8 October 2002

Pacific Power Association
& Asian Development Bank

Final Report
Performance Benchmarking
October 2002

Pacific Power Utilities

Credits

Credits for contributions in formulating this report are as follows.

- Co-ordination - Pacific Power Association (PPA);
- Funding - Asian Development Bank;
- Data collection and comment – representatives of Pacific power utilities who attended a series of meetings and workshops, particularly those who attended the benchmarking workshop in Fiji, 10-12 October 2001.

Benchmarking Workshop Participants
Fiji 10-12 October 2001

Standing *(from left to right)* : Tony Okwe, Kwajalein Atoll Joint Utility Resources; John Pirie, ADB Consultant; E. Gordon Fox, (then) Sr. Project Implementation Officer, ADB; Tony Neil, Executive Director, Pacific Power Association; Larry Gouland, Operations Manager, Chuuk Public Utility Corp.; Martin Rasu, Solomon Islands Electricity Authority; Fred Skilling, Kosrae Utilities Authority; M.I. George, Assist. Project Analyst, ADB; Anumitra Mirti, Benchmarking Project Officer, Pacific Water Association; Om Dutt Sharma, Network Design Manager, Fiji Electricity Authority; Joseph Walter, Deputy General Manager, Electric Power Corp., Samoa; Buibui Tiweri, Public Utilities Board, Kiribtai; Tokia Greig. Public Utilities Board, Kiribati

Sitting *(from left to right)* : Kelly Keller, Pohnpei Utilities Corp.; Apii Timoti, CEO, Te Aponga Uira O Tumu-Te Varovaro, Cook Islands; John Manetoa, Alofi, Niue; Leonard Sonoma, American Samoa Power Authority; Joachim Fong, American Samoa Power Authority; Mitchell Snodgrass, Acting CEO, Chuuk Public Utility Corp.; Peter Smiles, ADB Consultant; Rukebai Inabo, Controller, Palau Public Utilities Corp.; Ieti Matatia, Accountant, Kwajalein Atoll Joint Utility Resources; Paula Helu, General Manager, Tonga Electric Power Board

It is intended that in future Pacific power utility benchmarking will be conducted annually on a self-funded basis through the PPA.

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Executive Summary

The purpose of this report is to provide the results of the first round of benchmarking for Pacific power utilities.

Participation rates and characteristics of involvement are as follows:

1) 25 utilities are eligible to participate and 21 did so;
2) Due to their apparent unique circumstances, one utility submitted data which was incompatible to that from other utilities and this utility has been excluded from this round of benchmarking;
3) Of the four remaining utilities, two indicated they would participate in the next round of benchmarking.

Overall summary results of benchmarking to-date are contained in the following table.

Summary Benchmarking Results Table

Key Indicator	International Best Practice	Pacific Current Practice	Agreed benchmark reference value for future planing and performance review
Generation			
Load factor	50-80%	67%	**50-80%**
Capacity factor	35-65%	34%	**>40%**
Availability factor	10-65%	93%	**80%-90%**
Specific fuel oil consumption		3.79kWh/ltre	**3-4 kWhr/ltre**
Lubricating oil consumptions		3.50 ltres/hr	**3.2 – 3.5ltres/hr**
Forced outage	0%	7.93%	**3-5%**
Planned outage factor	3.00%	4.30%	**3%**
O&M/MWh	(No fuel or oil included) $18		**$18**
Transmission			
Reliability			
Losses	5%	8.02%	**5%**
Distribution			
Customers/employee	350	242	**240**
Reliability/km			
Transformer utilisation	50%	18.14%	**30%**
Losses	5%	12.34%	**5%**
SAIFI	0.9	19.00	**10**
SAIDI	47	592	**200**
$/km	167	$2,478 *(questionable figure)*	**800**
Corporate			
Operating ratio	> - 10%	186%	**0%**
Debt to equity ratio	< 50%	26.07%	**<50%**
Rate of return	= > 10%	- 16.80%	**> 0%**
Current ratio	1:1	3:1	**>1:!**
Debtor days	30 days	79 days	**< 50 days**

Executive Summary (Cont.)

A suggested interpretation of those results is as follows:

1) Generation shows good technical performance but with possible opportunities to improve capital and operational efficiencies (reflected, for example, in capacity factor and GWh/employee). However, the CEO's believe this will be difficult to achieve because of the need for reserve margins in isolated situations and the indivisibility of plant often servicing scattered, light loads;
2) Transmission is a function conducted by only a small minority of utilities. Possible there are opportunities here to improve on current levels of losses;
3) Distribution exhibits in some respects the reverse situation to generation; i.e. reasonably good operating productivity but with possible opportunities to improve technical performance particularly in reducing losses and improving reliability of supply (the latter reflected in "SAIDI" ie system average interruption duration index);
4) Generally Pacific power utilities exhibit fairly strong financial situations with low levels of debt and good liquidity, no doubt assisted in some cases by grant funding. At the same time some utilities earn low if not negative rates of commercial return indicating the need for improved commercial management in these cases;
5) General statistics including safety need to be further developed to be made consistent with international standards; however, data collected to-date suggests that some utilities need to improve safety management.

An overall theme which appears to be emerging is that there is a general opportunity for Pacific power utilities to become more customer and commercially focussed.

Overall, when considering both service levels and efficiencies in both generation and distribution, Utility "A" appears to be the most consistent best performer in the Pacific.

All utilities need to continually improving. An effective way of doing this is to include benchmark improvement targets in annual and longer term planning through use of "balanced scorecards" as illustrated in this report.

Introduction

Objective

The purpose of this report is to provide the results of the current round of benchmarking for Pacific power utilities. The objective of Pacific power benchmarking is to stimulate analysis and improvement in performance of participants.

Background

In 1999 the Asian Development Bank approved grant finance for technical assistance (TA) No 5883-REG Performance Benchmarking for Pacific Power and Water Utilities. This present report relates to power only. The purpose of the TA is to provide "seeding" assistance for on-going benchmarking in order to establish performance criteria, stimulate improvement plans and to promote improvement in performance of Pacific power utilities.

Methodology

This benchmarking project has been performed through the following phases:

1) Design of questionnaire and conduct of a survey relating to 2001 data (or closest year data available);
2) Conduct of a number of participatory workshop;
3) Review of progressive results at the 2001 and 2002 Pacific Power Association (PPA) annual conferences.

Structure of this Report

This following report is structured as follows:

- Overview of functions subject to benchmarking;
- Results of benchmarking;
- Opportunities for improvement.

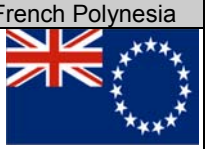
Attached are Appendix **A**: Benchmark Indicators; **B**: Benchmark Data and **C**: PPA Conference comments on progressive results at that time.

Participation & Data Collection

Participation

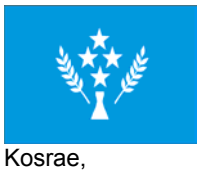
Following is a complete list of Pacific power utilities. Those utilities participating in the current cycle of benchmarking have their general profile statistics indicated; whereas those utilities not participating are noted accordingly.

Table of Pacific Power Utilities
Participating Utilities Indicated by Inclusion of Profile Statistics
Non-participating Utilities Noted Accordingly

Country/State	Power Utility	Generat-ion Capacity MW	Gross Generation MWh	Maximum Demand MW	Customers Number
 French Polynesia	Electricity de Tahiti	146.7	444,000	76.8	47,299
 Cook Is	Te Aponga Uira O Tumu-Te-Varovaro (TAU)	8.0	22,270	3.5	3,520
 Samoa	Electric Power Corporation (EPC)	26	85,270	14.5	21,831
 Samoa	Powertok	**Participated but data incompatible with that of other utilities**			
 **American Samoa**	American Samoa Power Authority (ASPA)	40.2	169,000	24.2	**10,000**
 Tonga	TEPB			6.0	14,200
 Fiji	Fiji Electricity Authority (FEA)	167	569,487	88	116,000
 New Caledonia	Electricitie et Eau de Caledonie (EEC)			66.70	44,658

Country/State	Power Utility	Generat-ion Capacity MW	Gross Generation MWh	Maximum Demand MW	Customers Number
 New Caledonia	Enercal	318	1,599,000	233.9	18,838
 Vanuatu	Societe d-Union Electrique du Vanautu	18.6	39,455	8.1	5,745
 Solomon Is	Solomon Island Electricity Authority (SIEA)	23,6	49,630	10.3	6,000
 Papua New Guinea	PNG Electricity Authority	302.0	770,000	147.2	71,600
 Guam	Guam Power Authority	552.4	1,956,000	280.0	44,115
 Saipan, Northern Marianas	Commonwealth Utilities Commission (CUC)	**Not-participating in current cycle of benchmarking**			
 Palau	Palau, Public Utilities Corporation (PPUC)	24.9	100,400	15.5	4,805
 Yap	Yap State Public Service Corporation	**Records destroyed in recent fire – however, will participate in future rounds of benchmarking**			
 **Chuuk, Micronesia**	Chuuk Public Utility Corporation (CPUC)	7.6	23,558	4.12	2,112

Participation & Data Collection

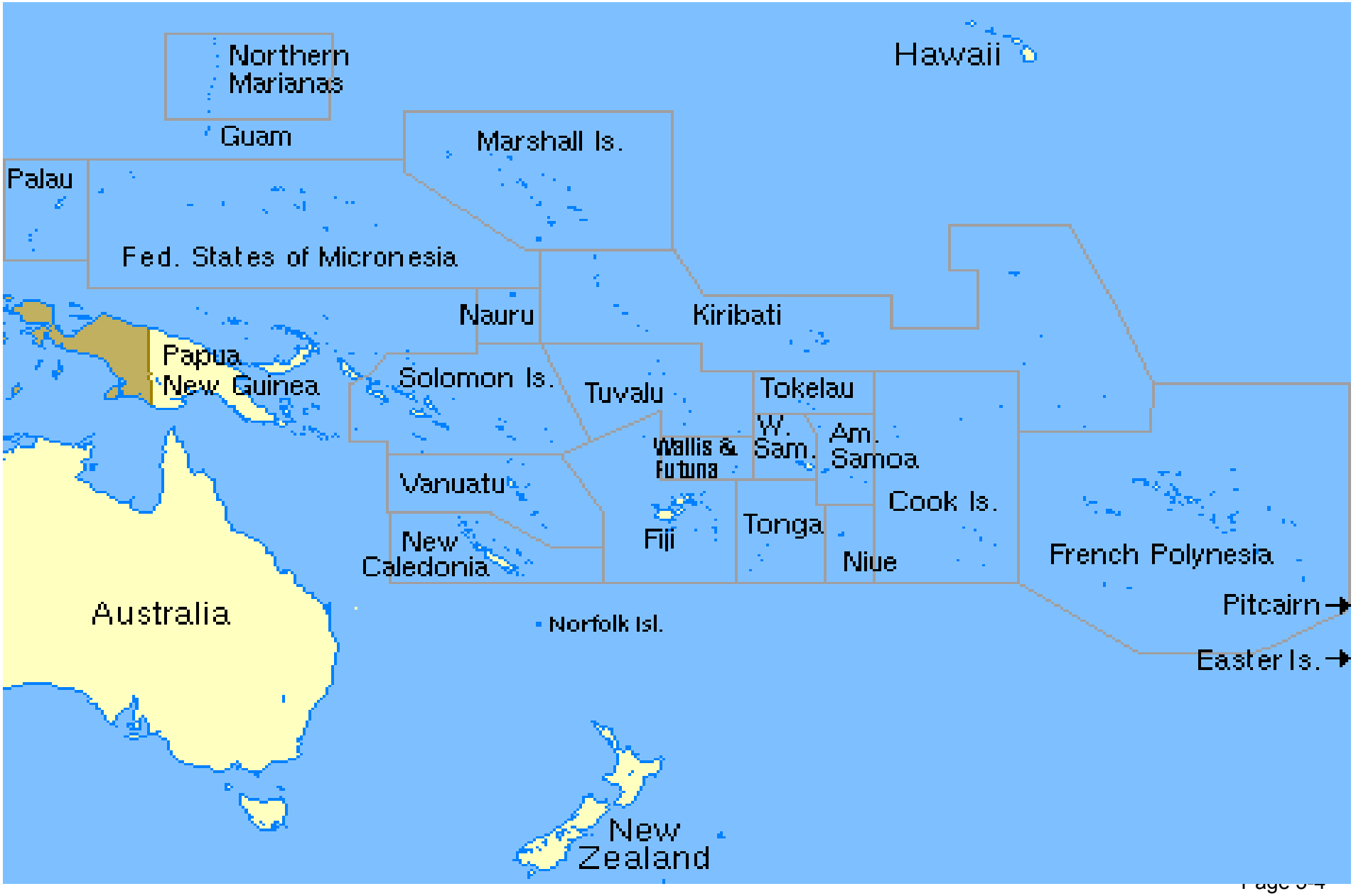
Country/State	Power Utility	Generat-ion Capacity MW	Gross Generation MWh	Maximu m Demand MW	Customers Number
 Pohnpei	Pohnpei Utilities Commission	21.0	39,892	6.6	**5,778**
 Marshalls	Marshalls Energy Company	Not participating in current round of benchmarking, but will participate in future cycles.			
 Marshalls	Kwajalein Atoll Joint Utility Resources	4.4	15,384	2.3	1000
 Kiribati	Public Utilities Board	3.8	1,480	2.7	4,200
 Kosrae, Micronesia	Kosrae Utilities Authority (KUA)	5.6	8,350	1.6	1,487
 Tuvalu	Tuvalu Electricity Corporation (TEC)	Not participating			
 Niue	Niue Power Corporation	1.8	3,500	0.6	1,012
 **Wallis & Futuna**	Electricitie et Eau de Wallis et Futuna	4.5	15,056	2.3	2,343

Participation

Data Collection (& Anonymity)

Most utilities submitted most required data; however, some utilities preferred to keep confidential financial data. In all cases anonomity has been preserved by identification of utilities in this report exclusively through use of alphabetical keys known respectively only to each “owning” utility. It is hoped that in future that sufficient confidence will be gained in this process that all utilities will exchange the full range of both technical and financial data.

Map of Pacific



Overview of Functions Benchmarked

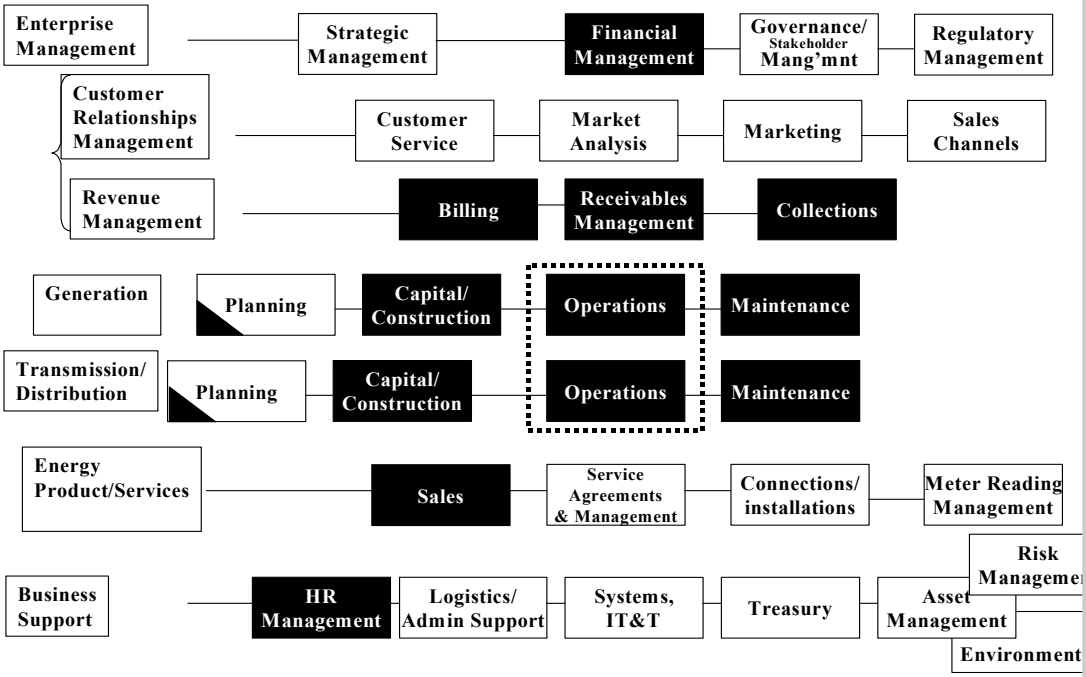
Generally, benchmarking may be undertaken in regard to some or all power utility functions.

Also generally, benchmarking itself may be undertaken at either overview or more detailed levels, as follows:

1) Overview benchmarking (of the type currently being undertaken through the PPA);
2) More detailed process mapping (which would normally be undertaken by individual utilities in regard to their respective biggest opportunity areas.

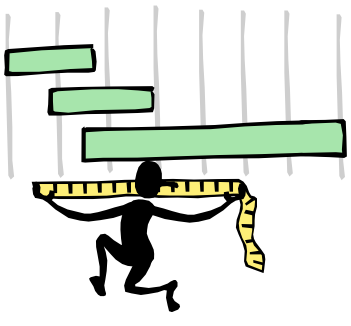
In this present review, the following functions highlighted in black have been benchmarked at overview level.

Key Power Utility Functions



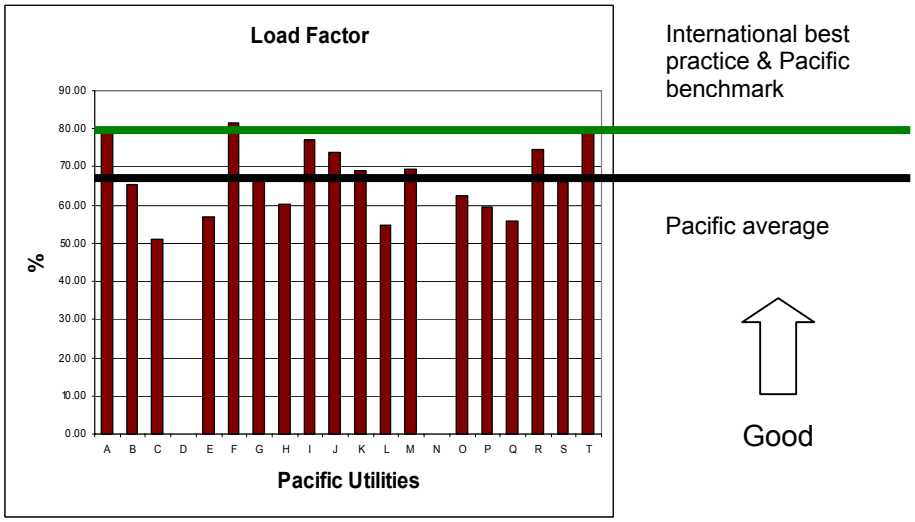
Note: darkened boxes indicate process areas covered so far in PPA overview benchmarking

Other functions may be progressively increasingly included in Pacific power benchmarking. Certainly, functions included so far represent those areas most traditionally benchmarked; i.e. "the low hanging fruits have been picked first" – which seems a reasonable strategy.

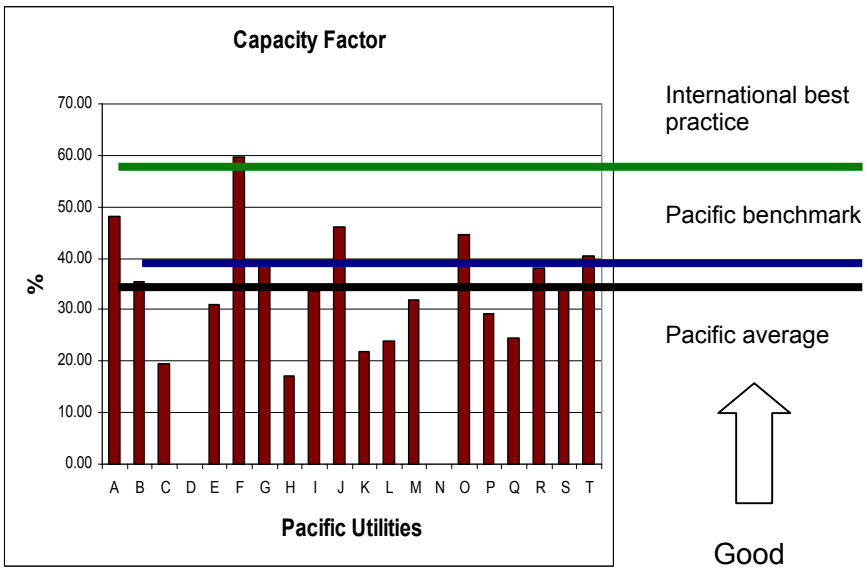


Results - Generation

Highlights of generation performance benchmarking are provided below, while details are contained at **Appendix B 3.**

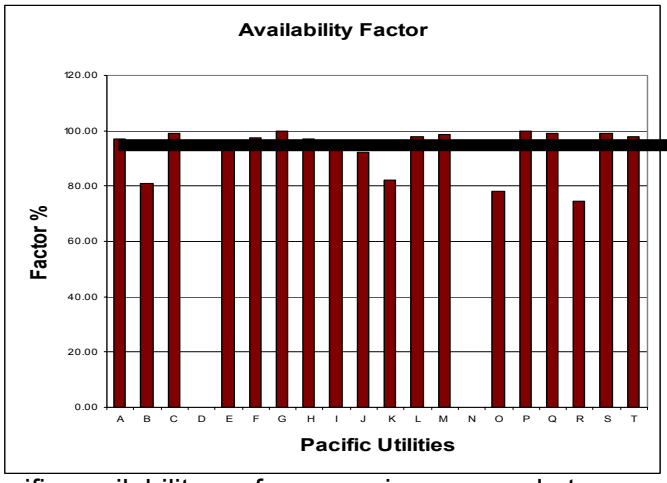


Load factor is relatively good at an average 67% (compared to international experience typically of around 65% - 80%). However, Pacific utilities have chosen a high benchmark of 80% indicating that in future demand management should play an increasingly important part in Pacific power sector policies (i.e. to further improve load factor).



Capacity factor for Pacific utilities is not good (actual Pacific avg 34% compared to Pacific benchmark of 40% and international best practice of up to 50-60%) reflecting no doubt isolation, need for reserve margins and indivisibility of plant serving “pockets” of small loads. Discussions with CEO’s at the PPA annual conference indicate that they believe this performance factor will be difficult to improve.

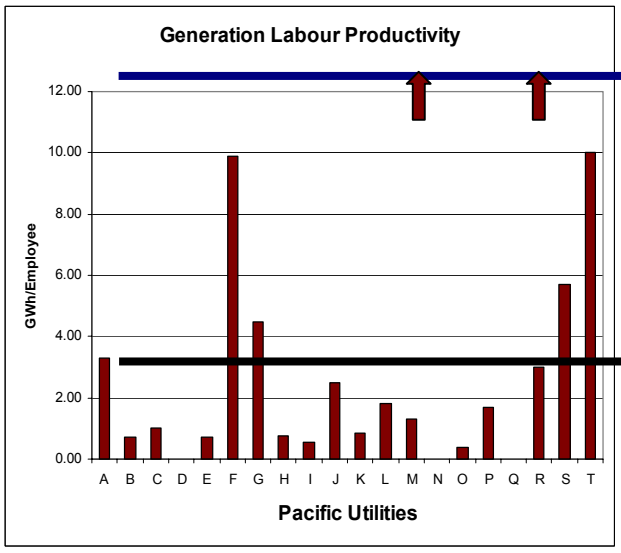
Generation (Cont.)



Pacific average, international best practice and benchmark

Good

Pacific availability performance is very good at an average of 93% compared to the Pacific benchmark of 90% and typical international practice of 65%.

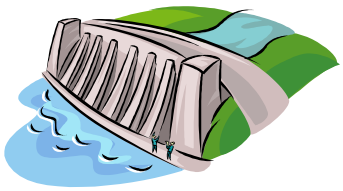


International best practice = around 22 GWh/employee

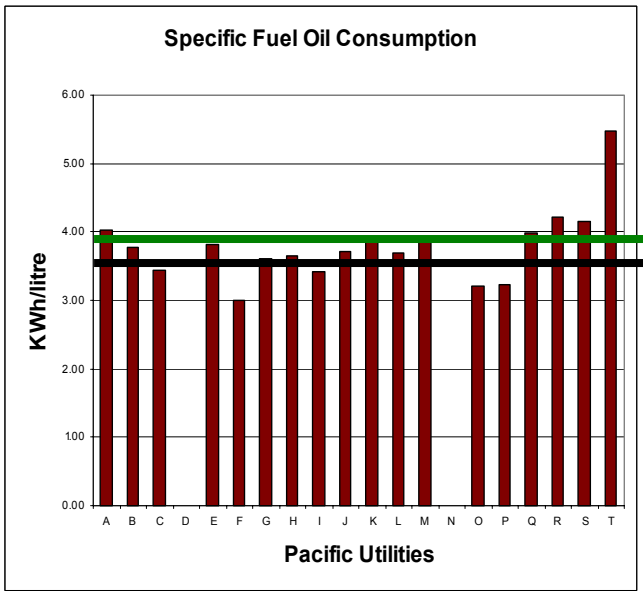
Pacific avg of some 3 GWh/employe

Good

As discussed at the PPA conference this is essentially an unfair comparison; i.e. involving large base-load large mainland compared to island generation stations. However, considering the worldwide emphasis on productivity improvement in the power sector, there may also be opportunities in this regard in the Pacific.



Generation (Cont.)

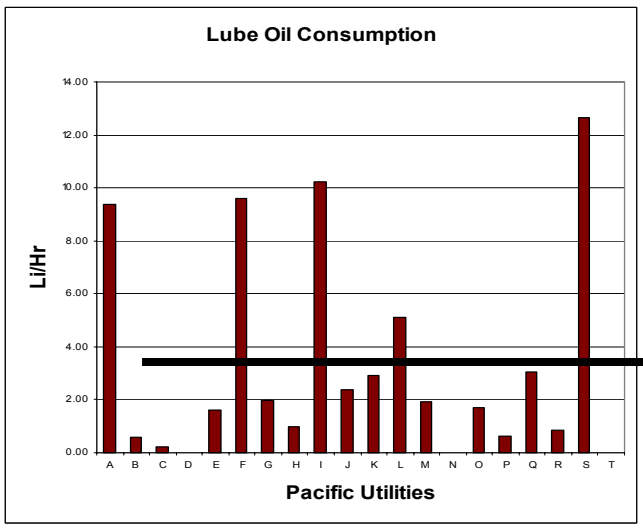


Good

Pacific benchmark

Pacific average

Current Pacific practice in managing specific fuel oil consumption (avg of 3.79kWH/litre is already close to or better than the Pacific benchmark of 4.0, indicating currently good performance.

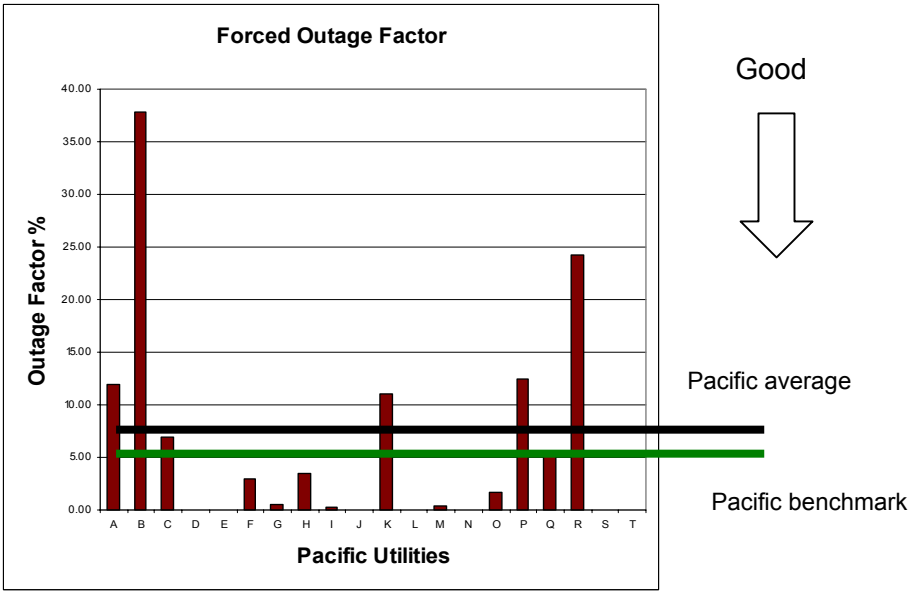


Good

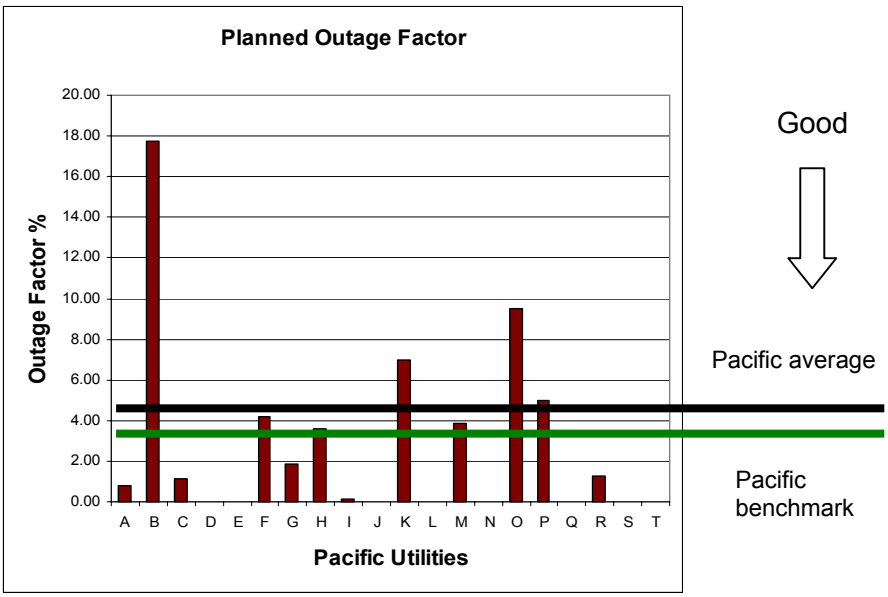
Pacific benchmark and present Pacific average performance

Similarly, lube oil consumption management is typically close to benchmark (ie current avg is 3.67Li/Hr compared to benchmark of 3.50).

Generation (Cont.)



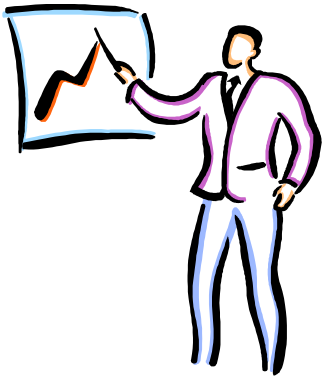
Some improvement is required on average regarding forced outage factor management (current avg is 7.93% compared to Pacific benchmark of 5%)



Similarly, there is only small scope on average for improvement in the management of planned outage which currently averages 4.31% compared to Pacific benchmark of 3%.

Generation (Cont.)

Overall, benchmarked performance indicators show generally good technical management (for example, as indicated by Specific Fuel Oil Consumption) but with possible opportunities to improve commercial performance.



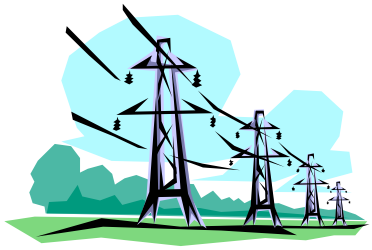
Results - Transmission

Six Pacific utilities perform transmission functions (defined as 33 kV and above). Performance statistics are contained at **Appendix B 4** and are summarised below**.**

1) There is on average some 35 outages/100km of transmission line per annum;
2) Labour productivity is on average 24 GWh/employee (compared, for example, to the Australian "ESAA" mainland average of 70);
3) Losses are typically around 8% (compared again, for example, to the Australian mainland average of 19% and the Pacific benchmark of 5%).

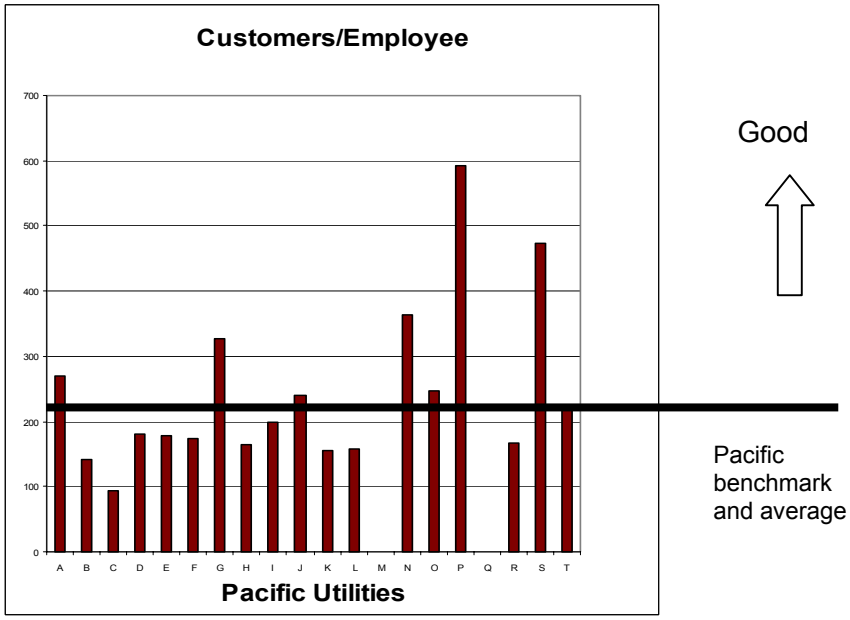
It would appear that there is scope in the Pacific to improve transmission line loses.

It is proposed for the next round of benchmarking that a sub-group representing utilities with transmission functions form a task team to further develop Pacific benchmarks for this function.

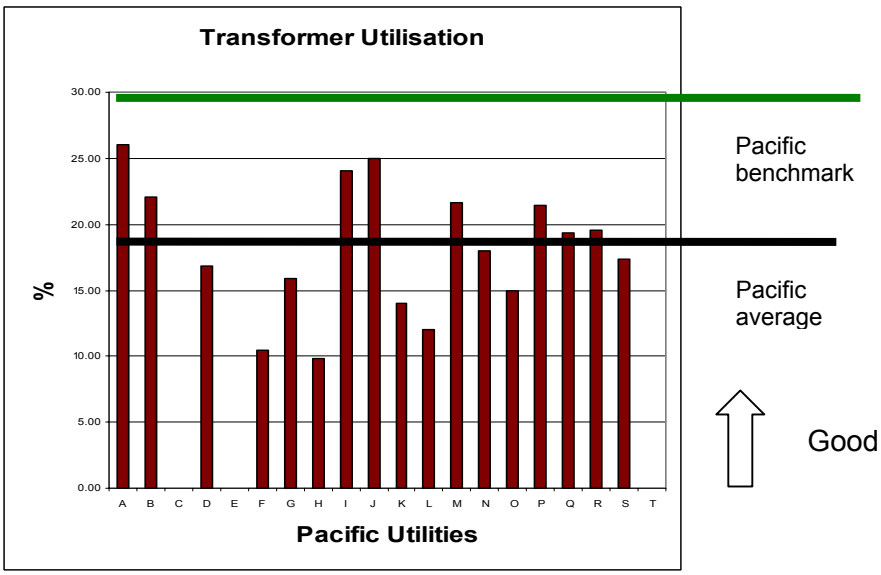


Results - Distribution

Distribution performance is highlighted directly below, while performance statistics are contained in **Appendix B 5.**

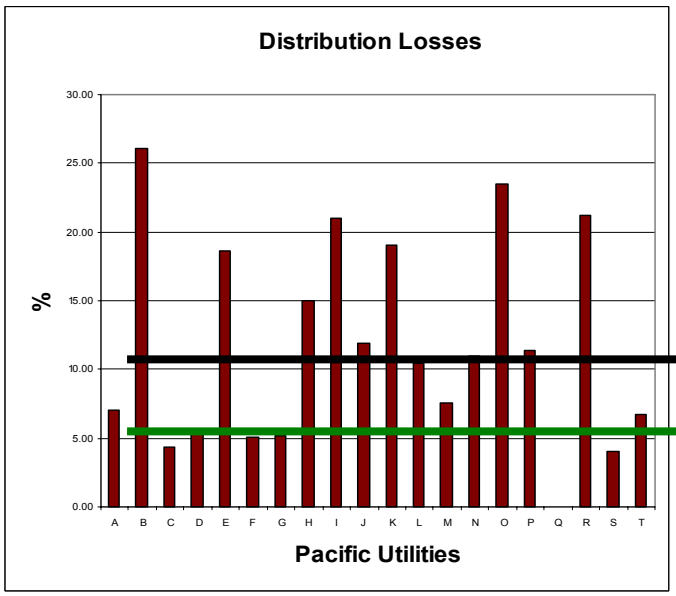


Current average Pacific performance of 242 customers/employee is currently at benchmark level (indicating reasonable operational productivity levels).



Utilisation needs to be improved from current average of 18% to the Pacific benchmark of 30% in order to increase capital efficiency; however, this can only be achieved in the long term because of the usually long lead times required to improve usage of capital assets.

Distribution (Cont.)

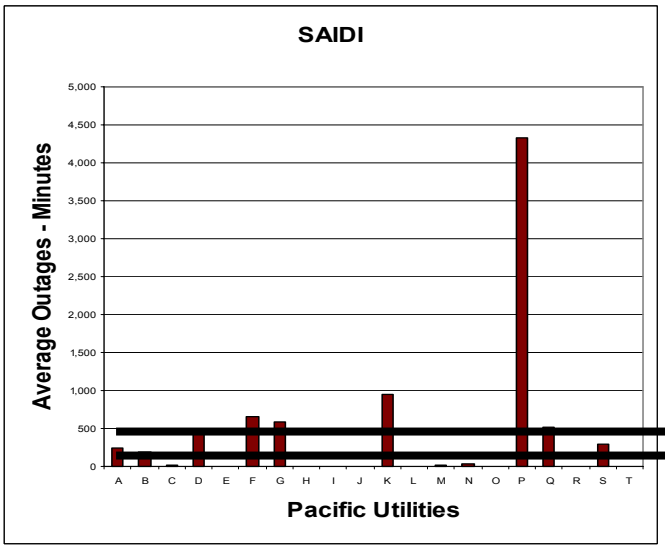


Good

Pacific average

Pacific & international benchmark

Pacific distribution losses on average at 12% are far too high (compared to benchmark of 5%). This is a priority area for improvement.



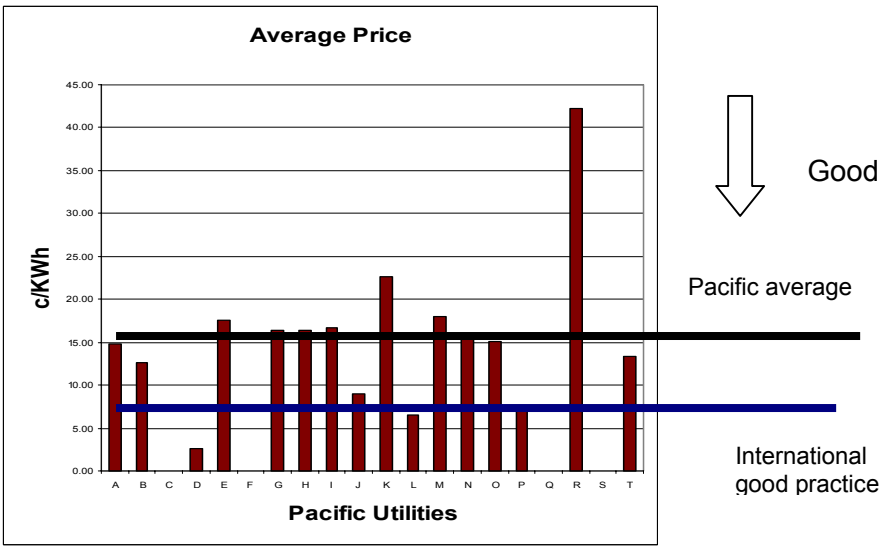
Good

Pacific average

Pacific benchmark

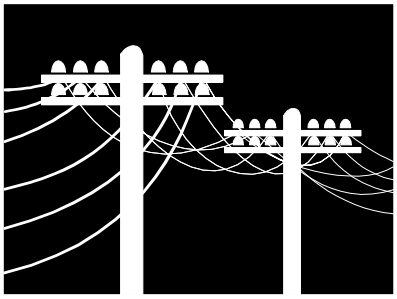
Similarly this (System Average Interruption Index) is a priority area for improvement considering that current performance is not good (avg of 592 minutes/pa compared to benchmark of 200) and customers typically rank reliability of supply as very important.

Distribution (Cont.)



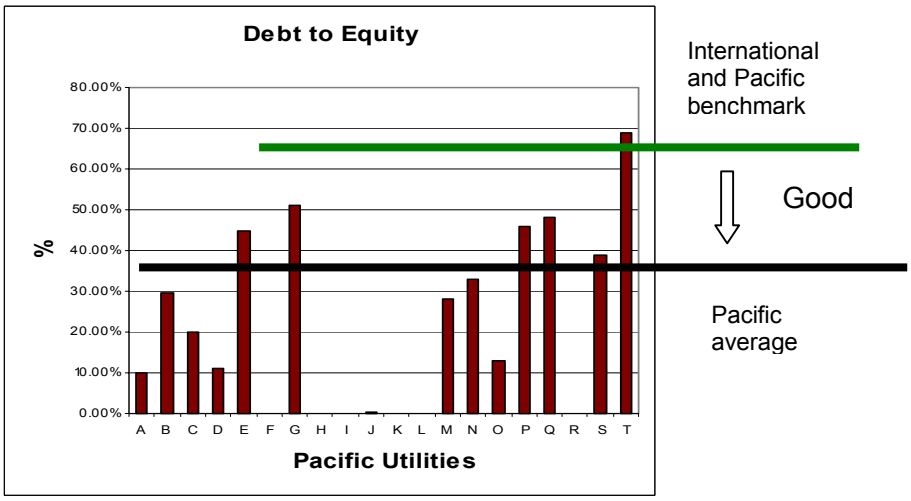
Pacific prices are typically well above international good prices (Pacific avg of around $US 15 cents/kWh compared to international good practice of around 7 cents. This high price in the Pacific is caused by usual reliance upon expensive diesel generation which in recent times is tending to increase. It is likely that there will be customer pressure to contain or even reduce prices and this may only be achieved by improving overall commercial management of utilities.

Generally for distribution, there are opportunities to improve services (eg improve system average interruption index “SAIDI”) and improve technical efficiency (eg reduce losses).

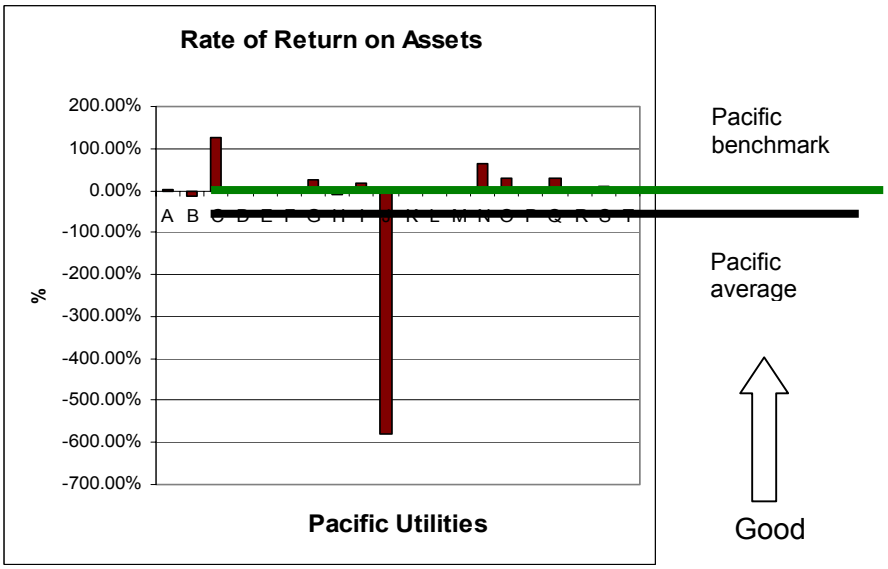


Results - Finance

Highlights of financial performance are indicated below while data tables are contained at **Appendix B 6**



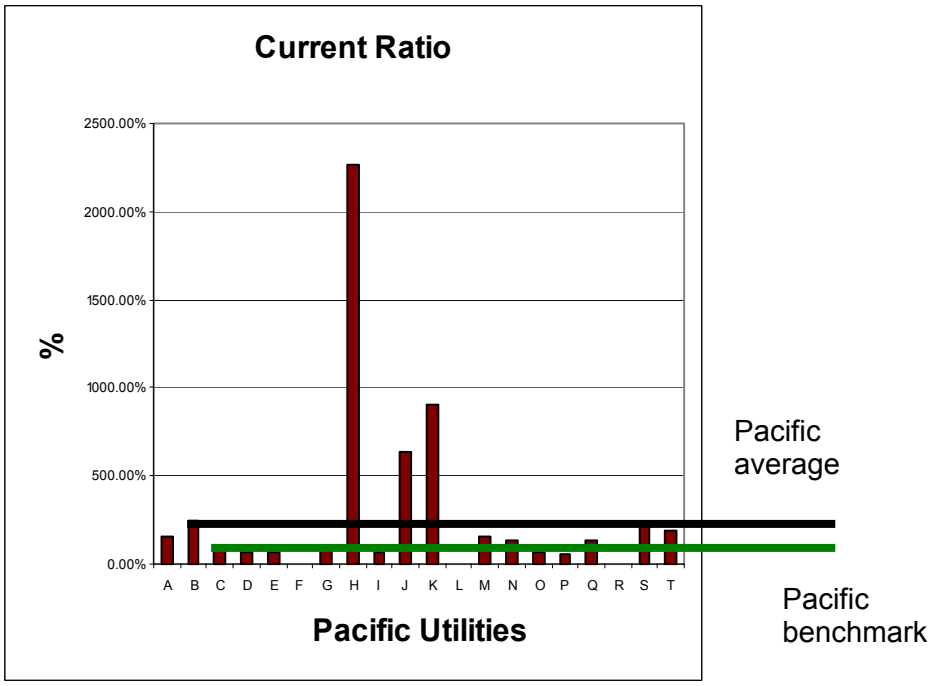
Pacific utilities generally have low levels of debt (avg is 26% debt to equity compared to benchmark of 50%).



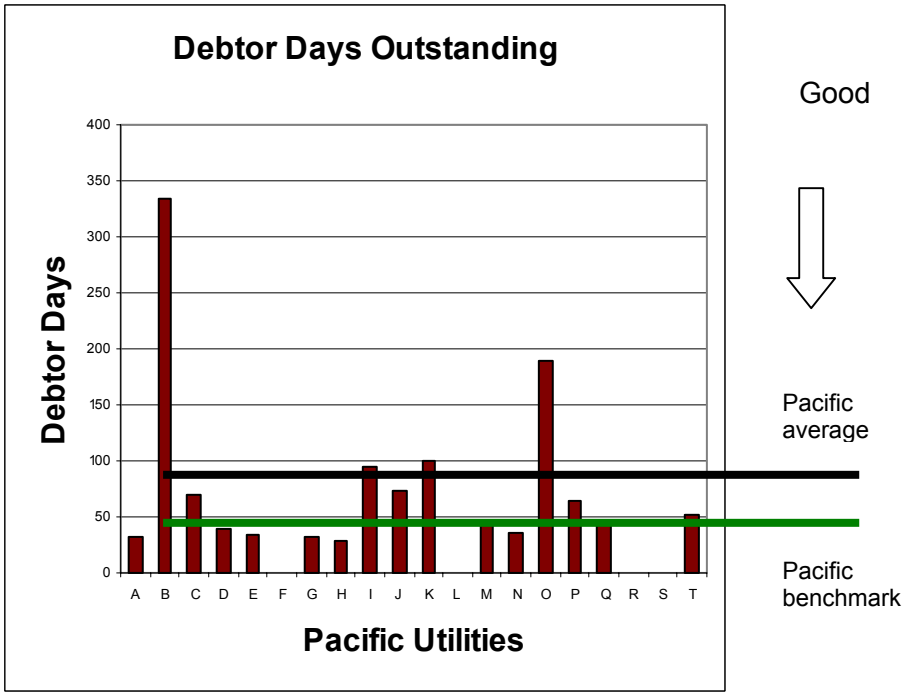
Generally Pacific power utilities do not earn commercial rates of return (the Pacific average is minus 16% compared to typical commercial returns of plus10%). Commercial development is a potential area for improvement in the Pacific.

Finance

Finance (Cont.)



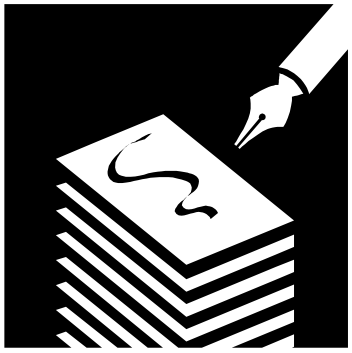
Generally, Pacific power utilities have adequate liquidity indicating probably grant support and effective rate recoveries (Pacific avg is 327% compared to benchmark of 100%)



Generally, revenue collection is good with a few exceptions making the average worse than benchmark (Pacific average is 79 days compared to benchmark of 50).

Finance (Cont.)

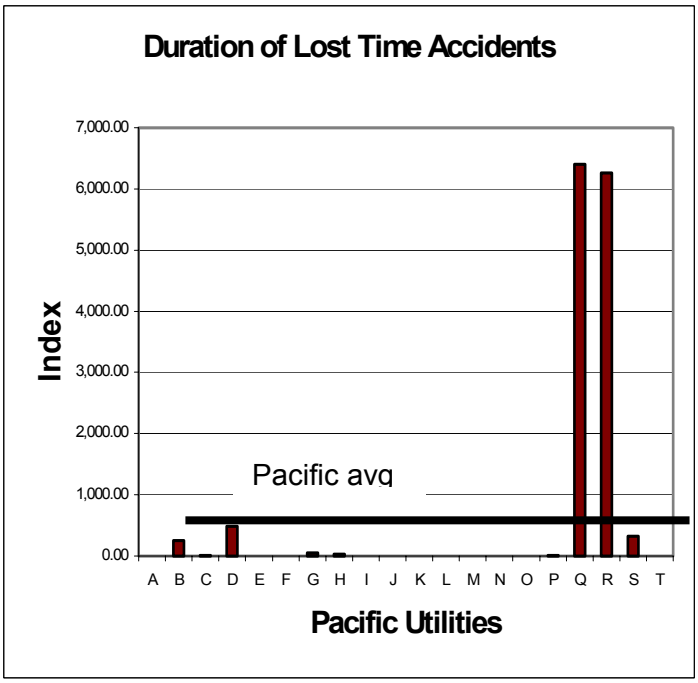
Overall, the financial indicators show that Pacific power utilities are financially robust with low rates of debt and adequate liquidity but in a good many cases there is the opportunity to improve commercial rates of return thereby preserving capital invested and in some cases being able to return a dividend to the community.



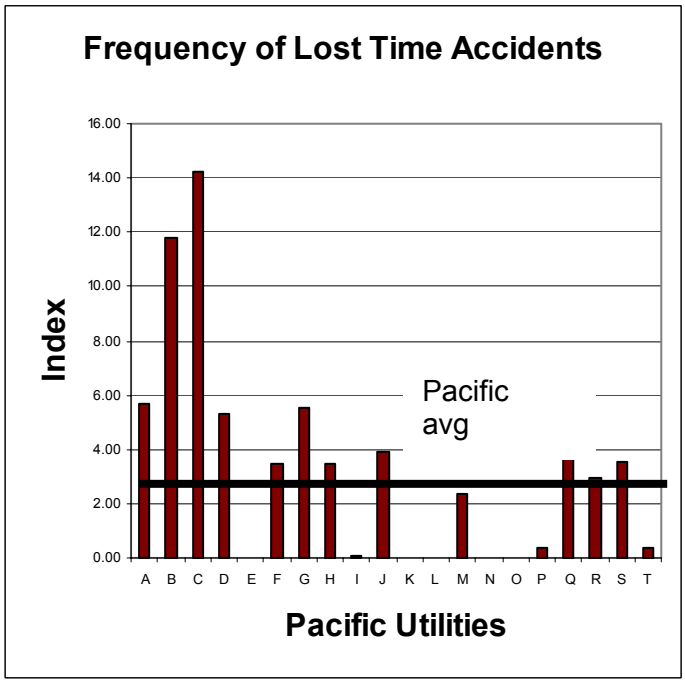
Results - General

Presently collected data relates to:
1) Duration of lost time accident index;
2) Frequency of lost time accidents;
3) Training

In future cycles of benchmarking, accident statistics need to be made consistent with international standards (which they are not at the moment). Consequently this data has not been developed. Nevertheless, results so far are indicated as “feedback” to participants with some comments as appropriate.



If these statistics are correct, then a number of utilities in particular could well benefit from pro-actively managing duration of absences caused by accidents.



Similarly, some utilities appear to have a high frequency of accidents which generally may not be severe; ie duration and frequency do not appear to be greatly correlated.

General (Cont)

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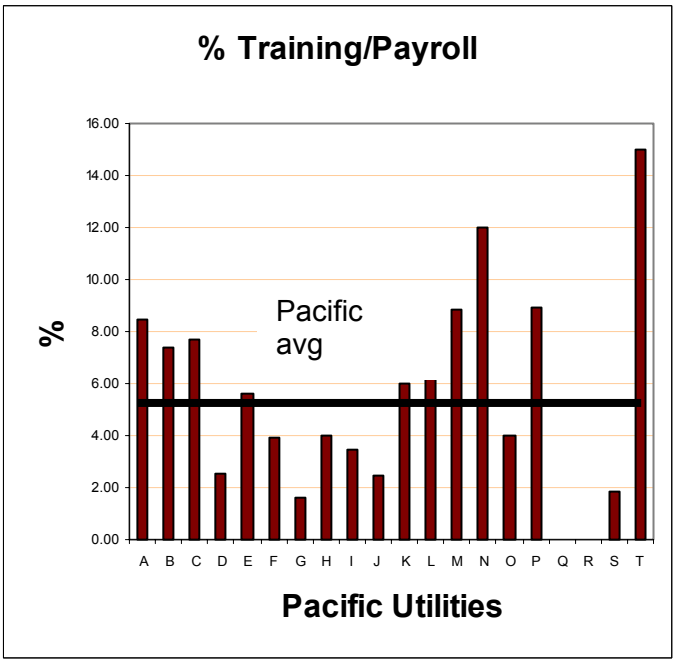


Training costs for Pacific power utilities can be high because of the frequent need to access these services off-shore.

Overall Results

Introduction

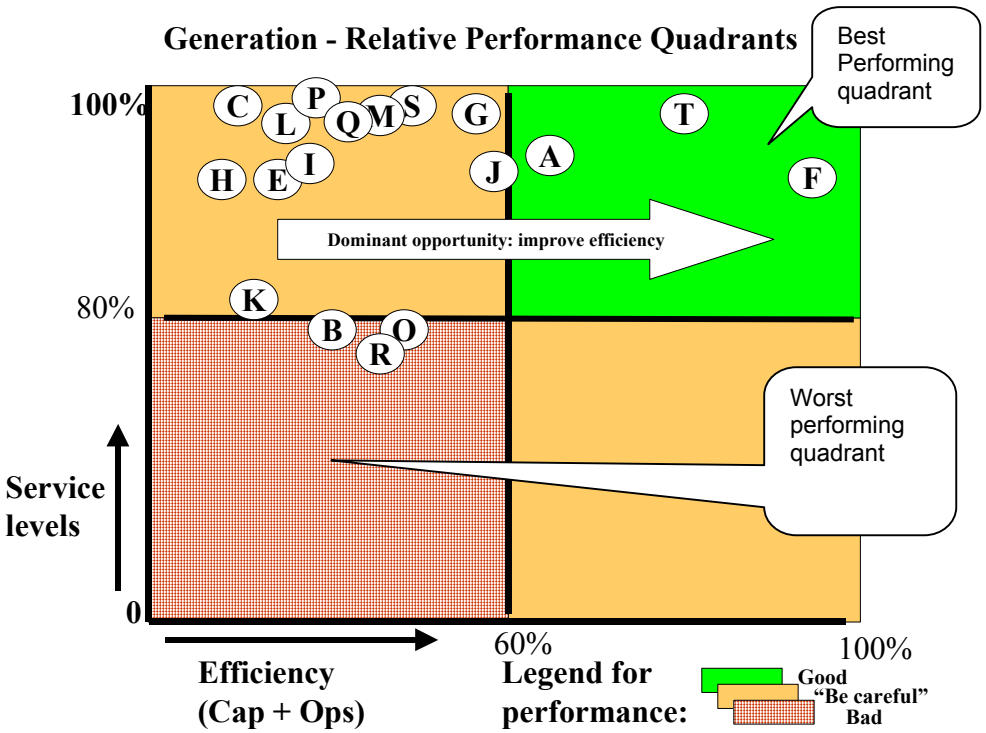
Performance Quadrant analysis attempts to concurrently consider a number of key performance indicators and to analyse the inevitable "trade offs" between service levels and costs. Detailed calculations are contained at **Appendices B 7 & 8.**

Qualification

As an initial exercise this Performance Quadrant analysis has been done respectively for generation and distribution only. In future cycles of benchmarking this technique can be developed to include other functions and more variables and to integrate all factors into one overall performance analysis. Also, this present overview contains only crude "mud map" comparisons and does not "drill down" into sub-sets of data which are potentially available; eg separately for thermal and hydro-generation. Further development of this approach will depend upon further enhancing benchmarking techniques appropriate for the Pacific and obtaining relevant and better data in future cycles of benchmarking.

Generation

Generation was analysed from the point of view of considering availability as a measure of service level compared to capital efficiency (measured by capacity factor - with a weighting of 2) and operating efficiency (measured by GWh generated for each employee – with a weighting of 1). For operating efficiency it would have been preferable to compare actual costs, but this data was not readily or reliably available for a good cross- section of utilities. The results of this analysis so far are illustrated below.



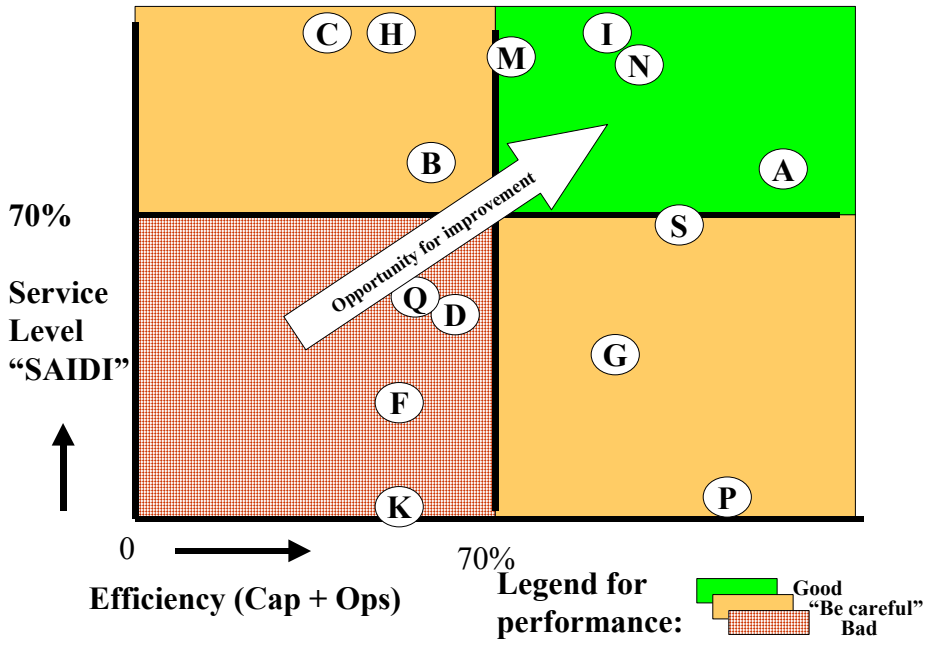
As may be seen, generation service levels are generally high in the Pacific, but there appears to be opportunities for many utilities to improve efficiency (i.e., to compared to better and best practice in the Pacific).

Overall Results (Cont.)

Distribution

Distribution service levels were measured in terms of SAIDI while capital efficiency was measured in terms of transformer utilisation levels and operating efficiency in terms of customers/staff member. Similar to generation, comparison of costs for operating efficiency is preferable, but data was not always available. The results of this analysis are indicated in the following graphic.

Distribution - Relative Performance Quadrants



As may be seen, the analysis outcomes are less clear (than for generation) except to say that for the majority of utilities there are opportunities to improve service levels and/or efficiencies

Overall Generation and Distribution

Overall, Pacific Utility "A" appears to be consistently best performing with superior service and efficiency results (i.e. top right-hand, green quadrant) for both generation and distribution.

Overall Opportunities for Improvement

The benchmarking results to-date indicate that the major opportunities for improvement for Pacific power utilities are as follows:

Generation

1) Build on generally good technical management and determine if increased efficiencies are possible;
2) Improve outage management and thereby contribute towards improved "SAIDI" as indicated below;

Distribution

1) Reduce losses
2) Overtime, improve transformer utilisation
3) Improve reliability (ie reduce "SAIDI")

Finance and Corporate

1) Improve commercial development and financial self-sufficiency.
2) Look at overall opportunities to contain price increases – and if possible reduce prices

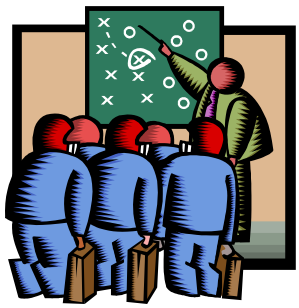
General

1) Improve safety

Benchmarking Generally

Improve:

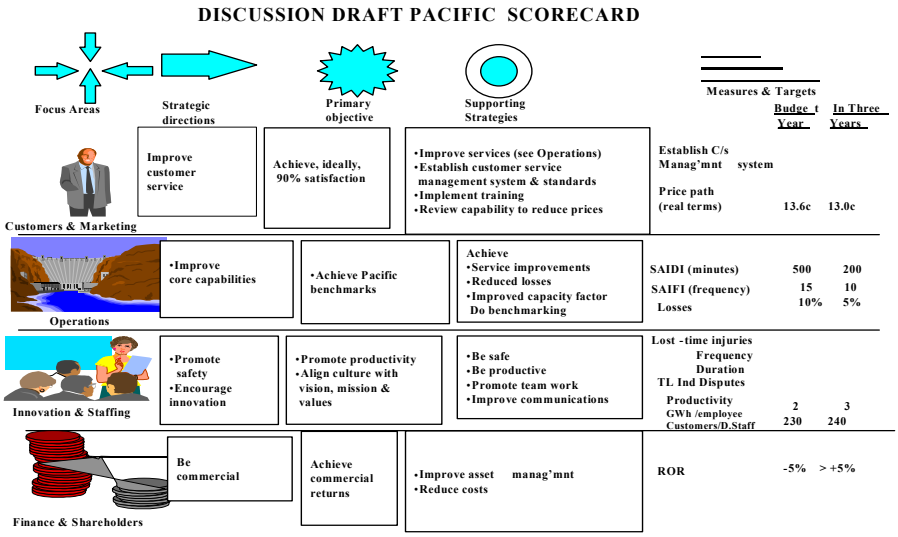
1) Participation rate by Pacific utilities in benchmarking in order to further improve the data base for the benefit of all;;
2) The quality and scope of data benchmarked;



Overall Opportunities for Improvement (Cont.)

Overall, it is very effective to plan for performance improvements in the form of Balances Scorecards.

Each utility will need to design a scorecard relative to its individual needs, but a template for Pacific utilities generally is illustrated below as an example



As may be seen, some of the opportunities for improvement have been included in this template scorecard for illustration purposes. Of course, each utility will need to decide for itself what its objectives and strategies will be.

Good luck.

Appendix A

Benchmark Indicators

Appendix A

Pacific Power Utilities Data Surveyed

Q	Indicator	Units	Definition
A	**General**		
A1	**Efficiency**		
	Total days lost	%	Total days lost * 100 / Total days worked
A 2	**Size**		
	System maximum demand	MW	
	Avg total employment	No.	The average of full time equivalent staff at beginning and end of the reporting period unless otherwise stated
A 3	**System Growth**		
	Demand	%	
	Energy	%	
A 4	**Safety**		
	Duration of lost-time accident index		Total person hours lost * 100 / Total number of employees
	Frequency of lost-time accidents		Number of lost time accidents * 100 / Total number of staff
	Note: Lost-time incident is defined as an incident where the employees are as a result of injury absent from the workplace for 0.5 days or greater		
	Training	%	Training expenditure * 100 / Employee payroll
B	**Generation**		
	Efficiency		
B 1	Load factor	%	Annual Generation (MWh) * 100 / Peak generated load (MW) * Period hours (8,760)
B 2	Capacity factor	%	Annual Generation (MWh) * 100 / Installed plant capacity (MW) * Period hours (8,760)
B 3	Reserve plant margin	%	Installed plant capacity (MW) - Peak demand (MW) * 100 / Peak demand (MW)
B 4	Equivalent availability factor	%	Installed plant capacity (MW) * Period hours (8,760) - MWh losses * 100 / Installed capacity (MW) * Period hours (8,760)
B 5	Labour productivity (excluding construction)	GWh/Emp	Electricity generated in period / Average number of generation employees

Appendix A Pacific Power Utilities Data Surveyed			
Q	**Indicator**	**Units**	**Definition**
B 6	Thermal efficiency	%	Electrical energy generated in period / Combustible energy consumed
B 6.1	Specific Fuel Oil Consumption (SFOC)		Units Generated / Fuel Used
B 6.2	Lubricating Oil Consumption (LOC)	Vol/Ltr	Lubricants used / Hours of operation
B 7	**Service Quality**	%	
	Equivalent forced outage factor		MWh out of service due to forced outages * 100 / Installed plant capacity (MW) * Period hours (8,760)
B 8	Planned outage factor	%	MWh out of service due to planned outages * 100 / Installed plant capacity (MW) * Period hours (8,760)
B 9	**Size**		
	Total physical output generated	GWh	
	Generating plant capacity	MW	
	Changes in generating plant capacity	MW	
B 10	**Cost and Revenue Measures**		
	Operation and maintenance costs	$/MWh	Total operation and maintenance costs / Electricity sent out to grid (MWh)
C	**Transmission**		
	Efficiency		
C 1	Transmission system reliability		Unplanned outage * 100 / Length of line
C 2	Transmission labour productivity		Electricity delivered to system transmission / Number of transmission employees
C 3	Transmission and Distribution losses	%	Energy sent out - Energy sales / Energy sent out
C 4	**Size**		
	Transmission transformer capacity	MVA	
	Transmission circuit kilometres	Km	
C 5	**Cost & Revenue Measures**		
	Operation and maintenance costs per circuit km	$/km	Transmission operation and maintenance costs / Total length of transmission line

Appendix A Pacific Power Utilities Data Surveyed			
Q	**Indicator**	**Units**	**Definition**
C 6	Operation and maintenance costs per MWh sold	$/MWh	Transmission operation and maintenance costs / Total energy sold
D	**Distribution**		
D 1	**Efficiency**		
D 1.1	Distribution labour productivity	Cust/ emp	Average total number of customers / Average number of employees in Distribution and Consumer Services
D 1.2	Distribution transformer utilisation ratio		Annual energy sales / Distribution transformer capacity (MVA) * 8,760
D 1.3	Distribution losses	%	Electricity sent out - electricity sold / Electricity sent out
D 2	**Service Quality**		
D 2. 1	System Average Outage Frequency (number of interruptions per customer) (SAIFI)		Total number of customer interruptions / Average total number of customers
D 2.2	System Average Outage Duration (minutes per customer per year) (SAIDI)		Total customer hours interrupted * 60 / Average total number of customers
D 3	**Size**		
	Total number of customers	0	
	Total physical output	GWh	
	Distribution transformer capacity	MVA	
	Distribution circuit kilometres	Km	Breakdown by voltage
D 4	**Cost and Revenue Measures**		
D 4.1	Average price of product	$/MWh	Total revenue from customer group / Total sales to customer group (MWh)
D 4.2	Operating and maintenance costs per circuit km	$/km	Distribution operation and maintenance costs / Total circuit km
D 4.3	As above - per MWh sold	$/MWh	Distribution operation and maintenance costs / Total electricity sold (MWh)
E	**Finance**		
E 1	Operating ratio		Total operating expenses + depreciation / Operating revenue

Appendix A Pacific Power Utilities Data Surveyed			
Q	**Indicator**	**Units**	**Definition**
E 2	Debt equity ratio		Long term debt / Equity + long term debt
E 3	Debt services ratio		Net income + depreciation + interest / Operating revenue
E 4	Self financing ratio		Initial revenue generated - debt service + increase in capital / Capital expenditure
E 5	Rate of return		Operating income / Average net fixed assets in operation
E 6	Current ratio		Current assets / Current liabilities
E 7	Debtor days		Debtors at year end * 365 / Total revenue

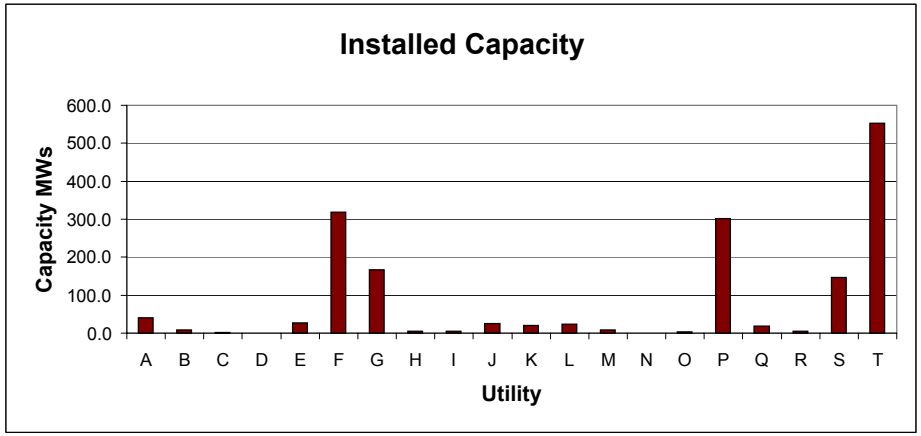
Appendix B

Benchmark Data

Appendix B 1

Power Utilities: Size and Characteristics

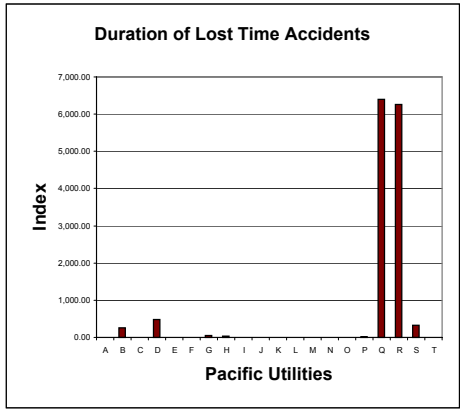
	GENERATION CAPACITY	GROSS GENERATION	MAXIMUM DEMAND	Customers	Employees
Utilities	Mega watt	Mega Watt Hours	Mega Watts	Number	Number
A	40.2	169,000	24.2	10,000	140
B	7.6	23,558	4.1	2,112	93
C	1.8	3,000	0.6	1,012	14
D			66.7	44,658	243
E	26.7	85,270	14.5	21,831	285
F	318.6	1,599,500	233.9	18,838	307
G	167.0	569,487	98.0	116,000	922
H	5.6	8,350	1.6	1,487	29
I	4.4	15,384	2.3	1,000	46
J	24.9	100,400	15.5	4,805	103
K	21.0	39,892	6.6	5,778	123
L	23.6	49,630	10.3	6,000	194
M	8.0	22,270	3.7	3,520	44
N			6.0	14,200	106
O	3.8	1,480	2.7	4,200	93
P	302.0	770,000	147.2	71,600	1,350
Q	18.6	39,455	8.1	5,745	105
R	4.5	15,056	2.3	2,343	34
S	146.7	443,810	76.8	47,299	255
T	552.4	1,956,000	280.0	44,115	573

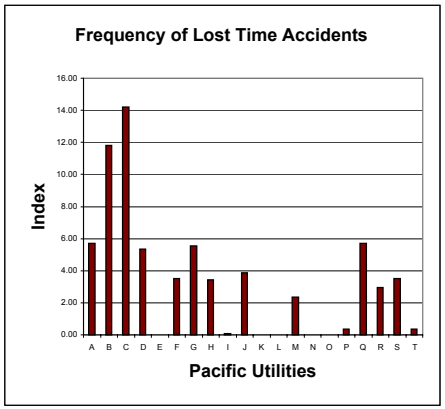


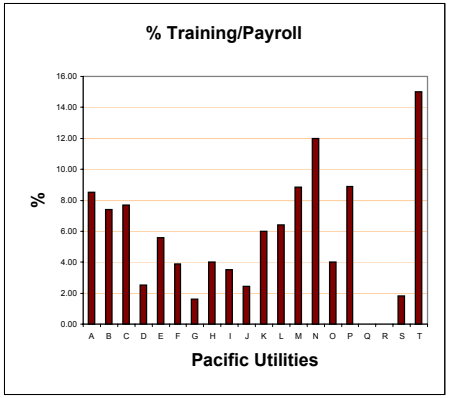
Appendix B 2

Section A General Data Input

	A.1	A.2		A.3		A.4		
	Efficiency	Size		S. Growth		Safety		
		System M.D	Employees	Demand	Energy	Duration -Lost-time	Frequency	Training
	%	MW	No.	%	%	Index	Index	%
A	0.50	24.20	140	2.30	6.60	0.60	5.71	8.50
B	8.01	4.12	93	3.04	1.72	249.46	11.83	7.42
C	7.00	0.64	14		0.03	7.14	14.20	7.67
D	18.51	66.69	243	1.28	4.15	484.00	5.34	2.51
E		14.40	285	5.00	4.00			5.60
F	0.83	233.90	307	4.60	2.40	0.74	3.50	3.90
G	1.73	98.00	922	-2.00	8.70	47.10	5.53	1.60
H	3.40	1.58	29	0.00	-3.19	33.90	3.44	4.00
I	0.04	2.28	46	-0.39	-0.58	0.50	0.07	3.50
J	2.92	15.54	103	6.29	7.30	0.17	3.88	2.43
K	5.00	6.60	123	5.00	-1.00	0.00	0.00	6.00
L		10.33	194	-2.10	-11.10			6.40
M	2.58	3.54	44	3.39	9.98	0.79	2.35	8.84
N	7.00	5.95	106	4.00	5.00	0.00	0.00	12.00
O		2.70	93	6.00	12.00	0.00	0.00	4.00
P	10.00	147.24	1,350	1.91	-3.30	13.90	0.37	8.89
Q	1.57	8.07	105	5.49	3.41	6,400.00	5.71	
R	3.66	2.31	34	-2.90	0.20	6,263.00	2.94	0.00
S	0.72	76.80	255	2.80	4.11	326.67	3.53	1.83
T	3.14	280.00	573	3.70	1.11	1.05	0.35	15.00
Total	**76.61**	**1,004.89**	**5,059**	**47.41**	**51.54**	**13,829.03**	**68.75**	**110.09**
Avg	**4.51**	**50.24**	**253**	**2.50**	**2.58**	**768.28**	**3.82**	**5.79**







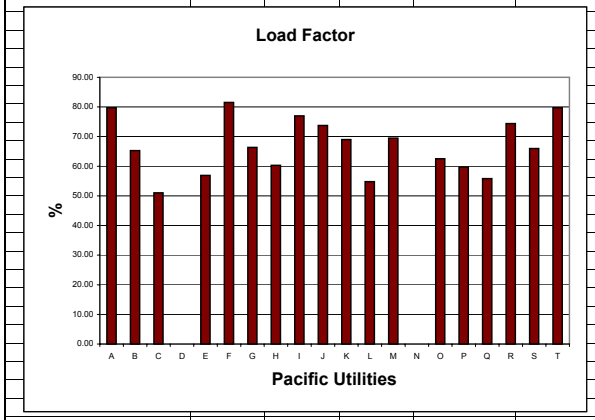
Appendix B 3

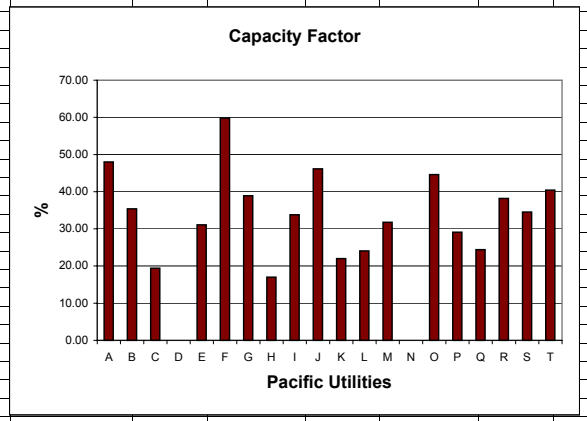
Section B Generation Utility Data

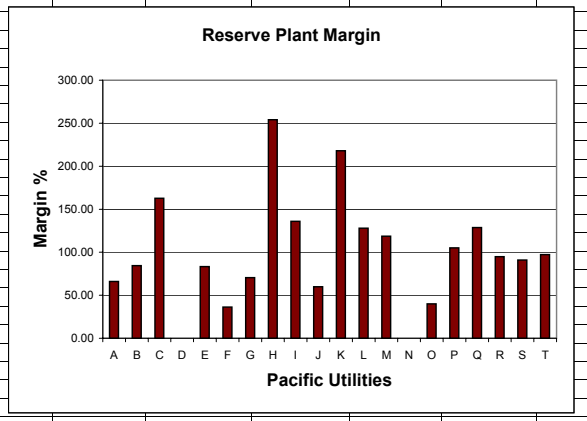
	B.1	B.2	B.3	B.4	B.5	B.6				B.7	B.8	B.9			B10		
						B6.1		B6.2				B9.1	B9.2	B9.3			
	Efficiency									Service Quality		Size			Cost & Revenue		
	Load Factor	Capacity Factor	RPM	Available Factor	Labour Prod.	S.F.O.C.	SFOC Standard	L.O.C.	LOC Standard	Forced Out Factor	Plan Out. Factor	Units Generated	Gen. Plant Capacity	Change in Capacity	O&M Cost	USD. EQ	Conversion Factor
	%	%	%	%	GWh/Emp		kWhr/litre	Li/Hr	Li/Hr	%	%	GWhrs	MW	MW	$/MWh		
A	79.76	48.00	66.00	96.90	3.30	15.27 KWh/USG	4.03	9.39	9.39	11.90	0.80	169	40.2	4.0	18.00	18.00	
B	65.27	35.38	84.47	80.83	0.74	14.29 kwh/USG	3.77	0.156USG/hr	0.59	37.85	17.72	24	7.6	0.0	1.01	1.01	
C	51.00	19.40	162.70	99.00	1.00	3.45kWhr/1	3.45	0.231/hr	0.23	6.97	1.14	3	1.8	0.2			
D																	
E	56.90	31.10	83.30	94.20	0.73	3.82kWh/l	3.82	1.631/hr	1.63			85	26.7				
F	81.50	59.80	36.20	97.40	9.90	0.28kg/kWhr	3.00	9.6 1/hr	9.60	3.00	4.20	1,600	318.6	29.0			
G	66.34	38.93	70.40	99.90	4.48	0.220gms kWhr	3.60	1.98 l/hr	1.98	0.45	1.87	569	167.0	22.0	10.48	15.00	0.015
H	60.30	17.00	254.00	97.00	0.76	13.8kWhr/USG	3.65	0.27 USG/hr	1.00	3.40	3.60	8	5.6	0.0	7.70	85.00	0.085
I	77.00	33.80	136.00	93.00	0.56	12.99 kWhr/USG	3.43	2.7USG/hr	10.22	0.20	0.12	15	4.4	0.0		235.00	
J	73.77	46.13	59.91	92.25	2.50	14.1kWh/USG	3.72	0.635USG/hr	2.40	0.03		100	24.9	0.0		91.11	
K	69.00	22.00	218.00	82.00	0.85	0.08 USG/kWh	3.86		2.93	11.00	7.00	40	21.0	0.0	19.10	99.26	
L	54.80	24.05	128.00	98.00	1.80	027litres/KWhr	3.70	5.1l/hr	5.10			50	23.6			0.02	
M	69.46	31.78	118.58	98.63	1.31	0.2531/kWhr	3.88	1.791/hr	1.92	0.34	3.85	22	8.0	0.0	67.00	96.80	
N																	
O	62.50	44.60	40.00	78.00	0.39	3.2	3.20	1.7	1.70	1.70	9.50	1	3.8	0.0			
P	59.69	29.11	105.00	99.75	1.71		3.24		0.62	12.50	5.00	770	302.0	0.0	130.61	33.61	0.2573
Q	55.81	24.40	128.75	99.04		210gr/kwh	3.99		3.03	5.35	0.00	39	18.5	0.0			
R	74.40	38.20	94.80	74.50	3.00	222.1gr/kwh	4.21		0.85	24.20	1.28	15	4.5	0.0	197.75		
S	65.97	34.54	91.02	99.14	5.69	0.241m3/MWh	4.15	0.01267m3 /MWh	12.67	0.00		444	146.7	0.0	9.90		
T	79.75	40.43	97.29	98.05	10.03	.05 US gals/ KWh	5.48					1,956	552.4		115.90		
Pacific Total	1,203.22	618.65	1,974.42	1,677.59	48.75		68.18		65.86	118.89	56.08	5,911	1,677.2	55.2	577.45		
Pacific Avg	66.85	34.37	109.69	93.20	2.87		3.79		3.87	7.93	4.31	328	93.2	3.7	57.74		
Pacific BM	80	40.00		90.00			4.00		3.50	5.00	3.00						
ESAA 1999	66.10	59.90		90.40	22.40					3.20	6.10						
International BM	65.00	50.00		65.00						0.00	3.00						

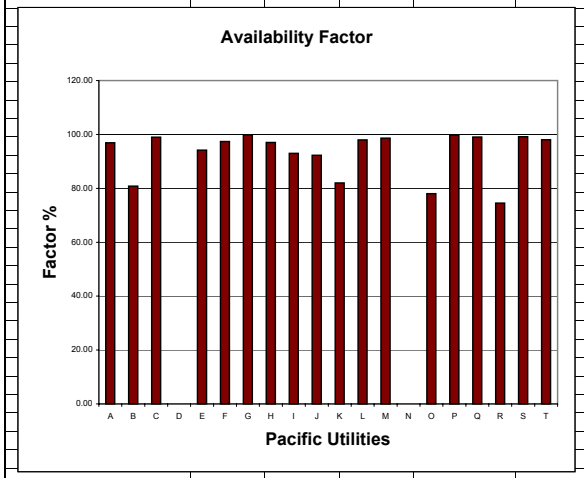
Appendix B 3

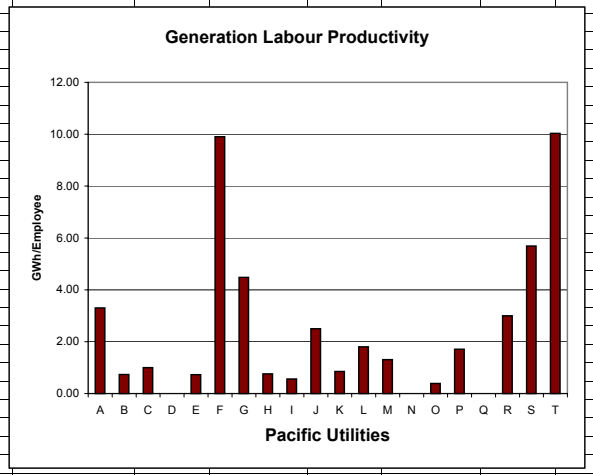
Section B Generation Utility Data

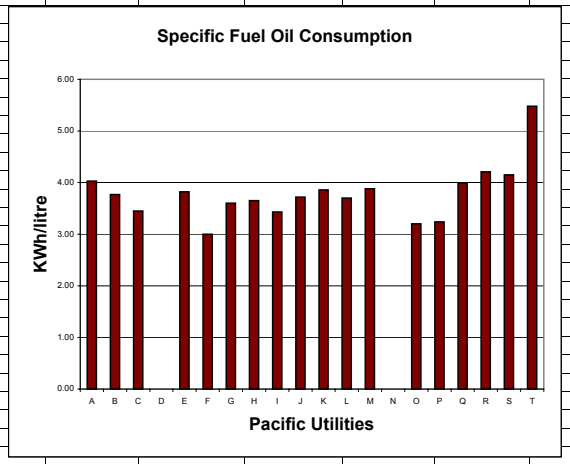






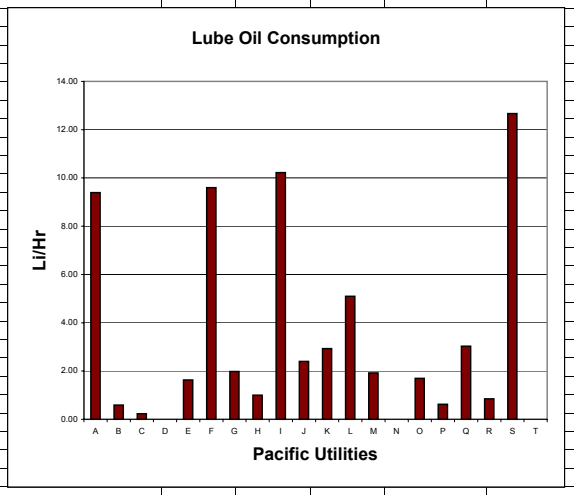


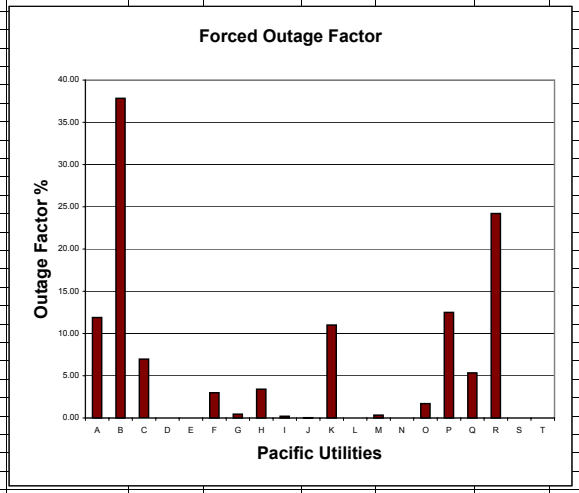


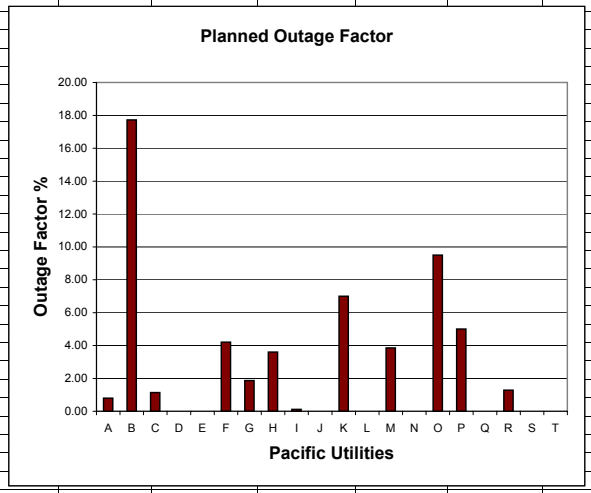


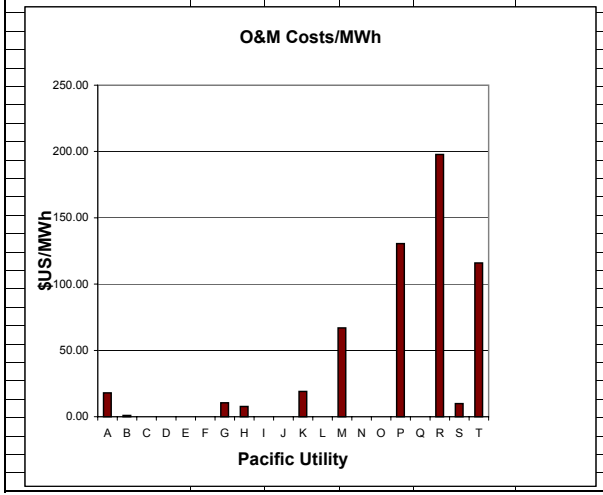
Appendix B 3

Section B Generation Utility Data





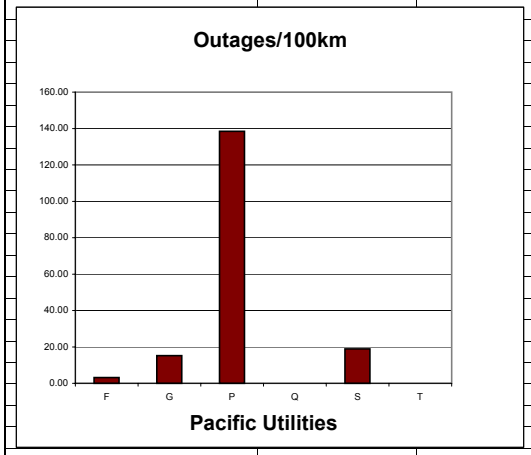


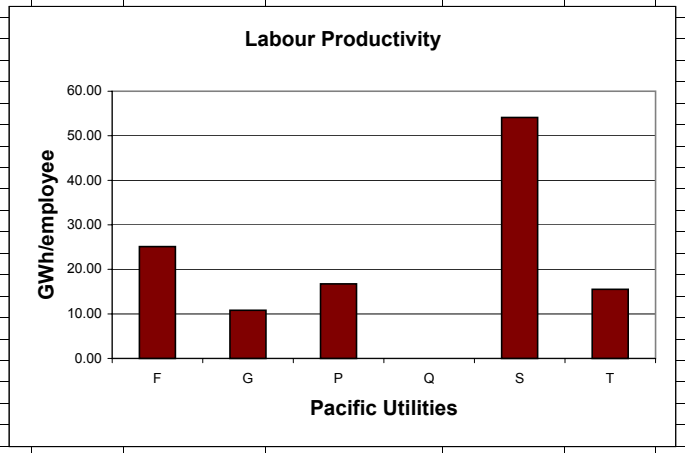


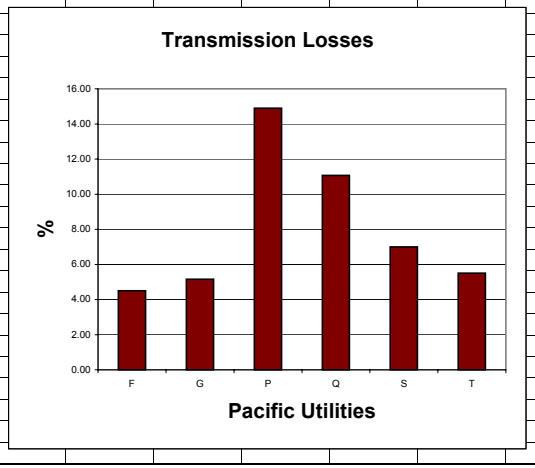
Appendix B 4

SECTION C TRANSMISSION _ Utility data

	Service	Efficiency		Size		C&R	
				C.4			
	C.1	C.2	C.3	C.4.1	C.4.2	C.5	C.6
	Outages/ 100km	Labour productivity	Trans & Dist losses %	Size MVA	Size km	$/km	$/MWh
F	3.20	25.10	4.50	395.00	374.00		
G	15.17	10.83	5.15	567.75	435.00	3,797.00	3.15
P	138.50	16.74	14.90	551.10	932.80	730.14	1.05
Q	0.00		11.07	32.00	11.00		
S	18.90	54.09	7.00	110.00	132.00		
T		15.52	5.50				
Total	**175.77**	**122.28**	**48.12**	**1,655.85**	**1,884.80**	**4,527.14**	**4.20**
Pacific Avg	**35.15**	**24.46**	**8.02**	**331.17**	**376.96**	**2,263.57**	**2.10**
Pacific BM							
ESAA 1999 (NSW only)		**65.90**	**18.80**				
International BM							







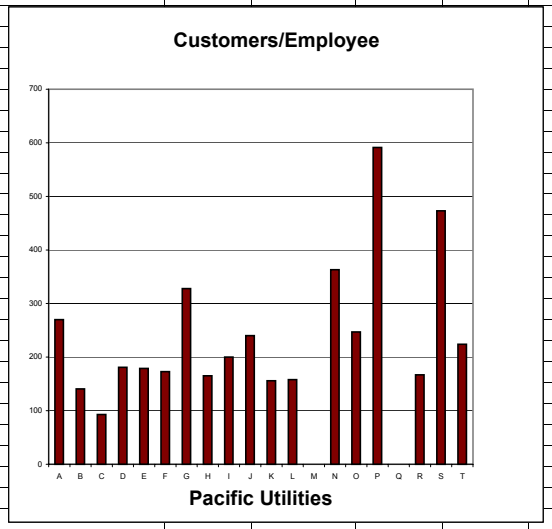
Appendix B 5

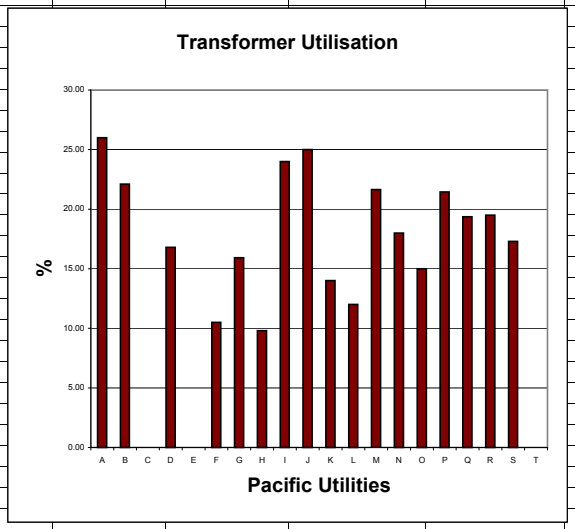
Section D: Distribution

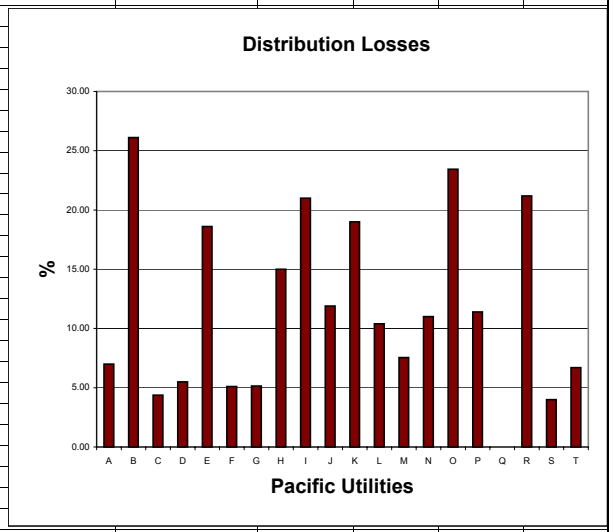
	D.1			D.2		D.3				D.4			
	D.1.1	D.1.2	D.1.3	D2.1	D.2.2	D.3.1	D.3.2	D.3.3	D.3.4	D4.1		D.4.2	D.4.3
	Efficiency			Service Quality		Size				Cost & Revenue			
	Cus/ Emp.	Tx Utilisation Ratio%	Dist losses %	SAIFI	SAIDI	Total Customers	Total Energy Sold GWh	Total Tx. Capacity MVA	Total Dist. Circuit km	Avg Price $MWh	Avg Price c/KWh	O&M $/km	O&M $MWh
A	270	26.00	7.00	10	236	10,000	161	65.0	2,770	148.00	14.80	882	17.00
B	141	22.10	26.11	8	187	2,112	17	8.6	32	126.00	12.60	5,856	8.90
C	93		4.37	2	18	1,012	3		60		0.00		
D	181	16.80	5.50	0	477	44,658	355	227.7	1,829	26.54	2.65		
E	179		18.60			21,831	69	31.5	477	175.86	17.59	1,948	13.50
F	173	10.50	5.10	3	660	18,838	97	105,260.0	3,306		0.00		
G	328	15.92	5.15	6	584	116,000	534	383.0	2,188	163.83	16.38	2,686	16.77
H	165	9.80	15.00	0	5	1,487	7,048	8.2	44	163.83	16.38	92	9.88
I	200	24.00	21.00	16	5	1,000	14	5.7	28	167.00	16.70	1,323	3.13
J	240	25.00	11.90			4,805	87	34.7	175	89.92	8.99	8,179	6.64
K	156	14.00	19.00	62	940	5,778	31	25.8	322	227.00	22.70	1,560	16.00
L	158	12.00	10.40			6,000	41	39.0	80	65.22	6.52		15.60
M		21.65	7.55	8	11	3,520	18	11.3	242	180.00	18.00	1,966	26.60
N	363	18.00	11.00	13	33	14,200	30	18.6	174	155.50	15.55	1,172	6.80
O	247	15.00	23.44	86		4,200		8.4	54	150.97	15.10		
P	591	21.44	11.40	45	4,327	71,600	650	346.2	2,001	73.28	7.33	1,134	3.84
Q		19.36			522	5,745	34	19.9	246				
R	167	19.50	21.19			2,343	12	6,933.0	68	423.00	42.30	2,938	39.41
S	473	17.30	4.00	4	290	47,299	390	257.8	1,558				
T	224		6.70			44,000	1,736			133.13	13.31		
Pacific Total	**4349**	**308.37**	**234.41**	**264**	**8,294**	**426,428**	**11,326**	**113,684.4**	**15,653**	**2,469.08**	**246.91**	**29,736**	**184.07**
Pacific Avg	**242**	**18.14**	**12.34**	**19**	**592**	**21,321**	**596**	**19.2**	**824**	**154.32**	**15.43**	**2,478**	**14.16**
Pacific BM	**240**	**30.00**	**5.00**	**10**	**200**							**800**	
ESAA 1999	**429**	**18.80**	**5.90**	**3**	**189**						**7.00**		
International BM	**350**	**50.00**	**5.00**	**1**	**47**						**7.00**	**167**	

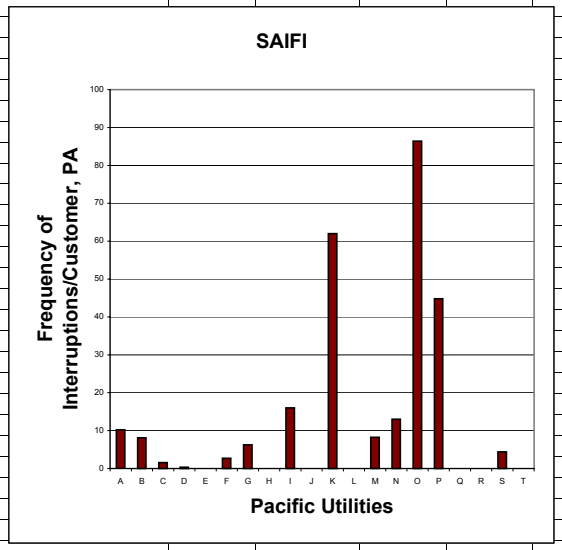
Appendix B 5

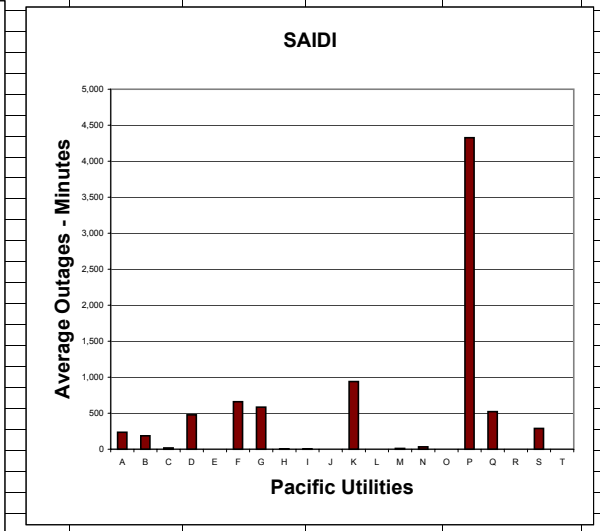
Section D: Distribution

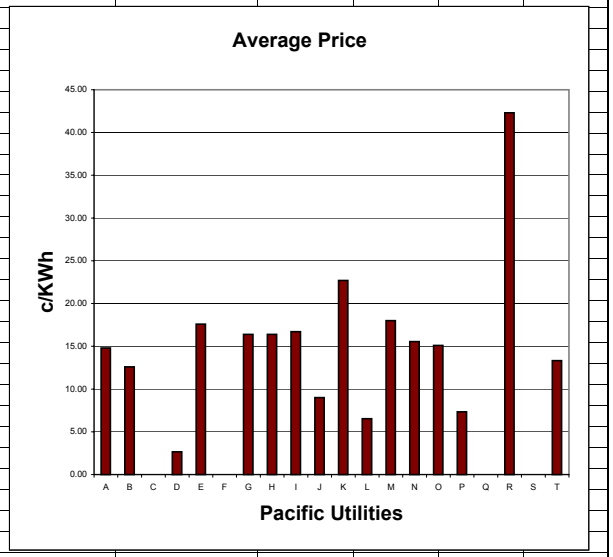






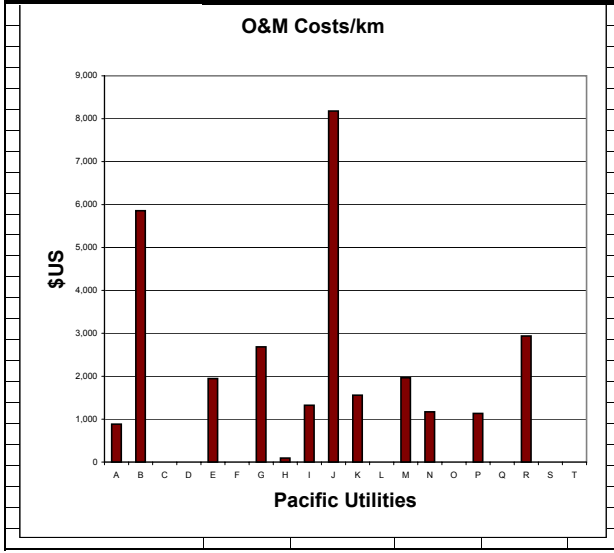






Appendix B 5

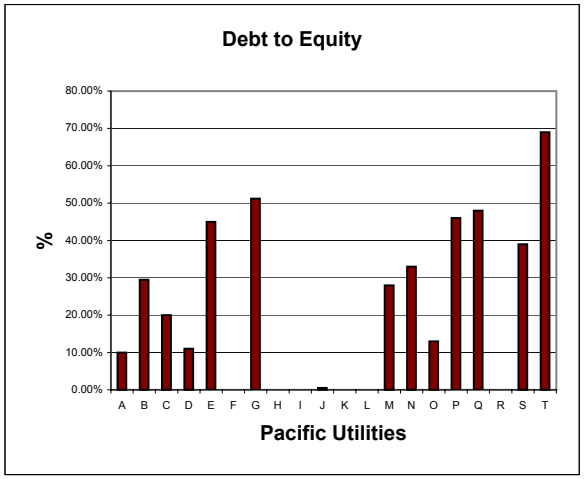
Section D: Distribution

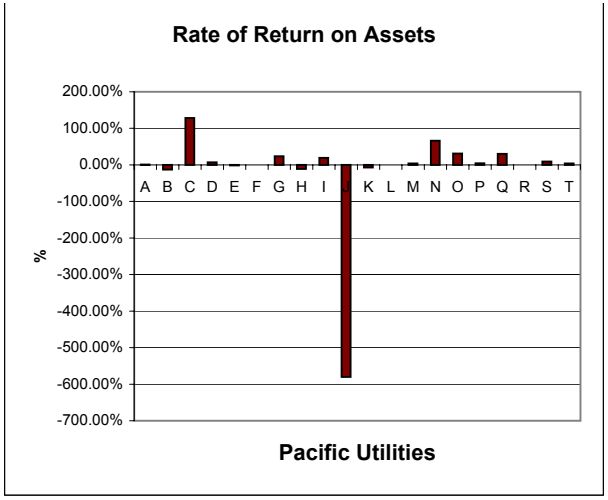


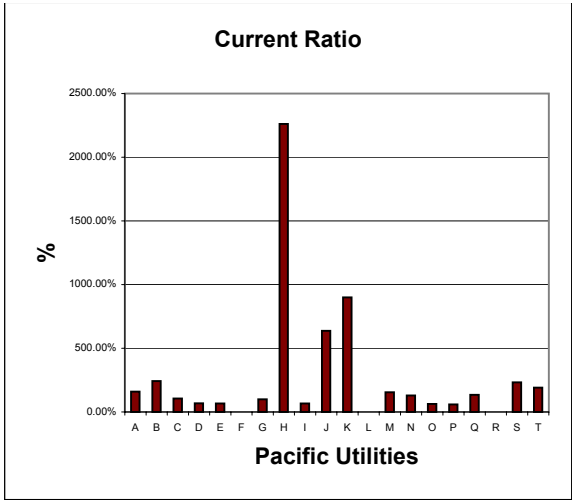
Appendix B 6

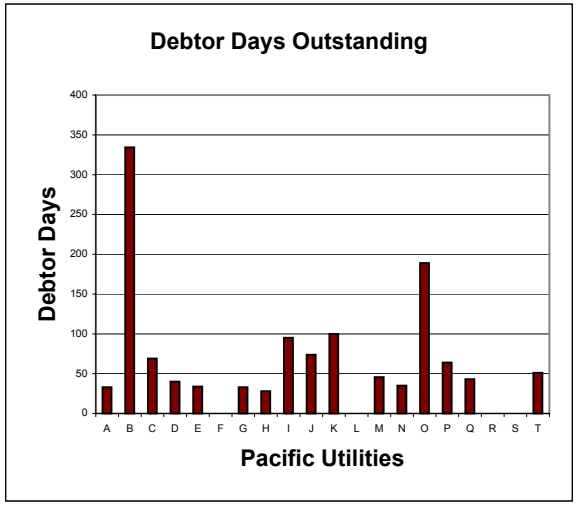
Section E: Finance Utility Data

	E.1	E.2	E.3	E.4	E.5	E.6	E.7
	Op. Ratio	**Dbt Eqty ratio**	**Dbt Ser ratio**	**Slf Fin.ratio**	**R.O.R**	**Cur. Ratio**	**Dbt days**
A	99.00%	10.00%	27.00%	256.00%	0.66%	160.00%	33
B	155.00%	29.50%	55.40%		-12.80%	242.20%	334
C	110.00%	20.00%	110.00%	330.00%	128.00%	105.00%	69
D	91.00%	11.00%	174.00%	168.00%	7.00%	68.00%	40
E	103.00%	45.00%	30.00%		-1.50%	67.00%	34
F							
G	126.00%	51.20%	52.30%		23.60%	99.40%	33
H	147.00%	0.00%	44.00%	98.66%	-11.00%	2261.00%	28
I	226.00%	0.00%	4.00%	355.00%	19.00%	67.00%	95
J	123.00%	0.50%	23.00%	2160.00%	-580.00%	637.00%	74
K	142.00%	0.00%	5.00%	33.00%	-7.00%	900.00%	100
L							
M	91.00%	28.00%	24.00%	309.00%	4.00%	155.00%	46
N	96.00%	33.00%	108.00%		66.00%	130.00%	35
O	129.00%	13.00%	22.00%	300.00%	31.20%	63.30%	189
P	91.00%	46.00%	60.00%	-143.80%	4.39%	58.60%	64
Q	74.00%	48.00%	21.00%	32.00%	30.00%	134.00%	43
R							
S	89.00%	39.00%	29.00%	121.00%	9.00%	233.00%	
T	1275.00%	69.00%	217.00%	140.00%	3.81%	191.00%	51
Pacific Total	3167.00%	443.20%	1005.70%	4158.86%	-285.64%	5571.50%	1267
Pacific Avg	186.29%	26.07%	59.16%	319.91%	-16.80%	327.74%	79
Pacific BM	0.00%	50.00%			0.00%	100.00%	50.00
ESAA (NSW)		48.00%				88.00%	
International BM						100.00%	30.00


Debt to Equity
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
%
A B C D E F G H I J K L M N O P Q R S T
Pacific Utilities


Rate of Return on Assets
200.00%
100.00%
0.00%
-100.00%
-200.00%
-300.00%
-400.00%
-500.00%
-600.00%
-700.00%
%
A B C D E F G H I J K L M N O P Q R S T
Pacific Utilities


Current Ratio
2500.00%
2000.00%
1500.00%
1000.00%
500.00%
0.00%
%
A B C D E F G H I J K L M N O P Q R S T
Pacific Utilities


Debtor Days Outstanding
400
350
300
250
200
150
100
50
0
Debtor Days
A B C D E F G H I J K L M N O P Q R S T
Pacific Utilities

Appendix B 7

Generation Service Levels Vs Efficiencies

Relative Performance Levels

	Service levels	Capital Efficiency		Operating Efficiency		Cap + Op Efficiency
	Availability	Capacity Factor	Capital efficiency % of 59.8 taken as benchmark	GWh/ Emp	Operating efficiency % of 9.9 GWh taken as BM	((Cap Eff x 2) + Op Eff))/2
A	96.90	48.00	80.27	3.30	33.33	64.62
B	80.83	35.38	59.16	0.74	7.43	41.92
C	99.00	19.40	32.44	1.00	10.10	24.99
D						
E	94.20	31.10	52.01	0.73	7.37	37.13
F	97.40	59.80	100.00	9.90	100.00	100.00
G	99.90	38.93	65.10	4.48	45.25	58.48
H	97.00	17.00	28.43	0.76	7.67	21.51
I	93.00	33.80	56.52	0.56	5.66	39.57
J	92.25	46.13	77.14	2.50	25.25	59.84
K	82.00	22.00	36.79	0.85	8.59	27.39
L	98.00	24.05	40.22	1.80	18.18	32.87
M	98.63	31.78	53.14	1.31	13.23	39.84
N						
O	78.00	44.60	74.58	0.39	3.94	51.03
P	99.75	29.11	48.68	1.71	17.27	38.21
Q	99.04	24.40	40.80			40.80
R	74.50	38.20	63.88	3.00	30.30	52.69
S	99.14	34.50	57.69	5.69	57.47	57.62
T	98.05	40.43	67.61	10.03	101.31	78.84
Total	1,677.59	618.61	1,034.46	48.75	492.37	853.77
Avg	93.20	34.37	57.47	2.87	28.96	47.43

Note: In absence of operating efficiency data for Q, only capital efficiency score has been included in calculating overall efficiency score

Appendix B 8

Distribution Service Levels Vs Efficiency

Relative Performance Levels

	Service Levels		Capital Efficiency		Operating Efficiency		Cap + Op Efficiency
	SAIDI	100-score/ 940 x 100 Condition: Values = or > 940 =0	Capital Efficiency Tranny Utilisation %	Relative capital efficiency 30% taken as b/m	Customers/ employee ratio	% of BM 240 Condition: scores > 240 = 100%	Total Ops Efficiency (Cap E+ 2xOp E)/3
A	236	74.89	26.00	86.67	270	100.00	95.56
B	187	80.13	22.10	73.67	141	58.67	63.67
C	18	98.12			93	38.67	38.67
D	477	49.26	16.80	56.00	181	75.42	68.94
E					179	74.58	
F	660	29.79	10.50	35.00	173	72.00	59.67
G	584	37.85	15.92	53.07	328	100.00	84.36
H	5	99.50	9.80	32.67	165	68.75	56.72
I	5	99.46	24.00	80.00	200	83.33	82.22
J			25.00	83.33	240	100.00	94.44
K	940	0.00	14.00	46.67	156	65.00	58.89
L			12.00	40.00	158	65.78	57.19
M	11	98.86	21.65	72.17			72.17
N	33	96.49	18.00	60.00	363	100.00	86.67
O			15.00	50.00	247	100.00	83.33
P	4,327	0.00	21.44	71.47	591	100.00	90.49
Q	522	44.47	19.36	64.53			64.53
R			19.50	65.00	167	69.58	68.06
S	290	69.15	17.30	57.67	473	100.00	85.89
T					224	93.33	
Total	8,294	877.96	308.37	1027.90	4,349	1465.11	1311.45
Avg	592	62.71	18.14	60.46	242	81.40	72.86
Notes:							
C & T	Only operating efficiency data provided, hence overall efficiency rating based on this factor only						
M & Q	Only capital efficiency data provided, hence overall efficiency rating based on this factor only						

Appendix C

PPA Conference 2002 Comments on previous Progress Report

Performance Benchmarking
Review of Benchmarking Progress Report June 2002
Matters Arising from CEO's MEETING on 23July 2002 and Proposals in Response for Decision

Report Reference	Matter Arising	Issues, Options, Comments	Proposal in Response	Decision of PPA Conference
Page 5, Customers & Marketing	Insufficient focus. Need to know customer priorities in order to know which benchmarking is important.	Could include: 1) % population served 2) % connected demand met 3) customer satisfaction surveys 4) customer service standards See Benchmarking Manual: • **Appendix B** for what customers want; • **Appendix** E for customer service standards Ideal to benchmark actual customer survey results and customer service standards achieved, but this may be difficult across multiple and possibly quite different markets.	Include in next survey: 1) % population served 2) % connected demand met 3) customer satisfaction survey conducted: yes/no 4) customer service standards published and measured: yes/no Generally, customer survey questions be organised into "Balanced Scorecard" order.	Consider proposal in response in next round of benchmarking.
Page 6 Capacity Factor	Not agreed that high capacity factor reflects likely over-investment in generation particularly because indivisibility of plant in small systems and lack of grid back-up means that reserve plant must be held.	Improvement of financial ratios in next cycle of benchmarking will increase commercial discipline; i.e. for achieving return on funds invested. Note, however, productivity issues still become apparent in Quadrant analysis, page 15	Withdraw current comment on page 6.	Agreed
Page 7 Labour Productivity	Not agreed that low GWh/employee ratio reflects opportunity to improve productivity because minimum levels of staff required even in	Agreed that true efficiency measures should be based upon costs. Poor costings included in current round of benchmarking data; eg some include and others	Obtain much more accurate costing data in next round of benchmarking by better defining inclusions and exclusions.	Agree to withdraw current comment.

Report Reference	Matter Arising	Issues, Options, Comments	Proposal in Response	Decision of PPA Conference
	small systems and in any case costs/GWh and not labour is true efficiency measure.	exclude fuel costs etc.	And then measure efficiency based upon costings. If possible persuade private utilities to submit financial data.	Focus more upon costings in next round of benchmarking.
Page 8 Forced Outages	Not agreed that Forced Outage Factor benchmark should be "0%". International benchmarks are required.	Available international benchmarks are as follows: Forced outage factors 99/00: NSW 4.5% Vic: 3.1% Qld: 3.2% SA: 2.4% WA: 1.7% Tas: 0.6% NT: 1.8% Aust: 3.2%	Conference: 1) Adopt a "Forced Outage" benchmark 2) Indicate improvement or otherwise required	Agreed Adopt 3 -5% as forced outage benchmark
Page 8 & Page 9, Forced and Planned Outages	Consider expressing Forced and Planned Outages each as reciprocals (i.e. 100 - current ratio)	This is already included in Availability Factor and, in any case, Forced and Planned Outage Factors are universal KPIs	Unless Conference determines otherwise, retain Forced and Planned Outage Factors as at present.	Agreed
Page 10 SAIDI	Unusual events, eg exceptional storms, can distort annual figures.	Often utilities will report SAIDI: 1) "Raw" and 2) "Normalised" i.e. excluding abnormal events	In next cycle of benchmarking including SAIDI "raw" and "normalised".	Agreed.
Page 11 Prices	Hydro-generators may or may not be able to reduce prices. Withdraw current comment.		Withdraw current comment.	Agreed
Page 11 &	Current formula not consistent	International (eg ESAA) standards (Plus ESAA	Adopt internationally recognised	Agreed

Report Reference	Matter Arising	Issues, Options, Comments	Proposal in Response	Decision of PPA Conference
12 Accident Duration and Frequency	with international standards. Also, current ratios are not complete.	results for 99/00): LTID: Total days lost due to injuries pa/avg total number of FTE employees (0.15 G) (0.10T) (0.23 D) LTIF: Total number of lost time injuries pa X 1,000,000/ Total annual hours worked (i.e. number of injuries per million hours worked) (8.26 G), (5.45 T) (8.07 D) Lost Time Due to Industrial Disputes: Total days lost/avg total number of FTE employees (1999 0.02 G) (0.10 T) (NA D) Sick leave: Total number of sick days leave pa/Avg total number of FTE employees. (5.84 G) (4.57 T) (NA D) The above standards may or may not be equivalent to APPA ratios.	standard ratios; i.e. ESAA standards as illustrated or other international ratios which may be preferred; eg APPA. Adopt benchmarks in next cycle of benchmarking	
Page 13-14 Financial ratios	Some ratios and/or definitions are different from common commercial ratios (which makes benchmarking difficult)	Common commercial ratios: (Examples are from 99/00, NSW power corporations, all ESAA data) Return on Total Assets (ROTA): Profit before interest & tax (PBIT)/ Avg total assets as in the balance sheet x 100 (9.33%G) (6.80%T) (9.82% D) Return on Equity (RoE): Profit after tax (PAT)/Avg total equity X 100 (11.25 G), 6.5% T?) (14.25% D)	Apply ratios as illustrated in next cycle of benchmarking These are the common most of ratios and therefore the easiest benchmarked. Recommended: 1) exclusion of "quick ratio" for time being, and 2) inclusion of total liabilities in	Agreed

Report Reference	Matter Arising	Issues, Options, Comments	Proposal in Response	Decision of PPA Conference
		Current Ratio (as per current PPA benchmarking) Debt/Equity: Short + long term debt/equity (1.09 G) (0.79 T) (0.91 D) Interest Cover: profit before interest and tax (PBIT)/interest (2.95 G) (2.16 T) (4.76 D) Debtor Days (As per current PPA benchmarking)	debt/equity as former is not often included in power company comparisons and latter is typically used.	

Peter Smiles
ADB Benchmarking Consultant