29 January, 2015

Lord Dalgety
Electricity Commission
Tu’atakilangi
Nuku’alofa

Dear Lord Dalgety


In accordance with the reporting requirements of the Electricity Concession Contract and in response to your request for additional information as specified in the suggested MOU dated May, 2012, TPL submits the following reports for the month of December, 2014.

1. System Loss Report
2. Fuel Efficiency Report
3. Reliability Measures Report (Tongatapu and Outer Islands)
4. Monthly Outage Events Report

The above report items are described in detail below.

1. System Loss Report

The following graphs illustrate the 12 months Moving Average (smoothed) Systems Losses for all four islands for the years 2012/13 and 2013/14. The 12 months moving average losses are used because of the variability of monthly Real Time Systems Losses due to the impact of the number of days and fall of the weekends in respect to meter reading cycle. In addition, system loss report is always one month late as last month consumption data (i.e. meter readings) will only be read this month and available to report next month. Hence December EC Report contains only November system loss data.
For the month of November, 2014, all island moving average system losses have increased significantly from 11.54% (November, 2014) to 12.55% (November, 2014) but still achieve the regulatory target of 13%.

The individual island group’s system losses are shown below.

The graph above shows that Tongatapu systems losses have increased from 11.32% (October) to 12.53% (November) mainly due to the short billing cycle (5 days delay) in November.
Vava’u losses however, have reduced from 13.45% to 12.78% (see the graph below).

Ha’apai system losses have always been below target until January, 2014. Since January, system losses have increased possibly due to Cyclone Ian effect.
Eua systems losses have been steady around 13% during past several months.

2. Fuel Efficiency Report

It is important to note that fuel efficiencies calculated here include diesel deneration only (i.e. renewable generation has been excluded) as stipulated by the Electricity Concession Contract.

Tongatapu fuel efficiency ratios have always been unachieved due to ageing generators and introduction of renewable generation plants that reduce diesel generators’ load factors.
Vava’u fuel efficiency ratios have been well above the target due to the two new 600KW generators commissioned in May, 2010.

Mostly, fuel efficiency ratios have been under achieved in Haapai but increased to higher figures in last few months.
Mostly, fuel efficiency ratios have been under achieved in Eua.

Overall, all island fuel efficiency ratios have been below the weighted average target of 4.17 KWh/L.
3. Reliability Measures (Tongatapu)

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Date Completed</th>
<th>No of Customers Off</th>
<th>Fault Description</th>
<th>Repair Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/12/2014</td>
<td>16/12/2014</td>
<td>4,106</td>
<td>Power off</td>
<td>Problem from Popua Generator</td>
</tr>
<tr>
<td>04/12/2014</td>
<td>04/12/2014</td>
<td>4,106</td>
<td>Power off to Generator Feeder Vaini</td>
<td>Generator feed back on 20:10 from Falahi to Vaini and Vaini to part of Haateho, and Vaini to Nituosa and Nakolo except part of Malapo to Fua'amotu because the broken tree was cutting down HV line at Faleahu.</td>
</tr>
<tr>
<td>04/12/2014</td>
<td>04/12/2014</td>
<td>700</td>
<td>Trees on HV lines</td>
<td>All 22:00 power back from on Malapo to Fua'amotu. Problem trees and branch on HV lines and HV conductor was broken that's why the power is off.</td>
</tr>
<tr>
<td>27/12/2014</td>
<td>27/12/2014</td>
<td>306</td>
<td>Shut down parts of Feeder 1</td>
<td>Lomaiti, mataikutini, kuhosa, liahona, matangarake.</td>
</tr>
<tr>
<td>25/12/2014</td>
<td>25/12/2014</td>
<td>50</td>
<td>One phase off</td>
<td>One phase off (yellow); material used: Amps 20A x 1; test after: 242 VOLTS</td>
</tr>
<tr>
<td>25/12/2014</td>
<td>25/12/2014</td>
<td>31</td>
<td>Broken Conductor</td>
<td>Shut down from MAVELULIKU to NAKOLO.</td>
</tr>
<tr>
<td>21/12/2014</td>
<td>21/12/2014</td>
<td>28</td>
<td>Power off</td>
<td>Partly off due to blown fuse on transformer yellow phase were blown so they replace it with 1 x 63 A; ta- 248 v</td>
</tr>
<tr>
<td>12/12/2014</td>
<td>12/12/2014</td>
<td>23</td>
<td>Planned Shut Down</td>
<td>Shut Down Power from Tatakamotonga to Ha'atafu.</td>
</tr>
<tr>
<td>05/12/2014</td>
<td>05/12/2014</td>
<td>19</td>
<td>Parity off</td>
<td>Partly off due to phase yellow blown so they fix it then test power line. Materials: 1 x 63A link; 2 x 6 mm sleeve; 1 x ins tape; Test After=237V</td>
</tr>
<tr>
<td>13/12/2014</td>
<td>13/12/2014</td>
<td>17</td>
<td>Parity off</td>
<td>Test result: 24 V volts Partly off due to line coat and causes tailer problem on Transformer need to renew or replace with tailor 16mm</td>
</tr>
<tr>
<td>01/12/2014</td>
<td>01/12/2014</td>
<td>12</td>
<td>Spark</td>
<td>Loose pole fuse on transformer in phase 2 so they fix it with 1 x 60 A and also complete pole fuse</td>
</tr>
<tr>
<td>21/12/2014</td>
<td>21/12/2014</td>
<td>12</td>
<td>Parity off</td>
<td>Power partly off due to loose phase from pole so they tighten it up then reconnect power line properly. Materials: 1 x ins tape; Test After=234V</td>
</tr>
<tr>
<td>26/12/2014</td>
<td>26/12/2014</td>
<td>12</td>
<td>Power off</td>
<td>Loose phase red in lv line; test: R=237V, Y=234V, B=235V; materials: IPC 16/95 x 1</td>
</tr>
</tbody>
</table>

SAIDI minutes (measuring average total duration of interruption per connected customer) for the month of December, 2014 have decreased significantly from 123.66 (November, 2014) to 28.04 (December, 2014) minutes (see the table above). Some of the major HV faults contributed to the SAIDI minutes for the month of October are described below.

Cumulative SAIDI YTD is showing below. The annual target is 5% less than the last year’s value.
CAIDI minutes (measuring average total duration of interruption per interrupted customer) for the month of December 2014 have also decreased from 190.51 minutes (November, 2014) to 43.97 minutes (December, 2013).

Cumulative CAIDI YTD is showing below. The annual target is 5% less than the last year’s value.
SAIFI (measuring average number of interruptions per customer) has slightly decreased from 0.649 (November, 2014) to 0.638 (December, 2014).

Cumulative SAIFI YTD is showing below. The annual target is 5% less than the last year’s value.

4. Reliability Measures (Outer Islands)

Since July 2014, TPL collects outage data to calculate the reliability measures for all three outer islands. The accumulated measures are shown below graphically.

The above graph shows the accumulated SAIDI for all three islands since July, 2014. The SAIDI figures include both planned and unplanned outages. Haapai has the highest SAIDI minutes in December due to large planned outages during Cyclone Ian reconstruction project. Planned SAIDI figures were found very high compared with the unplanned SAIDI figures.
Accumulated CAIDI figures are high for Ha’apai due to planned outages. Again, planned CAIDI figures were found very high for all three islands compared with the unplanned CAIDI figures.

Cumulative SAIFI figures were found significantly high for Vava'u compared with Eua and Ha’apai, implying that Vava'u has higher number of outages than the other two islands.
5. Monthly Outage Events

There were total of 612 planned & unplanned fault events for the month of November, 2014 affecting 10,356 customers (it is possible that the same customer would have been affected by outages more than once). As per the table above, the number of fault events has significantly increased from 512 in November, 2014 to 612 events in December, 2014. Number of faults in all categories has increased from the last month. Most of the customer services faults included fuses at the service line tap off point for a premise.

Should you have any queries with the information provided, please do not hesitate to contact me.

Yours Faithfully,
Ajith Fernando
Risk & Compliance Manager
Tonga Power Limited