

T&TEC's Annual  
Performance Indicator  
Report  
*For The Year*  
2021

August  
2023

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 2021. It focuses on the key performance indicators identified in two documents; *“Performance Monitoring and Reporting Framework for the Electricity Transmission and Distribution Sector (PMR) in 2005”*, and the *“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 assessment is focused on those aspects of performance that impact customers, using targets set out in the Final Determination (2006), historical performance, and performance metrics of electric utilities in other jurisdictions, where appropriate. 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 System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), Customer Average Interruption Duration Index (CAIDI) and number of transmission trips and interruptions affecting customers;
- Customer Responsiveness and Service – which covers the number of complaints received, number of complaints resolved and the complaints 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 summarized below.

### *Aggregate Performance*

T&TEC maintained an electricity service coverage of 99.3% in 2021, with only a small percentage of the population not connected to the national electricity grid. Its customer base expanded by 1.5% from 501,309 in 2020 to 508,892 at the end of 2021. The residential class accounted for 88.3% 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 declined by 1.24% from 2020 to 2021, and total electricity sales decreased by (1.8%) over the same period.<sup>1</sup> T&TEC also reported a small increase in total system losses<sup>2</sup>. This represents a decline in performance as T&TEC did not meet the total system losses target of 6.75% that was expected by the end of the regulatory period June 1st, 2006 to May 31, 2011 as set by the Regulated Industries Commission (RIC) in the Final Determination (2006).

### *Economic Data*

There were fluctuations in T&TEC's performance with respect to productivity indicators. The ratio of electricity sales per employee decreased by 1.3%, from 2,899,200 kWh in 2020 to 2,862,818 kWh in 2021; while its customer per employee ratio increased by 1.7%, from 173 in 2020 to 176 in 2021. T&TEC also reported a decline (1.8%) in the country's electricity consumption per capita to 6,046 kWh in 2021.<sup>3</sup> Trinidad and Tobago's electricity consumption per capita was higher than that of several countries within the Latin American and Caribbean region due to its high level of electricity consumption for industrial purposes.

### *Network Reliability*

System reliability indicators improved over all measures. SAIFI decreased from 5.01 interruptions per customer in 2020 to 3.75 interruptions per customer in 2021. SAIDI decreased from 483 minutes to 308 minutes over the same period. CAIDI also improved slightly over the period.

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<sup>1</sup> T&TEC's energy purchases declined from 8,862,252,000 kWh in 2020 to 8,751,992,000 kWh in 2021; and total electricity sales decreased from 8,416,376,513 kWh to 8,267,817,849 kWh over the same period.

<sup>2</sup> T&TEC's System Losses increased from 9.05% in 2020 to 9.48% in 2021.

<sup>3</sup> Trinidad and Tobago's electricity consumption per capita fell from 6,158 kWh in 2020 to 6,046 kWh in 2021.

T&TEC also experienced a 43% decline in the number of trips and interruptions on the transmission network from 37 in 2020 to 21 in 2021. The majority of the trips and interruptions occurred on the 33kV circuit. T&TEC restored 100% of the total number of trips and interruptions on the network within five hours, compared to 97.3% in 2020.

#### *Customer Responsiveness and Service*

T&TEC reported an overall decline of 7.8% in the number of customer complaints, from 41,175 in 2020 to 37,966 in 2021. However, written customer complaints increased from 151 in 2020 to 198 in 2021. The majority of customer complaints were related to poles and other<sup>4</sup> issues (28,785), followed by billing queries (8,439), high/low voltage complaints (374) and damaged appliances (368) respectively. At the end of 2021, T&TEC resolved 28,674 or 99.6% of the total complaints received, compared to 93.4% in 2020.

#### *Specific Directives*

The number of pole-mounted transformers in service decreased by 1.3%, from 40,629 in 2020 to 40,112 in 2021. T&TEC met the minimum inspection target of 20% which was set by the RIC, although the utility's performance decreased from 68.8% in 2020 to 59.1% in 2021. T&TEC also received 25,835 reports of non-functioning streetlights from customers and members of the public in 2021. Of these, T&TEC repaired 28% within the stipulated 7-day period, compared to 24% in 2020. T&TEC undertook 4,821 street lighting repairs in response to failures detected by its crews and other staff. Overall, T&TEC completed 28,942 street lighting repairs in 2021, compared to 30,981 in 2020.

#### *Financial Performance and Efficiency*

T&TEC's financial performance and efficiency continued to be below par in 2021. However, in 2021 the utility showed some improvements compared to 2020. Operating revenue for the period (TT\$3,092,504,880) was relatively stable compared to 2020, with operating expenditure dropping significantly (TT\$3,167,214,344). As a consequence, Funds from Operations (FFO)<sup>5</sup> whilst still negative, improved from negative TT\$688,958,458 in 2020 to negative TT\$74,709,464 in 2021.

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<sup>4</sup> 'Other' complaints include, but are not limited to, defective streetlights, power outages, delays in the delivery of service and line relocation and removals.

<sup>5</sup> Funds from Operations refers to the cash flows from 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 the *Performance Monitoring and Reporting Framework for the Electricity Transmission and Distribution Sector (PMR)* in 2005<sup>6</sup> to monitor the services<sup>7</sup> of the sector.

The PMR requires T&TEC to report data on a core set of financial, operational and service quality measures, quarterly and annually. This dataset includes aggregate data on electricity coverage, number of customers, electricity purchases and electricity sales, T&TEC's network reliability, system losses, and other performance metrics, such as customer responsiveness and service, equipment maintenance, and financial status.

Further to the PMR, the RIC published key performance indicators in the Final Determination (2006) to monitor T&TEC's performance. The Final Determination (2006) also outlined specific directives that were to be followed by T&TEC during the regulatory period (2006-2011). Accordingly, the RIC has been assessing T&TEC's performance as of 2006, and has reported its findings annually in Performance Indicator Reports.

This is the 2021 Annual Performance Indicator Report for T&TEC. The assessment of T&TEC focuses on those aspects of performance that impact customers, using targets set out in the Final Determination (2006), PMR, historical performance, and performance metrics of electricity utilities in other jurisdiction where appropriate.

All the data in this report were supplied by T&TEC, except where specified otherwise.

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<sup>6</sup> The PMR was reviewed in 2021 and the indicators used in this report remain relevant.

<sup>7</sup> Services in this context refer to the delivery of electricity supply to meet the customers' load requirements.

## **1.2 Purpose of Document**

The purpose of this document is to report on T&TEC's performance for 2021, with respect to the performance indicators and specific directives outlined in the Final Determination (2006). The findings of the Report are expected to provide information to stakeholders about T&TEC's performance, while simultaneously incentivising the utility to improve its performance.

## **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** reviews T&TEC's performance with respect to some broad performance criteria such as 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.<sup>8</sup>

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<sup>8</sup> The general list of performance indicators for the electricity transmission and distribution sector is contained in the Performance Monitoring and Reporting (PMR) Framework (2005).

## **SECTION 2.0      PERFORMANCE REVIEW**

### **2.1 Aggregate Performance**

This section summarises T&TEC’s aggregate performance over the review period with respect to the following indicators: electricity service coverage, customer numbers, electricity purchases and sales, and total system losses.

#### **2.1.1 Electricity Service Coverage**

Electricity service coverage indicates the level of the population’s access to the electricity service. This indicator is important for understanding 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 99.3%, with only a small percentage of the population not supplied by the national electricity grid.<sup>9</sup>

#### **2.1.2 Number of Customers by Class and Area**

T&TEC’s customers are separated into specific classes on the basis of the customer’s electrical load and supply voltage. These classes include residential, commercial and industrial customers.<sup>10</sup> All customers are billed for energy consumed, measured in kilowatt hour(s) (kWh). Some Commercial and the Industrial customers have an additional charge for demand, measured in kilovolts-ampere (kVA). A separate classification, “street lighting”, is used for billing private customers and governmental agencies for electricity that is consumed by private and public outdoor lighting, respectively.

T&TEC had 508,892 active customer accounts at the end of 2021, as shown in table 1. This represented an increase of 1.5% from the 501,309 active accounts on record at the end of 2020. The residential class accounted for the largest share of T&TEC’s customer base (449,680 or 88.3%). This was followed by the commercial class (55,062 or 10.8%), and the industrial and street lighting classes, which collectively accounted for less than 1% of T&TEC’s customer base. The

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<sup>9</sup> This estimate for electricity service coverage was provided by T&TEC.

<sup>10</sup> 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.

street lighting class continues to show the highest growth amongst T&TEC’s customer classes, expanding by 2.1% in 2021.

**Table 1: Number of Active Accounts by Class (2020 - 2021)**

Year	Customer Class				Total
	Residential	Commercial	Industrial	Street Lighting	
<b>2021</b>	<b>449,680</b>	<b>55,062</b>	<b>4,102</b>	<b>48</b>	<b>508,892</b>
2020	442,415	54,740	4,107	47	501,309
Percentage Change (%)	1.6%	0.6%	-0.12%	2.1%	1.5%

T&TEC supplies electricity to customers across Trinidad and Tobago via a single interconnected grid. Customers are grouped into five main distribution areas, namely, North, South, East, Central and Tobago. In 2021, the South distribution area had the largest number of active customer accounts (152,988) as seen in table 2. This represented 30.1% of T&TEC’s customer base. Tobago had the smallest number of active accounts, with 30,435 or 6.0% of the customer base. The largest growth over the period was reported in the Tobago distribution area, which expanded by 2.1% in 2021.

**Table 2: Number of Active Accounts by Area (2020 - 2021)**

Year	Distribution Area					Total
	North	South	East	Central	Tobago	
<b>2021</b>	<b>96,478</b>	<b>152,988</b>	<b>138,728</b>	<b>90,263</b>	<b>30,435</b>	<b>508,892</b>
2020	95,712	150,696	136,599	88,502	29,800	501,309
Percentage Change (%)	0.8%	1.5%	1.6%	2.0%	2.1%	1.5%

### 2.1.3 Electricity Purchases (kWh)

T&TEC purchases bulk electrical energy from three (3) independent power producers (IPPs) in Trinidad and Tobago, namely the Power Generation Company of Trinidad & Tobago Limited (PowerGen), Contour Global Trinity Power Limited<sup>11</sup>, and Trinidad Generation Unlimited

<sup>11</sup> Contour Global acquired Trinity Power Limited in February 2021.

(TGU).<sup>12</sup> Table 3 shows the amount of electricity purchased by T&TEC for the years 2020 and 2021.

In 2021, T&TEC purchased 8,751,992,000 kWh of electrical energy from the IPPs, compared to 8,862,252,000 kWh in 2020. This change represents a decline of 1.24% in energy purchases over the review period. In 2021, T&TEC purchased the highest amount of electricity during October-December (Q4) and the lowest during January-March (Q1).

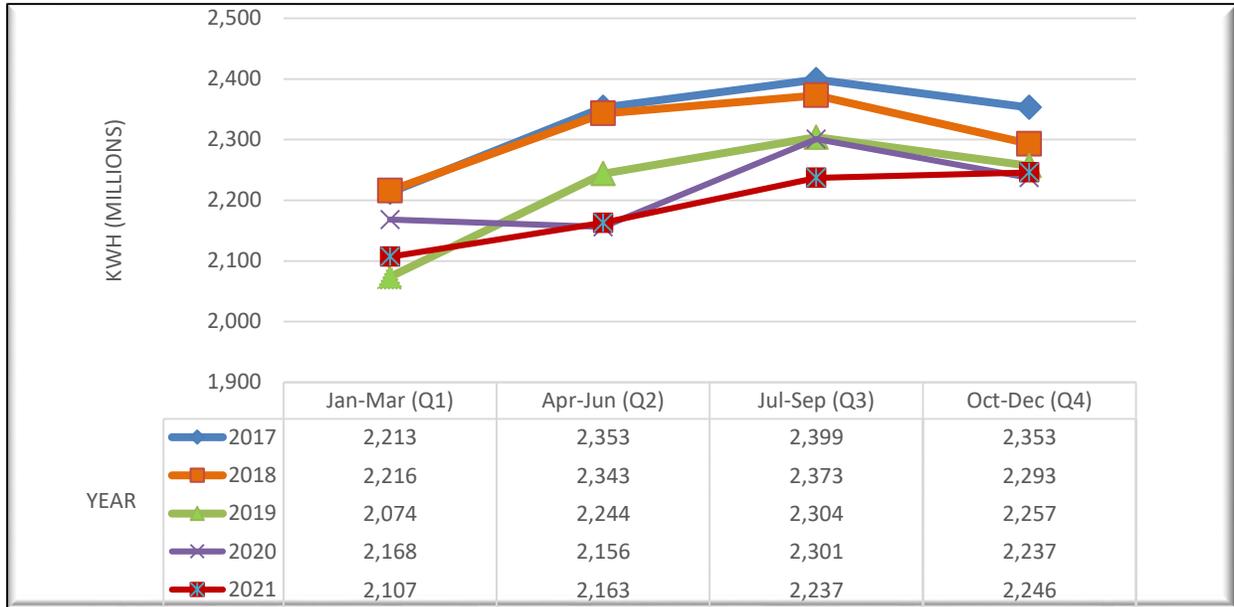
**Table 3: Electricity Purchases, kWh (2020 - 2021)**

Month	Electricity Purchases (kWh)	
	2021	2020
Jan-Mar (Q1)	<b>2,107,023,000</b>	2,167,791,000
Apr-Jun (Q2)	<b>2,162,653,000</b>	2,156,475,000
Jul-Sep (Q3)	<b>2,236,594,000</b>	2,300,571,000
Oct-Dec (Q4)	<b>2,245,722,000</b>	2,237,415,000
Total	<b>8,751,992,000</b>	8,862,252,000

A graphical representation of T&TEC’s electricity purchases (kWh) over the five-year period 2017 to 2021 is shown in figure 1. With the exception of 2020<sup>13</sup>, T&TEC’s quarterly electricity purchases followed a fairly similar trend over the period, with peak purchases recorded in the third quarter (July-September) and the lowest purchases in the first quarter (January-March). T&TEC reported that the peaks in electricity purchases over the period were partly due to seasonal variations in the manufacturing and industrial sectors. Overall, there was a 6.1% decline in T&TEC’s kWh purchases over the five-year period, which moved from 9,318,000,000 kWh in 2017 to 8,751,992,000 kWh in 2021.

<sup>12</sup> Additionally, T&TEC has its own generating assets located in Tobago, which had a de-rated capacity of 83.1 MW at the end of 2020. De-rated capacity is the operation of the plant at less than its rated maximum power capability.

<sup>13</sup> The trend in 2020 showed a slight variation from the other years, as 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. Consequently, the fall in demand resulted in a reduction of the electricity purchased by T&TEC.



**Figure 1: Electricity Purchases (kWh): Five-Year Trend (2017 - 2021)**

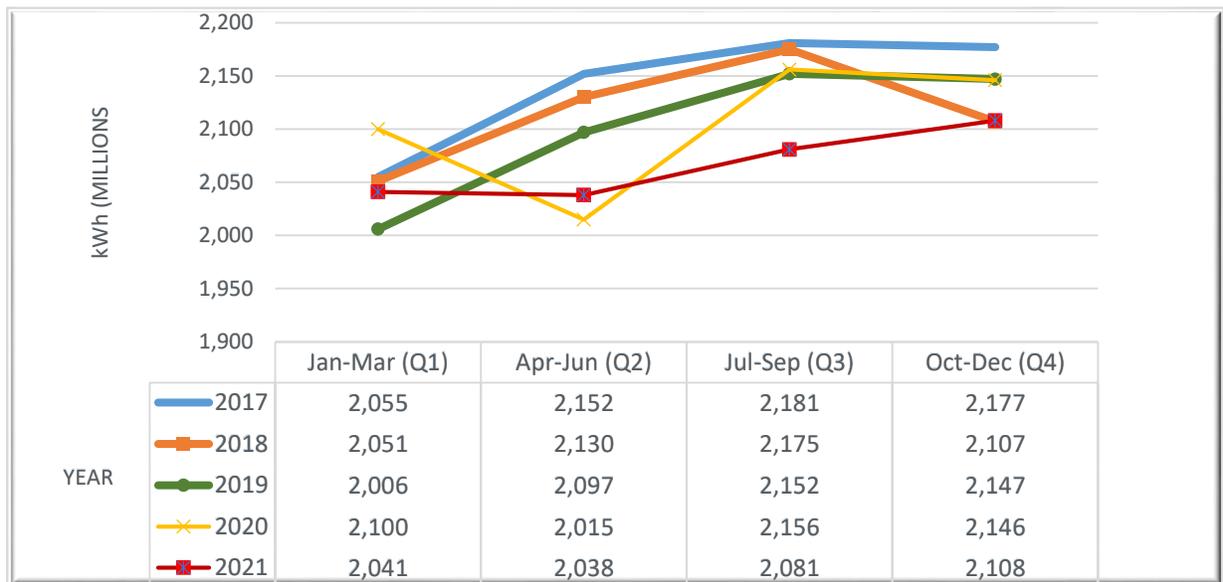
#### 2.1.4 Electricity Sales (kWh)

T&TEC reported total electricity sales of 8,267,817,849 kWh in 2021, compared to 8,416,376,513 kWh in 2020 (see table 4). This change represents a decrease of 1.8% in sales over the review period. The highest value of electricity sales was recorded in the Central distribution area (2,609,487,914 kWh), and accounted for 31.6% of total sales. The relatively high electricity sales (or consumption) in the Central area corresponds with the presence of the Point Lisas Industrial Estate in the area, which has the highest concentration of large industrial customers in Trinidad and Tobago.

**Table 4: Electricity Sales per Distribution Area, kWh (2020 - 2021)**

Month	Electricity Sales per Distribution Area (kWh)					Total
	North	South	East	Central	Tobago	
Jan – Mar (Q1)	371,392,238	451,679,153	477,463,910	667,542,415	73,696,683	2,041,774,399
Apr – Jun (Q2)	413,832,827	460,510,891	461,569,781	617,687,407	84,049,371	2,037,650,277
Jul – Sep (Q3)	366,540,788	456,527,984	482,140,240	702,692,177	72,788,038	2,080,689,227
Oct – Dec (Q4)	429,431,105	480,288,838	486,807,869	621,565,915	89,610,219	2,107,703,946
<b>Total (2021)</b>	<b>1,581,196,958</b>	<b>1,849,006,866</b>	<b>1,907,981,800</b>	<b>2,609,487,914</b>	<b>320,144,311</b>	<b>8,267,817,849</b>
Total (2020)	1,646,603,375	1,828,862,514	1,939,632,821	2,678,629,110	322,648,693	8,416,376,513

A graphical representation of T&TEC’s electricity sales (kWh) over the five-year period 2017 to 2021 is shown in figure 2. Overall, electricity sales declined by 3.5% over the period, moving from 8,565,000,000 kWh in 2017 to 8,267,817,849 kWh in 2021. Quarterly electricity sales fluctuated throughout the period, and followed a pattern that is comparable to that displayed by electricity purchases.

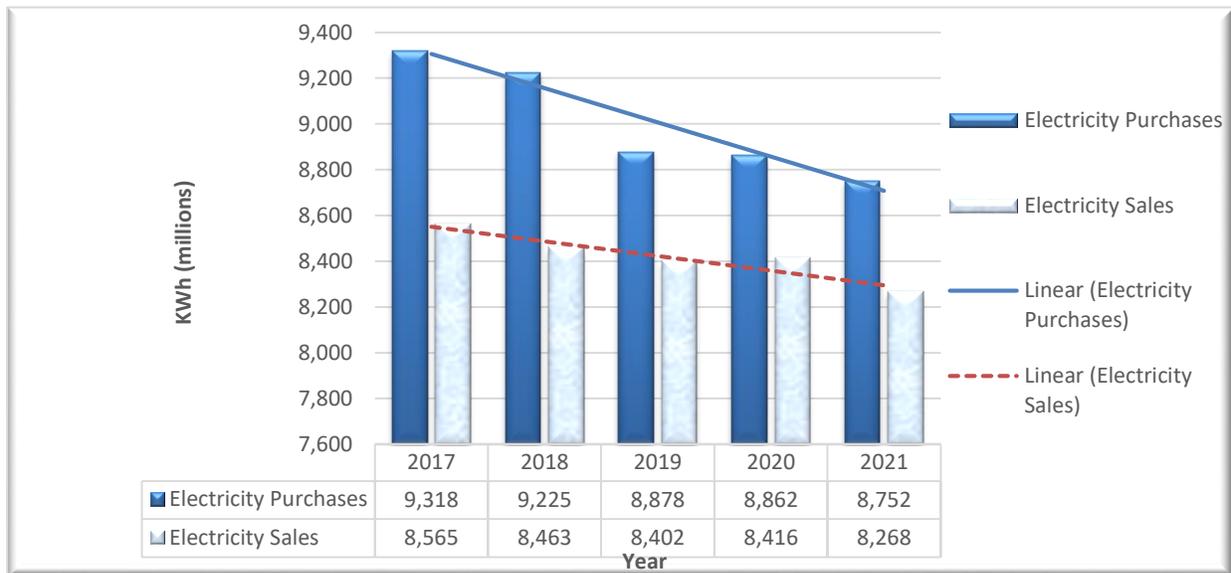


**Figure 2: Electricity Sales (kWh): Five-Year Trend (2017 - 2021)**

### 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 2017-2021 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 (2017 - 2021)**

### 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. Whereas, 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 has consistently failed to meet the stipulated target, and reported total system losses of 9.48% in 2021, compared to 9.05% in 2020 (see table 5). In 2021, system losses recorded for each quarter were highest during the third quarter (July – September) and 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 of JPS, Jamaica (28.4%), but worse than that of LUCELEC, St Lucia (6.28%) and GRENLEC, Grenada (7.22%).<sup>14</sup>

**Table 5: Total System Losses (2020 - 2021)**

Period	Energy Units Sold/Consumed (kWh)	Energy Units Purchased/Generated (kWh) <sup>15</sup>	System Losses <sup>16</sup> (%)
Jan – Mar (Q1)	2,041,774,399	2,201,185,000	7.24
Apr – Jun (Q2)	2,037,650,277	2,255,671,000	9.67
Jul – Sept (Q3)	2,080,689,227	2,331,743,000	10.77
Oct – Dec (Q4)	2,107,703,946	2,345,566,000	10.14
<b>Total (2021)</b>	<b>8,267,817,849</b>	<b>9,134,165,000</b>	<b>9.48</b>
Total (2020)	8,416,376,513	9,253,763,000	9.05

<sup>14</sup> Comparisons were based on data availability. Sources include: the Jamaica Public Service Company Limited Annual Report 2021, <https://www.jpSCO.com/annual-reports/>, the St. Lucia Electricity Services Limited Annual Report 2021, <https://www.lucelec.com/sites/default/files/annual-reports/> and the Grenada Electricity Limited Annual Report 2020, [https://grenlec.com/wp-content/uploads/2021/10/GRENLEC-2020\\_AR-web.pdf](https://grenlec.com/wp-content/uploads/2021/10/GRENLEC-2020_AR-web.pdf)

<sup>15</sup> Energy Units Purchased/Generated (kWh) represents the sum of T&TEC’s energy purchases from the power generators and that produced by its own-generation assets in Tobago.

<sup>16</sup> The formula for calculating total system losses is outlined in the Appendix.

## 2.2 Economic Data

In this section, T&TEC’s performance was examined against specific economic indicators that are reported on a “per employee” or “per customer” basis. These include electricity sales per employee, customers per employee and 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 that are generally used to measure labour productivity, and the efficient use of resources in the electricity sector. T&TEC’s performance, with respect to both indicators for the years 2020 and 2021, is shown in table 6.

T&TEC reported a 0.5% decline in the number of employees, from 2,903 in 2020 to 2,888 in 2021. Electricity sales (kWh) per employee decreased by 1.3%, from 2, 899,200 kWh in 2020 to 2,862,818 kWh in 2021. Revenue per employee also decreased by 1.1% from \$1,026,629 in 2020 to \$1,015,433 in 2021. T&TEC’s customers per employee ratio increased by 1.7%, from 173 in 2020 to 176 in 2021, which is a marginal improvement in performance.

**Table 6: Other Economic Data (2020-2021)**

Indicator	Year		% Change
	2021	2020	
Number of Employees	2,888	2,903	(0.5)%
Electricity Sales (kWh)	8,267,817,849	8,416,376,513	(2.8)%
<b>Electricity Sales per Employee (kWh)</b>	<b>2,862,818</b>	<b>2,899,200</b>	<b>(1.3)%</b>
Electricity Sales (Revenue TTD)	\$2,932,573,052	\$2,980,303,244	(1.6)%
Electricity Sales (Revenue) per Employee (TTD)	\$1,015,433	\$1,026,629	(1.1)%
Number of Customers	508,892	501,309	1.5%
<b>Customers per Employee</b>	<b>176</b>	<b>173</b>	<b>1.7%</b>

## 2.2.2 Electricity sales per employee (kWh) and Customers per employee - Trinidad and Tobago vs Regional Countries

T&TEC's electricity sales per employee (kWh) and customers per employee ratios were compared to the performance of other electric utilities within the Caribbean region, as shown in table 7. The electric utilities were selected based on data availability.<sup>17</sup> Over the period, T&TEC's electricity sales per employee ratio (2,862,818 kWh) was higher than that of several electric utilities in the Caribbean region, including those in the Cayman Islands (2,763,598 kWh), Jamaica (2,369,918 kWh) and St. Lucia (1,278,623 kWh). In terms of customers per employee, T&TEC's ratio was higher<sup>18</sup> than that of the electric utility in the Cayman Islands (135), but lower than the utilities in St. Lucia (256) and Jamaica (526). A similar trend was observed in previous years.

**Table 7: Economic Data: Trinidad and Tobago vs Regional Countries (2021)**

Indicator	Country			
	T&TEC, Trinidad and Tobago	JPS, Jamaica	LUCELEC, St. Lucia	CUC, Cayman Islands
No. of Employees	2888	1300	276	239
Electricity Sales (kWh)	8,267,817,849	3,080,894,000	352,900,000	660,500,000
<b>Electricity Sales per Employee (kWh)</b>	<b>2,862,818</b>	<b>2,369,918</b>	<b>1,278,623</b>	<b>2,763,598</b>
No. of Customers	508,892	683,887	70,744	32,185
<b>Customers per Employee</b>	<b>176</b>	<b>526</b>	<b>256</b>	<b>135</b>

## 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 use, whether residential, commercial or industrial.

<sup>17</sup> Comparisons were based on data for the year 2021. Relevant data was retrieved from the following reports: Jamaica Public Service Co. Limited 2021 Annual Report, Caribbean Utilities Co. Limited 2021 Annual Report, and St. Lucia Electricity Services Limited 2021 Annual Report.

<sup>18</sup> A higher ratio is indicative of better performance with respect to the customers per employee ratio.

Table 8 shows Trinidad and Tobago’s electricity consumption per capita (kWh/capita) over the period 2019 to 2021. During the period, there was a steady but small decline in electricity consumption per capita each year.

**Table 8: Electricity Consumption Per Capita for Trinidad and Tobago (2019-2021)**

Year	Electricity Consumption Per Capita (kWh/capita) <sup>19</sup>	Change from previous year (%)
2021	6,046	(1.8)
2020	6,158	(0.03)
2019	6,160	(1.1)

#### 2.2.4 Electricity Consumption per capita - Trinidad and Tobago vs Other Jurisdictions

Trinidad and Tobago’s electricity consumption per capita was compared to countries within the Latin American and Caribbean (LAC) region, and against some non-regional countries with a comparable GDP per capita to that of Trinidad and Tobago (see table 9). The countries were selected based on data availability.<sup>20</sup>

Trinidad and Tobago’s electricity consumption per capita appeared to be generally higher than several countries within the LAC region. These included Jamaica (1,100 kWh), Cuba (1,500 kWh), Dominican Republic (1,600 kWh), and Panama (2,400 kWh). Notably, Trinidad and Tobago’s electricity consumption per capita was also higher than many non-regional countries with a comparable GDP per capita. These included Uruguay (3,400 kWh), Lithuania (4,500 kWh), and Slovak Republic (5,200 kWh). The high level of electricity consumption for industrial purposes continues to account for Trinidad and Tobago’s relatively high per capita consumption, as discussed in Section 2.1.4.

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<sup>19</sup> 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/>

<sup>20</sup> Comparisons were based on data for the year 2019, as data for the current period were not available during the preparation of this report.

**Table 9: Electricity Consumption per Capita: Trinidad and Tobago vs Other Jurisdictions  
(2019)**

Region	Country	Electricity Consumption per Capita (kWh/capita) <sup>21</sup>	GDP Per Capita (Current US\$) <sup>22</sup>
Latin American and Caribbean (LAC)	Jamaica	1,100	5,369.5
	Cuba	1,500	9,125.9
	Dominican Republic	1,600	8,282.1
	Panama	2,400	15,774.3
	<b>Trinidad &amp; Tobago</b>	<b>6,300</b>	<b>16,637.2</b>
Non-regional Countries with Comparable GDP per capita	Uruguay	3,400	17,688.0
	Lithuania	4,500	19,575.8
	Slovak Republic	5,200	19,303.5
	Oman	7,000	17,700.7

### 2.3 Network Reliability

The delivery of a reliable supply of electricity is a critical measure of service quality. An unreliable electricity supply results in economic losses and inconveniences, and increases the likelihood of damage to customers’ electrical equipment. Therefore, it is important for a utility to meet some minimum standards of reliability, even as the utility seeks to improve its economic and operational efficiencies. Reliability metrics may also be used to assess the condition of the network over time. An analysis of the reliability of the network should be interpreted within the context of the environment in which it is operated by the utility, since reliability indices are situational in nature and will present different baselines depending on the many intrinsic factors affecting the system.<sup>23</sup>

The Institution of Electrical and Electronics Engineers (IEEE) published a Guide for Electric Power Distribution Reliability Indices (IEEE 1366-2012). It is used in many jurisdictions around the world to monitor and report on electricity network reliability, and is used in this report to assess the reliability of T&TEC’s supply. The guide recommends the use of the indices “SAIFI”, “SAIDI” and “CAIDI” to track reliability. T&TEC’s performance levels for each of these indices are shown in table 10.

<sup>21</sup> Electricity consumption per capita data was retrieved on 23/06/2022 from the IEA Atlas of Energy at <http://energyatlas.iea.org/#!/tellmap/-1118783123/1>

<sup>22</sup> GDP per Capita (Current US\$) data was retrieved on 23/06/2022 from the World Bank at <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?view=chart>

<sup>23</sup> Evaluation of Data Submitted in APPA’s 2013 Distribution System Reliability & Operations Survey [http://www.publicpower.org/files/PDFs/2013DSReliabilityAndOperationsReport\\_FINAL.pdf](http://www.publicpower.org/files/PDFs/2013DSReliabilityAndOperationsReport_FINAL.pdf)

### **2.3.1 System Average Interruption Frequency Index (SAIFI)**

The System Average Interruption Frequency Index (SAIFI) measures the average number of sustained interruptions per customer. During 2021, SAIFI for T&TEC was lowest in March (0.21 interruptions per customer per month) and highest in October (0.48 interruptions per customer per month). Overall, the annual value of SAIFI was 3.75 interruptions per customer, which was 25% lower than that recorded in 2020 (5.01 interruptions per customer). This decrease represents an improvement in SAIFI, and suggests that T&TEC customers experienced less than four interruptions in electricity supply per year on average. This is compared to one interruption per customer of selected North American Utilities (table 10). When compared to electric utilities within the Caribbean region, the annual value of SAIFI in Trinidad was better than that of Jamaica (10.71), Dominican Republic (6.90) and Grenada (6.61), but worse than that of St. Lucia (0.34) and Dominica (0.29).<sup>24</sup>

### **2.3.2 System Average Interruption Duration Index (SAIDI)**

The System Average Interruption Duration Index (SAIDI) measures the average outage duration per customer. During 2021, SAIDI was lowest in March with outages lasting 14.4 minutes, and highest in October with 37.8 minutes. Overall, the annual value of SAIDI was 308 minutes in 2021, which was 175 minutes less than in 2020. While this decrease in SAIDI represents an improvement from 2020, T&TEC's outage duration was about five times longer per customer than that of the North American Utilities (58.49 minutes). Compared to electric utilities within the Caribbean region, Trinidad's value of SAIDI was better than Jamaica (1,628), Dominican Republic (398), and Grenada (382), but worse than those in the Dominica (35) and St. Lucia (11).<sup>25</sup>

### **2.3.3 Customer Average Interruption Duration Index (CAIDI)**

The Customer Average Interruption Duration Index (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 2021, T&TEC's CAIDI was lowest in March

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<sup>24</sup> Comparisons were based on data for the year 2019, as data for the current period was not available during the preparation of this report. The relevant data was retrieved on 23/06/2022 from the World Bank - GovData360 (SAIFI) at <https://govdata360.worldbank.org/>

<sup>25</sup> Comparisons were based on data for the year 2019, as data for the current period was not available during the preparation of this report. Relevant data was retrieved on 23/06/2022 from the World Bank - GovData360 (SAIDI) at <https://govdata360.worldbank.org/>

with a restoration time of 68.40 minutes, and highest in August with 95.40 minutes. Overall, the annual value of CAIDI was 82.24 minutes in 2021, compared to 96.41 minutes in 2020. T&TEC outperformed the average CAIDI for the selected North American Utilities (96.47 minutes). When compared within the Caribbean region, the annual value of CAIDI was better than those in Jamaica (152.0) and Dominica (120.69), but worse than those St. Lucia (32.35), Dominican Republic (57.68) and Grenada (57.79).<sup>26</sup>

**Table 10: SAIFI, SAIDI & CAIDI (2021)**

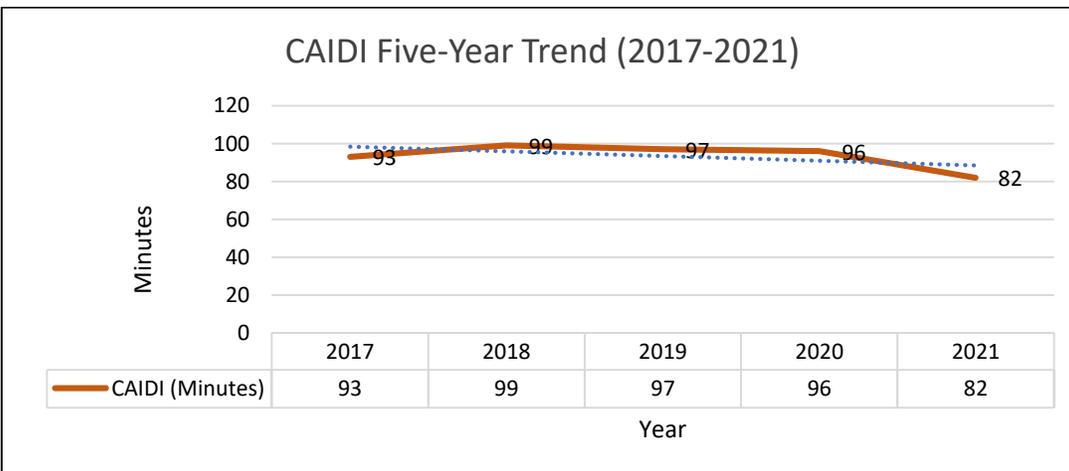
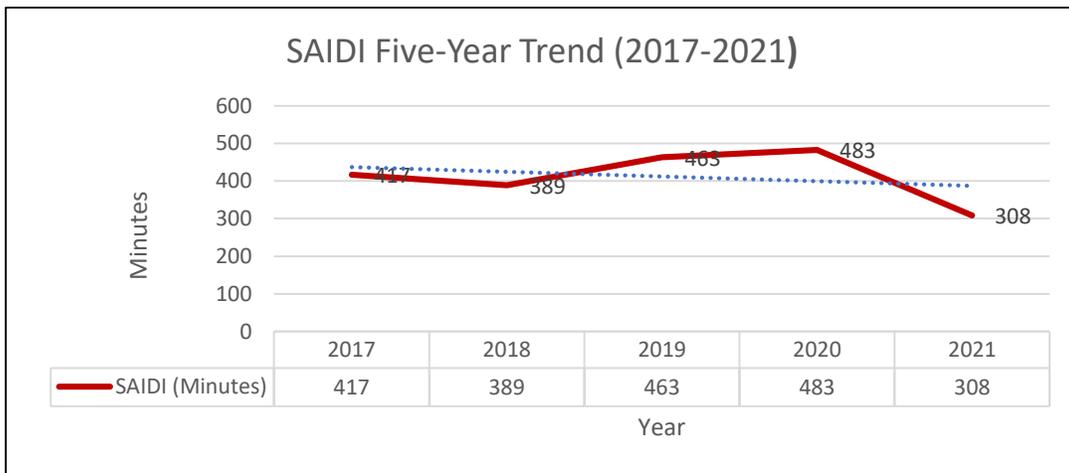
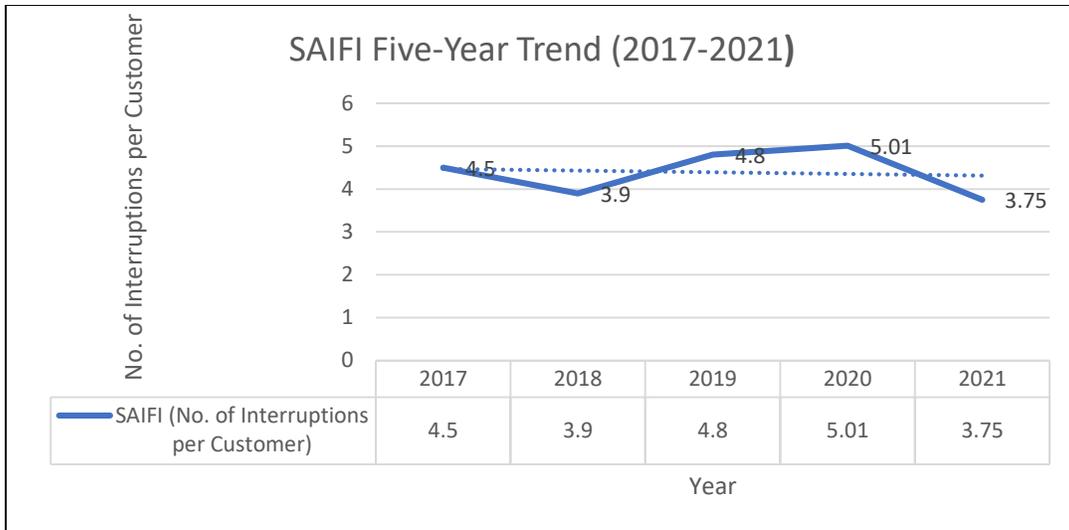
Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	NAU *
SAIFI (No. of interruptions per customer)	0.34	0.27	0.21	0.28	0.28	0.40	0.35	0.35	0.34	0.45	0.22	0.26	3.75	1.11
SAIDI (minutes)	28.80	21.00	14.40	19.80	22.80	32.40	31.20	33.00	28.20	37.80	18.00	21.00	308.4	58.49
CAIDI (minutes)	84.00	77.40	68.40	70.80	81.60	81.00	88.20	95.40	84.00	84.00	79.20	82.20	82.24	96.47

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 (2017-2021)

A graphical representation of the network reliability indicators (SAIFI, SAIDI and CAIDI) for the five-year period 2017-2021 is presented in figure 4. All three indicators improved over the five-year period. Specifically, SAIFI decreased from 4.5 interruptions per customer in 2017 to 3.75 interruptions per customer in 2021; SAIDI decreased from 417 minutes in 2017 to 308 minutes in 2021; and CAIDI decreased from 93 minutes in 2017 to 82 minutes in 2021.

<sup>26</sup> CAIDI calculations were based on the respective SAIFI and SAIDI values retrieved from the World Bank – GovData360 at <https://govdata360.worldbank.org/>



**Figure 4: Network Reliability: Five-Year Trends (2017-2021)**

### 2.3.5 Number of Transmission Trips & Interruptions Affecting Customers

There were 21 transmission trips and interruptions affecting customers in 2021. This represented a 43% reduction in the quantum recorded in 2020, in which there were 37 trips and interruptions. The majority of the trips and interruptions occurred on the 33kV circuit (14), followed by the 66kV circuit (6) and the 132kV (1).

**Table 11: Transmission Trips & Interruptions Affecting Customers (2021)**

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	0	0	0	0	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	0	1	0	0	0	0	0	1
May	1	0	0	1	0	0	0	0	0
Jun	1	0	0	1	0	0	0	0	0
Jul	3	0	0	3	0	0	0	0	0
Aug	3	2	0	3	2	0	0	0	0
Sep	2	3	0	1	2	0	1	1	0
Oct	4	0	0	4	0	0	0	0	0
Nov	0	1	0	0	0	0	0	1	0
Dec	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>14</b>	<b>6</b>	<b>1</b>	<b>13</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>1</b>

T&TEC restored 92.9% of the trips and interruptions on the 33kV circuit and 66.7% of them on the 66kV circuit within three (3) hours, as shown in table 12. T&TEC restored 81% of the trips and interruptions within three hours, while an additional 19% was restored within five (5) hours. Overall, T&TEC restored 100% of all the transmission trips and interruptions on the network within five (5) hours, compared to 97.3% in 2020. This represents an incremental improvement in T&TEC's performance over the previous period.

**Table 12: Summary of Transmission Trips & Interruptions Affecting Customers (2021)**

	No. of Trips and Interruptions on Network			
	33kV	66kV	132kV	Total
Total	14	6	1	<b>21</b>
Restoration < 3 hrs	13	4	0	<b>17</b>
Restoration < 5 hrs <sup>27</sup>	14	6	1	<b>21</b>
% < 3 hrs	92.9%	66.7%	0%	<b>81%</b>
% < 5hrs <sup>28</sup>	100%	100%	100%	<b>100%</b>

## 2.4 Customer Responsiveness and Service

This section examines T&TEC’s response to customer complaints, focusing on those aspects of performance that have been identified as most important to customers. An overall reduction in the number of complaints filed by customers is one signal that a utility is improving its service to customers. In assessing T&TEC’s responsiveness and service to customers, the RIC examined the number of complaints received, the number of complaints resolved and the resolution rate over the period.

### 2.4.1 Complaints Received and Resolved

In 2021, T&TEC received 37,966 customer complaints, representing a 7.8% decline from 2020 as shown in table 13. Poles and other<sup>29</sup> complaints (28,785) were again responsible for the largest share of customer complaints in 2021. This was followed by billing queries (8,439), high/low voltage complaints (374) and damaged appliances (368) respectively. T&TEC received the highest number of customer complaints during the 4<sup>th</sup> quarter (11,420), and the lowest during the 2<sup>nd</sup> quarter (6,637).

**Table 13: Complaints Received by Type (2020 - 2021)**

Type of Complaint	No. of Complaints Received				
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	Total
Billing Query	2,659	877	2,302	2,601	<b>8,439</b>
Damaged Appliances	118	16	127	107	<b>368</b>
High/Low Voltage	84	82	98	110	<b>374</b>
Poles/Other	7,783	5,662	6,738	8,602	<b>28,785</b>
<b>Total (2021)</b>	<b>10,644</b>	<b>6,637</b>	<b>9,265</b>	<b>11,420</b>	<b>37,966</b>
Total (2020)	11,998	8,396	11,364	9,417	41,175

<sup>27</sup> This value includes those transmission trips and interruptions restored in less than 3 hours (< 3 hrs).

<sup>28</sup> This percentage includes the percentage of transmission trips and interruptions restored in less than 3 hours, i.e. % < 3 hrs.

<sup>29</sup> ‘Other’ complaints include but are not limited to defective streetlights, power outages, delays in the delivery of service and line relocation and removals.

In 2021, T&TEC resolved 37,800 customer complaints, compared to 38,469 in 2020 (see table 14). T&TEC resolved the highest number of complaints during the 4<sup>th</sup> quarter (11,450), and the lowest during the 2<sup>nd</sup> quarter (6,490).

**Table 14: Complaints Resolved by Type (2020-2021)**

Type of Complaint	No. of Complaints Resolved				
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	Total
Billing Query	2,659	870	2,302	2,601	<b>8,432</b>
Damaged Appliances	68	3	116	135	<b>322</b>
High/Low Voltage	82	82	98	110	<b>372</b>
Poles/Other	7,730	5,535	6,805	8,604	<b>28,674</b>
<b>Total (2021)</b>	<b>10,539</b>	<b>6,490</b>	<b>9,321</b>	<b>11,450</b>	<b>37,800</b>
Total (2020)	9,920	8,340	11,277	8,932	38,469

#### 2.4.2 Complaints Resolution Rate

In 2021, there was an increase in T&TEC’s complaints resolution rates across all the complaints categories, compared to 2020. These include billing queries (99.9%), poles and other related complaints (99.6%), high/low voltage complaints (99.5%) and damaged appliances (87.5%), as shown in table 15. Consequently, T&TEC’s overall complaints resolution rate improved from 93.4% to 99.6% in 2021.

**Table 15: Complaints Resolution Rate (2020 - 2021)**

Type of Complaint	Total Number of Complaints					
	2021			2020		
	Received	Resolved	Resolution Rate	Received	Resolved	Resolution Rate
Billing Query	8,439	8,432	<b>99.9%</b>	8,838	8,820	99.8%
Damaged Appliances	368	322	<b>87.5%</b>	265	152	57.4%
High/Low Voltage	374	372	<b>99.5%</b>	254	250	98.4%
Poles/Other	28,785	28,674	<b>99.6%</b>	31,818	29,247	91.9%
Total	<b>37,966</b>	<b>37,800</b>	<b>99.6%</b>	41,175	38,469	93.4%

#### 2.4.3 Response to Written Complaints

Customers may lodge complaints with T&TEC using various media, including via telephone or in writing. In this regard, 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 2020-2021 is shown in table 16. T&TEC received 198 written customer complaints in

2021. This represented a 31% increase from 2020, in which 151 written complaints were received. Of the 198 written complaints received, T&TEC did not respond to 12 of them within two weeks. In 2021, T&TEC took longer than two (2) weeks to handle 8.6% of the written complaints received. This represented a decline in performance when compared to the 3.3% achieved in 2020.

**Table 16: Response to Written complaints (2020-2021)**

<b>Month/Year</b>	<b>No. of written complaints received</b>	<b>No. of written complaints (received in the month) not responded to within 2 weeks</b>	<b>No. of written complaints (received in previous months) not responded to within 2 weeks</b>	<b>% Complaints with Response &gt; 2 weeks</b>
Jan	18	1	1	11.1%
Feb	8	0	0	0%
Mar	17	3	1	23.5%
Apr	14	1	1	14.3%
May	17	0	0	0%
Jun	11	0	2	18.2%
Jul	24	0	0	0%
Aug	13	1	0	7.7%
Sep	18	4	0	22.2%
Oct	33	2	0	6.1%
Nov	12	0	0	0%
Dec	13	0	0	0%
<b>Total 2021</b>	<b>198</b>	<b>12</b>	<b>5</b>	<b>8.6%</b>
<b>Total 2020</b>	151	5	0	3.3%

## **2.5 Specific Directives**

T&TEC is required to carry out specific directives related to its operations, and meet certain requirements as stipulated by the RIC in the Final Determination (2006). This section focuses on two (2) of these specific directives – repair and maintenance of pole-mounted transformers, and 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 40,112 pole-mounted transformers in service at the end of 2021 compared to 40,629 in 2020, as shown in table 17. The annual percentage of pole-mounted

distribution transformers inspected/serviced in 2021 was 59.1%. While this performance was not as good as in 2020 when 68.8% of the transformers were inspected/serviced, it surpassed the stipulated 20% minimum requirement.

**Table 17: Repairs & Maintenance to Pole-Mounted Transformers (2021)**

Indicator	No. of Pole-Mounted Transformers					
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	Total 2021	Total 2020
No. of Pole Mounted Distribution Transformers	39,596	39,810	39,961	40,112	<b>40,112</b>	40,629
No. of Transformers Inspected	8,562	7,892	1,389	4,455	<b>22,298</b>	25,416
No. of Transformers Serviced	611	229	167	414	<b>1,421</b>	2,547
% Transformers Inspected/Serviced	<b>23.2%</b>	<b>20.4%</b>	<b>3.9%</b>	<b>12.1%</b>	<b>59.1%</b>	<b>68.8%</b>

### 2.5.2 Street Lighting Repair

T&TEC is responsible for monitoring the operation of public lighting. 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 18.

T&TEC received 25,835 reports from customers and members of the public for repairs to existing streetlights in 2021. Of these, T&TEC completed 7,282 repairs (or 28%) within seven days. Apart from this, T&TEC completed 4,821 street lighting repairs in response to failures detected by its crews and other staff during the period. In total, T&TEC completed 28,942 street lighting repairs in 2021, with the highest amount completed during the 2<sup>nd</sup> quarter (9,472).

**Table 18: Street Lighting Repairs (2021)**

Indicator	2021**				Total
	Jan-Mar (Q1)	Apr-Jun (Q2)	Jul-Sep (Q3)	Oct-Dec (Q4)	
No. of reports received (note 1)	7,517	5,449	5,403	7,466	<b>25,835</b>
No. of repairs completed within 7 days (note 2)	843	1,037	2,248	3,154	<b>7,282</b>
No. of repairs without a report (note 3)	1,603	1,005	1,222	991	<b>4,821</b>
No. of repairs completed (note 4)	3,648	9,472	6,862	6,966	<b>28,942</b>

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 report as well as inspections and observation by crews.
- \*\* The columns in table 18 are not meant to be totalled.

A comparison of T&TEC's performance with respect to street lighting repairs for the years 2020 and 2021 is shown in table 19. The number of street lighting failure reports received by T&TEC increased by 6.1% over the period. The 7-day repair rate for street lighting failures increased from 24% in 2020 to 28% in 2021, indicating that there was some improvement in T&TEC's performance over the period. The number of unreported failures of street lights detected and repaired by T&TEC decreased by 34.8%, moving from 7,392 in 2020 to 4,821 in 2021.

**Table 19: Summary of Street Light Repairs (2020 - 2021)**

Indicator	Year		Percentage Change (%)
	2021	2020	
No. of Reports Received	<b>25,835</b>	24,347	6.1%
No. of Repairs Completed within 7 days	<b>7,282</b>	5,847	24.5%
7-day Repair Rate for reported failures	<b>28%</b>	24%	16.7%
No. of Repairs without a report	<b>4,821</b>	7,392	(34.8%)
Total No. of Repairs Completed (includes carryover from previous year)	<b>28,942</b>	30,981	(6.6%)

## 2.6 Financial Performance and Efficiency

One of the primary goals of economic regulation is to ensure that the utility operates in a way that ensures financial viability and sustainability, while providing an acceptable quality of service to customers at a reasonable price. The RIC has a duty to ensure that T&TEC can finance its efficient expenditures. A selected set of financial ratios is shown in table 20 and these are used to assess T&TEC's performance from the perspective of debt financing, liquidity, and efficiency.<sup>30</sup>

**Table 20: Select Financial Ratios of T&TEC's Performance (2020 – 2021)**

Indicator	Year		Target
	2021	2020 <sup>31</sup>	
<b>Debt Financing</b>			
Gearing (%)	(1.62%)	(1.65%)	
Funds Flow Interest Cover	0.88	(0.09)	Greater than 3
Cash Interest Cover	(2.28)	(3.69)	Greater than 1
Debt Pay Back Period (Years)	(197.95)	(20.50)	Between 5 to 7
<b>Liquidity</b>			
Collection Rate (%)	41%	47%	
Revenue Billed/Operating Cost	0.98	0.82	Greater than 2
Revenue Collected/Operating cost	0.93	0.79	Greater than 1
Internal Financing (%)	(42%)	(281%)	Greater than 40%
<b>Efficiency</b>			
Operating Cost per unit (\$/kWh)	0.39	0.40	

<sup>30</sup> 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, and operating cash flows etc. For the purposes of this report, and to ensure comparability with previous reports, the effects of the this IFRS were removed and the figures were "normalised" to calculate the relevant ratios.

<sup>31</sup> T&TEC has revised the 2020 figures leading to some changes in the 2020 metrics as previously reported.

### **2.6.1 Debt Financing**

T&TEC's overall ability to meet its financial obligations showed no significant improvement in 2021. Gearing marginally increased from negative 1.65% in 2020 to negative 1.62% in 2021. In 2021, Funds Flow Interest Cover remained below the optimal range at 0.88, a significant improvement from negative 0.09 in 2020. Cash interest coverage is still below par in 2021, at negative 2.28, but has improved since 2020, when it was negative 3.69. Funds from Operations (FFO) was negative in both 2020 and 2021 and therefore was insufficient to match operating expenditure for both years. As a result of the FFO being negative, the debt payback period was negative, and hence there was no reduction in debt in either year.

### **2.6.2 Liquidity**

T&TEC's overall liquidity position in 2021 improved slightly over its 2020 position, however it remained below the set targets for the requisite indicators. The collection rate fell from 47% in 2020 to 41% in 2021, indicating that T&TEC's ability to collect receivables had deteriorated. In 2021, T&TEC's revenue billed/operating cost ratio increased marginally to 0.98 in 2021 as compared to 0.82 in 2020. This indicates that T&TEC's ability to cover its full operating costs from revenue slightly improved in 2021. The same pattern was observed in the revenue collected/operating cost ratio, which improved from 0.79 in 2020 to 0.93 in 2021. The internal financing ratio improved further in 2021, moving from negative 281% to negative 42%, as operating expenditure decreased primarily due to decreasing interest and finance costs.

### **2.6.3 Efficiency<sup>32</sup>**

In this analysis, the operating cost per kWh is used because it is appropriate for measuring the efficiency of operations in a state-owned public utility. Between 2020 and 2021, the operating cost per kWh decreased by \$0.01, indicating that some efficiency measures have been implemented. Overall, this ratio has remained relatively stable over the last three (3) years (\$0.38/kWh-\$0.40/kWh).

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<sup>32</sup> The Return on the Regulatory Asset Base (RAB) metric has been removed from the list of financial metrics included in this Report. It is dependent, as the name suggests, on the RAB, which was established in 2006, at the time of the last T&TEC Price Review; given the passage of time there is need to reassess same for regulatory purposes. The RAB was being rolled forward (minus annual depreciation, plus new capital expenditure) for the purpose of this calculation and the figure that is being yielded is not considered to be a reasonable reflection of the RAB.

## **SECTION 3.0 CONCLUSION AND RECOMMENDATIONS**

### **3.1 Conclusion**

Overall, T&TEC improved its performance in some key areas in 2021. These include: customer per employee ratio (176), the network reliability indicators SAIFI (3.75 interruptions per customer), SAIDI (308 minutes), transmission trips and interruptions on the network (21), restoration rate for trips and interruptions (100%), customer complaints received (37,966), customer complaints resolution rate (99.6%) and 7-day repair rate for reported street lighting failures (28%).

Notwithstanding the above, T&TEC's performance weakened in certain operational areas. These include total system losses (9.48%), electricity sales per employee ratio (2,862,818 kWh), street lighting failure reports received (25,835), annual percentage of pole-mounted distribution transformers inspected/serviced (59.1%), debt payback period (negative 197 years), collection rate (41%), and operating cost per unit (\$0.39).

When the findings of this report are combined with its predecessor, there were both improvements and deterioration of T&TEC's performance for certain indicators, e.g. debt financing improved with the exception of debt payback period, liquidity generally improved with exception to the collection rate. T&TEC also remained in a sizable deficit position at the end of 2021.

### **3.2 Recommendations**

In an effort to promote T&TEC's sustainability, the RIC proposes the following actions to be undertaken by T&TEC to improve future operations and performance. T&TEC should:

- develop suitable strategies to reduce system losses;
- review its strategies for reducing the frequency and duration of power outages. This would improve the SAIDI and SAIFI indicators, and may reduce the number of complaints related to damaged appliances;
- continue to employ suitable strategies to reduce the quantum of customer complaints, and enhance its complaints resolution rate; and
- implement an aggressive collection program to decrease receivables and improve cash flow. This is an important area which the RIC intends to pay close attention to going forward.

## 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  $\text{Total System Losses} = 1 - \left\{ \frac{\text{Energy Units Billed (kWh)}}{\text{Energy Units Purchased/Generated}} \right\}$	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	$\frac{[\text{Interest bearing debt}]}{[\text{Interest bearing debt} + \text{equity}]}$		Yearly
2.2		Funds From Operations (\$)	Operating Revenue – Operating Expenses	\$	Yearly
2.3		Funds Flow Interest Cover (Times)	$\frac{(\text{FFO} + \text{Interest})}{\text{Interest}}$		Yearly
2.4		Cash Interest Cover (Times)	$\frac{\text{Opening Cash Flow}}{\text{Interest Expense}}$		Yearly
2.5		Debt Pay Back 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	$\frac{\text{Operating Revenue} - \text{Receivables}}{\text{Operating Revenue}} \times 100 \%$	%	Yearly
2.8		Revenue Billed/Operating Cost	$\frac{\text{Operating Revenue Billed}}{\text{Operating Cost}}$		Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
2.9		Revenue Collected/Operating cost	Revenue Collected Operating Cost		Yearly
2.10		Internal Financing (%)	$\frac{(\text{FFO} - \text{Dividends})}{\text{Net CAPEX}} \times 100\%$	%	Yearly
2.11		Return on RAB (%)	$\frac{\text{Net operating income}}{\text{RAB}} \times 100\%$	%	Yearly
2.12		Operating cost per unit	$\frac{\text{Total Operating costs}}{\text{Total no. of kWh sold}}$	\$	Yearly
3.0	<b>Network Reliability</b>				
3.1		System average interruption frequency index (SAIFI) (Average number of sustained interruptions per customer)	Total number of reported customer interruptions greater than 1 minute duration / total number of customers served	Interruptions per year	Yearly
3.2		System average interruption duration index (SAIDI) (Average minutes off supply per customer)	Sum of each outage duration in minutes times the number of customers / total number of customers served	Minutes	Yearly
3.3		Customer average interruption duration index (CAIDI) (Average interruption duration)	$\frac{[\text{SAIDI}]}{[\text{SAIFI}]}$	Minutes	Yearly
3.4		Number of transmission and distribution circuit trip outs by voltage level			Yearly
3.5		Interruptions restored within 3 hours and 5 hours			Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
4.0	<b>Affordability and other Economic Data</b>				
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