REGULATED INDUSTRIES COMMISSION

Review of Performance Monitoring and Reporting Framework

For the

Electricity Transmission and Distribution Sector

January

2021

This document reviews the regulatory approach adopted by the RIC in using key performance indicators to monitor the performance of T&TEC. It examines whether this approach remains fit for purpose and makes recommendations for the PMR Framework for the regulatory period 2021-2026.

Consultative Document

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1.0 INTRODUCTION

1.1 Background

As the economic regulator of the electricity, and the water and wastewater sectors in Trinidad and Tobago, the Regulated Industries Commission (RIC) has a mandate to regulate the service providers under its purview in a manner which promotes efficiency and economy in their operations. In carrying out its regulatory role, the RIC is guided by the legislative and regulatory framework set out in the RIC Act No. 26 of 1998. Specifically, section 6(1) of the Act empowers the RIC to, among other things: prescribe standards of service; monitor service providers and conduct checks to determine compliance with the standards; impose sanctions for non-compliance with the standards; and carry out studies of efficiency and economy of operation and of performance by service providers, and publish the results thereof.

In keeping with the above mandate, the RIC established a **Performance Monitoring and Reporting (PMR) Framework** in 2005, for the purposes of monitoring the services of the electricity transmission and distribution sector in Trinidad and Tobago. Service in this context refers to the delivery of an electricity supply to meet customer's load requirements within targeted quality limits and targeted levels of reliability. Furthermore, in the "Regulation of the Electricity Transmission and Distribution Sector 2006-2011 - Final Determination: Rates and Miscellaneous Charges (2006)", or the "Determination (2006)", the RIC indicated that it would monitor the performance of the Trinidad and Tobago Electricity Commission (T&TEC) using key performance indicators, as outlined in the **Appendix**. The Determination also outlined specific directives to be followed by T&TEC during the first regulatory control period (2006-2011).

Section 6(2) of the RIC Act requires the RIC to consult with the service providers and representatives of consumer interest groups and any other parties it considers as having an interest in the matters before it. This document represents the first review of the PMR Framework, taking into account the performance of T&TEC from 2006 to 2019.

1.2 Purpose of this Document

This document reviews the regulatory approach adopted by the RIC in using key performance indicators to monitor the performance of T&TEC. It examines whether this approach remains fit

for purpose and makes recommendations for the PMR Framework for the regulatory control period 2021-2026.

1.3 Structure of this Document

This document is divided into four (4) sections. The introduction is contained in **Section 1**. **Section 2** provides an overview of the PMR Framework. **Section 3** reviews the performance of the PMR scheme over the period 2006-2019, and **Section 4** outlines proposals for the PMR Framework, moving forward.

1. 4 Responding to this Document

All persons wishing to comment on this document are invited to submit their written responses **by 4:00 pm on February 15th, 2021.** Responses should be sent by post, fax or email to:

Executive Director
Regulated Industries Commission
#37 Wrightson Road
Port-of-Spain, Trinidad
Postal Address: P.O. Box 1001, Port-of-Spain, Trinidad

Tel. : 1(868) 625-5384; 627-7820; 627-0821; 627-0503

Fax : 1(868) 624-2027

Email : ricconsultation@ric.org.tt

Website : www.ric.org.tt

All responses will normally be published on the RIC's website unless there are good reasons why they must remain confidential. Any requests for confidentiality must be indicated.

2.0 OVERVIEW OF PMR FRAMEWORK

2.1 The Need for Performance Monitoring and Reporting

Irrespective of the regulatory approach taken, information on services being provided is essential for the economic regulation of network industries. In fact, in the absence of effective competition and customer choice, monitoring and reporting of service performance can operate as a transparent customer protection measure. A performance and monitoring scheme can provide incentives for service providers to maintain and improve quality by providing information to customers, the media and stakeholders, thus enabling them to critically assess performance.

The main objective of the RIC's PMR scheme is therefore to provide comprehensive information to stakeholders about the services they receive, while at the same time provide incentives for the service provider to improve its performance. In short, the PMR scheme is a significant performance driver and a useful tool for:

- informing customers and other interest groups about the level of service they are receiving;
- providing information and data for developing regulatory standards where required and for on-going assessment of compliance with such standards;
- informing the decision-making processes of regulators; and
- identifying baseline performance of service providers as well as comparing relative performance with other utilities.

2.2 Principles and Scope

The identification, determination and monitoring of performance indicators is an integral tool in the evaluation of the performance of utilities. The performance indicators that a given stakeholder may be interested in can be very diverse. For instance, customers want to be assured that certain benchmarks are being met and there is a continuing quality improvement in the services provided by the utilities. Whereas shareholders, board and executive management usually show interest in the indicators that affect the bottom line of the organization. That interest is prompted by their concern to ensure improvements that lead to enhanced cost effectiveness. Consequently, the scope and set of performance indicators for the design of a PMR Framework can vary significantly.

Therefore, the RIC's PMR Framework has regard for the following principles:

- performance indicators need to be defined and collected on a consistent basis to provide a valid measure of performance as well as to allow reasonable comparisons overtime and with other utilities;
- performance indicators should be meaningful and relevant and must relate to key issues relating to both the organization and its customers and must reflect local conditions;
- the Framework should focus on a reasonable range of meaningful indicators and should draw on existing performance indicators to minimize the costs of collecting information and aid comparison; and
- the accuracy and reliability of information provided must be verifiable.

It is generally accepted that a well-run utility should provide efficient services to all customers at prices that are generally affordable and which allow the utility to recover efficient costs and finance new investment. There are five (5) broad characteristics of such a utility, including efficient operations and maintenance, financial sustainability, efficient and effective capital investment, responsiveness to customers, and accountability to stakeholders.[1] Assessing the achievement of each these characteristics can be determined by reference to appropriate indicators that measure the utility's performance. Accordingly, the PMR Framework broadly covers the following major areas:

- baseline explanatory data (e.g. number of customers)
- quality of supply (e.g. power quality)
- network reliability and efficiency (e.g. system losses and interruptions)
- customer responsiveness and service (e.g. response to service and complaints handling)
- financial performance (e.g. liquidity and profitability) and
- affordability (e.g. prices)

Whenever possible, the PMR Framework will include qualitative information.

[1] Tynan Nicola, and Kingdom Bill. 2002. "*Effective Water Service Provision: Performance targets for a well-run utility."* The World Bank.

The list of performance indicators approved by the RIC for the regulatory control period 2006-2011 is outlined in the **Appendix**. This list includes definitions, units of measurement and the time periods for reporting of the relevant indicators.

The RIC is aware that performance indicators and definitions should remain stable over time to facilitate the collection of time-series data and allow trends in performance to be monitored. However, it will be necessary to undertake periodic reviews of the performance indicators to ensure that they take into account future developments and remain relevant and meaningful. Thus the RIC reserves the right to adjust the scope and number of indicators that it monitors.

2.3 Reporting and Verification of Mechanisms

The RIC believes that the service provider must be adequately monitored and performance targets must be effectively enforced for the performance indicators to deliver the expected results. Accordingly, the reporting and verifying mechanisms in the PMR Framework broadly encompass the following:

- the service provider reports information quarterly/annually electronically using standardized templates developed by the RIC. All submissions by the service provider are to be interrogated by the RIC; and
- the RIC publishes an annual report of the service provider's performance.

In order for performance reporting to be credible, the information being used must be accurate and reliable. This can be achieved by the use of regulatory audits to verify that processes are in place to collect, analyse and report information, and that accurate and reliable information is being reported. Regulatory audits test the effectiveness and efficiency of the service provider's design or systems of control, as well as the integrity of the information provided. Audits are generally undertaken as necessary, prior to the release of the performance reports. These audits can be conducted by RIC staff, however, the RIC reserves the right to engage an external party to conduct this exercise.

3.0 REVIEW OF PERFORMANCE OF PMR SCHEME (2006-2019)

The RIC recognizes that it is important to review the PMR scheme periodically to ensure that it meets its objectives. This section provides a review of the scheme, taking into account the performance of T&TEC from 2006 to 2019. It also outlines key issues encountered over the period.

3.1 Monitoring and Reporting of T&TEC's Performance

As part of monitoring T&TEC's performance over the period, the RIC required the utility to provide data on a core set of financial, operational and service quality measures on a quarterly and annual basis. Over the period, T&TEC would have provided the required information using the electronic templates designed by the RIC.

The RIC typically performed checks to verify the relevant information, before conducting its performance assessment for T&TEC with respect to the key performance indicators. Each of the performance assessments were published in Annual Performance Indicator Reports and publicly released on the RICs website over the past thirteen years. These reports have played an instrumental role in bringing the performance of the T&TEC under the scrutiny of various stakeholders, thereby motivating performance improvements and efficiency gains in utility's operations. Additionally, it assisted with identifying performance gaps which may need to be resolved by the service provider, and which also feed into the RIC's Price Review Process.

3.2 Issues encountered with the PMR Scheme

Notwithstanding T&TEC's performance improvements and efficiency gains over the period the RIC encountered a few issues with the scheme. These are outlined below:

- From the inception of the PMR scheme, there have been some challenges in obtaining all the data specified in PMR Framework. For example, in the initial stages of implementation, T&TEC indicated that some of the data requests were more pertinent to electricity generators. In some cases, data was not available in the format indicated in the PMR Framework, as the method with which T&TEC collected the data differed from what was specified. Some of the data was also unavailable because of technical issues with T&TEC's data collection system. In addressing these issues the RIC has been streamlining its data requests to T&TEC over the years; and

- There have been some issues with the integrity of data submitted by T&TEC over the years. Some of the data appeared to be inconsistent, inaccurate and unreliable, while in other instances the data itself was not valid because of the basis on which it was determined. The RIC has been able to address these concerns through its verification processes which ensures that that the published data is reliable. The RIC also conducted a data mapping/audit exercise to improve the accuracy and reliability of the utility's data submissions.

4.0 PROPOSALS FOR PMR FRAMEWORK FOR REGULATORY CONTROL PERIOD (2021-2026)

Moving into the second regulatory control period (2021-2026), the RIC will maintain its approach of using the key performance indicators to monitor the performance of T&TEC. Additionally, the RIC will initiate a number of measures to improve its monitoring and reporting activities. These include:

- Reviewing and revising the templates used by RIC to retrieve performance indicator data from T&TEC, to ensure the reliability and validity of the data reported by the service provider.
- Employing all enforcement powers contained in the RIC Act, to obtain timely and reliable information from the T&TEC, including:
  - Caution letters;
  - Publication of Non-compliance Orders in the media; and
  - Any other action necessary to achieve compliance;
- Reporting on an abbreviated list of major indicators (i.e. "traffic signal" indicators) at six (6) months intervals to give a snapshot of the performance and financial health of T&TEC. In order to provide a broad perspective, the indicators will cover the following areas: **financial health, electrical efficiency, reliability, operational efficiency and customer responsiveness.** The rationale behind this list of indicators is to depict the overall health and performance of the service provider using no more than six (6) indicators that may be of interest to customers and easily understood by them (see Table below). These "traffic signal" indicators will also be included in the electricity bills of customers.

Table – List of Major Indicators

INDICATOR	What it Measures
Total System Losses (Transmission & Distribution)	The amount of electrical energy that is lost in the system
Current Ratio	Financial Health – Liquidity
% Net Profit	Financial Health (assessing the profit or loss position of the service provider)
SAIFI (System Average Interruption Frequency Index)	Reliability
Customers per Employee Ratio	Operational Efficiency of the company
Written Complaints Response Rate	Customer Responsiveness

- Continuing to produce and publish T&TEC's Annual Performance Indicator Reports on the RIC's website. To complement this, the RIC will also prepare a more reader-friendly version of the report, e.g. a one-page summary document, for the purposes of engendering public and media discussions. This document will be published using various types of media, including newspapers and social networking technologies such as Facebook and Twitter; and
- Conducting periodic audits of T&TEC's data collection and reporting system to ensure the validity and reliability of the data submitted to the RIC. As previously mentioned, the RIC conducted a 'Data-Mapping' Exercise which aimed to improve the accuracy and reliability of data submitted by T&TEC to the RIC.

APPENDIX

PERFORMANCE INDICATORS FOR THE ELECTRICITY SECTOR

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	$1-\left(\frac{[\text{Energy Units Billed}]}{[\text{Energy Units Purchased}]} \times \frac{[\text{Collection in \$}]}{[\text{Billing in \$}]}\right)$	MWh	Semi Annually
1.5		Number of connections and disconnections			Yearly
1.6		Peak demand	The maximum load during a specified period of time	MW	Semi Annually
1.7		Electricity coverage (i.e. Access to electricity)	$\frac{[\text{No. of customers (T\&TEC stats)}]}{[\text{No. of households in T\&T}]} \times 100$	%	Quarterly & Yearly
2.0	Financial				
2.1		Maintenance cost per MWh Sold	$\frac{[\text{Total annual maintenance costs (excluding capital cost)}]}{[\text{MWh sold}]}$	$/MWh	Yearly
2.2		Cost of fuel per kWh	$\frac{[\text{Total costs of fuel}]}{[\text{kWh generated}]}$	$/kWh	Quarterly & Yearly
2.3		Cost of fuel (sales)		$	Quarterly & Yearly
2.4		Revenue per kWh	$\frac{[\text{Total revenue from sales}]}{[\text{Total no. of kWh sold}]}$	$/kWh	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
2.5		Internal manpower costs	Annual internal manpower costs / annual running costs x 100.	%	Yearly
2.6		Energy costs ratio	Annual energy costs / annual running costs x 100.	%	Yearly
2.7		Depreciation costs ratio	Annual depreciation costs / annual capital costs x 100.	%	Yearly
2.8		Net interest costs ratio	(Interest expenses costs – interest income) / annual capital costs x 100.	%	Yearly
2.9		Sales revenues	(Sales revenues / annual revenues) x 100	%	Yearly
2.10		Total cost coverage ratio	Annual revenues / annual costs.		Yearly
2.11		Delay in accounts receivable	Year-end account receivable / annual sales revenues x 12.	months equivalent	Yearly
2.12		Investment ratio	Annual investments subject to depreciation / annual depreciation x 100.	%	Yearly
2.13		Debt service coverage ratio	Profit before interest and tax / (Interest + capital repayments) x 100	%	Yearly
2.14		Operating ratio	$\frac{[\text{Operating costs (including depreciation and interest)}]}{[\text{Operating revenue}]}$		Yearly
2.15		Working ratio	$\frac{[\text{Operating costs (excluding depreciation and interest)}]}{[\text{Operating revenue}]}$		Yearly
2.16		Return on net fixed assets	Net operating income / net fix assets x 100.	%	Yearly
2.17		Return on equity	Profit after interest and tax / shareholders' equity x 100.	%	Yearly
2.18		Operating cost per customer	$\frac{[\text{Total operating costs}]}{[\text{Total no. of customers}]}$	$/cust.	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
2.19		Operating revenue per kWh	$\frac{[\text{Total operating revenue}]}{[\text{Total no. of KWh sold}]}$	$/kWh	Yearly
2.20		Current ratio	$\frac{[\text{Current assets}]}{[\text{Current liabilities}]}$		Yearly
2.21		Quick Ratio	$\frac{[\text{Current assets - stock}]}{[\text{Current liabilities}]}$		Yearly
2.22		Return on capital employed	$\frac{[\text{Profit before interest and tax}]}{[\text{Capital employed}]} x100$	%	Yearly
2.23		Gearing	$\frac{[\text{Interest bearing debt}]}{[\text{Interest bearing debt + equity}]}$		Yearly
2.24		Creditors Payments	$\frac{[\text{Creditors}]}{[\text{Credit purchases}]} x12$	Monthly equivalent	Yearly
2.25		Total revenue	Operating revenue and other revenue for the period	$	Yearly
2.26		Total expenditure	Operating expenses plus other expenses (Operating Expenses includes Generation, Transmission and Distribution, Administration and General, and Depreciation)	$	Yearly
2.27		Operating profit	Revenue from the organization's regular activities, less costs, and expenses and before income deduction	$	Yearly
2.28		Asset turnover	$\frac{[\text{Sales}]}{[\text{Capital employed}]}$		Yearly
2.29		Interest Cover	$\frac{[\text{Profit before interest and tax}]}{[\text{Interest}]}$		Yearly
2.30		Long term debt	Debt liabilities due in excess of one year	$	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
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)	$\frac{[SAIDI]}{[SAIFI]}$	Minutes	Yearly
3.4		Number of faults per 10km of distribution lines		No.	Yearly
3.5		Number of faults per 20km of transmission lines		No.	Yearly
3.6		Number of transmission and distribution circuit trip outs by voltage level		No.	Yearly
3.7		Interruptions restored within 3 hours and 5 hours		No.	Yearly
3.8		Supply interruptions per 100 connected customers		No.	Yearly
3.9		Number of complaints on voltage levels per 100 connected customers		No.	Yearly
3.10		Number of faults assigned to modifications at substations		No.	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
3.11		Disaggregation of causes for interruptions of supply: 1. Maintenance 2. New construction 3. User connection 4. Faults		No.	Yearly
3.12		Average response time to interruptions		Minutes	Yearly
4.0	Affordability and other Economic Data				
4.1		Sales per employee (kWh)	$\frac{[\text{Total kWh sales}]}{[\text{Number of employees}]}$	KWh/emp.	Yearly
4.2		Sales per employee ($)	$\frac{[\text{Total revenue form sales}]}{[\text{Number of employees}]}$	$/emp,	Yearly
4.3		Customers per employee	$\frac{[\text{Total no of customers}]}{[\text{Total number of employees}]}$	Cust./Emp.	Yearly
4.4		Low/High voltage complaints by area		No.	Quarterly and Yearly
4.5		Consumption per capita (kWh)	$\frac{[\text{Total kWh sales}]}{[\text{Total population}]}$	kWh/person	Yearly
4.6		Tariff for electricity services by category			Yearly
4.7		Restrictions for non payment of bills		No.	Yearly
4.8		Average consumption by class		kWh	Yearly
4.9		Average electricity bill by class		kWh	Yearly
4.10		Percentage of Customers with installment plans		%	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
5.0	Customer Responsiveness and Service				
5.1		Calls to emergency phone Line (% answered in 30 sec.)		%	Quarterly and Yearly
5.2		Written complaints not responded to within 5 working days		No.	Quarterly and Yearly
5.3		Complaints received (per 100 customers)		No.	Quarterly and Yearly
5.4		Complaints by major type	Reporting on the major areas of complaint	No.	Quarterly and Yearly
5.5		Complaints resolved by type		No.	Quarterly and Yearly
6.0	Operational Indicators				
6.1		Operator effectiveness Training requirements (Per generation unit)	$\frac{[\text{MWh lost due to operator caused outage}]}{[\text{MWh generated}]} \times 100$	%	Quarterly and Yearly
6.2		Performance of generation unit when most needed (Per generation unit)	$\frac{[\text{Output (MW) at each monthly peak}]}{[\text{Name plate rating}]}$	No.	Quarterly and Yearly
6.3		Spinning Reserves Availability Indicates how well the system responds to load increases	$\frac{[\text{Spinning reserves at each monthly peak}]}{[\text{System peak load}]} \times 100$	%	Quarterly and Yearly
6.4		Generator Performance under Peak Load	$\frac{[\text{The generator unit output (MW) at each monthly system load peak}]}{[\text{The unit's name plate rating}]}$		Quarterly and Yearly
6.5		Capacity Factor	$\frac{[\text{Annual electricity produced (MWh)}]}{[\text{Installed capacity (MW) x 8760 (period in hours)}]} \times 100$	%	Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
6.6		Load Factor When the capacity factor is approximately the same as the load factor, this is an indication that installed capacity matches demand.	$\frac{[\text{Annual electricity produced (MWh)}]}{[\text{Maximum load (MW) x } 8760 \text{ (period in hours)}]} \times 100$	%	Yearly
6.7		Monthly System Peak Load Demand Indicates if monthly system peak loads are being met	$\frac{[\text{Available capacity (MW) at each monthly peak}]}{[\text{System peak load}]} \times 100$	%	Quarterly and Yearly
6.8		Generation Unavailability This indicates the generation capacity short fall due to forced or planned outages	$\frac{[\text{Unavailable capacity (MW) at each monthly peak}]}{[\text{System peak load}]} \times 100$	%	Quarterly and Yearly
6.9		Forced outage rate at monthly peak (per generator)	$\frac{[\text{unit rating (MW)} \times \text{outage hours (hrs)}]}{[\text{installed capacity (MW)} \times \text{period (hrs)}]}$		Quarterly and Yearly
6.10		Availability Factor Measures the availability of each unit after partial or full outages (both planned and forced) have been allocated Indicates whether sufficient capacity is available in the total system	$\frac{[\text{Total hours of operation of plant during the period}]}{[\text{Total length of period (hours)}]} \times 100$ o Ratio of available to installed capacity	%	Quarterly and Yearly
6.11		Output Factor (per unit) Measures the extent to which each unit capability is used	$\frac{[\text{MWh generated in period}]}{[\text{Site rating on unit (MW) x hours in period connected to system}]} \times 100$	%	Quarterly and Yearly

Item	Category	Indicator	Definition	Units	Reporting Period
6.12		Realization of monthly system loads	$\frac{[\text{Available capacity (MW)}]}{[\text{System peak load at each monthly peak}]} \times 100$	%	Quarterly and Yearly
6.13		Inadequate generation capacity due to a forced or planned outages	$\frac{[\text{Unavailable capacity (MW)}]}{\left[\begin{array}{l}\text{System peak load at}\\ \text{each monthly peak}\end{array}\right]} \times 100$	%	Quarterly and Yearly
6.14		Average Heat Rate (per unit) Measures the amount of energy needed to produce one kWh of electrical output. The smaller the heat rate the greater the efficiency	$\frac{[\text{Total Energy content of fuel burned}]}{[\text{Net kWh generated by unit}]}$	kJ/kWh	Quarterly & yearly