PACIFIC POWER UTILITIES

Benchmarking Report

2015 Fiscal Year

This report is a publication of the Pacific Power Association (PPA).

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Benchmarking Report

2015 Fiscal Year

PREPARED BY THE PACIFIC POWER ASSOCIATION (PPA)

JUNE 2017

PREFACE

It is encouraging to note that the quality of data has improved significantly and an increased number of utilities responding fully to the data collection questionnaire. It is also encouraging to see is that there is a growing number of utilities using the results from the previous assessments to put together improvement plans for their organizations. This is of course the most important use of the benchmarking assessment and the PPA encourages all utilities to do likewise.

This round of benchmarking is the first whereby the PPA has taken over the responsibility of all aspects of the work. It is also the first of which the indicators are reported without any analysis of trends as agreed the 2011 Board Meeting in Koror, Republic of Palau. In continuing the trend, all the financial data has been fully disclosed.

In recognizing the important role that benchmarking plays in utility operations, the Board of the PPA at its 25th Annual Conference in Nuku'alofa, Kingdom of Tonga, reaffirmed its commitment to the work and has given its support for the continuation of this exercise. A one day benchmarking workshop organized by the Secretariat during 25th Annual Conference provided further opportunity for the utility technical staff and Benchmarking Liaison Officers to address weaknesses in the data collection and reinforced messages about the importance of good quality data received in a timely manner.

On behalf of the PPA, I thank all the Active PPA Members' Management and Staff for their collective effort in providing the data 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, validation, liaising with the participating PPA member utilities and the production of the summary report. In particular, the leadership of the PPA Executive Director, Andrew Daka who also provided the text for the report, was critical to project success. In addition, Gordon Chang (Deputy Executive Director), Paula Loga (Administrative Clerk), Mohini Chand (Finance Officer), and Ana Chan (Administration Officer) were involved in a range of tasks supporting the data collection, analysis and production of the report.

The World Bank through the SEIPD funded electrical engineer, Krishnan Nair, who provided assistance in the vetting of the data, followed up with utilities on the data and put together the charts and the draft.

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 supplied data and clarified points for the data analysis process, as well as providing valuable feedback on the benchmarking process and the application of individual indicators in their utilities. Their commitment to improving operations and service delivery to their communities is acknowledged and appreciated.

Acronyms

ADB	Asian Development Bank
AF	Availability Factor
APPA	American Public Power Association (of which PPA is a member)
ASPA	American Samoa Power Authority
CEO	Chief Executive Officer
CF	Capacity Factor
CPUC	Chuuk Public Utility Corporation
CROP	Council of Regional Organisations of the Pacific
CUC	Commonwealth Utilities Corporation (Saipan)
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
ENERCAL	Societe Neo-Caledonenne D'Energie
EPC	Electric Power Corporation (Samoa)
EU	European Union
FEA	Fiji Electricity Authority
FSM	Federated States of Micronesia
FTE	Full Time Equivalent
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)
HV	High voltage
IPP	Independent Power Producer, usually private sector
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
kV	kilovolt (1,000 Volts)
KUA	Kosrae Utilities Authority
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)
NPC	Niue Power Corporation
NUC	Nauru Utilities Corporation
O&M	Operations and Maintenance
PICs	Pacific Island Countries
PICTs	Pacific Island Countries and Territories
PIPs	Performance Improvement Plans
PNG	Papua New Guinea
PPA	Pacific Power Association; also Power Purchase Agreement
PPL	PNG Power Ltd.
PPUC	Palau Public Utilities Corporation
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
SIEA	Solomon Islands Electricity Authority
SFC	Specific Fuel Consumption
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
USD	United States Dollars
USD	United States Dollar
WBG	World Bank Group
YSPSC	Yap State Public Service Corporation

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EXECUTIVE SUMMARY

Overview

The benchmarking of the 2015 Fiscal Year data for the PPA Utilities is the first year in which the Association has taken full responsibility of collection and verification of the data as well as and the production of the key performance indicator. This round of benchmarking is also the first to present only a summary of the indicators with no analysis in line with PPA Board's resolution at the 2013 Board Meeting held in Koror, Palau, on July 16, 2013.

All financial data has been fully disclosed in line with the PPA board resolution at the PPA Annual Conference held in Tahiti, French Polynesia from 7-11 July 2014 and this continues the trend from the 2013/2014 FY Benchmarking Report. Table A: compares the average results of the current exercise (2015 data) with that of the previous periods and highlights any associated trends over time. In summary of the generation indicators, the areas of load factor, capacity factor, specific fuel oil consumption and operating ratio have remained fairly stable. Availability factor values have improved but low confidence is placed in the comprehensiveness of out-of-service data provided. Lube oil consumption, forced outage and power station usage have improved. Generation labour productivity has declined overall and is a key area of concern. Generation and Distribution operations and maintenance indicators continue to decrease to very low levels, indicating a continued neglect of adequate maintenance practices for generation plant and equipment.

A continued decline in performance has been observed in transformer utilisation, return on equity, current ratio, operating ratio and lost time injury frequency rate. Other indicators including load factor and capacity factor and, specific oil consumption, distribution losses have remained stable.

There is no comparison of the KPIs with the CARILEC or the NESIS for this round in line with the earlier decision made by the CEOs.

Table A: Summary of Indicator Trends 2015

Key Indicators		2010 Results		2011 Results		2012 Results		2013 Results		2014 Results		2015 Results		Trend
		Av	Med	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	66.2	66.4	Stable
Capacity factor (%)	↑ better	32	31	36	37	36	35	35.7	33.5	35.6	33.0	33.2	31.6	Declined
Availability factor (%)	↑ better	98	100	82	81	92	99.6	95.9	99.8	95.9	99.6	97.3	99.7	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	2.5	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	3.8	3.8	Stable
Specific fuel oil consumption (kWh/ kg)	↑ better					4.5	4.5	4.4	4.5	4.6	4.6	4.4	4.5	Stable
Lube oil consumption (kWh/litre)	↑ better	1302	971	1084	936	1096	984	1130	1093	1102	1068	1020	904	Improved
Forced outage factor (%)	↓ better	1	0.2	8.3	6.3	5.4	0.4	1.5	0.1	2.7	0.1	0.4	0.2	Improved
Planned outage factor (%)	↓ better	1	0.1*	3.9	1.8	2.64	0.04	2.7	0.1	1.38	0.03	1.53	0.04	Declined
O&M (USD per MWh)	varies	148*	71*	214*	132*	47	40	20.0	11.5	61.4	35.5	48	37.5	Declined
Power Station Usage (%)	↓ better	4.7	4.8	3.9	3.6	3.5	2.7	3.6	2.9	5.2	3.2	3.8	3.2	Improved
Renewable energy to grid (%)	varies	22% main grid*		26% of all grids*								8.3	2.7	
Transmission														
Transmission losses (%)	↓ better			5*	5*	0.9*	0.9*					1.2	1.2	Varies
Transmission reliability (outages/100km)	↓ better			41.8	18.2	11.5*	15.9*					13.8	9.8	Declined
Transmission SAIDI (min/cust) Unplanned	↓ better					52.7	60.9					59	59	Declined
Planned	↓ better					0	0					7229	0	Declined
Transmission SAIFI (events/cust) Unplanned	↓ better					5.3	6.3							
Planned	↓ better					0	0							
Distribution														
Network delivery losses (%)	↓ better	12.8	11.7	11.8	9.2	14.0	12.2	13.9	12.9	17.8	15.8	11.2	8.8	Improved
Distribution losses (%)	↓ better	12	10.4	14.2	10.7	14.1	12.2	14.3	12.9	18.8	16.4	9.3	8.7	Improved
Transformer utilisation (%)	↑ better	19	21	18	19	16	16	15.1	16.6	17.4	18.7	16.6	14.1	Declined
Distribution reliability (events per 100km)	↓ better	51	26	135	19	64	23	96	26	88	17	15	9	Improved
Customers per dist employee	↑ better	334	297	259	249	246	253	240	233	223	192	244	167	Declined
Distribution O&M (USD/km)	↑ better			5846	4648	8662	5574	13354	5001	10087	7122	9090	7318	Declined
Gen. and Dist. SAIDI and SAIFI														
SAIDI (mins/customer)	↓ better	530*	139*	794*	583*	5664	475	1142	672.7	1719	301	3071	161	Declined
SAIFI (interruptions/cust)	↓ better	8*	4*	10*	6*	9	4	15.3	5.2	24.2	7.6	29.6	7	Declined
Financial														
Ave. supply cost (USD/kWh)						0.45	0.44	0.4	0.4	0.47	0.44	0.40	0.35	Improved
Debt to equity ratio (%)	↓better	10	18	47	24	38	13	38.2	26.2	34	27	29	24	Improved
Rate of return on assets (%)	↑ better	-4	1	3	0	-12	2	7.1	5.8	0	2	-0.7	0.05	Improved
Return on equity (%)	↑ better	5.7	5.7	8.1	5.7	2	0	3.8	4.7	1.9	1.7	-3.2	0	Declined
Current ratio (%)	↑ better			168	109	204	102	268.5	107.4	228	135	186	116	Declined
Operating ratio (%)	↓ better			100	99	98	99	99.9	99.1	101	100	98	98	Declined
Debtor days (days)	↓ better	115	56	62	51	57	50	60.6	49.3	72	60	65	45	Improved
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	0.19	0.02	Stable
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	5.33	0.46	Declined
Labour Productivity (customers per employee)	↑ better	85	74	71	59	81	55	102.5	47.4	74	65	79	62	Improved
Technical Composite														
Composite Indicator	↑ better	2.8	2.8	2.7	2.7	2.6	2.5					2.3	2.1	

Observations

The following are observations based on the key performance indicators arising from the 2015 fiscal year benchmarking.

Overall Utility Performance

The utility performances for the period of benchmarking have not showed significant changes from the previous period, the 2014 Fiscal Year.

Generation Performance: In Generation operations, Planned Outage continue to show decline in performance, which can be, attributed to the weakness in collecting of data. There have been improvements in the specific lube oil consumption, Forced outage and Power Station Usage with the rest of the generation KPIs; Load Factor, Availability Factor, Generation Labour Productivity and Specific Fuel Consumption by volume and weight remained stable.

Transmission Network Performance: Five out of the 23 utilities that participated in the 2015 Fiscal Year benchmarking; GPA, FEA, PPL, EDT and HECO; operated transmission network. However all these five utilities did not provide complete set of data so that a meaningful comparison of the indicators can be done.

Distribution Network Performance: the overall performance of distribution networks in the utilities has shown improvements during the 2015 Fiscal Year period. Improvements have been observed in Network Losses, Distribution Reliability (events/100km) and Customers/Employee. In contrast, there has been a decline in Transformer Utilisation

Generation and Distribution Reliability: The overall system reliability showed decline in 2015 which SAIDI and SAIFI dropping from the 2014 Fiscal Year levels.

Financial performance: for about half of the utilities participating in the benchmarking, they continue to operate unsustainably with the per unit cost of generating, distributing and the sale of electricity outweighing the application tariff as indicated by the continued declined in the Operating Ratio. The Return on Assets, Return on Equity and Current Ratio has decline in the Operating Ratio. The Return on Asset, Return on Equity and Current Ratio has also declined compared to the pervious benchmarking period. There are, however, improvements in the Debt to Equity Ratio and Debtor Days.

Safety and Incident Reporting: Despite the number of rounds of benchmarking to data, safety reporting continues to be an issue with some utilities not having in place a system whilst for others the system in place may not have matured. Hence based on the data received for the benchmarking period, Labour Productivity has improved whilst Lost Time Injury Duration Rates have remained stable.

1. INTRODUCTION

1.1 Benchmarking Overview

The 2015 exercise involves data from 23 power utilities compared to 20 for the 2014 Fiscal Year.

Table 1.1 shows the utilities that have participated in the Pacific benchmarking initiative since 2001. This round of benchmarking covered data governance, gender composition of the workforce, and KPI operational and performance data KPIs.

Table 1.1: Utility Participation in Benchmarking 2001, and 2010 - 2015 Data Periods

Utility			Data Period						
			2001	2010	2011	2012	2013	2014	2015
Acronym	Name	Country / Territory	Year Data Collated						
			2002	2011	2012/13	2013/14	2015	2015	2016
ASPA	American Samoa Power Authority	American Samoa	✓	✓	✓	✓	✓	✓	✓
CPUC	Chuuk Public Utility Corporation	Fed States of Micronesia (FSM)	✓	✓	✓	✓	✓	✓	✓
CUC	Commonwealth Utilities Corporation	Commonwealth of N Marianas	×	✓	✓	✓	✓	×	✓
EDT	Electricité de Tahiti	French Polynesia	✓	✓	✓	✓	✓	✓	✓
EEC	Electricité et Eau de Caledonie	New Caledonia	✓	×	×	✓	✓	✓	✓
EEWF	Electricité et Eau de Wallis et Futuna	Wallis & Futuna	✓	×	×	×	×	×	×
ENERCAL	Societe Neo-Caledonenne D'Energie	New Caledonia	✓	×	×	×	×	×	×
EPC	Electric Power Corporation	Samoa	✓	✓	✓	✓	✓	✓	✓
FEA	Fiji Electricity Authority	Fiji	✓	✓	✓	✓	✓	✓	✓
GPA	Guam Power Authority	Guam	✓	✓	✓	✓	✓	✓	✓
HECO	Hawaii Electric Company	Hawaii, (USA)	×	×	×	×	✓	✓	✓
KAJUR	Kwajalein Atoll Joint Utility Resources	Marshall Islands (RMI)	✓	✓	✓	✓	✓	✓	✓
KUA	Kosrae Utilities Authority	Fed States of Micronesia (FSM)	✓	✓	✓	✓	✓	✓	✓
MEC	Marshall Energy Company	Marshall Islands (RMI)	×	✓	✓	✓	✓	✓	✓
NPC	Niue Power Corporation	Niue	✓	✓	×	×	×	×	✓
NUC	Nauru Utilities Corporation	Nauru	×	✓	✓	✓	×	×	✓
PPL	PNG Power Ltd.	Papua New Guinea (PNG)	✓	✓	✓	×	✓	✓	✓
PPUC	Palau Public Utilities Corporation	Palau	✓	✓	✓	✓	✓	✓	✓
PUB	Public Utilities Board	Kiribati	✓	✓	✓	✓	✓	✓	✓
PUC	Pohnpei Utilities Corporation	Fed 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	Fed States of Micronesia (FSM)	×	✓	✓	✓	✓	✓	✓
		Total	20	19	21	21	22	20	23

2. GOVERNANCE

2.1 Key Governance Results

The Governance data for the 2015 benchmarking has not changed at all compared to 2014 or earlier benchmarking periods for that matter, as there has been no significant government policy changes in the various Pacific Islands and Territories. This situation is also reflected in the governance KPIs.

Table 2.1: Quality Standards and Regulatory Structures of Utilities

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

2.2 Governance Analysis

The composite governance score introduced in the 2012 Fiscal Year Report has again been utilised in this years' power benchmarking exercise for the purpose of analysing if good governance mechanisms are delivering tangible benefits to utilities in the form of improved financial performance. The composite score is comprised of the same weighted indicators as the 2012 Fiscal Year Report, determined from relevant responses in the governance questionnaire using a governance scorecard (Table 2.1).

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 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.

The composite governance scores for utilities which provided sufficient responses to enable the weightings to be calculated are represented in Figure 2.13, ranked from lowest to highest score (closest to 100%). As per previous reporting, there is a significant spread in terms of governance perspectives in the region, ranging from a low of 0% for KAJUR up to 100% for PPUC.

Figure 2.1: Composite Governance Score

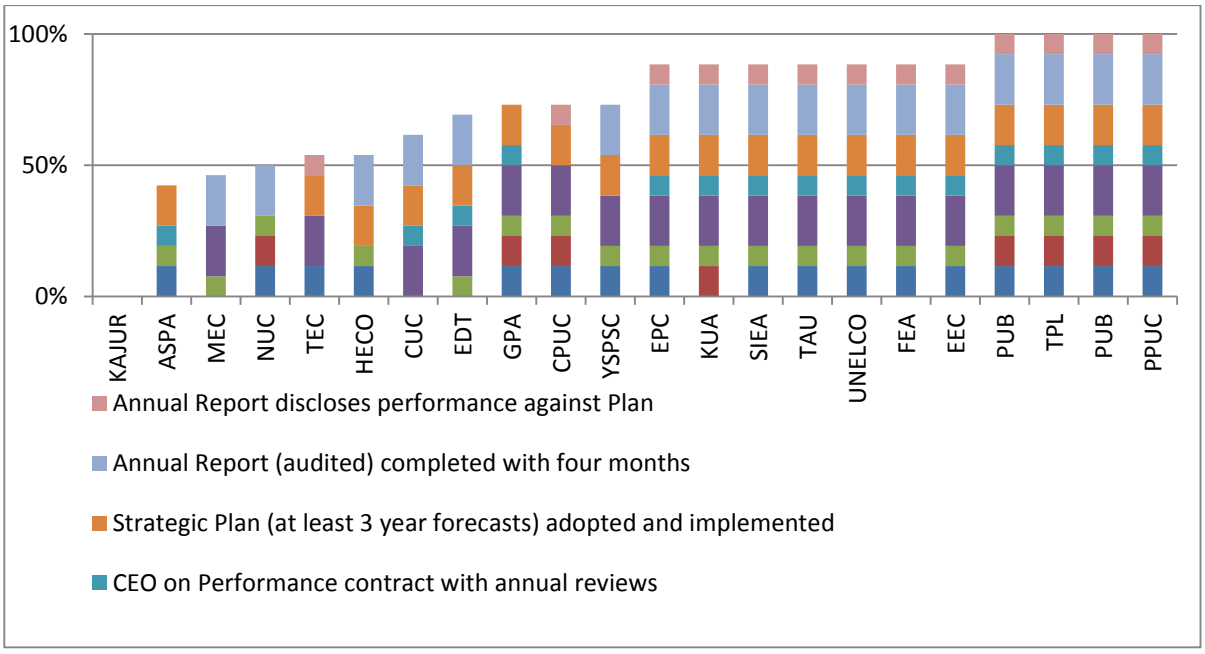
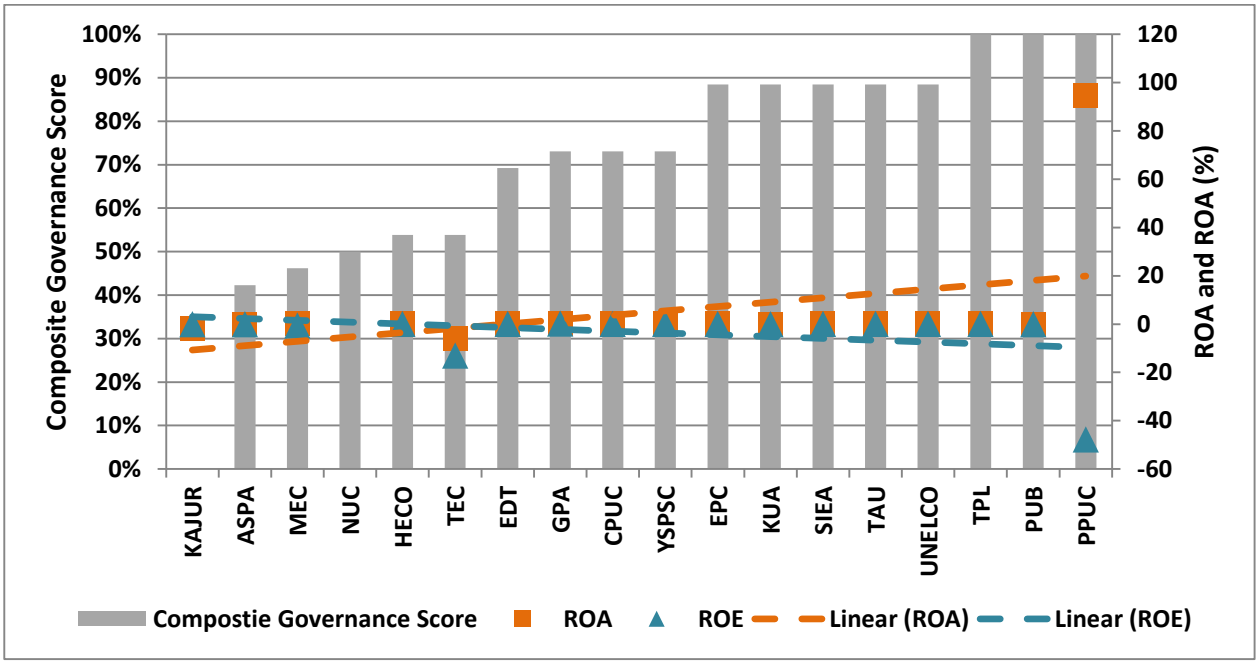


Figure 2.14: 2015 FY Composite Governance Score compared with ROE and ROA



3. GENDER

Overall, the number of females employed as a proportion of total staffing in the Pacific power utilities has decreased to 21.3% in the 2015 FY as compared with 23.1% in 2014.

In technical positions, there has been marginal increase in the number of female staff in 2015 increasing from 3% in 2014 to 4% in 2015. The discrepancy in senior staff employment in the region has remained unchanged with 69.4% male and 30.6% female. The significant majority (31.5%) of those female roles being occupied in the PR/Customer Service/Communications sector of the utilities, with 69.4% male and 30.6% female. The significant majority (31.5%) of those female roles being occupied in the PR/Customer Service/Communications sectors of the utilities.

Table 3.1: Key Gender Statistics

Workforce male/female role	Regional average
Total staff (male)	78.7%
Total staff (female)	21.3%
Technical staff (male)	96%
Technical staff (female)	4%
Senior staff (male)	69.4%
Senior staff (female)	30.6%
Senior female staff as a proportion of total staff by role	
Finance	20%
Procurement / Supply	8.5%
Human Resources	10.8%
PR/Cust Service/Comms	31.5%
Admin	16.9%
Other	12.3%

4. DATA RELIABILITY

Data reliability self-assessment was introduced to the benchmarking exercise in 2012. 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. This was intended to help better understand data quality issues and encourage improvements in data reliability.

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?

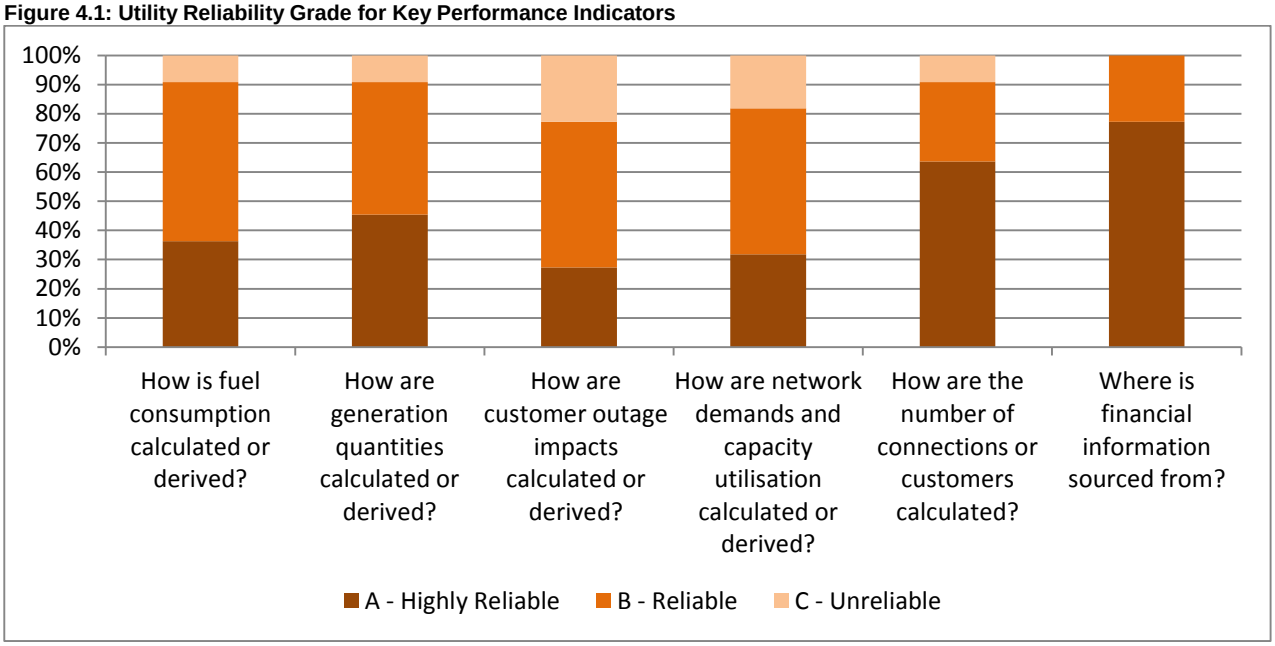
As with previous benchmarking reports , a 'Grade A' score represents highly reliable data, 'Grade B' reliable data, 'Grade C' unreliable data and 'Grade D' highly unreliable data. The definitions of each of these grades are provided are provided below in Table 4.2.

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.

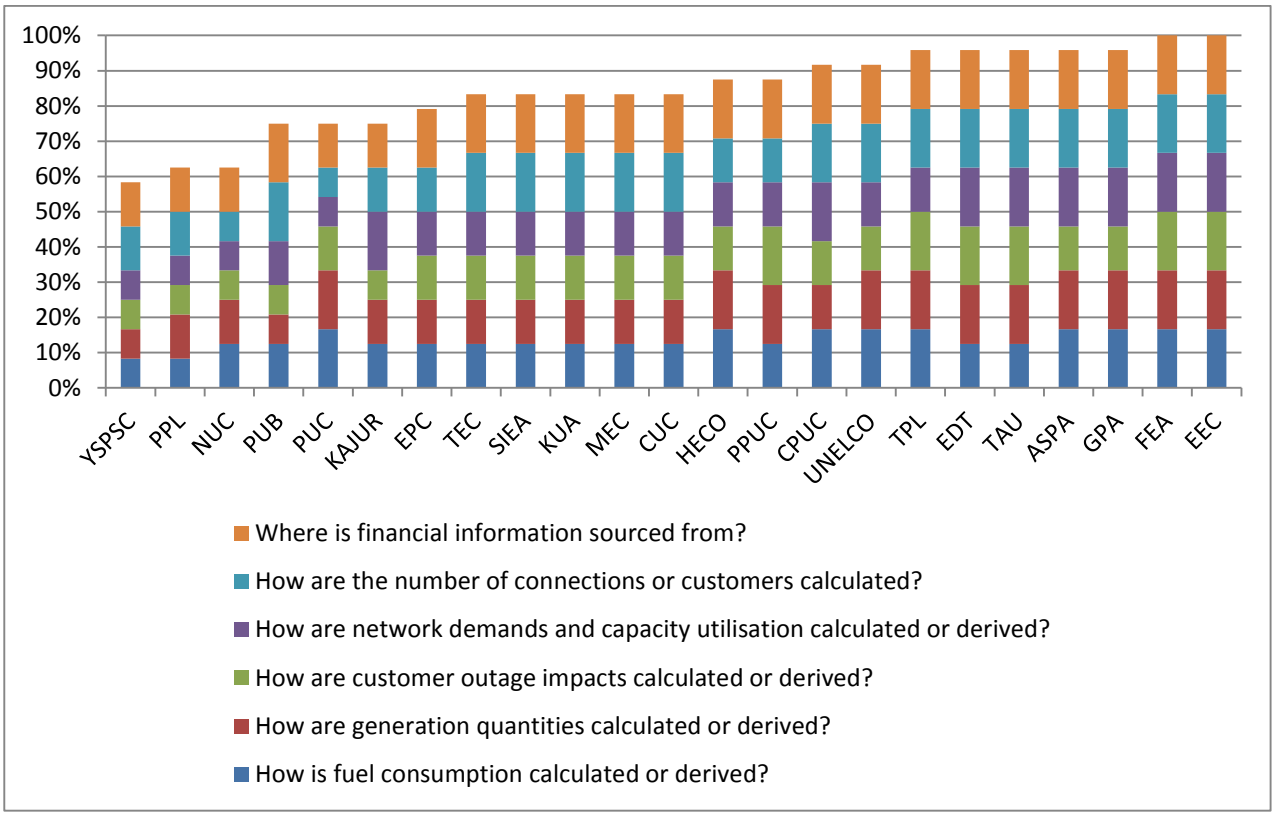
A total of 23 utilities participating in the 2015 FY data exercise. As per Figure 4.1 it can be seen that no utilities reported data as being Grade D (highly unreliable), with financial data and the calculation of customer connections typically being the most reliable data submitted keeping the trend from pervious benchmarking. By comparison, further work continues to be required in improving data quality of customer outage impacts and network demands.

Figure 4.1: Utility Reliability Grade for Key Performance Indicators



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 any 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 in this reporting in calculating the Composite Indicator for the 2015 FY.

Figure 4.2: Breakdown of Reliability Grades Assessment by Utility



5. KPI RESULTS

5.1 Introduction

This section provides performance results for the 20 (2014 FY) and 23 (2015 FY) utilities that participated in each relevant reporting year. The results from the previous 2013 FY reported have also been included for further longitudinal comparison. The results are comprised of 46 KPIs, with each indicator graphically presented with both the regional average (arithmetic mean) and median (middle) values, including also a comparison of 2013 results where available. If a Pacific benchmark was agreed by utility CEOs in 2002, this is also provided.

An indication of utility size is also provided via a colour coding of red, orange or yellow as determined by utility size in accordance with the PPA's membership level categorisations: 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 furthermore provides an overview of some key characteristics of the participating utilities, including the applicable colour coding.

It is important in reviewing this information that any conclusions closely consider the similarities and differences of operating conditions of other utilities. A table of these indicators and how they are calculated is provided below in Appendix C. The table also states whether the indicator was calculated for the main grid only or for all grids combined.

Table 5.1: Utility Key Characteristics

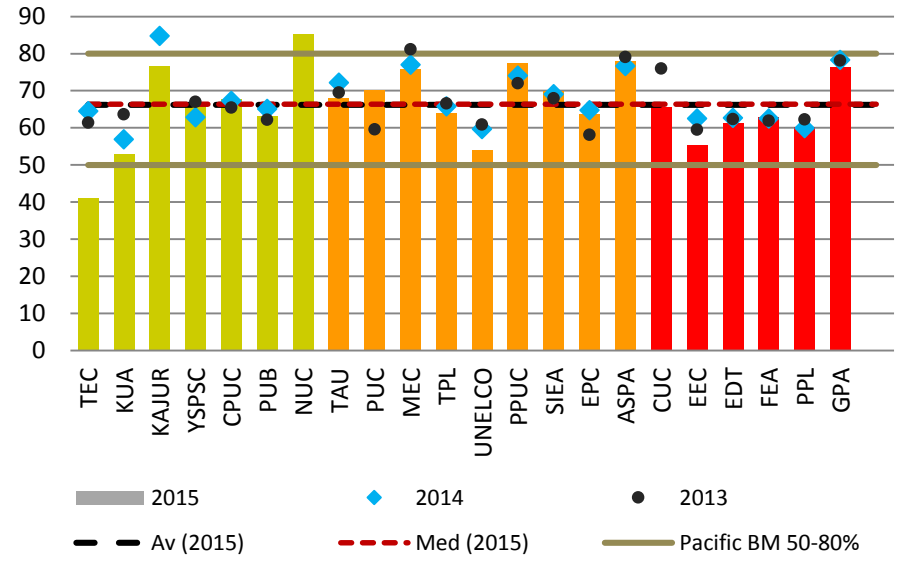
Utility and colour code	Peak Demand (MW) 2015	Size Category (S / M / L)	Outer Islands Serviced (Y/N)
ASPA	23	Medium	Yes
CPUC	2.3	Small	Yes
CUC	36.3	Large	Yes
EDT	96.3	Large	Yes
EEC	99.1	Large	Yes
EPC	21.5	Medium	Yes
FEA	155.5	Large	Yes
GPA	255	Large	No
HECO	1727	Large	Yes
KAJUR	2.1	Small	No
KUA	1.1	Small	No
MEC	8.6	Medium	Yes
NPC	0.6	Small	No
NUC	4.2	Small	No
PPL	114.2	Large	Yes
PPUC	12	Medium	Yes
PUB	4.1	Small	No
PUC	6.3	Medium	No
SIEA	14.4	Medium	Yes
TAU	4.5	Small	No
TEC	1.4	Small	Yes
TPL	8.5	Medium	Yes
UNELCO	11.7	Medium	Yes
YSPSC	2.0	Small	Yes

5.2 Generation Indicators

(i) Load Factor

Figure 5.1 shows that LF has remained fairly stable over the last three years, with a current average of 66 %. Only one utility has reported achieving the agreed Pacific benchmarking of 80% (i.e. NUC). Another five are over 70 % (i.e. KAJUR, MEC, PPUC, ASPA, and GPA).

Figure 5.1: Load Factor (%) 2015 (2014) (2013)



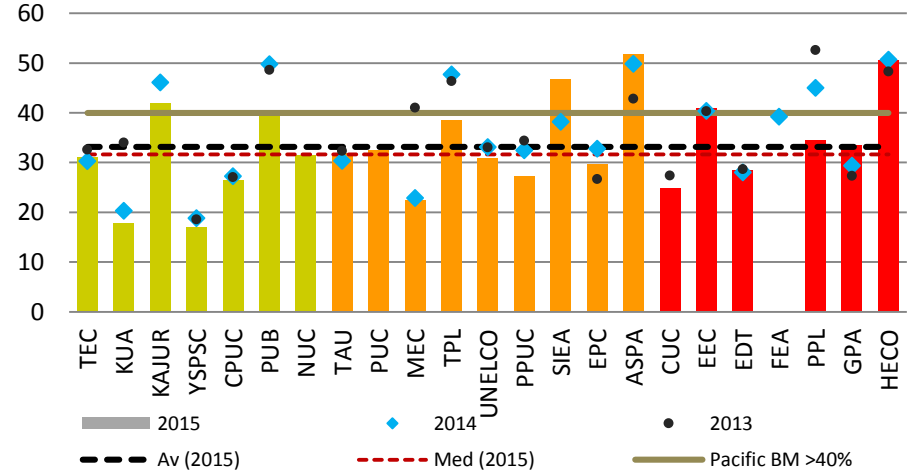
Average 66% (68%) (67%)
Median 66% (65%) (65%)

A higher value is better, indicating more efficient use of generation resources.

(ii) Capacity Factor

As shown in Figure 5.2, the CF has remained generally stable between 2013 and 2015, with an average of 32%. This is below the Pacific benchmark of over 40%.However following utilities ASPA, EEC, HECO, KAJUR, PUB and SIEA have achieved a capacity factor above 40 percent. No strong correlation exists between utility size and the CF results.

Figure 5.2: Capacity Factor (%) 2015 (2014) (2013)

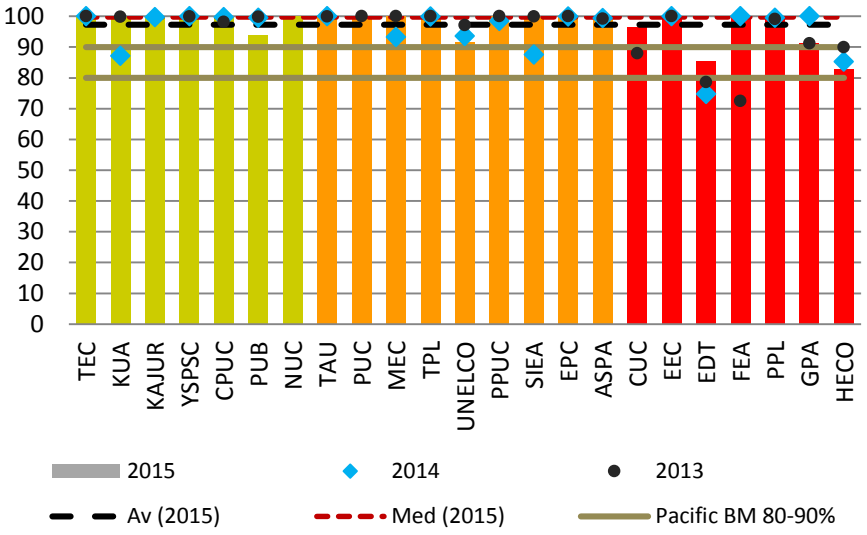


Average 32% (36%) (36%)
Median 31% (33%) (34%)

(iii) Availability Factor

The Pacific benchmarking set by utility CEOs is 80%-90% and typical international practice of 65%. As shown in figure 5.3, the average and median AF was 97.3% and 99.7 % for 2015 respectively, and is slightly improved compared with result of 2014.

Figure 5.3: Availability Factor (%) 2015 (2014) (2013)



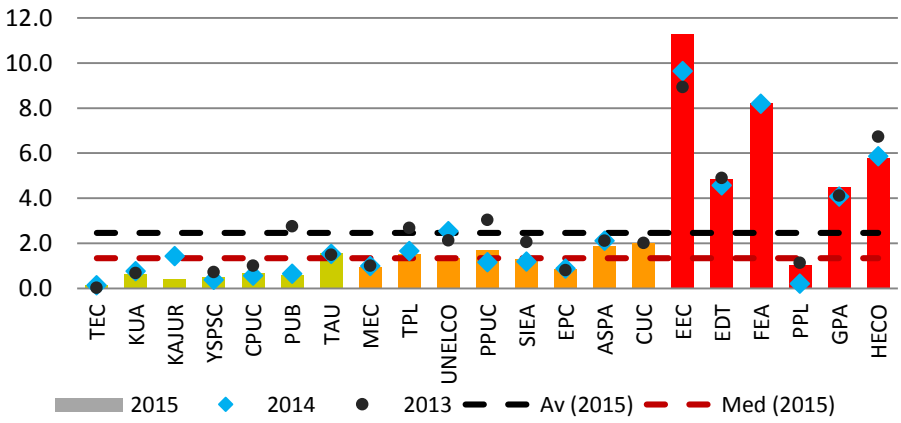
Median 99.7% (95.9%) (95.9%)
Average 97.3% (99.6%) (99.8%)

Higher is better with maximum value being 100%.

(iv) Generation Labour Productivity

In 2013 the average reported productivity per FTE generation employee was 3.1 GWh in 2013 it was 2.4 GWh; and in 2015 it was 2.5 GWh). In comparison with international best practice of 22 GWh these figures are extremely low. EEC has a higher Labour Productivity for the reason that it purchases a significant portion of its energy demand from IPP. Pacific region have some unique attributes that need to be taken into account in regards to reoccurring productivity output. For example, utilities being required to serve small population 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) 2015 (2014) (2013)



Higher is better

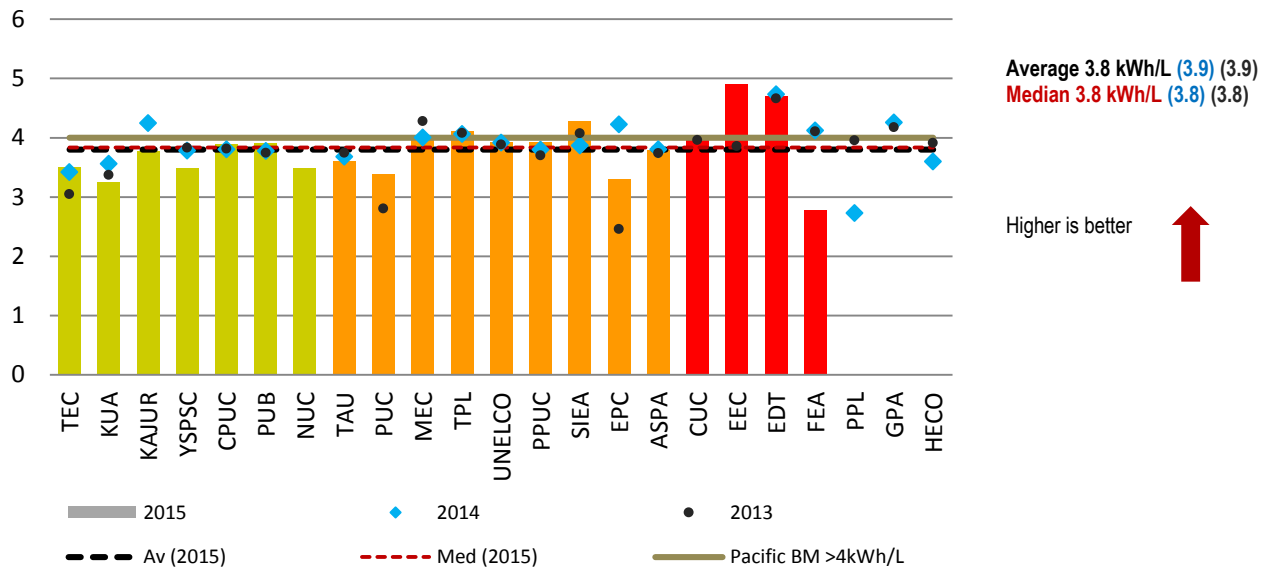
Note: EEC is able to achieve such high results due to 95.2% IPP production.

Average 2.5 (2.4) (3.1)
Median 1.3 (1.3) (2.1)

(v) Specific Fuel Consumption (kWh/L)

Figure 5.5 shows the SFC results (in KWh/L). Only generation by fuel based generation is counted in this indicator. The Pacific benchmark was set at 4.0kWh per litre in 2002. The 2013 average and median is 3.9kWh and 3.8kWh per litre respectively, remaining very consistent for the past three years. Eight utilities have improved in their result since 2013, namely, TEC, PUC, EPC and EEC. Currently EEC, EDT, CUC, MEC, TPL and SIEA are achieving fuel consumption over the Pacific target of 4.0kWh per litre. New low and medium speed engines should achieve 4.0-5.0kWh per litre.

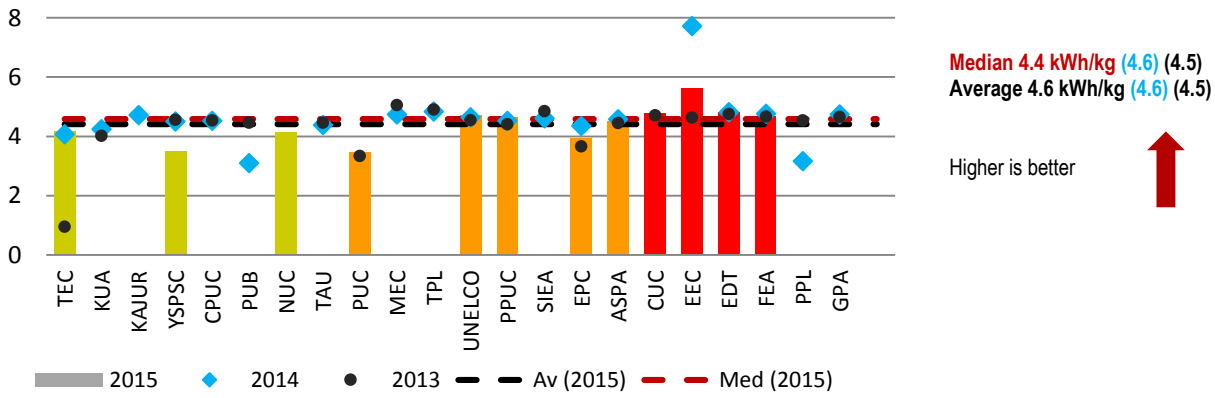
Figure 5.5: Specific Fuel Consumption (kWh/L) 2015 (2014) (2013)



(vi) Specific Fuel Consumption (kWh/kg)

In technical specifications fuel efficiency is generally reported in kilograms (kg) of fuel per kWh of power produced. This takes into consideration the different densities and energy content of lighter and heavier 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. TPL, FEA, MEC and EDT have the best results, at over 4.8kWh/kg.

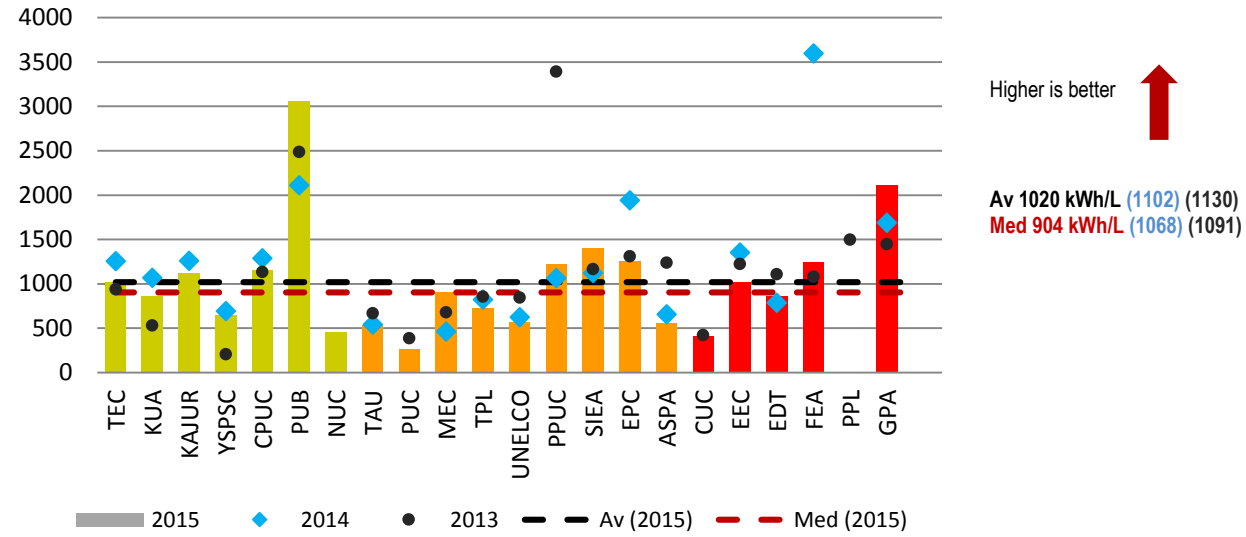
Figure 5.6: Specific Fuel Consumption (kWh/kg) 2015 (2014) (2013)



(vii) Lubricating Oil Consumption

As Figure 5.7 shows, the average consumption has reduced slightly from an average and median of 1102 kWh per litre and 1068 kWh per litre in 2014 to 1020 and 904 kWh per litre in 2015. GPA, TEC, PUB, SIEA, EPC, PPUC and CPUC have above average consumption efficiency. YSPSC, PUC, TAU, CUC, ASPA and UNELCO show below average efficiency as measured by this indicator.

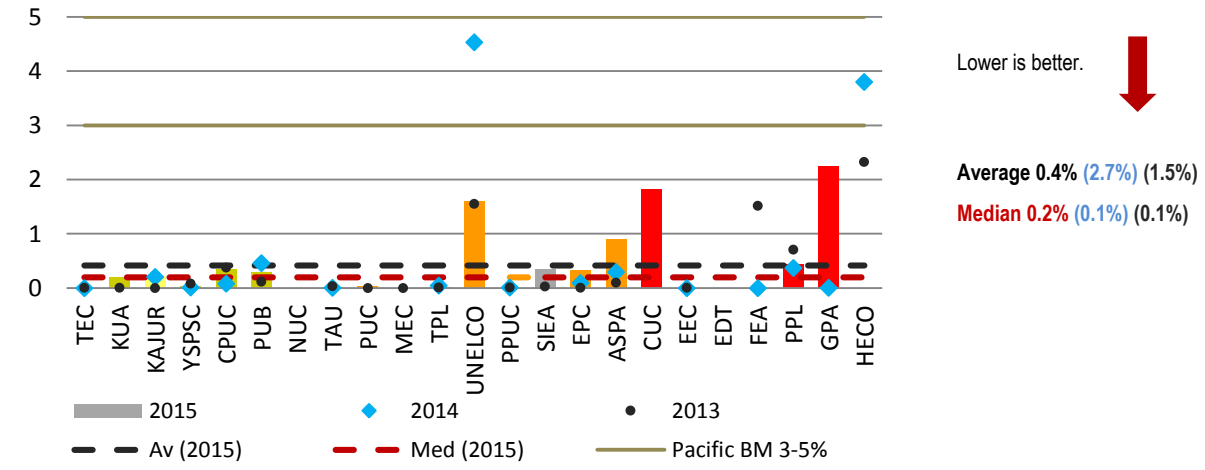
Figure 5.7: Lubricating Oil Consumption Efficiency (kWh/litre) 2015 (2014) (2013)



(viii) Forced Outage

A **forced outage** is an unplanned outage (or generator downtime) that has been forced on the utility. 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 2015 is 0.4% and the median is 0.2% (refer Figure 5.8). While utilities are improving in providing outage data, information gaps remain. This requires attention in the coming year.

Figure 5.8: Forced Outage (%) 2015 (2014) (2013)

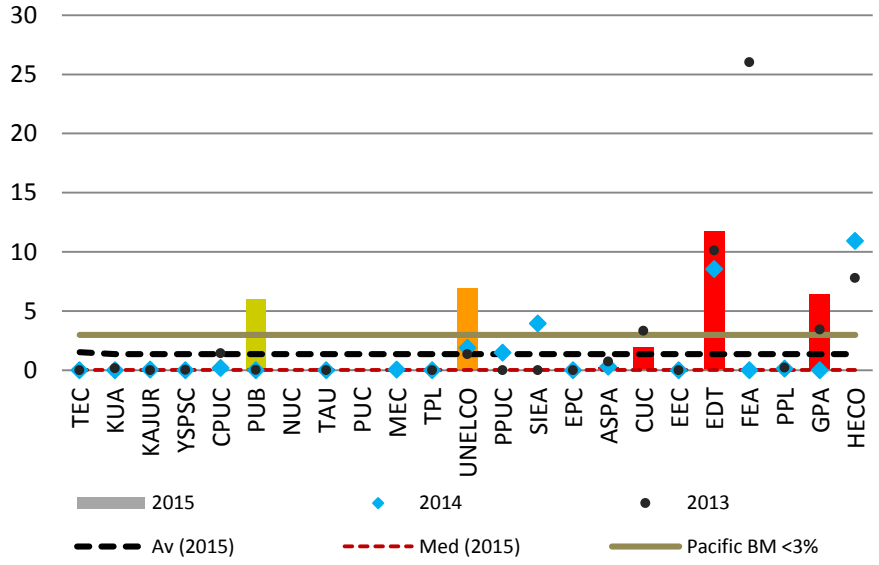


(ix) Planned Outage

Planned maintenance of generating equipment is often lacking in 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.

The planned outages reduced from 1.38% in 2015 on average from 1.5% in 2014. On the face of it, this is a good result as it holds the average within the Pacific benchmarking target. However, inadequate data was provide by 10 out of 23 utilities. This reinforces the need to ensure accurate record keeping and regular review of maintenance regimes.

Figure 5.9: Planned Outage (%) 2015 (2014) (2013)



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.

Average 1.5% (1.4%) (2.6%)
Median 0.04% (0.03%)

(x) Generation Operations and Maintenance (O&M) Costs

The indicator used is the expenditure on O&M of generating equipment per MWh generated, expressed in USD. The average O&M cost for 2015 was $37.54 per MWh with a median of $46.62 per MWh. KUA had the highest O&M cost at $248.92 per MWh followed by TEC at $100.35 per MWh.

Figure 5.10: Generation O&M Costs (USD per MWh) 2015 (2014) (2013)

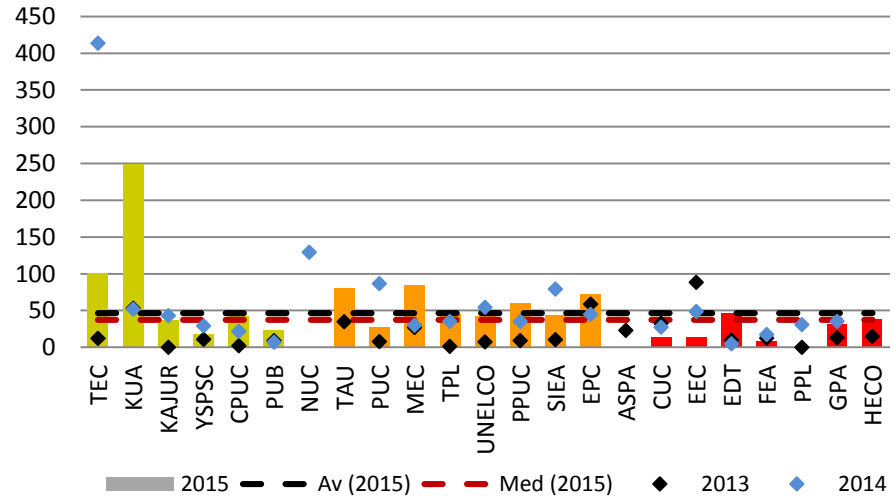


Figure 5.10 is based on data from 23 utilities, ranging from 5 to 250 USD.

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

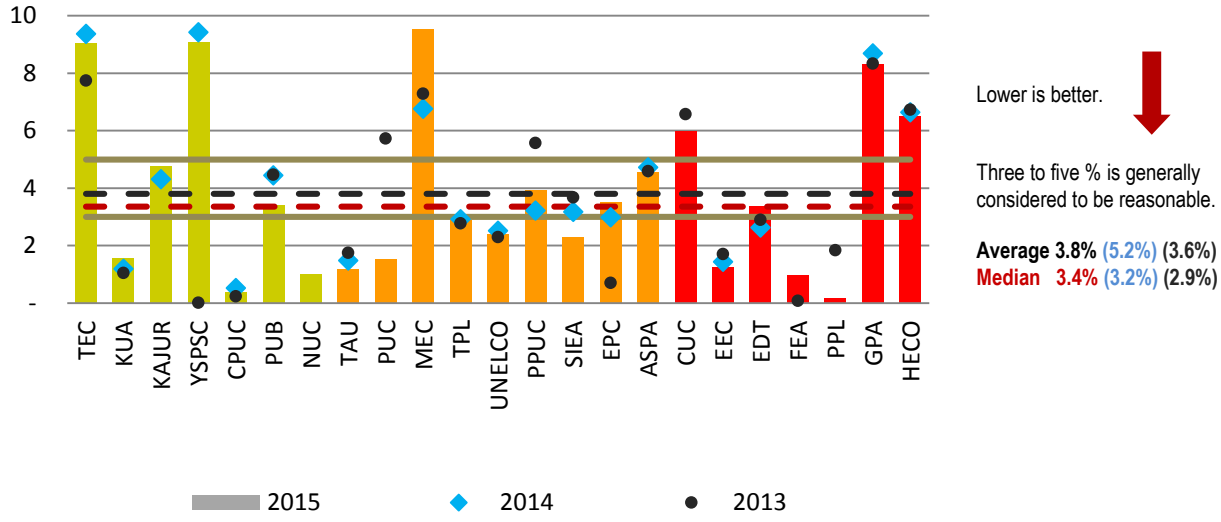
Average USD 47 (61) (47)
Median USD38 (36) (12)

(xi) Power Station Usage / Station Auxiliaries

A generating station's use of electricity is indicated by the percentage of MWh generation used internally for auxiliary systems. Three to five % is considered to be acceptable, and lower is better. The average reported value for 2015 was 3.8% and the median was 3.2%, compared to 5.2% and 3.2% respectively in 2014.

In considering these results it should be noted that data reliability has been a concern for most utilities in this indicator throughout each benchmarking round. Subsequent benchmarking rounds should therefore be able to more accurately reflect performances changes.

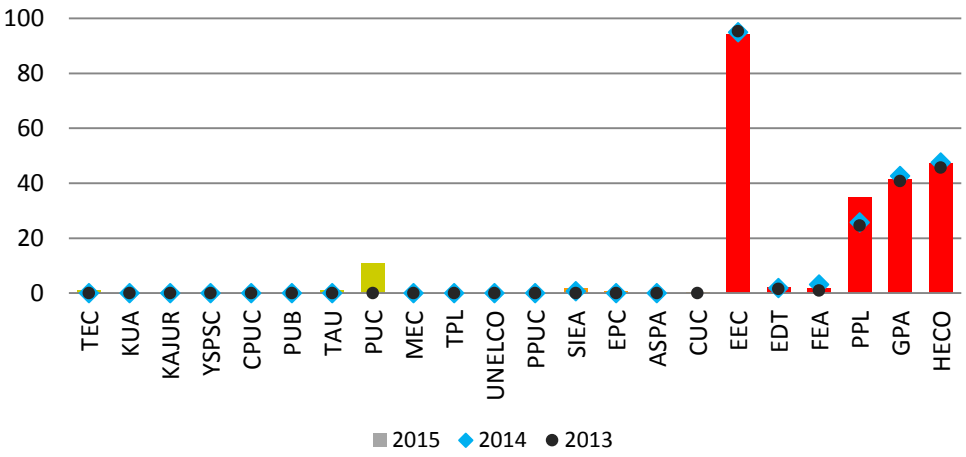
Figure 5.11: Station Energy (Auxiliaries) Use for Pacific Utilities (%) 2015 (2014) (2013)



(xii) IPP Generation

Six power utilities, all large in size with peak demand greater than 30MW, have IPP generation arrangements. The percentage of IPP generation ranges from 1 to 95%. EEC's generation is overwhelmingly from IPPs at 95%. This is followed by GPA at 41% and HECO at 47%. EEC's predominant IPP generation has a significant impact on the utility's performance in other areas, such as labour productivity and availability factor. In small size utility category PUC has recorded IPP generation of 11%.

Figure 5.12: IPP Generation (%) 2015 (2014) (2013)

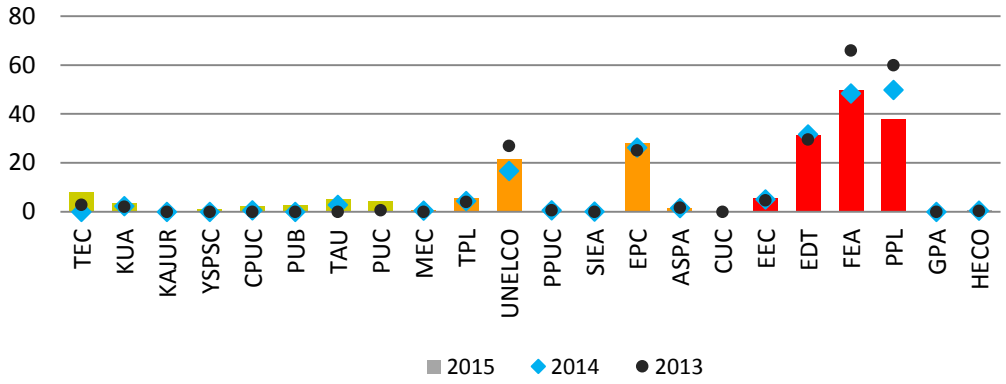


(xiii) Renewable Energy to Grid

The 2012 analysis provides renewable energy share for both the main grid and across all grids. The 2011 analysis presented renewable energy share for all grids, and the 2010 analysis for the main grid only. In 2010, renewable energy accounted for 22% of generation, 97% of which was from hydropower and concentrated in the EDT, EPC, FEA and PNGP. 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 for the main grid and across all grids for each utility in 2015. The available historical data of renewable energy percentage for the main grid in 2014 and renewable energy across all grids in 2013 is also shown. It can be seen that UNELCO, EPC, EDT, FEA and PPL have total renewable energy above 10%. The majority of renewable energy continues to come from the larger hydro facilities, though 17 of the 23 participating utilities still produce 98% or more of their electricity from petroleum fuel.

Figure 5.13: Renewable Energy Generation - All Utilities, Main Grid (%) 2015 (2014) (2013)



TEC, TAU, KUA, PUB, EEC and CPUC have small contributions of renewable energy generation shown for 2015 data.

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). In the 2012 round, this was expanded to include transmission (planned and unplanned) SAIDI and SAIFI.

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

Utility	Transmission Losses (%)		Transmission Reliability (Outages/100km)		Transmission SAIDI (min/cust)				Transmission SAIFI (events/cust)			
					Unplann.	Planned	Unplann.	Planned	Unplann.	Planned	Unplann.	Planned
	2015	2014	2015	2014	2015		2014		2015		2014	
EDT	2.1	3.7	5.1	2.1			3.1	0	0	0	0.6	0
FEA		-	2.7	0			0	0	0	0	0	0
GPA	0.3	-	14.5	16.9			48	0	0	0	0.6	0
HECO		-		-	51	225	51	0.0005	0	0	1.9	0
PPL		-	33	21.7	67.1	35918	77.6	1.0	0	0	25.4	0.5

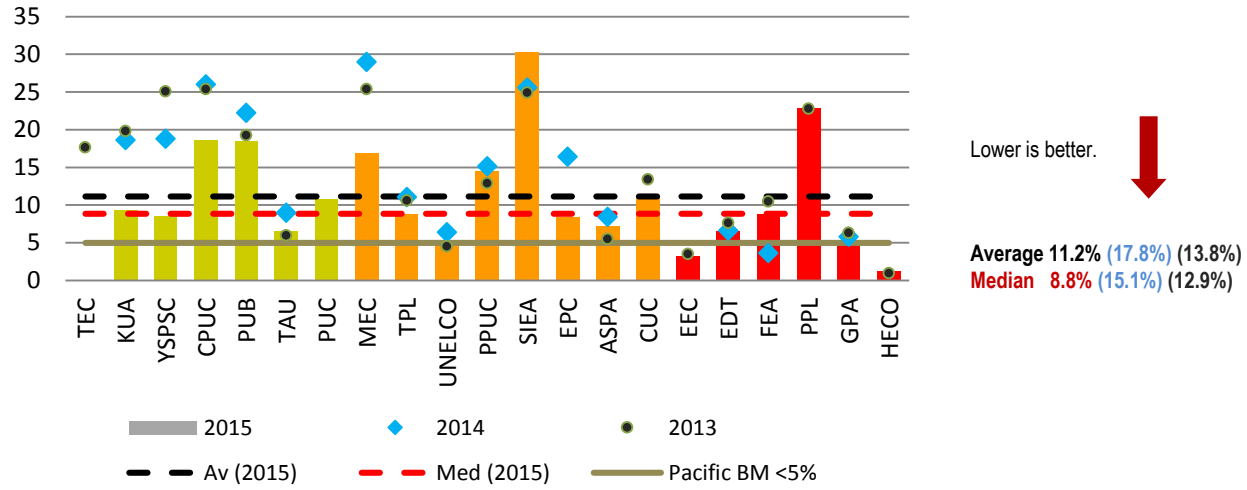
Of the 26 Pacific power utilities, five utilities have transmission networks: GPA, PPL, FEA, EDT and HECO. Transmission KPIs were not presented in previous benchmarking reports due to the limited data provided. Data remains inadequate for drawing firm conclusions and attention will be needed to improve data quality for the next round of benchmarking. The results are shown above in Table 5.2. Transmission losses averaged 0.8% compared to 1.5% in 2013 FY. In 2014 FY insufficient response was recorded.

5.4 Distribution Indicators

(i) Network Delivery Losses

The results for 2015 are shown in Figure 5.14. The average of 11.2% and median 8.8% is improvement from the previous year 2014 where the average was 17.8% with a median of 15.1%.

Figure 5.14: Network Delivery Losses (%) 2015 (2014) (2013)



There appears to be a direct correlation between high network delivery losses and size of utility with small utilities having noticeably higher losses. Assisting utilities to quantify the cost of system losses and understand the pay back of improvement initiatives could help in reducing system losses for the region.

(ii) Distribution Losses

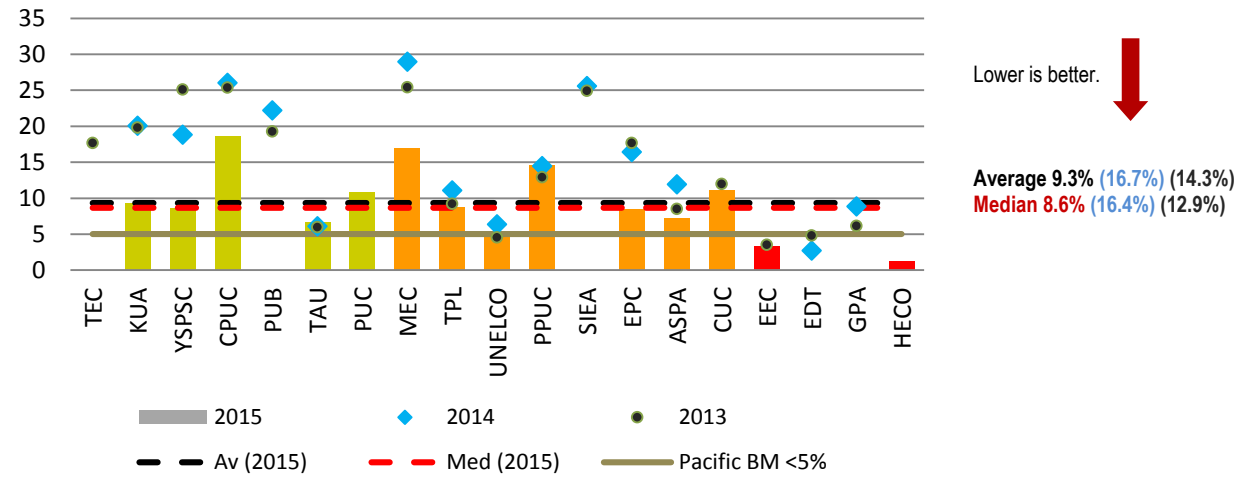
Distribution losses are those that occur from the high voltage (HV) substations to the consumer meters. For those utilities without HV transmission grids, distribution losses are those from circuit breakers of feeders inside power plants to consumer meters. These losses may be either technical or non-technical losses. Technical losses are mainly caused by imbalances in the distribution system and/or too high resistance in the system. These depend 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.

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.

The reported distribution losses in 2015, as shown in Figure 5.15 significantly reduced to 9.3%, with a median value of 8.6%. As for network distribution losses, smaller utilities appear to have higher losses. This may be

related to poor management of systems and processes and/or poor cash flow leading to inadequate maintenance of the system.

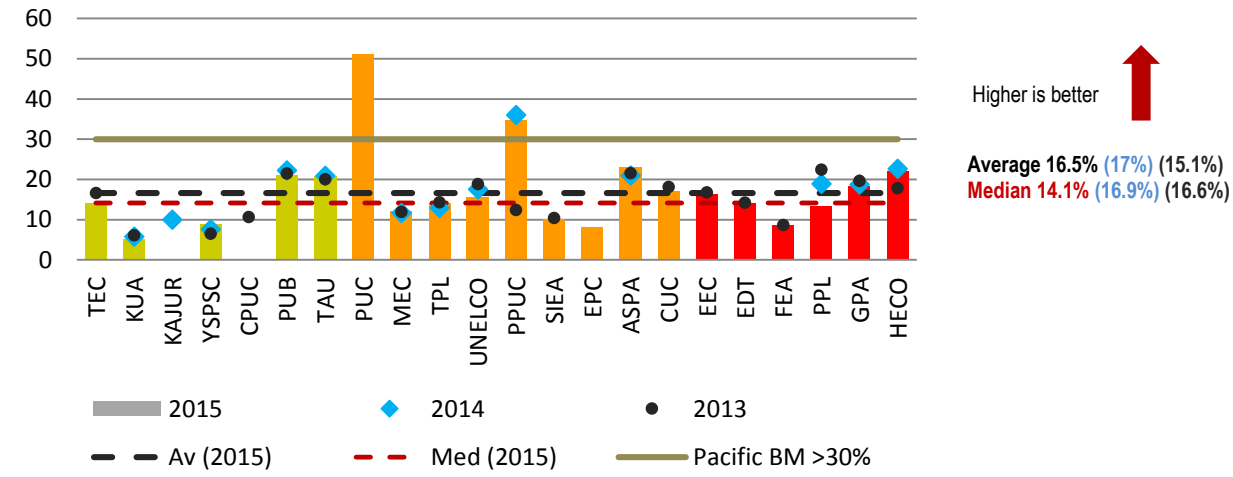
Figure 5.15: Distribution Losses Reported by Utilities (%) 2015 (2014) (2013)



(iii) Distribution Transformer Utilisation

As seen in Figure 5.16, on average, transformer utilisation in Pacific utilities is low and currently stands at 16.5%. This has declined from 17% in 2014. In 2002 a regional goal of 30% was set. The report noted that "this can only be achieved in the long term because of the long lead times required to improve usage of capital assets". However, PUC and PPUC are achieving the Pacific target of 30%.

Figure 5.16: Distribution Transformer Utilisation (%) 2015 (2014) (2013)

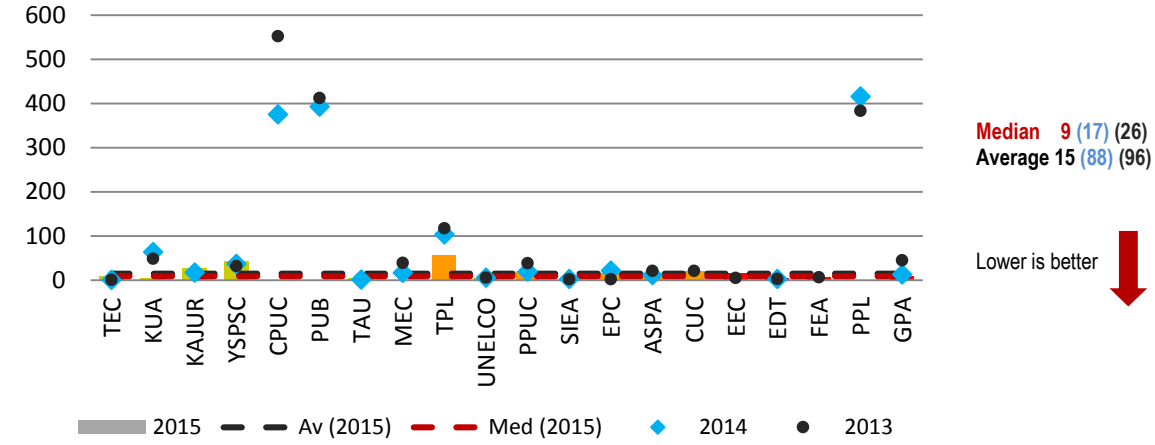


(iv) Distribution Reliability

This indicator looks at forced outage events per 100km of distribution line as a way of measuring the reliability of the distribution network. The average and median are 15% and 9% respectively (refer Figure 5.17).

Comparing to 2014 results, the average and median were 88% and 17% respectively, indicating high outlying values. Results indicate improvement in maintenance to preserve the condition of infrastructure leading to improvement in customer service which is reflected by this indicator.

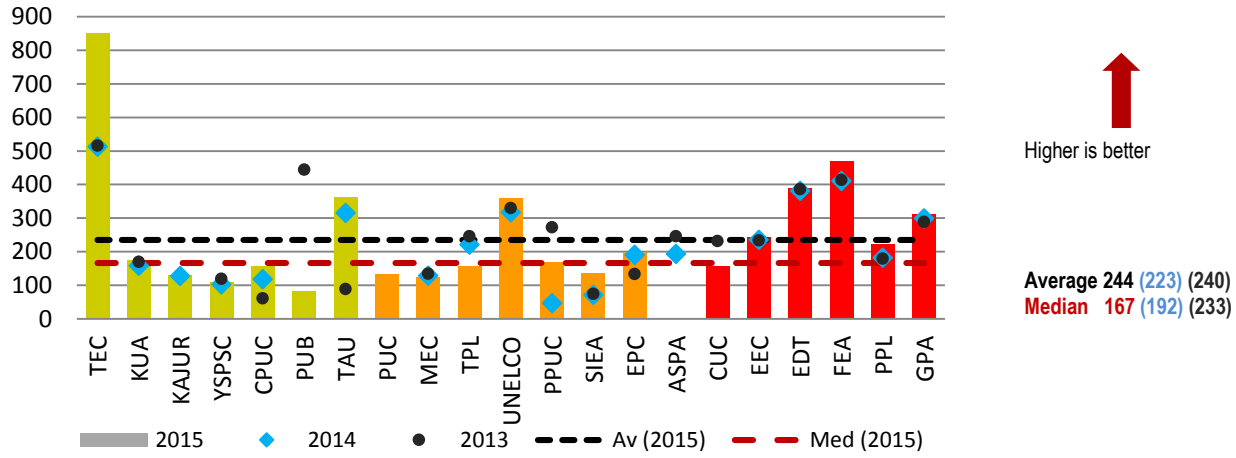
Figure 5.17: Distribution Reliability (Events per 100 km) 2015 (2014) (2013)



(v) Customers per Distribution Employee

Figure 5.18 shows that, in 2015, there were on average 244 customers for each FTE utility employee working on distribution, improvement from 223 in 2014 and 240 in 2013. Some utilities, such as TEC, EEC and FEA showed improvements. Overall, however, this is an area of concern for the region and needs to be addressed. Significant variance occurred in this indicator during assessments over the three reporting years, which suggests that data accuracy has progressively improved over the last three years.

Figure 5.18: Customers per Distribution Employee 2015 (2014) (2013)

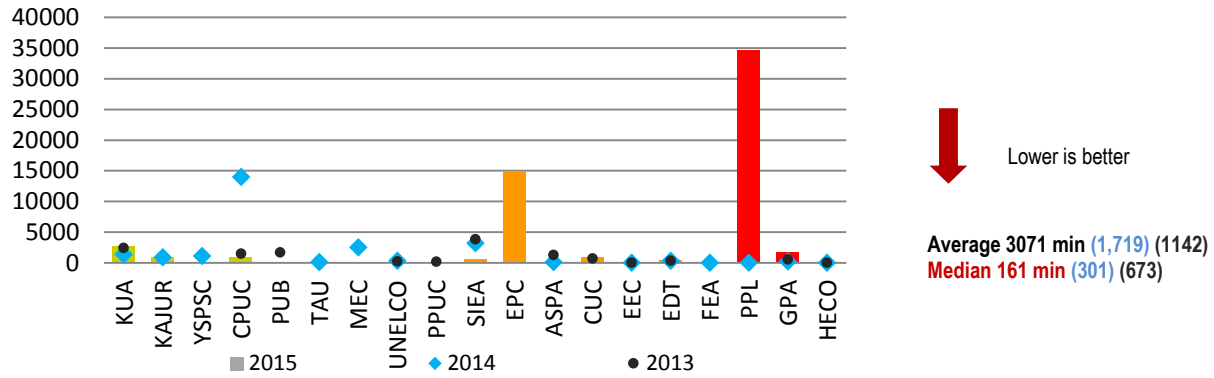


5.5 SAIDI and SAIFI

(i) System Average Interruption Duration Index (SAIDI)

Here SAIDI has been shown as combined SAIDI for generation, transmission and distribution. The average and median are 3,071 min (51 hours or approximately 2 days) and 161 min (2.6 hours) respectively. The trend for the indicator over the last three years is inconclusively showing great variability, which could reflect varying accuracy in the data rather than change in the level of service (Figure 5.19).

Figure 5.19: SAIDI Interruptions (Minutes per Customer) 2015 (2014) (2013)



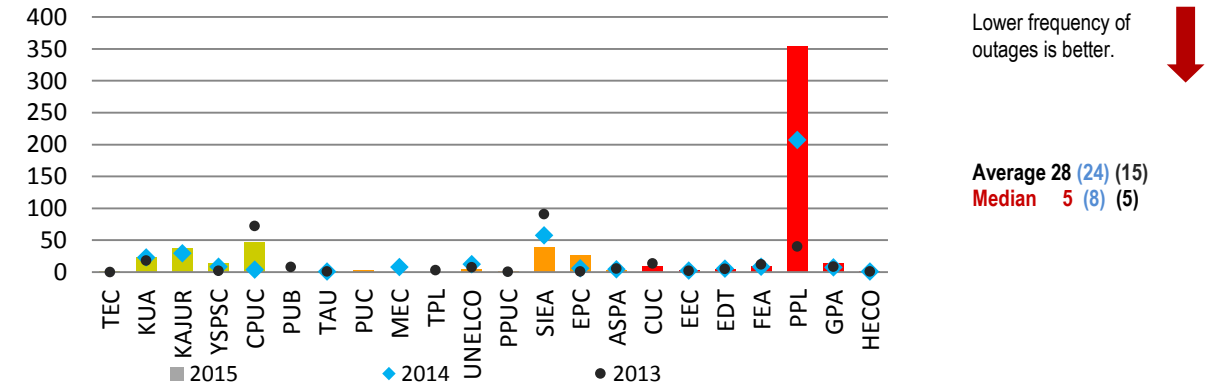
In 2010 it was noted that SAIDI tends to be estimated or only measured in part, so the reported results for some utilities were unlikely to be indicative of actual performance.[1] Through initiatives such as the PPA Conference Engineers' Benchmarking Workshop, site visits and the production of the Benchmarking Manual, understanding of this indicator and its importance is developing. This is being seen through more utilities submitting data for the SAIDI (and SAIFI) indicators and in the quality of the data provided. 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.

It should be noted that several larger utilities, have implemented detailed processes for capture of reliability performance data. Data confidence and reliability is higher in such cases.

(ii) System Average Interruption Frequency Index (SAIFI)

Referring to Figure 5.20, combined SAIFI has an average of 28 outages per customer per year, with a median of 5. This is a slight decline in performance to 2014 FY. As for SAIDI, changes in performance are likely to be reflective of increased data quantity and quality than previous benchmarking rounds. 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 at all negate the usefulness of utilities tracking their own SAIFI indicators and setting targets for data collection, recording and overall service performance.

Figure 5.20: SAIFI Interruption Frequency (Interruptions per Customer) 2015 (2014) (2013)



1 PPA and PRIF. *Performance Benchmarking for Pacific Power Utilities – Benchmarking Report*. December 2011, p. 39.

5.6 Demand Side Management

Table 5.3 summarises the responses received from utilities in 2015 and 2013 to DSM questions.

Table 5.3: Utility Demand Side Management Efforts in 2014 and 2015

Response from utilities	2014	2015
Number of responses	19	22
DSM activities reported	11	15
Ave. Staff assigned to DSM	0.002	0.001
Ave. Budget for DSM (USD)	160,629	288,511

Of the 23 utilities participating in 2015FY benchmarking activity 15 utilities reported engaging in DSM activities, of which only 6 had a budget assigned to support the initiative. The average DSM budget for six utilities was USD 288,511 with EDT having the largest budget at USD 933,660. Out of the 15 utilities that reported engaging in DSM activities, only PPL has them linked 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, and is highly recommended for the utilities.

5.7 Financial Indicators

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(i) Tariff Analysis

General

Conducting tariff analysis of Pacific utilities is highly complex due to the different tariff schedules and structures for the total 25 Pacific power utilities. Similar to pervious round of benchmarking round, PPA carried out an analysis of 2015 tariffs 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 consumers was based on monthly usage of 50kWh, 100kWh, 200kWh, 500kWh, 1000kWh, 2000kWh, 3000kWh and 10000kWh. For commercial or industrial usage the costs were analysed at monthly usage of 1000kWh, 3000kWh, 10,000kWh, 50,000kWh. These categories were selected, after reviewing the tariff schedules, to reflect the different points at which tariffs alter in different schedules. 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 and a full table of results is provided in Appendix H. Those detailed below are the:

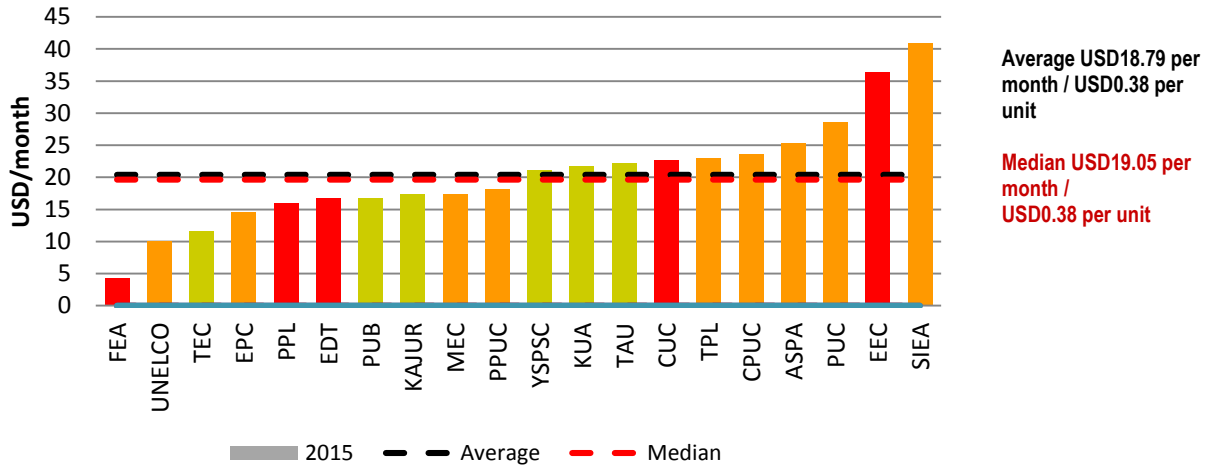
- total monthly charge to domestic consumers for 50kWh/month usage (Figure 5.21)
- total cost and equivalent per kWh rate for domestic consumers for consumption of 200kWh/month (Figure 5.22), and
- total cost and the equivalent per kWh rate for commercial consumer's 1000kWh/month usage (Figure 5.23).

The analysis of this indicator included 20 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 previously noted, “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”.[1]

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 USD18.79 and USD19.05 respectively. FEA offer the lowest cost, just below USD5 for this usage, whereas consumers in the Solomon Islands pay USD44 for the same consumption. There is no clear relationship between the size of the utility and the amount consumers pay.

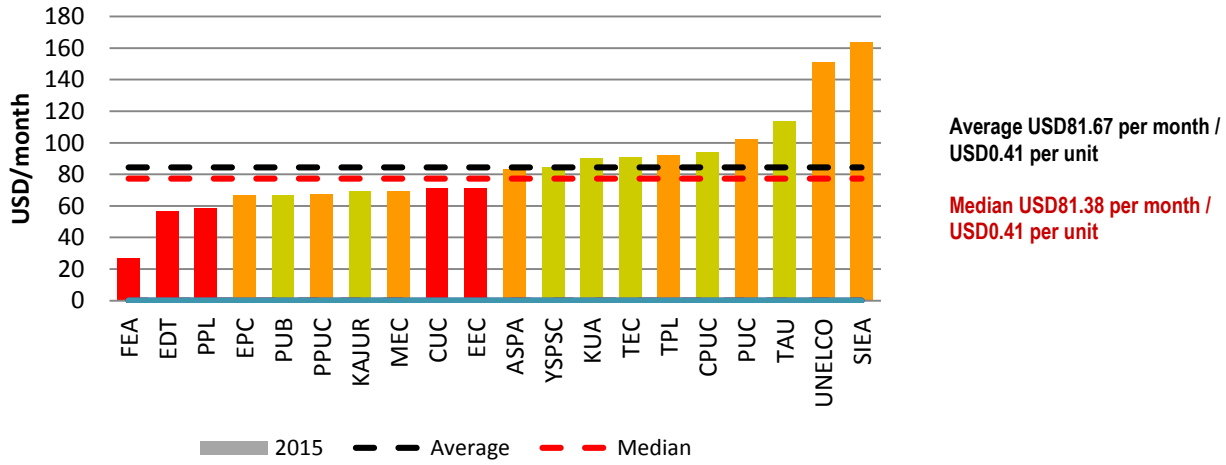
Figure 5.21: Domestic Consumer Cost (USD per month) 2015 for 50kWh Consumption



Domestic - 200kWh/month

Figure 5.22 presents the cost for domestic monthly consumption of 200kWh. It is expressed on the left hand y-axis as a monthly total charge in USD, and on the right hand y-axis as an equivalent per KWh unit charge factoring in monthly service fee, taxes and charges.

Figure 5.22: Domestic Consumer Cost (USD per month) 2015 for 200kWh Consumption

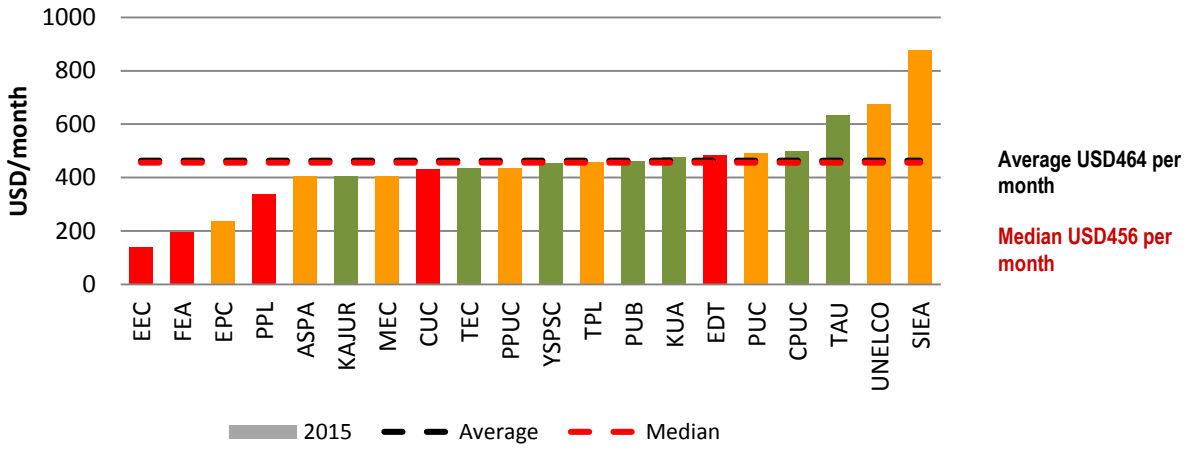


The average and median are USD81.67 and USD81.38 for total monthly charge and USD0.41 and USD0.41 for equivalent charge per kWh, factoring in all costs. FEA has the lowest rates at USD26.77 and SIEA has the highest rates for this consumption point with SIEA consumers paying USD163.55 in a month and equivalent per kWh charge of USD0.82. Again, the size of the utilities appears to have no bearing on the outcome of pricing.

Commercial - 1000kWh/month

Figure 5.23 presents the cost for commercial monthly consumption of 1000kWh. It is expressed on the left hand y-axis as a monthly total charge in USD, and on the right hand y-axis as an equivalent per KWh unit charge factoring in monthly service fee, taxes and charges.

Figure 5.23: Commercial Consumer Cost (USD per month) 2015 for 1000kWh Consumption



The average and median are USD464 and USD456 for total monthly charge. EEC has the lowest commercial rates at this consumption level, at USD141.99 and SIEA had the highest rate with commercial consumers paying USD879 in a month.

Again, size of the utility appears to have no bearing on the outcome. There is some variation between the relative positions among other utilities for commercial as compared to domestic rates.

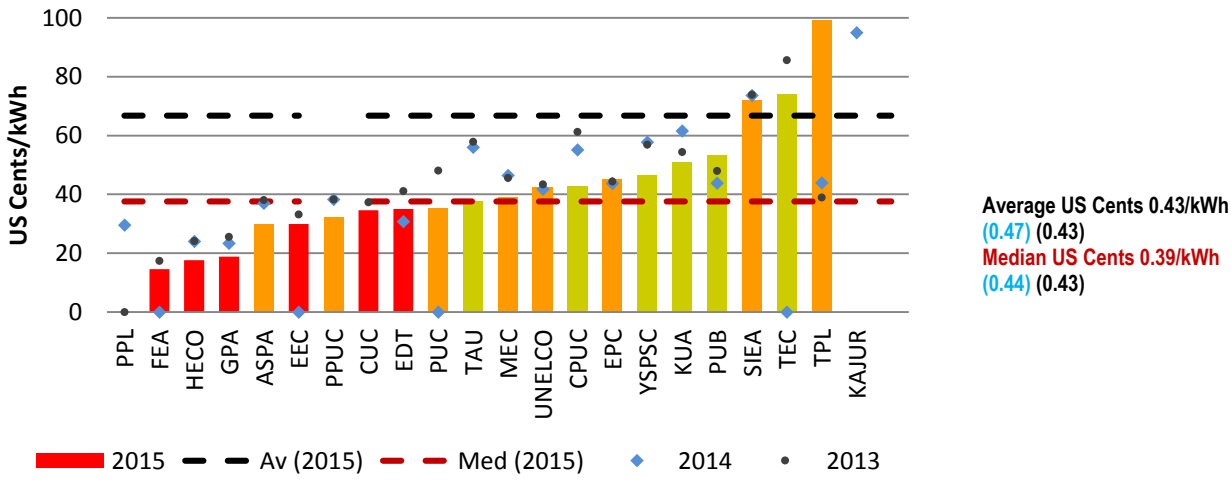
Note that the equivalent per unit charge is similar for commercial 1000kWh/month usage, and domestic 200kWh/month usage. This is due to the efficiencies afforded by commercial utilities and that service charges are shared over a greater number of consumption units.

(iv) Average Supply Costs

The average supply costs for 2015 are represented below in Figure 5.24. This is the unit cost of supplying electricity and is calculated by taking the total operating expenses and dividing by the total electricity sold.

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 and average supply costs, with small utilities having higher supply costs per unit, as would be expected due to their inability to harness efficiencies from economies of scale.

Figure 5.24: Average Supply Costs (US Cents/kWh) 2015 (2014) (2013)



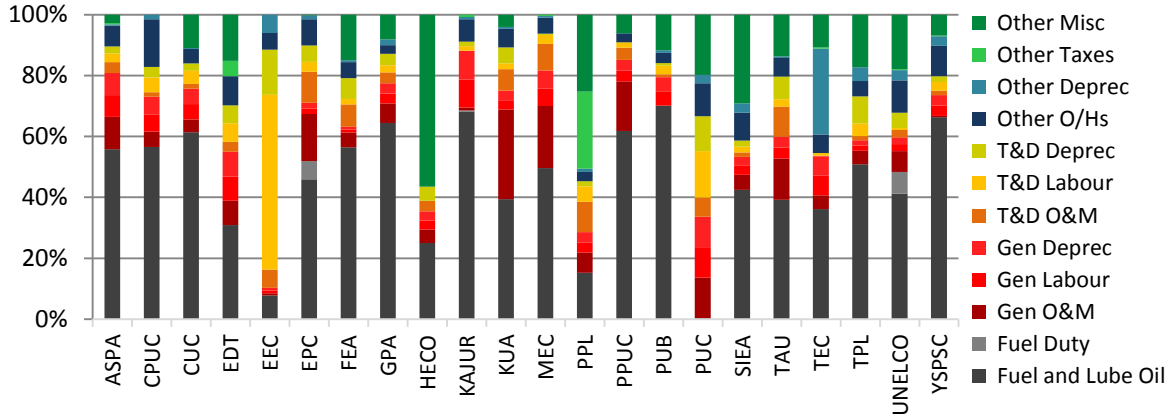
The large utilities have the lowest average supply cost. This is related to their relative size, as well as the benefit of hydropower resources for FEA and EDT. Consistent with the tariff analysis results, SIEA has among the highest average supply costs. Inconsistent with tariff rates is TPL which is reported to have the highest supply costs though it has mid-to-low tariff rates in comparison to the other Pacific power utilities. The medium-sized utilities are quite consistently represented in the middle of the cost spectrum with large utilities having lower average costs and small utilities having a higher average costs, as would be expected.

(iv) Utility Cost Breakdown

The previous benchmarking round sought a more detailed breakdown of key utility costs to assess and report on overall cost structure. The cost categories for which information was collected included hydrocarbon based fuel and lubrication costs, duty on fuel and lubricating oil, generation O&M, labour and deprecation, transmission and distribution O&M, labour and depreciation, and other overhead expenditure, duty, taxes and miscellaneous costs. This was continued in this year's benchmarking round. The percentage contributions of each component are presented for the utilities that reported sufficient data in Figure 5.25 below.

Other than the fact that fuel and lubricating oil costs dominate, as expected, with fuel duty regimes varying significantly, cost structures will vary with system topology, fuel mix and the other characteristics of the service area, customer base and organisational structure. TEC's fuel cost 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, as was stated earlier, has 95% IPP generation. Excluding TEC and EEC, fuel and related duty accounts for between 30 and 72% of total costs, with a median of 49% slightly lower to last year's median of 58%.

Figure 5.25: Utility Cost Breakdown (%) 2015

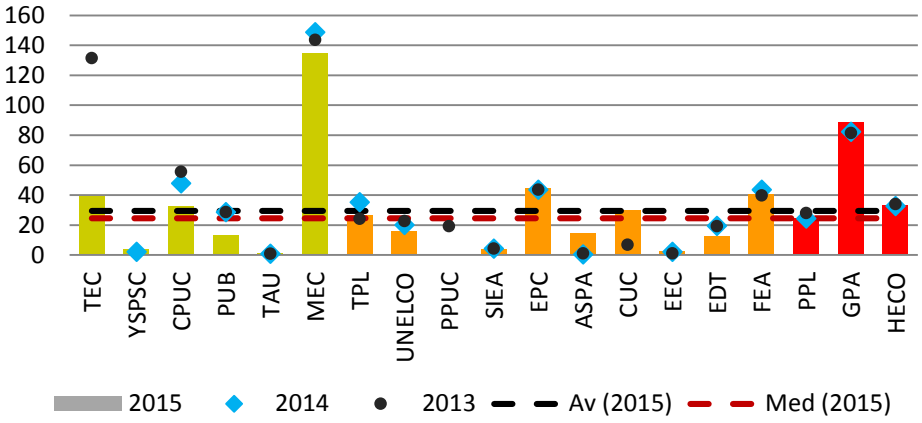


(v) Debt to Equity Ratio

The indicator used for the level of utility debt is the ratio of long term debt to equity, plus long term debt, expressed as a percentage (debt / (debt + equity)). Borrowing to improve services may be justified, but a high debt-to-equity ratio places a utility in a vulnerable position.

In 2001 Pacific utilities generally had low levels of debt,[2] with an average ratio of 26% compared to a regional and international benchmark of a maximum of 50%. The 2015 average debt to equity ratio is 27%, with a median of 16%. As can be seen in Figure 5.26, debt to equity rates have varied over the benchmarking years.

Figure 5.26: Debt to Equity Ratio (%) 2015 (2014) (2013)[2]



Lower is better although borrowing to improve service may be justified

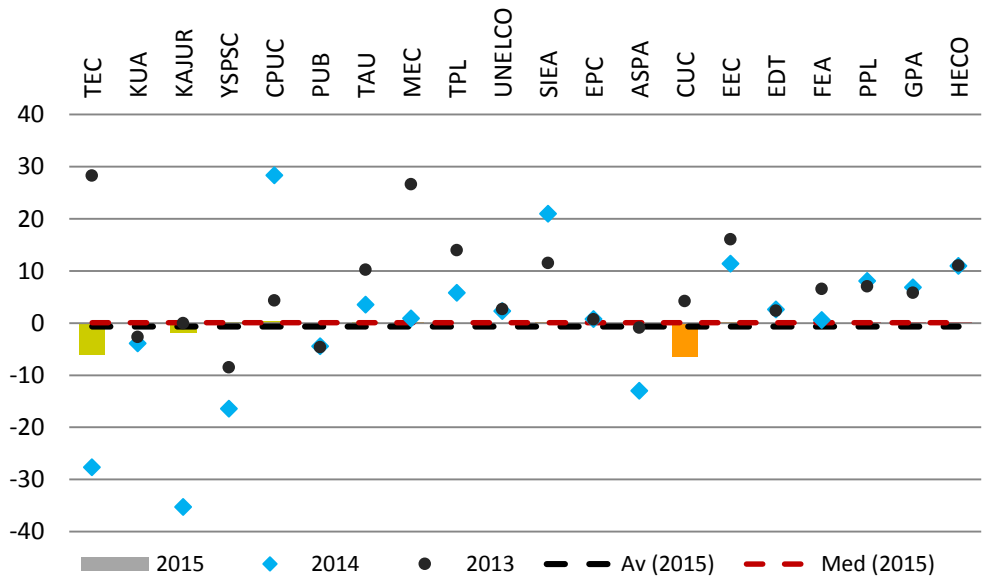
Average 27% (34%) (38%)

Median 16% (27%) (26%)

(vi) Rate of Return on Assets

The Rate of Return on Assets (RORA) is the return generated from the investment in the assets of the business. ROA indicates how efficient management is at using its assets to generate earnings. Pacific power utilities generally do not earn commercial rates of return, and this is reflected in Figure 5.27. The Pacific benchmark has a target of a positive rate of return. Ten utilities are currently achieving this, with MEC reporting the highest rates of approximately 94%. In 2015 the average RORA was 3.7%, with a median of 0.05%. This represents an improvement since the previous year where the average was 2.1%. It is noteworthy however, that 10 of the utilities are earning positive RORA, with PPUP earning a RORA of over 94%.

Figure 5.27: Rate of Return on Total Operating Assets in 2015 (2014) (2013) (%)



Median 0.05% (0.1%) (7%)

Average 3.7% (2.1%) (6%)

Higher is better, up to a reasonable return.

(vii) Return on Equity

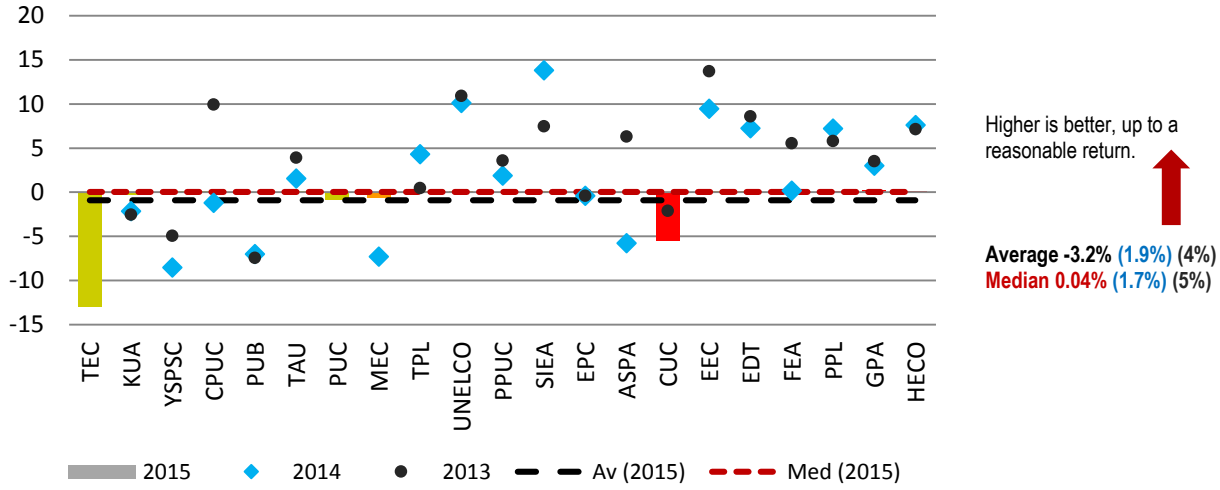
ROE measures financial returns on owners' funds invested. Results for ROE are shown in Figure 6.28. Some outlying values have been disregarded as their accuracy is not credible. As Figure 5.28 shows, overall

2 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 corporatize entity has under invested in assets.

3 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.

performance has deteriorated with a reduction in average return from 1.9% in 2014 to -3.2% in 2015 and a reduction in the median from 1.7% to 0.04%. Five utilities have a ROE of over 10%. Seven utilities have shown improvement shifting from minus to positive ROE. A high variability is seen between the results of previous and current years.

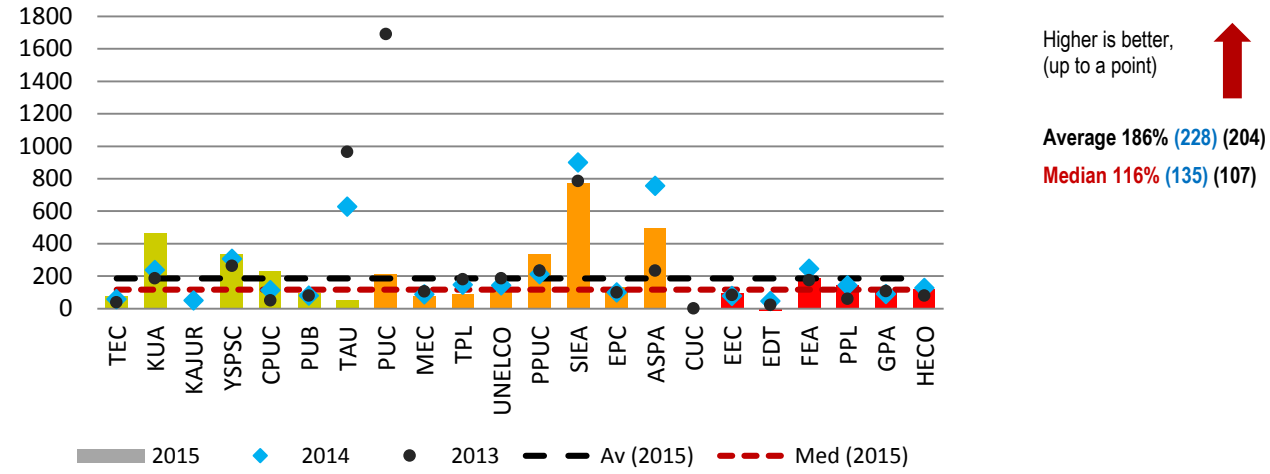
Figure 5.28: Return on Equity (%) 2015 (2014) (2013)



(viii) Current Ratio

The current ratio measures the ability of business to pay its creditors within the next 12 months, i.e. the ability of the utility to meet its current liabilities from current assets. In 2015, as illustrated in Figure 5.29, the reported average current ratio has reduced significantly to 186%, with a median value of 116%. 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 (%) 2015 (2014) (2013)

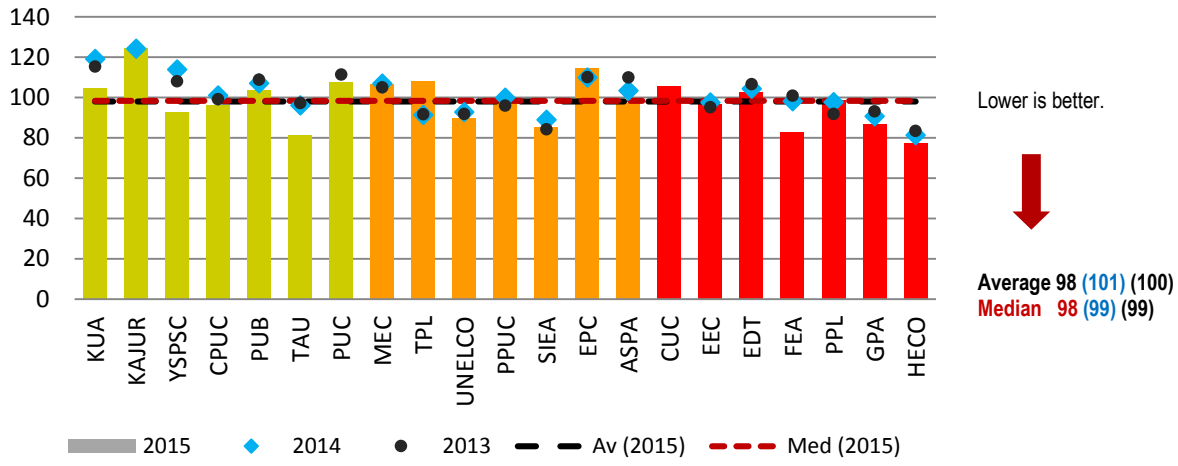


(viii) Operating Ratio

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, and an operating ratio below 100 indicates a profitable operation. An operating ratio above 100 indicates that it is costing an organisation more to produce the service than is being returned by the revenue, which is often the case in Pacific power utilities, as indicated by a median value of 98 in 2015. As shown in Figure 5.30, eleven utilities have an operating

ratio below 100 and nine utilities have an operating ratio above 100.[3] The average was 98, slightly reduced from 2014FY, indicating a slight decline in performance.

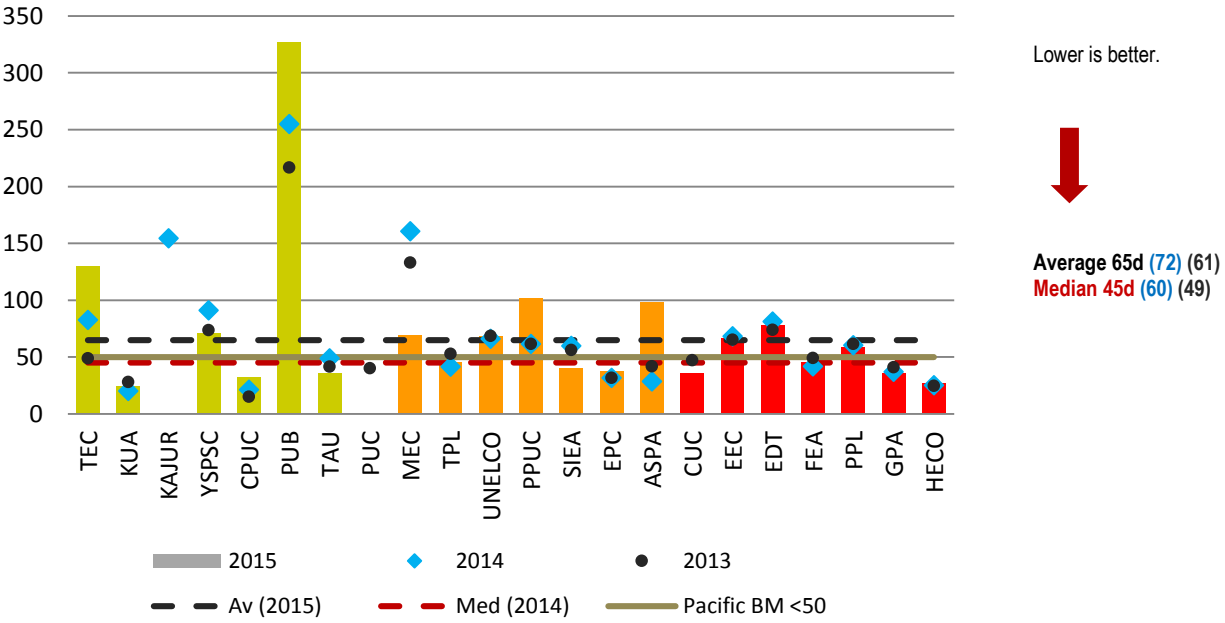
Figure 5.30: Operating Ratio in 2015 (2014) (2013)



(ix) Debtor Days

This indicator measures how long it takes, on average, for the utility to collect debts. In 2001, the Pacific average was 79 days compared to the Pacific benchmark of 50. In 2015 (refer to Figure 5.31), debtor days improved from 72 days to 65 days, with a median of 45 days. MEC, SIEA, TAU and YSPSC have made improvements in reducing debtor days. TEC, PUB, PPUB and ASPA have the high debtor days that exceeded the average.

Figure 5.31: Reported Debtor Days (Days) 2015 (2014) (2013)



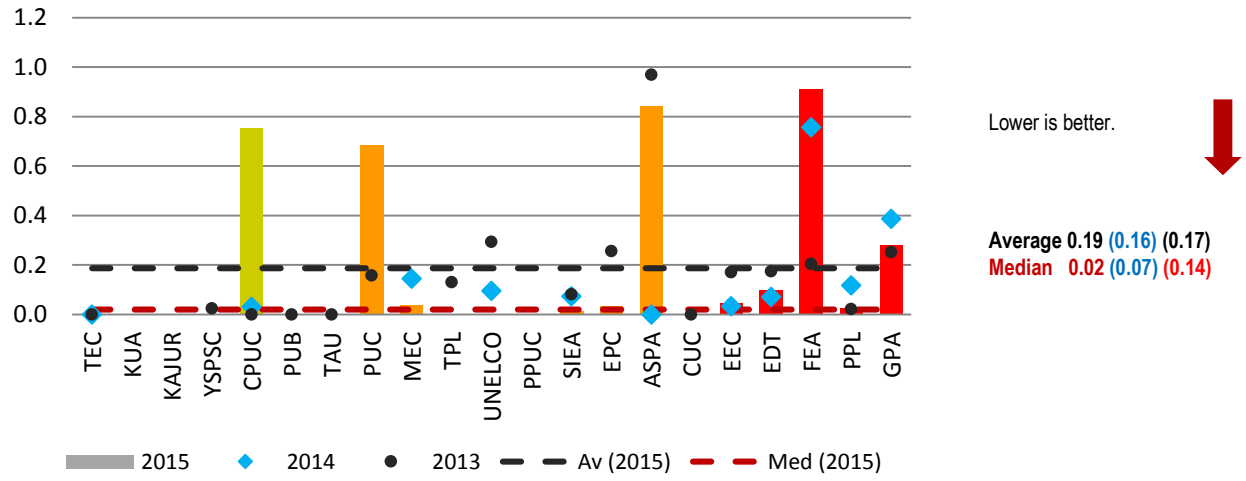
3 An extreme high value for KAJUR has been excluded.

5.8 Human Resources and Safety Indicators

(i) Lost Time Injury Duration Rate

The average for 2015FY was 0.19 days per FTE employee, compared to 0.16 for 2014FY (refer Figure 5.32). The median was 0.02 days per FTE employee compared to 0.07 last year. The results are variable and not sufficient enough for drawing any strong conclusions. Numerous 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.

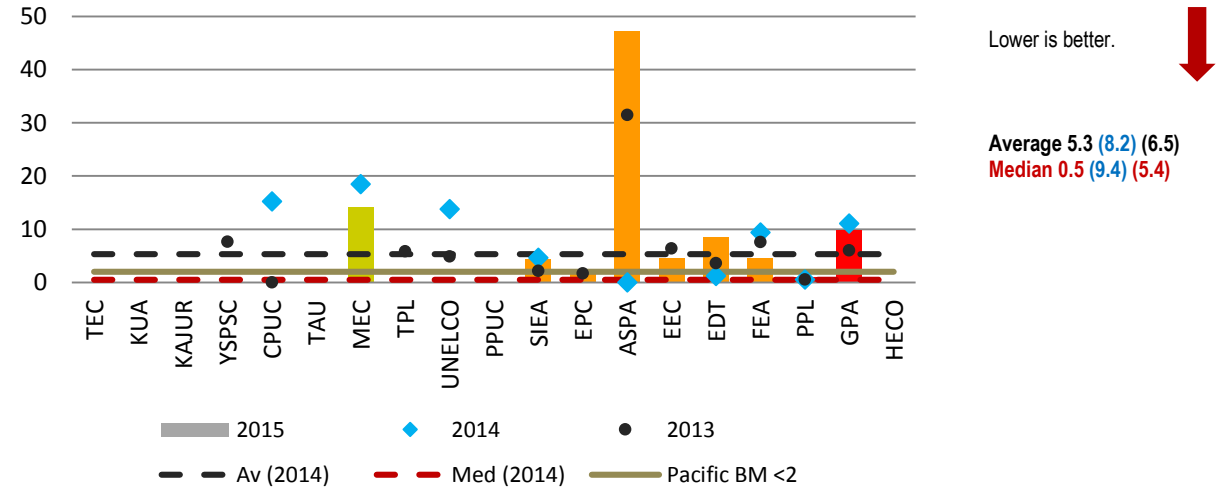
Figure 5.32: LTIDR (Days per FTE Employee) 2015 (2014) (2013)



(ii) Lost Time Injury Frequency Rate

The average for 2015 is 5.3 and the median 0.5. This has significantly risen from results recorded in 2014FY. MEC, APSA, EDT, FEA and GPA have frequency rates above pacific benchmark indicating a need for improved safety management.

Figure 5.33: LTI Frequency Rate (Number of Incidents per Million Hours) 2015 (2014) (2013)

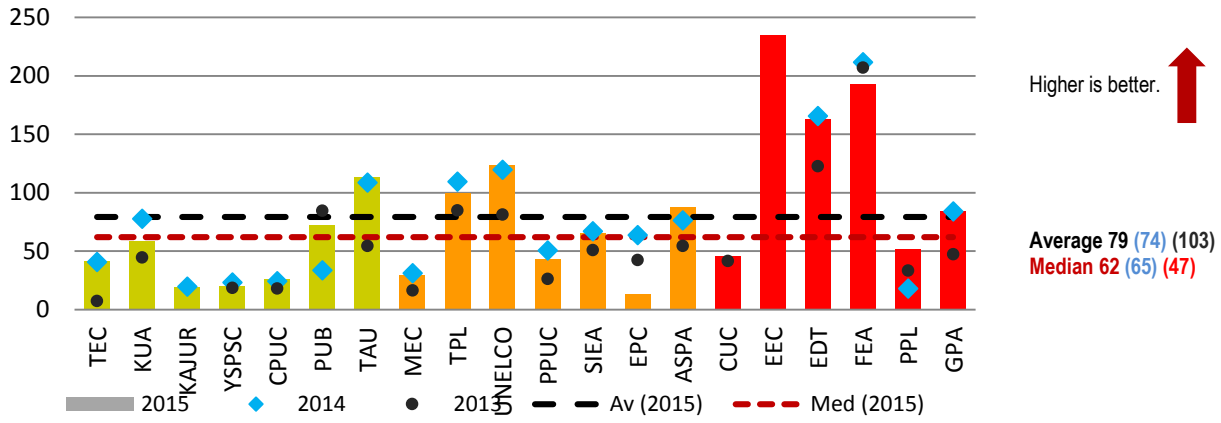


(iii) Overall Labour Productivity

The average productivity improved in 2015, compared to results from 2014FY (refer Figure 5.34). Labour productivity now averages 79 customers per FTE employee, with a median of 62. A higher productivity is

expected of larger utilities that operate with some economies of scale. EEC, FEA, EDT, TAU and UNELCO have favourable performance as compared to expectations, while EPC, KUA and PPUC show a decline in productivity considering their size characteristics.

Figure 5.34: Overall Labour Productivity 2015 (2014) (2013) (Customers per FTE Employee)



5.9 Overall Composite Indicator

The overall composite indicator of utility performance developed in 2011 has been used again this year to rank comparative performances between utilities. Where gaps existed in the data submitted by some utilities it was not possible to calculate an aggregate score.

The overall composite indicator is a simple indicator that equally weights generation efficiency, capacity utilisation, system losses and overall labour productivity, as derived from quantitative scores on a scale up to 4.0. Overall, this was considered to be a valid assessment of technical performance.

The composite indicator has changed in 2015 due to the inclusion of data reliability as a weighting upon the calculation of the final score. The utilities were 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.

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

Table 5.4: Composite Indicator Components for 2015FY

Results are summarised in Figure 5.35. The scores for previous years have not been shown this year as the components of the indicator have changed (data reliability weighting now incorporated). Only data for those utilities with sufficient data for the 2015 FY have been shown. EDT has the highest score of 3.1. PUB, SIEA, EEC, TAU, and GPA are ranked in the 'Medium' category. ASPA and EDT are the only two utilities able to attain scores to qualify to be ranked in 'High' category. Scores for all utilities which were under 2.5, ranked as lower performing utilities.

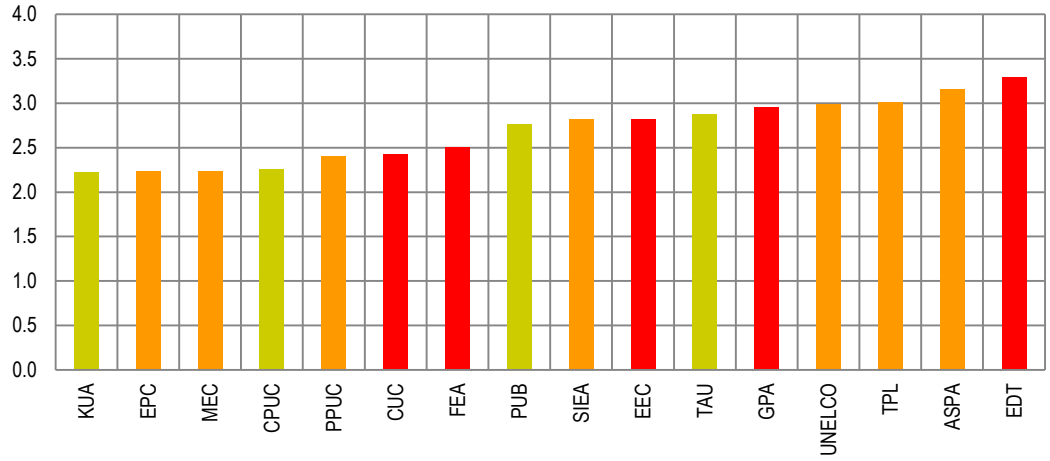


Figure 5.35: Composite Technical Indicator 2015

6. COMPARING RESULTS

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, and with other regions that possess similar characteristics. Table 6.2 compares the average results of the current exercise (2015 data) with that of the previous periods (i.e. 2013, and 2014) and shows the trends over time.

Table 6.1: Comparison of 2015 Results with 2011, 2012, 2013 and 2014

Key Indicators		2010 Results		2011 Results		2012 Results		2013 Results		2014 Results		2015 Results		Trend
		Av	Med	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	66.2	66.4	Stable
Capacity factor (%)	↑ better	32	31	36	37	36	35	35.7	33.5	35.6	33.0	33.2	31.6	Declined
Availability factor (%)	↑ better	98	100	82	81	92	99.6	95.9	99.8	95.9	99.6	97.3	99.7	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	2.5	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	3.8	3.8	Stable
Specific fuel oil consumption (kWh/ kg)	↑ better					4.5	4.5	4.4	4.5	4.6	4.6	4.4	4.5	Stable
Lube oil consumption (kWh/litre)	↑ better	1302	971	1084	936	1096	984	1130	1093	1102	1068	1020	904	Improved
Forced outage factor (%)	↓ better	1	0.2	8.3	6.3	5.4	0.4	1.5	0.1	2.7	0.1	0.4	0.2	Improved
Planned outage factor (%)	↓ better	1	0.1*	3.9	1.8	2.64	0.04	2.7	0.1	1.38	0.03	1.53	0.04	Declined
O&M (USD per MWh)	varies	148*	71*	214*	132*	47	40	20.0	11.5	61.4	35.5	48	37.5	Declined
Power Station Usage (%)	↓ better	4.7	4.8	3.9	3.6	3.5	2.7	3.6	2.9	5.2	3.2	3.8	3.2	Improved
Renewable energy to grid (%)	varies	22% main grid*		26% of all grids*								8.3	2.7	
Transmission														
Transmission losses (%)	↓ better			5*	5*	0.9*	0.9*					1.2	1.2	Varies
Transmission reliability (outages/100km)	↓ better			41.8	18.2	11.5*	15.9*					13.8	9.8	Declined
Transmission SAIDI (min/cust) Unplanned	↓ better					52.7	60.9					59	59	Declined
Planned	↓ better					0	0					7229	0	Declined
Transmission SAIFI (events/cust) Unplanned	↓ better					5.3	6.3							
Planned	↓ better					0	0							
Distribution														
Network delivery losses (%)	↓ better	12.8	11.7	11.8	9.2	14.0	12.2	13.9	12.9	17.8	15.8	11.2	8.8	Improved
Distribution losses (%)	↓ better	12	10.4	14.2	10.7	14.1	12.2	14.3	12.9	18.8	16.4	9.3	8.7	Improved
Transformer utilisation (%)	↑ better	19	21	18	19	16	16	15.1	16.6	17.4	18.7	16.6	14.1	Declined
Distribution reliability (events per 100km)	↓ better	51	26	135	19	64	23	96	26	88	17	15	9	Improved
Customers per dist employee	↑ better	334	297	259	249	246	253	240	233	223	192	244	167	Declined
Distribution O&M (USD/km)	↑ better			5846	4648	8662	5574	13354	5001	10087	7122	9090	7318	Declined
Gen. and Dist. SAIDI and SAIFI														
SAIDI (mins/customer)	↓ better	530*	139*	794*	583*	5664	475	1142	672.7	1719	301	3071	161	Declined
SAIFI (interruptions/cust)	↓ better	8*	4*	10*	6*	9	4	15.3	5.2	24.2	7.6	29.6	7	Declined
Financial														
Ave. supply cost (USD/kWh)						0.45	0.44	0.4	0.4	0.47	0.44	0.40	0.35	Improved
Debt to equity ratio (%)	↓better	10	18	47	24	38	13	38.2	26.2	34	27	29	24	Improved
Rate of return on assets (%)	↑ better	-4	1	3	0	-12	2	7.1	5.8	0	2	-0.7	0.05	Improved

Return on equity (%)	↑ better	5.7	5.7	8.1	5.7	2	0	3.8	4.7	1.9	1.7	-3.2	0	Declined
Current ratio (%)	↑ better			168	109	204	102	268.5	107.4	228	135	186	116	Declined
Operating ratio (%)	↓ better			100	99	98	99	99.9	99.1	101	100	98	98	Declined
Debtor days (days)	↓ better	115	56	62	51	57	50	60.6	49.3	72	60	65	45	Improved
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	0.19	0.02	Stable
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	5.33	0.46	Declined
Labour Productivity (customers per employee)	↑ better	85	74	71	59	81	55	102.5	47.4	74	65	79	62	Improved
Technical Composite														
Composite Indicator	↑ better	2.8	2.8	2.7	2.7	2.6	2.5					2.3	2.1	

APPENDICES

Appendix A: PPA Member Utilities in 2017

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P O Box PPB, Pago Pago,
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CEO: Mr. Hasmukh Patel
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Updated 18 April 2017

Appendix B: Data Reliability Self-Assessment Responses

Table B.1: Data Reliability Self-Assessment Responses 2015

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

Appendix C: KPI Calculations

Table C.1: Key Performance Indicators 2015[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

	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 D: Data Tables

Table D.1: KPIs 2015 (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	77.9	51.7	98.78	1.89	3.79	4.51	555	0.90	0.32	0.00	4.55	1.50	0.00
CPUC	67.9	26.3	99.62	0.70	3.88	n.av	1149	0.34	0.05	41.85	0.38	2.15	0.00
CUC	65.71	24.80	96.28	2.02	4.02	4.78	414.60	1.81	1.93	13.06	6.00	9.65	0.04
EDT	61.3	28.4	85.22	4.84	4.70	4.79	859	n.av	11.79	46.65	3.36	31.35	2.29
EEC	55.4	40.94	100	11.29	4.90	5.63	1023.53			13.87	1.24	5.57	94.13
EPC	63.77	29.60	99.639	0.88	3.31	3.94	1258	0.32	0.04	71.98	3.51	28.06	0.60
FEA	62.90	1.09	100.00	8.21	2.78	4.67	1249	0	0	7.91	0.960	49.57	1.53
GPA	76.372	33.416	91.345	4.521	673.817	#NAME?	2119.103	2.246	6.409	31.899	8.297	0.345	41.319
HECO	n.av	50.599	82.623	5.766	n.av	n.av	n.av	n.av	n.av	37.538	6.503	0.740	47.304
KAJUR	76.772	41.789	99.731	0.393	3.773	#NAME?	1117.503	0.206	0.063	36.728	4.744	0.000	0.000
KUA	53.010	17.859	99.802	0.632	3.244	n.av	865.763	0.198	0.000	248.916	1.571	3.171	0.000
MEC	75.916	22.282	100.000	0.941	4.025	n.av	903.918	0.000	0.000	84.254	9.521	0.530	0.000
NUC	85.210	31.393	100.000	n.av	3.492	4.147	462.433	0.000	0.000	0.000	0.996	0.728	0.000
PPL	60.182	34.544	99.534	1.055	9.28	n.av	23072.434	0.437	0.030	0.043	0.162	37.98	34.883
PPUC	77.537	27.206	100.000	1.696	3.914	4.660	1225.554	0.000	0.000	59.350	3.936	0.365	0.000
PUB	63.115	40.255	93.694	0.585	3.903	n.av	3063.152	0.295	6.012	23.178	3.422	2.699	n.av
PUC	70.140	32.432	99.899	n.av	3.387	3.445	265.224	0.034	0.067	27.090	1.517	4.282	10.667
SIEA	69.843	46.643	99.662	1.299	4.280	n.av	1403.860	0.345	0.051	43.394	2.295	0.083	1.624
TAU	68.174	31.833	99.996	1.592	3.597	n.av	538.326	0.004	0.000	79.705	1.189	4.967	0.910
TEC	41.170	31.152	100.000	0.162	3.503	4.171	1018.031	0.000	0.000	100.347	9.019	8.123	0.000
TPL	64.047	38.437	99.994	1.516	4.111	n.av	724.162	0.006	0.000	21.772	2.894	5.374	0.000
UNELCO	53.918	30.746	91.462	1.341	3.926	4.703	568.462	1.596	6.943	42.143	2.388	21.297	0.000
YSPSC	61.930	17.043	99.943	0.516	3.483	n.av	646.191	0.027	0.030	17.189	9.075	0.924	0.000

Table D.2: KPIs 2015 (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	98.500	0	0	0	0	No	7.162	7.162	0.000	6.815	22.958	14326.052
CPUC	97.850	0	0	0	0	Yes	18.646	18.646	57.688	461.85	13.325	13206.98
CUC	100.000	0	0	0	0	Yes	11.122	11.122	154.980	20.635	17.113	3179.121
EDT	0.828	64.472	0.0	0.0	0.0	Yes	6.615	-2.078	388.381	3.866	14.044	8459.455
EEC	0.000	0		0	0	Yes	3.252	3.252	242.2	16.74	16.237	18543.94
EPC	70.729	0	0	0	0	Yes	8.385	8.385	197.543	14.779	7.994	8905.435
FEA	26.490	24.049	0	0	0	Yes	8.884	-53.640	470.119	6.178	8.730	1170.214
GPA	6.478	93.522	0	0	0	Yes	5.136	-0.252	311.677	8.716	18.284	7318.511
HECO	0.221	51.734	0.740	n.av	n.av		1.304	1.219	n.av	n.av	22.187	n.av
KAJUR	0.000	100.000	0	0	0	No			130.000	28.244	0.000	4589.404
KUA	100.000	0	0	0	0	No	9.284	9.284	174.300	75.945	5.207	4831.373
MEC	99.470	0	0	0	0	No	16.950	16.950	124.118	0.000	12.174	39966.200
NUC	99.272	0	0	0	0	Y/N	100.000	n.av	n.av	n.av	n.av	n.av
PPL	27.142	21.880	n.av	n.av	13.003	Yes	22.848	61.08	222.155	178.29	13.404	23.13
PPUC	99.635	0	0	0	0	No	14.528	14.528	166.625	20.769	34.726	10676.314
PUB	99.998	n.av	n.av	n.av	n.av	No	18.490	18.49	83.191	#VALUE!	21.070	n.av
PUC	74.384	0	0	0	0	Yes	10.813	10.813	132.948	125.67	51.153	4616.19
SIEA	88.277	0	0	0	0	No	30.363	30.36	134.772	0.738	10.157	143.533
TAU	94.123	0	0	0	0	Yes	6.634	6.634	361.581	3.488	20.753	17825.427
TEC	100.000	0	0	0	0	No	-4.744	-4.744	850.000	10.000	13.989	2702.189
TPL	94.626	0	0	0	0	Yes	8.769	8.769	155.963	56.842	14.129	5613.267
UNELCO	78.703	0	6.169	0	0	Yes	5.364	5.364	359.861	3.188	15.520	1488.772
YSPSC	100.000	n.av	n.av	n.av	n.av	No	8.532	8.532	107.875	43.570	8.841	1804.796

Table D.3: KPIs 2015 (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	55.462	0.000	0.793	0.793	0.000	70.332	70.332	0.000	2.086	2.086	0.000	125.794	2.879
CPUC	848.483	104.256	46.623	33.217	13.406	9.049	8.919	0.130	0.000	0.000	0.000	961.788	46.623
CUC	705.397	178.361	7.159	5.297	1.862	21.884	21.884	0.000	1.815	1.815	0.000	905.641	8.974
EDT	80.196	309.777	2.983	1.719	1.265	3.035	3.035	0.000	1.412	1.412	0.000	393.008	4.395
EEC	33	68	2.413	1.818	0.595	111	0.000	0.000	0.000	0.000	0.000	0.002	2.413
EPC	11962.939	845.189	20.163	18.209	1.954	2149.809	2118.283	31.526	6.167	5.537	0.631	14957.937	26.330
FEA	0.002	0.011	7.604	3.934	3.670	0.000	0.000	0.000	1.561	1.541	0.020	0.013	9.165
GPA	1481.559	9.024	5.499	5.407	0.093	224.228	222.718	1.510	8.341	8.323	0.019	1714.811	13.840
HECO	71.326	9.972	0.815	0.770	0.045	4.348	4.348	0.000	0.301	0.301	0.000	85.646	1.116
KAJUR	65.391	9.403	3.944	3.691	0.254	834.188	661.930	172.259	33.367	28.069	5.299	908.982	37.312
KUA	1255.963	0.000	18.493	18.493	0.000	1356.020	1356.020	0.000	4.960	4.960	0.000	2611.983	23.453
MEC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NUC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PPL	13958.186	1779.455	144.187	135.586	8.601	18929.048	18214.081	714.968	210.351	204.971	5.380	34666.690	354.538
PPUC	0.201	0.032	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.233	0.004
PUB	0.011	0.015	#VALUE!	#VALUE!	#VALUE!	0.018	0.011	0.007	#VALUE!	#VALUE!	#VALUE!	0.045	#VALUE!
PUC	0.001	0.000	1.009	0.504	0.504	0.004	0.004	0.000	1.009	0.673	0.336	0.005	2.018
SIEA	31.301	24.266	11.581	6.581	5.000	590.789	588.742	2.047	26.801	24.137	2.663	646.357	38.381
TAU	46.786	0.000	0.800	0.800	0.800	63.017	63.017	0.000	0.000	0.000	0.000	109.802	0.800
TEC	0.004	0.002	0.084	0.055	0.029	0.056	0.000	0.056	1.000	0.000	1.000	0.062	1.085
TPL	0.037	0.022	#VALUE!	#VALUE!	#VALUE!	0.008	0.008	0.000	#VALUE!	#VALUE!	#VALUE!	0.066	#VALUE!
UNELCO	18.597	100.601	1.327	0.309	1.017	41.874	41.874	0.000	3.609	3.609	0.000	161.072	4.935
YSPSC	0.052	0.018	13.047	10.814	2.233	0.001	0.000	0.001	0.000	0.000	0.000	0.070	13.047

Table D4: KPIs 2015 (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	0	0.000	0	None	0.842	47.332	87.457	98.934	69.972	0.000	30.028	28.805	22.783	18.384	0.000	self regulated
CPUC	No	0	0.000	0	US NESC	0.754	0.000	25.807	21.270	73.659	#DIV/0!	20.430	51.134	0.000	22.525	5.911	self regulated
CUC	Yes	0	0.000	n.av	US	0.000	#VALUE!	45.683	70.134	72.113	0.000	29.065	54.620	0.000	7.753	10.832	externally regulated
EDT	Yes	933660	0.002	0	EN 50160	0.099	8.443	163.244	92.473	79.600	10.397	24.905	16.373	46.338	0.606	1.381	externally regulated
EEC	Yes	92987	0.001		EN 50160	0.046	4.7	351.506	62.466	68.067	0.000	36.399	24.709	37.593	0.000	1.291	externally regulated
EPC	Yes	0	0.001	0	AS/NZ 3000/2007	0.036	1.657	13.363	99.115	80.339	100.000	26.835	40.875	4.151	28.139	0.000	externally regulated
FEA	Yes	0	0.000	0	0.000	0.910	4.508	192.703	#DIV/0!	75.214	3.427	26.113	45.506	24.953	0.000	0.000	externally regulated
GPA	No	0	0.000	0	None	0.280	9.872	84.503	#DIV/0!	70.020	14.364	29.980	17.050	20.115	32.855	5.149	externally regulated
HECO	Y/N	0	0.000	0	0.000	#######	#VALUE!	#VALUE!	#VALUE!	0.000	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	externally regulated
KAJUR	No	0	0.000	0	None	0.000	0.000	19.385	98.644	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	self regulated
KUA	Yes	0	0.000	0	KUA	0.000	0.000	58.382	108.063	57.850	0.000	40.475	25.915	5.834	26.102	1.670	self regulated
MEC	Yes	0	0.001	0	none	0.038	14.150	29.468	89.451	52.820	3.176	47.177	37.142	0.000	15.679	0.000	self regulated
NUC	Yes	0	0.001	0	ANZS	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0
PPL	Yes	624000	0.002	406808	None	0.026	0.929	51.337	6.051	170.119	100.000	18.204	53.323	18.879	9.902	10.422	externally regulated
PPUC	Yes	25935	0.002	0	JIS, NEC	0.000	0.000	43.302	98.557	66.304	0.000	33.695	32.571	33.732	0.000	0.000	self regulated
PUB	No	0	0.000	0	None	#######	#VALUE!	71.887	66.873	65.644	0.000	34.356	23.549	42.095	0.000	7.279	self regulated
PUC	Yes	0	0.001	0	0.000	0.686	12500.000	#DIV/0!	65.714	20.834	0.000	4.360	11.642	9.192	0.000	0.000	self regulated
SIEA	No	0	0.000	0	AS	0.013	4.283	65.797	11.572	87.336	0.000	24.413	52.488	18.221	16.627	0.001	self regulated
TAU	Yes	42692	0.004	0	NZ Standard	0.000	0.000	113.428	146.068	65.491	10.299	34.407	37.732	27.759	0.000	0.000	externally regulated
TEC	Yes	0	0.001	0	AUS/NZ	0.000	0.000	41.851	75.316	64.901	17.610	49.698	30.473	0.000	28.644	2.724	self regulated
TPL	Yes	0		No	TPL Standard	0.000	0.000	99.553	90.379	63.816	0.000	45.000	55.000	0.000	0.000	0.000	externally regulated
UNELCO	Yes	11792	0.010	0	0.000	0.000	0.000	123.632	27.374	67.685	8.532	25.349	25.318	40.436	0.366	1.149	externally regulated
YSPSC	No	0	0.000	0	none	0.000	0.000	19.591	51.394	76.243	1.039	24.913	47.031	28.054	0.000	5.691	self regulated

Table D.5: KPIs 2015(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	2.1	5.1	0.0							
FEA		2.71739	0							
GPA	0.3	14.5	0.0							
HECO			225.258	51.0						
PPL		33.0	35918.3	67.1						

Table D.6: KPIs 2015 (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	-0.97	0.1453	-0.0747	-0.040	493.3	-98.0	30	57.1	0	10.9	7.3	5.0	3.7	2.8	2.4	7.0	0.5	0.4	2.9
CPUC	0.96	0.3	0.3	0.03	229.4	32.4	43	57.5	0	5.1	5.8	4.0	1.5	4.9	3.5	15.9	1.6	0.0	0.0
CUC	1.06	30.06	-6.44	-5.52	0.79	35.36	34.58	63.72	0.00	4.42	5.25	1.39	1.55	4.50	2.48	4.95	0.37	0.00	11.37
EDT	1.0	0.1	0.0	0.1	-33.7	78.0	35	29.8	0	7.7	7.8	11.2	3.1	5.9	5.7	9.2	0.0	4.9	14.7
EEC	0.97	0.02	0.14	0.09	91.7	66.4	29.956	7.7	0	0.75	0.88	1.5	6.0	56.9	14.8	5.5	6.0	0	0
EPC	1.1	0.4	0.0	0.1	133.8	37.3	45	44.0	5.74	14.80	1.77	5.90	9.79	3.11	5.18	8.26	1.19	0.00	0.25
FEA	0.8	0.4	0.1	0.1	183.9	44.9	14.534	52.9	0.0	4.5	0.9	7.2	6.8	1.7	6.4	4.9	0.6	0	14.04
GPA	0.9	0.9	0.1	0.2	107.9	35.0	19	61.9	0	6.1	3.2	7.2	3.4	2.3	3.6	2.7	1.9	0.0	7.8
HECO	0.8	0.3	0.1	0.1	120.1	26.9	17.6	25.3		4.4	3.1	1.9	3.5		4.6		0		57.2
KAJUR	1.2		-1.9		0.0	0.0		71.8	0.3	0.96	9.8	4.53	0.08	1.6	1.5	7.7	0.79	0.8	0
KUA	1.0	0.00	0.0	0.0	463.0	24.4	51	39.2	0	29.2	3.1	3.8	7.0	1.9	5.2	6.0	0.7	0	4.0
MEC	1.1	1.3	0.1030	-0.615	73.5	68.5	39	49.2	0.0	20.2	5.8	5.5	8.7	3.0	0.4	5.3	0.5	0.5	0.0
NUC	0.0	#DIV/0!	#DIV/0!	#DIV/0!	1630.6	193.8	#DIV/0!	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PPL	0.98	0.25	0.08	0.07	143.4	58.6	0.05	15.4	0.0	6.8	3.4	2.3	10.1	5.1	1.7	3.0	1.1	25.6	25.6
PPUC	1.0	0.0	94.4	-47.8	332.3	101.8	32	64.1	0.0	16.9	3.7	0.1	4.1	1.8	0.0	3.0	0.0	0.0	6.4
PUB	1.0	0.13	-0.02	-0.01	96.5	326.3	53.19	68.6	0.0	0.0	4.6	6.7	0.9	2.7	0.8	3.4	0.77	0.0	11.5
PUC	1.07	0.00	0.00	-0.83	214.98	0.00	35.32	0.27	0.00	11.94	8.88	19.74	5.59	13.59	10.22	9.71	2.42	0.00	17.64
SIEA	0.85	0.03	0.2	0.1	771.7	39.6	74	41.3	0.0	4.8	2.8	5.7	1.5	1.8	2.0	8.8	3.0	0.0	28.3
TAU	0.8	0.0	0.2	0.1	54.9	35.6	38	0.0	13.0	13.0	3.5	7.4	9.5	2.3	7.2	5.8	0.5	0.0	13.2
TEC	15.4	0.39	-5.9	-13.01	77.8	129.7	74	8.8	0.0	1.1	1.6	77.3	0.1	0.2	0.0	1.5	6.8	0.1	2.6
TPL	1.1	0.3	0.0	0.0	90.0	45.3	99	50.4	0.0	4.4	1.7	2.5	1.3	4.1	8.9	5.0	4.5	0.0	17.1
UNELCO	0.9	0.2	0.0	0.1	112.2	68.3	42	38.0	6.6	6.3	2.1	9.7	2.2	0.6	4.7	9.8	3.1	0.3	16.5
YSPSC	0.9	0.0	0.1	0.0	331.7	70.9	46	60.4	0.0	0.4	3.1	11.9	1.4	2.6	1.8	9.1	2.8	0.2	6.3

Appendix E: Currency Conversion Table

Table E.1: Currency Conversion Table for 2014 and 2015 Data

			2014			2015		
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-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
CPUC	Chuuk, FSM	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
CUC	Saipan, Northern Marianas	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
EDT	French Polynesia	XPF	1-Jan-14	31-Dec-14	0.0102	1-Jan-15	31-Dec-15	0.00917
EEC	New Caledonia	XPF	1-Jan-14	31-Dec-14	0.0102	1-Jan-15	31-Dec-15	0.00917
EEWF	Wallis and Fortuna	XPF	1-Jan-14	31-Dec-14	0.0102	1-Jan-15	31-Dec-15	0.00917
ENERCAL	New Caledonia	XPF	1-Jan-14	31-Dec-14	0.0102	1-Jan-15	31-Dec-15	0.00917
EPC	Samoa	WST	1-Jul-13	30-Jun-14	0.4237	1-Jul-13	30-Jun-15	0.4237
FEA	Fiji	FJD	1-Jan-14	31-Dec-14	0.5008	1-Jan-15	31-Dec-15	0.46187
GPA	Guam	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
HECO	Hawaii, USA	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
KAJUR	Kwajalein Atoll, Marshall Islands	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
KUA	Kosrea, FSM	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
MEC	Marshall Islands	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
NPC	Niue	NZD	1-Jul-13	30-Jun-14	0.8762	1-Jul-14	30-Jun-15	0.68295
NUC	Nauru	AUD	1-Jul-13	30-Jun-14	0.9419	1-Jul-14	30-Jun-15	0.7653
PPL	Papua New Guinea	PGK	1-Jan-14	31-Dec-14	0.3777	1-Jan-15	31-Dec-15	0.3259
PPUC	Palau	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
PUB	Kiribai	AUD	1-Jan-13	31-Dec-13	0.8156	1-Jan-14	31-Dec-14	0.7653
PUC	Pohnpei, FSM	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1
SIEA	Solomon Islands	SBD	1-Jan-14	31-Dec-14	0.1304	1-Jan-15	31-Dec-15	0.12403
TAU	Cook Islands	NZD	1-Jul-13	30-Jun-14	0.8762	1-Jul-14	30-Jun-15	0.68295
TEC	Tuvalu	AUD	1-Jan-14	31-Dec-14	0.8156	1-Jan-15	31-Dec-15	0.7653
TPL	Tonga	TOP	1-Jul-13	30-Jun-14	0.5406	1-Jul-14	30-Jun-15	0.4616
UNELCO	Vanuatu	VUV	1-Jan-14	31-Dec-14	0.0098	1-Jan-15	31-Dec-15	0.00904
YSPSC	Yap, FSM	USD	1-Oct-13	30-Sep-14	1	1-Oct-14	30-Sep-15	1

Appendix F: Electricity Tariff Tables

Table F.1: Electricity Tariff Table[12] (Local Currency)

		TOTAL COST TO CONSUMER FOR SET kWh/mth, incl base charge, taxes,etc (IN LOCAL CURRENCY)												
		DOMESTIC / RESIDENTIAL									COMMERCIAL / BUSINESS			
Pacific Utilities	Local Currency	50	100	200	500	1000	2000	3000	10000		1000	3000	10000	50000
ASPA	USD	25.29	44.58	83.17	198.92	391.83	777.66	1163.49	3864.30		404.93	1194.79	3959.30	19756.50
CPUC	USD	27.37	54.73	109.46	273.65	547.30	1094.60	1641.90	5473.00		577.40	1732.20	5774.00	28870.00
CUC	USD	22.67	38.84	71.16	168.14	373.46	795.72	1273.98	4621.80		432.79	1277.31	4233.13	21123.53
EEC	XPF	3913	4954	7688	14162	27332	49508	93780	151613		15301	61949	162277	2257073
EDT	XPF	1802.00	2995.00	6107.00	23386.00	56115.00	122940.00	193876.00	394969.00		52041.00	145624.00	394969.00	1811738.00
EPC	WST	34.50	75.50	157.50	403.50	813.50	1633.50	2453.50	8193.50		810.00	2430.00	8100.00	40500.00
FEA	FJD	8.60	21.18	54.28	153.58	319.08	650.08	1312.08	3629.08		399.00	1197.00	3990.00	20615.00
KAJUR	USD	14.90	29.80	59.60	149.00	298.00	596.00	894.00	2980.00		358.00	1074.00	3580.00	17900.00
KUA	USD	21.69	43.09	89.89	230.29	464.29	942.29	1420.29	4766.29		477.29	1453.29	4869.29	23989.29
MEC	USD	19.90	39.80	79.60	199.00	408.00	826.00	1244.00	4170.00		478.00	1434.00	4780.00	23900.00
NPC	NZD	40.00	65.00	125.00	325.00	675.00	1375.00	2075.00	6975.00					
NUC	AUD	10.00	20.00	40.00	130.00	305.00	655.00	1005.00	3455.00		700.00	2100.00	7000.00	35000.00
PPL	PGK	45.25	85.41	165.74	406.73	808.38	1611.68	2414.98	8038.08		953.60	2824.80	9374.00	46798.00
PPUC	USD	18.20	33.40	67.50	180.90	394.40	821.40	1248.40	4237.40		438.00	1292.00	4281.00	21361.00
PUB	AUD	20.00	40.00	80.00	200.00	400.00	800.00	1200.00	4000.00		550.00	1650.00	5500.00	27500.00
PUC	USD	28.53	53.05	102.10	249.25	494.50	985.00	1475.50	4909.00		490.50	1471.50	4905.00	24525.00
SIEA	SBD	323.43	646.86	1293.72	3234.30	6468.60	12937.20	19405.80	64686.00		6953.00	20859.00	69530.00	347650.00
TAU	NZD	28.50	66.20	146.20	408.00	828.00	1668.00	2508.00	8388.00		815.00	2435.00	8105.00	40505.00
TEC	AUD	15.00	34.50	90.50	258.50	538.50	1098.50	1658.50	5578.50		560.00	1680.00	5600.00	28000.00
TPL	TOP	45.87	91.73	183.46	458.65	917.30	1834.60	2751.90	9173.00		917.30	2751.90	9173.00	45865.00
UNELCO	VUV	922.00	3731.00	13722.00	33708.00	66819.00	133042.00	200457.00	663418.00		61504.00	170193.00	469144.00	2006741.00
YSPSC	USD	21.06	42.27	84.69	217.25	442.60	893.30	1344.00	4498.90		455.70	1516.30	5228.40	26440.40

[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 F.2: Electricity Tariff Table (USD)

TOTAL COST TO CONSUMER FOR SET kWhs/mth, incl base charge, taxes, etc (CONVERTED TO USD)													
	DOMESTIC / RESIDENTIAL								COMMERCIAL / BUSINESS				Comments
Pacific Utilities	50	100	200	500	1000	2000	3000	10000	1,000	3,000	10,000	50,000	
ASPA	25.29	44.58	83.17	198.92	391.83	777.66	1163.49	3864.30	405	1195	3959	19757	Commercial based on small general 3PHSE
CPUC	27.37	54.73	109.46	273.65	547.30	1094.60	1641.90	5473.00	577	1732	5774	28870	Based on 8 Feb 2012 announcement
CUC	22.67	38.84	71.16	168.14	373.46	795.72	1273.98	4621.80	433	1277	4233	21124	2 Feb 2012 sched of charges, lifeline applied up to 500KWh
EDT	16.72	27.79	56.67	217.02	520.75	1140.88	1799.17	3665.31	483	1351	3665	16813	
EEC	36.31	46.01	71.34	131.42	253.64	459.43	870.28	1406.97	142	575	1506	20946	
EPC	14.62	31.99	66.73	170.96	344.68	692.11	1039.55	3471.59	343	1030	3432	17160	0.86 applied up to 50kWh for domestic
FEA	4.24	10.44	26.77	75.74	157.37	320.62	647.12	1789.86	197	590	1968	10167	
KAJUR	14.90	29.80	59.60	149.00	298.00	596.00	894.00	2980.00	358	1074	3580	17900	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	1420.29	4766.29	477	1453	4869	23989	Rate was quoted from Resolution 2008-30-4
MEC	19.90	39.80	79.60	199.00	408.00	826.00	1244.00	4170.00	478	1434	4780	23900	
NPC	31.11	50.55	97.21	252.75	524.95	1069.34	1613.73	5424.46	0	0	0	0	No commercial rate stated on notice issue 8 Nov 2008
NUC	8.37	16.74	33.47	108.79	255.24	548.14	841.03	2891.32	586	1757	5858	29290	Tariff rate 2011
PPL	15.99	30.18	58.56	143.70	285.60	569.41	853.21	2839.85	337	998	3312	16534	Commercial uses "general supply customers"
PPUC	18.20	33.40	67.50	180.90	394.40	821.40	1248.40	4237.40	438	1292	4281	21361	
PUB	16.74	33.47	66.94	167.36	334.72	669.44	1004.16	3347.20	460	1381	4602	23012	
PUC	28.53	53.05	102.10	249.25	494.50	985.00	1475.50	4909.00	491	1472	4905	24525	Fuel charge 0.3905 as advised by PUC in email
SIEA	40.89	81.78	163.55	408.88	817.76	1635.52	2453.28	8177.60	879	2637	8790	43950	
TAU	22.16	51.48	113.70	317.30	643.94	1297.20	1950.47	6523.35	634	1894	6303	31501	
TEC	12.55	28.87	75.73	216.33	450.64	919.28	1387.92	4668.37	469	1406	4686	23432	
TPL	22.99	45.98	91.96	229.90	459.80	919.59	1379.39	4597.97	460	1379	4598	22990	No commercial rate stated
UNELCO	8.57	34.70	127.61	313.48	621.42	1237.29	1864.25	6169.79	572	1583	4363	18663	Used business licence holder LV for commercial
YSPSC	21.06	42.27	84.69	217.25	442.60	893.30	1344.00	4498.90	456	1516	5228	26440	