

# **The Treatment of Input Price Inflation in Price Reviews**

January  
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*This document explores the RIC's approach to the treatment of input price inflation, within the second price review for the electricity transmission and distribution sector.*

Consultative  
Document

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## 1. BACKGROUND

An important issue faced by all utility regulators is the treatment of input price inflation in price reviews. Where the price of inputs may be increasing, or may become more volatile, regulators employ various assumptions and methods for estimating the effects at the start of the price control period. Essentially, increases in costs that are faced by a utility arising out of input price inflation must be accounted for if they are to be recovered via the rates that customers pay. Conversely, in the event of decreasing input prices, the utility may benefit from higher than anticipated profit margins through lower than anticipated costs. Therefore, the cost allowances for regulated entities should adequately reflect the potential impact of future changes in input costs.

The Regulated Industries Commission (RIC) is responsible for setting maximum rates for the electricity transmission and distribution sector and is governed by the RIC Act. As part of its mandate, the RIC seeks to ensure that reliable electricity services are provided to customers at affordable rates. The price of inputs directly impact operating costs which comprise a significant portion of the utility's total costs that need to be recovered from customers, through rates.

Cost inflation reflects external inflationary increases in the purchase price of inputs used to produce and distribute electricity. Both price cap and revenue cap approaches to incentive regulation use an adjustment factor for cost increases when deriving the revenue requirement of the utility. In determining appropriate incentive schemes for the utility, consideration must be given to the cost inflation index that is most suitable. Ideally, the various components of the regulated utility's cost base should be indexed using specific deflators. However, in the absence of these, measures of inflation such as the Consumer Price Index (CPI) or the Retail Price Index (RPI) may be used as an overall deflator to index for cost inflation in the price review. This is the approach that was adopted by the RIC in its first review of the electricity rates and charges for the Trinidad and Tobago Electricity Commission (T&TEC)<sup>1</sup>.

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<sup>1</sup> The first regulatory control period covered the period June 2006 - May 2011.

## **1.1 Purpose of the Document**

The purpose of this document is to examine how input price inflation fits into the regulatory building block-approach and the approaches that the RIC will consider in dealing with this issue in its current price review for the electricity transmission and distribution sector. The paper focuses on the effects of short-term inflation adjustments on the revenue requirement and consequently, on price limits for the five-year control period.

## **1.2 Structure of document**

The remainder of this document will be structured as follows:

- **Section 2** – gives a brief introduction explaining the overarching regulatory approach adopted by the RIC;
- **Section 3** – looks at concept of setting revenue allowances when price inflation is considered;
- **Section 4** – outlines the RIC’s approach to accounting for input price inflation;
- **Section 5** – prescribes certain methods for dealing with uncertainty associated with input price inflation; and
- **Section 6** – conclusion.

## **1.3 Responding to this Document**

All persons wishing to comment on this document are invited to submit their comments by **February 22, 2021**.

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.

## 2. INTRODUCTION

The Regulated Industries Commission (RIC) Act No. 26 of 1998 established the RIC as the economic regulator of the electricity transmission and distribution sector in Trinidad and Tobago and the RIC has commenced a price review for the second regulatory control period 2021 - 2026. The overarching regulatory approach adopted by the RIC to regulate prices/revenue is an incentive-based approach, commonly referred to as an RPI-X approach<sup>2</sup>. In its most general form, the RPI-X approach involves limiting price changes to the general inflation level less a specified “X” factor. The aim of the “X” factor is to reflect the expected change in productivity of the service provider. RPI-X regulation is intended to provide strong incentives for efficiency, as any savings above the predicted rate “X” can be kept by the service provider.

Over time, the RPI-X model has evolved and now takes on a number of different forms. However, two main common approaches have been utilized to establish the “X” factor. The first approach relies heavily on Total Factor Productivity<sup>3</sup> which is data intensive and usually works best in environments already adapted to cost effective practices. The second approach, known as the “building-block” approach, was the preferred approach of the RIC in the first regulatory control period. This approach entails assessing the revenue requirement that an efficiently-operated service provider might be expected to recover from customers through rates over a five-year period, taking into consideration projected operating and maintenance costs (Opex) and projected investment (Capex) in the service provider’s asset base.

The RIC is required to establish the principles and methodologies for rate setting and review these every five years (RIC Act, Sections 6(h) and 48). This five-year approach is aligned with international best practice, and is used by most regulators<sup>4</sup>. It offers the utility a clear and stable environment to make

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<sup>2</sup> The RIC has discussed the RPI-X approach at length in its consultative paper, *Establishing the Appropriate Form of Price Control*. This paper is available on the RIC’s website at [www.ric.org.tt](http://www.ric.org.tt).

<sup>3</sup> Total Factor Productivity (TFP) or Multi Factor Productivity (MFP) reflects the overall efficiency with which labour and capital inputs are used together in the production process. Essentially if labour and capital inputs remained unchanged between two periods, any changes in output would reflect changes in TFP.

<sup>4</sup> As part of the second price review for T&TEC, the RIC has published a consultative paper on *Determining the Length of the Regulatory Control Period*. This paper can be viewed on the RIC’s website at [www.ric.org.tt](http://www.ric.org.tt).

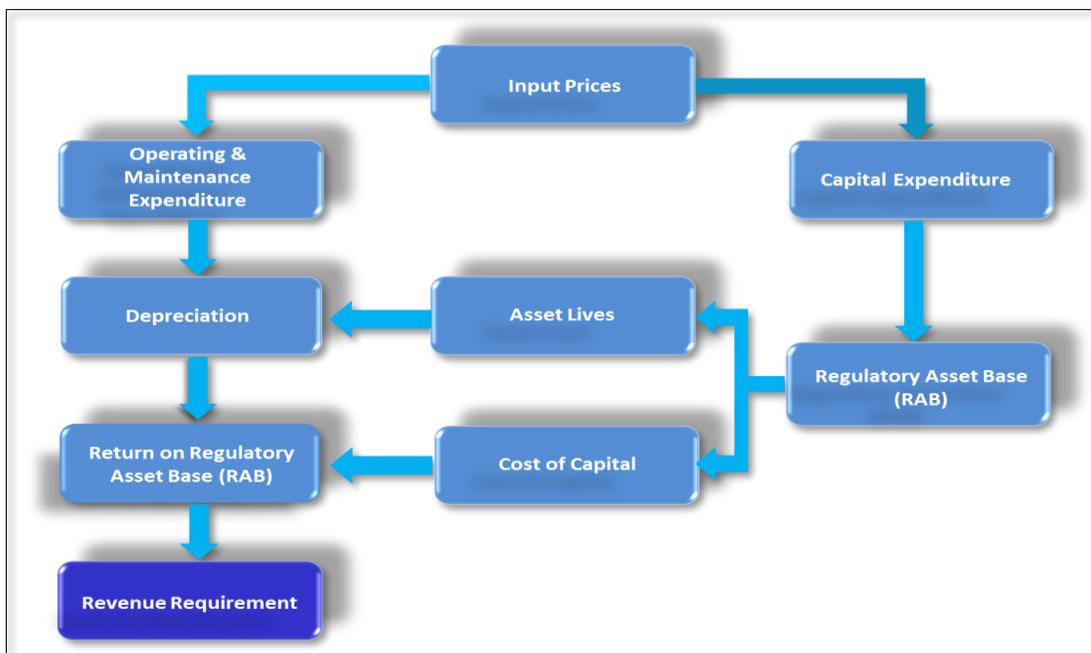
necessary investments. The building-block approach is consistent with Section 67 (4) of the RIC Act, which requires the RIC to have regard to, *inter alia*:

- Replacement capital cost expended;
- Least-cost operating expenses which must be incurred;
- Annual depreciation; and
- Return on the rate base.

Under incentive regulation, the building block approach summarized in Figure 1 below, places emphasis on the cost components of Opex and Capex. Input price adjustments for these various cost components, may be influenced by a number of factors, one of which is input price inflation.

In the case of regulated entities, increases in costs arising from input price inflation may not be recovered if they were not accounted for in the revenue requirements of the service provider and conversely, decreases in input costs can result in windfall profits to the utility, all things being equal. The input price adjustments made in determining the revenue requirement are therefore an important element of the regulatory assessment and have an impact on the revenue requirement and the processes of efficiency assessment.

**Figure 1: Building Block Approach from Input Prices**



### **3. SETTING REVENUE ALLOWANCES**

As discussed earlier, in the simple RPI-X model, allowed revenue is indexed to take into account price inflation. The index that is used should be the best reflection of the increases in prices to be faced by the utility. Also, the index needs to be practical to implement, robust and transparent.

In the determination of allowed revenue, the movement in the overall level of prices is an important consideration, as measures of general inflation are required for a number of purposes. Adjustments for inflation are required to determine the real cost of capital, to adjust the Regulatory Asset Base (RAB) and other costs, and to set the annual escalation factor for price limits during the control period.

Given the step-wise approach to price reviews, input prices will be assessed prior to finalization of price controls for the second regulatory control period, therefore, there will inevitably be an element of uncertainty about the movement of input prices. There are a number of generic mechanisms that regulators normally employ to take input cost pressures into account. These include:

- allowing for separate “cost items” in the revenue allowance, with specific indicators of input cost trends. This may be practical for a small number of major activities, such as labour inputs, but may not be so for more general cost elements; and
- building a “weighted” cost index, reflecting different cost pressures across activities and weighting these by the proportion of costs accounted for by each activity.

Some regulators have used a “contingency uplift” mechanism to capture several factors that affect future costs. This mechanism consists of an “uplift” that reflects increases in prices beyond those forecast by the regulator. The contingency uplift can help to mitigate the negative effects of unanticipated price fluctuations and it could also cover other types of risk that a service provider may face during a price control. A contingency uplift is typically applied to cost allowances and is based on the ability of the regulator to forecast future movements in risk, which include input prices as well as other factors. This approach may also be used in conjunction with other mechanisms.

In practice, increases in input costs including labour, energy and raw material costs have been estimated differently by different regulators. For example:

- **taking the future price**, since this represents what market experts consider to be the forward-looking price. This approach has been used primarily in forecasting the cost of raw materials.
- **taking an indirect approach** – for example, drivers of labour costs may be used for forecasting labour costs, instead of the direct price of labour.
- **econometric techniques** – where input prices may be forecast by using statistical modeling to explain the pattern in prices that have been observed using historical data.

As it is often difficult to obtain specific deflators, most regulators traditionally use an exogenous index such as the Consumer Price Index (CPI), or the Retail Price Index (RPI) and to a lesser extent the Gross Domestic Product (GDP) deflator, as an overall deflator. While no individual inflation measure satisfies all the criteria of an ideal inflation factor, the CPI possesses many of the characteristics that are desired in an index to be used for cost inflation in price reviews. The CPI is often published by independent government institutions which will eliminate any claims relating to price manipulation, as neither the electricity utility nor the regulator have any influence or control over the index and therefore cannot subject it to manipulation or significant revisions. It is also noteworthy that the CPI is published at regular intervals, as the availability of an inflation index on a timely and regular basis, is critical for price review purposes. It is also generally recommended that regulators use a broad-based government published index that is free of interpretation such as the CPI, as a broad-based inflation index would reflect changes in prices of a large bundle of goods and services. The main criticism that normally arises is whether a consumer focused index is relevant for the electricity sector as the majority of the costs of this sector relates to wages, materials and purchased power/fuel.

Despite limitations, the CPI or RPI remain well recognized and understood measures of inflation for macroeconomic policy management and are widely used for general indexation of public and private sector contracts and charges. While the bundle of domestic products and services used in determining the RPI may not bear a strong resemblance to the inputs of the electricity industry, the RPI provides a useful surrogate for the input price indexes in the absence of an electricity specific cost index in Trinidad and Tobago. In any case, while an industry-specific index has the potential to more accurately reflect the particular costs of an industry, there are important conceptual and measurement difficulties.

Additionally, there is a risk that an industry-specific index can easily equate to the pass-through of actual costs without sufficient regard to efficiency and productivity considerations.

### **3.1 Approaches in Other Jurisdictions**

A number of regulators worldwide have adopted the use of the Consumer Price Index (CPI), or some variant, as the index used for cost inflation in price reviews. The approach used by the Australia Energy Regulator (AER)<sup>5</sup> is to set the revenue that service providers can recover from customers in the first year of the regulatory period, and then for the remaining four years, adjust the revenue allowance to include movements in actual inflation. As part of this framework, the AER escalates the RAB by movements in actual inflation. This approach means that the value of investments in network infrastructure moves in line with actual inflation.

The Electricity Regulatory Authority of Uganda (ERA) publishes detailed calculations for its inflation adjustment factor<sup>6</sup> According to the ERA, operation and maintenance costs for utilities in the electricity supply chain are inflation-adjusted. Inflation fluctuations will therefore imply cost fluctuations to the utilities. Inflationary adjustment is done on a quarterly basis using the index composite underlying Consumer price inflation for the month preceding the quarter to which the tariff relates as published by the Uganda Bureau of Statistics.

The United Kingdom (UK) gas and electricity regulator, the Office of Gas and Electricity Markets (Ofgem) proposed a two-step approach in calculating the effects of input price inflation, as part of its RIIO<sup>7</sup> regulatory framework. An input price trend relative to the RPI for labour, materials and a range of other costs relevant to the inputs purchased by the network companies is constructed. These input price trends are then weighted together based on the assumed proportion of labour, materials, etc. in the cost areas of opex, capex, repex<sup>8</sup> and totex<sup>9</sup>. A third step converts these assumptions into monetary allowances.

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<sup>5</sup> Final position: Regulatory Treatment of Inflation, December 2020. Australia Energy Regulator.

<sup>6</sup> Quarterly Tariff Adjustment Methodology, January 2020, Electricity Regulatory Authority, Uganda.

<sup>7</sup> RIIO (Revenue = Incentives + Innovation + Outputs) Ofgem's recently implemented regulatory framework that replaced RPI-X.

<sup>8</sup> The replacement or refurbishment of assets which are at the end of their useful life due to their age or condition, or need to be replaced for safety or environmental reasons

<sup>9</sup> Totex generally consists of all the expenditure relating to a utility's regulated activities but with the exception of some specified expenditure items.

Ofgem has recently taken the decision to minimize the risk of forecasting error by exploring the use of indexation where feasible, including labour and construction cost inflation (to the extent that evidence suggests this is different from general consumer price inflation)<sup>10</sup>. They have also signaled their intention to move away from the Retail Price Index (RPI) to CPIH<sup>11</sup> for inflation adjustment in calculating Regulatory Asset Value (RAV) and allowed returns, pending further work on whether phasing is necessary for the transition and if so, what form it could take.

The Federal Network Agency of Germany determines revenue caps for a period of five years for each network operator. The determination of each revenue cap is based on a formula that contains the network operator's costs as well as further elements to reflect inflation, general sectoral productivity and quality of network services.

A number of regulatory agencies in the United Kingdom, inclusive of Ofwat<sup>12</sup> and the Civil Aviation Authority have designed their regulatory regimes to preserve the purchasing power of shareholders' funds by adjusting for inflation while remaining neutral in net present value terms. This has been achieved by adjusting asset values by inflation during the regulatory control period.

#### **4. RIC'S APPROACH TO ACCOUNTING FOR INPUT PRICE INFLATION**

In its business plan submission to the RIC, T&TEC is required to provide evidence behind their assumptions for ongoing efficiency, which includes justifications for input price inflation. In assessing the following cost categories, the RIC will consider the evidence presented by T&TEC and conduct its own internal analysis:

- Conversion and fuel costs, which constitute about 50% of T&TEC's total costs<sup>13</sup>, will be treated largely as pass-through items as these are considered non-controllable input costs for T&TEC and are subject to contractual arrangements;
- Labour costs may be escalated by relevant factors used in wage negotiations in similar sectors in Trinidad and Tobago and may also be influenced by prevailing economic conditions;

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<sup>10</sup> Major objectives for the regulatory period are outlined in Ofgem's RIIO-2 Framework Decision, published in July 2018.

<sup>11</sup> Consumer price inflation including owner-occupiers' housing costs.

<sup>12</sup> The Water Services Regulation Authority, the economic regulator for the water sector in the UK.

<sup>13</sup> Based on T&TEC's financial data for the year 2019.

- Depreciation and the return on capital will be adjusted via the Retail Price Index (RPI) which will result in a conversion to real terms. The application of the RPI reflects the changing value of money and it can be argued that a consumer index reflects this best; and
- Other Transmission and Distribution Costs will be adjusted using the Retail Price Index (specifically the Core Index, which removes the effects of food inflation).

As the majority of T&TEC's revenue requirement, which is determined by the RIC, is generated from a few notable or sizeable cost activities, the RIC will apply the above-mentioned approaches to account for input prices and their increases over the second regulatory control period.

## **5. DEALING WITH UNCERTAINTY**

Indexation is not the only way in which the regulatory model takes into account the changes in input prices. As indicated above, some costs are treated as pass-through items. The degree of pass-through can vary, and it is usually applied in conjunction with other mechanisms that account for increases in input prices. Regulators not only have to deal with forecasting input price inflation, but also with the errors associated with forecasts of other inputs. Due to unforeseeable events, input prices may exceed the forecast level and, in some cases, the increase may impact the financeability of the service provider. In this situation, regulators generally apply an additional set of mechanisms to deal with such uncertainty.

Fuel adjustment clauses (FACs) have been in widespread use, where changes in fuel prices are automatically passed on to consumers through bills. FACs can ensure a better alignment of cost recovery in terms of cost causality, can help to stabilize operating margins of utilities and therefore increase the utility's ability to pay its bills, and can reduce exposure to rate shocks as prices closely track fuel cost over time. However, use of FACs can cause significant uncertainty in electricity rates with implications for business risk and competitiveness, loss of incentive for utilities to be more efficient in conversion of fuel and the transfer of risk between utility or customer, depending on movements in market fuel price vs allowed fuel prices established by the regulator.

Another way of dealing with this uncertainty is to allow the service provider to recover additional costs (ad hoc allowances) above those assumed in the price control. This mechanism is usually applied in respect to capital expenditure. This technique permits a utility to pass on all legitimate costs to the consumer immediately. If, upon review by the regulator, the costs are subsequently disallowed as being unjustified, they must be refunded to customers with 10% interest. This approach has been used in the USA.

Employing cost drivers for the non-controllable cost components may also help to preserve purchasing power as these cost driver allowances will take effect as input prices fluctuate.

Finally, the service provider has the option to apply for a re-opener (interim determination) in order to mitigate an adverse effect of changing market conditions. The increases in costs here have to be as a result of exogenous shocks and have a significant impact on the service provider's operations or finances.

## **6. CONCLUSION**

Input prices are not always beyond the service provider's control. In the short-term, the service provider may have no control over input prices, but, in the medium-term, the service provider may change its mix of inputs in order to minimize costs incurred, as it may shift to cheaper inputs price when prices are increasing. In the longer term, the service provider may be expected to mitigate the adverse impact of rising input prices through capital-labor substitution or even outsourcing some of its services.

The assessment of the impact of input price inflation requires a degree of judgment, especially when there is no simple agreed upon methodology. The RIC proposes to continue use of its approach as described above.

Comments are welcome with respect to the RIC's approach to treating with dealing with uncertainty and input price inflation.