



PACIFIC POWER UTILITIES

Benchmarking

Report

2017 Fiscal Year

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PACIFIC POWER

Benchmarking

Summary Report

2017 Fiscal Year

PREPARED BY THE PACIFIC POWER ASSOCIATION (PPA)

SEPTEMBER 2018

1. INTRODUCTION

1.1 Benchmarking Overview

The 2017 exercise involves data from 22 power utilities compared to 17 for the 2016 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 - 2017 Data Periods

Utility			Data Period							2016	2017
			2001	2010	2011	2012	2013	2014	2015		
Acronym	Name	Country / Territory	Year Data Collated						2016	2017	2018
			2002	2011	2012/13	2013/14	2015	2015			
ASPA	American Samoa Power Authority	American Samoa	✓	✓	✓	✓	✓	✓	✓	✓	✓
CPUC	Chuuk Public Utility Corporation	Fed States of Micronesia (FSM)	✓	✓	✓	✓	✓	✓	✓	✓	✓
CUC	Commonwealth Utilities Corporation	Commonwealth of 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-Caledonienne D'Energie	New Caledonia	✓	✗	✗	✗	✗	✗	✗	✗	✗
EPC	Electric Power Corporation	Samoa	✓	✓	✓	✓	✓	✓	✓	✗	✓
EFL	Energy Fiji Limited	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)	✓	✗	✓	✓	✓	✗	✓	✓	✓
SP	Solomon Power	Solomon Islands	✓	✓	✓	✓	✓	✓	✓	✓	✓
TAU	Te Aponga Uira O Tumu -Te-Varoaro	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	18	22

2. GOVERNANCE

2.1 Key Governance Results

The Governance data for the 2017 benchmarking has not changed at all compared to 2016 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	US	Self	Public
CUC	US	External	Public
EDT	concession contract	External	Private
EEC	EN50160	External	Private
EPC	AUS/NZ	External	Public
EFL	AUS/NZ	External	Public
GPA	None	External	Public
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
SP	-	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 2.2).

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 2.1.

Figure 2.1: Composite Governance Score

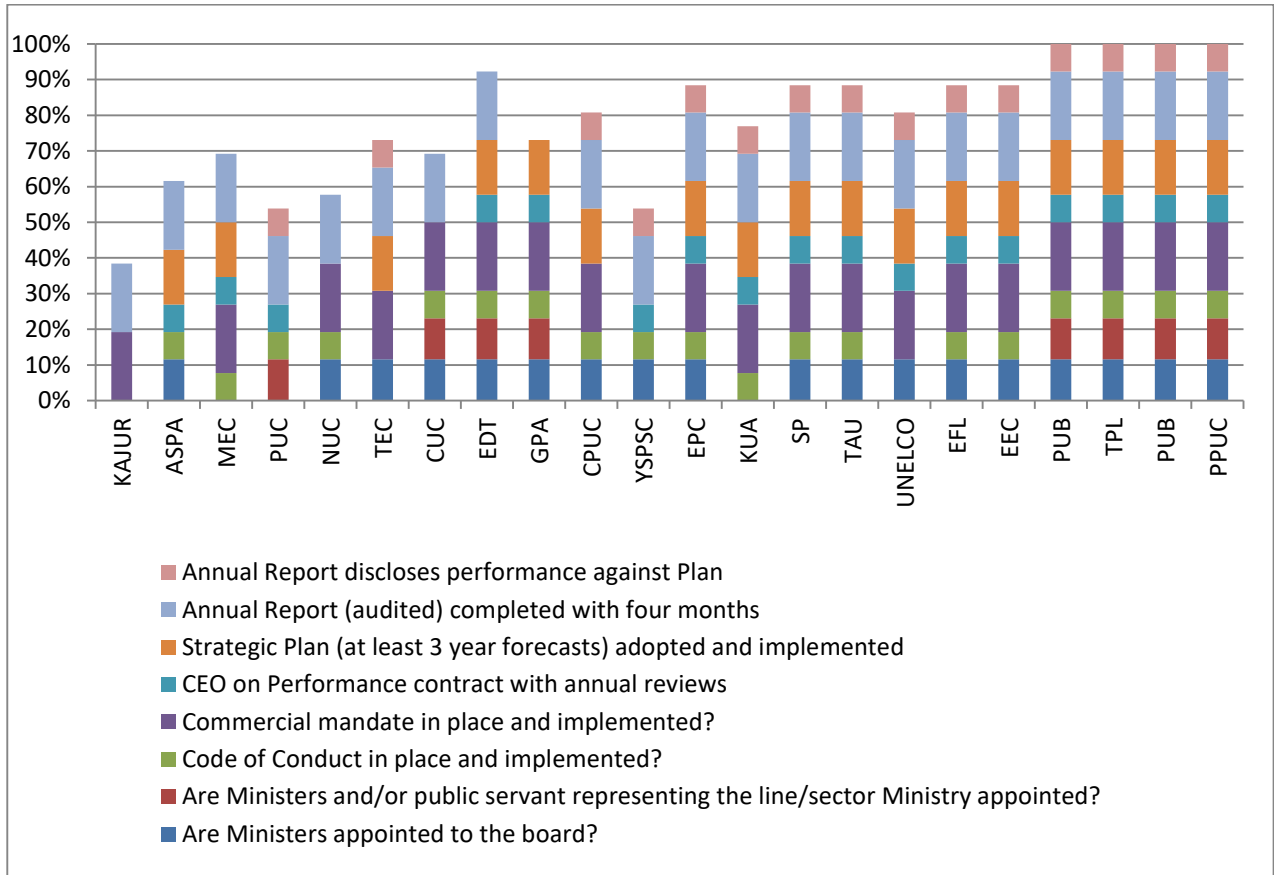
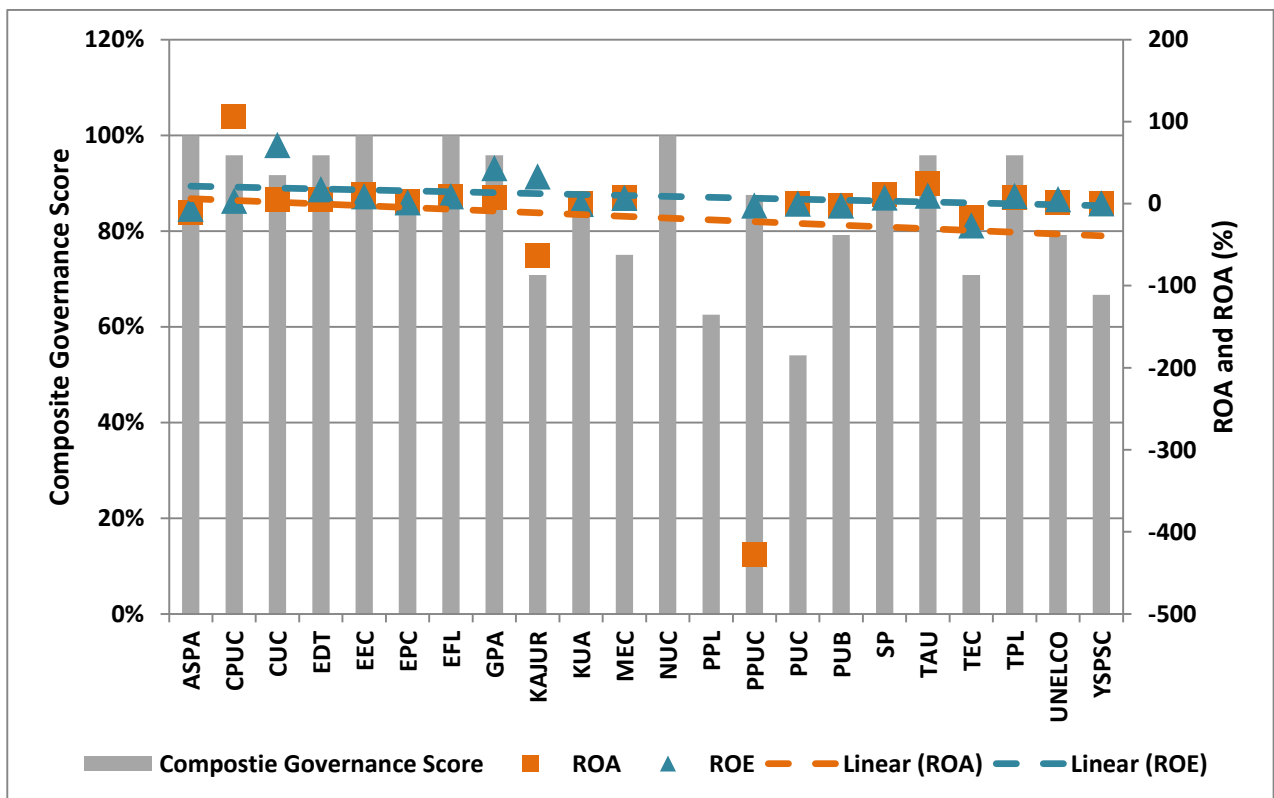


Figure 2.2: 2017 FY Composite Governance Score compared with ROE and ROA



3. GENDER

Overall, the number of females employed as a proportion of total staffing in the Pacific power utilities has slightly reduced from previous years, 17.8% in 2017 as compared with 21.3% in the 2015 FY.

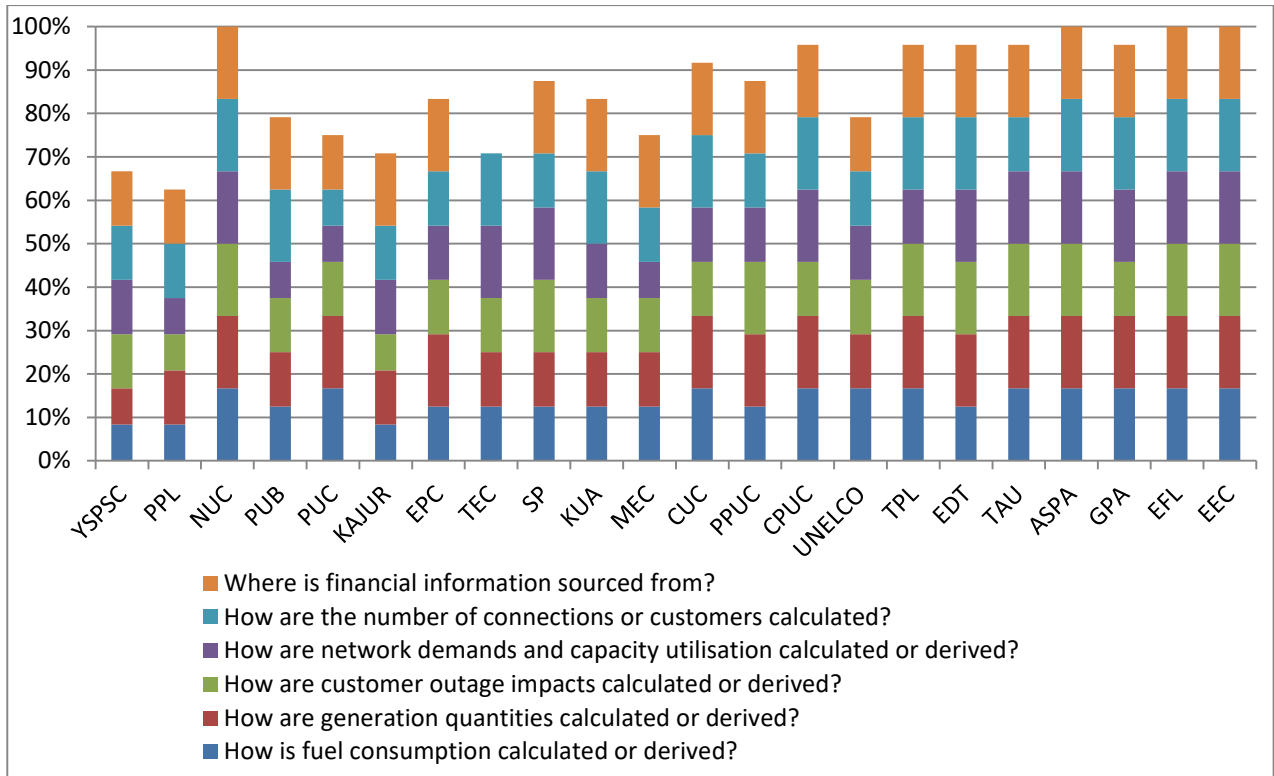
Table 3.1: Key Gender Statistics

Workforce male/female role	Regional average
Total staff (male)	82.2%
Total staff (female)	17.8%
Technical staff (male)	95.6%
Technical staff (female)	4.4%
Senior staff (male)	75.2%
Senior staff (female)	24.8%
Senior female staff as a proportion of total staff by role	
Finance	21.4%
Procurement / Supply	8.2%
Human Resources	10.7%
PR/Cust Service/Comms	27.7%
Admin	13.8%
Other	18.2%

4. DATA RELIABILITY

. Figure 4.2 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 2017 FY.

Figure 4.2: Breakdown of Reliability Grades Assessment by Utility



5. KPI RESULTS

5.1 Introduction

This section provides performance results for the 17 (2016 FY) and 22 (2017 FY) utilities that participated in each relevant reporting year. The results from the previous 2015 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.

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.

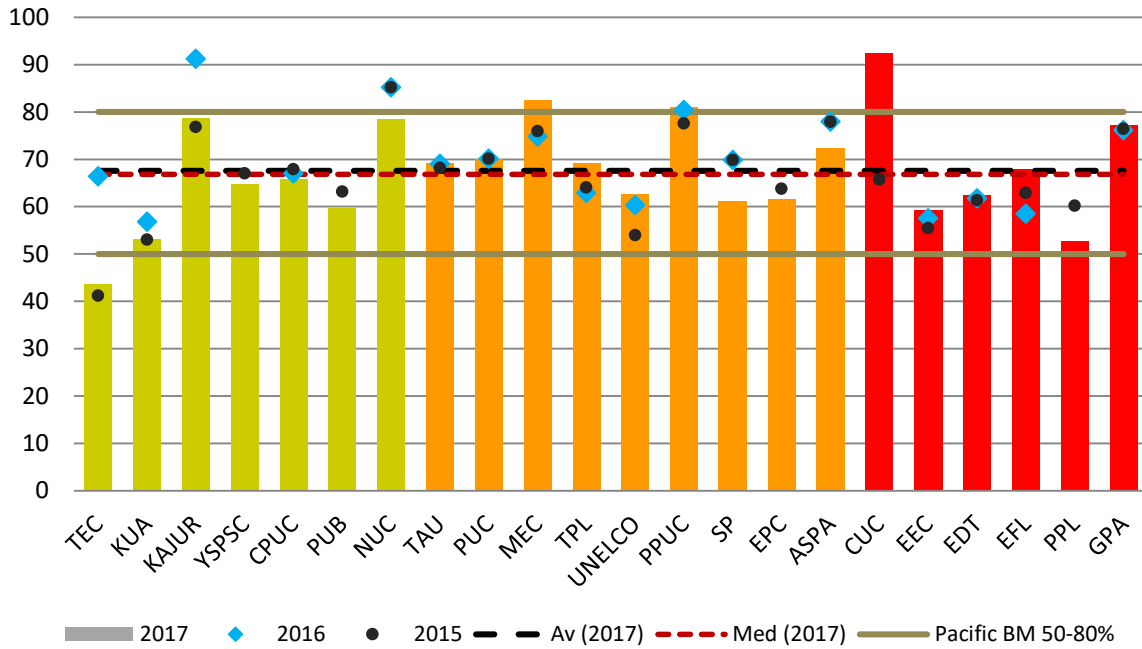
Table 5.1: Utility Key Characteristics

Utility and colour code	Peak Demand (MW) 2017	Size Category (S / M / L)	Outer Islands Serviced (Y/N)
ASPA	26.02	Medium	Yes
CPUC	2.85	Small	Yes
CUC	35.7	Large	Yes
EDT	94.33	Large	Yes
EEC	91.15	Large	Yes
EPC	25.95	Medium	Yes
EFL	160	Large	Yes
GPA	261	Large	No
KAJUR	2.6	Small	No
KUA	1.2	Small	No
MEC	8.5	Medium	Yes
NPC		Small	No
NUC	5.03	Small	No
PPL	124.9	Large	Yes
PPUC	12	Medium	Yes
PUB	5.05	Small	No
PUC	6.3	Medium	No
SP	15.47	Medium	Yes
TAU	5.05	Small	No
TEC	1.75	Small	Yes
TPL	9.56	Medium	Yes
UNELCO	11.85	Medium	Yes
YSPSC	1.99	Small	Yes

5.2 Generation Indicators

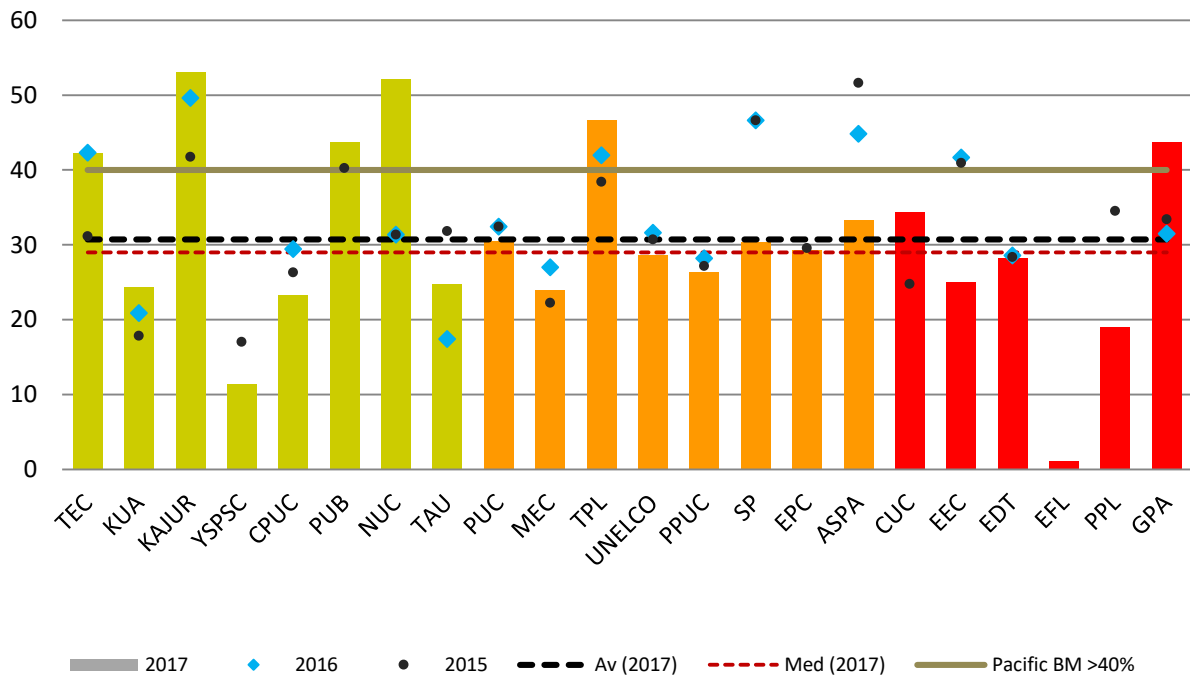
(i) Load Factor

Figure 5.1: Load Factor (%) 2017 (2016) (2015)



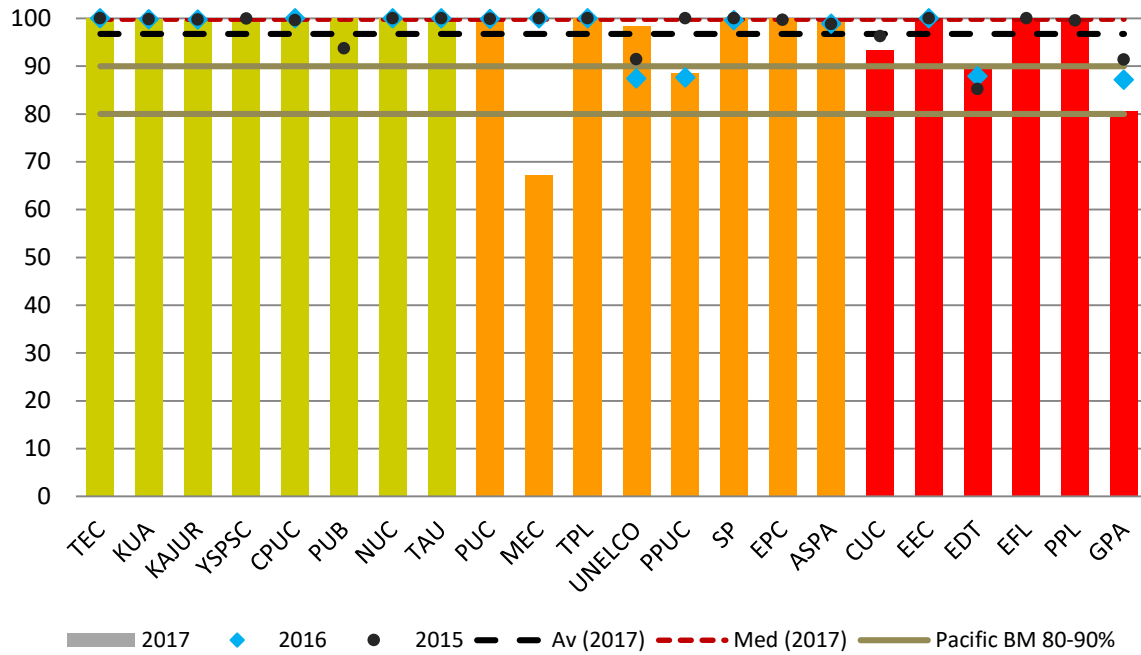
(ii) Capacity Factor

Figure 5.2: Capacity Factor (%) 2017 (2016) (2015)



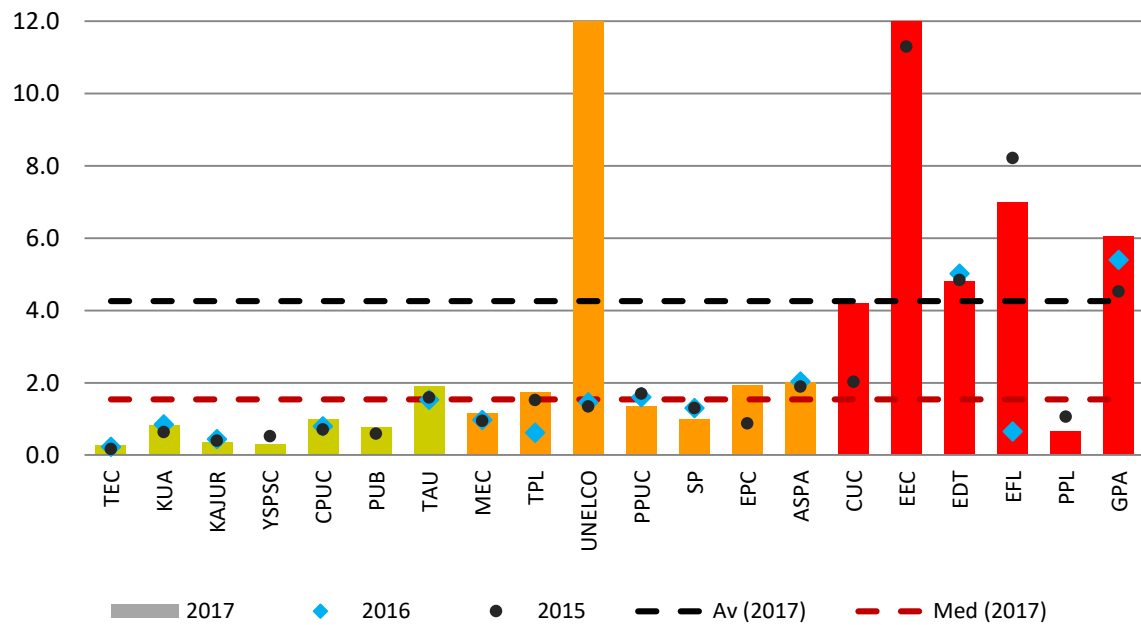
(iii) Availability Factor

Figure 5.3: Availability Factor (%) 2017 (2016) (2015)



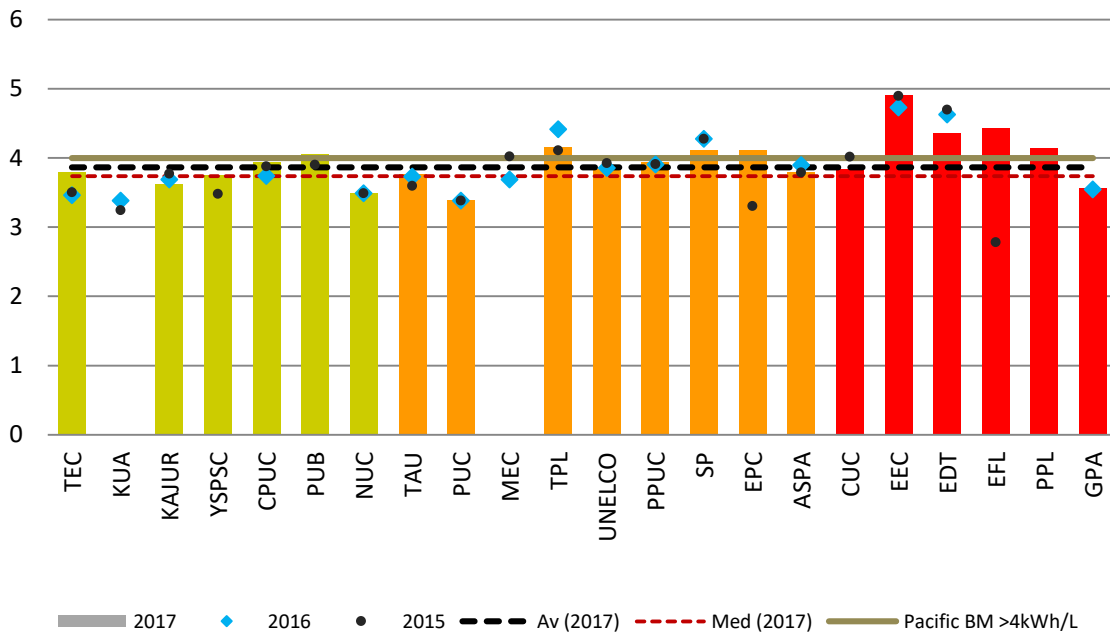
(iv) Generation Labour Productivity

Figure 5.4: Generation Labour Productivity (GWh/FTE Generation Employee) 2017 (2016) (2015)



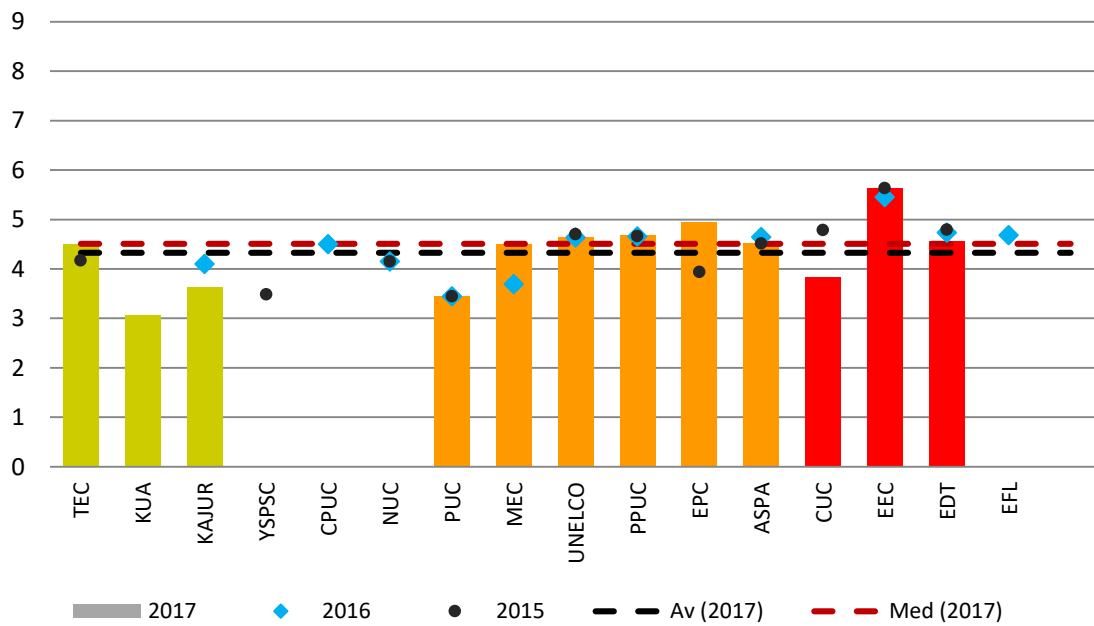
(v) Specific Fuel Consumption (kWh/L)

Figure 5.5: Specific Fuel Consumption (kWh/L) 2017 (2016) (2015)



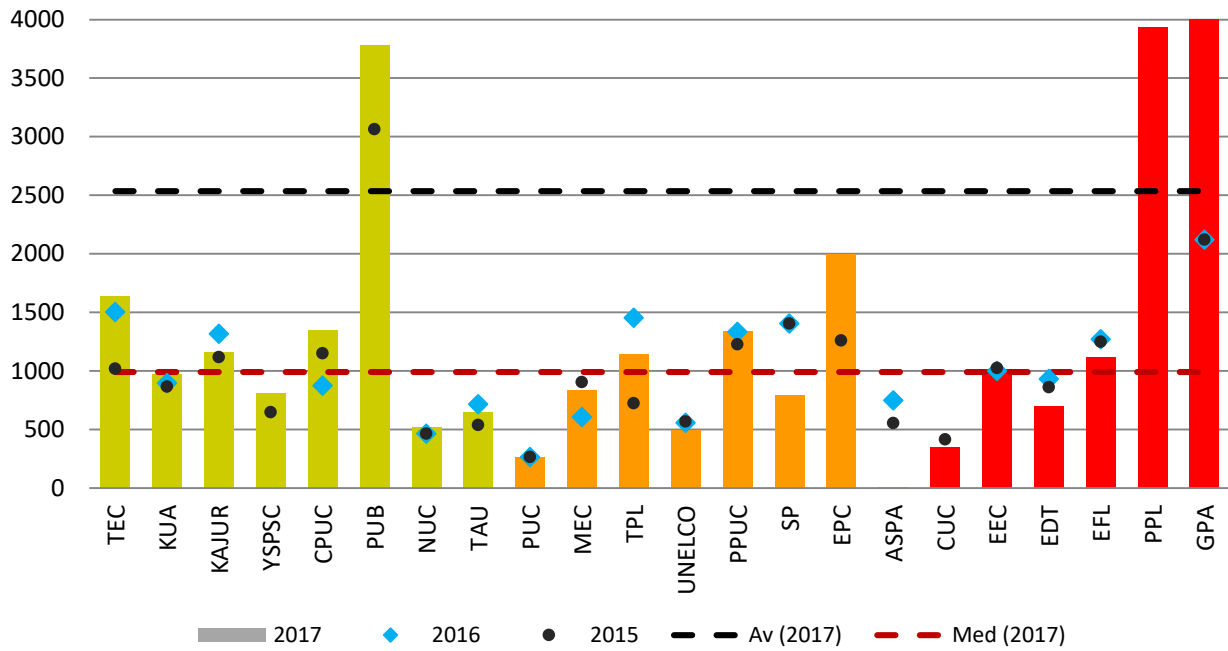
(vi) Specific Fuel Consumption (kWh/kg)

Figure 5.6: Specific Fuel Consumption (kWh/kg) 2017 (2016) (2015)



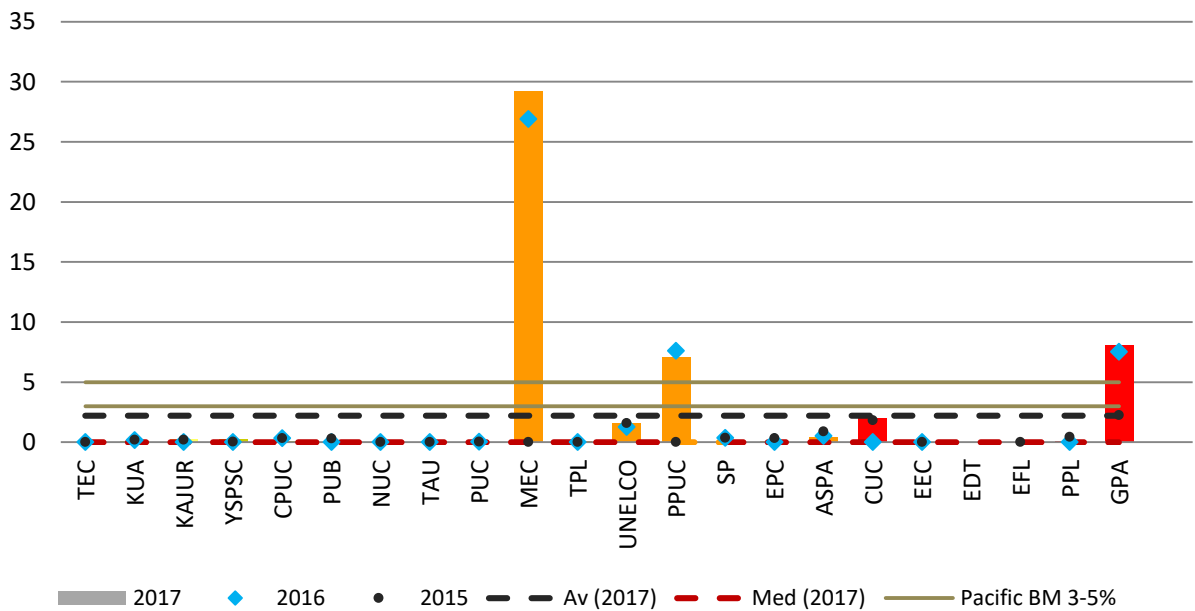
(vii) Lubricating Oil Consumption

Figure 5.7: Lubricating Oil Consumption Efficiency (kWh/litre) 2017 (2016) (2015)



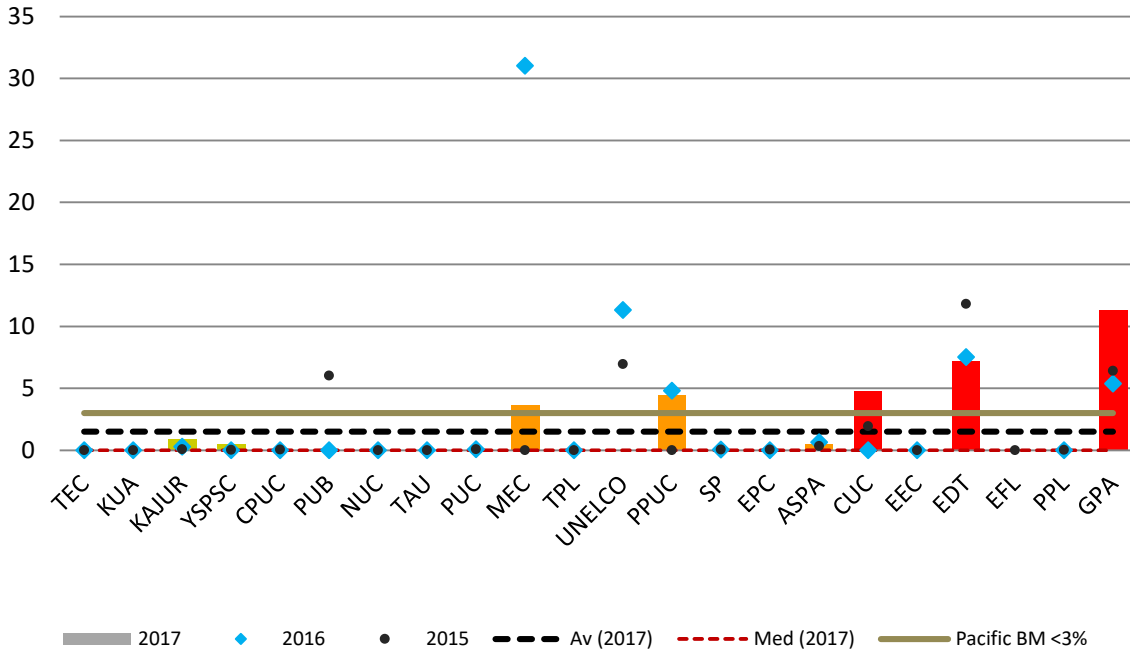
(viii) Forced Outage

Figure 5.8: Forced Outage (%) 2017 (2016) (2015)



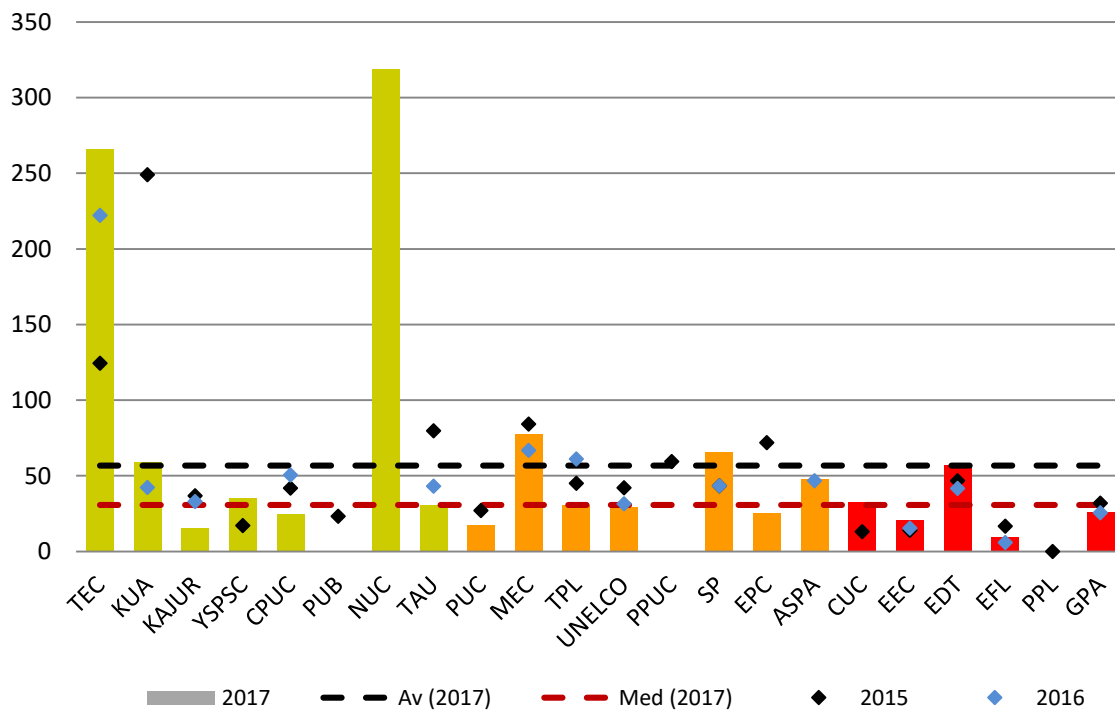
(ix) Planned Outage

Figure 5.9: Planned Outage (%) 2017 (2016) (2015)



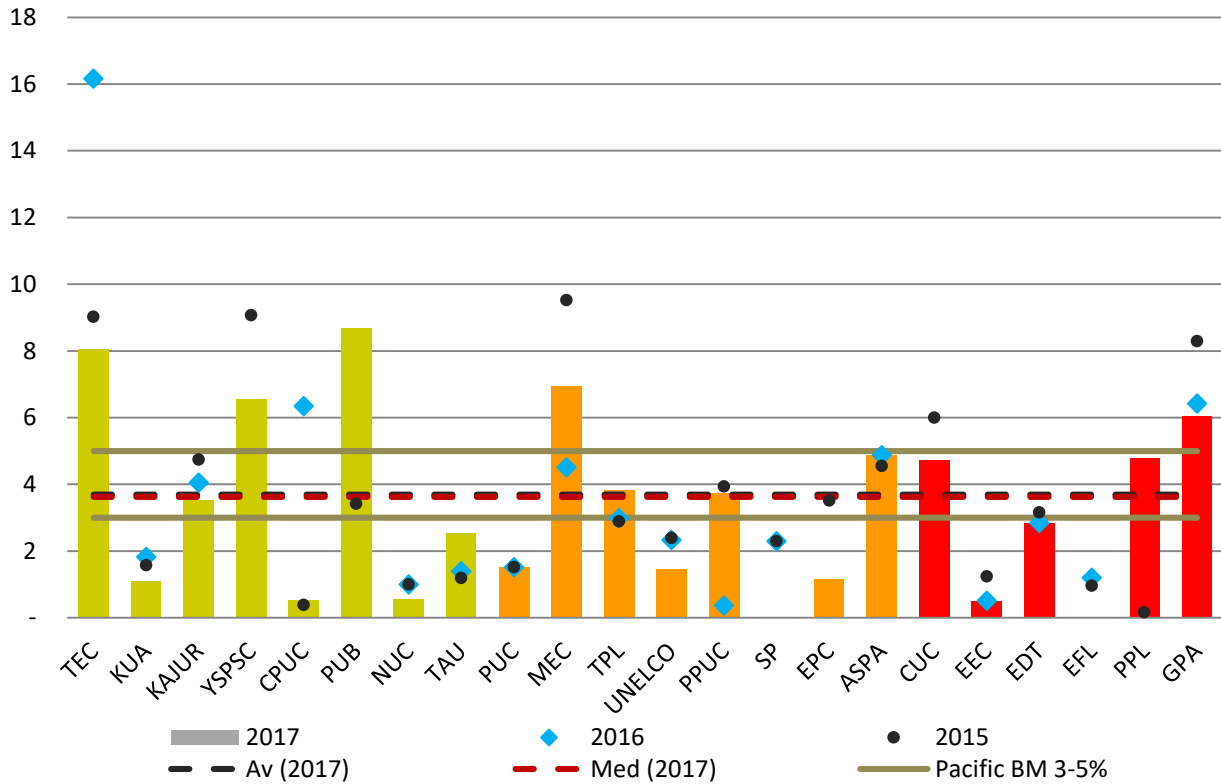
(x) Generation Operations and Maintenance (O&M) Costs

Figure 5.10: Generation O&M Costs (USD per MWh) 2017 (2016) (2015)



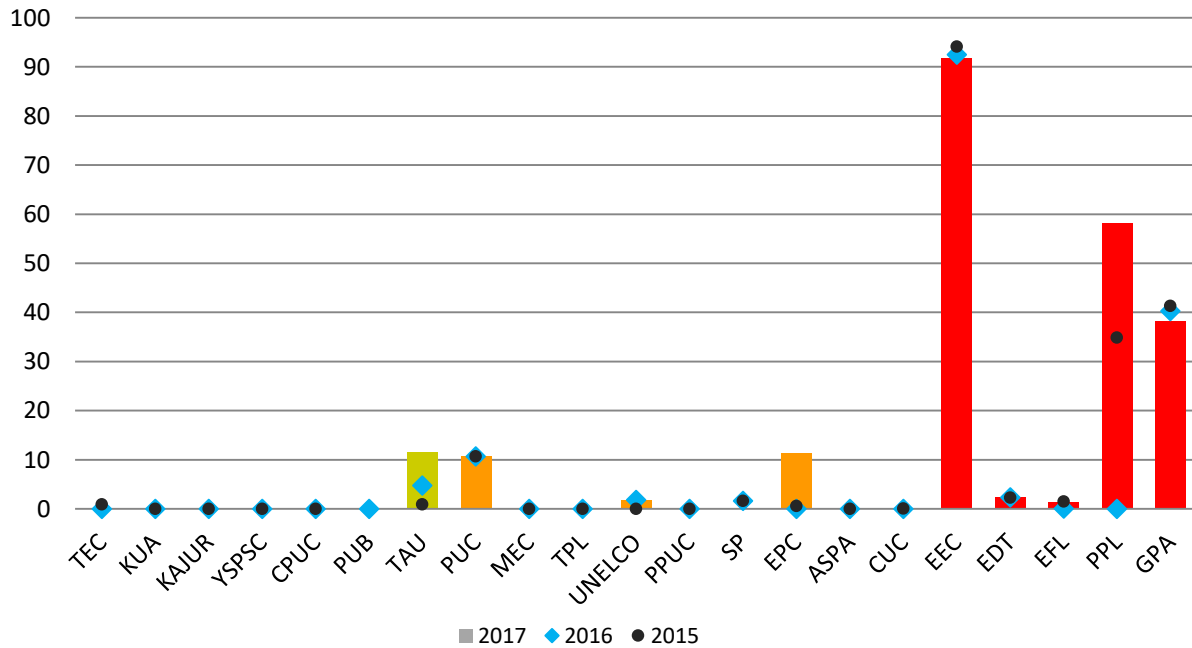
(xi) Power Station Usage / Station Auxiliaries

Figure 5.11: Station Energy (Auxiliaries) Use for Pacific Utilities (%) 2017 (2016) (2015)



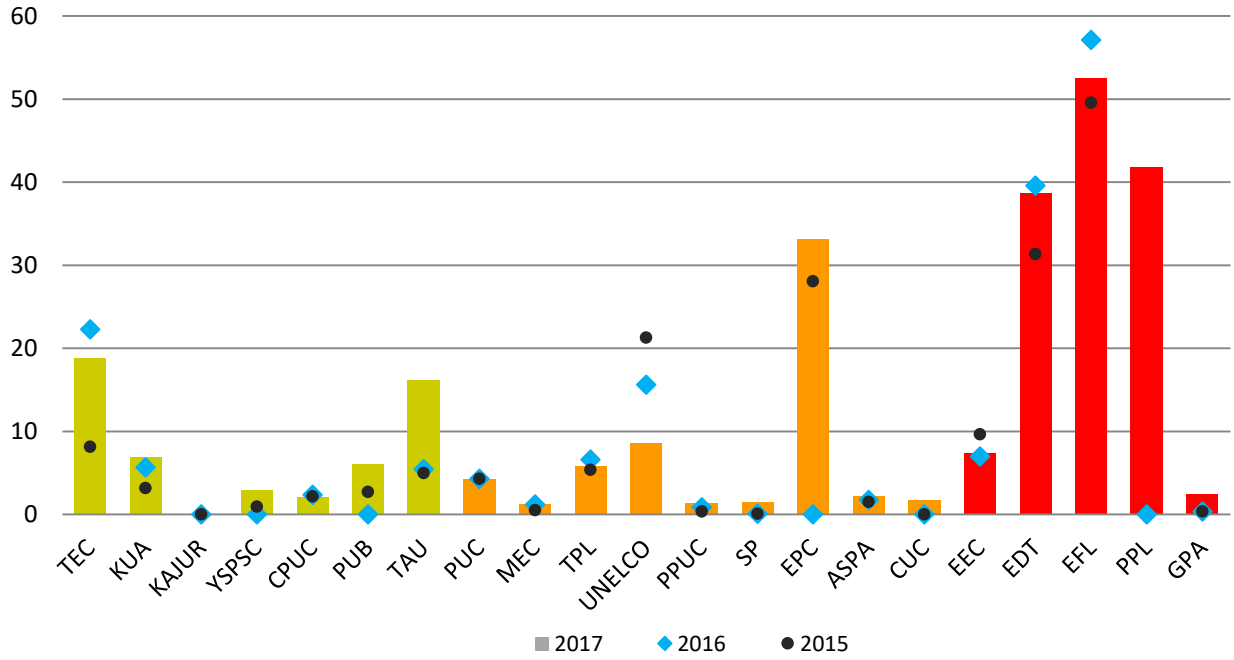
(xii) IPP Generation

Figure 5.12: IPP Generation (%) 2017 (2016) (2015)



(xiii) Renewable Energy to Grid

Figure 5.13: Renewable Energy Generation - All Utilities, Main Grid (%) 2017 (2016) (2015)



5.3 Transmission Indicators

(i) Transmission (General)

Table 5.2: Transmission Indicators 2016, 2017

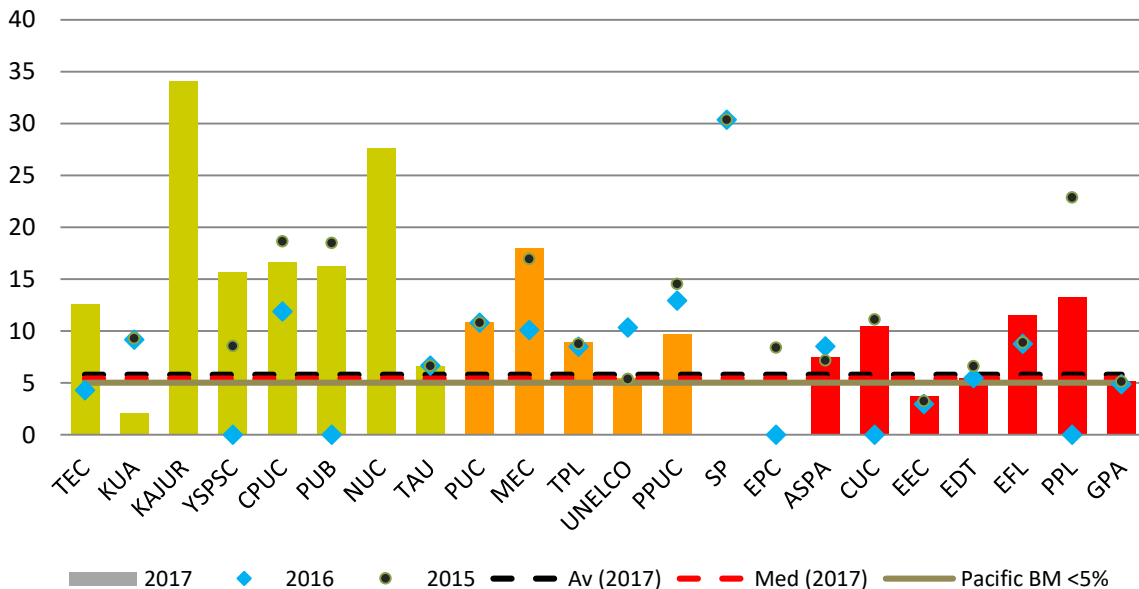
Utility	Transmission Losses (%)		Transmission Reliability (Outages/100km)		Transmission SAIDI (min/cust)				Transmission SAIFI (events/cust)			
	2016	2017	2016	2017	Unplann.	Planned	Unplann.	Planned	Unplann.	Planned	Unplann.	Planned
					2016		2017		2016		2017	
EDT	0.95	0.86	2.1	5.5	3.1	0	-	0	-	-	-	-
EFL	43	-	0	2.49	0	0	-	-	-	-	-	-
GPA	0.14	0.19	32.3	8.6	567.1	94.39	37.7	8730.8	-	-	-	-
PPL	-	-	-	-	-	-	-	37914.4	-	-	-	-

Of the 22 Pacific power utilities participated in 2017FY benchmarking survey, four utilities have transmission networks: GPA, PPL, FEA and EDT.

5.4 Distribution Indicators

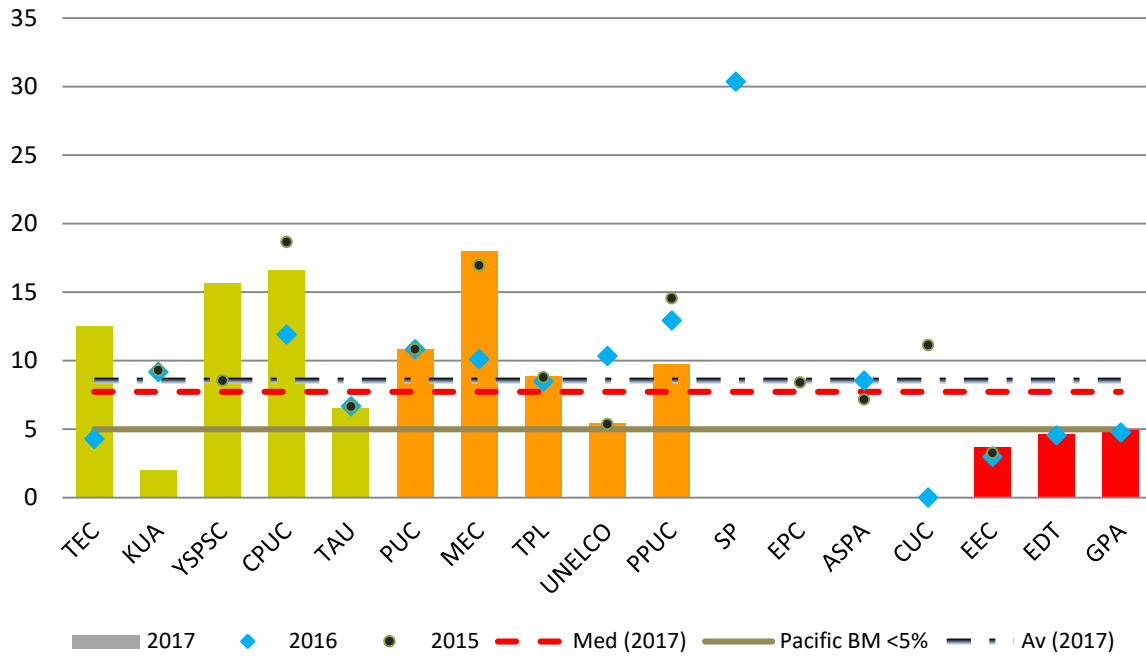
(i) Network Delivery Losses

Figure 5.14: Network Delivery Losses (%) 2017 (2016) (2015)



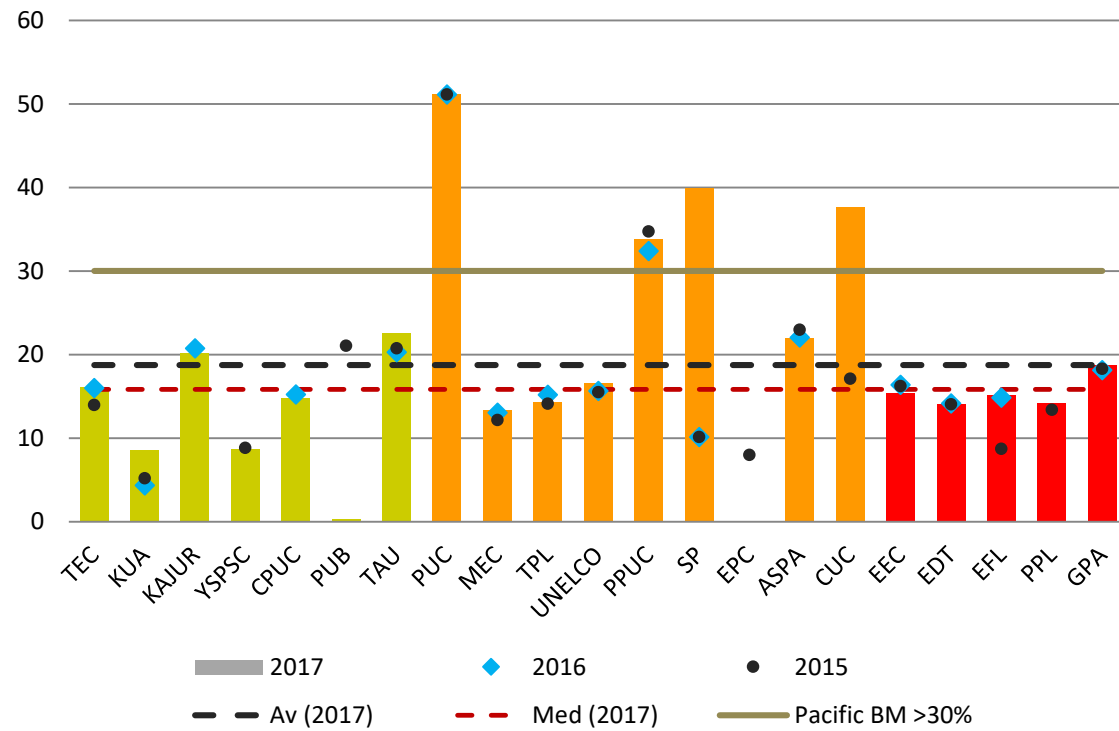
(ii) Distribution Losses

Figure 5.15: Distribution Losses Reported by Utilities (%) 2017 (2016) (2015)



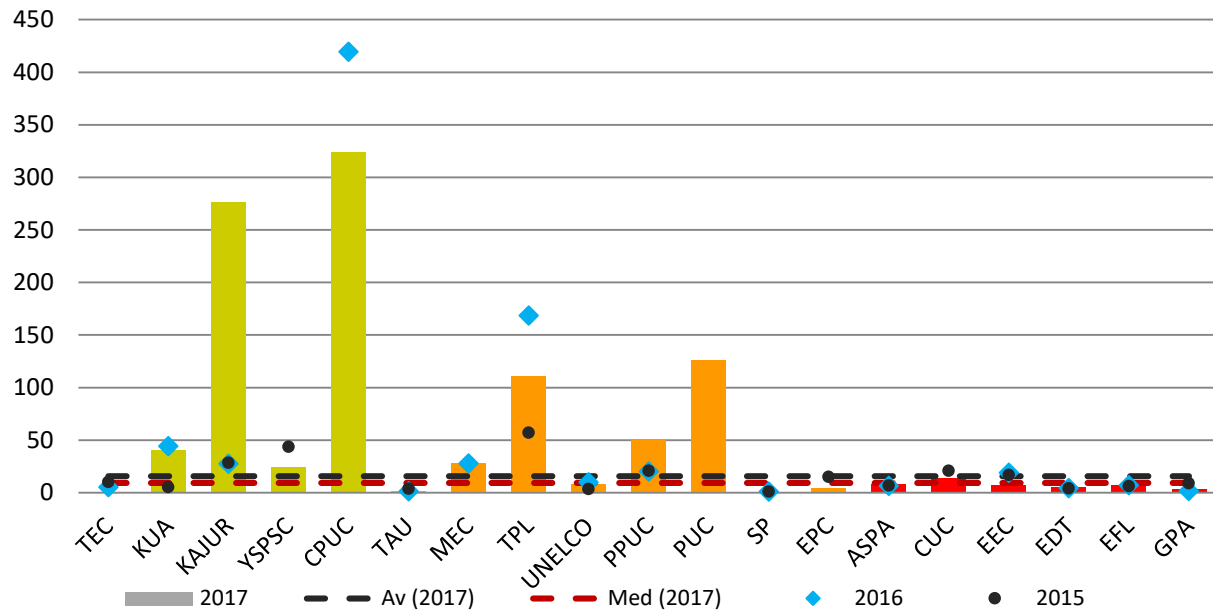
(iii) Distribution Transformer Utilisation

Figure 5.16: Distribution Transformer Utilisation (%) 2017 (2016) (2015)



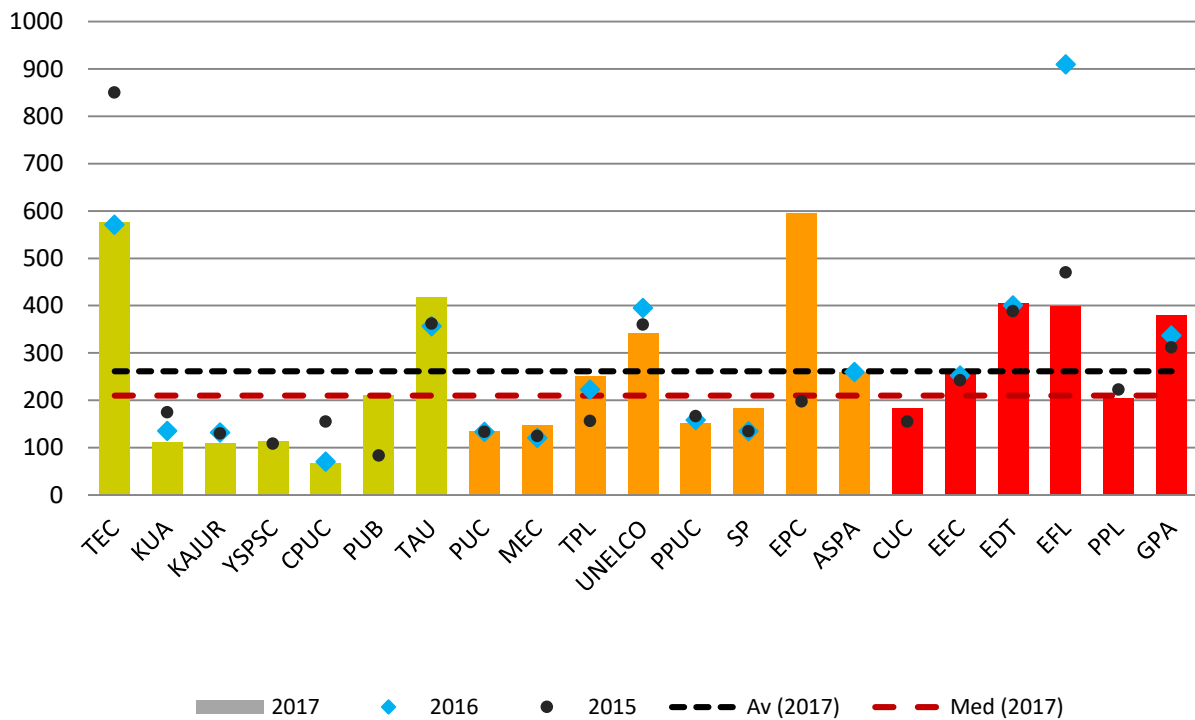
(iv) Distribution Reliability

Figure 5.17: Distribution Reliability (Events per 100 km) 2017 (2016) (2015)



(v) Customers per Distribution Employee

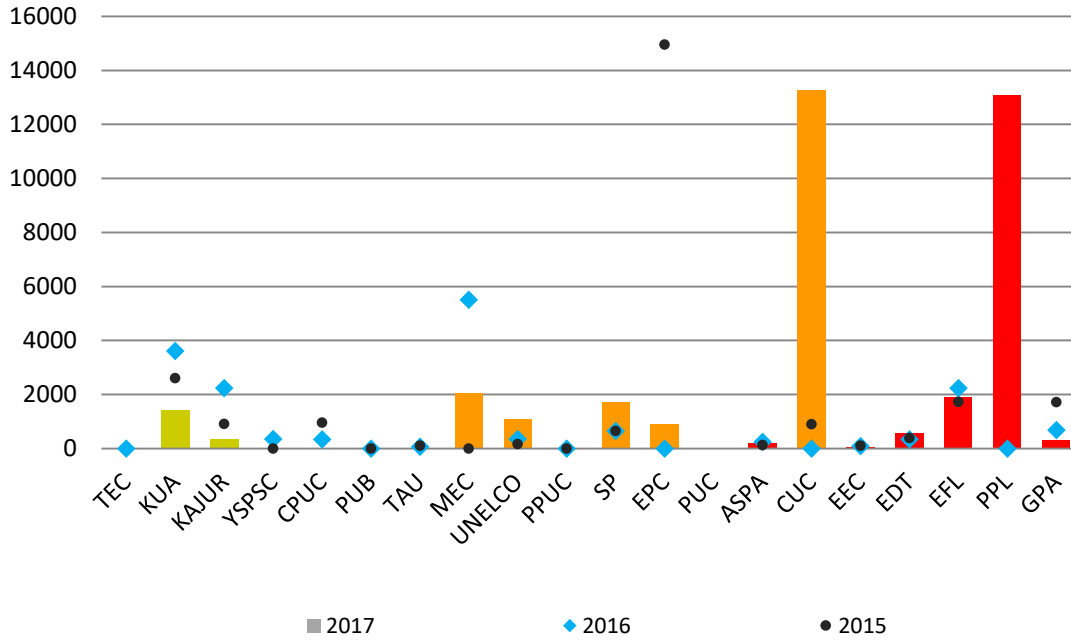
Figure 5.18: Customers per Distribution Employee 2017 (2016) (2015)



5.5 SAIDI and SAIFI

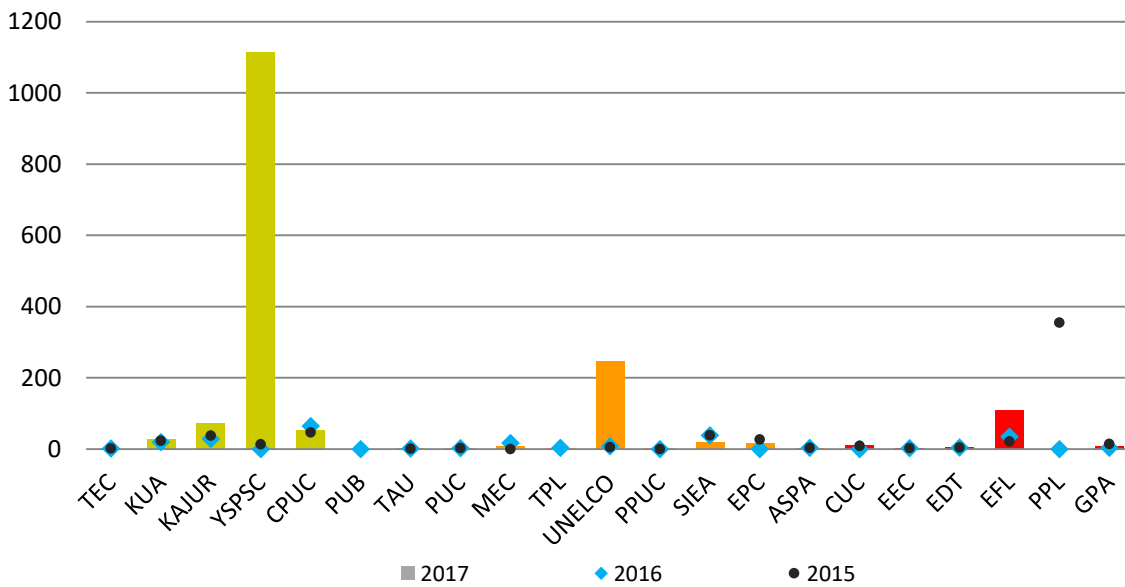
(i) System Average Interruption Duration Index (SAIDI)

Figure 5.19: SAIDI Interruptions (Minutes per Customer) 2017 (2016) (2015)



(ii) System Average Interruption Frequency Index (SAIFI)

Figure 5.20: SAIFI Interruption Frequency (Interruptions per Customer) 2017 (2016) (2015)



5.6 Demand Side Management

Table 5.6 summarises the responses received from utilities in 2016 and 2017 to DSM questions.

Table 5.6: Utility Demand Side Management Efforts in 2016 and 2017

Response from utilities	2016	2017
Number of responses	17	22
DSM activities reported	13	15
Ave. Staff assigned to DSM	1.437	0.001
Ave. Budget for DSM (USD)	513,804	588,002

5.7 Financial Indicators

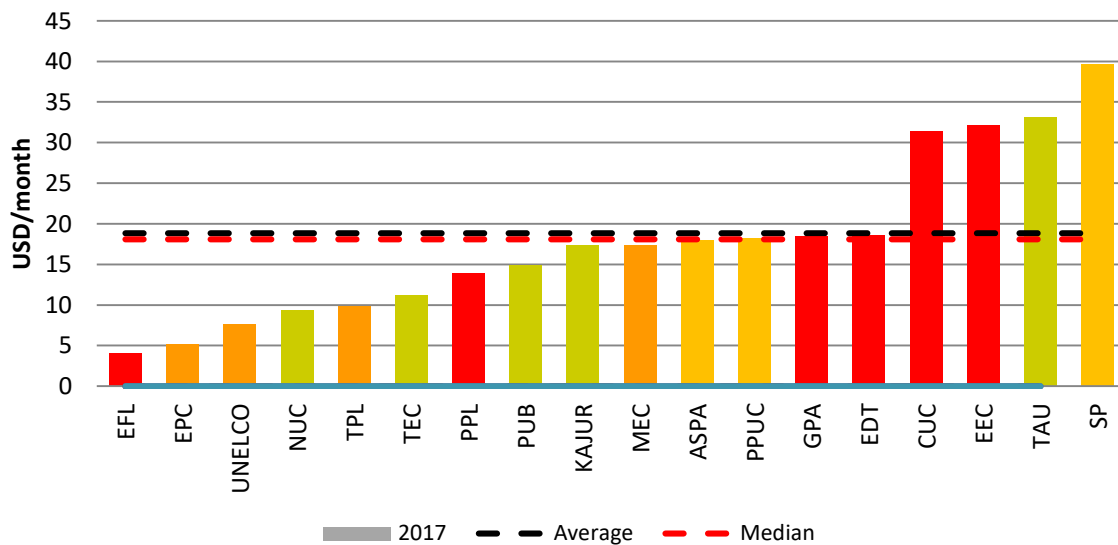
(i) Tariff Analysis

General

Conducting tariff analysis of Pacific utilities is highly complex due to the different tariff schedules and structures for the total 22 Pacific power utilities.

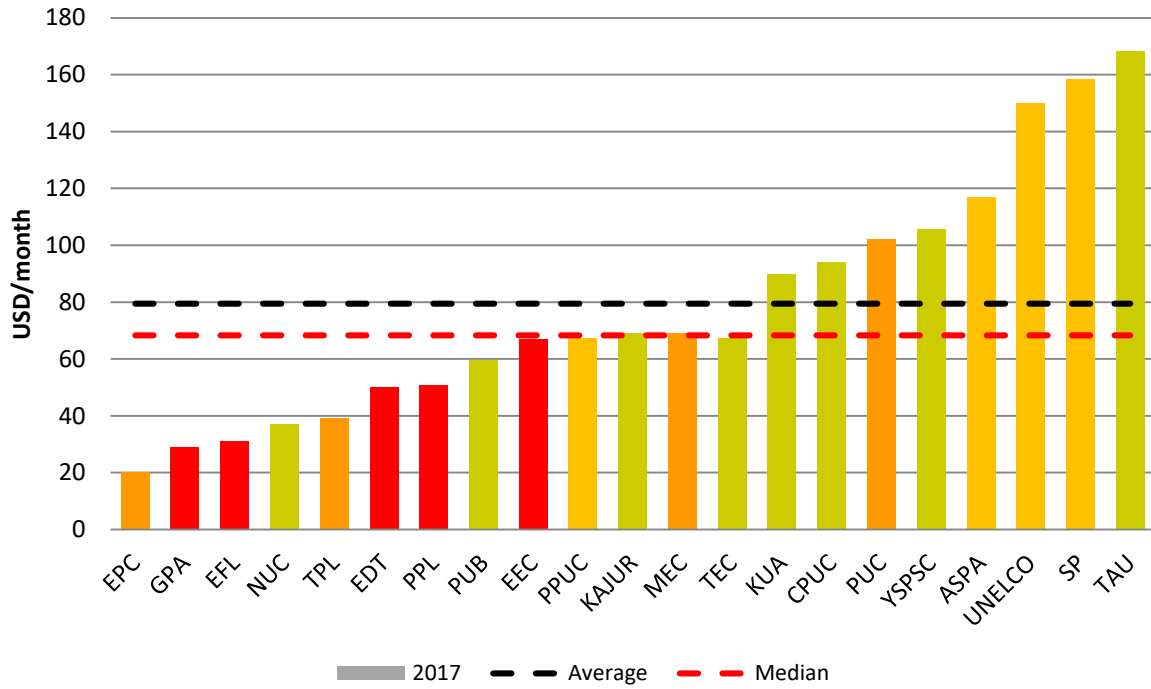
Domestic - 50kWh/month

Figure 5.21: Domestic Consumer Cost (USD per month) 2017 for 50kWh Consumption



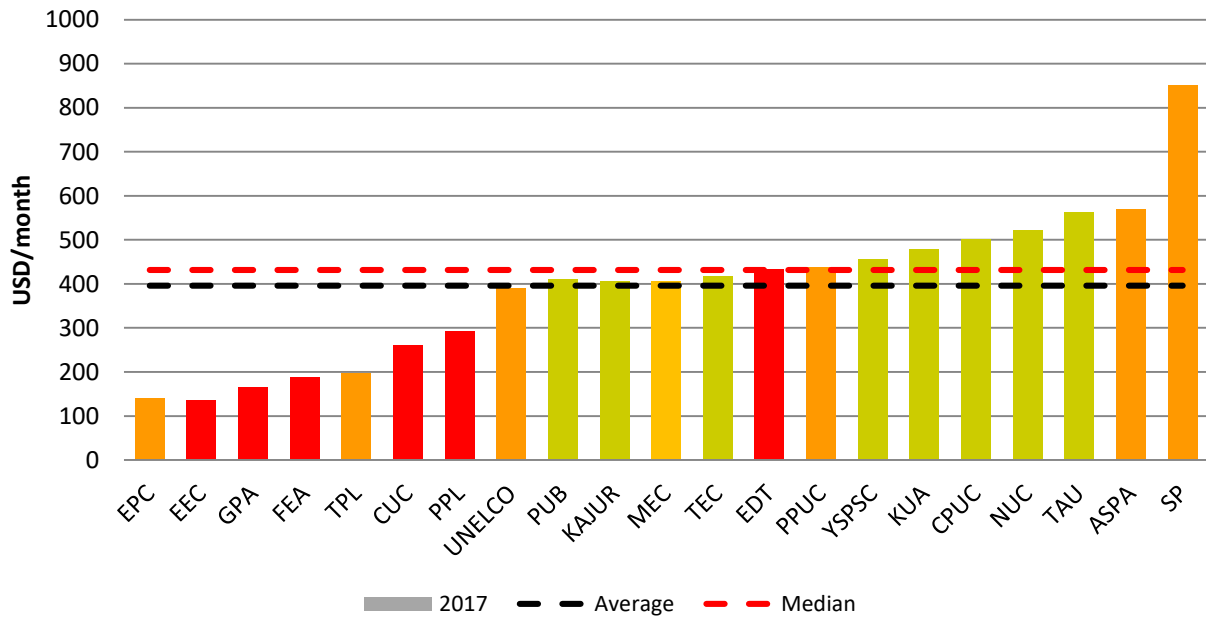
Domestic - 200kWh/month

Figure 5.22: Domestic Consumer Cost (USD per month) 2017 for 200kWh Consumption



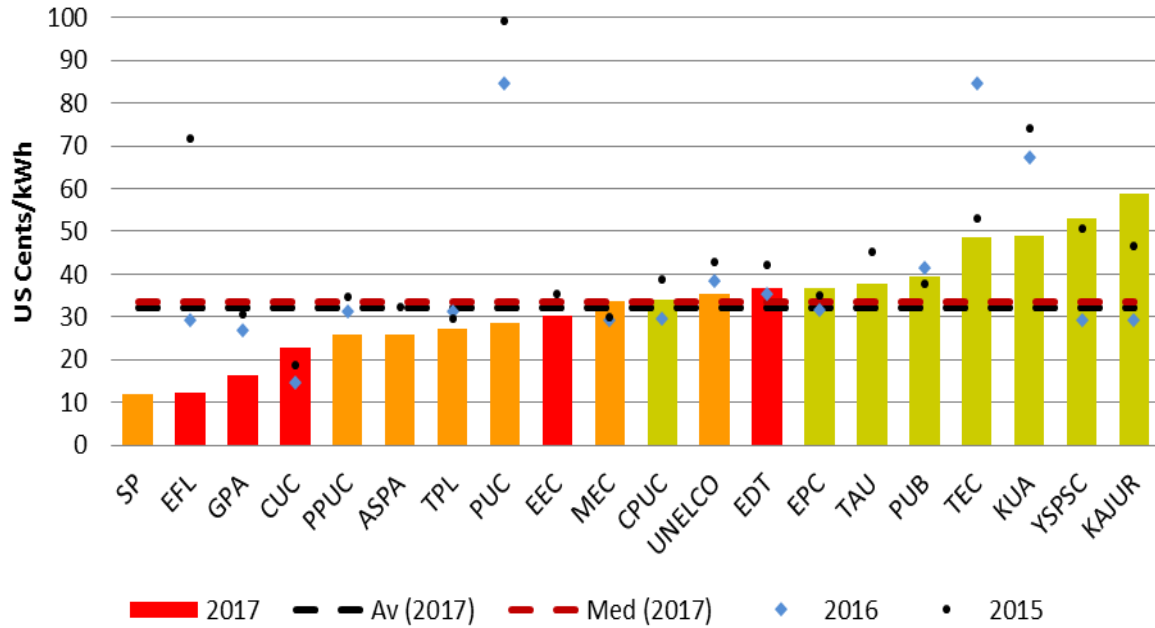
Commercial - 1000kWh/month

Figure 5.23: Commercial Consumer Cost (USD per month) 2017 for 1000kWh Consumption



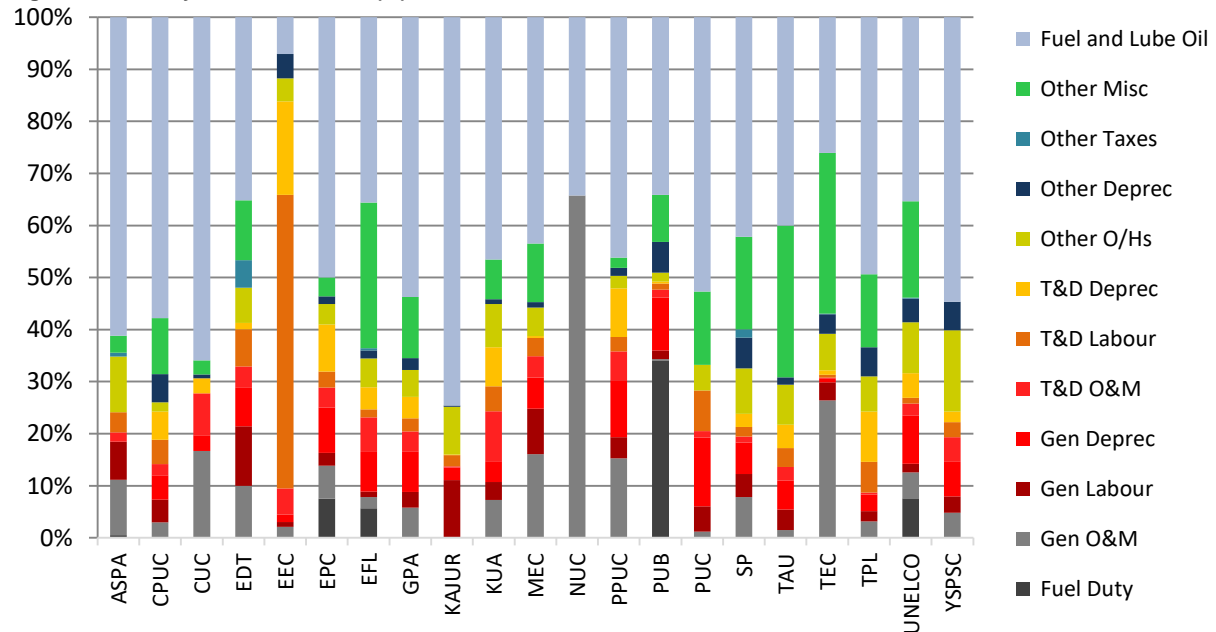
(iv) Average Supply Costs

Figure 5.24: Average Supply Costs (US Cents/kWh) 2017 (2016) (2015)



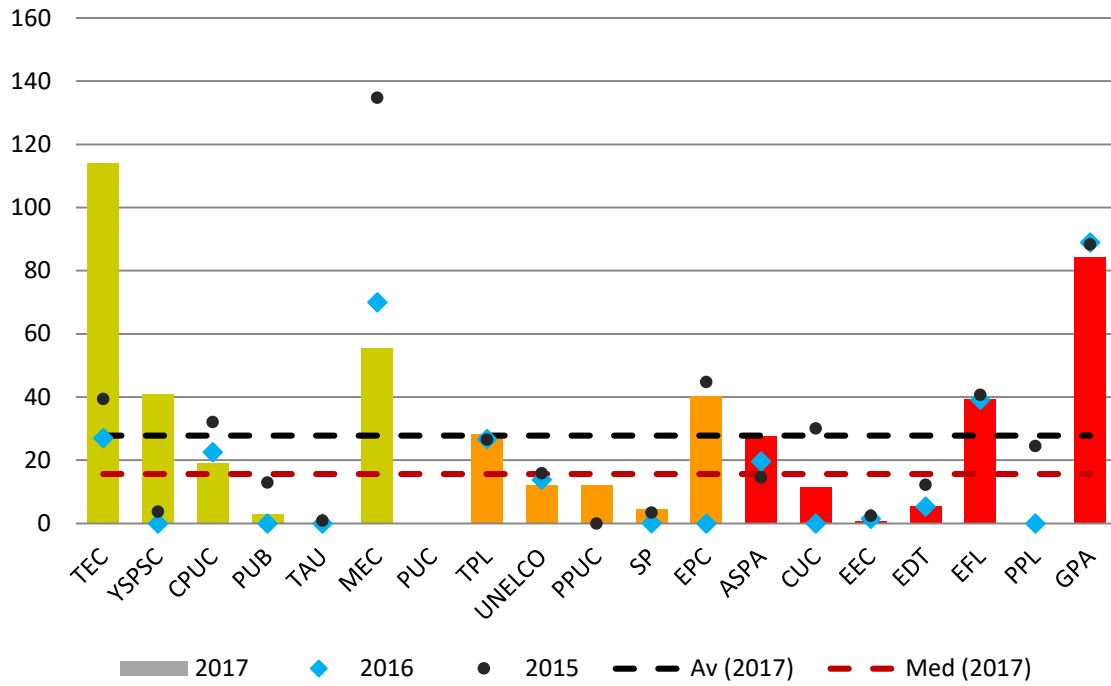
(iv) Utility Cost Breakdown

Figure 5.25: Utility Cost Breakdown (%) 2017



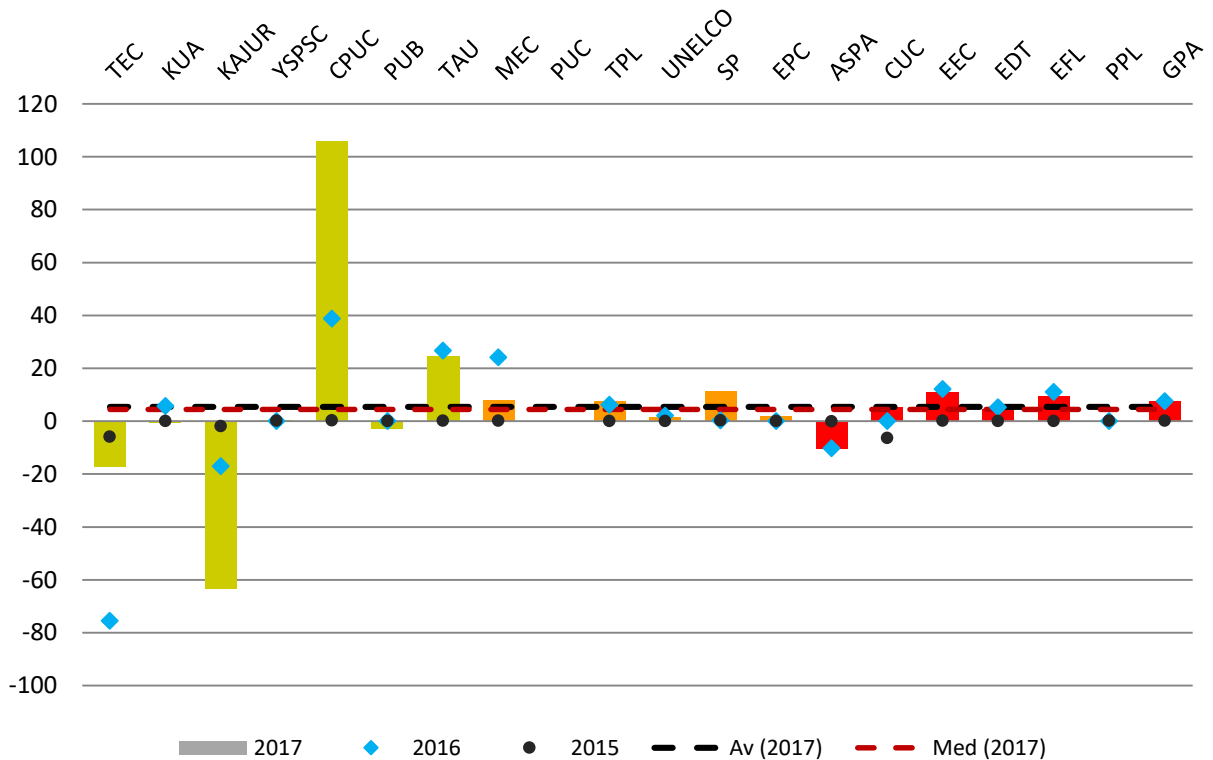
(v) Debt to Equity Ratio

Figure 5.26: Debt to Equity Ratio (%) 2017 (2016) (2015)



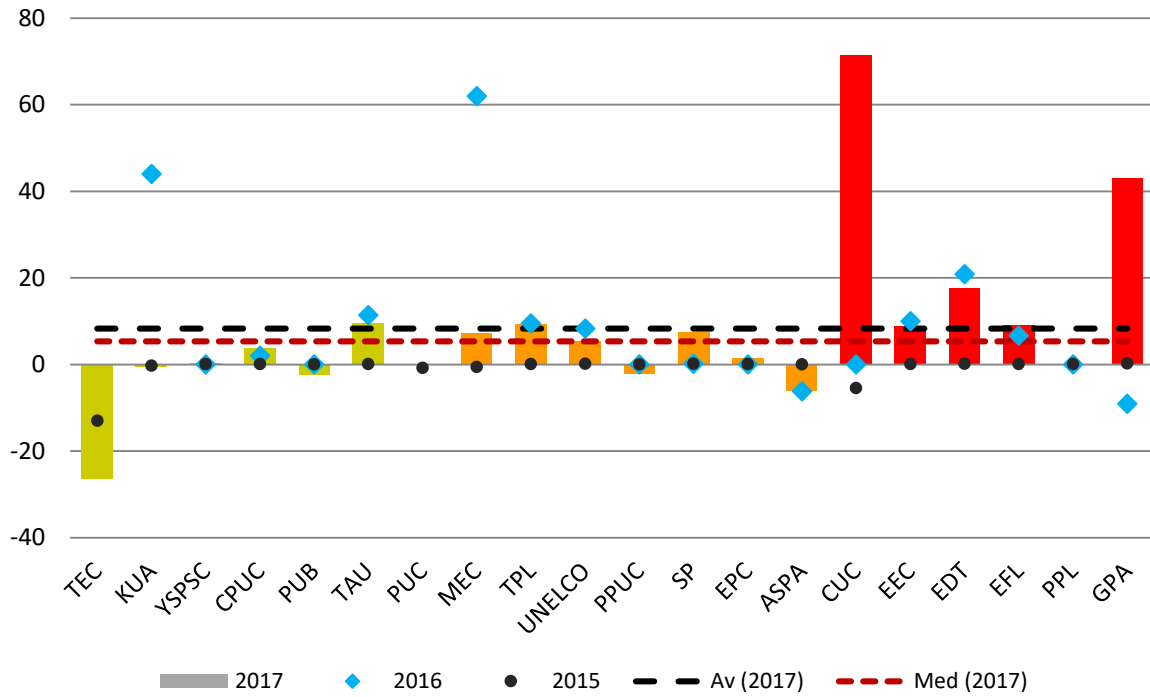
(vi) Rate of Return on Assets

Figure 5.27: Rate of Return on Total Operating Assets in 2017 (2016) (2015) (%)



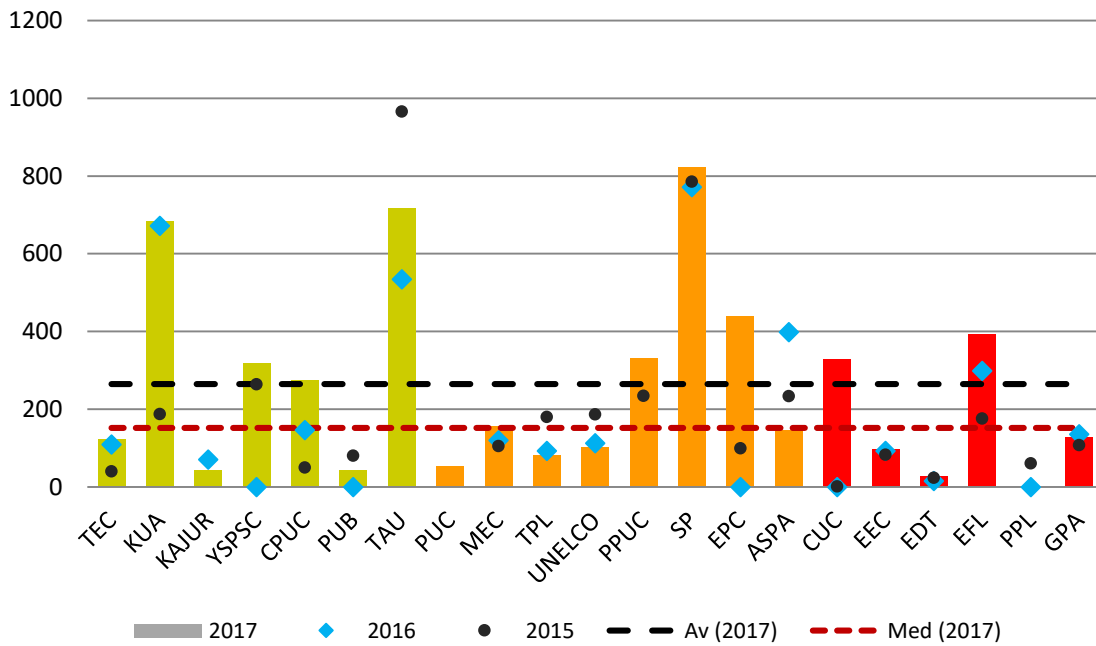
(vii) Return on Equity

Figure 5.28: Return on Equity (%) 2017 (2016) (2015)



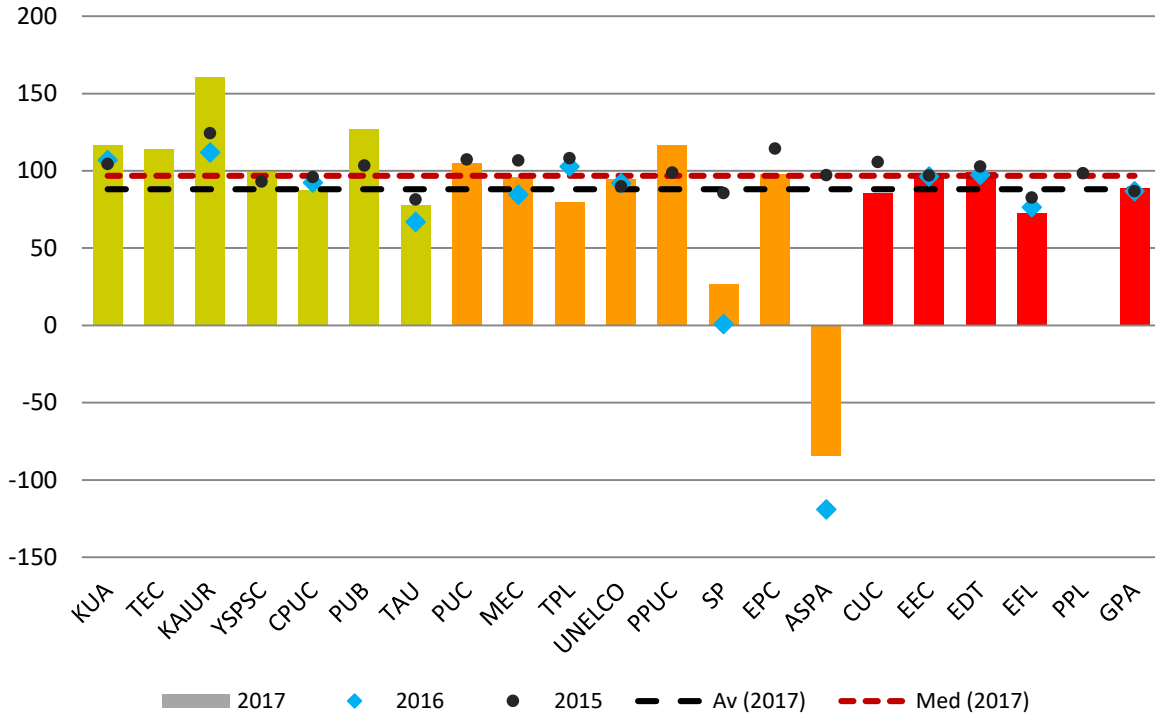
(viii) Current Ratio

Figure 5.29: Reported Current Ratio (%) 2017 (2016) (2015)



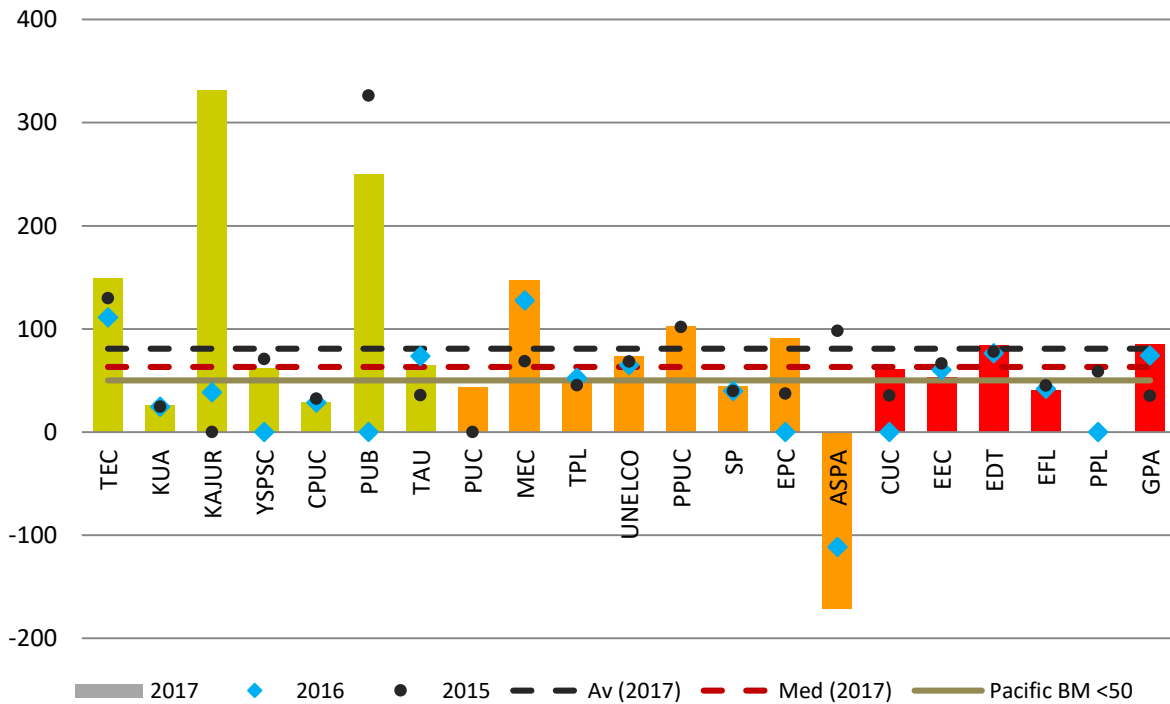
(viii) Operating Ratio

Figure 5.30: Operating Ratio in 2017 (2016) (2015)



(ix) Debtor Days

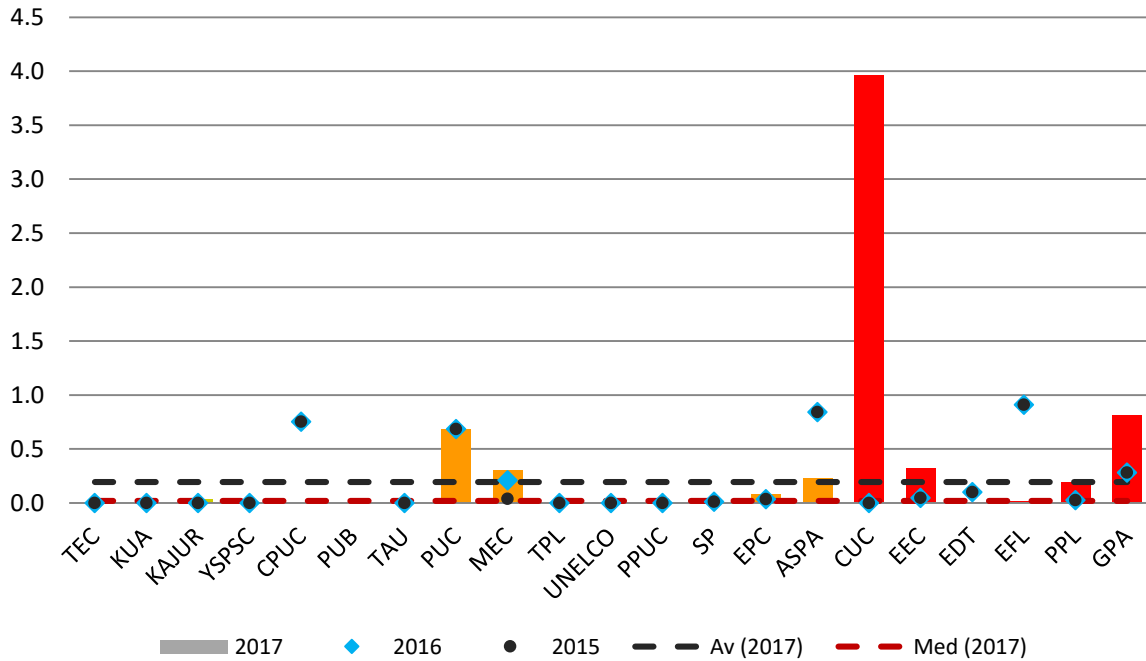
Figure 5.31: Reported Debtor Days (Days) 2017 (2016) (2015)



5.8 Human Resources and Safety Indicators

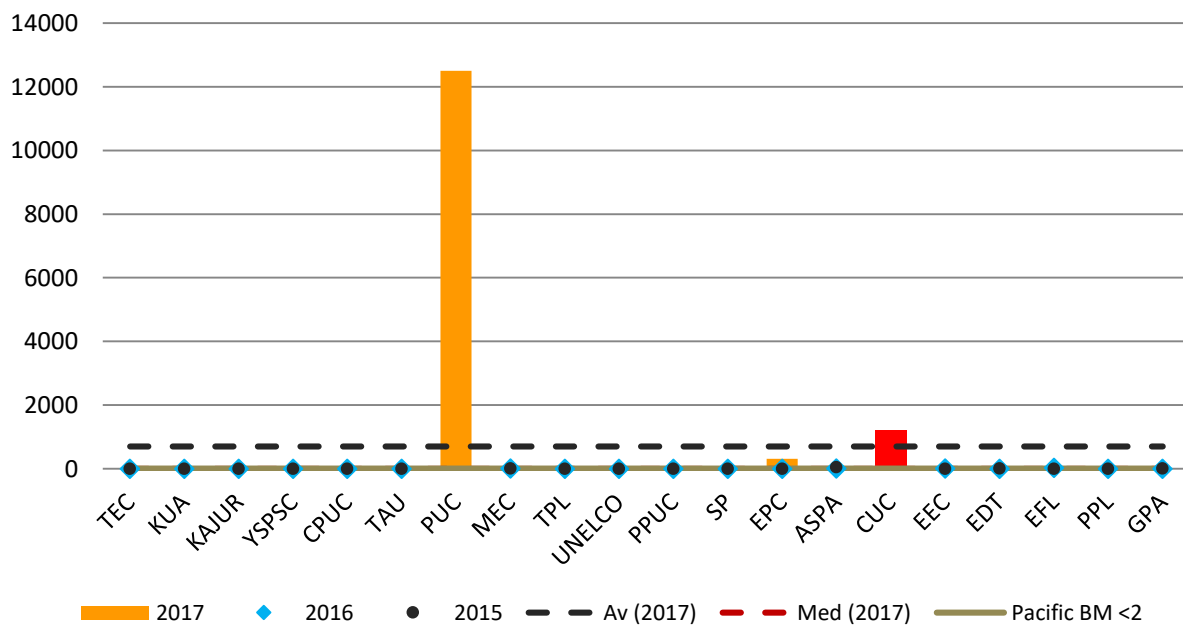
(i) Lost Time Injury Duration Rate

Figure 5.32: LTIDR (Days per FTE Employee) 2017 (2016) (2015)



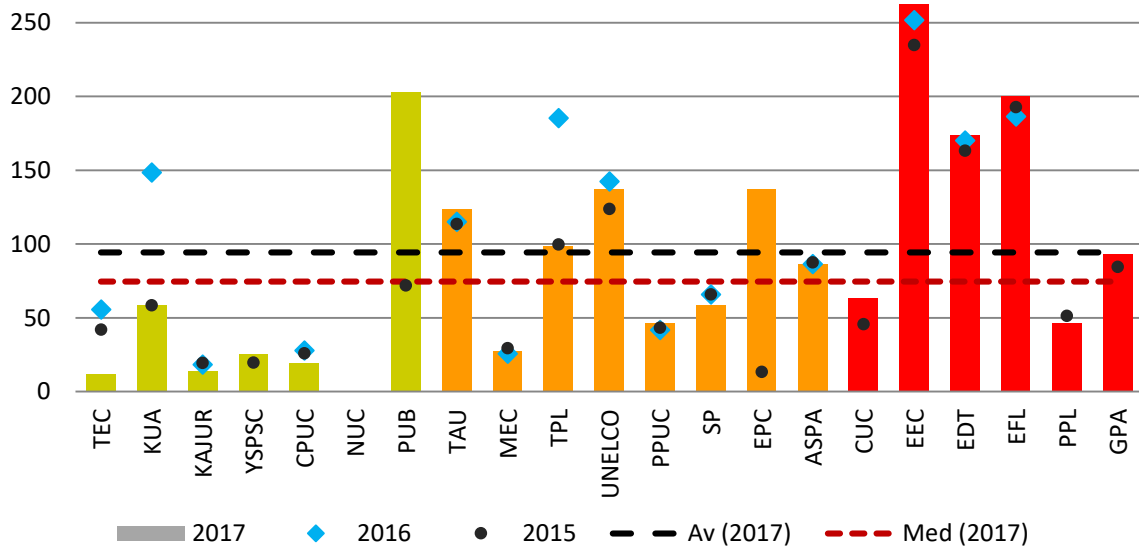
(ii) Lost Time Injury Frequency Rate

Figure 5.33: LTI Frequency Rate (Number of Incidents per Million Hours) 2017 (2016) (2015)



(iii) Overall Labour Productivity

Figure 5.34: Overall Labour Productivity 2017 (2016) (2015) (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.

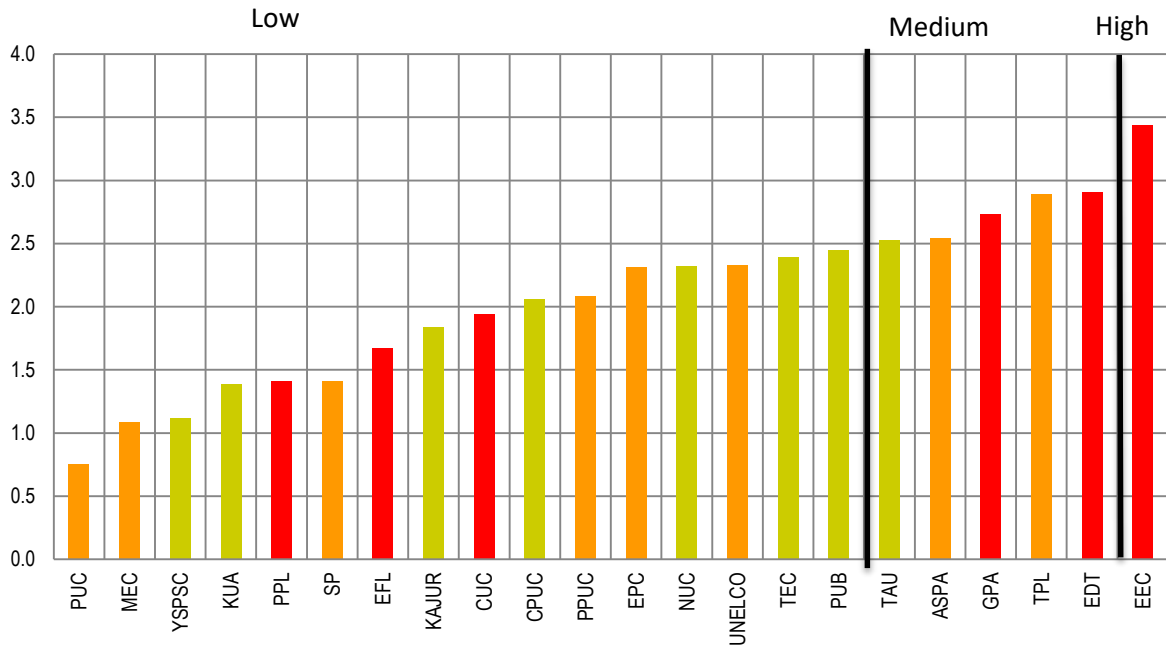
The overall composite indicator is a simple indicator that equally weights generation efficiency, capacity utilisation, system losses and overall labour productivity, as derived from quantitative scores on a scale up to 4.0. Overall, this was considered to be a valid assessment of technical performance.

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 2017FY

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 2017 FY have been shown.

Figure 5.35: Composite Technical Indicator 2017



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Table G.1: KPIs 2017 (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	72.4	33.3	99.14	1.99	3.79	4.51	4	0.38	0.48	47.48	4.88	2.26	0.00
CPUC	65.8	23.3	99.99	0.98	3.94		1348	0.00	0.01	24.52	0.52	2.04	0.00
CUC	92.48	34.32	93.31	4.19	3.83	3.83	343.05	1.95	4.74	32.98	4.73	1.76	0.01
EDT	62.5	28.3	89.45	4.81	4.35	4.56	694		7.21	57.03	2.85	38.71	2.38
EEC	59.2	25.09	100	15.58	4.90	5.64	1012.50	0.0000	0.0000	20.91	0.50	7.33	91.77
EPC	61.60	29.38	99.989	1.92	4.11	4.94	1997	0.01	0.00	25.53	1.17	33.14	11.20
EFL	67.92	1.17	100.00	7.00	4.43	4.70	1113	0	0	9.70	0.000	52.56	1.23
GPA	77.113	43.677	80.655	6.051	3.556		30935.019	8.045	11.300	25.921	6.054	2.472	38.267
KAJUR	78.675	53.021	98.884	0.362	3.624	3.624	1154.561	0.249	0.867	15.120	3.525	0.000	0.000
KUA	53.225	24.424	99.937	0.821		3.06	967.445	0.063	0.000	59.471	1.108	6.946	0.000
MEC	82.556	23.950	67.144	1.145	3.798	4.51	829.729	29.221	3.635	77.387	6.933	1.249	0.000
NUC	78.583	52.220	100.000		3.487		521.774	0.000	0.000	318.942	0.545	3.348	0.000
PPL	52.681	19.022	99.972	0.647	4.14		3936.993	0.028	0.000	0.000	4.775	41.88	58.119
PPUC	81.026	26.425	88.466	1.355	3.934	4.683	1337.269	7.066	4.468	0.000	3.726	1.321	0.000
PUB	59.745	43.768	100.000	0.756	4.058		3778.714	0.000	0.000	0.000	8.680	6.038	0.00
PUC	70.140	30.422	99.906	#DIV/0!	3.387	3.445	265.224	0.031	0.063	17.801	1.517	4.282	10.667
SP	61.167	30.362	100.000	0.999	4.105	#DIV/0!	786.644	0.000	0.000	65.892	4034.296	1.442	0.000
TAU	69.198	24.772	100.000	1.911	3.759		642.143	0.000	0.000	30.769	2.535	16.222	11.607
TEC	43.646	42.337	100.000	0.266	3.777	4.497	1635.482	0.000	0.000	266.121	8.048	18.792	0.000
TPL	69.233	46.722	99.999	1.729	4.149		1140.171	0.001	0.000	30.914	3.825	5.849	0.000
UNELCO	62.507	28.612	98.445	32.355	3.833	4.640	487.583	1.555	0.000	29.233	1.441	8.661	1.625
YSPSC	64.667	11.461	99.320	0.300	3.753		807.175	0.220	0.460	35.096	6.564	2.962	0.000

Table G.2: KPIs 2017 (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	97.464	0	0	0	0	No	7.442		258.905	8.419	21.911	10137.366
CPUC	97.961	0	0	0	0	No	16.609	16.609	65.850	324.33	14.762	11355.00
CUC	98.032	0	0	0	0	Yes	10.436		182.343	13.611	37.564	15079.796
EDT	1.058	63.376	0.0	0.0	0.0	Yes	5.421	4.605	403.892	4.793	14.104	9140.422
EEC	0.000	0	0.000	0	0	Yes	3.688	3.688	260.701	6.74	15.376	18662.37
EPC	66.849	0	0	0	0	Yes			595.450	4.283	9041.961	709.805
EFL	12.199	33.923	0	0	0	Yes	11.544		399.294	6.789	15.081	2628.746
GPA	15.119	75.021	0	0	0	Yes	5.132	4.956	380.142	2.936	18.717	7657.097
KAJUR	100.000	0.000	0	0	0	No	34.095	34.095	109.348	276.793	20.133	3307.848
KUA	93.066	0	0	0	0	No	2.022	2.022	110.250	40.044	8.512	6156.374
MEC	98.751	0	0	0	0	No	17.983	17.983	145.699	27.781	13.291	27215.204
NUC	96.797	0	0	0	0	Y/N	27.628		0.00			
PPL	19.077	21.442	0.00	0.00	36.678	Yes	13.237	62.40	204.938		14.143	
PPUC	98.679	0	0	0	0	No	9.717	9.717	150.587	51.111	33.805	15919.702
PUB	100.000					Yes	16.229		209.691		0.243	
PUC	74.384	0	0	0	0	Yes	10.813	10.813	132.948	125.67	51.153	4952.68
SP	100.000	0	0	0	0	Yes	102.038	102.04	183.208	#VALUE!	39.923	#VALUE!
TAU	83.778	0	0	0	0	Yes	6.568	6.568	417.000	1.208	22.612	11568.701
TEC	93.709	0	0	0	0	No	12.543	12.543	575.800	0.000	16.043	2484.594
TPL	94.149	0	0	0	0	Yes	8.883	8.883	249.239	110.609	14.254	12404.800
UNELCO	89.713	0	0.000	0	0	Yes	5.436	5.436	341.634	8.595	16.573	3786.066
YSPSC	100.000	0.00	0.00	0.00	0.00	No	15.635	15.635	112.349	24.298	8.620	3201.444

Table G.3: KPIs 2017 (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	63.697	0.148	0.061	0.061	0.000	140.849	140.849	0.000	0.662	0.662	0.000	204.695	0.723
CPUC	0.012	0.001	28.791	22.148	6.642	0.088	0.082	0.006	24.954	18.715	6.238	0.101	53.744
CUC	3609.447	7140.681	9.243	5.461	3.782	2513.056	2509.719	3.337	2.035	1.990	0.045	13263.185	11.278
EDT	95.862	289.135	3.101	2.003	1.098	166.681	166.681	0.000	1.775	1.775	0.000	551.678	4.876
EEC	28.000	33.000	2.021	1.512	0.508	0.000	0.000	0.000	0.000	0.000	0.000	61.000	2.021
EPC	612.289	182.587	13.699	12.886	0.813	118.391	118.356	0.035	1.377	1.377	0.000	913.267	15.076
EFL	172.201	1721.247	14.193	1.312	12.882	27.063	27.063	0.000	93.947	25.405	68.542	1920.511	108.141
GPA	88.736	55.195	1.989	1.540	0.450	162.343	162.343	0.000	5.903	5.903	0.000	306.274	7.893
KAJUR	70.364	39.958	36.186	24.627	11.559	247.850	0.500	247.350	35.683	2.010	33.673	358.172	71.870
KUA	436.837	70.437	25.560	24.996	0.563	899.313	899.313	0.000	0.807	0.807	0.000	1406.587	26.366
MEC	934.715	542.361	6.229	5.152	1.077	563.611	190.407	373.204	2.447	1.883	0.564	2040.688	8.676
NUC													
PPL	5087.107	899.420	57.143	52.777	4.366	7083.023	6708.346	374.677	58.500	56.742	1.758	13069.550	115.643
PPUC													
PUB													
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
SP	1225.931	138.399	12.709	10.796	1.913	357.251	357.251	0.000	5.832	5.832	0.000	1721.581	18.542
TAU	23.824		0.266	0.266	0.000	1.323	1.323	0.000	0.265	0.265	0.000	25.147	0.530
TEC													
TPL			1.420	0.741	0.678				0.910	0.910		0.092	2.330
UNELCO	164.304	164.304	658.505	122.623	3.417	119.206	282.718	0.000	123.349	4.143	119.206	1105.526	245.971
YSPSC	0.010	0.001	1.890	1088.595	1.147	1.890	0.625	1.265	24.653	13.766	10.887	1.901	1114.396

Table G.4: KPIs 2017 (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	%	%	%	%	%	%	%	%	
ASPA	Yes	0	0.000	0	None	0.227	14.564	86.251	97.610	67.995	0.000	33.013	27.888	17.712	21.387	0.000	self
CPUC	No	0	0.000	0	US RUS	0.000	0.000	19.555	22.907	77.023	0.000	22.979	52.590	0.000	24.433	0.000	self
CUC	No	0	0.003	0		3.956	1210.608	63.130	57.367	76.871	#VALUE!	29.323	50.794	#VALUE!	19.883	#VALUE!	externally
EDT	Yes	0	0.002	0		0.006	1.189	173.921	87.869	80.480	10.378	26.076	16.593	45.760	1.170	0.022	externally
EEC	Yes	142050	0.001	0	EN 50160	0.323	6.820	262.904	62.000	67.964	0.000	36.769	25.531	36.384	0.000	1.315	externally
EPC	Yes	0	0.000	0	AS/NZ	0.073	311.465	137.332	114.252	79.760	0.000	27.544	32.606	4.275	35.576	0.000	externally
FEA	Yes	0	0.001	0	AS/NZS	0.015	3.549	200.235	84.307	77.093	0.925	27.863	46.193	24.607	1.476	0.000	self
GPA	Yes	1667110	0.006	0	None	0.811	5.826	93.098	100.000	68.552	13.803	31.448	17.043	19.600	31.910	5.214	externally
KAJUR	Yes	0	0.000	0	None	0.032	5.530	13.907	96.000	51.787	0.000	48.213	36.937	0.000	14.850	6.644	externally
KUA	Yes	0	0.000	0	KUA	0.000	0.000	58.401	122.485	60.336	0.000	38.842	31.889	4.300	24.147	0.822	self
MEC	No	0	0.000	0	none	0.300	5.353	27.209	98.983	51.793	0.000	48.209	35.948	0.000	15.846	0.000	externally
NUC										48.919		51.081	36.083	10.133			0
PPL	Yes	1037400	0.003	0	None	0.186	0.259	46.775	6.579	157.677	0.000	19.782	55.598	18.134	5.929	0.556	externally
PPUC	Yes	25935	0.003	0	JIS, NEC	0.000	0.000	46.809	99.588	58.223	18.534	23.241	34.377	19.070	4.776	0.000	self
PUB								202.828	44.728	54.270	100	45.730	20.711	33.559	0.000	0.000	externally
PUC	Yes	0	0.001	0	0.000	0.686	12500	#DIV/0!	65.714	20.834	0.000	4.360	11.642	9.192	0.000	0.000	self
SP	No	0	0.000	0	0.000	0.000	0.000	58.330	10.530	87.242	0.000	24.756	65.510	21.731	0.000	0.000	self
TAU	Yes	67514	0.004	0	NZ Standards	0.000	0.000	123.767	100.000	66.799	10.027	33.201	38.724	28.075	0.000	0.000	externally
TEC	Yes	0	0.001	No	AUS/NZ	0.000	0.000	11.704	97.830	69.750	13.459	43.692	27.848	0.000	28.46	27.925	self
TPL	Yes	0	0.002	0	TPL	0.000	0.000	98.371	98.130	63.931	0.000	44.801	55.199	0.000	0.000	9.768	externally
UNELCO	No	0	0.000	0	0.000	0.000	0.000	137.062	33.331	66.890	8.002	26.783	24.356	40.561	0.293	1.059	externally
YSPSC	Yes	0	0.000	0	0.000	0.000	0.000	25.656	66.587	75.662	0.000	23.950	47.293	27.164	0.000	5.399	self

POWER BENCHMARKING | Appendix A

Table G.6: KPIs 2017 (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	-84.85	27.7017	-10.4046	-6.032	146.4	-171.3	26	61.2	1	10.6	7.3	0.0	1.8	3.9	0.0	10.7	0.0	0.7	3.3
CPUC	87.82	19.1	105.8	3.68	274.3	28.7	34	57.8	0	3.0	4.4	4.6	2.2	4.7	5.4	1.8	5.4	0.0	10.7
CUC	85.84	11.50	5.26	71.44	327.96	60.39	22.97	65.90	0.00	16.66	0.00	3.00	8.09	0.00	2.87	0.00	0.74	0.00	2.73
EDT	99.5	5.7	4.4	17.7	28.1	84.1	37	35.2	0	9.9	11.5	7.5	4.0	7.1	1.2	6.8	0.0	5.3	11.5
EEC	97.63	0.93	10.83	8.94	95.4	52.8	30.243	7.1	0	2.09	0.91	1.5	5.0	56.4	18.0	4.4	4.7	0	0
EPC	98.1	40.3	1.9	1.6	438.8	90.9	0	50.0	7.50	6.34	2.45	8.76	3.81	3.06	9.07	3.92	1.46	0.00	3.66
EFL	72.7	39.5	9.2	9.0	391.7	40.1	12.369	35.6	5.7	2.1	1.0	7.7	6.7	1.5	4.2	5.6	1.5	0.41	27.99
GPA	88.9	84.5	7.4	43.2	126.9	85.2	16	53.7	0	5.8	3.0	7.8	3.8	2.5	4.1	5.1	2.3	0.0	11.7
KAJUR	160.6	0.00	-63.2	33.08	41.8	331.1	59	74.6	0.0	0.11	11.0	2.41	0.24	2.2	0.1	9.2	0.23	0.0	0
KUA	116.9	0.00	-0.5	-0.4	681.6	26.0	49	46.5	0	7.3	3.4	4.0	9.6	4.8	7.5	8.3	0.9	0	7.6
MEC	96.2	55.5	7.7367	7.230	156.4	146.9	34	43.5	0.0	16.1	8.7	6.0	4.1	3.5	0.3	5.4	1.1	0.0	11.3
NUC	105.8						44	34.2		65.8									
PPL																			
PPUC	116.7	12.1	-428.2	-2.1	329.7	102.8	26	46.1	0.0	15.3	4.1	10.9	5.5	2.8	9.4	2.4	1.6	0.0	2.0
PUB	127.2	2.92	-2.64	-2.46	42.8	249.9	39.49	51.7	0.0	0.3	2.6	15.3	2.4	1.8	0.6	2.5	9.01		13.7
PUC	105.00	0.20	-0.16	-0.02	51.55	43.65	28.75	52.70	0.00	1.17	4.88	13.19	1.27	7.83		4.90	0.00	0.00	14.08
SP	26.85	4.63	11.4	7.6	822.4	44.3	12	42.2	0.0	7.8	4.4	6.0	1.2	1.9	2.5	8.7	5.9	1.6	17.8
TAU	77.8	0.0	24.6	9.7	717.6	64.4	38	40.0	0.0	1.5	3.9	5.6	2.6	3.7	4.5	7.7	1.4	0.0	29.1
TEC	114.1	24.57	-17.2	-26.37	121.4	149.2	49	26.1	0.0	26.4	3.4	0.8	0.1	0.6	0.8	7.0	3.7	0.1	30.9
TPL	80.2	28.5	7.4	9.2	79.9	51.5	27	49.4	0.0	3.1	2.0	3.2	0.4	5.9	9.7	6.8	5.6	0.0	14.0
UNELCO	94.6	12.1	1.5	5.4	101.7	72.9	35	35.3	7.6	5.0	1.6	9.2	2.4	1.1	4.7	9.8	4.6	0.2	18.5
YSPSC	99.4	40.9	0.4	0.3	316.9	62.2	53	48.7	0.0	4.3	2.8	5.9	4.3	2.6	1.8	14.0	4.9	0.0	10.8

Currency Conversion Table

Table E.1: Currency Conversion Table for 2016 and 2017 Data

Pacific Utilities	Country	Local Currency	2016				2017			
			Benchmarking Period Start	Benchmarking Period End	Multiplier to Convert to USD (Ave. Rate)	End Fiscal Year Conversion	Benchmarking Period Start	Benchmarking Period End	Multiplier to Convert to USD (Ave. Rate)	End Fiscal Year Conversion
ASPA	American Samoa	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
CPUC	Chuuk, FSM	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
CUC	Saipan, Northern Marianas	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
EDT	French Polynesia	XPF	1-Jan-15	31-Dec-15	0.00928	0.00917	1-Jan-16	31-Dec-16	0.009259	0.008825
EEC	New Caledonia	XPF	1-Jan-15	31-Dec-15	0.00928	0.00917	1-Jan-16	31-Dec-16	0.009259	0.008825
EEWF	Wallis and Fortuna	XPF	1-Jan-15	31-Dec-15	0.00928	0.00917	1-Jan-16	31-Dec-16	0.009259	0.008825
ENERCAL	New Caledonia	XPF	1-Jan-15	31-Dec-15	0.00928	0.00917	1-Jan-16	31-Dec-16	0.00928	0.008825
EPC	Samoa	WST	1-Jul-14	30-Jun-15	0.4237	0.4237	1-Jul-15	30-Jun-16	0.421455	0.388319
FEA	Fiji	FJD	1-Jan-15	31-Dec-15	0.4932	0.46187	1-Jan-16	31-Dec-16	0.477356	0.4725
GPA	Guam	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
KAJUR	Kwajalein Atoll, Marshall Islands	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
KUA	Kosrae, FSM	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
MEC	Marshall Islands	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
NPC	Niue	NZD	1-Jul-14	30-Jun-15	0.7777	0.68295	1-Jul-15	30-Jun-16	0.7777	0.68295
NUC	Nauru	AUD	1-Jul-14	30-Jun-15	0.83685	0.7653	1-Jul-15	30-Jun-16	0.72825	0.74409
PPL	Papua New Guinea	PGK	1-Jan-15	31-Dec-15	0.3533	0.3259	1-Jan-16	31-Dec-16	0.313942	0.306448
PPUC	Palau	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
PUB	Kiribai	AUD	1-Jan-14	31-Dec-15	0.8368	0.7653	1-Jan-15	31-Dec-16	0.743623	0.74409
PUC	Pohnpei, FSM	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1
SP	Solomon Islands	SBD	1-Jan-15	31-Dec-15	0.12642	0.12403	1-Jan-16	31-Dec-16	0.125486	0.1224
TAU	Cook Islands	NZD	1-Jul-14	30-Jun-15	0.7777	0.68295	1-Jul-15	30-Jun-16	0.667932	0.71088
TEC	Tuvalu	AUD	1-Jan-15	31-Dec-15	0.83685	0.7653	1-Jan-16	31-Dec-16	0.743623	0.74409
TPL	Tonga	TOP	1-Jul-14	30-Jun-15	0.50125	0.4616	1-Jul-15	30-Jun-16	0.440377	0.441716
UNELCO	Vanuatu	VUV	1-Jan-15	31-Dec-15	0.0093	0.00904	1-Jan-16	31-Dec-16	0.009203	0.009348
YSPSC	Yap, FSM	USD	1-Oct-14	30-Sep-15	1	1	1-Oct-15	30-Sep-16	1	1

Electricity Tariff Tables

Table F.1: Electricity Tariff Table (Local Currency)

Currency Conversion				TOTAL COST TO CONSUMER FOR SET kWh/mth, incl base charge, taxes,etc (IN LOCAL CURRENCY)														
Conversion Factor for each currency				DOMESTIC / RESIDENTIAL									COMMERCIAL / BUSINESS					
Pacific Utilities	Country	Local Currency	kWh/mth:	50	100	200	500	1000	2000	3000	10000	1000	3000	10000	50000			
			0.1948	Flat rate								flat rate						
ASPA	American Samoa	USD	0.0974	0.29215	29.22	58.43	116.86	292.15	584.30	1168.60	1752.90	5843.00	0.08960	568.70	1706.10	5687.00	28435.00	
CPUC	Chuuk, FSM	USD		0.4713	23.57	47.13	94.26	235.65	471.30	942.60	1413.90	4713.00	0.5014	501.40	1504.20	5014.00	25070.00	
CUC	Siapan, Northern Marianas	USD	0.021	0.097	0.158	31.40	55.80	104.60	102.25	224.10	461.30	821.30	2954.20	0.25970	259.70	779.10	2597.00	12985.00
EDT	French Polynesia	XPF	22.55	37.05	2104.00	3296.00	5682.00	21509.00	45306.00	94263.00	147328.00	392728.00	33.8000	48924.00	135811.00	392728.00	1802672.00	
EEC	New Caledonia	XPF			3632.00	4844.00	7582.00	13923.00	26798.00	48596.00	88640.00	164727.00		15403.00	62742.00	162827.00	2005837.00	
EPC	Samoa	WST		0.26	13.10	26.10	52.10	130.10	260.10	520.10	780.10	2600.10	0.36	360.10	1080.10	3600.10	18000.10	
EFL	Fiji	FJD	0.331	0.331	8.60	33.10	66.20	165.50	331.00	662.00	993.00	3310.00	0.40	399.00	1197.00	3990.00	20615.02	
GPA	Guam	USD	0.0696	0.08687	18.48	21.96	28.91	49.78	93.21	180.08	266.95	875.04		166.07	378.23	1120.79	5363.99	
KAJUR	Kwajalein Atoll, Marshall Islands	USD		0.346	17.30	34.60	69.20	173.00	346.00	692.00	1038.00	3460.00	0.406	406.00	1218.00	4060.00	20300.00	
KUA	Kosrea, FSM	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	Marshall Islands	USD		0.346	17.30	34.60	69.20	173.00	346.00	692.00	1038.00	3460.00	0.406	406.00	1218.00	4060.00	20300.00	
NUC	Nauru	AUD			12.50	25.00	50.00	175.00	425.00	925.00	1425.00	4925.00	0.70	700.00	2100.00	7000.00	35000.00	
PPL	Papua New Guinea	PGK			45.25	85.41	165.74	406.73	808.38	1611.68	2414.98	8038.03	0.9356	953.60	2824.00	9374.00	46798.00	
PPUC	Palau	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	Kiribai	AUD		0.40	20.00	40.00	80.00	200.00	400.00	800.00	1200.00	4000.00	0.55	550.00	1650.00	5500.00	27500.00	
PUC	Pohnpei, FSM	USD		0.4905	28.53	53.05	102.10	249.25	494.50	985.00	1475.50	4909.00	0.4905	490.50	1471.50	4905.00	24525.00	
SP	Solomon Islands	SBD		6.4686	323.43	646.86	1293.72	3234.30	6468.60	12937.20	19405.80	64686.00	6.9530	6953.00	20859.00	69530.00	347650.00	
TAU	Cook Islands	NZD			46.50	82.60	236.60	394.60	789.60	1579.60	2369.60	7899.60	0.77	790.00	2330.00	7720.00	38520.00	
TEC	Tuvalu	AUD			15.00	34.50	90.50	258.50	538.50	1098.50	1658.50	5578.50	0.56	560.00	1680.00	5600.00	28000.00	
TPL	Tonga	TOP		0.4435	22.18	44.35	88.70	221.75	443.50	887.00	1330.50	4435.00	same as dom	443.50	1330.50	4435.00	22175.00	
UNELCO	Vanuatu	VUV			820.00	3318.40	16060.80	59467.80	131812.80	276502.80	421192.80	1434022.80	41.69	41690.00	125070.00	416900.00	2084500.00	
YSPSC	Yap, FSM	USD		0.4507	21.06	63.48	105.90	117.17	139.70	184.77	229.84	545.33		455.70	1595.90	5308.00	26520.00	

Table F.2: Electricity Tariff Table (USD)

TOTAL COST TO CONSUMER FOR SET kWh/mth, incl base charge, taxes,etc (CONVERTED TO USD)													
Conv Factor to USD	DOMESTIC / RESIDENTIAL								COMMERCIAL / BUSINESS				
	50.00	100.00	200.00	500.00	1000.00	2000.00	3000.00	3000+	1,000	3,000	10,000	50,000	
1	29.22	58.43	116.86	292.15	584.30	1168.60	1752.90	5843.00	569	1706	5687	28435	
1	23.57	47.13	94.26	235.65	471.30	942.60	1413.90	4713.00	501	1504	5014	25070	
1	31.40	55.80	104.60	102.25	224.10	461.30	821.30	2954.20	260	779	2597	12985	
0.009259	19.48	30.52	52.61	199.15	419.49	872.78	1364.11	3636.27	453	1257	3636	16691	
0.009259	33.63	44.85	70.20	128.91	248.12	449.95	820.72	1525.21	143	581	1508	18572	
0.421455	5.52	11.00	21.96	54.83	109.62	219.20	328.78	1095.83	152	455	1517	7586	
0.477356	4.11	15.80	31.60	79.00	158.00	316.01	474.01	1580.05	190	571	1905	9841	
1	18.48	21.96	28.91	49.78	93.21	180.08	266.95	875.04	166	378	1121	5364	
1	17.30	34.60	69.20	173.00	346.00	692.00	1038.00	3460.00	406	1218	4060	20300	
1	21.69	43.09	89.89	230.29	464.29	942.29	1420.29	4766.29	477	1453	4869	23989	
1	17.30	34.60	69.20	173.00	346.00	692.00	1038.00	3460.00	406	1218	4060	20300	
0.72825	9.10	18.21	36.41	127.44	309.51	673.63	1037.76	3586.63	510	1529	5098	25489	
0.313942	14.21	26.81	52.03	127.69	253.78	505.97	758.16	2523.48	299	887	2943	14692	
1	18.20	33.40	67.50	180.90	394.40	821.40	1248.40	4237.40	438	1292	4281	21361	
0.743623	14.87	29.74	59.49	148.72	297.45	594.90	892.35	2974.49	409	1227	4090	20450	
1	28.53	53.05	102.10	249.25	494.50	985.00	1475.50	4909.00	491	1472	4905	24525	
0.125486	40.59	81.17	162.34	405.86	811.72	1623.44	2435.16	8117.19	873	2618	8725	43625	
0.667932	31.06	55.17	158.03	263.57	527.40	1055.07	1582.73	5276.40	528	1556	5156	25729	
0.743623	11.15	25.65	67.30	192.23	400.44	816.87	1233.30	4148.30	416	1249	4164	20821	
0.440377	9.77	19.53	39.06	97.65	195.31	390.61	585.92	1953.07	195	586	1953	9765	
0.009203	7.55	30.54	147.81	547.28	1213.07	2544.66	3876.24	383.67	384	1151	3837	19184	
1	21.06	63.48	105.90	117.17	139.70	184.77	229.84	545.33	456	1596	5308	26520	

