INFORMATION DOCUMENT

REGULATED INDUSTRIES COMMISSION

PERFORMANCE INDICATORS

FOR THE

THE TRINIDAD AND TOBAGO

ELECTRICITY COMMISSION

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TABLE OF CONTENTS **PAGE**

LIST OF TABLES **PAGE**

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1. Introduction

The RIC strongly believes that public involvement is an important element of its processes and that the results of its investigations will be enhanced if information is made available for public comment. With this in mind, the RIC is releasing the **Information Document on Performance Indicators.**

The document compares the performance of the Trinidad and Tobago Electricity Commission (T&TEC) - against international best practice in order to analyze its present levels of performance and determine the need for improvement where necessary. Benchmarking is an internationally recognized means by which utilities measure their performance against industry leaders with a view to chart progress and to address the inherent need to understand and improve performance.

This document has important links to a number of other investigative papers currently being prepared by the RIC. These papers, which will also be put out for public consultation/information, include:

1. Setting price controls: framework and approach;
2. Review of the State of the Trinidad and Tobago Electricity Commission;
3. Receivables Policy for the Trinidad and Tobago Electricity Commission.

Requirements of the RIC Act

Section 6 and Sections 47 to 52 of the RIC Act No. 26 of 1998 provide guidelines for the economic regulation of service providers. The Act emphasizes the adoption of an incentive based regulatory regime that:

- Provides a fair and reasonable return to service providers on efficient investment;
- Fosters efficient operations and maintenance practices; and
- Provides an equitable allocation of efficiency gains among shareholders.

The RIC in proposing recommendations is required to consider the twin goals of protecting the interest of customers and the financial sustainability of service providers in the long term.

In keeping with the above, the RIC is endeavouring to gauge and compare the efficiency of local service providers with its peers internationally. One method of achieving this task is through benchmarking. The RIC will use benchmarking studies in conjunction with other relevant information to reach a judgement on the extent to which local service providers can improve their efficiency and productivity and what rate of efficiency and productivity improvements are achievable.

2. Importance of Benchmarking

The objective of a performance monitoring and benchmarking exercise is to help an organization identify, learn and adapt exceptional practices and processes from elsewhere in the world to help it improve its performance (Aitken, 1999). It consists of two elements (Tynan and Gonzalez, 2002):

- The "measurement" side of benchmarking (called the metrics). This aspect concentrates on measurement and comparison within organizations and within industry by the use of techniques such as performance indicators, modeling and outcome measures such as regression, data envelope and total factor productivity (TFP) analyses;
- The "action" side of benchmarking (called the process). It deals with understanding current processes, comparing to "best in class" and changing the way things are done.

This document is mainly concerned with the measurement side of benchmarking, by the use of performance indicators.

The use of benchmarking as a management tool is now fairly common in utility regulation. Benchmarking is a method of performance monitoring that assesses

the potential efficiency improvements within organizations. It llows for the measurement of improvement in the performance of an entity over time thus providing an indication of the rate of previous productivity gains as well as helping to establish the expected rate over the future regulatory period. In the case of local utilities, by comparing the operating efficiency with that of their international counterparts, benchmarking is able to identify the scope for further efficiency improvements.

Within recent times, benchmarking has been used for cost comparisons and tariff control by some utilities, as a first step in examining whether comparatively high tariffs are attributable to inefficiency. It can also help to identify cost discrepancies and cost drivers, which may then require more precise investigation. If used for tariff control it can have a direct effect on the revenue situation of the utilities affected. The issues of methodology, the quality of data and the interpretation of results become critical. In such cases, benchmarking methodologies should be robust and objective and should take into account:

- Environmental differences (population density, scattering of customer base, topography.);
- Quality differences (reliability of supply, customer satisfaction etc.); and
- Controllable and uncontrollable factors within utilities.

In general, simple comparisons can supply valuable information for internal purposes but are only of limited use for tariff and regulatory purposes. Indeed the interpretation of all performance measures requires caution. Therefore the RIC will use benchmarking in conjunction with other relevant information to reach a judgement on the extent to which T&TEC can improve its productivity and efficiency.

3. Objectives of Performance Indicators

Performance indicators can be useful tools for assessing the achievements of service providers. However, the indicators alone are not likely to portray a

complete picture of performance as they often exclude other contributing factors. Furthermore, utilities face different social, political and financial constraints and operating environments and, as such, these factors need to be taken into account when evaluating cross-country performance. Notwithstanding this, cross-country benchmarking of performance helps to identify the best and worst - performing utilities. Therefore, the indicators can be a starting point for a more comprehensive analysis and debate by stakeholders on how to achieve better service.

Tynan and Kingdom (2002) argue that performance indicators serve three purposes:

- To highlight the wide variation of performance to be found amongst developed and developing country utilities. This will provide stakeholders with some appreciation of the range of values to be found around the world, and the performance being achieved by "best practice" providers.
- To propose target indicator values for utilities in developing countries. These target values are already being achieved by utilities in developing countries thus giving them grounding in reality.
- The exercise will be a starting point from which more comprehensive and regularly updated analysis can be undertaken, providing stakeholders with more and better information with which to assess the performance of their own utilities.

4. Sources of Information

Data have been obtained for various performance indicators in both sectors and from various sources including the Office of Gas and Electricity Markets (Ofgem) of Britain, the Latin American Organisation of Energy (OLADE), the Inter-American Development Bank (IDB), the American Public Power Association (APPA), the Steering Committee on National Performance Monitoring of Government Trading Enterprises (GTEs) in Australia and annual reports of several Caribbean electricity utilities. The data are mainly for the years 2000 to

2003 but includes periods in the 1990s. Definitions for these indicators are provided in **Appendix I**. Country data include sets from the United Kingdom, the United States, Australia and the Caribbean. As far as possible, data used for comparison were for utilities of similar size (i.e. > 500,000 persons served) and for recent periods for which current and reliable data were obtainable. **Appendix II** provides a summary of the information sources.

A "Best Practice"[1] recommendation is also given to indicate acceptable levels of performance for utilities both in developed and developing countries. The World Bank, primarily from its work in developing countries has recommended these "Best Practices". They are actually "Best Performances" based on actual utility results and are a reasonable guideline with which to commence monitoring of indicators. These recommendations are however, also incomplete due to the inability to acquire relevant data.

4. The Service Provider

T&TEC is a statutory body established by the Trinidad and Tobago Electricity Commission Ordinance No. 42 of 1945. Prior to 1994 T&TEC was a vertically integrated monopoly but the T&TEC (Amendment) Act of 1994 allowed for the divestment of T&TEC's generation assets to two independent generation companies; Power Generation Company of Trinidad and Tobago Ltd. (PowerGen) and Trinity Power Ltd. (formerly InnCogen Ltd.)

T&TEC has an exclusive right to transmit and distribute electricity in Trinidad and Tobago. Power is supplied to Tobago via a submarine cable with an 11Megawatt (MW) diesel station being maintained as a back-up supply.

[1] Best Practice is based on the actual performance of the top 25% of utilities surveyed by the World Bank based on data from 246 utilities in 51 developed and developing countries.

T&TEC purchases bulk electrical power from the two generation companies. PowerGen's current total installed capacity is 1178MW. PowerGen sells bulk power to T&TEC under a 15-year power purchase agreement (PPA), its commitment being the provision of 819MW of supply and 100MW of spinning reserve at a specified heat rate.

The PPA specifies the prices to be paid by T&TEC and the prices are adjusted annually by the rate of inflation in the United States (i.e. US Consumer Price Index). The main shareholders of PowerGen are, T&TEC, 51%, Mirant Corporation (formerly Southern Electric International) 39%, and bpTT (formerly Amoco) 10%.

T&TEC also has a 30-year PPA with Trinity Power Ltd. (owned by a consortium of American companies with Power Management Company having the controlling interest) to supply 195 MW. Trinity Power's total installed capacity is 225MW.

While T&TEC has the responsibility for load forecasting, it may however, enter into a licence agreement with an approved generator for the non-exclusive right to supply electricity.

T&TEC is responsible for procuring natural gas for the generation companies, and has a contract with the National Gas Company (NGC) for the purchase of gas, the price of which is increased annually by 4%.

Currently, electrification in the nation is over 97%. The staffing levels for 2002 were approximately 2,180 persons and the customer base was approximately 333,720 accounts. Revenue collected in 2001 totalled TT$1,351.8 million and expenditure amounted to TT$1,472.9 million over the same period.

5. Performance Indicators

The data comprise indicators in the following areas:

- **Network Reliability and Efficiency**: Network/Grid performance;
- **Administrative**: Costs and Staffing;
- **Quality of Service;** Service Coverage
- **Financial**: Billings and Collections, Financial Performance, Capital Investment.

These are specified below in **Tables 1 to 4.** The tables provide comparisons between Trinidad and Tobago and other countries and show the best practice assessment for several of the indicators.

Additionally, a number of other indicators which although yet to be measured locally are included for reference purposes. They are **quality or level of service** standards that are now being instituted by the RIC (**Table 4**). The equivalent local quality of service code has been included in the table. Data for these were obtained specifically from the United Kingdom.

Table 1 – Network Reliability and Efficiency Indicators

	Indicator	Trinidad & Tobago		Caribbean (average)	UK	US	Aus	Best Practice Developed Countries
		2003	2002	2003	2001	2000	1996/97	
1.	System Average Interruption Duration Index SAIDI (min)	963	1092.6	N/A	N/A	N/A	163	120
2.	System Average Interruption Frequency Index SAIFI	10.3	10.6	N/A	N/A	N/A	2.4	1.2
3.	Customer Average Interruption Duration Index CAIDI (min)	94.2	103.8	N/A	N/A	N/A	95	100
4.	Total system losses (%)	4.9	7.6	16.3	7.0	4.1	6.0	< 7

* Approximate value

N/A – Not available

Table 2 – Administrative Indicators

	Indicator	Trinidad & Tobago		Caribbean (average)	United States	Aus
		2003	2002	2003	2000	1996/97
5.	Sales per employee (US$)	99,177	93,896	244,632	N/A	334,896
6.	Sales per employee (GWh)	2.63	2.49	1.33	N/A	4.98
7.	Customers per employee	149	149	179	264	307

GWh – Gigawatt hours

Table 3 – Quality of Service Indicators

	Indicator	Trinidad & Tobago		Caribbean	United States	Best Practice Developed Countries
		2003	2002	2003	2000	
8.	Service Coverage (%)	96.17	94.15	N/A	N/A	99.5

Table 4 - Financial and Economic Indicators

	Indicator	Trinidad & Tobago		Caribbean (average)	United States	Australia	Best Practice Developed Countries
		2003	2002	2003	2000	1996/97	
9.	Average Sales per kWh (US$)	0.038	0.038	0.195	0.060	0.060	
10.	Operating cost per customer (US$)	614.47	676.98	1201.88	N/A	376.84	
11.	Collection Period	3.31	4.05	N/A	N/A		< 3 months
12.	Operating ratio	1.13	1.15	N/A	0.74		0.75
13.	Working ratio	1.01	1.04	0.65	N/A	0.34	0.70
14.	Debt Service Coverage ratio	-0.5	-0.8	N/A	2.35		2.25

Table 5 – Additional Indicators

Trinidad and Tobago Code	INDICATORS	No of breaches 2004	Units	Trinidad & Tobago 2004	Great Britain 2001/02		
					East Midlands Electricity	Seeboard Power Networks	United Utilities
GES4	Making & keeping appointments	0	No. of payments made	0	6	3	1
OES1	Line faults repaired within a specified period of the fault being reported	0	No. of payments made	0	0	0	56
OES6 (a)	Time to respond after receipt of queries / requests (e.g. meter checks)	313	%	39	100	100	100
OES8	Prior notice of planned outages	381	No. of payments made	0	5	3	28
OES9	Correction of Low/High voltage complaints	272	No. of payments made	0	0	0	0

References

1. Aitken K (1999) *Performance Monitoring and Benchmarking in the Water Industry*. Institute of Municipal Engineering Australia – Queensland Division.

2. Tynan N and F Gonzalez (2002) *Performance Benchmarking: What, Why and How*. Water Forum, The World Bank, Washington, D.C.

3. Tynan N and B Kingdom (2002) *Effective Water Service Provision: Performance Targets for a well run utility.* World Bank, Washington D.C.

Appendix I

Network Reliability and Efficiency Indicators (Table 1)

1. **System Average Interruption Duration Index (SAIDI)**

The sum of the duration of each customer interruption (in minutes) / the total number of connected customers averaged over the year

2. **System Average Interruption Frequency Index (SAIFI)**

The total number of customer interruptions / the total number of connected customers averaged over the year

3. **Customer Average Interruption Duration Index (CAIDI)**

The sum of the duration of each customer interruption (in minutes) / the total number of customer interruptions

4. **Availability factor**

Ratio of available to installed capacity

5. **Total system losses**

Difference between MWH purchased and sold

Administrative Indicators (Table 2)

6. **Sales per employee ($US)**

Revenue from Sales per number of employees

7. **Sales per employee (GWh)**

Gigawatt Sales per number of employees

8. **Customers per employee**

No. of customers per employee

Quality of Service (Table 3)

9. Service Coverage

Access to electricity

No. of customers (T&TEC statistics)
No. of households in T&T [Central Statistical Office (CSO)]

Financial and Economic Indicators (Table 4)

10. Average Sales per kWh

Total revenue from sales
Total No. of kWh sold

11. Operating cost per customer

Total operating costs
Total number of customers

12. Collection Period

Year-end Receivables
Total Operating Revenue x 12 (expressed in months)

13. Average revenue per kWh

Total revenue
Total No. of kWh sold

14. Operating ratio

Operating costs (including depreciation & interest)
Revenue

15. Working ratio

Operating costs (excluding depreciation & interest)
Revenue

16. **Debt Service Coverage ratio**

Revenue
Medium & Long term Debt

Additional Indicators (Table 5)[2]

1. **Making & keeping appointments**

The responsibility to offer and keep a morning or afternoon appointment or a timed appointment if requested by the customer.

2. **Line faults repaired within a specified period of the fault being reported**

The utility's ability to efficiently carry out full and complete repairs and maintenance work on the transmission and distribution system within 18 hours.

3. **Time to respond after receipt of queries/requests**

The minimum percentage of customers' letters to be responded to within 10 working days.

4. **Prior notice of planned outages**

The provision of 2 days advance notice to customers of planned interruption to supply.

5. **Correction of Low/High voltage complaints**

The investigation of voltage complaints within 7 working days or a substantive reply provided within 5 working days.

[2] Definitions are from Ofgem level of service indicators. For local definitions see *Quality of Service Standards for the Electricity Transmission and Distribution Sector* (RIC, 2002)

Appendix II

Information Sources - Electricity

Country	Companies	Source of Data
Caribbean	• Barbados Light and Power Company Ltd. • Jamaica Public Service Company Ltd. (JPSCo) • Anguilla Electricity Company Ltd. (ANGLEC) • Grenada Electricity Company (GRENLEC) • St Lucia Electricity Services Ltd. (LUCELEC) • Caribbean Utilities Company Ltd. (Cayman Islands) • Belize Electricity Ltd. (BEL) • Bermuda Electric Light Company Ltd. (BELCO)	Annual Reports 2003
United Kingdom	East Midlands Electricity Seeboard Power Networks United Utilities	OFGEM
United States	415 utilities in the U.S.	American Public Power Association
Australia	16 utilities in Australia	Steering Committee on National Performance Monitoring of Government Trading Enterprises (GTEs)