6	-
KAJUR	-	100.0	-	-	-	No	62.0	62.0	128	16.9	10.0	8,829
KUA	100.0	-	-	-	-	No	18.6	20.1	158	63.5	5.8	4,540
MEC	99.6	-	-	-	-	No	29.0	29.0	129	16.7	11.6	34,969
PPL	24.4	25.7	-	-	-	Yes	32.6	NA	182	416.2	18.9	31,436
PPUC	99.4	-	-	-	-	No	15.2	14.5	46	19.4	36.0	9,667
PUB	100.0	-	-	-	-	No	22.2	22.2	-	393.1	22.2	2,278
PUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
SIEA	90.5	0	0	0	0	No	25.6	25.6	71	2.8	0.0	207
TAU	97.1	-	-	-	-	Yes	9.0	6.1	315	1.2	20.9	29,913
TEC	100.0								513	0.3		13
TPL	95.6	-	-	-	-	Yes	11.1	11.1	222	103.8	12.9	4,399
UNELCO	83.3	-	5.099441949	-	-	Yes	6.4	6.4	318	5.9	17.6	1,599
YSPSC	100	-	-	-	-	No	18.8	18.8	103	36.9	7.6	2,223

Table F.3: KPIs 2014 (Generation and Distribution, SAIDI & SAIFI)

Utility	24a	24b	25a	25b	25c	25d	25e	25f	25g	25h	25i	25j	25k
	Dist Related SAIDI (Unplanned)	Dist Related SAIDI (Planned)	Dist SAIFI (Total)	Dist Related SAIFI (Unplanned)	Dist Related SAIFI (Planned)	Gen SAIDI (Total)	Gen Related SAIDI (Unplanned)	Gen Related SAIDI (Planned)	Gen SAIFI (Total)	Gen Related SAIFI (Unplanned)	Gen Related SAIFI (Planned)	Total SAIDI (Gen and Dist)	Total SAIFI (Gen and Dist)
	mins per customer	mins per customer	events per customer	events per customer	events per customer	mins per customer	mins per customer	mins per customer	events per customer	events per customer	events per customer	mins per customer	events per customer
ASPA	34.8	4.5	0.6	0.6	0.0	81.5	81.5	0.0	3.8	3.8	0.0	120.8	4.5
CPUC	6799.3	5736.0	2.0	1.0	1.0	1456.3	426.5	1029.7	2.0	1.0	1.0	13991.6	4.1
CUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
EDT	71.6	235.4	2.8	1.8	1.0	9.0	9.0	0.0	2.7	2.7	0.0	316.0	5.5
EEC	0.0	0.0	2.4	1.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
EPC	0.0	0.0	6.1	1.2	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
FEA	0.0	0.0	8.4	4.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4
GPA	111.5	13.9	2.7	2.4	0.3	73.1	73.1	0.0	4.7	4.7	0.0	198.5	7.4
HECO	0.0	0.0	0.9	0.8	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.0	1.1
KAJUR	67.2	8.8	3.4	3.3	0.1	830.7	704.9	125.8	26.2	21.1	5.0	906.8	29.6
KUA	773.0	33.8	16.0	15.0	1.0	564.4	434.2	130.2	6.8	5.8	1.0	1371.2	22.8
MEC	635.6	224.9	3.8	3.3	0.5	1621.2	223.4	1397.8	4.1	1.0	3.1	2481.8	7.9
PPL	0.3	0.0	74.5	70.5	4.0	0.5	0.4	0.05	133.0	127.4	5.6	0.8	207.5
PPUC	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
PUB	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
PUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
SIEA	1088.4	415.4	18.7	13.8	4.8	1698.9	1436.2	262.7	39.0	34.4	4.6	3202.7	57.7
TAU	2.5	0.0	0.1	0.1	0.0	93.0	93.0	0.0	1.0	1.0	0.0	95.5	1.1
TEC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
TPL	0.0	0.1	-	-	-	0.0	0.0	0.0	-	-	-	0.1	-
UNELCO	80.4	37.8	3.5	2.9	0.5	168.5	168.5	0.0	8.9	8.9	0.0	286.7	12.4
YSPSC	731.4	27.3	8.3	8.0	0.3	337.1	264.2	72.9	0.0	0.0	0.0	1095.9	8.3

Table F.4: KPIs 2014 (DSM, HR and Safety, Customer)

Utility	26	27	28	29	30	31	32	33	34	35	36a	36b	36c	36d	36e	37	38
	DSM Initiatives	DSM Budget	DSM FTE Empl	DSM MWh Savings	Power Quality Standards	Lost Time Injury Duration	Lost Time Injury Freq Rate	Labour Productivity	Service Coverage	Productive Electricity Usage	Lifeline Tariff Usage	Domestic Usage	Commercial Usage	Industrial Usage	Other Usage	Customer Unbilled Electricity	Self-Regulated or Externally Regulated
		USD	FTE empl	MWh		days	injuries per million hrs worked	customers/ FTE empl	%	%	%	%	%	%	%	%	self / ext
ASPA	No	NA	NA	NA	None	0.00	0.00	76.25	1.9	68.6	0.0	29.9	27.2	17.2	24.3	0.0	self
CPUC	Yes	-	0.001	-	None	0.03	15.19	24.30	20.0	73.1	-	20.9	50.1	-	23.0	6.0	self
CUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
EDT	Yes	9,180	0.002	-	None	0.07	1.19	165.62	90.3	66.2	10.0	23.7	16.4	46.6	3.2	0.1	ext
EEC	Yes	102,000	0.0005	n.av.	EN50160	0.03	-	-	62.9	-	-	-	-	-	-	-	-
EPC	No	NA	NA	NA	None	n.av.	n.av.	64	n.av.	88.5	-	7.0	59.9	0.5	28.1	-	ext
FEA	Yes	n.av.	-	-	-	0.76	9.36	211.77	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	ext
GPA	No	NA	NA	NA	None	0.39	11.04	83.89	n.av.	70.1	14.3	29.9	17.3	19.4	33.4	5.6	ext
HECO	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	ext
KAJUR	No	NA	NA	NA	None	-	-	19.55	96.3	18.8	-	81.2	18.2	-	0.6	8.2	self
KUA	Yes	-	-	-	KUA	-	-	77.84	100.0	58.3	-	39.6	27.1	5.9	25.3	2.1	self
MEC	Yes	-	-	-	None	0.14	18.46	31.09	100.0	55.0	-	43.0	37.9	-	17.1	28.4	self
PPL	Yes	755,400	0.0015	406808	None	0.12	0.52	18.01	7.3	81.2	-	18.4	52.6	18.9	9.6	10.7	ext
PPUC	Yes	25,000	0.0015	-	JIS,NEC	-	-	50.61	97.1	68.4	-	31.6	36.7	31.7	0.0	-	self
PUB	No	NA	NA	NA	0	-	-	33.50	39.9	56.4	-	43.6	20.1	36.4	-	22.2	ext
PUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
SIEA	No	NA	NA	NA	0	0.07	4.60	66.95	13.0	66.0	0.0	34.0	65.0	1.0	0.0	0.4	self
TAU	Yes	57,023	0.0035	-	NZ Standard	-	-	108.79		66.2	10.0	23.8	37.9	28.2	-	-	ext
TEC	No	NA	NA	NA	AUS & NZ			40.71									self
TPL	Yes	-	-	n.av.	TPL Standard	-	-	109.44	87.3	4.2	-	3.4	4.2	-	-	-	ext
UNELCO	Yes	15,173	0.0065	-	Concession Contract	0.10	13.78	119.70	25.5	67.5	7.5	24.9	24.6	42.5	0.4	1.0	ext
YSPSC	No	NA	NA	NA	NEC	-	-	23.28	52.0	75.3	0.6	24.7	46.7	28.6	-	7.5	self

Table F.5: KPIs 2014 (Transmission)

Utility	15	16	17a	17b	17c	17d	17e	17f		
	Transmission Losses	Transmission Reliability	Trans SAIDI (planned)	Trans SAIDI (unplanned)	Trans SAIDI Total	Trans SAIFI (unplanned)	Trans SAIFI (planned)	Trans. SAIFI Total	Total SAIDI (Gen Dist Tran)	Total SAIFI (Gen Dist Tran)
	%	outage/s100km	min per cust	min per cust	min per cust	events/cust	events/cust	events/cust	min per cust	events per cust
EDT	3.7	2.1	0.0	3.1	3.1	0.6	0.0	0.6	319.1	6.1
FEA	-	0	0	0	0	0	0	0	0.0	8.4
GPA		16.9	0.0	48.0	48.0	0.6	0.0	0.6	246.6	8.0
HECO	-	-	0.000475	51.0	51.0	1.9	0.0	1.9	51.0	3.0
PPL	-	21.7	1.0	77.6	78.6	25.4	0.5	25.9	79.4	233.4

Table F.6: KPIs 2014 (Financial and Utility Cost Breakdown)

Utility	Financial							Utility Cost Breakdown											
	39	40	41	42	43	44	45	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	46.1	46.11	46.12
	Operating Ratio	Debt to Equity Ratio	Rate of Return on Assets	Return on Equity	Current Ratio	Debtor Days	Average Supply Cost	Fuel and Lube Oil	Fuel Duty	Gen O&M	Gen Labour	Gen Deprec	T&D O&M	T&D Labour	T&D Deprec	Other O/Hs	Other Deprec	Other Taxes	Other Misc
		%	%	%		days	USc/kWh	%	%	%	%	%	%	%	%	%	%	%	%
ASPA	103.3	0.5	-13.0	-5.8	756.0	28.6	37	69.5	0	7.9	4.6	4.8	6.4	2.7	3.1	0.5	0.4	0.2	0.0
CPUC	101.0	48.0	28.4	-1.2	114.8	21.3	55	66.1	-	2.7	2.0	2.0	1.4	3.4	0.8	2.5	2.2	0.2	16.7
CUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
EDT	104.4	19.4	2.6	7.2	46.7	81.2	31	31.7	0	5.8	8.0	10.7	1.6	5.4	10.0	8.8	0.0	2.6	15.4
EEC	97.4	2.3	11.4	9.5	78.1	68.4	-	12.6	-	1.2	1.1	1.5	10.5	43.5	16.8	7.1	5.6	-	-
EPC	109.9	43.7	0.8	-0.4	99.5	31.6	44	50.0	6.52	13.53	1.64	4.53	10.20	2.86	3.85	3.95	1.26	0.10	1.52
FEA	98.1	43.7	0.6	0.2	245.0	41.8	n.av.	57.2	6.4	2.0	0.6	5.6	4.6	1.0	4.5	4.0	1.5	-	12.55
GPA	90.6	82.3	6.9	3.0	90.3	37.1	23	67.5	-	4.4	2.5	4.8	3.0	1.7	2.6	3.0	1.0	1.7	7.9
HECO	81.3	32.8	10.9	7.6	127.9	25.4	24.0	31.3	-	3.0	2.1	1.2	2.4	-	2.9	-	-	-	57.1
KAJUR	124.2	n.av.	-35.2	n.av.	51.2	154.6	95	72.1	0.2	0.7	10.4	3.6	0.3	2.2	1.2	8.9	-	0.4	-
KUA	119.1	n.av.	-3.9	-2.2	237.3	20.1	62	58.1	-	5.7	3.2	4.5	8.1	2.3	6.5	6.5	0.8	-	4.4
MEC	106.9	148.8	0.9	-7.3	87.9	160.6	47	58.0	-	17.3	5.2	4.6	6.0	2.3	-	4.1	1.2	0.3	0.9
PPL	97.7	24.5	8.1	7.2	143.4	60.5	29.6	45.1	-	6.8	8.0	4.4	7.8	0.0	3.7	7.8	2.0	0.0	14.3
PPUC	99.9	-	340.1	1.9	213.4	61.5	38	64.6	-	12.1	2.5	6.3	2.8	1.2	2.0	2.1	0.9	-	5.4
PUB	106.9	28.6	-4.4	-7.0	80.3	255.1	44	74.5	-	0.0	3.9	5.0	1.8	2.6	0.7	3.0	0.7	-	7.8
PUC	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	n.av.
SIEA	88.9	4.3	21.0	13.8	900.0	59.8	74	50.5	12.6	4.8	0.8	5.1	1.1	3.3	1.5	6.2	3.2	1.0	9.9
TAU	96.1	1.0	3.5	1.5	628.1	48.8	56	38.1	0.0	14.5	2.9	7.5	9.8	2.2	7.5	4.5	1.0	0.0	12.0
TEC	290.8	n.av.	-27.6	n.av.	59.7	82.8		26.4		26.4		19.4	0.5	1.8		7.2	15.0	0.3	3.1
TPL	91.3	35.4	5.8	4.3	147.2	41.6	44	54.2	-	4.8	2.2	2.9	0.8	3.1	6.5	4.8	2.5	0.0	18.2
UNELCO	92.7	20.1	2.3	10.1	142.9	66.1	42	44.5	6.2	5.5	1.6	9.1	1.9	0.8	3.5	8.1	3.8	0.1	14.8
YSPSC	113.8	2.2	-16.4	-8.5	307.6	91.2	58	65.3	-	2.0	3.7	10.1	2.0	2.2	1.3	5.1	1.7	-	6.5

Appendix G: Currency Conversion Table

Table G.1: Currency Conversion Table for 2013 and 2014 Data

			2013			2014		
Pacific Utilities	Country	Local Currency	Benchmarking Period Start	Benchmarking Period End	End Fiscal Year Conversion	Benchmarking Period Start	Benchmarking Period End	End Fiscal Year Conversion
ASPA	American Samoa	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
CPUC	Chuuk, FSM	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
CUC	Saipan, Northern Marianas	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
EDT	French Polynesia	XPF	1-Jan-13	31-Dec-13	0.0115	1-Jan-14	31-Dec-14	0.0102
EEC	New Caledonia	XPF	1-Jan-13	31-Dec-13	0.0115	1-Jan-14	31-Dec-14	0.0102
EEWF	Wallis and Fortuna	XPF	1-Jan-13	31-Dec-13	0.0115	1-Jan-14	31-Dec-14	0.0102
ENERCAL	New Caledonia	XPF	1-Jan-13	31-Dec-13	0.0115	1-Jan-14	31-Dec-14	0.0102
EPC	Samoa	WST	1-Jul-12	30-Jun-13	0.4237	1-Jul-13	30-Jun-14	0.4237
FEA	Fiji	FJD	1-Jan-13	31-Dec-13	0.5281	1-Jan-14	31-Dec-14	0.5008
GPA	Guam	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
HECO	Hawaii, USA	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
KAJUR	Kwajalein Atoll, Marshall Islands	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
KUA	Kosrea, FSM	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
MEC	Marshall Islands	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
NPC	Niue	NZD	1-Jul-12	30-Jun-13	0.7734	1-Jul-13	30-Jun-14	0.8762
NUC	Nauru	AUD	1-Jul-12	30-Jun-13	0.9133	1-Jul-13	30-Jun-14	0.9419
PPL	Papua New Guinea	PGK	1-Jan-13	31-Dec-13	0.3888	1-Jan-14	31-Dec-14	0.3777
PPUC	Palau	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
PUB	Kiribai	AUD	1-Jan-13	31-Dec-13	0.8873	1-Jan-13	31-Dec-13	0.8156
PUC	Pohnpei, FSM	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1
SIEA	Solomon Islands	SBD	1-Jan-13	31-Dec-13	0.1358	1-Jan-14	31-Dec-14	0.1304
TAU	Cook Islands	NZD	1-Jul-12	30-Jun-13	0.7734	1-Jul-13	30-Jun-14	0.8762
TEC	Tuvalu	AUD	1-Jan-13	31-Dec-13	0.8873	1-Jan-14	31-Dec-14	0.8156
TPL	Tonga	TOP	1-Jul-12	30-Jun-13	0.5388	1-Jul-13	30-Jun-14	0.5406
UNELCO	Vanuatu	VUV	1-Jan-13	31-Dec-13	0.0103	1-Jan-14	31-Dec-14	0.0098
YSPSC	Yap, FSM	USD	1-Oct-12	30-Sep-13	1	1-Oct-13	30-Sep-14	1

Appendix H: Electricity Tariff Tables

Table H.1: Electricity Tariff Table[1,2] (Local Currency)

TOTAL COST TO CONSUMER FOR SET kWh/mth, incl base charge, taxes,etc (IN LOCAL CURRENCY)												
	DOMESTIC / RESIDENTIAL								COMMERCIAL / BUSINESS			
Pacific Utilities	**50**	**100**	**200**	**500**	**1,000**	**2,000**	**3,000**	**10,000**	**1,000**	**3,000**	**10,000**	**50,000**
ASPA	25.29	44.58	83.17	198.92	391.83	777.66	1,163.49	3,864.30	404.93	1,194.79	3,959.30	19,756.50
CPUC	27.37	54.73	109.46	273.65	547.30	1,094.60	1,641.90	5,473.00	577.40	1,732.20	5,774.00	28,870.00
CUC	22.67	38.84	71.16	168.14	373.46	795.72	1,273.98	4,621.80	432.79	1,277.31	4,233.13	21,123.53
EPC	34.50	75.50	157.50	403.50	813.50	1,633.50	2,453.50	8,193.50	810.00	2,430.00	8,100.00	40,500.00
FEA	8.60	21.18	54.28	153.58	319.08	650.08	1,312.08	3,629.08	399.00	1,197.00	3,990.00	20,615.00
KAJUR	14.90	29.80	59.60	149.00	298.00	596.00	894.00	2,980.00	358.00	1,074.00	3,580.00	17,900.00
KUA	21.69	43.09	89.89	230.29	464.29	942.29	1,420.29	4,766.29	477.29	1,453.29	4,869.29	23,989.29
MEC	19.90	39.80	79.60	199.00	408.00	826.00	1,244.00	4,170.00	478.00	1,434.00	4,780.00	23,900.00
NPC	40.00	65.00	125.00	325.00	675.00	1,375.00	2,075.00	6,975.00				
NUC	10.00	20.00	40.00	130.00	305.00	655.00	1,005.00	3,455.00	700.00	2,100.00	7,000.00	35,000.00
PPL	45.25	85.41	165.74	406.73	808.38	1,611.68	2,414.98	8,038.08	953.60	2,824.80	9,374.00	46,798.00
PPUC	18.20	33.40	67.50	180.90	394.40	821.40	1,248.40	4,237.40	438.00	1,292.00	4,281.00	21,361.00
PUB	20.00	40.00	80.00	200.00	400.00	800.00	1,200.00	4,000.00	550.00	1,650.00	5,500.00	27,500.00
PUC	28.53	53.05	102.10	249.25	494.50	985.00	1,475.50	4,909.00	490.50	1,471.50	4,905.00	24,525.00
SIEA	323.43	646.86	1,293.72	3,234.30	6,468.60	12,937.20	19,405.80	64,686.00	6,953.00	20,859.00	69,530.00	347,650.00
TAU	28.50	66.20	146.20	408.00	828.00	1,668.00	2,508.00	8,388.00	815.00	2,435.00	8,105.00	40,505.00
TEC (Fogafale)	15.00	34.50	90.50	258.50	538.50	1,098.50	1,658.50	5,578.50	560.00	1,680.00	5,600.00	28,000.00
TEC (Outstation)	14.50	33.50	88.50	253.50	528.50	1,078.50	1,628.50	5,478.50	550.00	1,650.00	5,500.00	27,500.00
TPL	45.87	91.73	183.46	458.65	917.30	1,834.60	2,751.90	9,173.00			.	
UNELCO	958.00	3,876.40	18,761.40	69,467.40	153,977.40	322,997.40	492,017.40	1,675,157.40	50,146.80	148,186.80	491,326.80	2,452,126.80
YSPSC	21.06	42.27	84.69	217.25	442.60	893.30	1,344.00	4,498.90	455.70	1,516.30	5,228.40	26,440.40

[1]Tariff review was carried out by PPA.
[2]Some utilities were not represented in tariff tables were due to difficulty in understanding or interpreting application or tariff, or due to missing information (such as a variable fuel component).

Table H.2: Electricity Tariff Table (USD)

	TOTAL COST TO CONSUMER FOR SET kWh/mth, incl base charge, taxes,etc (IN USD)												
	DOMESTIC / RESIDENTIAL								COMMERCIAL / BUSINESS				COMMENTS
Pacific Utilities	50	100	200	500	1,000	2,000	3,000	10,000	1,000	3,000	10,000	50,000	
ASPA	25.29	44.58	83.17	198.92	391.83	777.66	1,163.49	3,864.30	404.93	1,194.79	3,959.30	19,756.50	Commercial based on small general 3PHSE
CPUC	27.37	54.73	109.46	273.65	547.30	1,094.60	1,641.90	5,473.00	577.40	1,732.20	5,774.00	28,870.00	Based on 8 Feb 2012 announcement
CUC	22.67	38.84	71.16	168.14	373.46	795.72	1,273.98	4,621.80	432.79	1,277.31	4,233.13	21,123.53	2 Feb 2012 sched of charges, lifeline applied up to 500KWh
EPC	14.62	31.99	66.73	170.96	344.68	692.11	1,039.55	3,471.59	343.20	1,029.59	3,431.97	17,159.85	0.86 applied up to 50kWh for domestic
FEA	4.31	10.60	27.18	76.91	159.79	325.56	657.09	1,817.44	199.82	599.46	1,998.19	10,323.99	Lifeline tariff applicable to total consumption up to 70kWh only.
KAJUR	14.90	29.80	59.60	149.00	298.00	596.00	894.00	2,980.00	358.00	1,074.00	3,580.00	17,900.00	Life line rate was stated but without any indication as to the KWh
KUA	21.69	43.09	89.89	230.29	464.29	942.29	1,420.29	4,766.29	477.29	1,453.29	4,869.29	23,989.29	Rate was quoted from Resolution 2008-30-4
MEC	19.90	39.80	79.60	199.00	408.00	826.00	1,244.00	4,170.00	478.00	1,434.00	4,780.00	23,900.00	
NPC	35.05	56.95	109.53	284.77	591.44	1,204.78	1,818.12	6,111.50	-	-	-	-	No commercial rate stated on notice issue 8 Nov 2008
NUC	9.42	18.84	37.68	122.45	287.28	616.94	946.61	3,254.26	659.33	1,977.99	6,593.30	32,966.50	Tariff rate 2011
PPL	17.09	32.26	62.60	153.62	305.33	608.73	912.14	3,035.98	360.17	1,066.93	3,540.56	17,675.60	Commercial uses "general supply customers"
PPUC	18.20	33.40	67.50	180.90	394.40	821.40	1,248.40	4,237.40	438.00	1,292.00	4,281.00	21,361.00	
PUB	16.31	32.62	65.25	163.12	326.24	652.48	978.72	3,262.40	448.58	1,345.74	4,485.80	22,429.00	
PUC	28.53	53.05	102.10	249.25	494.50	985.00	1,475.50	4,909.00	490.50	1,471.50	4,905.00	24,525.00	Fuel charge 0.3905 as advised by PUC in email
SIEA	42.18	84.35	168.70	421.75	843.51	1,687.01	2,530.52	8,435.05	906.67	2,720.01	9,066.71	45,333.56	
TAU	24.97	58.00	128.10	357.49	725.49	1,461.50	2,197.51	7,349.57	714.10	2,133.55	7,101.60	35,490.48	
TEC (Fogafale)	12.23	28.14	73.81	210.83	439.20	895.94	1,352.67	4,549.82	456.74	1,370.21	4,567.36	22,836.80	
TEC (Outstation)	11.83	27.32	72.18	206.75	431.04	879.62	1,328.20	4,468.26	448.58	1,345.74	4,485.80	22,429.00	
TPL	24.79	49.59	99.18	247.95	495.89	991.78	1,487.68	4,958.92	-	-		-	No commercial rate stated
UNELCO	9.39	37.99	183.86	680.78	1,508.98	3,165.37	4,821.77	16,416.54	491.44	1,452.23	4,815.00	24,030.84	Used business licence holder LV for commercial
YSPSC	21.06	42.27	84.69	217.25	442.60	893.30	1,344.00	4,498.90	455.70	1,516.30	5,228.40	26,440.40	