REGULATED INDUSTRIES COMMISSION

T&TEC's Annual Performance Indicator Report 2013

February 2017

Information Document

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EXECUTIVE SUMMARY

This is the annual report for 2013 on the key performance indicators identified in the Performance Monitoring and Reporting Framework (PMR) and the Final Determination: Regulation of Electricity Transmission and Distribution 2006 – 2011 (The Determination). It accounts for the performance of the Trinidad and Tobago Electricity Commission (T&TEC) for 2013. The RIC assessed T&TEC's performance on aspects that affect customers, using targets set by the Determination, as well as against its performance in the previous year, and performance metrics of other jurisdiction in some instances.

Generally, T&TEC's performance remained stagnant for some performance indicators and worsened in some of the key areas for the period under review. Total system losses deteriorated, going from 6.67% in 2012 to 7.08% in 2013. This is above the target of 6.75% given in the Determination. There was no significant change in system reliability as indicated by the System Average Interruption Frequency Index (SAIFI, but there was some improvement in the System Average Interruption Duration Index (SAIDI) and the Customer Average Interruption Duration Index (CAIDI). Although there were fewer transmission trips, which should have resulted in a more reliable level of electricity supply to customers, there was a decline in the restoration rate.

In respect of its customer care, while there was only a 3% increase in the total number of complaints, the number in the category "Damaged appliances" increased by over 300%. T&TEC's performance only showed improvement in resolving high/low voltage complaints, with a resolution rate of 50%, but worsened for all other categories of complaints.

T&TEC continued to exceed the minimum target of 20% per annum set for inspecting/servicing pole-mounted transformers. However, there continued to be a decline in the rate of addressing reported street light failures within 7 days, with the rate moving from 72% to 63%.

The financial performance of T&TEC for the year 2013 continued along a similar trend of the previous year where funds from operations continued declining. This impacted the ability of the company to service its debt.

SECTION 1 INTRODUCTION

The Regulated Industries Commission (RIC) is the economic regulator of the water and electricity sectors in Trinidad and Tobago. In its role as the economic regulator, the RIC has to balance both the interest of the service provider and the customers, by undertaking the following principal activities:

- Setting tariffs at levels sufficient for the service providers to finance their activities in accordance with obligatory standards and acceptable level of service expectations, but at the same time promoting efficiency to ensure that tariffs are reasonable and no higher than they need to be;
- Ensuring that service providers meet their level of service obligation; and
- Safeguarding customers' interests by ensuring that services are provided in accordance with established standards of service.

The RIC is empowered by its Act to carry out studies of efficiency and economy of operation and of performance by service providers and publish the results thereof. The RIC monitors the performance of the Trinidad and Tobago Electricity Commission (T&TEC) to determine and report on the level of compliance with the Final Determination: Regulation of Electricity Transmission and Distribution 2006 – 2011 (The Determination). This is the seventh report on T&TEC's key Performance Indicators such as, network reliability and customer responsiveness. Data used in the assessment were supplied by T&TEC, except where specified otherwise.

1.1 Purpose of Document

This document reports on the performance of T&TEC for 2013 with respect to the performance indicators and the specific directives contained in the Determination, and any other metric of performance that is relevant to the electricity transmission and distribution sector as decided by the RIC. It provides a comparison of the performance indicators against targets set by the Determination as well as against the performance in the previous year, and compares these with the performance of other utilities, where data are available.

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1.2 Structure of Document

The remainder of this report is organized into the following sections:

Section 2.0 Performance Review; and

Section 3.0 Conclusions and Recommendations.

An abridged list of key performance indicators along with definitions of key terms of the electricity sector (taken from the PMR) is contained in the appendix.

SECTION 2 PERFORMANCE REVIEW

T&TEC is required to collect performance data periodically, and to submit the data to the RIC quarterly and/or annually. This data set includes aggregate data on indicators such as electricity coverage, number of customers, electricity purchases and sales. T&TEC's network reliability and system losses are also reviewed in addition to other performance criteria, such as, customer responsiveness, equipment maintenance, and financial status. T&TEC's performance is analysed and discussed below.

2.1 Aggregate Performance

2.1.1 Electricity Service Coverage

Electricity Service Coverage is an indicator of the level of access to electricity. This metric is the ratio of T&TEC's residential customer accounts to the number of households in Trinidad and Tobago irrespective of geographical location. It is a gauge of the level of infrastructural development and capacity for growth in a country. The electricity service coverage for Trinidad and Tobago, for 2011 to 2013, is presented in table 1. The electricity service coverage was maintained at 99%, with only a small percentage of the population not supplied by the national electricity grid.

Table 1 – Electricity Service Coverage

Year	Estimated T&T population (CSO)	Residential Accounts (T&TEC)	Service Coverage[1]
2011	1,328,019	382,882	99%
2012	1,335,194	390,188	99%
2013	1,340,557	395,515	99%

[1] Source: The Trinidad and Tobago Electricity Commission (T&TEC).

2.1.2 Number of Customers by Class and Area

T&TEC categorizes its customer into different classes based on the customer's electrical load and supply voltage. These classes[2] are Domestic, Commercial and Industrial. All customers are billed for energy consumed, measured in kWh. Industrial customers are billed an additional charge based on their kVA demand. A separate classification, Street Lighting, is used to bill private customers and governmental agencies for the electricity that is consumed by private and public outdoor lighting. Table 2 shows the number of active customer accounts by class for both 2012 and 2013. There were 442,182 accounts at the end of 2013, of which 395,515 (90%) were Domestic. Nine percent or 43,168 were Commercial accounts. Industrial and Street Lighting customers accounted for less than one percent. There was an overall increase in the total number of accounts by 8,220, two percent greater than the previous year.

Table 2 – Number of Active Accounts by Class

YEAR	CLASS				TOTAL
	Domestic	Commercial	Industrial	Street Lighting	
2012	390,188	40,370	3,359	45	**433,962**
2013	395,515	43,168	3,454	45	**442,182**
% Change	1	7	3	0	**2**

T&TEC's operations are divided into five distribution areas – North, South, East, Central and Tobago. The number of active customer accounts by distribution area is shown in table 3. The South Distribution Area accounts for the largest number of active accounts (113,739 out of 442,182), which represented thirty percent of the customer base. The largest growth rate (3%) was in Central Distribution Area, which has 74,586 or 17% of the active accounts.

[2] **Domestic (Rate A)** supplied at 115/230V at loads less than 50kVA.
Commercial (Rate B) supplied at 115/230V or 230/400V at loads less than 50kVA.
Commercial (Rate B1) supplied at 115/230V, 230/400V, 6.6kV, 12kV or 33kV at loads greater than 50kVA but less than 350kVA.
Industrial (Rate D1-5, E1-5) supplied at 115/230V, 230/400V, 6.6kV, 12kV, 33kV, 66kV or 132kV at loads greater than 50kVA.

Table 3 – Number of Active Accounts by Area

YEAR	AREA					TOTALS
	North	South	East	Central	Tobago	
2012	89,722	131,735	115,589	72,436	24,480	**433,962**
2013	90,488	133,739	118,280	74,586	25,089	**442,182**
% Change	0.9	2	2	3	2	**2**

2.1.3 Electricity Purchases and Sales

Energy purchased and sold is measured in kilowatt hours (kWh). Table 4 shows a comparison of the amount of electricity purchased in 2013 against that of 2012. There was an overall increase of approximately 4.5 percent in electricity purchased from the generators.

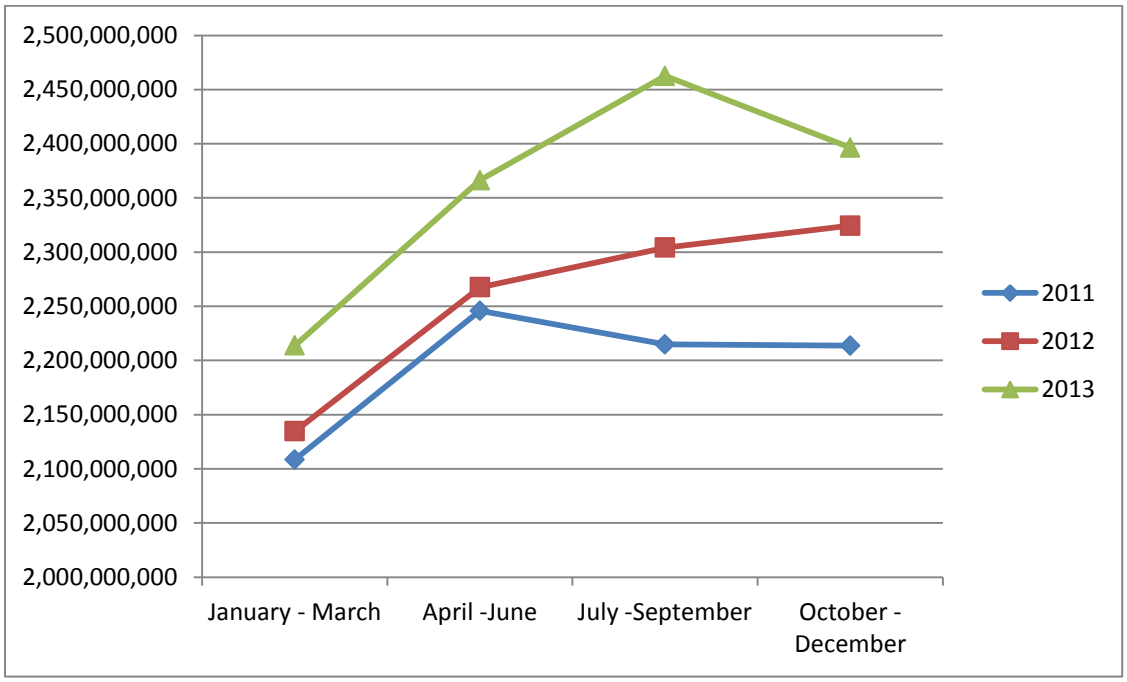
Table 4 – Electricity Purchased

Quarter	Electricity purchased (kWh)	
	2012	2013
January - March	2,134,624,000	2,213,857,000
April -June	2,267,596,000	2,366,260,000
July -September	2,304,097,000	2,462,583,000
October - December	2,324,373,000	2,396,474,000
TOTAL	**9,030,690,000**	**9,437,173,000**

An examination of the amount of electricity purchased during the years 2011, 2012 and 2013, showed various patterns of fluctuation for each year. While the lowest amount of electricity

purchased occurred during the first quarter (January to March) for all three years, the peak purchases occurred at different points in the period as shown in figure 1.

Figure 1 – Electricity Purchased for 2011, 2012 and 2013



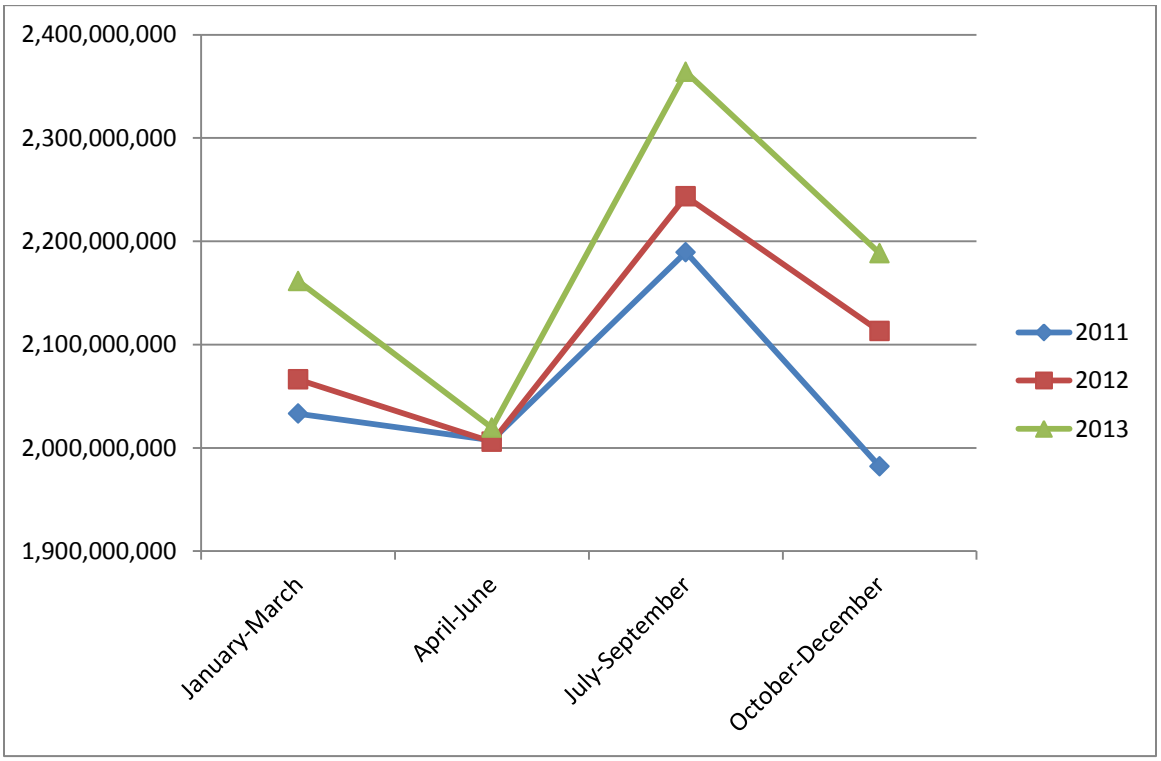
The total amount of electricity sold in kilowatt hours (kWh) to customers by distribution area for each quarter of 2013 is presented in table 5. The largest consumption (sales) of electricity occurred in the Central Distribution Area, at 38.1% of total consumption. A similar trend was observed in 2012, with 38.5% of the consumption being in the Central Distribution Area. This corresponds with the fact that this area has the highest concentration of large industrial customers. The total consumption in 2013 increased by 3.6% when compared to 2012.

Table 5 – Electricity Sales by Distribution Area, kWh (2013)

QUARTER	NORTH	SOUTH	EAST	CENTRAL	TOBAGO	TOTAL
Jan – March	399,802,663	410,589,618	442,742,535	843,537,733	64,813,628	**2,161,486,177**
April - June	415,116,341	410,259,087	359,495,192	761,798,141	72,831,957	**2,019,500,718**
July - Sept	426,602,716	462,228,082	478,274,972	927,721,129	69,141,084	**2,363,967,983**
Oct - Dec	431,770,372	463,691,914	417,165,847	795,443,629	80,391,526	**2,188,463,288**
Total	**1,673,292,092**	**1,746,768,701**	**1,697,678,546**	**3,328,500,632**	**287,178,195**	**8,733,418,166**
Average	**418,323,023**	**436,692,175**	**424,419,637**	**832,125,158**	**71,794,549**	**2,183,354,542**

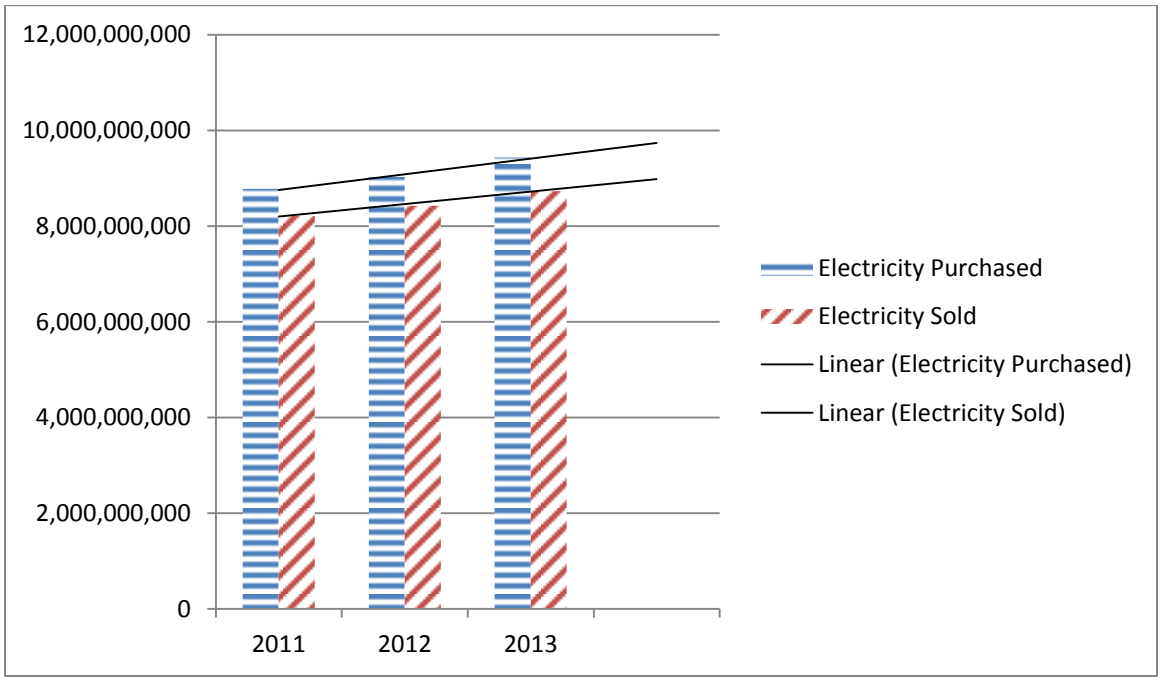
The trends in electricity sales tracked similar patterns over the last three years 2011, 2012 and 2013. Sales were the lowest during the second quarter (April to June) and peaked during the third quarter (July to September).

Figure 2 – Electricity Sales for 2011, 2012 and 2013



A comparison of the annual amounts of electricity purchased versus electricity sales in shown in figure 3. The rate of increase of electricity purchased has been aligning with the rate of increase in electricity sales over the period 2011 to 2013. This is an indication that the disparity between electricity purchased and sold has been lessening compared to what had been observed in previous years.

Figure 3 – Electricity Purchased vs Electricity Sales for 2011, 2012, and 2013



2.1.4 Total System Losses

Electrical energy is lost in the transmission and distribution system due to the electrical resistance of the conductors, and a portion is consumed for own use by T&TEC. Hence, not all the electrical energy entering T&TEC's transmission and distribution network is sold to customers. Inaccuracies due to defective meters and illegal consumption also result in discrepancies between the energy supplied to the end users and what is billed. The combination of all these losses is referred to as the total system losses. Technical losses result from inefficiencies in T&TEC's transmission and distribution networks, and commercial losses are due to theft, billing errors, meter inaccuracy, etc.

The RIC set a system loss target of 6.75% to be achieved by the end of the regulatory control period June 1, 2006 to May 31, 2011. The method used in this report to calculate the system losses is based on the formula used by T&TEC[3]. According to this formula, the total system losses 7.08%. There continues to be wide variations in the values of the system losses for the different quarters. This is likely due to the lag between the real-time purchases from the generators and delayed billing for energy sold to customers.

Table 6– Total System Losses (2013)

Quarter	Energy Units Billed (kWh)	Energy Units Purchased (kWh)	% System Losses (T&TEC'S Formula)
January – March	2,161,486,177	2,213,857,000	2.37
April - June	2,055,500,718	2,366,259,876	13.13
July - September	2,363,967,983	2,460,582,680	3.93
October - December	2,188,463,287	2,396,473,543	8.68
TOTAL (2013)	**8,769,418,165**	**9,437,173,099**	**7.08**
TOTAL (2012)	8,428,592,351	9,030,689,070	6.67

2.2 Other Economic Data

In this section we provide a summary of economic and consumption data that are reported on a "per employee" or "per customer" basis. Table 7 shows a summary of other economic data for 2012 and 2013. Two of the indicators – energy sold per employee and customers per employee – are metrics generally used to measure labour productivity in the electricity distribution sector.

There was a 4% increase in electricity consumption, which resulted in a 2% increase in kWh sales per employee and a 1% increase in the revenue associated with that consumption. The

[3]The T&TEC formula for system losses:

$$\text{Total System Losses} = 1 - \left\{ \frac{\text{Energy Units Billed}}{\text{Energy Units Purchased}} \right\}$$

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number of customers and the number of employees both increased by 2%, hence customers per employee remained constant.

Table 7 – Other Economic Data

Data	2012	2013	% Change
Number of Employees	3,137	3,200	2
Electricity Sales (kWh)	8,428,592,351	8,769,418,165	4
Electricity Sales per Employee (kWh)	2,686,832	2,729,193	2
Electricity Sales per Employee ($)	960,022	970,007	1
Number of Customers	433,962	442,182	2
Customers per Employee	138	138	0
Consumption per capita (kWh)	6,764	6,541	-3

Consumption per capita is defined as the total amount of electricity sold divided by the population. It gives an indication of a country's average electricity consumption per individual not accounting for the specific purpose of use whether domestic, commercial or industrial. There was a very marginal decrease (3%) in consumption per capita for Trinidad and Tobago over the period. The consumption per capita was compared with data for three Caribbean countries, as well as against four other countries with comparable GDP per Capita to Trinidad and Tobago, as shown in table 8.

While consumption per capita remained significantly higher than that for the three countries in the Caribbean region, it was comparable to countries outside of the region that have comparable GDP per Capita. The relatively high level of electricity consumption for industrial purposes is one of the reasons for the relatively high per capita consumption in Trinidad and Tobago when compared to the countries in the Caribbean region

Table 8 – Electricity Consumption Per Capita[4]

Country	GDP Per Capita (US$)	kWh Consumption per Capita		
		2013	2012	2011
Jamaica	5,332	1,126	1,154	1,261
Cuba	6,093	1,425	1,369	1,322
Venezuela	10,755	3,245	3,250	3,197
Trinidad & Tobago	**18,287**	6,876	**6,629**	**6,390**
Estonia	17,454	6,665	6,689	6,314
Slovak Republic	18,139	5,202	5,138	5,348
Oman	21,164	5,981	6,095	5,929
Czech Republic	21,657	6,285	6,305	6,299

2.3 Network Reliability

The delivery of a reliable supply of electricity is key to providing quality service to customers. An unreliable electricity supply results in economic losses and inconveniences, and increases the likelihood of damage to customers' equipment. Utilities should meet minimum standards of reliability, even as they seek to pursue and maintain economic and operational efficiencies. As an economic regulator, the RIC is charged with the responsibility of ensuring that T&TEC supplies electricity to its customers at an acceptable level of reliability.

Reliability indicators are used to assess the condition of the network system over time. It can be difficult to compare two systems since all systems are different and affected by different factors. Reliability indices are therefore, situational in nature and will present different baselines depending on the many intrinsic factors affecting the system[5]. The IEEE Guide for Electric Power Distribution Reliability Indices (IEEE 1366-2012) is the standard that has been applied across many jurisdictions with respect to monitoring and reporting on

[4] Electric power consumption (kWh per capita) data was obtained for the respective calendar years from World Bank: World Development Indicators, retrieved from: http://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC/countries/

[5] http://www.publicpower.org/files/PDFs/2013DSReliabilityAndOperationsReport_FINAL.pdf

reliability, and is used in this report to assess T&TEC's reliability of supply. Table 9 shows the indices for 2013.

Table 9 – Network Reliability (2013)

INDICATOR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2013	NAU*
SAIFI (No per customer)	0.49	0.33	0.30	0.47	0.38	0.50	0.41	0.38	0.48	0.52	0.49	0.46	**5.21**	**1.11**
SAIDI (minutes)	32.4	19.8	22.2	39	32.4	40.8	28.8	33	46.8	31.8	32.4	38.4	**398**	**58.5**
CAIDI (minutes)	66.0	59.4	75.6	82.2	85.2	90.6	70.8	86.4	96.6	61.2	65.4	82.8	**76**	**96.5**

***Mean values for North American Utilities (NAU) supplied by the American Public Power Association, APPA, according to IEEE Standard 1366-2012**.

2.3.1 System Average Interruption Frequency Index (SAIFI)

The System Average Interruption Frequency Index (SAIFI) measures the average number of sustained interruptions per customer. There was no significant change in T&TEC's performance in 2013, when compared to the 5.71 achieved in 2012, as shown in table 10. The value of this index suggests that statistically, a T&TEC customer is likely to experience between five to six interruptions in electricity supply per year, as compared to one interruption per customer of selected North American Utilities.

2.3.2 System Average Interruption Duration Index (SAIDI)

The System Average Interruption Duration Index (SAIDI) measures the average outage duration per customer. The SAIDI was 398 minutes for 2013. This is 66 minutes less than that for the previous year, which continues a trend of improved performance that was observed in 2012. Compared with the mean SAIDI for North American Utilities, T&TEC's outage duration is now about seven times longer per T&TEC customer. This is also an improvement over the performance in 2012, which was eight times longer.

2.3.3 Customer Average Interruption Duration Index (CAIDI)

The Customer Average Interruption Duration Index (CAIDI) is the ratio of SAIDI to SAIFI. It is a measure of the average outage duration that an individual customer would experience. It can also be viewed as the average restoration time. The annual value of CAIDI for 2013

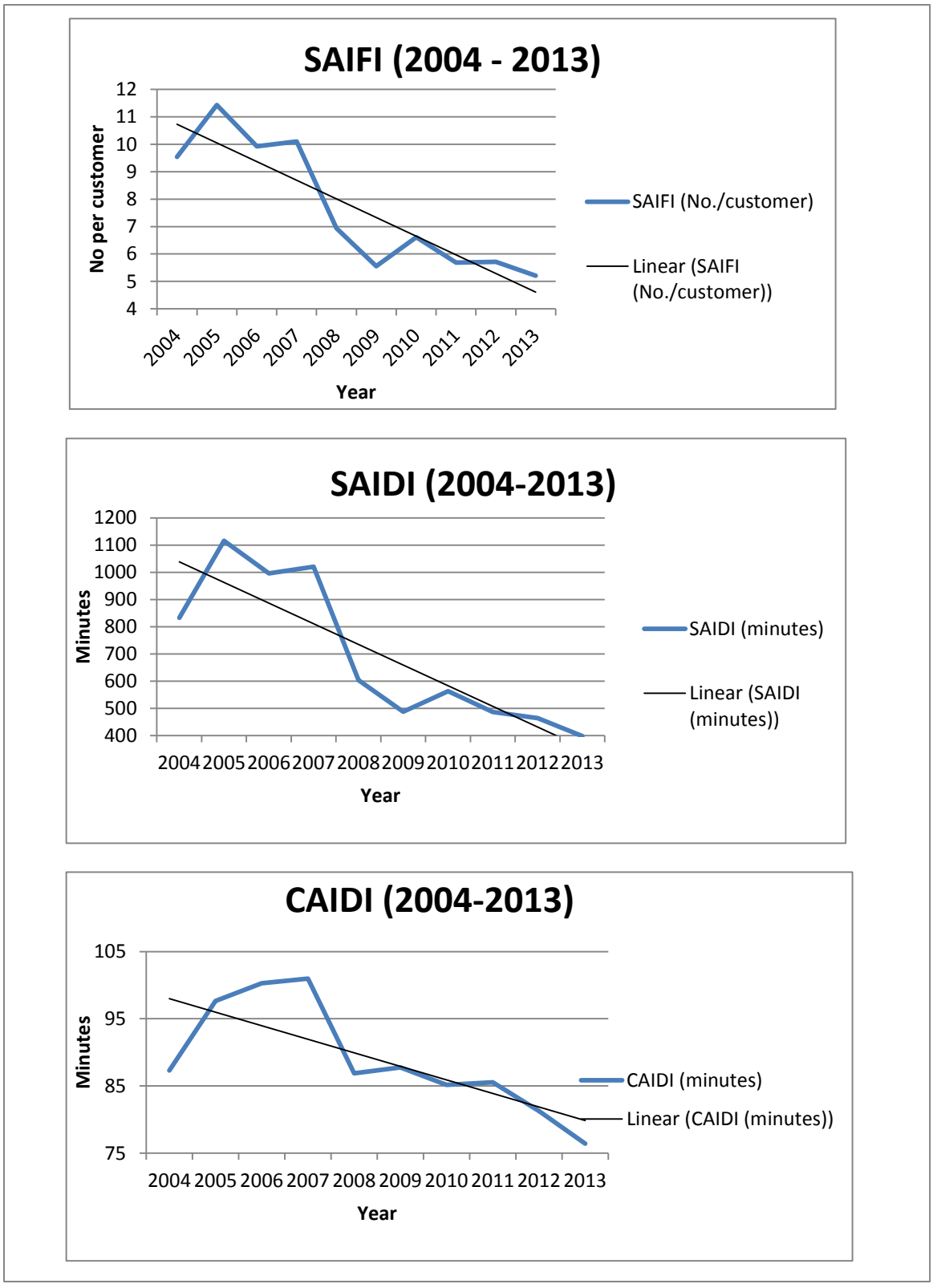
was 76 minutes, with a high of 96.6 minutes in September, and a low of 59.4 in February. The average for the North American Utilities is 96.5

The reliability indicators for the ten years spanning 2004 to 2013 are shown in table 10, which shows improvement in all three indicators over the period.

Table 10 – Network Reliability Indicators for T&TEC (2004-2013)

INDICATOR	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
SAIFI (No./customer)	9.54	11.43	9.93	10.1	6.94	5.55	6.61	5.68	5.71	**5.21**
SAIDI (minutes)	833	1116	996	1020	603	487	563	486	464	**398**
CAIDI (minutes)	90	98	100	100	93	87	85	86	81	**76**

Figure 4 – Trends in SAIFI, SAIDI and CAIDI



2.3.4 Number of Transmission Trips

Table 11 shows the number of transmission trips and interruptions affecting customers during 2013. There were 36 transmission trips during this period. The largest number of these occurred on the 33kV network with 22 trips, followed by the 66kV network with 9 trips and 5 trips on the 132kV network.

Table 11 – Transmission Trips & Interruptions Affecting Customers (2013)

Month	Transmission circuit trip outs				Number of interruptions restored (<3hrs)				Number of interruptions restored (<5hrs)			
	33 kV	66 kV	132 kV	220 kV	33 kV	66 kV	132 kV	220 kV	33 kV	66 kV	132 kV	220 kV
January	6	0	0	0	6	0	0	0	6	0	0	0
February	0	0	1	0	0	0	1	0	0	0	1	0
March	0	1	0	0	0	1	0	0	0	1	0	0
April	2	2	0	0	2	2	0	0	2	2	0	0
May	1	0	0	0	1	0	0	0	1	0	0	0
June	4	0	0	0	2	0	0	0	3	0	0	0
July	2	1	0	0	1	1	0	0	1	1	0	0
August	2	1	0	0	2	1	0	0	2	1	0	0
September	0	3	0	0	0	2	0	0	0	2	0	0
October	3	0	1	0	3	0	1	0	3	0	1	0
November	1	1	2	0	1	1	0	0	1	1	0	0
December	1	0	1	0	1	0	1	0	1	0	1	0
TOTAL	**22**	**9**	**5**	**0**	**19**	**8**	**3**	**0**	**20**	**8**	**3**	**0**

T&TEC performed better at restoring trips on the 66kV network than on the 33kV, with 91% of the trips being restored within 5 hours (table 12). In the case of the 33kV network, 89% of the trips were restored with in 5 hours. On the 132kV network, 60% of the trips were restored within 5 hours.

Table 12 – Summary of Transmission Trips & Interruptions (2013)

	No. of Trips			
	33kV	**66kV**	**132kV**	**Total**
TOTAL	22	9	5	**36**
Restoration < 3hrs	19	8	3	**30**
Restoration < 5hrs	20	8	3	**31**
% < 3hrs	86%	89%	60%	**83%**
% < 5hrs	91%	89%	60%	**86%**

2.4 Customer Responsiveness and Service Performance

This section reports on the customer complaints and their resolution, with particular attention to those aspects that are most important to customers. One of the best signals that a utility is improving its service to the customer is a reduction in the number of complaints received.

Table 13 shows the comparison of total complaints received during 2012 and 2013. Overall, there was a 3% increase in the number of complaints and a 23% decline in the resolution rate. The increase in the number of complaints was drive by an increase of 311% in the number of complaints in the damaged appliances category. While there was a significant decrease in the number of complaints in all the other categories, damaged appliances was the only category with an increase.

Table 13 – Number of Complaints by Type (2013)

Type of Complaint	**No. of Complaints**		**% Change**
	2012	**2013**	
Billing query	30	16	-47%
Damaged appliances	28	116	311%
High/Low Voltage	38	22	-42%
Poles/Other	166	116	-30%
Total	**262**	**269**	**3%**
Resolution Rate	**50%**	**36%**	**-23%**

The total number of complaints by type and the percentage resolution is shown in table 14. Of the 269 complaints received, the largest number (116) was recorded for the “poles/other” category, followed closely by 115 recorded for damage appliances. Both of these accounted

for 86% of the total received. High/low voltage complaints and billing query accounted for 8% and 6% of the total respectively. Of the 269 complaints received, 97 (36%) were resolved, which was a 14% decrease in the resolution rate from 2012.

Table 14 – Total Complaints Resolved by Type (2013)

Type of Complaint	No. of Complaints	% of Total Complaints	Total Resolved	% Resolved
Billing query	16	6%	11	69%
Damaged appliances	115	43%	23	20%
High/Low Voltage	22	8%	11	50%
Poles/Other	116	43%	52	45%
Total	**269**	**100%**	**97**	**36%**

Table 15 lists the number of complaints received and resolved by type per quarter for 2013. The largest number of complaints (105) was received during October to December, and the lowest (26) was received in January to March. The highest resolution rate per quarter was during April to June at 50%, and lowest in October to December (29%).

Table 15 - Complaints Resolved by Type per Quarter (2013)

Type of Complaint	Number of complaints received				Number of complaints resolved			
	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec
Billing query	6	3	4	3	5	2	3	1
Damaged appliances	0	1	33	81	0	1	7	15
High Low Voltage	5	5	8	4	2	3	4	2
Poles/Other	22	33	44	17	9	15	16	12
TOTAL	**33**	**42**	**89**	**105**	**16**	**21**	**30**	**30**
% Resolved by Qtr	**-**	**-**	**-**	**-**	**48%**	**50%**	**34%**	**29%**

Queries, requests and/or complaints can be made to the utility in verbal or written form. One of the important indicators of service quality is the promptness of the service provider's response to the more formal written queries and complaints of customers. Table 16 provides

a summary of T&TEC's performance with respect to written complaints received during 2013.

Table 16 – Response to Written Complaints (2013)

Month	No. of written complaints received	No. of written complaints with response > 2 weeks	Percentage of complaints with Response > 2 weeks
January	10	4	40%
February	5	2	40%
March	18	0	0%
April	12	5	42%
May	19	1	5%
June	11	8	73%
July	25	12	48 %
August	9	5	56%
September	53	3	6%
October	10	9	90%
November	10	5	50%
December	4	1	25%
TOTAL	**186**	**55**	**30%**

Of the 186 written complaints received, 30% were not responded to within 2 weeks. The highest percentage (90%) of written complaints that were not responded to within 2 weeks was recorded in October. The best performance, when 100% of complaints were responded to within 2 weeks, was achieved in March.

2.5 Equipment Maintenance

T&TEC is required to provide information on specific directives related to its operations as stipulated by the RIC in its Determination. This section reports on two of these specific directives – repair and maintenance of pole-mounted transformers, and repair/replacement of defective street lights.

2.5.1 Pole-mounted Transformers

As per the Determination, T&TEC has a directive to repair and maintain pole-mounted distribution transformers at a rate of at least 20% per annum. There were 33,858 pole-mounted transformers in service at the end of 2013 (see table 16). Although T&TEC only managed to have 16% of pole-mounted transformers inspected/serviced during the second quarter of 2013, the annual percentage was 39%, which surpassed the minimum requirement of 20%.

Table 17 – Repairs and Maintenance to Pole-Mounted Transformers (2013)

Data	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec
Number of Pole Mounted Distribution Transformers	33,048	33,178	33,352	33,858
Number of Pole Mounted Distribution Transformers Inspected	13,090	4,905	9,418	7,560
No of Transformers Serviced	1263	243	835	641
% Inspected/Serviced	**43%**	**16%**	**31%**	**24%**

2.5.2 Street lighting Repair and Replacement

T&TEC is responsible for monitoring the condition and performance of public lighting assets. This includes the development and implementation of plans for the installation, operation, maintenance and replacement of public lighting. T&TEC is required to repair street lighting failures that are reported to them within 7 days. T&TEC is also required to

monitor highway lighting and repair non-working lights within 14 days of discovery. Table 18 shows the number of reports received and the number of repairs effected for 2013.

During 2013, T&TEC received 24,818 reports, of which 15,711 (or 63%) repairs/installations were completed within 7 days. T&TEC also completed 4,058 repairs in response to failures that were not reported by the public, but detected during inspections by staff and crews, during that period. In total, T&TEC completed 28,365 repairs during 2013.

Table 18 – Quarterly Street Light Repairs And Installations (2013)

	January - March	**April-June**	**July - September**	**October - December**	**TOTAL**
No. of Reports Received (1)	5,926	5,378	6,871	6,643	**24,818**
No. of Repairs & Installation Completed within 7 days (2)	4,295	4,076	3,665	3,675	**15,711**
No. of Repairs & Installation without a report (3)	1,222	807	862	1,167	**4,058**
Total No. of Repairs & Installation Completed within the month (4)	7,338	5,811	7,700	7,516	**28,365**

Notes:

1 Reports received from customers and/or members of the public for repairs to existing street lights and for new street lights.
2 Work arising from reports received as in Note 1 and completed in **7 days or less** of the date received.
3 Work arising from sources other than customer reports, e.g. inspections by staff and observed by crews.
4 Total work completed **within the month**, i.e. repairs and installations arising from customer reports as well as inspections and observation by crews.

Table 19 shows a summary of the year-on-year comparison of repairs of street lights for 2012 and 2013. There was only a 3% increase in the number of reports of street lighting failures received in 2013 when compared to the number received in 2012. Considering there was only a small increase in the number of reports received, it is a concern that T&TEC's repair rate decreased from 72% in 2012 to 63% in 2013. Repairs due to failures detected by staff and crews fell by 21% in 2013 compared to 2012. Generally, T&TEC's overall performance during 2013 was not as good as the performance during 2012, with 7% fewer repairs being completed.

Table 19 – Street Light Repairs (2012/2013)

	2012	2013	% Change
No. of Reports Received	24,142	24,818	**3**
No. of Repairs Completed within 7 days	17,427	15,711	**-10**
7-day Repair Rate for reported failures	72%	63%	
No. of Repairs without a report	5,110	4,058	**-21**
Total No. of Repairs Completed (Including carryover from previous year)	30,375	28,365	**-7**

2.6 Financial Performance and Efficiency

One of the primary goals of economic regulation is to ensure that the utility operates in a way that ensures financial viability and sustainability, while providing an acceptable quality of service to customers at a reasonable price. The RIC has a duty to ensure that T&TEC is able to finance its efficient functions and thus, should enable T&TEC to earn a return on its regulatory asset base that is at least equal to its efficient cost of capital in addition to raising finance on reasonable terms.

Table 20 below shows a select set of financial ratios which assess the performance of T&TEC from the perspective of debt financing, liquidity, profitability and efficiency.

Table 20 – Select Financial Ratios of T&TEC's Performance for 2011 - 2013

RATIOS	YEAR			TARGET
	2013	2012	2011	
Debt Financing[6]				
Gearing (%)	85%	84%	83%	
Funds Flow Interest Cover	0.82	0.73	2.60	Between 2 to 3
Cash Interest Cover	(3.02)	(1.38)	1.22	Greater than 1
Debt Pay Back Period (Years)	(146.88)	(89.84)	7.82	Between 5 to 7
Debt as a proportion of RAB (%)	564%	376%	322%	Below 65%
Liquidity				
Collection Rate (%)	79%	80%	77%	
Revenue Collected/Operating cost	0.78	0.77	1.25	Greater than 1
Revenue Billed/Operating Cost	0.98	0.97	1.62	Greater than 1
Internal Financing (%)	(26)%	(48)%	505%	Greater than 40%
Profitability and Efficiency				
Return on RAB (%)	(4)%	(4)%	41%	≈ 9%
Operating Cost per unit ($/KWH)	0.34	0.35	0.21	

2.6.1 Debt Financing

Compared to the previous reporting period[7], T&TEC's ability to meet its financial obligations has weakened. From 2011 to 2013 both funds flow and cash interest coverage have fallen outside the target ranges, suggesting that T&TEC may have experienced difficulty in meeting its finance costs.

[6] For a full discussion on the RIC's choice of these particular debt financing ratios see the RIC's Consultative Document "Embedding Financial Viability and Sustainability", September 2011.
[7] T&TEC's Annual Performance Report for the period July 2010 to June 2011 and for the period 2012

Funds from operations[8] experienced a sharp decline between 2011 and 2013, which negatively impacted the debt payback period[9]. In both 2012 and 2013, operating expenditure exceeded operating revenue thus creating an operating loss. Hence, T&TEC would not have been in a position to retire its debt due to the lack of funds from operation.

Debt as a portion of Regulatory Asset Base (RAB) remained well above the target of 65% which suggests that borrowed funds which should have been allocated to RIC approved capital projects were being used to fund other projects.

T&TEC's gearing ratio increased partly due to an advance from the GORTT to assist with loan repayments.

2.6.2 Liquidity

According to the indicators presented, T&TEC maintained a better liquidity position in 2011 when compared to 2012 and 2013. The collection rate fluctuated between 77% and 79% over the period, suggesting that T&TEC made efforts to decrease receivables. T&TECs collection rate increased by 3% in 2012, up to 80%, which was the result of a decrease in receivables of over $52 million in 2012. However, receivables increased by $31 million from 2012 to 2013 so the collection period increased. The working coverage ratios, which compare both revenue collected and billed income to operating costs, both decreased from 2011 to 2013 suggesting T&TEC's inability to meet its full operating costs from either revenue billed or revenue collected. In 2011, the average number of times that collected revenue was able to cover operating costs was 1.25; by 2013, this figure had been reduced to 0.78. For the same period, the average number of times that billed income was able to cover operating costs in 2011 was 1.62, compared to 0.98 in 2013.

A decrease in funds from operations during 2011-2013 caused negative changes in the internal financing ratio which posed a challenge for T&TEC to find cash to finance capital expenditure.

[8] *Funds from operations* is broadly equivalent to net cash flow from operation less non recurrent sources of revenue such as capital contributions, proceeds from disposals and other investment activity.

[9] Mathematically, the ratio is negative since the denominator, FFO, is negative. Realistically, debt cannot be repaid in negative years , instead this indicator can be interpreted as the debt cannot be repaid at this time given the circumstances.

2.6.3 Profitability and Efficiency

T&TEC is a state-owned utility and analysing profitability may not be as useful as in the case of an investor-owned utility. Instead of assessing the traditional return on capital, measuring the return on RAB is better suited to this type of governance structure .This approach is similar to the return on capital except the net cash flow return will be compared to the regulatory asset base. In 2011, the net cash flow return on the RAB was 41%, well above the benchmark of 9%. In 2013, an operating loss contributed to a small negative return on the RAB for that year.

The above approach is often supplemented by financial metrics on costs such as the operating cost per kWh, which may be more suited in determining the efficiency of operations in a state owned public utility. The operating cost per kWh increased by 66%, between 2011 and 2013, hinting at a fall in efficiency.

SECTION 3 CONCLUSIONS & RECOMMENDATIONS

3.1 Conclusions

T&TEC's customer base increased by 2% and approximately 4.5% more electricity was purchased in 2013, allowing T&TEC to maintain its level of electricity service coverage at 99%. Unlike 2012, as the quantity of electricity sold increased, the number of employees remained constant, which effectively increased productivity. Total system losses based on the T&TEC's formula deteriorated from 6.67% to 7.08%, falling short of the target of 6.75%. T&TEC needs to takes steps to restore the previous improving trend observed.

There was no significant change in the system reliability indicator, SAIFI in 2013 when compared to 2012. However, there is room for improvement when compared to the average utility in North America. SAIDI showed significant improvement, reflecting that on average, outages lasted 64 minutes less than in the previous year. While the RIC recognizes that there is still significant margin for improvement when compared with North American utilities, it acknowledges that T&TEC continues to show improvement in its performance over the years.

While there was only a 3% increase in the total number of complaints, the number in the category "Damaged appliances" increased by over 300%. All other categories of complaints showed a reduction in the number received. The overall resolution rate was 36% with the highest resolution rate (69%) being in the category of "Billing Queries".

T&TEC continued to exceed the minimum target of 20% per annum set for inspecting/servicing pole-mounted transformers. However, there continued to be a decline in the rate of addressing reported street light failures within 7 days, with the rate moving from 72% to 63%.

The financial performance of T&TEC for the year 2013 continued along a trend from the previous year. Funds from operations continued declining, which impacted the ability to service the company's debt. Despite marginal improvement in T&TEC's collections efforts,

operating expenditure of the company increased which contributed to a decline in T&TEC's ability to meet its financial obligations. RIC wishes to reiterate the importance of using borrowed funds for their specific purpose and not on other projects. The profitability and efficiency indicators have highlighted the importance of operational efficiency on influencing the profitability of a unit of electricity. As costs increase, there needs to be at least a proportional increase in revenue per unit in order to remain commercially viable.

3.2 RIC's Recommendations

- T&TEC needs to review its strategies that were implemented to control system losses because system losses have been increasing over the last few years.
- T&TEC should investigate the reason for the significant increase in damage appliance complaints, and take steps to address the same.
- T&TEC needs to improve its street lighting repair and maintenance programme.
- T&TEC should continue its efforts to collect outstanding funds, including accounts receivables from government Ministries and local government authorities.

APPENDIX: SELECTED PERFORMANCE INDICATORS FOR T&TEC

Item	Category	Indicator	Definition	Units	Reporting Period
1.0	**Aggregate Data**				
1.1		Number of electricity customers by class and area	T&TEC's customer data		Yearly
1.2		KWh sales by area	T&TEC's customer data		Semi Annually
1.3		KWh purchased	The basic unit of electric demand, equal to 1,000 watt-hours.	KWh	Monthly
1.4		Total System Losses	Difference between MWh purchased and sold	MWh	Semi Annually
1.5		Electricity coverage (i.e. Access to electricity)	$\frac{[\text{No. of customers (T\&TEC stats)}]}{[\text{No. of households in T\&T}]}$		Quarterly & Yearly
2.0	**Financial**				
2.1		Funds Flow Interest Cover (Times)	$\frac{(\text{FFO} + \text{Interest})}{\text{Interest}}$		Yearly
2.2		Debt Pay Back Period (Years)	$\frac{\text{Net Debt}}{\text{FFO}}$	Years	Yearly
2.3		Cash Interest Cover (Times)	$\frac{\text{Opening Cash Flow}}{\text{Interest Expense}}$		Yearly
2.4		Revenue per kWh	$\frac{[\text{Total revenue from sales}]}{[\text{Total no. of Kwh sold}]}$	($)	Yearly
2.5		Total cost coverage ratio	Annual revenues / annual costs.	%	Yearly
2.13		Debt service coverage ratio	Profit before interest and tax / (Interest + capital repayments).	%	Yearly
2.14		Operating ratio	$\frac{[\text{Operating costs (including depreciation and interest)}]}{[\text{Operating revenue}]}$	%	Yearly
2.15		Working ratio	$\frac{[\text{Operating costs (excluding depreciation and interest)}]}{[\text{Operating revenue}]}$	%	Yearly
2.16		Collection Rate	$\frac{\text{Revenue} - \text{Receivables}}{\text{Revenue}}$	%	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
2.17		Operating cost per unit	$\frac{\text{Total Operating costs}}{\text{Total no. of kWh sold}}$	$	Yearly
2.18		Operating cost per customer	$\frac{[\text{Total operating costs}]}{[\text{Total no. of customers}]}$	($)	Yearly
2.19		Operating revenue per kWh	$\frac{[\text{Total operating revenue}]}{[\text{Total no. of KWH sold}]}$	($)	Yearly
2.20		Current ratio	$\frac{[\text{Current assets}]}{[\text{Current liabilities}]}$	%	Yearly
2.23		Gearing	$\frac{[\text{Interest bearing debt}]}{[\text{Interest bearing debt + equity}]}$		Yearly
3.0	**Network Reliability**				
3.1		System average interruption frequency index (SAIFI) (Average number of sustained interruptions per customer)	Total number of reported customer interruptions greater than 1 minute duration / total number of customers served	Interruptions per year	Yearly
3.2		System average interruption duration index (SAIDI) (Average minutes off supply per customer)	Sum of each outage duration in minutes times the number of customers / total number of customers served	Minutes	Yearly
3.3		Customer average interruption duration index (CAIDI) (Average interruption duration)	$\frac{[\text{SAIDI}]}{[\text{SAIFI}]}$	Minutes	Yearly
3.4		Number of transmission and distribution circuit trip outs by voltage level			Yearly
3.5		Interruptions restored within 3 hours and 5 hours			Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
4.0	**Affordability and other Economic Data**				
4.1		Sales per employee (KWh)	$\frac{[\text{Total KWh sales}]}{[\text{Number of employees}]}$	(KWh)	Yearly
4.2		Sales per employee ($)	$\frac{[\text{Total revenue form sales}]}{[\text{Number of employees}]}$	($)	Yearly
4.3		Customers per employee	$\frac{[\text{Total no of customers}]}{[\text{Total number of employees}]}$	Number	Yearly
4.4		Consumption per capita (kWh)	$\frac{[\text{Total Kwh sales}]}{[\text{Total population}]}$	KWh	Yearly
5.0	**Customer Responsiveness and Service**				
5.1		Complaints by major type	Reporting on the major areas of complaint	Number	Quarterly and Yearly
5.2		Written complaints not responded to within 5 working days			Quarterly and Yearly