REGULATED INDUSTRIES COMMISSION

T&TEC's Annual Performance Indicator Report

For The Year

2022

November

2026

Information Document

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EXECUTIVE SUMMARY

This Annual Performance Indicator Report provides an assessment of the Trinidad and Tobago Electricity Commission's (T&TEC) performance for the year 2022. The assessment is focused on the performance indicators and targets established under the "*Performance Monitoring and Reporting Framework for the Electricity Transmission and Distribution Sector (PMR)*" and "*Regulation of Electricity Transmission and Distribution Sector (June 01, 2006 to May 31, 2011) - Final Determination: Rates and Miscellaneous Charges (2006)*", hereinafter called the "Final Determination (2006)".

The indicators included in this report are grouped as follows:

- Aggregate Performance – which covers indicators such as electricity service coverage, number of customers, electricity purchases and sales, and total system losses;
- Economic Data – which covers productivity indicators such as electricity sales per employee, customers per employee and electricity consumption per capita;
- Network Reliability – which covers indicators such as the System Average Interruption Frequency Index (SAIFI), the System Average Interruption Duration Index (SAIDI), the Customer Average Interruption Duration Index (CAIDI) and the number of transmission trips and interruptions affecting customers;
- Customer Responsiveness and Service – which covers the number of complaints received, the number of complaints resolved and the complaint resolution rate;
- Specific Directives – which cover repairs and maintenance of pole-mounted distribution transformers and street lighting repairs; and
- Financial Performance and Efficiency – which covers debt financing, liquidity and financial efficiency indicators.

T&TEC's performance for the review period is summarised below.

Aggregate Performance

T&TEC maintained an electricity service coverage of 99.4% in 2022, with only a small percentage of the population not connected to the national electricity grid. Its customer base expanded by 1.2%, from 508,892 in 2021 to 515,114 at the end of 2022. The residential class accounted for

88.4% of T&TEC's customer base, followed by the commercial class (10.8%), and the industrial and street lighting classes (<1%).

T&TEC's energy purchases from the power generators decreased by 0.35%, from 8,751,992,000 kWh in 2021 to 8,721,723,000 kWh in 2022, but total electricity sales increased by 1.3% over the same period, from 8,267,817,849 kWh to 8,378,538,179 kWh. T&TEC also reported a decrease in total system losses from 9.48% in 2021 to 8.03% in 2022.

Economic Data

T&TEC's performance with respect to the productivity indicators fluctuated over the period. The ratio of electricity sales per employee increased by 1.6%, from 2,862,818 kWh in 2021 to 2,909,215 kWh in 2022, and the customer per employee ratio increased by 1.7%, from 176 in 2021 to 179 in 2022. T&TEC also reported an increase of 1.5% in the country's electricity consumption per capita from 6,046 kWh in 2021 to 6,134 kWh in 2022.

Network Reliability

T&TEC's network reliability weakened over the period as the frequency and duration of outages increased. The System Average Interruption Frequency Index (SAIFI) increased to 4.04 interruptions per customer, and the System Average Interruption Duration Index (SAIDI) increased marginally to 309 minutes. Despite fewer transmission trips and interruptions on the network, the restoration rate (within 5 hours) deteriorated from 100% in 2021 to 87% in 2022.

Customer Responsiveness and Service

T&TEC reported an overall decline of 55% in the number of customer complaints, from 37,966 in 2021 to 17,235 in 2022. Written customer complaints also decreased, from 198 in 2021 to 124 in 2022. The majority of customer complaints were related to poles and other[1] issues (13,743), followed by billing queries (2,801), high/low voltage complaints (555), and damaged appliances (136), respectively. At the end of 2022, T&TEC resolved 16,817 or 97.6%, of the total complaints received, compared to 99.6% in 2021.

[1] 'Other' complaints include, but are not limited to, defective streetlights, power outages, delays in the delivery of service and line relocation and removals.

Specific Directives

The number of pole-mounted transformers in service increased by 6%, from 40,112 in 2021 to 42,573 in 2022. T&TEC significantly outperformed the minimum inspection target of 20% set by the RIC by inspecting and servicing 122.6% of the installed transformers in 2022. T&TEC also received 27,866 reports of non-functioning streetlights from customers and members of the public in 2022. Of these, T&TEC repaired 64% within the stipulated 7-day period, compared to 28% in 2021. T&TEC undertook 5,483 street lighting repairs in response to failures detected by its crews and other staff. Overall, T&TEC completed 32,343 street lighting repairs in 2022, compared to 28,942 in 2021.

Financial Performance and Efficiency

T&TEC's financial performance and efficiency continued to be below par in 2022. In 2022, the utility showed no significant improvements compared to 2021. Operating revenue for the period (TT$3,122,458,169) was relatively stable compared to 2021, with operating expenditure decreasing slightly (TT$3,132,808,087). As a consequence, Funds from Operations (FFO)[2] continued to be negative, improving from negative TT$74,709,464 in 2021 to negative TT$52,651,404 in 2022.

[2] Funds from Operations refers to the cash flows from the operations of the business.

SECTION 1.0 INTRODUCTION

1.1 Background

The RIC is the economic regulator of the electricity, water and wastewater sectors in Trinidad and Tobago. In carrying out its mandate, the RIC is guided by the legislative and regulatory framework set out in the RIC Act No. 26 of 1998. Section 6(1) of the Act empowers the RIC to, amongst other things, carry out studies of efficiency and economy of operation and of performance by service providers and publish the results thereof. In accordance with this mandate, the RIC developed its Performance Monitoring and Reporting Framework for the Electricity Transmission and Distribution Sector (PMR) to monitor a core set of financial, operational and service quality indicators of the sector on a quarterly and annual basis. The RIC also identified key performance indicators and specific directives in the Final Determination (2006)[3] to monitor T&TEC's performance, and reports its findings annually in the Performance Indicator Reports.

This report focuses on the aspects of performance in 2022 that impact customers using targets set out in the Final Determination (2006), the PMR, and performance metrics of electricity utilities in other jurisdictions where appropriate. The report includes aggregate data on electricity coverage, number of customers, electricity purchases and sales, T&TEC's network reliability, system losses, and other performance metrics, such as customer responsiveness and service, equipment maintenance, and financial status. The data in this report was supplied by T&TEC, except where specified otherwise.

1.2 Purpose of Document

The purpose of this document is to inform stakeholders about T&TEC's performance, and incentivise the utility to improve its performance.

[3] The second price determination for the electricity transmission and distribution sector commenced on November 1, 2023 and does not impact the contents of this report.

1.3 Structure of Document

This document is divided into three sections. **Section 1.0** explains the background, purpose and structure of the report. **Section 2.0** presents T&TEC's performance with respect to broad performance criteria including aggregate performance, economic data, network reliability, customer responsiveness and service, specific directives, and financial performance and efficiency. **Section 3.0** presents a conclusion and recommendations for T&TEC.

An abridged list of key performance indicators for the electricity transmission and distribution sector is contained in the appendix.

SECTION 2.0 PERFORMANCE DATA

2.1 Aggregate Performance

This section summarises T&TEC's aggregate performance for 2022 with respect to the following indicators: electricity service coverage, number of customers, electricity purchases and sales, and total system losses.

2.1.1 Electricity Service Coverage

Electricity service coverage indicates the extent to which households across the country are connected to the national grid. The indicator may also be used to gauge the potential for growth in a country's commercial and industrial sectors. T&TEC's electricity service coverage for Trinidad and Tobago remained at an estimated 99.4%, with only a small percentage of the population not supplied by the national electricity grid.

2.1.2 Number of Customers by Class and Area

T&TEC classifies customers according to their electrical load and supply voltage. These classes include residential, commercial, and industrial customers.[4] All customers are billed for energy consumed, measured in kilowatt hours (kWh). Industrial customers have an additional charge for demand, measured in kilovolts-ampere (kVA). A separate classification, "street lighting," is used to bill private customers and governmental agencies for electricity supplied to private and public outdoor lighting, respectively.

T&TEC had 515,114 active customer accounts at the end of 2022, as shown in table 1. This represented an increase of 1.2% from the 508,892 active accounts on record at the end of 2021. The residential class accounted for the largest share of T&TEC's customer base (455,436 or 88.4%). This was followed by the commercial class (55,774 or 10.8%), and the industrial and street lighting classes, which together accounted for less than 1% of T&TEC's customer base. The number of customers in the industrial class declined by 6%. The overall number of active accounts grew by 1.2% in 2022.

[4] Residential (Domestic) Rate A is supplied at 115/230V at loads less than 50kVA. Commercial Rate B is supplied at 115/230V or 230/400V at loads less than 50kVA. Commercial Rate B1 is supplied at 115/230V, 230/400V, 6.6kV, 12kV or 33kV at loads greater than 50kVA but less than 350kVA. Industrial Rates D1-5, E1-5 are supplied at 115/230V, 230/400V, 6.6kV, 12kV, 33kV, 66kV or 132kV at loads greater than 50kVA but less than 25,000kVA.

Table 1: Number of Active Accounts by Customer Class (2021-2022)

Year	Customer Class				Total
	Residential	Commercial	Industrial	Street Lighting	
2022	**455,436**	**55,774**	**3,856**	**48**	**515,114**
2021	449,680	55,062	4,102	48	508,892
Percentage Change (%)	1.3%	1.3%	-6.0%	0.0%	1.2%

T&TEC supplies electricity to customers across Trinidad and Tobago via a single interconnected grid. Customers are divided into five main distribution areas, namely: North, South, East, Central and Tobago. The South distribution area continues to have the largest number of active customer accounts (154,692), which is 30% of T&TEC's customer base (see table 2). Tobago had the smallest number of active accounts, with 31,027 or 6% of the customer base. The largest growth over the period was reported in the Tobago distribution area, which increased by 1.9% in 2022.

Table 2: Number of Active Accounts by Distribution Area (2021-2022)

Year	Distribution Area					Total
	North	South	East	Central	Tobago	
2022	**97,005**	**154,692**	**140,601**	**91,789**	**31,027**	**515,114**
2021	96,478	152,988	138,728	90,263	30,435	508,892
Percentage Change (%)	0.5%	1.1%	1.4%	1.7%	1.9%	1.2%

2.1.3 Electricity Purchases (kWh)

T&TEC purchases bulk electrical energy from three (3) independent power producers (IPPs) in Trinidad[5] - the Power Generation Company of Trinidad & Tobago Limited (PowerGen), Contour Global Trinity Power Limited (CGTPL), and Trinidad Generation Unlimited (TGU). Table 3 shows the amount of electricity T&TEC purchased in 2021 and 2022.

T&TEC purchased 8,721,723,000 kWh of electrical energy from the IPPs in 2022, which is 0.35% less than the energy purchased in 2021 (8,751,992,000 kWh). In 2022, the largest quantity of

[5]T&TEC has its own generating assets in Tobago with a de-rated capacity of 83.1 MW. A submarine cable between Trinidad and Tobago is maintained to supply Tobago in the event of an emergency.

electricity was purchased during July – September (Q3) and the lowest during January – March (Q1).

Table 3: Electricity Purchases, kWh (2021-2022)

Month	Electricity Purchases (kWh)	
	2022	2021
Jan-Mar (Q1)	**2,070,698,000**	2,107,023,000
Apr-Jun (Q2)	**2,209,396,000**	2,162,653,000
Jul-Sep (Q3)	**2,253,333,000**	2,236,594,000
Oct-Dec (Q4)	**2,188,296,000**	2,245,722,000
Total	**8,721,723,000**	8,751,992,000

A graphical representation of T&TEC's electricity purchases (kWh) over the five-year period from 2018 to 2022 is shown in figure 1. In 2022, the trend returned to its pre-COVID pattern, with peak purchases recorded in the third quarter (July–September) and the lowest purchases in the first quarter (January–March).[6] Overall, there was a 5.5% decline in T&TEC's kWh purchases over the five-year period, which moved from 9,225,000,000 kWh in 2018 to 8,721,723,000 kWh in 2022.

[6] The trend in 2020 showed that the lowest electricity purchases were recorded in the second quarter (April – June) of that year. The introduction of the COVID-19 restrictions at the start of the second quarter resulted in reduced business activity. The reduction in demand resulted in less electricity being purchased by T&TEC.

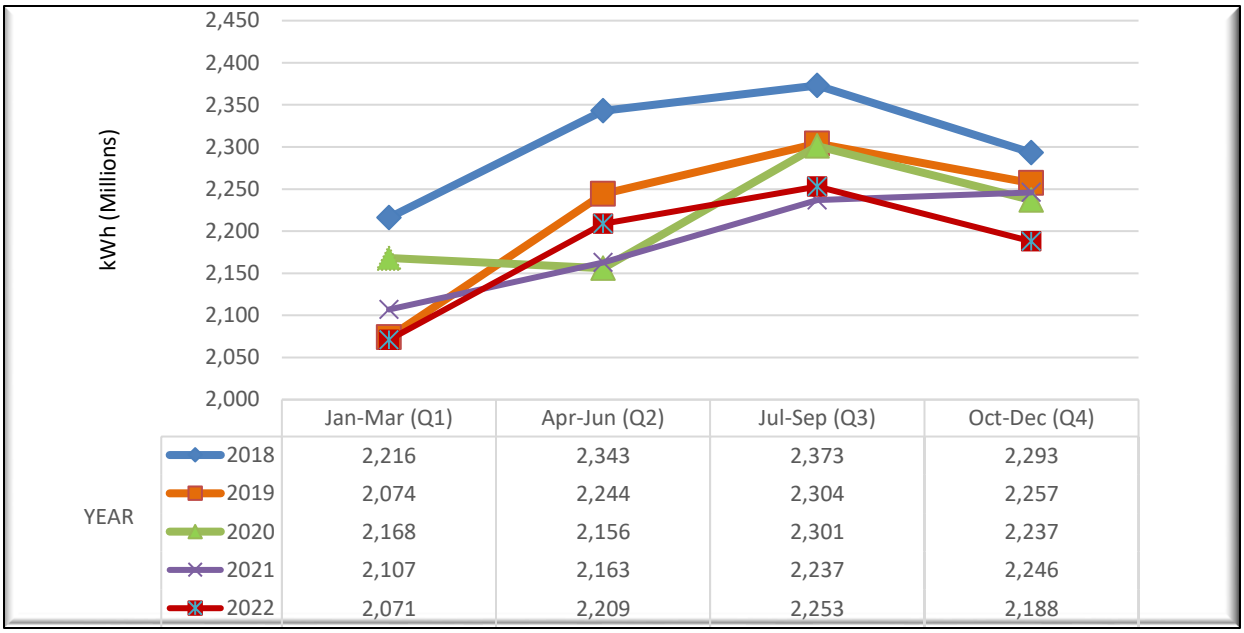


Figure 1: Electricity Purchases (kWh): Five-Year Trend (2018-2022)

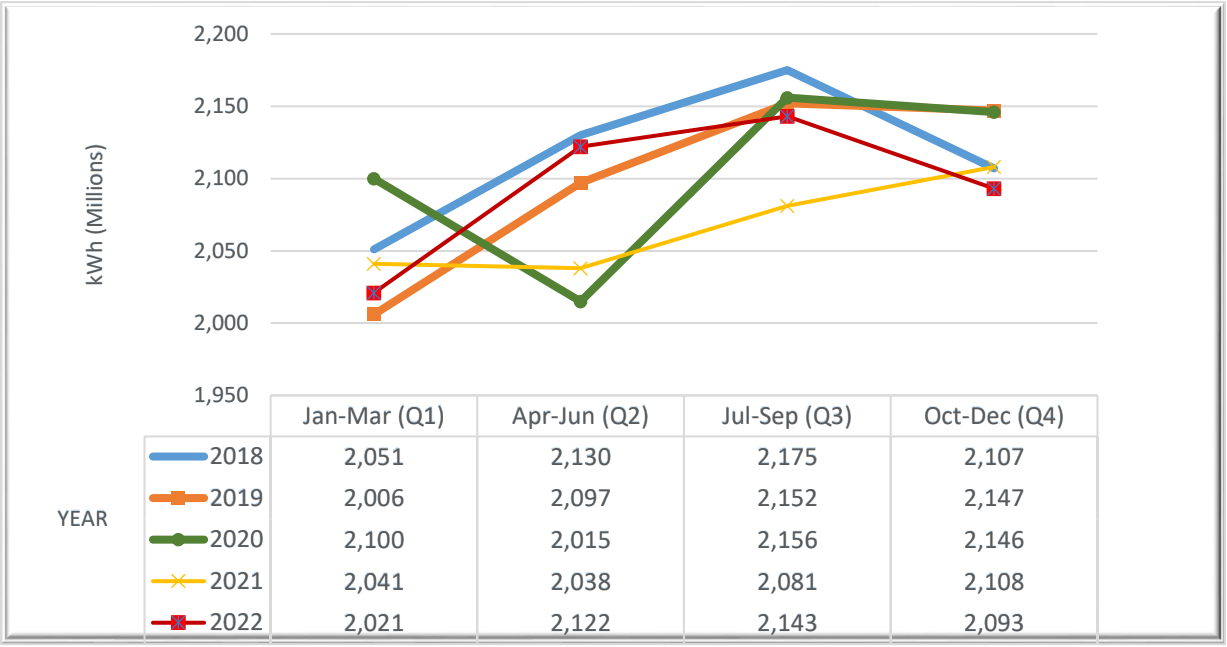
2.1.4 Electricity Sales (kWh)

T&TEC reported total electricity sales of 8,378,538,179 kWh in 2022 compared to 8,267,817,849 kWh in 2021 (see table 4). This represents an increase of 1.3% in sales over the review period. The Central distribution area, which has the highest concentration of large industrial customers in the Point Lisas Industrial Estate, continues to record the highest electricity sales (2,672,312,550 kWh) and accounted for 31.9% of total sales.

Table 4: Electricity Sales per Distribution Area, kWh (2021-2022)

Month	Electricity Sales per Distribution Area (kWh)					Total
	North	South	East	Central	Tobago	
Jan – Mar (Q1)	359,186,761	444,902,618	469,939,671	674,487,212	72,215,571	**2,020,731,833**
Apr – Jun (Q2)	421,323,085	465,508,210	472,875,944	676,399,304	85,469,803	**2,121,576,346**
Jul – Sep (Q3)	382,268,730	471,755,143	500,590,458	710,381,450	78,548,266	**2,143,544,047**
Oct – Dec (Q4)	423,420,337	482,606,127	483,960,141	611,044,584	91,654,764	**2,092,685,953**
Total (2022)	**1,586,198,913**	**1,864,772,098**	**1,927,366,214**	**2,672,312,550**	**327,888,404**	**8,378,538,179**
Total (2021)	1,581,196,958	1,849,006,866	1,907,981,800	2,609,487,914	320,144,311	8,267,817,849

A graphical representation of T&TEC's electricity sales (kWh) over the five-year period from 2018 to 2022 is shown in figure 2. Overall, electricity sales declined by 1% over the period, moving from 8,463,000,000 kWh in 2018 to 8,378,538,179 kWh in 2022. Once again, it can be seen that in 2022, the trend is returning to its pre-COVID pattern, with peak sales recorded in the third quarter (July–September) and the lowest sales in the first quarter (January–March). This pattern is similar to that displayed by electricity purchases for the same period.



YEAR	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)
2018	2,051	2,130	2,175	2,107
2019	2,006	2,097	2,152	2,147
2020	2,100	2,015	2,156	2,146
2021	2,041	2,038	2,081	2,108
2022	2,021	2,122	2,143	2,093

Figure 2: Electricity Sales (kWh): Five-Year Trend (2018-2022)

2.1.5 Electricity Purchases vs Electricity Sales Trends

T&TEC measures the amount of electricity purchased from the power generators at the time it is received, whereas the amount of electricity sold is computed when customers' bills are prepared. The latter takes place at various times, depending on the billing cycle of the customer. As a result, the trends in peaks and troughs for "electricity purchases" vs. "electricity sales" may not coincide on a quarterly basis and can affect the calculation of total system losses, which is discussed in Section 2.1.6.

A comparison of T&TEC's electricity purchases against electricity sales for the five-year period 2018–2022 is shown in figure 3. It indicates that both electricity purchases and sales followed a

similar trend, with a general decrease in both indicators over the past five years. The rate of decrease in electricity purchases is greater than the rate of decrease in electricity sales.

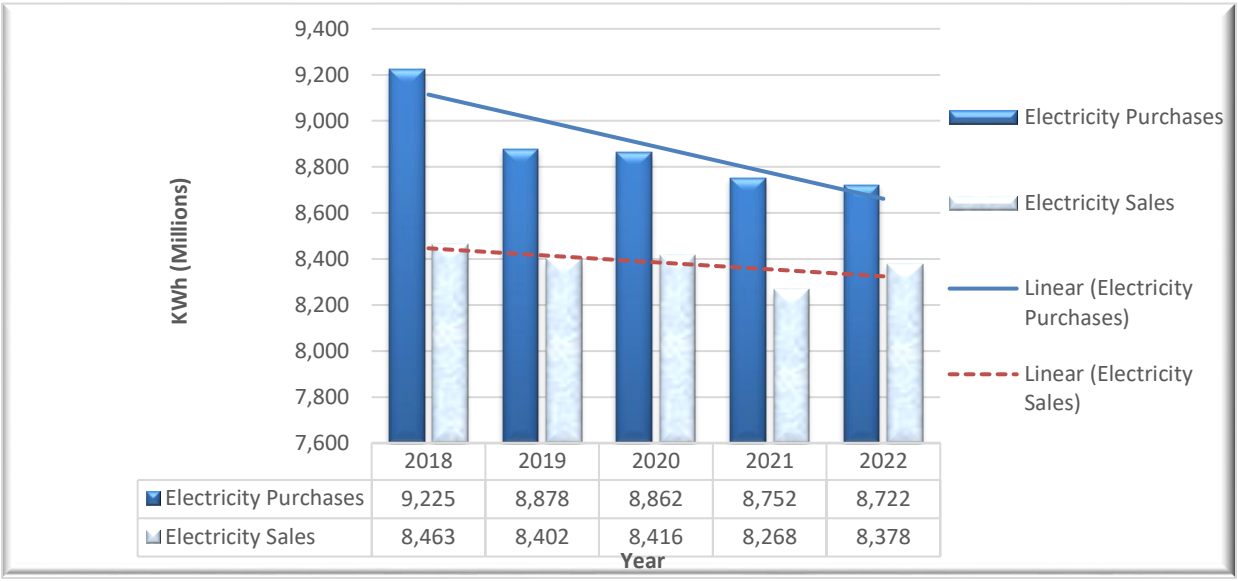


Figure 3: Electricity Purchases vs. Sales: Five-Year Trend (2018-2022)

2.1.6 Total System Losses

All of the electrical energy that T&TEC purchases from the power generators is not available for sale to customers because of losses in the power lines and other components of the transmission and distribution system. The difference between the quantity of electricity entering T&TEC's network and that which is billed to customers is referred to as "total system losses". Total system losses usually result from a combination of technical and non-technical losses. Technical losses are due to the physical characteristics of the network, such as the type of conductor used to construct the transmission and distribution lines and the configuration and operation of the system. Non-technical losses, or commercial losses, are generally due to metering errors, recording errors and electricity theft. These losses occur when electrical energy is delivered to customers, but the amount of energy billed is less than the amount delivered. Total system losses represent a loss of revenue to the utility, and therefore, should be minimised.

The RIC set a target of 6.75% for total system losses, which was to be achieved by T&TEC by the end of the regulatory period, June 1, 2006, to May 31, 2011. T&TEC reported total system losses

of 8.03% in 2022, compared to 9.48% in 2021 (see table 5). In 2022, the highest system losses figure was recorded during the third quarter (July–September) and the lowest during the first quarter (January–March). The variations in the quarterly values of system losses were likely due to the lag between the real-time energy purchased from the generators and the delayed billing for energy sold to customers, as previously mentioned in Section 2.1.5. T&TEC's performance for total system losses was better than that of Jamaica Public Service Company Limited (JPS), (28.4%), but worse than that of St. Lucia Electricity Services Limited (LUCELEC), (5.82%) and Grenada Electricity Services Limited (GRENLEC), (5.92%).[7]

Table 5: Total System Losses (2021-2022)

Period	Energy Units Sold/Consumed (kWh)	Energy Units Purchased/Generated (kWh)[8]	System Losses[9] (%)
Jan – Mar (Q1)	2,020,731,833	2,160,767,000	**6.48**
Apr – Jun (Q2)	2,121,576,346	2,309,265,000	**8.13**
Jul – Sept (Q3)	2,143,544,047	2,356,050,000	**9.02**
Oct – Dec (Q4)	2,092,685,953	2,283,981,000	**8.38**
Total (2022)	**8,378,538,179**	**9,110,063,000**	**8.03**
Total (2021)	8,267,817,849	9,134,165,000	9.48

2.2 Economic Data

This section summarises T&TEC's aggregate performance with respect to the following economic indicators: electricity sales per employee (kWh) and customers per employee, regional comparisons of the same, along with electricity consumption per capita.

2.2.1 Electricity Sales per Employee (kWh) and Customers per Employee

"Electricity sales per employee" and "customers per employee" are two indicators used to measure labour productivity and the efficient use of resources in the electricity sector. T&TEC's performance for both indicators in 2021 and 2022 is shown in table 6.

[7] The data were retrieved from the following reports: Jamaica Public Service Company Limited (JPS) 2022 Annual Report, St. Lucia Electricity Services Limited (LUCELEC) 2022 Annual Report, and Grenada Electricity Services Limited (GRENLEC) 2022 Annual Report.
[8] Energy Units Purchased/Generated (kWh) represent the sum of T&TEC's energy purchases from the IPPs and energy produced by its generation assets in Tobago.
[9] The formula for calculating total system losses is outlined in the appendix.

T&TEC reported a 0.3% decline in the number of employees, from 2,888 in 2021 to 2,880 in 2022. Electricity sales per employee (kWh) increased by 1.6%, from 2,862,818 kWh in 2021 to 2,909,215 kWh in 2022. Electricity sales (revenue) per employee also increased by 1.0%, from $1,015,433 in 2021 to $1,025,575 in 2022. T&TEC's customers per employee ratio increased by 1.7%, from 176 in 2021 to 179 in 2022, which is a marginal improvement in performance.

Table 6: Other Economic Data (2021-2022)

Indicator	Year		% Change
	2022	2021	
Number of Employees	2,880	2,888	(0.3)%
Electricity Sales (kWh)	8,378,538,179	8,267,817,849	1.3%
Electricity Sales per Employee (kWh)	**2,909,215**	**2,862,818**	**1.6%**
Electricity Sales (Revenue TTD)	$2,953,657,587	$2,932,573,052	0.7%
Electricity Sales (Revenue) per Employee (TTD)	$1,025,575	$1,015,433	1.0%
Number of Customers	515,114	508,892	1.2%
Customers per Employee	**179**	**176**	**1.7%**

2.2.2 Electricity Sales per Employee (kWh) and Customers per Employee - Trinidad and Tobago vs Regional Countries

Table 7 shows the comparison of T&TEC's performance against other utilities for the ratios "electricity sales per employee (kWh)" and "customers per employee" for 2022. The selection of regional electric utilities was constrained by data availability.[10] T&TEC's electricity sales per employee ratio (2,909,215 kWh) was higher than that of Caribbean Utilities Company Limited (CUC) (2,664,427 kWh), JPS (1,823,014 kWh), and LUCELEC (1,431,801 kWh). For the "customers per employee" ratio, T&TEC was higher[11] than that of CUC (131), but lower than LUCELEC (273) and JPS (524). A similar trend was observed in previous years.

[10] The data was retrieved from the following reports: Jamaica Public Service Company Limited (JPS) 2022 Annual Report, Caribbean Utilities Company Limited (CUC) 2022 Annual Report, and St. Lucia Electricity Services Limited (LUCELEC) 2022 Annual Report.

[11] A higher ratio is indicative of better performance with respect to the customers per employee ratio.

Table 7: Economic Data: T&TEC vs Selected Regional Utilities (2022)

Indicator	Country			
	T&TEC, Trinidad and Tobago	JPS, Jamaica	LUCELEC, St. Lucia	CUC, Cayman Islands
Number of Employees	2880	1300	261	253
Electricity Sales (kWh)	8,378,538,179	3,165,975,000	373,700,000	674,100,000
Electricity Sales per Employee (kWh)	**2,909,215**	**1,823,014**	**1,431,801**	**2,664,427**
Number of Customers	515,114	680,828	71,484	33,119
Customers per Employee	**179**	**524**	**273**	**131**

2.2.3 Electricity Consumption per Capita

Electricity consumption per capita refers to the total electricity sales (kWh) of a country, divided by the population. This metric indicates the average electricity consumption per person within the country without adjusting for specific uses, whether residential, commercial or industrial.

Table 8 shows Trinidad and Tobago's electricity consumption per capita (kWh/capita) over the period 2021 to 2022.

Table 8: Electricity Consumption per Capita for Trinidad and Tobago (2021-2022)

Year	Electricity Consumption per Capita (kWh/capita)[12]	Change from previous year (%)
2022	**6,134**	**1.5**
2021	6,046	(1.8)

2.3 Network Reliability

This section summarises T&TEC's performance with respect to key network reliability indices and the number of transmission trips and interruptions affecting customers. The three core indices used to track reliability are the System Average Interruption Frequency Index (SAIFI), the System

[12] Consumption per capita was calculated using electricity sales data reported by T&TEC and population mid-year estimates reported by the Central Statistical Office (CSO) of Trinidad and Tobago. https://cso.gov.tt/subjects/population-and-vital-statistics/population/

Average Interruption Duration Index (SAIDI), and the Customer Average Interruption Duration Index (CAIDI).

2.3.1 System Average Interruption Frequency Index (SAIFI)

SAIFI measures the average number of sustained interruptions per customer. During 2022, SAIFI for T&TEC was lowest in January and March (0.18 interruptions per customer per month) and highest in October (0.58 interruptions per customer per month). Overall, the annual value of SAIFI was 4.04 interruptions per customer, which is 7.7% higher than that recorded in 2021 (3.75 interruptions per customer). This suggests that T&TEC customers experienced approximately four interruptions in electricity supply per year on average. This is compared to one interruption per customer for selected North American Utilities (NAU) (table 9).

2.3.2 System Average Interruption Duration Index (SAIDI)

The SAIDI measures the average outage duration per customer. During 2022, SAIDI was lowest in January with outages lasting 12.6 minutes and highest in October with 43.8 minutes. Overall, the annual value of SAIDI was 309.0 minutes in 2022, which was one minute more than in 2021. T&TEC's outage duration was about five times longer per customer than that of the NAU (58.5 minutes).

2.3.3 Customer Average Interruption Duration Index (CAIDI)

CAIDI is a ratio of SAIDI to SAIFI. It is a measure of the average outage duration that an individual customer experiences. It can also be interpreted as the average restoration time. During 2022, T&TEC's CAIDI was lowest in December with a restoration time of 60.0 minutes and highest in May with 85.2 minutes. Overall, the annual value of CAIDI was 76.5 minutes in 2022. T&TEC outperformed the average CAIDI for the selected NAU (96.5 minutes).

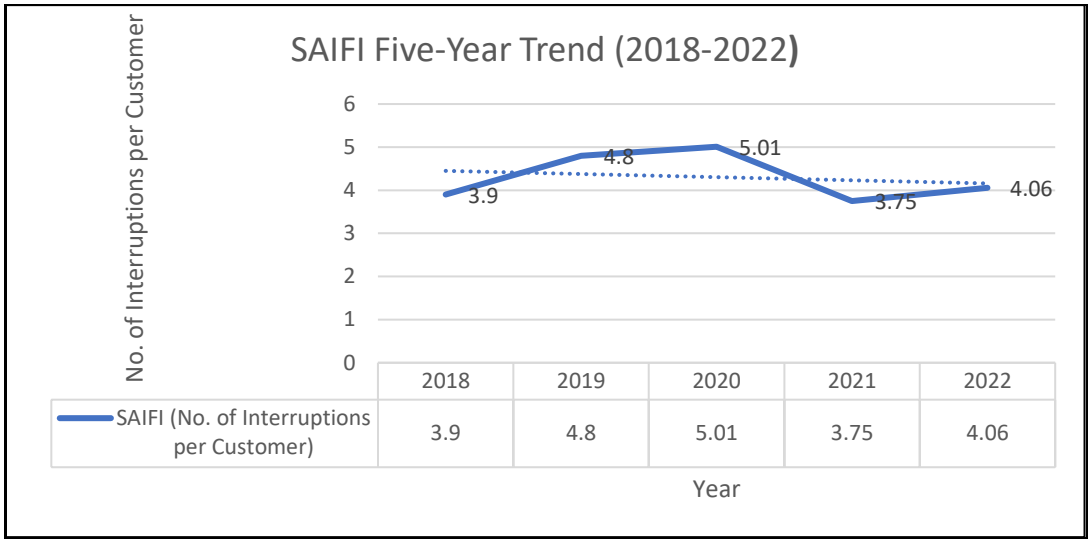
Table 9: SAIFI, SAIDI & CAIDI (2022)

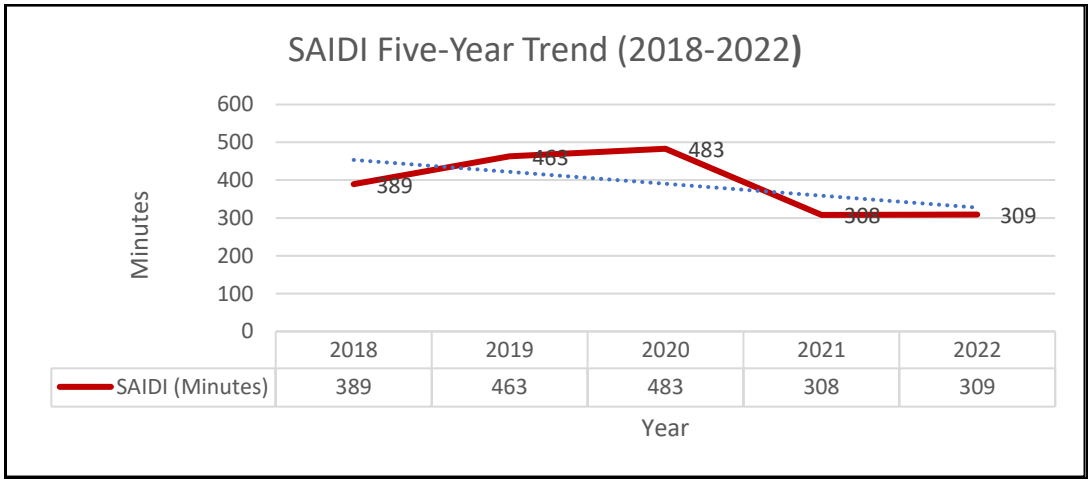
Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	NAU*
SAIFI (Number of interruptions per customer)	0.18	0.20	0.18	0.25	0.23	0.41	0.31	0.51	0.56	0.58	0.35	0.28	4.04	1.11
SAIDI (minutes)	12.6	15	13.2	17.4	19.2	30	25.8	43.2	41.4	43.8	25.8	21.6	309.0	58.5
CAIDI (minutes)	69.6	73.8	75	69.6	85.2	72.6	83.4	84.0	73.2	75.0	74.4	60.0	76.5	96.5

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

2.3.4 Network Reliability Trends (2018-2022)

A graphical representation of the network reliability indicators (SAIFI, SAIDI, and CAIDI) for the five-year period 2018–2022 is presented in figure 4.





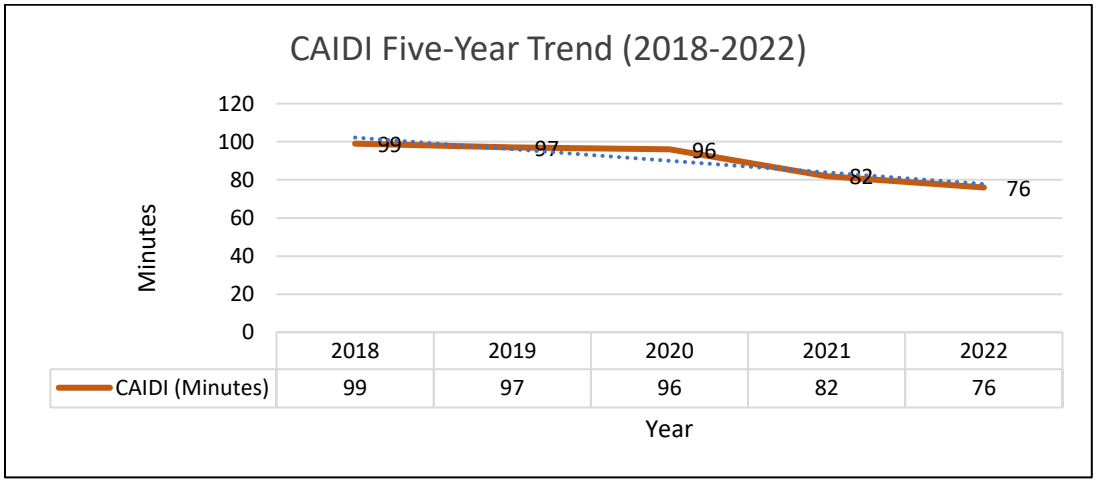


Figure 4: Network Reliability: Five-Year Trends (2018-2022)

2.3.5 Number of Transmission Trips & Interruptions Affecting Customers

There were 15 transmission trips and interruptions affecting customers in 2022. This represents a 29% reduction from 2021, in which there were 21 trips and interruptions. The majority of the trips and interruptions occurred on the 33 kV circuit (10), followed by the 66 kV circuit (5). No trip occurred on the 132 kV circuit.

Table 10: Transmission Trips & Interruptions Affecting Customers (2022)

Month	Transmission Circuit Trip			Number of Interruptions Restored (<3hrs)			Number of Interruptions Restored (<5hrs)		
	33kV	66k V	132kV	33kV	66kV	132kV	33kV	66k V	132kV
Jan	1	0	0	1	0	0	0	0	0
Feb	0	0	0	0	0	0	0	0	0
Mar	0	0	0	0	0	0	0	0	0
Apr	0	1	0	0	1	0	0	0	0
May	0	1	0	0	0	0	0	0	0
Jun	0	1	0	0	1	0	0	0	0
Jul	0	0	0	0	0	0	0	0	0
Aug	0	1	0	0	1	0	0	0	0
Sep	0	0	0	0	0	0	0	0	0
Oct	3	0	0	2	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0	0
Dec	6	1	0	6	1	0	0	0	0
Total	**10**	**5**	**0**	**9**	**4**	**0**	**0**	**0**	**0**

T&TEC restored 90% of the trips and interruptions on the 33 kV circuit and 80% of them on the 66 kV circuit within three (3) hours, as shown in table 11. T&TEC restored 87% of the trips and interruptions within three hours. The outstanding transmission trips and interruptions on the network were not restored within five (5) hours. This represents a decline in T&TEC's performance compared to the previous year, when 100% of trips and interruptions were restored within five (5) hours.

Table 11: Summary of Transmission Trips & Interruptions Affecting Customers (2022)

	Number of Trips and Interruptions on Network			
	33kV	66kV	132kV	**Total**
Total	10	5	0	**15**
Restoration < 3 hrs	9	4	0	**13**
Restoration < 5 hrs[13]	9	4	0	**13**
% < 3 hrs	90%	80%	n/a	**87%**
% < 5hrs	90%	80%	n/a	**87%**

n/a – not applicable

2.4 Customer Responsiveness and Service

This section summarises T&TEC's response to customer complaints, with a focus on the resolution rates.

2.4.1 Complaints Received and Resolved

T&TEC received 17,235 customer complaints in 2022. This was 55% fewer complaints than the number received in 2021, as shown in table 12. The majority of complaints (13,743) received in 2022 were in the "poles and other"[14] category. This was followed by "billing queries" (2,801), "high/low voltage" (555), and "damaged appliances" (136), respectively. T&TEC received the highest number of customer complaints (9,804) in the first quarter and the lowest (63) in the third quarter.

Table 12: Complaints Received by Type (2021-2022)

Type of Complaint	**Number of Complaints Received**				
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	**Total**
Billing Queries	2,514	199	31	57	**2,801**
Damaged Appliances	80	24	0	32	**136**
High/Low Voltage	254	289	7	5	**555**
Poles and Other	6,956	6,742	25	20	**13,743**
Total (2022)	**9,804**	**7,254**	**63**	**114**	**17,235**
Total (2021)	10,644	6,637	9,265	11,420	37,966

[13] This value includes those transmission trips and interruptions restored in less than 3 hours (< 3 hrs).

[14] 'Other' complaints include but are not limited to defective streetlights, power outages, delays in the delivery of service and line relocation and removals.

In 2022, T&TEC resolved 16,817 customer complaints (see table 13). T&TEC resolved the highest number of complaints during the first quarter (9,652) and the lowest during the fourth quarter (55).

Table 13: Complaints Resolved by Type (2021-2022)

Type of Complaint	Number of Complaints Resolved				
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	**Total**
Billing Queries	2,514	199	31	38	**2,782**
Damaged Appliances	57	0	0	3	**60**
High/Low Voltage	254	289	6	0	**549**
Poles and Other	6,827	6,565	20	14	**13,426**
Total (2022)	**9,652**	**7,053**	**57**	**55**	**16,817**
Total (2021)	10,539	6,490	9,321	11,450	37,800

2.4.2 Complaints Resolution Rate

T&TEC's complaints resolution rates in 2022 declined in all complaint categories when compared to 2021. These include "billing queries" (99.3%), "poles and other" (97.7%), "high/low voltage" (98.9%), and "damaged appliances" (44.1%), as shown in table 14. Consequently, T&TEC's overall complaints resolution rate declined from 99.6% in 2021 to 97.6% in 2022.

Table 14: Complaints Resolution Rate (2021-2022)

Type of Complaint	Total Number of Complaints					
	2022			2021		
	Received	Resolved	**Resolution Rate**	Received	Resolved	Resolution Rate
Billing Queries	2,801	2,782	**99.3%**	8,439	8,432	99.9%
Damaged Appliances	136	60	**44.1%**	368	322	87.5%
High/Low Voltage	555	549	**98.9%**	374	372	99.5%
Poles and Other	13,743	13,426	**97.7%**	28,785	28,674	99.6%
Total	**17,235**	**16,817**	**97.6%**	**37,966**	**37,800**	**99.6%**

2.4.3 Response to Written Complaints

Customers may lodge complaints with T&TEC using various media, including via telephone or in writing. The timeliness of T&TEC's response to a customer complaint is an important indicator of

its service quality. T&TEC's response to written customer complaints over the period 2021-2022 is shown in table 15. T&TEC received 124 written customer complaints in 2022. This represents a 37% decrease from 2021, in which 198 written complaints were received. Of the 124 written complaints received, T&TEC did not respond to 15 of them within two weeks. In 2022, T&TEC took longer than two (2) weeks to handle 23.4% of the written complaints received. This represented a decline in performance when compared to the 8.6% achieved in 2021.

Table 15: Response to Written Complaints (2021-2022)

Month/Year	Number of written complaints received	Number of written complaints (received in the month) not responded to within 2 weeks	Number of written complaints (received in previous months) not responded to within 2 weeks	% Complaints with Response > 2 weeks
Jan	5	0	0	0%
Feb	11	1	1	18.2%
Mar	14	0	0	0%
Apr	8	0	0	0%
May	10	1	6	70%
Jun	8	5	7	150%
Jul	14	1	0	7.1%
Aug	10	1	0	10.0%
Sep	8	0	0	0%
Oct	13	3	0	23.1%
Nov	16	3	0	18.8%
Dec	7	0	0	0%
Total 2022	**124**	**15**	**14**	**23.4%**
Total 2021	198	12	5	8.6%

2.5 Specific Directives

This section summarises T&TEC's performance under the specific directives stipulated by the RIC, with a focus on the repair and maintenance of pole-mounted transformers and the repair/replacement of defective streetlights.

2.5.1 Repair and Maintenance of Pole-Mounted Distribution Transformers

T&TEC is required to repair and maintain pole-mounted distribution transformers at a rate of at least 20% per annum. There were 42,573 pole-mounted distribution transformers in service at the end of 2022, compared to 40,112 in 2021, as shown in table 16. During 2022, some transformers

were inspected more than once, resulting in the annual percentage of pole-mounted distribution transformers inspected/serviced increasing to 122.6%. This performance surpassed the stipulated 20% minimum requirement.

Table 16: Repairs & Maintenance to Pole-Mounted Distribution Transformers (2022)

Indicator	Number of Pole-Mounted Distribution Transformers					
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	**Total 2022**	Total 2021
Number of Pole-Mounted Distribution Transformers	40,237	40,432	42,120	42,573	**42,573**	40,112
Number of Transformers Inspected	7,653	4,443	21,918	14,671	**48,685**	22,298
Number of Transformers Serviced	373	527	1,701	911	**3,512**	1,421
% Transformers Inspected/Serviced	**19.9%**	**12.3%**	**56.1%**	**36.6%**	**122.6%**	59.1%

2.5.2 Street Lighting Repair

T&TEC is responsible for monitoring the operation of lighting on streets and highways. It is required to repair reported street lighting failures within seven (7) days. T&TEC is also required to monitor highway lighting and repair non-working lights within 14 days of discovery. The number of street lighting repairs undertaken by T&TEC in 2021 is presented in table 17.

T&TEC received 27,866 reports from customers and members of the public for malfunctioning street lights in 2022. Of these, T&TEC repaired 17,873 (or 64%) within seven days. In addition, T&TEC detected and repaired 5,483 street lighting failures without a report during the period. In total, T&TEC completed 32,343 street lighting repairs in 2022, with the highest number completed during the fourth quarter (10,200).

Table 17: Street Lighting Repairs (2022)

Indicator	2022**				
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	**Total**
Number of reports received (note 1)	4,741	5,466	7,610	10,049	**27,866**
Number of repairs completed within 7 days (note 2)	3,374	1,456	3,072	9,971	**17,873**
Number of repairs without a report (note 3)	1,981	1,256	909	1,337	**5,483**
Number of repairs completed (note 4)	5,659	7,249	9,235	10,200	**32,343**

Notes:

1 Reports received from customers and/or members of the public for repairs/requests to existing streetlights

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 observation by crews.

4 Total work completed within the month, i.e., repairs arising from both customer reports as well as inspections and observation by crews.

** The columns in table 17 are not meant to be totalled.

A comparison of T&TEC's performance with respect to street lighting repairs for the years 2021 and 2022 is shown in table 18. The number of reports of street lighting failure received by T&TEC increased by 7.9% over the period. The 7-day repair rate for street lighting failures increased from 28% in 2021 to 64% in 2022, indicating considerable improvement in T&TEC's performance over the period. The number of unreported failures of street lights detected and repaired by T&TEC increased by 13.7%, moving from 4,821 in 2021 to 5,432 in 2022.

Table 18: Summary of Street Lighting Repairs (2021-2022)

Indicator	Year		Percentage Change (%)
	2022	**2021**	
Number of Reports Received	**27,866**	25,835	7.9%
Number of Repairs Completed within 7 days	**17,873**	7,282	145%
7-day Repair Rate for reported failures	**64%**	28%	129%
Number of Repairs without a report	**5,483**	4,821	13.7%
Total Number of Repairs Completed (includes carryover from previous year)	**32,343**	28,942	11.8%

2.6 Financial Performance and Efficiency

This section summarises T&TEC's performance with respect to a selected set of financial ratios with a focus on debt financing, liquidity, and efficiency. [15] 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 can finance its efficient expenditures.

Table 19: Select Financial Ratios of T&TEC's Performance (2021-2022)

Indicator	Year		Target
	2022	2021	
Debt Financing			
Gearing (%)	(1.58%)	(1.62%)	
Funds From Operations (FFO)	(10,349,918)	(74,709,464)	
Funds Flow Interest Cover	0.91	0.88	Greater than 3
Cash Interest Cover	(2.38)	(2.28)	Greater than 1
Debt Payback Period (Years)	(277)	(198)	Between 5 to 7
Liquidity			
Collection Rate (%)	34%	41%	
Revenue Billed/Operating Cost	0.98	0.98	Greater than 2
Revenue Collected/Operating Cost	0.93	0.93	Greater than 1
Internal Financing (%)	(57%)	(42%)	Greater than 40%
Efficiency			
Operating Cost per unit ($/kWh)	0.40	0.39	

[15] The accounting standard IFRS 16- Leases, which affects how lease agreements are treated in financial statements, was implemented in 2019. Previously, leases were treated as either finance or operating leases. Finance leases were recognised as assets on the lessees' statement of financial position (balance sheet), and operating leases were not. This distinction has been removed and the vast majority of leases are, in essence, to be classified as finance leases. This has implications for depreciation and the asset base, and consequently affects the calculation of many common financial ratios and performance metrics, such as gearing, current ratio, asset turnover, interest cover, operating profit, net income, operating cash flows, etc. For the purposes of this report, and to ensure comparability with previous reports, the effects of this IFRS were removed and the figures were "normalised" to calculate the relevant ratios.

2.6.1 Debt Financing

T&TEC's overall ability to meet its financial obligations showed no significant improvement in 2022. Gearing marginally increased from negative 1.62% in 2021 to negative 1.58% in 2022. In 2022, Funds Flow Interest Cover remained below the optimal range at 0.91, a small improvement from 0.88 in 2021. Cash interest coverage remains well below par in 2022, at negative 2.38. In 2021, it was negative 2.28. Funds from Operations (FFO) was negative in both 2021 and 2022, and therefore operating revenues were insufficient to match operating expenditures for both years. As a result of the FFO being negative, the debt payback period was also negative, and hence there was no reduction in debt in either year.

2.6.2 Liquidity

T&TEC's overall liquidity position in 2022 declined slightly compared to its 2021 position, and remained below the set targets for the requisite indicators. The collection rate fell from 41% in 2021 to 34% in 2022, indicating that T&TEC's ability to collect receivables had deteriorated. In 2022, T&TEC’s revenue billed/operating cost ratio remained unchanged at 0.98. This indicates that T&TEC's ability to cover its full operating costs from revenue remained at the same level across both years. The same pattern was observed in the revenue collected/operating cost ratio, which was also unchanged at 0.93. The internal financing ratio decreased in 2022, moving from negative 42% to negative 57%, as operating expenditure increased from $3,162,214,344 in 2021 to $3,132,808,087 in 2022. This increase was primarily due to increasing interest and finance costs.

2.6.3 Efficiency

In this analysis, the operating cost per kWh is used because it is appropriate for measuring the efficiency of operations at a state-owned public utility. Between 2021 and 2022, the operating cost per kWh increased by $0.01. Overall, this ratio has remained relatively stable over the last three (3) years ($0.38/kWh – $0.40/kWh).

SECTION 3.0 CONCLUSION AND RECOMMENDATIONS

3.1 Conclusion

Generally, T&TEC showed improvement in 2022 for some of the key indicators. These included: the "customer per employee" ratio, which increased to 179; total system losses, which reduced to 8.03%; the "electricity sales per employee" ratio, which increased to 2,909,215 kWh; the number of transmission trips and interruptions on the network, which decreased to 15; the annual percentage of pole-mounted distribution transformers inspected/serviced, which increased to 122.6%; the number of customer complaints, which fell to 17,235; and the 7-day repair rate for reported street lighting failures, which increased to 64%.

T&TEC's performance weakened in a few operational areas. These included the network reliability indicators. SAIFI increased to 4.04 interruptions per customer, and SAIDI increased marginally to 309 minutes. The restoration rate for trips and interruptions decreased to 87%. More street lighting failure reports were received (27,866), and the customer complaints resolution rate decreased to 97.6%. With respect to the financial indicators, debt payback period (negative 277 years), collection rate (34%), and operating cost per unit ($0.40) all showed deterioration over the period. T&TEC remained in a sizable deficit position at the end of 2022.

3.2 Recommendations

The RIC proposes that T&TEC give strong consideration to taking the following actions:

- develop and implement suitable strategies to reduce system losses;
- review its strategies for improving network reliability (SAIDI and SAIFI);
- develop suitable strategies to reduce the number of customer complaints and improve the complaints resolution rate; and
- implement an aggressive collection program to decrease receivables and improve cash flow.

APPENDIX: 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 $\text{Total System Losses} = 1 - \left\{ \frac{\text{Energy Units Billed (kWh)}}{\text{Energy Units Purchased/Generated (kWh)}} \right\}$	kWh	Quarterly
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		Gearing	$\frac{[\text{Interest bearing debt}]}{[\text{Interest bearing debt + equity}]}$		Yearly
2.2		Funds From Operations ($)	Operating Revenue – Operating Expenses	$	Yearly
2.3		Funds Flow Interest Cover (Times)	$\frac{\text{(FFO + Interest)}}{\text{Interest}}$		Yearly
2.4		Cash Interest Cover (Times)	$\frac{\text{Opening Cash Flow}}{\text{Interest Expense}}$		Yearly
2.5		Debt Payback Period (Years)	$\frac{\text{Net Debt}}{\text{FFO}}$	Years	Yearly
2.6		Debt as a proportion of RAB (%)	$\frac{\text{Net Debt}}{\text{RAB}}$		
2.7		Collection Rate	$\frac{\text{Operating Revenue – Receivables}}{\text{Operating Revenue}} \times 100\ \%$	%	Yearly
2.8		Revenue Billed/Operating Cost	$\frac{\text{Operating Revenue Billed}}{\text{Operating Cost}}$		Yearly
2.9		Revenue Collected/Operating Cost	$\frac{\text{Revenue Collected}}{\text{Operating Cost}}$		Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
2.10		Internal Financing (%)	$\frac{\text{(FFO – Dividends)}}{\text{Net CAPEX}}$ X 100%	%	Yearly
2.11		Return on RAB (%)	Net operating income / RAB x 100%	%	Yearly
2.12		Operating Cost per unit	$\frac{\text{Total Operating Costs}}{\text{Total no. of kWh sold}}$	$	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
4.0	**Affordability and other Economic Data**				
4.1		Sales per employee (kWh)	$\frac{\text{Total kWh sales}}{\text{Number of employees}}$	(kWh)	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
4.2		Sales per employee ($)	$\frac{\text{Total revenue from sales}}{\text{Number of employees}}$	($)	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