REGULATED INDUSTRIES COMMISSION

T&TEC's Annual Performance Indicator Report

for the period

July 2011 To June 2012

November 2016

Information Document

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EXECUTIVE SUMMARY

This is the fifth annual report 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 the period July 2011 to June 2012. The RIC assessed T&TEC's performance against targets set by the Determination, as well as against its performance in the previous year, and performance metrics of other jurisdictions in some instances.

Generally, T&TEC's performance over 2011/2012 varied with respect to the previous reporting period 2010/2011with improvement shown for some performance indicators and decline in others. Total system losses increased from 6.2% in the previous year to 6.55% for the current period, but remained lower than the target of 6.75% set in the Determination. The increase occurred in spite of T&TEC's efforts to reduce the theft of electricity during the period, which would have contributed to reducing system losses. System reliability, as indicated by the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI), showed improvement when compared with the previous period. However, T&TEC's performance fell significantly below that of the median value of North American utilities as recorded in the Institute of Electrical and Electronics Engineers (IEEE) Guide for Electric Power Distribution Reliability Indices (IEEE 1366-1998). Although there were fewer transmission trips than reported for the previous period, the time taken to restore the supply increased in some instances, resulting in a lower level of reliability in the electricity supply to customers.

In respect of its responsiveness to customers, although there was a 14% reduction in the number of complaints, there was a 3% deterioration in the resolution rate. Also, there was a 50% increase in the number of damaged appliances complaints. T&TEC's resolution

rate for damaged appliances complaints increased to 69%, but worsened for all other categories of complaints.

T&TEC has inspected/serviced more pole-mounted transformers compared with the previous period and maintained an exceptional performance relative to the minimum target set in the Determination.

The financial indicators for this year showed an increase in operating expenditure, which contributed to the decline in T&TEC's ability to meet its financial obligations. Debt as a portion of the 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 liquidity position has also weakened, notwithstanding an increase in their collections ratio.

SECTION 1 INTRODUCTION

The Regulated Industries Commission (RIC) was established by the Regulated Industries Commission Act No. 26, 1998 as the economic regulator of the water and electricity sectors in Trinidad and Tobago. The RIC's role as an economic regulator is to balance the economic interests of both the service provider and the customers. To achieve this, the RIC:

- Sets 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;
- Ensures that service providers meet their level of service obligation; and
- Safeguards customers' interests by ensuring that services are provided in accordance with established standards of service.

Section 56(1)(a) of the Act empowers the RIC to collect and compile any information which may be of assistance in the exercise of its functions, and Section 6(d) mandates the RIC to carry out studies of efficiency and economy of operation and of performance by service providers and publish the results thereof. The RIC published a document, "**Performance Monitoring and Reporting Framework**" (PMR) in May 2005, for the purposes of monitoring the services of the electricity sector. The RIC further indicated in the Final Determination: Regulation of Electricity Transmission and Distribution 2006 – 2011 (The Determination) that it will monitor the performance of the Trinidad and Tobago Electricity Commission (T&TEC) for the purpose of determining and reporting on the level of compliance by T&TEC with the Determination. This is the fifth report on T&TEC's performance on the key Performance Indicators that impact on customers, such as service reliability and cost efficiency. 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 the period July 2011 to June 2012 with respect to the performance indicators contained in the Determination, the specific directives given by the RIC, and other metrics of performance that are relevant to the

electricity transmission and distribution sector. It provides an assessment of the performance indicators against targets set by the Determination as well as against performance of the previous year and compares these with the performance of other utilities, where data are available.

1.2 Structure of Document

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

Section 2.0 Reviews T&TEC's Performance; and

Section 3.0 Concludes and provides Recommendations.

An abridged list of key performance indicators and 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. The RIC assesses T&TEC's performance through indicators that gauge the availability of its service, such as, electricity coverage, number of customers, kWh purchases and sales. T&TEC's network reliability and system losses are also reviewed in addition to other performance criterion, such as, customer responsiveness, equipment maintenance, and financial status. The performance and data analyses for T&TEC are compared against that of the previous year.

2.1 Indicators - 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 typically considered as a gauge of the level of infrastructural development and capacity for economic growth in a country. The electricity coverage for Trinidad and Tobago, as at the mid-year over the period 2009 to 2012, is presented in table 1.

Table 1 - Electricity Coverage

Mid-year	Estimated T&T population (CSO)	Residential Accounts (T&TEC)	Service Coverage[1]
2009	1,310,106	364,250	98%
2010	1,317,714	375,569	99%
2011	1,325,402	382,882	99%
2012	1,335,194	390,188	99%

Electricity service coverage was maintained at 99% throughout 2011 and 2012. There is a small percentage of the population not supplied by the national electricity grid.

[1] Estimated by Central Statistical Office of Trinidad and Tobago (CSO), except 2011 which was obtained from International Energy Agency, *World Energy Outlook 2011*

2.1.2 Number of Customers by Class and Area

T&TEC supplies electricity to various customer types[2] – Domestic, Commercial and Industrial – which are categorized by the customer's electrical load and supply voltage. All customers are billed for energy consumed, measured in kWh. In addition, Industrial customers are assessed a maximum demand charge, measured in kVA. A separate classification – Street Lighting – is used to bill private customers and governmental agencies for the electricity that is consumed for private and public outdoor lighting. T&TEC's customer base in 2011/2012 was comprised of 429,719 accounts, of which 386,625 (90%) were Domestic. There were 39,740 Commercial accounts (9%) and the Industrial and Street Lighting customers accounted for 3,354 accounts less than one percent of all customer accounts. Table 2 shows the number of active customer accounts by class for both 2010/2011 and 2011/2012. There was an overall increase in the total number of accounts by 8,597, two percent greater than the previous reporting period.

Table 2 – Number of Active Accounts by Class (2011/2012)

YEAR	CLASS				TOTAL
	Domestic	Commercial	Industrial	Street Lighting	
2011/2012*	386,625	39,740	3,309	45	**429,719**
2010/2011*	379,224	38,637	3,216	45	**421,122**

*As at June 30th

T&TEC's customers are served by 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 (129,885 out of 429,719), which represented 30% of T&TEC's entire customer base.

[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 but less than 25,000kVA.

Table 3 – Number of Active Accounts by Area (2011/2012)

YEAR	AREA					TOTALS
	North	South	Tobago	East	Central	
2011/2012*	89,677	129,885	24,183	114,745	71,229	**429,719**
2010/2011*	89,199	127,354	23,547	111,969	69,053	**421,122**

*As at June 30th

2.1.3 Electricity Purchases and Sales

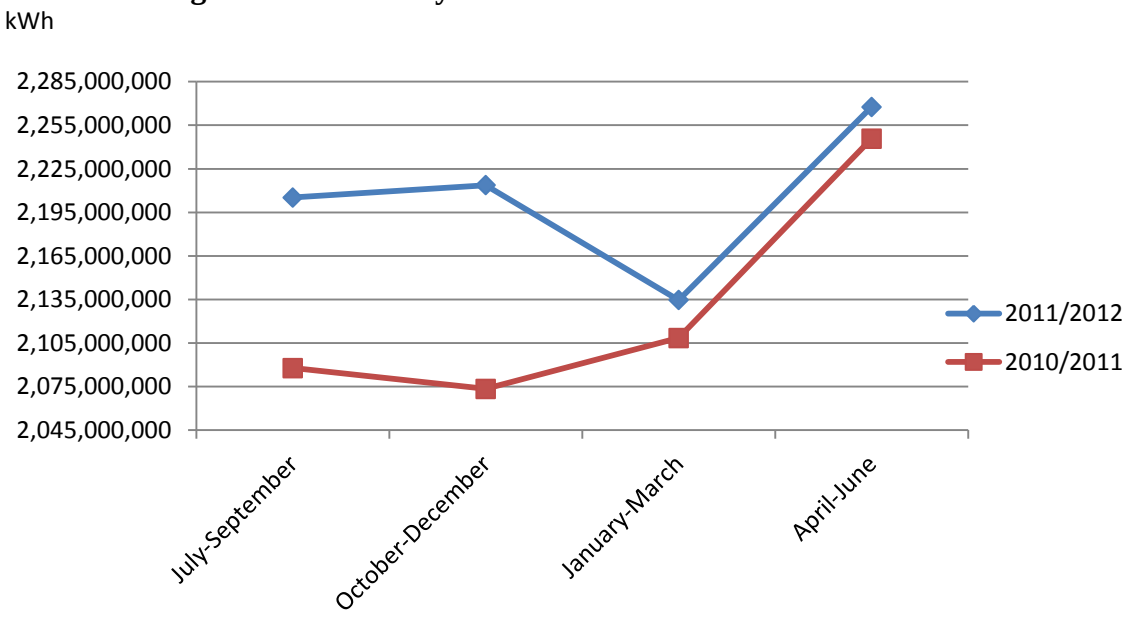
Table 4 shows the year-on-year comparison of electricity purchased by T&TEC during the period July 2011 to June 2012 against the corresponding period for 2010/2011. There was an overall increase of approximately 3.7 percent in the electricity purchased from the generators.

Table 4 – Electricity Purchased

QUARTER	Electricity purchased for period (kWh)	
	2011/2012	2010/2011
July -September 2011	2,205,240,000	2,087,790,000
October - December 2011	2,213,716,000	2,073,488,000
January - March 2012	2,134,624,000	2,108,473,000
April -June 2012	2,267,596,000	2,245,826,000
TOTAL	**8,830,809,000**	**8,515,577,000**

An examination of the trends in electricity purchased during the last two reporting periods, 2010/2011 and 2011/ 2012, shows that the amount of electricity purchased fluctuates throughout the year. The peak in purchases has typically occurred during the (April to June) quarter for both periods, while the the lowest amount of electricity purchased occurred for the (January to March) quarter in 2011/2012 and for the (October to December) quarter in 2010/2011, as shown in figure 1.

Figure 1 – Electricity Purchased for 2010/2011 and 2011/2012



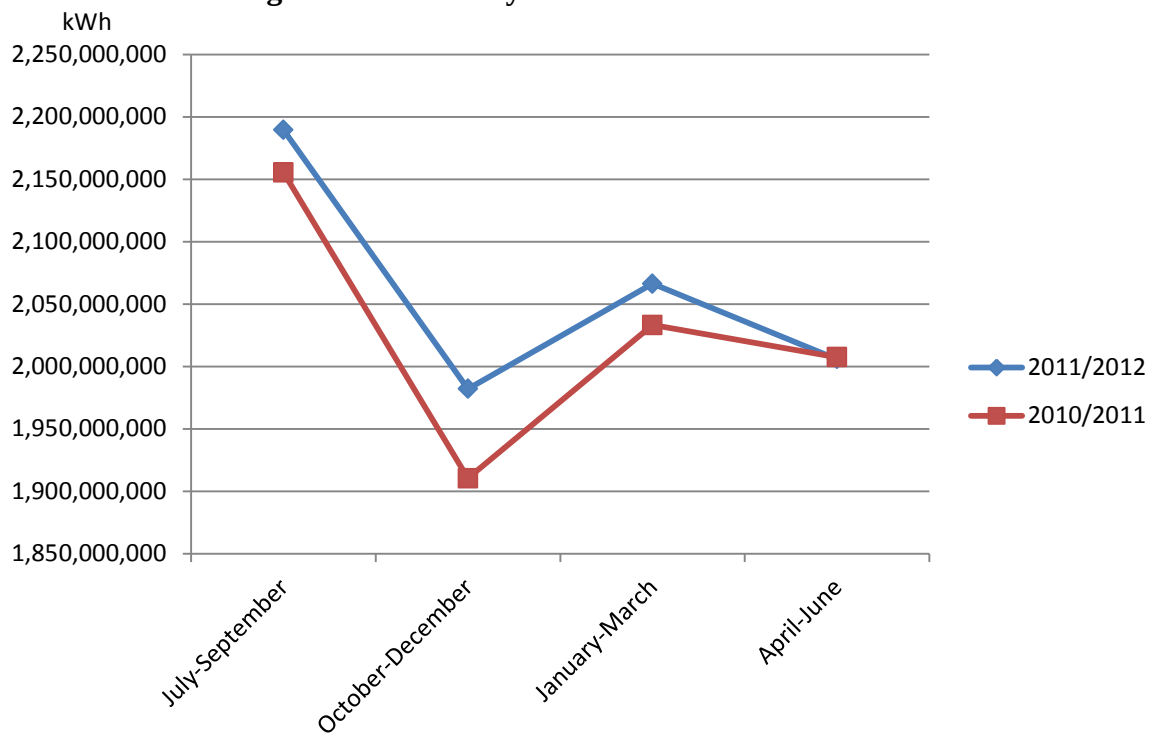
The total amount of electricity sales to customers by distribution area in kilowatt-hour (kWh) is presented in table 5 for each quarter during the period July 2011 to June 2012. The largest consumption (sales) of electricity occurred in the Central Distribution Area, at 38.5% of total consumption. This corresponds with the fact that this area has the highest concentration of large industrial customers. In fact, the average quarterly consumption in the Central area for 2011/2012 is approximately equal to the combined averages of the South and East areas over the same period. The total consumption of all the areas combined increased slightly by 1.52% when compared to 2010/2011.

Table 5 – Electricity Sales by Distribution Area, kWh (2011/2012)

QUARTER	NORTH (kWh)	SOUTH (kWh)	EAST (kWh)	CENTRAL (kWh)	TOBAGO (kWh)	TOTAL (kWh)
July - September 2011	419,047,856	414,464,447	442,799,811	851,091,138	61,974,896	**2,189,378,148**
October - December 2011	412,870,388	366,332,930	372,235,086	761,056,594	69,580,924	**1,982,075,923**
January – March 2012	396,411,433	389,301,686	421,498,016	798,782,692	60,243,519	**2,066,237,346**
April - June 2012	404,015,383	376,921,780	377,164,236	778,436,288	69,336,164	**2,005,873,851**
Total	**1,632,345,060**	**1,547,020,843**	**1,613,697,149**	**3,189,366,712**	**261,135,503**	**8,243,565,267**
Average	406,548,186	388,248,194	403,953,379	791,588,325	65,036,101	**2,055,374,185**

For the periods 2010/2011 and 2011/2012, electricity sales have fluctuated, but tracked similar patterns over the two reporting periods, as shown in figure 2.

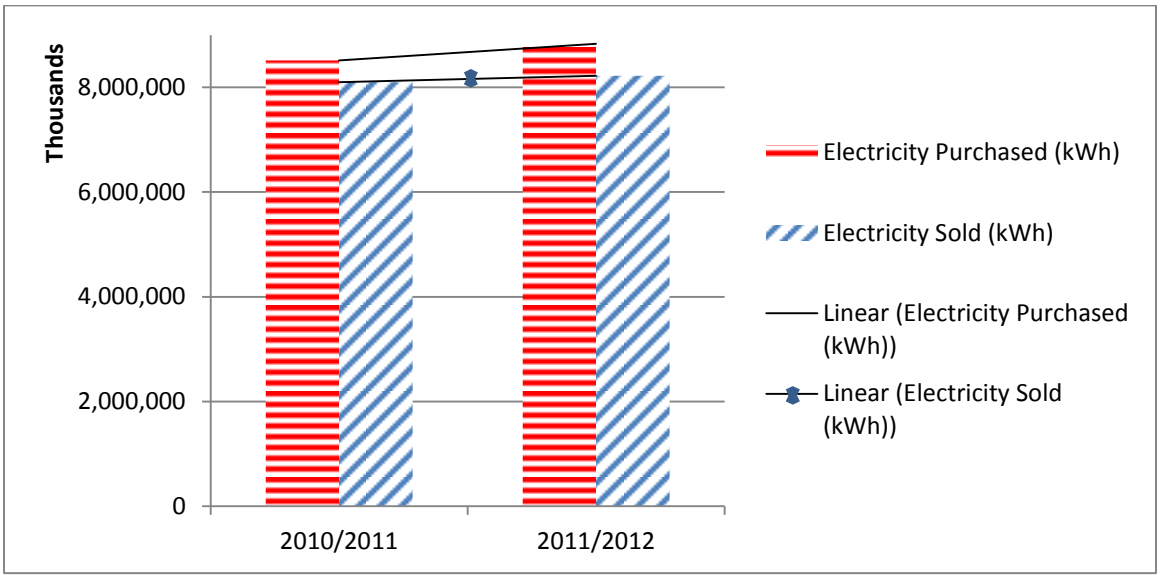
Figure 2 - Electricity Sales for 2010/2011 and 2011/2012



The data collected for the electricity purchased by T&TEC from the generators is measured on a real-time basis while electricity sales are tabulated on customers' consumption that is billed over various cycles. Hence, the trends of peak and low values for these two indicators do not simultaneously occur on a quarterly basis.

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 greater than the rate of increase in electricity sales over the period July 2010 to June 2012. This is an indication that the disparity between electricity purchased and sold has been increasing. There is some correlation with this trend and the total system losses discussed in section 2.1.4.

Figure 3 - Electricity Purchased vs Electricity Sales for 2010/2011 and 2011/2012



2.1.4 Total System Losses

Not all the electrical energy that T&TEC purchases from the generators is sold to customers. 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. Inaccuracies due to defective meters and illegal consumption may also result in discrepancies between the energy supplied to the end users and what is billed. The combination of all the 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 formula used to calculate the system losses for the purpose of the Determination was developed by the RIC[3]. This formula yields a different

[3]The RIC's system's losses formula, which included a factor based on the revenue collected and the customer billings to account for commercial efficiencies:

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

result from the formula employed by T&TEC[4]. Table 6 shows the system losses reported by T&TEC for the period July 2011 to June 2012, calculated using both T&TEC's and RIC's formulas[5]. For this period the results derived from the different formulas for total system losses are vastly different. The T&TEC formula yields a system loss result of 6.55%, while the RIC formula yields a result of -2.71%. The RIC's formula has a "Collections/Billings" factor, which had a significant impact on the calculations, as Collections were higher than Billings for all four quarters of the period. It is unusual for this to be the case over an entire reporting period and may be an indication of the collection of arrears throughout the period. The ratio "Collections/Billings" did not capture commercial or technical losses and might be more a reflection of commercial inefficiencies rather than system losses. Pursuant to the views presented in the RIC consultative document "Incentive Mechanism for Managing System Losses, July 2011", the RIC decided that the formula without the factor of "Collections/Billings" in keeping with T&TEC system losses formula would be used for future performance reporting.

Based on T&TEC's formula, and barring any data errors, the system losses increased from 6.2% in the 2010/2011 period to 6.55% for the 2011/2012 period. Although there was an increase, the system losses remained within the target of 6.75% as mandated by the RIC in the Determination.

[4] T&TEC's system losses formula:

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

[5] The RIC notes that due to the disparity in the collection of data for electricity purchased versus electricity sold, the values computed for system losses on a quarterly basis may vary significantly above and below the annual value.

Table 6 - Total System Losses (2011/2012)

Quarter/Year	Energy Units Billed (kWh)	Energy Units Purchased (kWh)	Collections ($)	Billings ($)	System Loss % (RIC Formula)	System Loss % (TTEC Formula)
July - September 2011	2,189,378,148	2,205,240,150	767,728,000	734,844,613	-3.72	0.72
October - December 2011	1,982,075,923	2,213,715,800	680,827,950	658,015,685	7.36	10.46
January - March 2012	2,066,237,346	2,134,624,000	777,738,907	692,524,680	-8.71	3.2
April - June 2012	2,005,873,851	2,267,595,120	788,066,536	657,148,068	-6.08	11.54
TOTAL (2011/2012)	**8,243,565,268**	**8,821,175,070**	**3,014,361,393**	**2,742,533,046**	**-2.71**	**6.55**
TOTAL (2010/2011)	**8,098,296,729**	**8,633,331,227**	**2,605,094,734**	**2,691,019,149**	**9.19**	**6.20**

2.2 Indicators - Other Economic Data

This section provides 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 2011/2012 and 2010/2011. 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[6]. It is observed that, while electricity sales per employee declined by 13%, the revenue per employee associated with those electricity sales increased by less than 1%. While both the electricity sales and the number of customers increased from the previous period, the number of employees increased significantly by 16%, thus attributing to the decline in the performance metrics electricity sales per employee and customers per employee.

[6] The World Bank Group (2009). *Benchmarking Data of the Electricity Distribution Sector in the Latin America and Caribbean Region 1995 – 2005*. http://info.worldbank.org/etools/lacelectricity/home.htm

Table 7 – Other Economic Data

Data	2011/2012	2010/2011	% Change
Number of Employees	3,115	2,680	16%
Electricity Sales (kWh)	8,243,565,267	8,098,504,628	2%
Number of Customers	429,719	421,122	2%
Electricity Sales per Employee (kWh)	2,639,325	3,021,830	-13%
Electricity Sales per Employee ($)	1,010,650	1,008,952	0.17%
Customers per Employee	138	159	-13%
Consumption per capita (kWh)	6,158	6,110	0.8%

Consumption per capita is defined as the total amount of electricity sold divided by the population. It gives an indication of a country's electricity consumption averaged per individual not accounting for the specific purpose of use whether domestic, commercial or industrial. As shown in table 8, there was a very marginal increase in consumption per capita for Trinidad and Tobago over the period 2010-2012.

Table 8 – Electricity Consumption Per Capita[7]

Country	GDP Per Capita (US$)	kWh Consumption per Capita		
		2012	2011	2010
Jamaica	5,332	1,154	1,261	1,270
Cuba	6,093	1,369	1,322	1,294
Venezuela	10,755	3,250	3,197	3,134
Trinidad & Tobago	**18,287**	**6,629**	**6,390**	**6,189**
Estonia	17,454	6,689	6,314	6,689
Slovak Republic	18,139	5,138	5,348	5,138
Oman	21,164	6,095	5,929	6,095
Czech Republic	21,657	6,305	6,299	6,305

[7] 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/

Due to the lack of data available for countries in the Caribbean region besides Jamaica, Cuba and Venezuela, the four countries with the closest comparable GDP per Capita to Trinidad and Tobago were also chosen for comparison in order to ascertain whether comparable values for consumption per capita obtained. While consumption per capita remained significantly higher than that for the three countries in the Caribbean region, it was comparable to the countries 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.

2.3 Indicators - Network Reliability

A critical part of providing quality service to customers is the delivery of a reliable supply of electricity. An unreliable electricity supply results in economic losses and inconveniences, and increases the likelihood of damage to customers' equipment. It is therefore important for utilities to meet minimum standards of reliability, even as they seek to pursue and maintain economic and operational efficiencies. One of the roles of the RIC as an economic regulator, is to ensure that T&TEC supplies electricity to its customers at an acceptable level of reliability. The IEEE Guide for Electric Power Distribution Reliability Indices (IEEE 1366-1998) is the standard that has been applied across many jurisdictions with respect to monitoring and reporting on reliability. The reliability of T&TEC's supply has been assessed using the under-mentioned indices as defined in IEEE 1366-1998. Table 9 shows the monthly values of the indices accounting for both planned and unplanned outages for the period July 2011 to June 2012.

2.3.1 System Average Interruption Frequency Index (SAIFI)

The System Average Interruption Frequency Index (SAIFI) indicates the average number of sustained interruptions per customer. The annual value of SAIFI for the period, 5.61 interruptions per customer, was an improvement in performance, when compared to 6.28 for the same period in 2010/2011. The value of this index suggests that statistically, a T&TEC customer can expect to experience between five to six interruptions in electricity supply per year, compared to one interruption per customer of selected North American utilities (based on the median values indicated in IEEE 1366-1998).

2.3.2 System Average Interruption Duration Index (SAIDI)

The System Average Interruption Duration Index (SAIDI) indicates the average outage duration per customer. The SAIDI was 468.4 minutes for the period July 2011 to June 2012. This is 79 minutes less than that for the same period in the previous year, representing an improvement in performance. The median value for SAIDI for North American utilities, according to IEEE 1366-1998, is 90 minutes, suggesting that statistically the yearly outage duration can be over five times longer per T&TEC customer.

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 2011/2012 was 83 minutes, with a high of 100.2 minutes in December 2011, and a low of 67.2 minutes in May 2012.

Table 9 – Network Reliability (2011/2012)

INDICATOR	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	2011/2012
SAIFI (No per customer)	0.57	0.51	0.44	0.59	0.52	0.47	0.37	0.36	0.38	0.42	0.48	0.50	**5.61**
SAIDI (minutes)	49.8	46.2	37.8	49.8	43.2	46.8	28.8	25.8	29.4	28.2	38.4	44.2	**468.4**
CAIDI (minutes)	87.0	91.8	86.4	84.0	82.8	100.2	76.8	72.0	77.4	67.2	80.4	84.6	**83**

Looking at SAIFI, SAIDI and CAIDI over the period 2002 to 2012 (Table 10), it can be seen that T&TEC achieved a significant performance improvement in 2008 and maintained this level in the ensuing years to 2012.

Table 10 – Network Reliability Indicators for T&TEC (2002 – 2012)

INDICATOR	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	*NAU
SAIFI (No./customer)	10.56	10.25	9.54	11.43	9.93	10.1	6.94	5.55	6.61	5.68	5.71	1.1
SAIDI (minutes)	1093	966	833	1116	996	1020	603	487	563	486	464	90
CAIDI (minutes)	104	94	90	98	100	100	93	87	85	86	81	82

Reliability measures reported in Table 10 are for calendar years

*NAU = Median values for North American utilities according to IEEE Standard 1366-1998

2.3.4 Number of Transmission Trips

Table 11 shows the number of transmission trips and interruptions affecting customers during the period July 2011 to June 2012. There were 38 transmission trips during this period. The largest number of these occurred on the 33kV network with 25 trips, followed by the 66kV network with 12 trips. The best performance was on the 132kV network which had one transmission trip. T&TEC performed better at restoring trips on the 66kV network than on the 33kV, with 100% of the trips being restored within 3 hours (Table 12). In the case of the 33kV network, 80.0% of the trips were restored within 3 hours, with the remaining 20.0% taking more than 5 hours.

There was a slight increase in the number of trips in 2011/2012 compared with the 35 trips that occurred in 2010/2011. The percentage of transmission trips restored within 3 hours decreased from 94.3% for 2010/2011 to 86.8% for the 2011/2012 period.

Table 11 – Transmission Trips & Interruptions Affecting Customers (2011/2012)

MONTH/YEAR	Transmission Circuit Trip outs			Number of Interruptions Restored (<3hrs)			Number of Interruptions Restored (>3hrs & <5hrs)		
	33kV	66k V	132kV	33kV	66kV	132kV	33kV	66kV	132kV
Jul-11	2	2	0	2	2	0	0	0	0
Aug-11	1	3	0	1	3	0	0	0	0
Sep-11	4	3	0	4	3	0	0	0	0
Oct-11	5	1	0	2	1	0	0	0	0
Nov-11	2	0	0	2	0	0	0	0	0
Dec-11	4	0	0	4	0	0	0	0	0
Jan-12	5	0	0	5	0	0	0	0	0
Feb-12	1	1	1	0	1	1	0	0	0
Mar-12	1	1	0	0	1	0	0	0	0
Apr-12	0	1	0	0	1	0	0	0	0
May-12	0	0	0	0	0	0	0	0	0
Jun-12	0	0	0	0	0	0	0	0	0
TOTAL	**25**	**12**	**1**	**20**	**12**	**1**	**0**	**0**	**0**

Table 12 – Summary of Transmission Trips & Interruptions (2011/2012)

	No. of Trips			
	33kV	**66kV**	**132kV**	**Overall**
TOTAL	25	12	1	**38**
Restoration < 3hrs	20	12	1	**33**
Restoration < 5hrs	0	0	0	**0**
% < 3hrs	80.0%	100.0%	100.0%	**86.8%**
% < 5hrs	0.0%	0.0%	0.0%	**0.0%**

2.4 Indicators - Customer Responsiveness and Service Performance

This section reports on the customer complaints and their resolution, with particular attention to those aspects that are 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 2011/2012 and 2010/2011. Overall, there was a 14% reduction in the number of complaints but a 31% decline in the resolution rate. Damaged appliances accounted for the largest percentage increase in the number of complaints at 50%. All other categories showed a reduction in complaints received: Billing query (25%); High/Low Voltage complaints (42%); and Poles/Other[8] (10%).

Table 13 – Number of Complaints by Type (2011/2012)

Type of Complaint	**No. of Complaints**		**% Change**
	2011/2012	**2010/2011**	
Damaged appliances	36	24	50
Billing query	29	32	-9
High/Low Voltage	42	73	-42
Poles/Other	75	83	-10
Total	**182**	**212**	**-14**
Resolution Rate	**56.%**	**82%**	**-31**

[8] "Other" complaints include but are not limited to defective street lights; power outages; delays in the delivery of service and line relocations and removals.

Table 14 shows the total number of complaints by type and the percentage resolution. Of the total complaints received, the largest number was recorded for the "poles/other" category, which accounted for 34%. This was followed by high/low voltage (23%), damaged appliances (20%) and billing query (16%). Of the 182 complaints received, 100 (56%) were resolved. This was a decline in the resolution rate compared with the 2010/2011 rate of 82%.

Table 14 – Total Complaints Resolved by Type (2011/2012)

Type of Complaint	No. of Complaints	% of Total Complaints	Total Resolved	% Resolved
Billing query	29	16%	23	79
Damaged appliances	36	20%	23	64
High/Low Voltage	42	23%	22	52
Poles/Other	75	41%	34	45
Total	**182**	**100%**	**102**	**56**

Table 15 lists the number of complaints by type that were received and resolved per quarter over the period July 2011 to June 2012. The largest number of complaints (64) was received during the January to March 2012 quarter, and the lowest (26) was received in October to December 2011. The percentage resolution per quarter was highest in the October to December 2011 quarter at 73%, and lowest in January to March 2011 (41%).

Table 15 - Complaints Resolved by Type per Quarter (2011/2012)

Type of Complaint	Number of complaints received				Number of complaints resolved			
	Jul - Sep 2011	Oct - Dec 2011	Jan - Mar 2012	Apr - Jun 2012	Jul - Sep 2011	Oct - Dec 2011	Jan - Mar 2012	Apr - Jun 2012
Billing query	6	5	8	10	6	4	3	10
Damaged appliances	5	3	27	1	4	3	15	1
High Low Voltage	19	6	7	10	13	5	4	0
Poles/Other	10	12	22	31	5	7	4	18
TOTAL	**40**	**26**	**64**	**52**	**28**	**19**	**26**	**29**
% Resolved by Qtr	-	-	-	-	**70%**	**73%**	**41%**	**56%**

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 the period July 2011 to June 2012.

Of the 182 written complaints received, 21% were not responded to within 2 weeks. The highest percentage (62%) of written complaints that were not responded to within 2 weeks was recorded in October 2011. The best performances, when 100% of complaints were responded to within 2 weeks, were achieved in August 2011, January 2012, February 2012 and April 2012. The overall performance in 2011/2012 was not as good as in 2010/2011 when there were 212 complaints and only 7% were not responded to within 2 weeks.

Table 16 - Response to Written Complaints (2011/2012)

Month/Year	No. of written complaints received	No. of written complaints not responded to within 2 weeks		Percentage of complaints with Response > 2 weeks
		Received in current month	Received in previous months	
Jul-11	14	0	1	7%
Aug-11	12	0	0	0%
Sep-11	14	0	5	36%
Oct-11	13	5	3	62%
Nov-11	7	0	1	1%
Dec-11	6	0	2	33%
Jan-12	8	0	0	0 %
Feb-12	18	0	0	0%
Mar-12	38	9	2	29%
Apr-12	9	0	0	0%
May-12	22	3	2	23%
Jun-12	21	3	2	24%
TOTAL	**182**	**20**	**18**	**21%**

While the general responsiveness to handling complaints over the relevant period has been good, the RIC has observed that the same number of complaints is being reported for total complaints as well as for written complaints. However, based solely on the information submitted by T&TEC for the Quality of Service Standards report, voltage complaints alone are usually in the order of thousands. Therefore, it is expected that total number of complaints would be of a similar or greater magnitude. This trend, which was observed in the previous report, is being investigated.

2.5 Specific Directives - Equipment Maintenance

T&TEC is required to provide information on specific directives related to its operations, in addition to meeting requirements stipulated by the RIC in the 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

In the Determination, a directive was given to T&TEC to repair and maintain pole-mounted distribution transformers at a rate of at least 20% per annum.

There were 34,022 pole-mounted transformers in service at the end of the period, as recorded in the 2nd quarter of 2012 (Table 17). The annual percentage of the transformers inspected/serviced was well above the 20% minimum requirement. Most of the maintenance was done in the first quarter of 2012, during which approximately 48% of the then existing units were inspected/serviced.

Table 17 –Repairs And Maintenance To Pole-Mounted Transformers (2011/2012)

	3rd Qtr 2011	4th Qtr 2011	1st Qtr 2012	2nd Qtr 2012
Number of Pole Mounted Distribution Transformers	33,572	33,836	34,100	34,022
Number of Pole Mounted Distribution Transformers Inspected	10,201	5,431	15,282	9,399
No of Transformers Serviced	1,082	1,268	1,246	1,192
% Inspected/Serviced	**34%**	**20%**	**48%**	**31%**

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. The service provider is also required to monitor highway lighting and repair non-working lights within 14 days of discovery. Street lighting failures that are reported to the service provider are to be repaired within 7 days. Table 18 shows the number of reports received and the number of repairs done during the period July to June for the years 2010/2011 and 2011/2012. For 2011/2012, T&TEC received 22,027 reports, of which 17,731 (or 80.5%) repairs/installations were completed within 7 days. T&TEC also completed 5,820 repairs in response to failures that were not reported by the public during that period. In total, T&TEC completed 29,775 repairs during 2011/2012.

Table 18 – Street Light Repairs And Installations (2011/2012)

	July – September 2011	**October – December 2011**	**January – March 2012**	**April – June 2012**	**TOTAL 2011/2012**	**TOTAL 2010/2011**
No. of Reports Received	4,944	5,085	5,814	6,184	**22,027**	**16,463**
No. of Repairs & Installations completed within 7 days	4,060	4,394	4,159	5,118	**17,731**	**12,738**
No. of Repairs & Installations completed without a report	1,512	1,804	1,452	1,052	**5,820**	**9,037**
Total No. of Repairs & Installations Completed	6,599	7,859	7,769	7,548	**29,775**	**25,399**

Table 19 shows a summary of the year-on-year comparison of repairs of street lights for both years. The number of reports of street lighting failures received in 2011/2012 was approximately 34% more than that received in 2010/2011. There was also a 39% increase in the number of reported failures that were repaired within 7 days. There was a 4% increase in the 7-day repair rate for reported failures. T&TEC showed significant improvement in addressing reported failures over the period. The number of unreported failures that were detected and repaired decreased significantly by approximately 36%. Generally, T&TEC's overall performance during 2011/2012 was better that the performance during 2010/2011.

Table 19 – Street Light Repairs (2011/12)

	2011/2012	2010/2011	% Change
No. of Reports Received	22,027	16,463	**34**
No. of Repairs completed within 7 days	17,731	12,738	**39**
7-day Repair Rate for reported failures	80.50%	77.37%	**4**
No. of Repairs completed without a report	5,820	9,037	**-36**
Total No. of Repairs Completed (Including carryover from previous year)	29,775	25,399	**17**

2.6 Indicators - Financial

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 functions and thus, should enable T&TEC to earn a return on its regulatory asset base (RAB) that is at least equal to its cost of capital in addition to raising finance on reasonable terms. An assessment of financial viability is essentially about examining the ability of the service provider to meet its cash obligations.

Table 20 below shows a select set of financial ratios which were used to 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 July-June 2008-2012

RATIOS	YEAR				TARGET
	2011/12	2010/11	2009/10	2008/09	
Debt Financing					
Gearing	0.81	0.67	0.42	0.32	
Funds Flow Interest Cover	2.11	3.76	3.91	4.28	Greater than 3
Cash Interest Cover	0.66	2.06	3.86	1.95	Greater than 1
Debt Pay Back Period (Years)	13	5.22	5.30	4.99	Between 5 to 7
Debt as a proportion of RAB (%)	272%	169%	306%	242%	Below 65%
Liquidity					
Collection Rate (%)	82%	79%	80%	80%	
Revenue Collected/Operating cost	1.00	1.20	1.09	1.13	Greater than 1
Revenue Billed/Operating Cost	1.22	1.52	1.37	1.40	Greater than 2
Internal Financing (%)	1%	54%	1980%	703%	Greater than 40%
Profitability and Efficiency					
Return on RAB (%)	21%	32%	58%	48%	≈ 9%
Operating Cost per unit ($/kWh)	0.27	0.24	0.26	0.23	

2.6.1 Debt Financing

Compared to the previous reporting periods, T&TEC's ability to meet its financial obligations weakened in 2011/2012. Both funds flow and cash interest coverage were outside the target ranges for 2011/2012, suggesting that T&TEC may have experienced difficulty in meeting its finance costs. The debt payback period more than doubled to 13 years over 2011-2012, fuelled mainly by an increase in operating expenditure. This increase in the debt payback period

suggests that T&TEC would have required more time to retire its debt if all 'funds from operations (FFO)' were devoted to debt repayment.[9]

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&TECs gearing ratio increased partly due to an increase in the advance from the GORTT which was meant to assist with loan repayments.

2.6.2 Liquidity

According to the indicators presented, T&TEC maintained a better liquidity position in the previous periods when compared to 2011/2012. On the one hand, the collection rate increased suggesting that T&TEC made efforts to decrease receivables. T&TEC's collection rate increased by 2% in 2011/2012, up to 82%, which was the result of a decrease in receivables. On the other hand, the working coverage ratios, which compare both revenue collected and billed income to operating costs not only decreased from 2010/2011 to 2011/2012, the values were outside of the target range. This suggests that T&TEC may have faced difficulty in meeting its full operating costs from either revenue billed or revenue collected in 2011/2012. The average number of times that collected revenue was able to cover operating costs was 1.2 in 2010/2011; by 2011/2012, this figure had been reduced to 1.00. For the same period, the average number of times that billed income was able to cover operating costs was 1.52, compared to 1.22 in 2011/2012.

A significant decrease in CAPEX between 2010/2011 and 2011/2012 had a major impact on the internal financing ratio, which increased from 54% to 272%. Funds were allocated to capital projects during the first regulatory control period and during the last year of this period (2010/2011).[10] CAPEX spiked, then decreased as a number of approved projects were completed. The internal financing ratio for 2011/2012 suggests that T&TEC had more than sufficient funds from FFO to finance capital projects for that year.

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[9] Funds from operations is broadly the equivalent of net cash flow from operation less non recurrent sources of revenue such as capital contributions, proceeds from disposals and other investment activity.
[10] The first regulatory control period for T&TEC ended May 31, 2011

2.6.3 Profitability and Efficiency

T&TEC is a state-owned utility and analyzing 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 the RAB is better suited to entities with this type of governance structure. In 2010/2011, the net cash flow return on the RAB was 32%, which was above the benchmark of 9%. However, a decrease in FFO in 2011/2012 contributed to a lower cash flow return on the RAB of 21%.

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 $0.03 between 2010/2011 and 2011/2012, suggesting a fall in efficiency

Operating costs for each kWh produced have increased from the last period. Efficiency incentives were included in the last rate review, to encourage the utility to keep operating costs at sustainable levels. The RIC will continue with such financial efficiency measures in the second rate review period to incentivize the service provider to reduce its costs.

SECTION 3 CONCLUSIONS & RECOMMENDATIONS

3.1 Conclusions

T&TEC's overall performance was fair for the period under review. Total system losses were 6.55% in this period based on the T&TEC's formula. While this was an increase from the 6.2% from the last period, it remained less than the target of 6.75% set in the Determination. T&TEC has not initiated any major projects to reduce the system losses. However, the RIC notes T&TEC's attempts to limit the theft of electricity, which will contribute to the reduction in the system losses. The system reliability indicators SAIFI and SAIDI showed some improvement, but there is significant margin for improvement when compared with the median values for North American utilities indicated in IEEE 1366-1998. Although there were fewer transmission trips, the restoration rate declined.

There was a 14% reduction in the number of complaints, and a 31% deterioration in the resolution rate. Although there was an overall reduction in the number of complaints, there was a 50% increase in damaged appliances complaints. T&TEC's performance improved in resolving damaged appliances complaints, with a resolution rate of 69%, but worsened for all other categories of complaints.

T&TEC continued the trend of improving its rate of inspecting/servicing pole-mounted transformers, exceeding what was already an exceptional performance relative to the minimum target set by the Determination. Similarly, there was an improvement in the rate of addressing reported failures (within 7 days).

The financial indicators for this year showed an increase in operating expenditure which contributed to the decline in T&TEC's ability to meet its financial obligations. It appears that borrowed funds which should have been allocated to RIC approved capital projects were being used to fund other projects, which is of concern to the RIC. T&TEC's liquidity position has also weakened, notwithstanding an increase in their collections ratio. The period of the first rate review ended at May 31, 2011 and the RIC will be looking at further efficiency incentives for T&TEC in the second regulatory control period.

3.2 RIC's Recommendations

- T&TEC should develop and implement a clear policy to appropriately manage system losses. The RIC intends to introduce measures that will incentivize improvements and penalize substandard performance.
- T&TEC should develop a strategy for improving SAIFI and SAIDI, paying special attention to areas where service interruption is very frequent. This may also help to reduce the number of damaged appliances complaints, as a decrease in interruptions is likely to reduce the number of surges and spikes experienced by customers.
- T&TEC should maintain its momentum in addressing unreported failures of street lighting.
- T&TEC should closely monitor its operating cost per unit ($/kWh) as a gauge to its efficiency and seek to maintain or improve its performance in this regard.
- T&TEC should continue its efforts to collect outstanding funds, including accounts receivables from government Ministries and local government authorities.
- T&TEC should consider the introduction of performance related incentives for managers and staff subject to the approval by the owner /shareholder.

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)	$\frac{\text{(FFO + Interest)}}{\text{Interest}}$		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

Item	Category	Indicator	Definition	Units	Reporting Period
2.16		Collection Rate	$\frac{\text{Revenue – Receivables}}{\text{Revenue}}$	%	Yearly
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

Item	Category	Indicator	Definition	Units	Reporting Period
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
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