

Establishing an Appropriate Form of Price Control

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As part of the second price control review for the electricity transmission and distribution sector, the RIC intends to revisit the forms of price control that are consistent with an incentive framework so that the RIC makes an informed decision regarding the most suitable approach going forward. The document is also intended to highlight the key strengths and weaknesses of the alternative approaches.

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Document

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1. INTRODUCTION

1.1 Background

The Regulated Industries Commission (RIC) is required to establish principles for determining rates and charges of service providers under its purview. Sections 6, 47 - 52 and 67 of the RIC Act provides that the type of overall regulation utilized by the RIC be some form of incentive regulation, however, the Act does not specify any particular form of price control. Therefore, the RIC is free to utilize any form of price control that it deems appropriate for the sectors under its remit. The form of price control is the high level structure adopted to establish price controls or price limits and refers to the specific manner by which the regulated entity can recover costs, which can have several different variations. In its first price review for the electricity transmission and distribution sector in 2006, the RIC reviewed the three primary forms of price control under incentive regulation¹ that met the requirements of the Act namely:

-) Price Caps;
-) Revenue Caps; and
-) Hybrid forms of control.

The RIC's final decision was to utilize a fixed revenue cap for the 2006-2011 regulatory control period.

1.2 Purpose of the Document

As part of the second price control review, the RIC intends to revisit the forms of price control that are consistent with an incentive framework so that the RIC makes an informed decision regarding the most suitable form of price control to be utilized going forward. The document is also intended to highlight the key strengths and weaknesses of the alternative approaches.

¹ These forms of price control can also be classified as *ex-ante* price controls. The rate of return price control can also be classified as an *ex-ante* price control, but does not fall under the incentive regulation approach.

1.3 Structure of the Document

The remainder of this document is structured as follows:

Section 2 briefly outlines the various forms of price control which can be used under incentive regulation and evaluates their suitability for use *vis a vis* certain assessment criteria.

Section 3 evaluates the performance of the fixed revenue cap that was utilized for the 2006-2011 regulatory control period for the electricity distribution and transmission sector in Trinidad and Tobago and presents recommendations.

1.4 Responding to this document

All persons wishing to comment on this document are invited to submit their comments. **Comments close at 4.00 pm on December 18, 2017.** 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.

2. FORMS OF PRICE CONTROL

2.1 Introduction

Under its Act, the RIC's core functions include:

-) ensuring that an efficient service provider (SP) can execute and finance its functions;
-) undertaking studies of economy and efficiency of operation;
-) prescribing and monitoring standards of service; and
-) establishing the principles and methodologies for determining rates and charges, that is, reviewing and determining price controls.

These functions reflect the responsibility of the regulator to ensure that the service provider for the electricity transmission and distribution sector is able to earn the revenue it requires to sustain its business while delivering quality service to its customers, at affordable rates. With respect to establishing price controls or price limits, the most fundamental aspect of setting price limits is deciding the form of price control.

The RIC Act confines the RIC to an incentive regulatory approach but does not specify a particular form of price control. The RIC can choose the specific form of control that it deems appropriate for the sectors, which encourages the utility to find lower cost ways of delivering service (productive efficiency), to make the best use of scarce resources that accrue the maximum benefit to society (allocative efficiency) and to develop new and more efficient ways of conducting its business over time (dynamic efficiency). Broadly the form of control that can be utilized under incentive regulation is either a revenue or price based control or a combination of both. Where a revenue-based control is used, the regulated firm will have an implied price over the control period. Where a price-based control is preferred, the firm will have an implied revenue over the control period. A regulator can also have additional controls to the primary price control which include correction mechanisms that adjust the primary control for unexpected changes in demand, cost or even quality of service requirements. This Section examines the main characteristics of the primary forms of incentive based price controls and then evaluates these against specific assessment criteria.

In the United Kingdom, Ofgem² has developed a new form of price control regulation, under a framework known as RIIO³. This new Framework represents an evolution relative to the “RPI-X” approach that Ofgem previously utilized to set energy network price controls. The approach remains an *ex-ante* revenue control, but has, among other things, lengthened the duration of the price control period. The impact of this framework and its implications for the RIC will also be briefly examined in this Section.

2.2 Forms of Price Control under Incentive Regulation

Form of control refers to the high level structure for setting price controls or price limits. In broad terms, it specifies the manner by which a regulated utility is allowed to recover its costs over the regulatory control period. It includes primarily:

-) what is controlled (prices or revenues) and
-) how the price or revenue is controlled (e.g. individual price caps or tariff baskets).

However, the definition can be broadened to include the length of the period of control period.

The form of price control does not cover the method of assessing the revenue required nor does it detail the recovery of that revenue via the tariff structure. These aspects of a price review as well as the length of the regulatory control period will be discussed in separate papers. The different forms of price control under incentive regulation (RPI-X) are discussed below.

2.2.1 Price Caps

Price caps can be implemented either in the form of a series of separate individual price controls (Pure Price Caps) on the individual prices of the service provider (SP) which are independent of any total revenue requirement or a weighted average price cap (Tariff Basket). Some regulators include a third category; Pure Price Caps with triggers.

In order to establish a Price Cap, estimates of future costs and demand are established, usually for a period of five (5) years. A forward looking price per unit is then set, which is consistent

² The Office of Gas and Electricity Markets (Ofgem)

³ RIIO is an acronym for the phrase **R**evenue set to deliver strong **I**ncentives, **I**nnovation and **O**utputs.

with the estimated Revenue Requirement. The price is then allowed to rise (or fall) in line with inflation (Retail Price Index or RPI) less an adjustment factor known as the x-factor. Hence, the formula is commonly referred to as RPI-X, since prices are held constant in real terms except for the efficiency adjustment.

Individual or Pure Price Caps

Individual price caps, also known as pure price caps, are easier to implement where there are few products of limited fixed or common costs. Where this is not the case it requires significant judgement as to the allocation of these costs to the individual products. This type of price cap provides an incentive to meet increasing levels of demand as long as the marginal cost of supply is lower than the marginal revenue associated with increased service provision. This incentive can dampen efforts at demand management unless alternative measures are put in place. Additionally, while they promote price stability they can result in revenue instability if demand is volatile, which in turn impacts the volatility of their profits. The SP has an incentive to sell more of its product if it can keep its cost lower than the cap that has been set on price, otherwise, the SP will be required to absorb the resultant losses. Under this particular form of control, the SP bears all the risks and therefore, may have to bear a higher cost of capital. However, there are strong incentives to cut costs once the length of the price control is sufficiently long, but there is also the possibility of gaming the estimates of both costs and demand on the part of the SP. In fact, estimation of costs is a problem of all price mechanisms that are based on RPI-X form.

Weighted Average Price Caps (Tariff Baskets)

The weighted average price cap or tariff basket form of price control limits price increases on the basis of a weighted average of the prices of a basket of services. The firm faces a cap on this weighted average price, which changes over time on the basis of the RPI-X formula. The SP is able to increase some prices by more than others (known as “rebalancing”) within the basket, provided that the weighted average increase in prices is within the overall cap. In setting the weighted average price, the weights can be by volume (sales) or value (revenue) and the weights may be fixed by reference to the base year of the price control or they may reflect actual quantities with a lag, thereby breaking the link between allowed revenue and the volume. Under tariff basket controls the SP has some flexibility in the pricing as the individual tariffs in the basket can be

adjusted, as long as the maximum limit on the basket is not exceeded. However, the regulator can include certain regulatory constraints on this flexibility to address concerns that certain groups may be taken advantage of by the SP. Under this type of price control, the SP also has little incentive to dampen rising demand.

Price Caps with Triggers

Price Caps with Triggers are similar to pure price caps, except that a price review may be triggered when certain specified variables move outside a certain range. For example, a trigger can be specified as an increase or decrease in demand by more than twenty (20) percent above or below the forecast level. The other generally used variable is movement in the per unit costs, however, the use of particular trigger events is not mutually exclusive and can be combined.

This form of control has been used by OFWAT⁴ in the United Kingdom during privatization of the water industry where a “shipwreck” clause was included. The shipwreck clause allows companies, or the regulator, to seek an interim determination if circumstances beyond the companies’ control change such that the total impact on the company amounts equal to 20% of turnover. This form of control also provides similar incentive effects as an individual price cap.

2.2.2 Revenue Caps

Under a **pure** (or **fixed or total**) revenue cap⁵, the SP’s revenues are limited to a fixed amount and the cap is subject to annual adjustment for inflationary effects and productivity gains. Fixed revenue caps can be applied at the level of a service basket, service classification or an entire business and they provide discretion to the utility to set charges within the cap. A revenue cap provides the SP with a guaranteed level of income and thus reduces revenue risk.

There are a number of benefits, for example, this form of cap does not provide incentives to pursue new customers or increase sales once the cap is reached. Hence, the ability to make

⁴ The Water Services Regulation Authority (OFWAT) is responsible for economic regulation of water and sewerage industry in the UK.

⁵ Some authors also include a category known as dynamic revenue controls or variable revenue caps. These controls permit revenue to change given changes in particular parameter. Such controls are not the same as flexible revenue caps, where prices are set on a per unit basis based on assumptions about the level of demand.

additional profits through misspecification of demand forecasts is removed. Further, while there is no causal link formed between costs and revenues, it allows for flexibility in tariffs in order to reflect changing costs. Arguably, if costs remain in line with the allowed revenue requirements, it can assure the SP a steady profit stream, which can lead to a lower cost of capital. Under this form of control, prices can be more volatile as compared with a price cap, and it also transfers a greater portion of risk to customers in terms of demand forecasting errors. Fixed revenue caps also create incentives to overestimate capital expenditure over the control period and to delay (between the control periods) undertaking investment.

Often fixed revenue caps are supplemented by a correction mechanism. In its simplest form this mechanism would apply corrections at the end of the price control period and in advance of the following period. Alternatively, a symmetric mechanism could be applied where revenue allowances alter annually during the control and correct for both under or over recovery of revenue. In the final instance an asymmetric correction mechanism can be applied where revenue is corrected for only one type of deviation.

Flexible revenue caps (i.e. average revenue cap or revenue yield) allow total revenue to vary in line with the change in some underlying variable (the growth in customer base or any other variable). Broadly speaking, this form of regulation imposes a cap on the maximum revenue that a utility is permitted to earn per unit of output. Under this form of control, revenue varies directly with output, and the cap is allowed to vary over different time periods in line with the RPI-X formula. Since the average revenue per unit is constant, there is an incentive to minimize costs and increase output, as there is no limit to the total revenue that a firm can generate.

2.2.3 Hybrid Form of Control

As the name suggests it essentially combines elements of both price and revenue caps⁶. Hybrid controls come in a variety of forms; they generally contain a fixed revenue component combined

⁶ The Office of Rail Regulation (ORR) in the United Kingdom imposes a hybrid revenue and price cap form of incentive based regulation. The portion of Network Rail's revenue requirement that is recovered through fixed charges is based on a revenue cap. The rest of the revenue requirement, recovered through variable charges, is subject to a price cap which establishes caps on individual charges but does not impose a limit on the level of

with annual revenue drivers, such as customer numbers, sales and length of network system. Usually, the extent to which the revenue allowance varies with volume will reflect the extent to which underlying costs vary with volume. Therefore, the development of a cost tracking formula is an integral part of setting hybrid controls. A hybrid revenue cap is perhaps the most common hybrid form of control and is effectively a combination of a revenue and a price cap.

The main advantages of hybrid controls are: the lowering of disincentive to expand growth in services; the increased incentives to participate in demand management; the moving of revenue closely in line with costs; and the lowering of financial risk of service providers. Overall, hybrid forms of control offer the potential for significant improvements in regulatory effectiveness. The main disadvantages include the potential difficulty of developing an effective cost tracking formula; the potential to less accurately track incremental costs; and the reduction in incentives to maximize efficiency, since under the hybrid form of control the cap is required to be reset each year of the regulatory period.

revenue that Network Rail can earn. A five year review period is in place which the ORR believes is a long enough period to provide incentives to Network Rail, but also short enough to reflect the inherent difficulties in forecasting. See:https://www.ofcom.org.uk/__data/assets/pdf_file/0028/84169/royal_mail_fti_report_on_regulatory_intervention.pdf

2.2.4 Comparison of Alternatives

The following table outlines some of the key characteristics of different Forms of Price Control.

Table: Summary Impact of Alternative Price Control Mechanisms

	Firm has incentive to price efficiently?	Firm has pricing Flexibility?	Regulated firm bears volume risks?	Information required for setting cap, given allowed revenue?	Information required for compliance?
Average revenue cap (Flexible yield)	Some Incentive (firm can increase profits by pricing efficiently, but may engage in excessive price discrimination)	Yes	Yes	Low (volume forecast)	Low (actual revenues and volume)
Total revenue cap	No	Yes	No	Very low	Very Low (actual revenues)
Hybrid revenue cap	Some incentive	Yes	Some risk	Low (volume forecast)	Low (actual revenues and volumes)
Tariff Basket (Weighted Average Price Caps)	Yes	Yes	Yes (to the extent that regulated tariffs do not reflect marginal costs)	Medium (volume forecast and weights for different services)	Medium (tariffs for different services)
Disaggregated price caps (Pure Price Caps)	Yes (but firm can only exercise this incentive to the extent that it can influence regulated tariffs)	No (except to the extent that firm can influence regulated tariffs)	Yes	High (volume forecast and costs/mechanism for setting individual tariffs)	Medium (tariffs for different services)

Source: Frontier Economics (2006)

From the above analysis some the following are evident:

-) All forms of price control (regimes) have aspects of regulatory gaming associated with them and consequently, the choice of regime should partly depend on the regulator's ability to handle gaming;
-) The allocation of risk and volatility of prices differs between regimes. The choice of regime should include deciding who is best placed to handle that risk, and whether additional mechanisms exist to dampen the volatility without creating additional problems; and
-) The choice of regulatory regime must be predicated on the regulatory objectives that are required for the sector.

2.3 Criteria for assessing Price Controls

In arriving at the right choice of regulatory regime, a regulator must first determine the objectives for the regulated sector. In the case of the RIC, these objectives are embodied in the RIC Act and include:

-) **ensuring the long-term viability of an efficient SP** - that is, the ability to create stable revenue flows for an efficiently operated SP.
-) **the protection of consumers** – that is, its consequent impact on customers through stability of prices (and household bills).

These can be broken down further as:

-) ensuring viability;
-) full cost recovery (that is, how the regime mirrors the cost structure of the SP);
-) economy and efficiency; and
-) ability to pay.

The RIC's objective is to ensure that the form of price control chosen will provide T&TEC with the best incentives to operate efficiently while allowing for a fair level of revenue recovery from electricity customers.

A variety of criteria may be utilized in order to assess whether a particular form of control is suitable for a particular regulatory environment and the regulator's defined objectives for the sector. Such criteria include but are not limited to:

-) The impact of a particular price control on the firm's ability to set efficient prices.
-) The impact on the path of prices or revenues within the regulatory period, as this has implications for the stability of household bills.
-) The allocation of risks, in particular volume risk, between the utility and the customer, that is, whether or not the form of control is highly sensitive to inaccurate volume forecasts.
-) The flexibility and scope to introduce new products or price structures, as this improves the ability to provide services that customers find attractive and to match prices to marginal costs.
-) Information asymmetry and opportunities for gaming.
-) Impact on the utility's incentive to reduce costs and promote efficient behavior.
-) Impact in relation to demand management.
-) Degree to which competition is promoted or a competitive outcome is achieved.

It is important to the RIC, that the form of price control allows total revenue to track total costs, particularly because in the case of electricity transmission and distribution, a significant proportion of these costs are outside of the SP's control⁷. It is also noteworthy to mention that primary controls are often coupled with secondary controls which are utilized to mitigate some of the disadvantages or short-comings of a particular approach.

⁷ The two major costs here are fuel and conversion, which together constitute almost 70% of the costs faced by T&TEC.

2.4 Assessing the Different Forms of Control

Selecting the form of price control should involve comparison of the various options against the assessment criteria outlined previously. These are discussed below.

2.4.1 Weighted average price cap (tariff basket)⁸

Under a weighted average price cap (tariff basket control) the service provider faces a cap on the weighted average price of a basket of services which changes over time on the basis of an 'RPI - X' formula. Under this approach SPs have flexibility in establishing prices (rebalancing tariffs) provided that the overall cap is not exceeded. This flexibility improves the ability of the service provider to match prices to marginal costs⁹.

In terms of volume risk it can be argued that because the cap is placed on prices rather than revenue, there is less volume risk and overall less sensitivity to the accuracy of volume forecasts. However, it means that the SP will in fact have to bear the risk of any short falls in demand. Indeed, price cap controls can provide incentives for firms to meet and expand demand since the revenue received is not capped as it would be under a revenue control. Hence, as long as the marginal revenue associated with increased service provision is greater than the marginal cost of increased service provision, the service provider will have an incentive to increase sales. This will of course run counter to any demand management plans.

All forms of incentive regulation incorporate incentives for efficiency savings. However, depending on whether these are quantity or revenue weights there may be less of an incentive for a SP to incur additional cost savings¹⁰ than a fixed or dynamic revenue cap.

⁸ Individual Price caps as well as Price Caps with triggers are similar to average revenue caps and will be discussed along with them.

⁹ According to economic theory, efficient price setting requires tariffs to be equated to marginal costs. The rationale for this is that marginal cost based prices sends signals to consumers and producers that encourage them to balance the benefits obtained by consuming a good or service with the costs of providing it. However, marginal cost pricing cannot guarantee that revenue will match the total costs of service provision and in natural monopolies it can lead to under-recovery of total costs.

¹⁰ Savings above those embodied in the x-factor.

There are also concerns that the need to specify individual prices and weights in the revenue basket can constrain the development of new services and prices. In instances where the structure and scope of services are stable, this may not be a concern but it may be a constraint in emerging markets.

Price based controls are, in general, not well suited in a regulatory environment where there is a primary focus on maintaining a relationship between revenue and efficient costs over an extended regulatory review period. It can also become a complex exercise to translate target revenue into a weighted average price control which increases the chance of substantial errors being made.

2.4.2 Fixed Revenue Cap

A fixed revenue cap allows revenue to be set equal to the target revenue set for the price review period subject to inflation adjustments. Often, a secondary control mechanism, that is, a correction mechanism is employed. It has also been argued that this mechanism is best suited for SPs that face a high proportion of fixed costs and in sectors¹¹ where volume changes are predictable. Unexpected volume changes can be accommodated by secondary controls.

As in the tariff basket approach outlined above, SPs also have flexibility in establishing prices provided that the overall cap on revenue is not exceeded. In terms of volume risk, where demand is lower than anticipated, customers will have to face increased prices, thus transferring the risk from the SP to the customer. However, a fixed revenue cap can also encourage innovation in the provision of new products as well as pricing structures to meet customer requirements.

The risk of increased costs however, is borne by the SP at least until the next price review. It can also be argued that this can be an incentive for gaming when estimates of demand growth are submitted by a SP as part of a price review, as the SP may be incentivized to submit inflated levels of demand as a way of minimizing the risk of higher than expected growth depressing

¹¹ Such sectors include electricity transmission and distribution.

their profits. In order to counter such an incentive, the regulator may seek to have independent verification of these estimates.

In contrast to a tariff basket cap, a fixed revenue cap may incentivise a SP to encourage conservation among customers.

It is noteworthy to mention that in most non-contestable elements of network industries (i.e. transmission and distribution networks), and where the networks are considered to have a strong or dominant ongoing degree of monopoly, a revenue cap approach is generally considered to be more appropriate by most regulators.

2.4.3 Flexible or average revenue caps (Revenue Yield), Individual or disaggregated price caps and Price Caps with triggers

Flexible or average revenue caps share similar advantages and disadvantages to individual price caps and Price Caps with triggers, and consequently will be discussed together. However, while individual price caps (as well as price cap with triggers) are placed on the price of an individual product or service¹², in the case of an average revenue cap, a cap is placed on the average revenue per unit of output that a service provider is permitted to earn for each year of the regulatory period.

In the first instance, both individual price caps and average revenue caps incentivise service providers to expand output since total revenue and hence profits increase as volume increases¹³. Average revenue caps, particularly if they incorporate weights, also provide some incentives to price efficiently. However, the opposite can also be true as there is little connection between the actual tariff the SP charges for a unit of output and the average revenue it earns for a unit of output. This creates an incentive for the SP to expand output by pricing some services even below marginal cost. The SP can do this by engaging in price discrimination, potentially

¹² The cap can also be placed on an individual customer type.

¹³ A secondary control such as an outperformance reallocation or correction mechanism can be used to nullify such effects.

involving products where the demand is particularly elastic and making up for losses through excessive markup on products with inelastic demand. It has also been noted that average revenue controls are more appropriate where costs vary in relation to volume and demand might be unpredictable.

As with other methods of incentive regulation, flexible or average price controls provide good incentives for cost reduction. However, this incentive may be limited since revenue varies with output thus enabling a degree of cost recovery from customers. Additionally, the link between output and total revenue means that firms are subject to output risk and potential revenue instability.

Under both individual caps and average revenue caps the service provider bears all the volume risk. Its revenue will rise if demand is higher than expected. In practice correction mechanisms have typically been adopted to adjust for under and over-recovery. Further, under an average revenue cap there may not be a systematic relationship between the average revenue cap and costs. There could be two reasons why marginal revenue is likely to be greater than marginal cost. First, because many costs are likely to be fixed, the average revenue cap will likely be greater than marginal cost. Second, the regulated firm can increase volume for those services for which it can do so at least marginal cost. Consequently, the service provider is likely to bear significant financial risk.

2.4.4 Hybrid Revenue cap

Under this approach the incentives to price efficiently varies depending on the formula used to set the cap. Hybrid controls aim at minimizing the potential distortions created by the pure forms of revenue control. The greater the extent to which the revenue allowance varies with volume, the greater the incentive that the service provider will have to artificially expand output by pricing inefficiently.

With respect to volume risk, since the link between allowed revenue and volume is weakened, both the customer and firm bear some volume risk. Indeed, depending on the form of the cap if

actual volume differs from the cap either the service provider or customers will suffer a gain or loss.

Under a hybrid revenue cap, unlike fixed revenue caps, changing price structures may be problematic depending on how volume forecasts are treated. Moreover, while the accuracy of volume forecasts is not critical under a fixed revenue cap, the accuracy of such forecasts is more important under a hybrid form because there is in fact a variable component to such a control.

Hybrid controls also require considerable information with respect to the appropriate coefficients and forecasts for the control equation which makes it more difficult to implement than a fixed revenue control

2.5 The Evolution of RPI-X to RIIO

RIIO is an acronym for the phrase **R**evenue set to deliver strong **I**ncentives, **I**nnovation and **O**utputs and is the new framework for setting price controls in the electricity and gas markets in the United Kingdom¹⁴. RIIO is an *ex-ante* form of price control that is built on an RPI-X platform and is geared towards the achievement of long-term value for money for existing and future consumers and also ensuring that the energy companies contribute to a sustainable energy sector.

In 2013, and after several years of review and consultation, Ofgem replaced the RPI-X form of price control with RIIO. Ofgem concluded that the RPI-X approach worked well by delivering lower prices, better quality of service and significant investment however, new challenges lay ahead, inclusive of extensive environmental obligations.¹⁵ These commitments required utilities to make significant infrastructure investments in order to maintain a reliable and secure network, and also manage demand and electricity generation volatility in a low carbon future.

¹⁴ RIIO was implemented in 2013 by the Office of Gas and Electricity Markets (Ofgem) in the United Kingdom for gas and electricity transmission markets, after a three-year period of review of the RPI-X approach including extensive consultation with stakeholders. RIIO was implemented for the electricity distribution market in 2015.

¹⁵ The energy sectors had to respond to European Union (EU) and global climate policy demands including the need to deliver a low carbon economy with a target of 80% reduction in greenhouse gas emissions by 2050 and a more urgent target of de-carbonized electricity generation by 2030.

Ofgem responded by introducing RIIO as the form of price control that would foster greater innovation and investment in the regulated energy markets into the future and provide well-defined benefits to consumers. The more innovative service providers would receive more financial rewards, while those that failed to innovate sufficiently would face financial penalties and further regulatory scrutiny. RIIO was structured to attract more investment into the UK energy infrastructure by increasing the price framework period from typically five years (under RPI-X) to eight years, which is intended to create stability over a longer period and increased investor confidence. At its heart however, RIIO continues, as before under RPI-X, to be a revenue cap, based on estimates of efficient operation and which allows for a fair return on the Regulatory Asset Base.

The main features of RIIO are as follows:

-) **Longer price control period:** The period of price control has been lengthened to 8 years with a provision for a mid-period review of output requirements in the event of any major changes, which allows utilities to retain cost savings for a longer period and make investments that have a longer payback period, incentivizing long-run infrastructure enhancement;
-) **Customer-oriented Business Plans:** Utilities must produce business plans that focus on the needs of customers with evidence of how they intend to deliver services to existing and future consumers. The regulator will rely heavily on this information to inform decisions on what proportion of base revenue requests will go into final pricing;
-) **Revenue Requirement for long-run Investment:** The approach builds up revenue requirement using assessment of total expenditure (totex) rather than distinguishing between operating and capital expenditure, on the basis that totex balances competing goals of reducing cost and increasing investment, in the short, medium and long term; and
-) **Performance Incentives:** There is heavy emphasis on delivery of outputs rather than inputs, focusing on six (6) primary outputs categories of customer satisfaction, reliability and availability, conditions for connections, safety, environmental impact, and social

obligations. The degree to which these obligations are met by the utility, will determine the level of financial adjustment (rewards) to a SP's revenue requirement.

In the UK, the RPI-X approach had been in use for roughly 20 years, going through at least four (4) iterations of price review cycles which provided valuable learning to the regulator on aspects that could be improved. The RIC will continue to examine the RIIO approach to evaluate which aspects of the approach can be useful within the local context. The RIC utilized a revenue cap for T&TEC in its 2006 Review which already placed emphasis on some of the output categories that RIIO has at its core. For instance, the RIC has monitored reliability and availability of electricity supply by T&TEC through its performance monitoring scheme, has established minimum quality of service standards to be delivered by T&TEC and has assisted consumers with obtaining redress regarding complaints about T&TEC. The RIC's thinking on these and other output categories will be communicated in separate documents for public consultation during the price review. Additionally, the RIC will also examine the length of the regulatory review period in a separate document.

The RIC will continue to monitor the performance of RIIO in the UK and give due consideration to its successes and failures for the next price review period, especially with respect to customer engagement.

3. THE FIRST REGULATORY CONTROL PERIOD: ASSESSMENT OF THE FIXED REVENUE CAP.

In the first regulatory control period for the electricity transmission and distribution sector, the RIC preferred form of control was a fixed (total) revenue cap. A fixed or total cap was chosen because it provided distinct advantages, such as striking an appropriate balance of risk between customers and the service provider, while concomitantly incentivising the service provider to

reduce costs. It also provided T&TEC with the operational flexibility it needed to meet its service objectives and, at the same time, it exposed T&TEC to risks it could control.

The RIC supplemented its fixed (total) revenue cap with a number of secondary controls including:

-) An efficiency carryover mechanism for both operating expenditure and capital expenditure.
-) A profit sharing mechanism if profits were to exceed 10% of total revenue.
-) A notional unders and overs account.
-) A side constraint of 7.4% on the annual increase in revenue.

In terms of its performance, RIC's fixed revenue cap will be assessed below against the criteria outlined in section 2.

3.1 Efficient Prices.

As previously noted efficient prices mean prices set at marginal cost, however, under conditions of natural monopoly marginal cost pricing will lead to under-recovery of revenues. The RIC discussed this issue in its Final Determination (2006) and noted that two solutions have been suggested to address this issue:

-) provide revenue on a per customer basis that is lower than the stand alone cost of providing the service; and
-) provide revenue on a per customer basis that is higher than the avoidable cost of providing the service.

Setting prices within these bounds (generally referred to as upper and lower bounds for efficient prices) implies an allocation of the joint or overhead costs of service provision across customers. The RIC also noted that this efficiency goal would be met if the recovery of joint or overhead costs is derived from those customers with more inelastic demand for the service over the relevant price range (i.e. second-best or Ramsey pricing rule). A strict adoption of this rule

would make prices high for consumers whose use of electricity constitutes a necessity, which are usually the low-income groups.

In the absence of a marginal-cost study the RIC utilised a fully distributed cost model to establish starting tariffs and ensured through its Annual Tariff Approval Process that tariffs remained cost reflective. In this regard the fixed revenue cap has worked well.

3.2 Stability of households bills

In its final determination for the transmission and distribution the RIC set starting prices for the T&TEC for the period 2006-2007. In the annual adjustment for the period 2007-2008, average household bills rose by 0% - 1.21%. For the period 2008-2009, average household bills fell between 7% and 0.4%. In 2009-2010 average household bills rose between 3.1% - 3.7%. The fixed revenue cap has therefore performed well in this regard.

3.3 Allocation of Risk

As noted previously, under a fixed revenue cap volume risks are borne by customers because the service provider is guaranteed a fixed total revenue over the price control period. This risk did not materialize because, with the exception of industrial customers, actual demand out-stripped forecast demand in every other customer category over the period.

3.4 Flexibility and Scope to introduce new products or price structures

During the first price control period, T&TEC did not indicate any desire to introduce a new pricing structure, but the revenue cap can accommodate alternative pricing structures.

3.5 Information asymmetry and opportunities for gaming

During the first price review for T&TEC the RIC did not see any evidence of gaming. With respect to information asymmetry, the extent to which this particular form of control has been able to reduce the information asymmetry will become evident as the RIC moves to closely examine T&TEC performance vis-a vis the building block components that it had established in its first review.

3.6 Impact on the firm's Incentive to Reduce costs and Promote Efficient Behaviour.

The impact of incentive regulation on the performance of state-owned and run utilities has extensively engaged the attention of the RIC. In this regard the RIC notes that the primary incentive to reduce costs embodied in incentive regulation is the ability to make profit. Consequently, it may be argued that such a regime will be most successfully applied to utility service providers that are privately owned and operated, and conventionally financed through a mixture of debt and equity¹⁶. Here the incentives are transmitted by (i) shareholders, who maximize their value by encouraging out-performance of regulatory targets and (ii) debt holders/lenders, who are keen to avoid under performance in order to protect their interest payments and principal. The RIC understands that utilities that are state-owned and controlled sometimes have very different objectives and it may be necessary to provide additional incentives or employ different mechanisms to ensure improved efficiency on the part of those utilities. This may entail a heavier reliance on “sticks” within the regulatory framework, that is, setting tough targets, rather than “carrots”, that is, rewarding performance beyond the target level.

Consequently, the RIC noted that during the relevant period, T&TEC has to a large extent treated the fixed revenue cap as its budgetary allocation and it is unclear the extent to which efforts have been made to reduce costs. This will become clearer as the RIC closely examines costs as part of

¹⁶ Indeed different types of corporate entities, with their associated regulatory and financing arrangements, lead to different incentives for cost efficiency.

its price review process. The RIC will also devote extensive efforts as part of the second review to exploring options for incentivizing T&TEC to out-perform expenditure forecasts.

3.7 Demand Management.

As previously noted, a fixed revenue cap performs well with respect to encouraging a service provider to promote conservation. Overall, however, the RIC has observed that demand in the case of both residential and commercial customers had consistently outstripped the estimates included in final determination for the first regulatory control period. The RIC understands that for the most part, that the last price review straddled a period of economic growth in Trinidad and Tobago and this would have fuelled the demand for electricity. The RIC, as part of the second review, will seek to employ measures that will encourage greater conservation and energy efficiency among customers. Even so, the RIC is cognizant that there are changes in the economic landscape, such as electric vehicles, that may increase demand in the longer term. Concomitantly, the growth of renewables and the possibility of greater self-generation can dampen demand.

Based on the above analysis the RIC is of the view that a fixed revenue cap remains fit as the appropriate form of price control for the electricity transmission and distribution sector.

Comments are welcome on the RIC's proposal to continue with a fixed revenue cap for the 2018-2023 Price Control period.