

TONGA POWER LIMITED OPERATIONS



OVERVIEW

- TPL Core Purpose
- Accomplishment in the 2016 – 2017 Financial Year
- Goals for the 2017 – 2018 Financial Year
- Objectives for the Year & Over the next 3-5 Years
- Key Performance Indicators & Trends of How TPL is Operating
- Health & Safety-Best Work Practice & Lessons Learnt
- How will TPL look like over the next 3-5 Years



TPL CORE PURPOSE

Safe, Reliable, Sustainable and Affordable Service to the people of Tonga.

TPL MISSION

- To deliver the nation's core purpose via our strategies and Business Plan
- To be financially sustainable

'every public enterprises and subsidiary to operate as a successful business and, to this end, to be as profitable and efficient as comparable businesses that are not state owned'

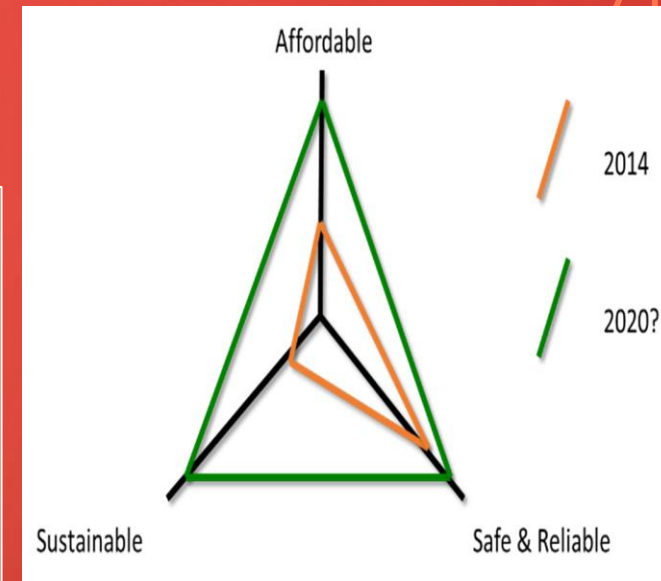
TONGA CORE PURPOSE

Reduce Tonga's vulnerability to oil price shocks, and achieve an increase in quality access to modern energy services in an affordable and environmentally sustainable manner

50% RENEWABLE BY 2020 & 100% RENEWABLE BY 2035

Key Energy Outcomes:

- National security of supply of energy
- Economic development- competitive energy pricing
- Standard of Living- energy price, quality, services
- Low carbon energy system



ACCOMPLISHMENT IN THE 2016 – 2017 FINANCIAL YEAR

- ONGOING HV & LV WORKS ON TVNUP
- TPL SCOPE OF WORKS FOR 2MW MATATOA SOLAR FARM
- INSTALLATION OF OVER 1 500 LED STREET LIGHTS
- 1.3KM SUBMARINE CABLE LAID ACROSS THE LAGOON AND CONNECTED TO POPUA
- ONGOING OF THE OUTER ISLAND RENEWABLE ENERGY PROJECT ('EUA & VV)
- ONGOING SMART METER INSTALLATION
- 528 CAPEX AND 1 468 OPEX COMPLETED



GOALS FOR THE 2017 – 2018 FINANCIAL YEAR

- CONTINUATION OF CAPEX, OPEX & PROJECT WORKS
- MAINTAIN FUEL EFFICIENCY AND DIESEL SECURITY OF SUPPLY
- 50% RE GOAL PATHWAY
- ENTERPRISE RESOURCE PLANNING SYSTEM (ERP)
- INCREASE HEALTH & SAFETY AWARENESS
- IMPROVE ON KEY PERFORMANCE INDICATORS
 - INCIDENT / ACCIDENT & REPORTING
 - SAFE WORK PRACTICE
 - CUSTOMER SERVICE
 - OUTAGE RESPONSE TIME
 - AWARENESS PROGRAM

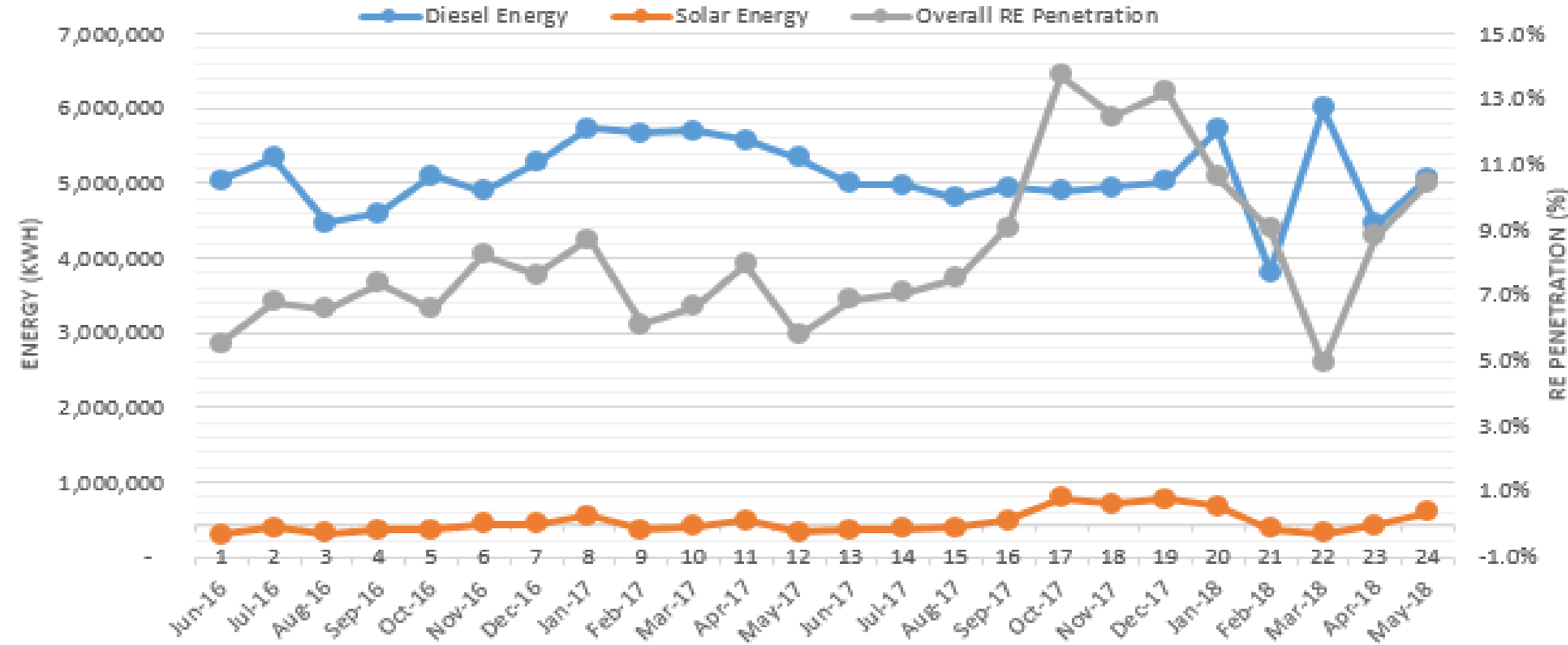


OBJECTIVE FOR THE YEAR – MAJOR PROJECTS

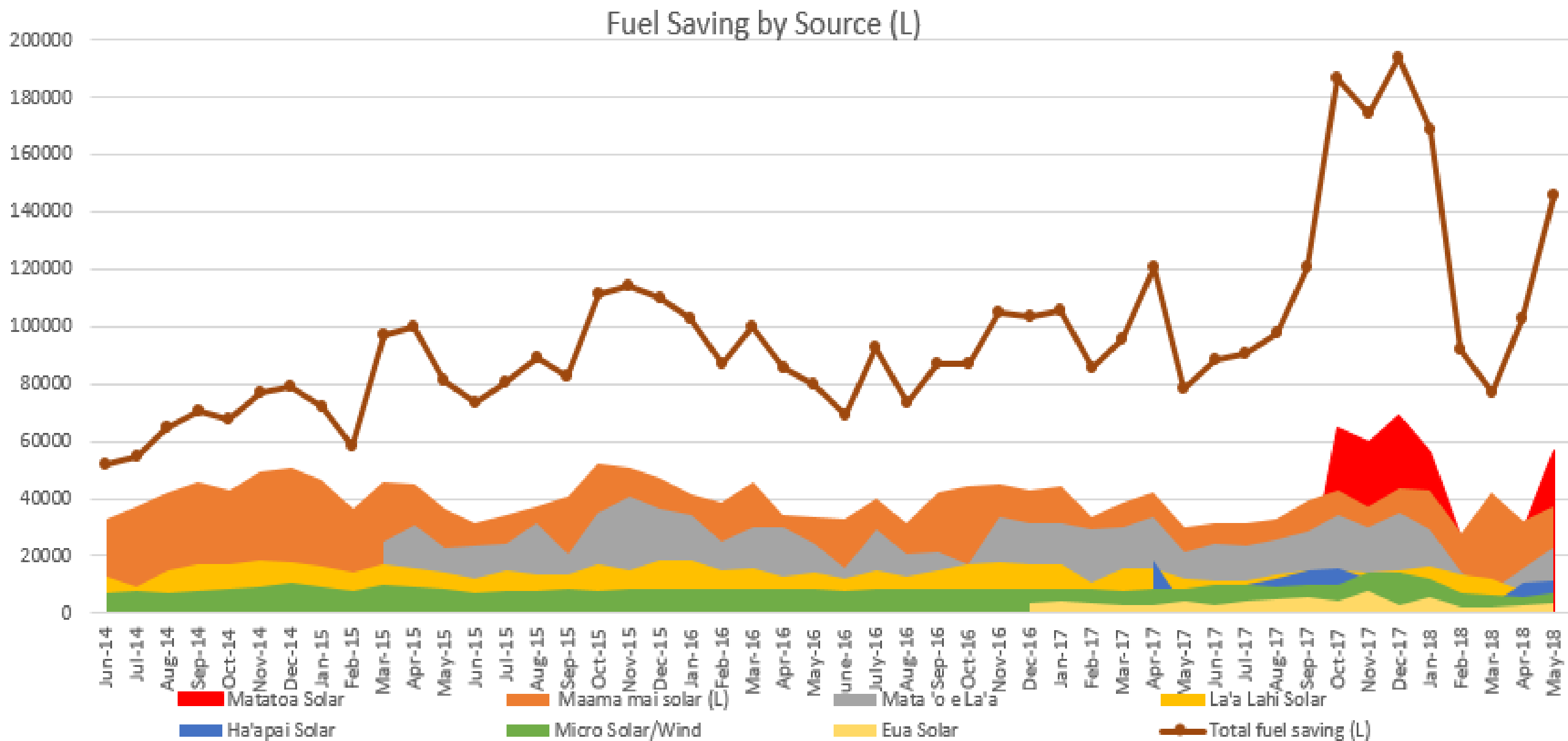
- TVNUP (TONGA VILLAGE NETWORK UPGRADE PROJECT)
- OIREP (OUTER ISLAND RENEWABLE ENERGY PROJECT)
- NNUP (NUKU'ALOFA NETWORK UPGRADE)
- SMART METER IMPLEMENTATION
- RENEWABLE PROJECTS (SOLAR & WIND)
- BESS (BATTERY ENERGY STORAGE)
- PROFESSIONAL TRAINING QUALIFICATION
- INTERNATIONAL DISTRIBUTION LINE CONSTRUCTION CAPABILITY

KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

TPL Electricity Energy Production (KwH)



KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING



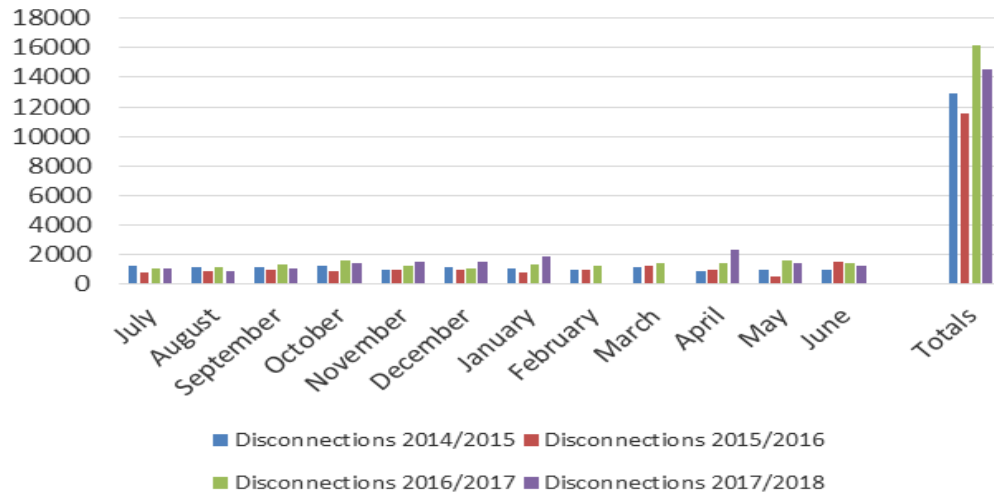
KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

Generation Performance Measures - May, 2018								
Performance Indicator	Tongatapu		Vavau		Ha'apai		Eua	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Diesel Generators								
Fuel Efficiency (kWh/L)	4.03	3.98	3.75	3.94	3.55	3.77	3.55	3.56
Load Factor (%)	80%	65.00%	80%	61%	80%	56.00%	80%	59%
Availability Factor (%)	100%	100.00%	100%	79.95%	100%	99.90%	100%	99.58%
Firm Installed Capacity (MW)	15	13.9	1.2	1.892	0.35	0.692	0.36	0.792
Capacity Factor (%)	40%	37.79%	40%	35.60%	40%	28.12%	40%	22.94%
Renewable Energy								
Fuel Displacement (%)	20%	10.20%	20%	5.50%	50%	30.10%	20%	7.85%
Overall Fuel Displacement (%)	20%	10.20%	NA	NA	NA	NA	NA	NA
RE Penetration (%)	20%	10.00%	20%	5.50%	50%	30.10%	20%	7.85%
Overall RE Penetration (%)	50%	10.40%	NA	NA	NA	NA	NA	NA
RE Installed Capacity (MW)	16	4.5	0.5	0.42	0.5	0.5	0.5	0.2
Renewable Energy Sources								
Availability Factor (%)								
Maama Mai	100%	100%	NA	NA	NA	NA	NA	NA
Mata 'Oe La'a	100%	100%	NA	NA	NA	NA	NA	NA
Matatoo Solar	100%	100%	NA	NA	NA	NA	NA	NA
La'a Lahi Solar	NA	NA	100%	99.80%	NA	NA	NA	NA
Ha'apai Solar	NA	NA	NA	NA	100%	0.00%	NA	NA
Eua Solar	NA	NA	NA	NA	NA	NA	100%	93.55%
Capacity Factor (%)								
Maama Mai	30%	15.60%	NA	NA	NA	NA	NA	NA
Mata 'Oe La'a	30%	12.30%	NA	NA	NA	NA	NA	NA
Matatoo Solar	30%	13.19%	NA	NA	NA	NA	NA	NA
La'a Lahi Solar	NA	NA	30%	9.30%	NA	NA	NA	NA
Ha'apai Solar	NA	NA	NA	NA	30%	11.73%	NA	NA
Eua Solar	NA	NA	NA	NA	NA	NA	30%	7.56%
Feeders								
Availability Factor (%)								
Feeder 1	100%	99.90%	100%	100.00%	100%	99.96%	100%	100.00%
Feeder 2	100%	99.90%	100%	100.00%	100%	99.91%	100%	100.00%
Vaini Feeder 2	100%	99.81%	NA	NA	NA	NA	NA	NA
Overall Plant								
N+1 Security Compliance (MW)	11.23	13.74 (8.96MW Peak Demand)	1.292	1.892 (1.07 Peak Demand)	0.372	0.692 (0.345 peak demand)	0.372	0.792 (0.300 Peak Demand)
Frequency Fluctuation (50Hz +/- 1.5%)	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz	50.75Nz (HL) ; 49.25Hz
Voltage Fluctuation (11/6KV +/- 10%)	12.1 KV (HL); 9.9KV (LL)	11.2KV (HL); 10.8KV (LL)	7.26KV (HL); 5.94KV (LL)	6.68 (HL); 6.52(LL)	7.26KV (HL); 5.94KV (LL)	6.68 (HL); 6.52(LL)	7.26KV (HL); 5.94KV (LL)	6.68 (HL); 6.52(LL)
No. of Accidents & Incidents	0	0	0	0	0	0	0	0
Plant Noise (dB)	60dB	90-100dB	60dB	90-95dB	60dB	85-90dB	60dB	85-90dB
Parasitic Consumption	2.50%	3.04%	2.50%	1.56%	2.50%	2.66%	2.50%	1.25%
Fuel Losses (L)	0	0	0	-1	0	0	0	0
Lub Oil Losses (L)	0	-147	0	0	0	17	0	0

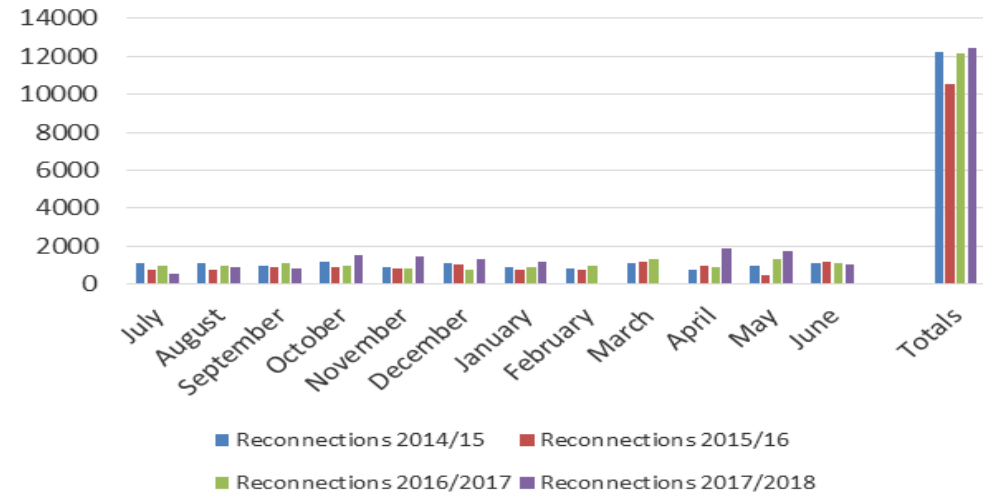
KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

Month	Disconnections 2014/2015	Disconnections 2015/2016	Disconnections 2016/2017	Disconnections 2017/2018	Variance 16-17 to 17-18	Month	Reconnections 2014/15	Reconnections 2015/16	Reconnections 2016/2017	Reconnections 2017/2018	Variance 16-17 to 17-18
July	1208	813	1103	1099	-4	July	1131	792	949	522	-427
August	1135	919	1200	929	-271	August	1136	770	1002	920	-82
September	1124	993	1300	1063	-237	September	981	890	1102	804	-298
October	1276	846	1645	1472	-173	October	1168	868	994	1516	522
November	966	990	1251	1531	280	November	912	853	816	1469	653
December	1139	996	1107	1559	452	December	1141	1022	753	1349	596
January	1106	839	1377	1843	466	January	937	765	924	1202	278
February	968	987	1283	0	-1283	February	850	762	943	0	-943
March	1175	1229	1415	0	-1415	March	1113	1177	1340	0	-1340
April	894	935	1455	2300	845	April	794	962	925	1857	932
May	940	498	1612	1433	-179	May	979	498	1291	1739	448
June	985	1499	1412	1274	-138	June	1081	1164	1099	1021	-78
Totals	12916	11544	16160	14503		Totals	12223	10523	12138	12399	

DISCONNECTION 14-15-16-17-18

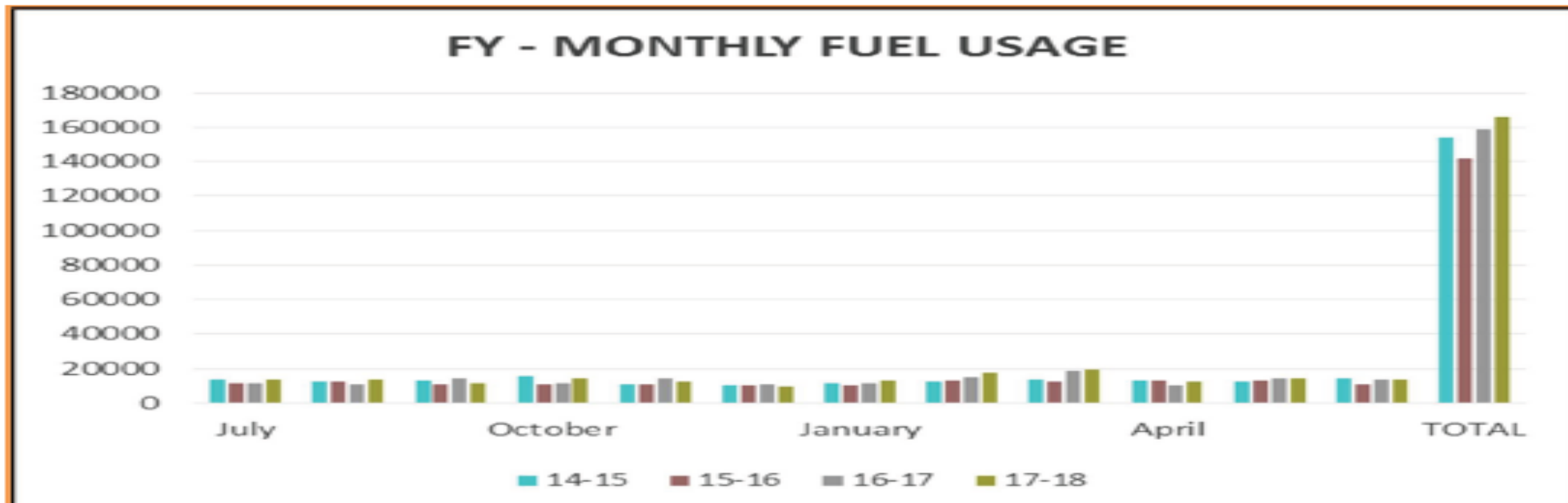


RECONNECTION 14-15-16-17-18



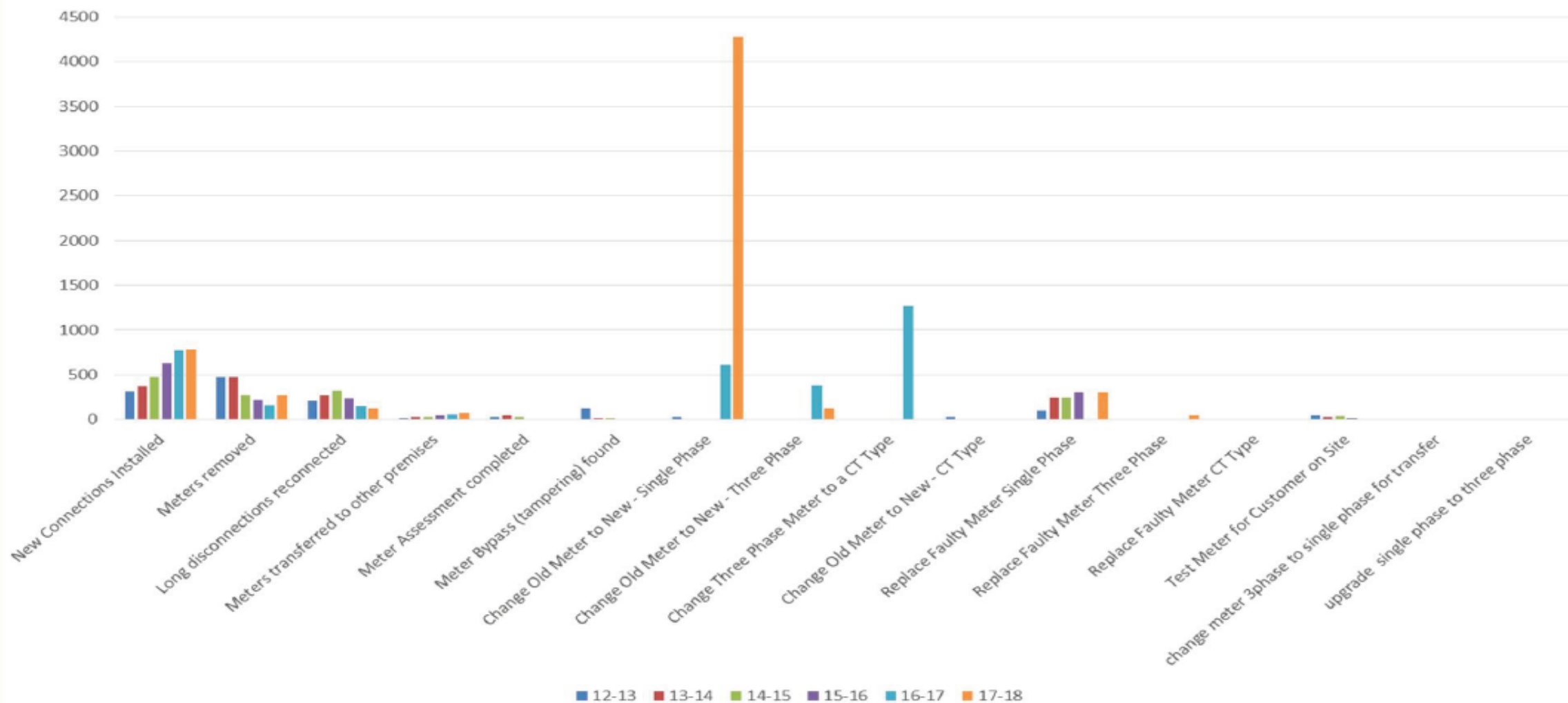
KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

Monthly Summary		Monthly Summary		Monthly Summary		Monthly Summary		Variance for 16-17 to 17-18
Month	Usage	Month	Usage	Month	Usage	Month	Usage	
Jul-17	13846	Jul-16	11592	Jul-15	12077	Jul-14	13769	2254
Aug-17	13753	Aug-16	11410	Aug-15	12565	Aug-14	12357	2343
Sep-17	11784	Sep-16	14212	Sep-15	11133	Sep-14	12817	-2428
Oct-17	14105	Oct-16	11885	Oct-15	11395	Oct-14	15801	2220
Nov-17	12501	Nov-16	14270	Nov-15	11317	Nov-14	10870	-1768
Dec-17	9767	Dec-16	11017	Dec-15	10254	Dec-14	10824	-1250
Jan-18	13211	Jan-17	11676	Jan-16	10617	Jan-15	11893	1535
Feb-18	17350	Feb-17	15119	Feb-16	12909	Feb-15	12456	2231
Mar-18	19429	Mar-17	19078	Mar-16	12627	Mar-15	13600	351
Apr-18	12523	Apr-17	10350	Apr-16	12994	Apr-15	12808	2173
May-18	14393	May-17	14349	May-16	13057	May-15	12387	44
Jun-18	13491	Jun-17	13898	Jun-16	10885	Jun-15	14234	-407
Total Year 2017 - 18	166153	Total Year 2016 - 17	158856	Total Year 2015 - 16	141829	Total year 2014 - 15	153816	7297



KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

METER WORK TRENDS IN THE LAST 5 YEARS



KEY PERFORMANCE INDICATORS & TRENDS OF HOW TPL IS OPERATING

- Line Loss Trend
- System Indicators
 - SAIDI : SAIFI : CAIDI
- Health & Safety (KPI)

HEALTH & SAFETY-BEST WORK PRACTICE & LESSONS LEARNT

Figure 4: Unplanned Outage Works (Bat secretion causing short circuit on Disk Insulator & Old Hardware)

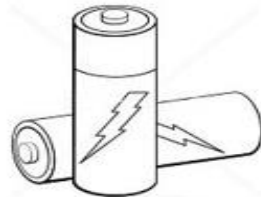
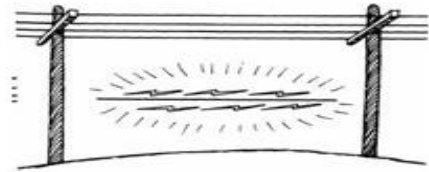
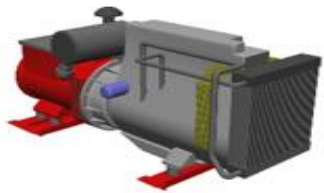


HEALTH & SAFETY-BEST WORK PRACTICE & LESSONS LEARNT



HOW WILL TPL LOOK LIKE OVER THE NEXT 3-5 YEARS

- Hybrid System Plan to reach 50% Renewable Penetration by 2020



**SAFE,
RELIABLE,
SUSTAINABLE,
AFFORDABLE
Electricity for
the people of
Tonga**

AL



04/03/2014

MALO 'AUPITO

QUESTION?



TC GITA POWER RESTORATION - TONGATAPU & EUA