

**REGULATING QUALITY OF  
SERVICE – Service Incentive  
Mechanisms**

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**ELECTRICITY TRANSMISSION  
AND DISTRIBUTION SECTOR**

Consultation  
Document

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## 1. BACKGROUND

An important feature of the first price review for the **Electricity Transmission and Distribution Sector** was to clearly establish the level of performance and the quality of service standards that the Trinidad and Tobago Electricity Commission (T&TEC) was expected to meet during the control period. The service standard framework normally comprises three types of service incentive mechanisms. These being:

- Public Reporting against average performance targets;
- Guaranteed Service Level Scheme (GSS); and
- Service Incentive Scheme (inclusive of an “S-Factor”).

The RIC had already implemented the first two mechanisms but decided against adopting a Service Incentive Scheme, specifically the S-factor, for the first regulatory period. However, the RIC also indicated that it would revisit this decision and investigate the potential benefits of the introduction of such a scheme in the future.

Under RPI-X incentive regulation, there is little incentive for a service provider to improve service quality. In fact, a monopoly service provider may attempt to reduce costs to meet other regulatory targets and obligations, with little or no concern for the quality of service that it provides to its customers. A Service Incentive Scheme, such as the S-factor, is used by regulators to create a link between service quality and revenue. More specifically, by including an S-factor in the price/revenue cap provides an explicit incentive to improve the level of service, by way of a mechanism that adjusts revenues in response to changes in service quality.

## 2. PURPOSE OF DOCUMENT

The purpose of the document is to set out the issues relevant to the development of a Service Incentive Scheme for the second rate review period and to discuss the potential benefits that may result from its introduction.

### **3. RESPONDING TO THIS DOCUMENT**

All persons wishing to comment on this document are invited to submit their comments. Responses should be sent by post, fax or e-mail to:

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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](http://www.ric.org.tt)**.

**All responses must be submitted by March 2, 2018.**

### **4. INTRODUCTION**

#### **4.1 Objectives for Establishing Service Incentive Mechanisms**

Standards of service are an important feature in any industry. However, service providers operating in sectors with natural monopoly characteristics, such as electricity transmission and distribution networks, are subject to little or no competition, and have fewer incentives to provide good service as customers generally cannot select an alternative provider. The purpose of natural monopoly regulation is, in fact, to prevent the natural monopolies from exercising their market power to set their prices above costs, restrict supply below efficient levels or compromise the quality of the supply that customers receive.

Pursuant to its mandate under its Act, the RIC has adopted incentive regulation (also known as RPI-X regulation, after the formula used to define the price-cap) for controlling the activities of service providers under its purview. The aim of this type of regulation is to provide an incentive for efficient operation of the network. The regulated entity can increase its profits by cutting costs, without fear that the regulator will immediately take away the additional profits by reducing allowed revenues. A price cap that rewards the service provider only for cost reductions while ignoring the quality of service provided, will almost certainly cause the quality of service to fall below the level that customers want and pay for.

In response to this potential disincentive to maintain service standards, regulators have generally used three broad incentive mechanisms for regulating quality of service. This consultative paper sets out the issues relevant to and the potential benefits of the introduction of a Service Incentive Scheme in detail, with particular emphasis on the S factor

#### **4.2 RIC's Act Requirements**

The Regulated Industries Commission (RIC) is mandated by its Act Chapter 54:73 to establish clear standards for service. Section 6 (1) (d), (e), and (f) of the RIC Act require the RIC, *inter alia*, to:

- Carry out studies of efficiency and economy of operation and of performance by service providers and publish the results thereof;
- Prescribe and publish in the *Gazette* and in at least one daily newspaper circulating in Trinidad and Tobago, standards for service; and
- Monitor service providers and conduct checks to determine their compliance with the standards referred to above.

In addition, according to Section 6 (3) (a), (b) and (d), when performing its functions, the RIC is required to give due consideration:

- To maximum efficiency in the use and allocation of resources to ensure as far as is reasonably practicable, that services are reliable and provided at the lowest possible cost;
- To equal access by consumers to service;
- In respect of consumers similarly placed, to non-discrimination in relation to access, pricing and quality service.

## 5. TYPES OF SERVICE INCENTIVE MECHANISMS

There are at least three (3) broad incentive mechanisms for regulating quality of service, namely the Public Reporting Scheme (also known as Performance Monitoring and Reporting), the Guaranteed Standards Scheme (GSS) and the Service Incentive Scheme. A summary of the three schemes is presented in **Table 1** below.

**Table 1 – Service Incentive Mechanisms**

<b>SCHEME</b>	<b>OPERATION</b>	<b>OBJECTIVE</b>
Public Reporting Scheme (Average/minimum service standards established by the Regulator)	Service provider to comply with standards on a ‘best endeavour’ basis. Performance reporting to Regulator.	Used as a basis for measurement of overall average performance.
Guaranteed Standard Scheme	Failure to meet guaranteed service levels involves payments to customers.	Encourage improved service for worst-served customers.
Service Incentive Scheme	Performance measures assessed with reference to base-line and performance bands.	Encourage continuous improvement in the performance of services to all customers.

### 5.1 Public Reporting Scheme

Public reporting aids in the transparency of the service provider’s operations, by regularly publishing information on its performance. It also improves accountability by informing customers and focusing service provider’s performance even where indicators are not subject to financial rewards and/or penalties. The information may be reported using

internal or external benchmarks, and gives the regulator an opportunity to “name and shame” the service provider for poor performance.

The RIC had encountered some problems with reporting (e.g. delays in reporting, quality of information, etc.), and strengthened its Public Reporting Scheme by:

- Rationalizing and including priority or “most important” indicators;
- Redesigning the format for reporting to make it easier to complete; and
- Requiring the service provider to prepare the report in the required format and making it public annually by publishing it on its website.

The RIC is currently engaged in a data mapping exercise to further improve the quality of data submitted by T&TEC and plans to employ an Independent Auditor, in the future, to verify the process of the service provider’s information collection and quality of information.

## **5.2 Guaranteed Standards Scheme**

Under this approach the regulator sets a minimum level of service that a customer is entitled to receive by setting a threshold level and penalizing the service provider in the event of failure to meet this level. The scheme provides both an incentive for service providers to improve performance and guarantees payments to customers for poor service. The cost of this scheme is actually borne by the customer base through tariffs.

The RIC first implemented a Guaranteed Standards Scheme (GSS) in 2004, and revised it in 2010 to increase the quantum of the guaranteed payment and to introduce automatic payment for some standards. It was again revised in 2017, as part of the RIC’s commitment to regularly review and modify the standards to improve the quality of service, and is currently awaiting publication in the Gazette so that it can be implemented.

## **5.3 Service Incentive Scheme**

International experience has shown that while the GSS is effective in ensuring that a minimum level of service is attained, it provides little incentive for the service provider to

improve beyond that threshold level. As such, other Service Incentive Mechanisms may be introduced into the quality of service framework. These mechanisms make adjustments to revenue via either a **Direct Revenue Adjustment** or by adopting an ‘**S**’ **factor**. A direct revenue adjustment rewards or penalizes the service provider **by directly adjusting allowed revenue** in response to differences between the expected or target level of service and the actual level of service for few key indicators. The mechanism is not captured within the pricing formula and is less complex to implement as compared to other Service Incentives Schemes such as an S-factor.

The S-factor, on the other hand, **is a quality component introduced into the price cap formula (RPI-X)** that provides a direct financial incentive to service providers. It reflects the difference between the actual quality of service delivered and a predetermined benchmark or performance indicator. The modified formula becomes  $RPI-X \pm S^1$ . When the S-factor is positive, prices (and hence revenues) increase, and when the S-factor is negative prices decrease. A similar form of control applies to revenue cap regulation where the S-factor varies the maximum allowed revenue pre-determined for that year within the formula. In general, the purpose of these incentive mechanisms, whether a direct revenue adjustment or an S-factor, is to motivate or incentivize the service provider to improve its level of service by increasing the link between service levels and revenues.

## 6. **DEVELOPING AN EFFECTIVE S-FACTOR SCHEME<sup>2</sup>**

For an S-Factor scheme to be effective, it must meet the following basic criteria:

- it should reflect aspects of service that are received and valued by all customers (e.g. reliability and telephone response);
- the targets must be easy to measure (and thus be at minimum cost);
- the scheme must be simple to communicate, understand and manage by the service provider;

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<sup>1</sup> RPI is the Retail Price Index, X is the efficiency factor and S is the service incentive factor.

<sup>2</sup> This section heavily relies on S-factor schemes introduced by different regulators in Australia and UK.



- accurate baseline performance should be easily established;
- the measured performance must reflect the service provider's efforts (i.e. events not outside the control of service provider); and
- the amount of the incentive must reflect the customers' willingness to pay.

There are also many issues that must be resolved. Experience in many jurisdictions suggests that this scheme can be ineffective. Further, some regulators, having established such a scheme, have abandoned it because of its complexity. Moreover, the schemes in use are also found to differ. These differences are with respect to:

- the form of S-factor scheme takes;
- the way performance is measured;
- the type and number of measures to be included;
- whether service measures should include only those who are worst served or reflect "all customer" performance;
- the incentive rates applied to the measure of service performance;
- whether the scheme should be symmetrical, that is, provide rewards for performance above a threshold and penalties for under performance; and
- whether exclusions should be allowed and the types of exclusions.

In general, S-factor type schemes are aimed at maintaining and improving average network performance, while GSS are aimed at maintaining minimum service levels to worst served customers. However, the aspects of service covered by GSS type schemes can be more targeted than the average measures typically used by S-factor schemes. In fact, each of the schemes are aimed at addressing distinct objectives. Therefore, there is merit and place for having both types of schemes in the regulatory framework. **Table 2** below sets out some of the key differences between GSS schemes and S-factor type schemes.

Table 2 – Major Differences between GSS and S-factor Schemes

GSS Type Schemes	S-factor Type Schemes
<ul style="list-style-type: none"> <li>• Provides for penalties only</li> <li>• Focuses on worst served customers</li> <li>• Sets minimum standards for service quality</li> <li>• Payments made directly to affected customers</li> <li>• Information reporting limitations, as all affected customers may not be known</li> <li>• Different aspects of service generally dealt with including: reliability, new connections, appointment keeping and complaint handling.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides for rewards and penalties</li> <li>• Focuses on average performance</li> <li>• Sets average network performance targets</li> <li>• Average prices for all customers increased or decreased</li> <li>• No information reporting limitations</li> <li>• Aspects of service generally dealt with included reliability (some have included customer service too).</li> </ul>

### 6.1 Form of S-factor Scheme

S-factor schemes are generally of two (2) different forms:

- **Target based** S-factor schemes take a measure of service performance and compare with the **actual** performance in a particular year with either a target or the result in the previous year. The resulting difference in performance is then multiplied by a weighting factor to decide an appropriate factor to be used in the price control formula.
- **Performance band based** S-factor schemes defines bands around the incentive target and reward points for actual performance depending on which performance band is achieved.

## 6.2 Designing of the S-factor

There are a number of ways in which the S-factor can be designed:

- **To maintain a desired performance level** simply by setting a target and providing a reward (penalty) when target is met (not met).
- **To provide an incentive to improve performance** over time by changing the target annually so that service provider has to improve its performance each year to meet the target.
- **To reward sustained performance improvements** by setting target for a year at the actual result for the previous year. The reward (penalty) depends on the achievement of previous year target.

## 6.3 Types and Number of Service Performance Measures/Indicators

The number of service quality indicators/measures incorporated into the scheme should be minimized so as to not dilute the incentives provided, and should target only those services that customers value highly. It also makes for easier data collection and benchmarking to identify a target level. Since the S-factor may contain several indicators, the regulator must also decide whether to consider each indicator separately or aggregate them into an overall quality index.

Using separate indicators facilitates transparency and allows stakeholders to see where service has either fallen short or exceeded the targeted levels for each indicator. Alternatively, aggregating the indicators into one index allows for a simpler presentation, and provided that the weights used in designing the index reflect the relative value that customers assign to the indicator, should yield the same output as keeping them separate. In selecting the appropriate indicators for inclusion in the S-factor, there are certain criteria that must be considered:

- the indicators should relate to areas of service that are important to customers, such as reliability, technical quality and commercial quality;

- the indicators should be measurable and the service provider should be able to affect the measured quality;
- the cost for the service provider to improve service level should not be onerous; and
- the indicators should be universally applied to every customer, and not ignore pockets of service quality problems.

### **6.3.1 Reliability Indicators**

Of major concern to customers in the area of reliability, is the duration and frequency of these outages. Outages are of two basic types, planned and unplanned. Planned outages are as a result of scheduled maintenance and are usually preceded by a public notification so that customers can make the necessary adjustments. Unplanned outages are just as the name states, unplanned, and so are generally more disruptive to customers. These may be caused by a number of factors ranging from accidents and failures involving elements of the service provider's network, to poor maintenance. The indicators that the RIC considers important when measuring reliability<sup>3</sup> are:

- SAIDI - System Average Interruption Duration Index measures the total number of minutes, on average, that a customer on the distribution network is without electricity in a year.
- SAIFI - System Average Interruption Frequency Index measures the average number of times a customer's supply is interrupted in a year.

To allow for more stringent monitoring and collection of accurate data, these two indicators have been included as overall standards in the revised GSS.

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<sup>3</sup> A third indicator known as CAIDI, Consumer Average Interruption Duration Index, is often included as well and measures the average interruption time per consumer affected by the interruption per year. It is calculated as SAIDI /SAIFI.

### **6.3.2 Quality of Supply Indicators**

Quality of supply can be measured directly through the use of voltage quality measuring equipment or through secondary sources (indirectly) such as the number of customer complaints relating to quality of supply. Indicators of power quality generally relate to issues surrounding the characteristics of the electricity supply, specifically voltage surges or sags and harmonic distortions. The impact that voltage variations have on customers include the need to reset computers or clocks, or damage to equipment. Industrial customers may suffer significant losses due to interruptions to manufacturing processes. In its Final Determination for the first price control period, the RIC further identified measures that should be implemented in order to properly measure and collect data on the quality of supply. The installation of equipment for monitoring quality of supply at each zone substation to better monitor voltage problems was only partially completed, making measurement difficult, so there is an inadequate collection of baseline data to enable the RIC to set any targets in this area.

Furthermore, unlike reliability indicators such as SAIDI, there are no commonly used indicators for measuring the average quality of supply to customers. Indirect measurement involves indicators such as the number of complaints about various aspects of supply quality. Accurate classification of complaints into the categories is difficult to achieve and therefore these indicators are not considered to be particularly reliable. In addition, there are a number of factors that can cause supply quality to vary, including the effect of the customer's own equipment, for example. Many of these factors are outside of the control of the service provider. Consequently, very few regulators include a quality of supply measure.

### **6.3.3 Customer Service Indicators**

Customer service indicators typically include items such as: on-time provision of services like connections and reconnections; timely response to written queries; time to repair faults; the number of different types of complaints; quality of

response and the performance of the call centres. The Guaranteed Standards Scheme included standards to deal with timely provision of some critical services as well as responding to queries.

In the Final Determination for the first regulatory control period, the RIC stipulated that T&TEC should establish suitable systems to track performance of its call centres, with the target being “calls should be answered within 30 seconds”. The call answering system was eventually implemented in March 2009 and reports were generated from November 2009. There is now sufficient data on the historical performance to establish an appropriate benchmark. Typically, telephone call response is usually the only customer service indicator that has been included in S-factor schemes.

#### **6.4 Symmetry of the S-Factor Scheme**

As previously stated, there are rewards and penalties for over- and under- performance. The application of these may be symmetric with rewards and penalties being applied at the same rate, or it may be asymmetric where the incentive is either reward only, penalty only or both, but applied at different rates.

The risks associated with the scheme are intrinsically asymmetrical owing to uncontrollable one-off events, the impact of which can be minimized by mechanisms implemented by the regulator to either cap or exclude such events.

### **7. APPROACHES TO SETTING REWARDS AND PENALTIES IN S-FACTOR SCHEME**

The revenue level that the S-Factor will affect is one for serious consideration. International experience has shown that the S-Factor is usually linked to the customers’ willingness to pay for incremental service improvements, though this is difficult to measure or establish. Ideally, the

incentive should be set at a level lower than or equal to customers' willingness to pay for service improvements, but high enough to influence behaviour. To be successful, the scheme must take into account and ensure that:

- benefits to customers are sufficient to warrant reward/penalty;
- the incentives are sufficient to offset financial incentives the service provider may have to reduce costs at the expense of service level; and
- there is the willingness of customers to pay for improved performance.

Given these considerations, there are some possible approaches that may be used for setting rewards and penalties. These include:

- Measuring the willingness of customers to pay for increments – comparing improvements from the current level of reliability with the additional cost of provision. The problem with this approach is that customers generally have difficulty valuing a hypothetical product. The RIC conducted a 'Willingness to Pay' survey in 2003. However, due to changes that have taken place since then, the results of that survey would not adequately measure or establish the customers' current willingness to pay;
- Estimating the marginal cost of bringing about service improvements - the main difficulty here would be as a result of the network configuration, whether the feed is radial or not, and therefore this will impact on whether or not everyone will reap equitable benefits; and
- Measuring the value of lost load to the service provider - currently there are no systems in place to measure lost load and so quantifying it is not possible.

S-factors have usually been set anywhere between  $\pm 0.5\%$  to  $\pm 1.5\%$  of the total revenue. This level is not only dependent on the marginal costs to make the improvement, but also on the rate at which the regulator hopes to get the service provider to effect changes. To counter the risk of setting rewards/penalties too high, regulators have imposed overall caps on the total value of the reward or penalty. For example, OFGEM, the UK Gas and Electricity Markets Regulator, has set a cap of 2% of a service provider's revenue. It is also possible that at the introduction of the

scheme for the first time, the incentive weightings for a particular measure can be set at a lower rate.

## **8. APPROACHES TO SETTING PERFORMANCE TARGETS**

Once indicators have been identified and decided upon, a target level must be set. There are five ways in which this can be done:

- The most recent year's result;
- Average historical performance;
- Trends extrapolated from past performance;
- Moving average historical performance; or
- The use of external benchmarks.

The chosen method should be specific to how the performance will be measured, the data availability and whether there was a pre-existing target. A good standard for baseline performance data would be at least 5 years as this limits the risks that the target can be misspecified. However, that is not to say, that in the absence of historical data for a new performance measure that a target cannot be set by another method.

## **9. ALLOWING FOR RISKS**

An S-factor scheme introduces additional risks for service providers, especially due to revenue volatility. The aspects of risk that require consideration when introducing the S-factor scheme are the total size of the risk, whether the risks are symmetrical or not, and the extent to which a service provider should be held accountable for events outside its control. Therefore, mechanisms that deal with risk must be considered. These could include:

- **Deadbands** around the benchmark where small variations in performance does not attract reward or penalty, thereby preventing volatility in the service provider's allowed revenue from insignificant fluctuations in performance.



- **Overall limits** – the scheme may have an overall financial limit. This has the advantage of providing a level of certainty to the service provider with respect to the maximum penalty that may be imposed on it.
- **Collars** – setting caps and floors to limit a service provider’s risk of a particularly poor performance year. Collars are also used to remove outlier performance.
- **Allowing for exclusions** – this is most apt when the service provider is not responsible, as the event might be totally beyond its control. For example, lack of generation or exceptional weather.

## 10. RIC’S PROPOSALS

The detailed discussion above highlights the complexity associated with the implementation of an S-Factor scheme and the distortions that might be created if the scheme were incorrectly calibrated/calculated. Among other things, the RIC has also noted the difficulty of measuring service standards, calibrating the level of service into a dollar measure based on customers’ values (willingness to pay) and designing a scheme to reward or penalize the service provider. There are additional issues that concern the RIC, including: the accuracy and availability of data; and the observed variability of service performance indicators of T&TEC so far.

Given the complexities discussed above, the RIC is of the view that introducing an S-factor scheme at this time may not be appropriate and there is a risk that the scheme may not work as intended. However, regulatory measures to further encourage reliable service performance remain a priority for the RIC. In this regard, the RIC will continue to collect information on and monitor the indicators introduced in the first regulatory period, with emphasis on reliability measures such as SAIDI, SAIFI and CAIDI, as well as customer service indicators like “calls answered within 30 seconds”. The RIC will also continue to publish the performance statistics on service standards.

The RIC also proposes to use the **Direct Revenue Adjustment** mechanism, described in Section 5.3 above and will seek commitment from T&TEC to improve service quality in specifically identified areas where customers have the greatest needs or concerns. In this regard,

- The RIC will establish clearly identified service quality and will adjust T&TEC’s allowed revenue in response to the differences between the identified target level of service and the actual level of service achieved.
- The specific reward and penalty to apply will also be defined upfront. The targets to be considered for the Direct Revenue Adjustment mechanism will be based on two indicators:
  - the “percentage of telephone calls responded to within 30 seconds”; and
  - the “number of customer interruptions below a certain target level”.
- The RIC will set target levels for each year and the monetary rate to be applied to the differential between actual and target levels. The adjustment will be made year-to-year to continuously incentivize T&TEC to improve performance.
- The penalties associated with these performance indicators will be capped at a level that does not endanger the service provider’s continued operation.
- The RIC, depending on the efficacy of this approach, may in the future continue to use this general approach or revise or amend it as it sees fit, including broadening the range of performance indicators to be taken into account.

## 11. CONCLUSION

This document assessed the different types of service incentive schemes and highlighted the complexity associated with the implementation of an S-factor scheme and the distortions that may be created if the scheme were incorrectly calibrated/calculated. Based on its analysis, the RIC is reluctant to introduce the S-factor scheme at this time but has proposed the use of the Direct Revenue Adjustment mechanism to improve service quality in two main areas of concern to customers at this time.

The RIC welcomes submissions on the proposals contained in this document.
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