



Review of Performance Monitoring and Reporting Scheme

*For the
Electricity Transmission and Distribution Sector*

February
2018

The purpose of this report is to review the approach adopted by the RIC in using key performance indicators to monitor the performance of the service provider, and to determine whether any changes are required to the RIC's approach.

Consultative
Document

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1.0 Introduction

1.1 Background

As the economic regulator of the electricity, and water and wastewater sectors in Trinidad and Tobago, the Regulated Industries Commission (RIC) has a mandate to regulate the service providers 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, amongst other things, to prescribe standards of service; monitor service providers and conduct checks to determine 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, the RIC established a **Performance Monitoring and Reporting Framework (PMR)** in 2005, for the purposes of monitoring the services of the Electricity Transmission and Distribution Sector. Service performance in this context refers to the delivery of an electricity supply to meet customer's load requirements within targeted quality limits and within targeted levels of reliability. In the Regulation of the Electricity Transmission and Distribution 2006-2011: Final Determination (The Determination), the RIC indicated that it would monitor the performance of the Trinidad and Tobago Electricity Commission (T&TEC) using key performance indicators. The Determination further outlined specific directives to be followed by the service provider during the regulatory period (2006-2011).

Section 6(2) of the RIC Act requires the Commission 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 scheme, taking into account the performance of T&TEC from 2006 to present.

1.2 Purpose of this Document

This document seeks to examine the approach adopted by the RIC in using key performance indicators to monitor the performance of T&TEC, and to determine whether any changes are required to this approach.

1.3 Structure of this Document

This document is divided into four sections. The Introduction, contained in **Section 1. Section 2** provides some background information on the RIC's PMR scheme. **Section 3** reviews performance of the scheme for the period 2006-2017 and **Section 4** outlines proposals for the scheme, moving forward.

1.4 Responding to this Document

As part of the consultative process, the RIC invites feedback from the public with respect to the approach being used. All persons wishing to comment on this document are invited to submit their responses in writing, by **March 9, 2018**, to:

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Regulated Industries Commission
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Cor. Wrightson Road and Independence Square
Port-of-Spain, Trinidad
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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. A copy of this document is available from the RIC's website at **www.ric.org.tt**.

2.0 RIC's Performance Monitoring and Reporting (PMR) Scheme

2.1 Importance and Objectives of 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 operates as a transparent customer protection measure. The main objective of the PMR scheme is 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. Essentially, the PMR scheme can be 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 of PMR Scheme

An integral tool in evaluating the performance of the service provider is the identification, determination and monitoring of performance indicators. Performance indicators that the various stakeholders are 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. This interest is prompted by their concern to ensure improvements that lead to enhanced cost effectiveness. Consequently, the following principles were considered in the design of the PMR scheme:

- 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 performance reporting 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.

2.3 Scope of Performance Indicators used in PMR Scheme

The RIC proposed certain performance indicators to be used under the PMR scheme. These broadly covered 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)

The list of performance indicators, which were used during the first regulatory period for the electricity transmission and distribution sector, is outlined in the **Appendix** of this paper.

2.4 Reporting and Verification of Information under PMR Scheme

The RIC believes that the service provider has to be monitored properly and targets have to be effectively enforced, in order for the performance indicators and targets set out in the PMR Framework to deliver the expected results. On this basis, the reporting and verifying mechanisms employed by the RIC 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 interrogated by RIC staff); and
- the RIC publishes an annual report of the service provider's performance.

3.0 Review of Performance Monitoring and Reporting (PMR) Scheme

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 the service provider from 2006 to present. It also outlines key issues encountered with PMR scheme over the period.

3.1 Monitoring T&TEC's Performance

As part of monitoring the service provider's performance over the period, the RIC required T&TEC to provide data on a core set of financial, operational and service quality measures on a quarterly and annual basis. The RIC provided electronic templates, which were used by T&TEC to supply the data needed to calculate the relevant performance indicators. The RIC performed manual checks to verify the data, before conducting performance assessments for T&TEC with respect to the indicators. These assessments were then published in an Annual Performance Indicator Report for T&TEC for the respective years. It was expected that these reports would highlight T&TEC's performance over the respective period, bringing it under the scrutiny of the various stakeholders, and thereby motivating performance improvements and efficiency gains in T&TEC's operations.

3.2 Issues encountered with PMR Scheme

Over the period 2006-2017, the RIC encountered a few issues which affected the effectiveness of the PMR scheme. These are outlined below:

- From the inception of the PMR scheme, there have been some challenges in obtaining all the data specified in 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 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 system¹. To address these issues the RIC has streamlined its data requests to T&TEC over the years;
- There have been issues with the integrity of data submitted by T&TEC over the years. Some of the data have been inconsistent and inaccurate and therefore unreliable, while in other instances the data itself was not valid because of the basis on which it was determined. Consequently, the RIC has been working with T&TEC on a Data-Mapping exercise to address this issue and improve the accuracy and reliability of the utility's data submissions.

¹ The technical difficulties cited by T&TEC included breakdowns and computer virus infections.

4.0 Proposals for Performance Monitoring and Reporting Scheme

The RIC will continue to monitor the performance of T&TEC using the identified performance indicators during the second regulatory control period 2018-2023. The RIC will also initiate a number of measures to improve its monitoring and reporting activities, moving forward. These include:

- Reviewing and/or revising the templates used by RIC to collect 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 service provider, including:
 - Caution letters;
 - Publication of non-compliance 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 – Profitability
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 T&TEC’s Annual Performance Indicator reports, and publishing them using the RIC’s website and other media. To complement these reports, the RIC will prepare a more reader-friendly version of the report for the purposes of engendering public and media discussions, e.g. a one-page summary. Both documents will be published using various other media, including newspapers and social media, such as Facebook and Twitter; and
- Conducting periodic audits of the service provider’s data collection and reporting system by the regulator and/or an independent auditor to ensure the validity and reliability of the data submitted to the regulator. The RIC, in conjunction with T&TEC, is currently conducting a Data Mapping Exercise which aims to improve the accuracy and reliability of data submitted by T&TEC to the Commission.

APPENDIX

PERFORMANCE INDICATORS FOR THE ELECTRICITY SECTOR

<u>Item</u>	<u>Category</u>	<u>Indicator</u>	<u>Definition</u>	<u>Units</u>	<u>Reporting Period</u>
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

<u>Item</u>	<u>Category</u>	<u>Indicator</u>	<u>Definition</u>	<u>Units</u>	<u>Reporting Period</u>
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

<u>Item</u>	<u>Category</u>	<u>Indicator</u>	<u>Definition</u>	<u>Units</u>	<u>Reporting Period</u>
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	$\frac{[\text{Profit before interest and tax}]}{[\text{Capital employed}]} \times 100$	%	Yearly
2.23		Gearing	$\frac{[\text{Interest bearing debt}]}{[\text{Interest bearing debt + equity}]}$		Yearly
2.24		Creditors Payments	$\frac{[\text{Creditors}]}{[\text{Credit purchases}]} \times 12$	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	$\frac{[\text{Annual electricity produced (MWh)}]}{[\text{Installed capacity (MW)} \times [\text{8760 (period in hours)}]]} \times 100$	%	Yearly

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