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REGULATED INDUSTRIES COMMISSION

SETTING PRICE CONTROL:
FRAMEWORK AND APPROACH

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EXECUTIVE SUMMARY

The Regulated Industries Commission (RIC) is a statutory body with a range of functions including establishing the principles and methodologies for determining rates, monitoring the performance and efficiency of service providers and setting and enforcing standards of service.

Section 6 (2) mandates the RIC to consult with service providers, representatives of consumer interest groups, and any other parties it considers as having an interest in establishing principles and carrying out reviews of rating regimes.

The RIC is in the process of establishing a pricing framework against which the pricing practices of service providers will be assessed and determined. This will be particularly important given that it will be the first price review by the RIC under its Act. As a first step in the review process, the RIC is publishing this issues paper.

The purpose of this paper is to identify the main issues likely to arise in undertaking rate reviews and the framework within which future rate reviews will be conducted, to indicate, where possible, the approach the RIC proposes to take to those issues and to seek comments on them from interested parties. The paper also draws attention to key requirements of the regulatory framework that govern the RIC's decision-making for the purposes of rate reviews.

In addition, the paper addresses in more detail the major elements of the overall framework and approach and highlights the main phases of work and milestones in conducting the rate review exercise. It also identifies the key issues for public comment - such issues to be resolved by the RIC in its decision-making process.

The paper sets out the RIC's preliminary thinking in relation to a number of issues regarding the regulatory principles and methodology. However, the paper does not seek to establish the RIC's final position on all matters related to the price review. The issues/proposals are designed to provide the basis for consultation among stakeholders as well as the RIC's decision-making process.

Two dominant methods of regulation – the rate of return regulation and incentive/price cap regulation are presented. The RIC Act appears to favour the use of incentive regulation over rate of return regulation. The incentive regulation allows service providers to concentrate on minimizing costs and sharing of cost savings with consumers.

Although, the RIC Act specifies the guidelines and objectives in setting the price controls, the Act provides no specific guidance on the exact form of price control that should be used and the scope of the services to be regulated. Consequently, Section 3 of the document, "Approaches to Developing the Regulatory Arrangements", discusses different forms of price control such as revenue cap, price cap, or a hybrid approach.

Based on certain key considerations, the paper proposes that the RIC was inclined to utilize a revenue cap for the initial regulatory period.

The first step in the determination of price/revenue controls for service providers is to establish the allowable (forecast) revenue on which to base a price control. In defining a revenue requirement, the RIC is required under its Act to assess the future cash flow needs of the service provider. Broadly, the Act requires the revenue to be sufficient to cover efficient operating and maintenance expenses, plus an appropriate return of and on capital. This document is seeking to foster discussion on the issues raised with respect to each of those components. It examines the different approaches and issues associated with determining and forecasting efficient operating and capital expenditure, determining the initial value of the regulatory asset base (RAB), rolling-forward of the RAB, treatment of depreciation, and approaches to the calculation of the cost of capital.

The RIC's principal task in undertaking a rate review is to decide on the form of price control. However, there are a number of related issues that need to be resolved as part of the rate review process. These include the calculation of the X factor, the period of regulation, the treatment of quality of service standards, the sharing of benefits and incentive carryover mechanism, correction (adjustment) factor, reset and revocation of a Determination, and the phasing in of tariffs and side constraints.

A summary of issues for consultation and for public comment is included at the end of this document.

Over the next few months the RIC will release additional consultation/information papers that treat, in more detail, with some issues highlighted in this paper. These will cover tariff structures, subsidization, demand forecasting, total factor productivity calculations and sharing of efficiency gains and efficiency carryover.

1. INTRODUCTION

1.1 Background and Context

The Regulated Industries Commission (RIC) is a statutory body with a range of functions including establishing the principles and methodologies for determining rates, monitoring the performance and efficiency of service providers and setting and enforcing standards of service.

Section 6 (2) mandates the RIC to consult with service providers, representatives of consumer interests groups and any other parties it considers as having an interest in establishing principles and carrying out reviews of rating regimes.

Pursuant to its statutory objectives and the legal framework, the RIC is in the process of establishing a pricing framework against which the pricing practices of service providers will be assessed and determined. To achieve this goal, the RIC will need to decide upon a framework and approach that it will use to determine the new price controls in the future. This will be particularly important given that it will be the first price review by the RIC under its Act. It also represents the first opportunity to consult with stakeholders on issues relating to the establishment of the principles and methodologies for determining rates. The framework and approach set out in this document will be refined and modified in the light of comments provided by stakeholders. To ensure its decisions reflect the views of all interested parties, the RIC intends to follow a process that is open and transparent and to provide stakeholders with adequate opportunity to present their views.

1.2 Objectives of this Document

This paper seeks to address all the major issues involved in developing a methodology and the framework within which future price reviews will be conducted. Specifically, the objectives are:

- to outline the broad approach and process for setting price controls;
- to present a range of issues relevant to the establishment of the principles and methodologies for determining rates including:
    - the key aspects of the framework for economic regulation;
    - the methods of regulation;
    - the alternative approaches to incentive regulation; and
    - the key design issues in incentive regulation.

- to provide an opportunity to stakeholders (service providers, customers, other interested parties) to participate and to comment at an early stage in the development of all aspects of the establishment of the principles and methodologies for determining rates.

The comments and information received in response to this document will assist the RIC in developing its proposed approach. The RIC intends to consult on specific aspects of its approach prior to the actual price control determinations.

1.3 Setting and Reviewing Price Controls

The process of reviewing and setting price controls is an interactive one. As part of the rate review process, the RIC will provide regular updates of its work, release information and consultation documents for public comment and provide a number of options for key decisions. The service providers will be required to submit information that the RIC needs to conduct its review. The RIC has, in fact, identified data needs, and a document (**Information Requirements: Business Plan 2004-2008**) is already being made public. The RIC also intends to recruit consultants to review the service providers' investment plans and to undertake asset valuations. The RIC will release its indicative decisions in a draft determination. It will then provide opportunities for all stakeholders to respond to the draft determination in writing. There will also be a public workshop to discuss the draft determination and entertain views and comments.

1.3.1 General Approach

The RIC will conduct the rate review in four broad phases:

- **Developing the rate review framework and establishing service standards**

  The issues related to the rate review (**this document**) and service standards framework (already presented for public comment) are being addressed in separate papers and will be finalized in consultation with all interested parties.

- **Identifying and resolving detailed issues**

  This phase involves resolving detailed issues identified in the rate review framework for each service provider. The RIC will hold workshop(s) on a continuous basis to assist in finalizing some of the technical issues raised during the rate review process.

- **Undertaking the rate determination**

  This phase relates to the process leading up to the presentation of the final rate determination and commences once the above issues have been resolved. The RIC will prepare a draft rate determination for public consultation and there will be extensive consultation before the final rate determination is released.

- **Implementing the rate determination**

  This final phase refers to the introduction and monitoring of the final rate determination.

In short, the key steps in setting and reviewing price control include the following:

- Publication of a background document setting out recent experience in terms of operating and capital costs, prices and output;

- A request to service providers to provide detailed information and a Business Plan of projected future expenditures;

- Analysis of Business Plan and other information by the Regulator;

- Dialogue with service providers and consumers, including customer groups, about the Business Plan and projections;

- Publication and discussion of the regulator's interim views about the form of the future control and the main parameters involved (**Draft Determination**);

- Further discussion with service providers to test the strength of arguments and to obtain further information as necessary;

- A Public Consultation (oral submissions); and

- Publication of the Regulator's **Final Proposals**.

1.4 Structure of the Document

The remainder of this document is structured as follows:

- Section 2 discusses the need for regulation together with a broad outline of the main approaches used for regulation.

- Section 3 discusses approaches to developing the initial regulatory arrangements.

- Section 4 discusses methods of determining Revenue Requirement.

- Section 5 discusses a range of key issues that the RIC will consider in determining the new arrangements for setting price controls.

- Section 6 sets out other additional issues.

- Section 7 lists the issues for consultation.

1.5 Submissions/Questions

Throughout this paper questions have been raised on every issue to guide submissions. Interested parties/stakeholders are encouraged to respond to these questions in their submissions. However, submissions should not be constrained by the issues raised in this document. Those making submissions may wish to address other issues that they think the RIC should consider in developing the price control framework, as long as those fall within the RIC's legal framework and meet the principles and objectives set out in Sections 2 and 3 of this paper. In a few cases, this paper puts forward the views of the RIC on particular issues to encourage focused discussion around the relative merits of a potential decision/issue rather than to have an open discussion.

1.6 Public Availability and Confidentiality

To promote an open and transparent process, the RIC intends to make all submissions public unless confidentiality is specifically sought. Where possible, written submissions should be accompanied by an electronic version. Submissions will be available on-line on RIC's website and for public inspection at the RIC's offices.

All **submissions** should be sent to:

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Copies of this document are available from the RIC Information Centre and on the RIC website.

2. METHODS OF REGULATION

2.1 Objective of Regulation

The need to regulate utility industries arises from their position as main/sole suppliers of utility services and the likely monopoly power associated with these services. As such, those entities are in a position to potentially generate monopoly rents by restricting output and raising prices above socially optimal levels. Furthermore, the absence of competitive pressure substantially weakens the rigors provided by competition, that is, to price and produce efficiently, to satisfy customers with respect to quality of service relative to price and to innovate.

Additionally, in any market, correct price signals are a key determinant of economic efficiency. Prices that accurately reflect costs encourage the efficient allocation of resources and efficient investment decisions. Therefore, in an attempt to ensure that prices reflect efficient costs and to minimize/prevent adverse monopoly behaviour, price regulation is generally implemented.

Price regulation has several objectives[1] but they are generally grouped into three broad categories:

- **Financial Sustainability** - An important objective of price regulation is ensuring that regulated firms are permitted to earn sufficient revenue to finance on-going operations and future investments.

- **Efficiency Objectives** - Price regulation should promote efficiency in the supply of services. There are three aspects of efficiency:

  - **Allocative efficiency** is achieved when prices reflect relative scarcity of resources used to provide network services i.e. when they are close to marginal costs.

  - **Productive efficiency** requires that the service be produced as efficiently as possible by minimizing all inputs as well as by having the most efficient mix of inputs for a given level of output.

- **Dynamic efficiency** involves the movement from one type of efficient use of resources to another type of efficient use of resources.

[1] Other objectives include:

- **Transparancy and replicability** - Viable decision-making process that is fair for all and proper rationales for all decisions.
- **Simplicity of the regulatory approach.**
- **Low administrative costs.**

- **Equity Objectives** imply the fair distribution of welfare benefits among all classes of society, such that:

  - the payments by consumers should be fair and reasonable and due consideration should be given to lower income groups;

  - no class of consumers should bear a disproportionately larger share relative to costs (consumer - consumer equity); and

  - returns to operators should be reasonable (operator-consumer equity).

There are often trade-offs between these objectives and the regulator's task is to bring about balance between objectives. However, different regulatory methods will assign risks and responsibilities differently to the affected parties and will have different consequences. This assignment of rights and responsibilities will affect the regulated firm's risks, rewards and incentives. Accordingly, the method of regulation plays a critical role in the assignment of these rights and responsibilities.

2.2 Methods of Regulation

Although there is a large menu of options[2], the dominant methods of price regulation may be grouped into two broad categories, the Rate of Return (ROR) Regulation and Incentive Regulation or Price Control which includes price caps, revenue control (or RPI-X regulation) etc.

2.2.1 Rate of Return Regulation

Under the ROR regulation, regulators determine the revenue required in order to recover the regulated operators' costs including an allowed rate of return on assets. The price path remains fixed until there is a request for review either from the service provider or by the regulator. The revenue requirement is calculated as follows:

$$RR = E + d + T + (V - D) r$$

[2] Berg, Sanford V. (Infrastructure Regulation and Market Reform - Principles and Practice, Selected Papers, 1997) has identified five general forms of regulation:
- Cost of Service regulation (including direct price setting and rate of return)
- Price cap regulation
- Performance based regulation
- Franchise regulation
- Yardstick regulation

Where:

RR = Revenue requirements, or total revenues
E = Expenditure
d = Annual Depreciation expense
T = Taxes
V = Original book value of plant in service
D = Accumulated Depreciation; [(V - D) = A net rate base ≅]
r = Weighted average cost of capital

The rates are set using a historical test year, adjusted for known and measurable changes. The simplest way to set rates would be to divide the revenue requirement by sales volume as follows:

$$\text{Rates} = RR \div \text{Volume of sales}$$

The underlying idea of this method is that the service provider's revenue must equal its costs, which include all expenses and a 'fair' rate of return for the regulated entity's investment. An important caveat of this method is that it relies on the service provider's information.

As ROR regulation equates prices with costs, it provides relative certainty for cost recovery while limiting the profit level that can be achieved. It also provides a stable environment for attracting investment. However, ROR has a number of serious drawbacks including:

- weak incentives to reduce costs, operate efficiently or increase productivity by linking allowed revenues to costs;
- incentives to exaggerate costs by the operator;
- incentives to over-invest in fixed assets and to incur costs that may not be in the best interest of consumers; and
- limited incentives to develop or introduce new services and to fulfill the needs of consumers.

2.2.2 Benefit Sharing Plans

In an attempt to correct some of the weakness of the traditional ROR method, a number of alternative approaches have emerged and one such alternative is the use of benefit sharing plans. Under these plans the regulated firm is allowed to retain a portion of the profits (earnings sharing) or revenues (revenue sharing) generated beyond a threshold. Once again, these plans are less likely to provide as strong incentives to improve efficiency as would more carefully designed incentive regulation schemes.

2.2.3 Incentive/Price Cap Regulation

Legal Framework

In conducting price reviews, the RIC will be guided by the principles and objectives set out in its Act (specifically Sections 6, 47 to 52 and 67). The Act mandates the RIC to:

- establish the principles and methodologies by which service providers determine rates [Section 6 (1) (h)]; and
- review the principles for determining rates and charges for services every five years (Section 48).

In setting out principles for determining rates, the Act requires the RIC to have regard to:

- the funding and ability of the service provider to perform its functions;
- the ability of the consumer to pay rates;
- the results of studies of economy and efficiency;
- the standards of service being offered by the service provider;
- the rate of inflation in the economy for any preceding period as may be considered appropriate; and
- future prospective increases in productivity by the service providers.

The RIC has interpreted these sections as giving clear support to the use of not only incentive regulation, but to the application of a price cap method in shaping its approach to future rate reviews.

The essential difference between rate of return and incentive regulation is that, while the initial prices under both regimes typically are set on the basis of cost, there is a pre-defined period under price cap regulation. Accordingly, service providers are able to retain the benefits of efficiency improvements and have greater certainty about how long they will continue to retain the benefits. This greater degree of certainty is widely considered to provide better incentives for efficiency improvements.

The central idea behind price cap regulation is the encouragement to "outperform" pre-determined benchmarks embodied in the price cap regime, and allowing the firm to retain part or all of the benefit from doing so. It is argued that the regulated firm will have little incentive to devote managerial effort to achieve the gains if it cannot retain some of the benefits. In fact, price cap regime offers financial rewards to those service providers who continue to improve their efficiency but it applies financial penalties to those who fail to achieve the efficiency improvement benchmarks reflected in the regime. In this way, the price cap regulation endeavours to mimic the discipline of a competitive market. Customers ultimately benefit by sharing in the gains that are realized over time.

There is a range of possible approaches to price cap regulation including revenue capping and price capping. In its simplest form, price cap regulation uses an indexing formula to determine the maximum allowable price to recover unavoidable cost increases but also requires the firm to lower prices regularly to reflect productivity (X-factor), during a defined period. The X-factor is set at the time of the determination for the duration of the regulatory control period. In the determination of the X-factor, a number of relevant factors are taken into account, such as demand, costs and underlying efficiency.

In its simplest form, the formula can be specified as:

$$P_1 = P_0 (1+I - X)$$

Where :

P_0 = price in the base year
P_1 = price in the subsequent year
I = Rate of inflation
X = Assumed future productivity growth (in percentage terms).

The maximum price rises in line with the rate of inflation but falls at a rate X. The level of X is based on the share of expected or required cost savings to be passed on to customers. These savings may arise from increased productivity, technological change or changes in economies of scale or scope. As noted above, the operator that achieves higher productivity gains can retain part or all of the savings.

Price-cap approaches can exhibit a wide variety of designs and characteristics and are open to adjustments in response to particular stakeholder concerns. Accordingly, details can vary by jurisdiction and sector, for example:

- the indexing formula may include an explicit factor to account for extraordinary capital expenditure;

- price-cap approaches can allow for termination of the indexing process in the event of unforeseen developments; and

- the indexing formula may explicitly provide for some degree of "savings sharing" between consumers and service providers.

There are a number of advantages to using incentive regulation:

- it produces financial stability and viability by introducing rating flexibility;
- it provides incentives to minimize costs and allows the attainment of dynamic efficiency;
- it reduces/eliminates bias in factor proportions and thereby removes incentives to expand uneconomically;
- it reduces the ability to cross-subsidize; and
- it reduces the transaction costs of regulation, especially costs related to regulatory hearings.

In short, incentive regulation helps avoid the pitfalls commonly associated with rate of return regulation and allows services providers to concentrate on minimizing costs and sharing of cost savings with customers. The RIC is charged with the responsibility to ensure: that all the regulatory objectives and principles are achieved, that regulation is cost effective, transparent and balanced between the interests of consumers and the regulated entities, and that the regulated prices achieve economic efficiency, revenue sufficiency and equity.

The RIC welcomes comments on the above discussed methods of regulation.

3. FORM OF ECONOMIC REGULATION

The first element in developing a price control framework involves the establishment of the form of economic regulation that is to be applied to service providers. The form of regulation applied to service providers is one of the most important factors in determining the overall performance of the utility and the level of benefits delivered to customers.

It was argued in Section 2.2.3 above that the RIC Act gives clear support to the use of incentives regulation, using a price-cap approach, rather than rate of return regulation. However, various forms of price control fall under the general umbrella of the price-cap approach, and are compatible with incentive based regulation. Within this general requirement, the RIC Act provides no specific guidance as to the exact form of price control that should be used and the scope of the services to be regulated. Consequently, the RIC believes that it has flexibility in the choice of the form of the price control to be adopted. The remainder of this section discusses different forms of price control. It also outlines the RIC's preferred approach and invites public comments.

3.1 Forms of Price Control

Section 6 of the RIC Act sets out the powers and functions of the RIC. Those powers and functions emphasize the importance of ensuring the financial viability of the service providers, the facilitation of competition, where possible, the promotion of efficiency and the protection of interests of customers. Specifically, the powers and functions are noteworthy to:

- ensure, as far as is reasonably practicable, that the service provided by a service provider operating under prudent and efficient management will be on terms that will allow the service provider to earn sufficient return to finance necessary investment [Section 6 (1) (c)];

- facilitate competition between service providers where competition is possible and desirable [Section 6 (1) (k)];

- prescribe and publish standards for services [Section 6 (1) (e)];

- carry out studies of efficiency and economy of operation and of performance by service providers [Section 6 (1) (d)]; and

- have regard 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 [Section 6 (3) (a)].

In assessing different forms of price control, the RIC will have regard to these objectives. In particular, the extent to which these objectives encourage efficient behaviour by the service providers, the extent to which price controls ensure that total revenues track total costs and, finally, the extent to which the different forms of price control have implications for risk allocation between customers and service providers.

3.2 Options for the Form of Price Control

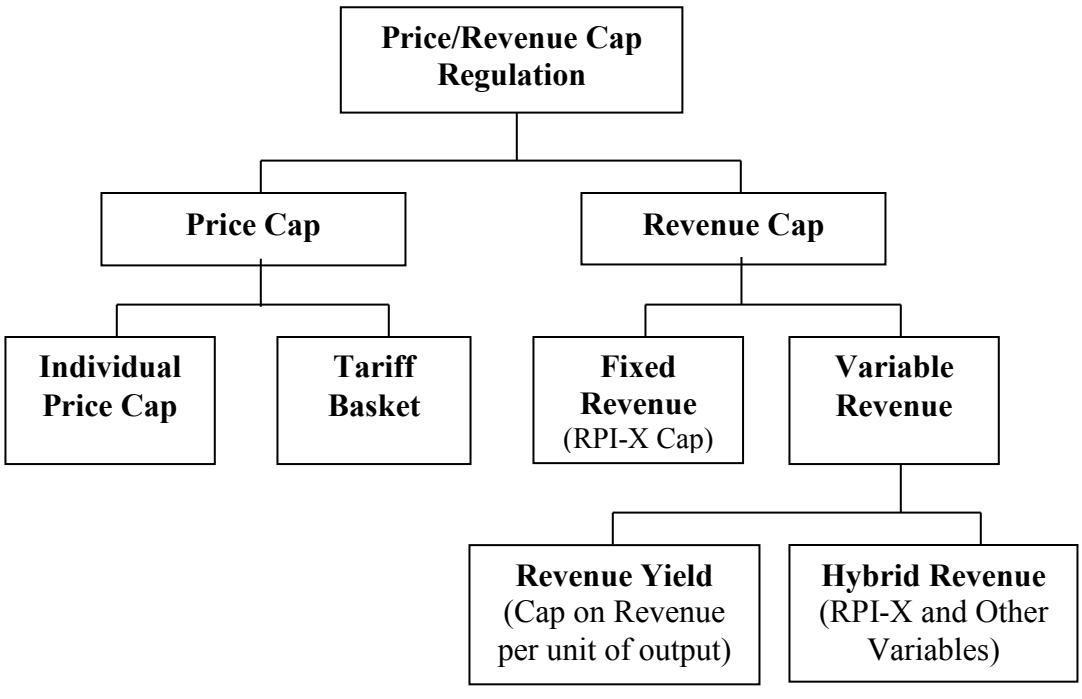
This section discusses the general principles that should underlie the choice of the form of price control. The RIC will undertake further work to derive a specific formulation for the price control to apply to service providers and this will be published in its draft determination.

There are two kinds of price control:

- Revenue cap approach; and
- Price cap approach.

Variations of these forms of control have been adopted in a range of jurisdictions. **Figure 1** presents different kinds of price control.

Fig. 1: Forms of Price Control



3.2.1 Revenue Cap Approach

Under the revenue cap approach, the service provider's gross revenues are limited to a fixed amount for a defined set of services. This fixed amount (cap) is usually subject to an annual adjustment for productivity gains (called the X factor) and inflationary effects. Periodic readjustments assist in scaling revenues appropriately to changes in the customer base of the regulated firm. Broadly, the revenue cap can be expressed as:

$$R_t = (R_t + CGA * CUST) * (1 + RPI - X) \pm Z ------(i)$$

$$OR$$

$$R_t = R_{t-1}\left[(1 + (CGA * CUST) + (RPI - X)\right] \pm Z ----(ii)$$

Where :

R_t - is the authorized revenue for time t

RPI - is the annual change in prices

X - is the reduction in prices imposed by the regulator

Z - is a cost passthrough variable

CUST - is the annual change in the number of customers (or the annual change in output)

CGA - is a customer growth factor which can be expressed in either absolute dollar terms ,(equation (i)), or in percentage terms, (equation (ii)).

Revenue caps may be established for different customer groups, for categories of service or for the entire business. An initial revenue cap for a level of service is set according to traditional rate of return procedures (the "building block" approach for assessing required revenue). Thereafter, real revenue is typically reduced each year by the X-factor until the next review. If the service provider can realize efficiency gains greater than the X-factor then it can keep all or some percentage of such gains. If not, the service provider's profit suffers. It is this cost risk and/or opportunity to outperform that provides a regulated firm with significant incentives to operate more efficiently. Revenue caps come in different forms.

- **Pure Revenue Cap**

Under a **pure** (or **fixed or total**) revenue cap, the firm'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 firm to set charges within the cap. It also provides the service provider with a guaranteed income.

This form of cap does not provide incentives to pursue new customers or increase sales once the cap is reached. Although it provides incentives to cut costs, there is the potential for sustained profits or losses and the financial benefit/risk to be borne by the service providers.

- **Flexible (Variable) Revenue Caps**

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.

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. The service provider also has a certain degree of flexibility in setting individual tariffs. This flexibility can apply to both the split between the fixed and variable elements of any one tariff category and to different tariff categories. Generally, the financial risk is borne by the service providers.

Under a revenue cap mechanism, a correction mechanism ('unders' and 'overs' account) is usually used to adjust for forecast errors. A sharing arrangement is also specified and a surplus in the account is returned to customers. The revenue cap can be expressed as follows:

$$R_t = (RPI - X) * R_{t-1} - K_t$$

Where: K_t is a correction factor that adjusts for under and over recovery of revenue.

The main advantages of revenue caps include incentives for cost reduction, investment, and productivity improvements. They may be better suited to networks such as electricity and water transmission and distribution systems which generally exhibit reducing average costs as output increases. Revenue caps also allow a more direct means of passing the benefits of growth to customers. On the other hand, revenue caps have some important disadvantages. Revenue caps, if not adjusted for customer numbers or output, may provide incentives to restrict sales. Also, when significant growth is expected, revenue caps require accurate estimates of demand.

3.2.2 Price Cap Approach

Price cap regulation attempts to control price rather than revenue. As in the case of revenue caps, prices are set according to traditional rate of return procedures as the cap applies to particular prices rather than revenue. Price caps could be either

in the form of a weighted average price cap (tariff basket) or a series of separate price controls independent of any total revenue requirement. In setting the weighted average price, the weights can be volume (sales) or value (revenue) and the weights may be fixed by reference to the base year or they may reflect actual quantities with a lag, thereby breaking the link between allowed revenue and the volume. This approach allows for more than one charge, i.e. connection as well as a volume charge. Generally, under this approach, total revenues will track total costs, thus limiting the financial risks faced by service providers.

Price cap regulation provides a number of advantages. As in the case of revenue caps, it provides incentives for cost reduction and productivity improvements. It provides incentives to satisfy demand as well as protection to individual users of services as it assigns most of the risks to the firm. Among the main disadvantages of price caps are the reduced flexibility to adjust prices to maximize efficiency and the incentives to cut costs through reduced service quality. Additionally, the translation of revenue targets into weighted average price controls is not only complex but subject to errors.

3.2.3 Hybrid forms of Control

Although hybrid controls come in a variety of forms, they generally contain a fixed revenue component combined with annual revenue drivers such as customer numbers, sales and length of network system. Therefore, the development of a cost tracking formula is an integral part of setting hybrid controls. A price cap with automatic pass-through of costs is one of the most common forms of hybrid control.

Another option is to make modifications to the general schemes discussed above or to combine elements from different schemes. The objective of such schemes is to off set the weakness of one scheme with the strengths of others.

The main advantages of hybrid control 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.

3.2.4 Choosing an Option

As noted above, each of the options discussed has advantages and disadvantages in terms of meeting regulatory objectives, depending on the situation and context. More importantly, corporate governance, ownership, the form and extent of

private sector involvement and the current state of regulatory environment may largely determine which option is optimal. In choosing one option over another, there may also be direct trade-offs which need to be considered. Therefore, in the final analysis, the RIC will need to make a judgement about which form of price control is most likely in practice to produce the best overall outcome.

Notwithstanding, some key considerations to take into account when assessing different options (revenue caps vs price caps) include the following:

- **Revenue/Income Variations**

  Price cap regulation is more likely to expose a regulated firm to variations in revenue, especially when demand volumes fluctuate. Additionally, when fixed costs constitute a significant portion of a regulated firm's cost (as is generally the case in transmission and distribution networks), price cap regulation can expose the firm to unduly wide variations in net income. Under these circumstances, revenue cap regulation can help avoid/minimize these wide variations in revenue and/or income. Furthermore, revenue caps make most sense if costs do not vary with volume. With respect to transmission and distribution utilities, the evidence is fairly clear that costs do not vary with volume, making revenue caps the most sensible approach.

- **Degree of Competition**

  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.

- **Impact of Cost Structure**

  Price cap regulation generally aims to de-link the prices of a firm from its own costs. The important question is whether it is totally possible to disregard the firm's actual costs. The form of price regulation should take into account; the cost structure of the industry, the substantial fixed costs needs associated with infrastructure repair, rehabilitation, replacement and new capital investment obligations and even some of the variable costs over which the utility has no control such as gas and conversion cost of electricity to T&TEC and the cost of desalinated water to WASA. These costs need to be considered in light of the firm's stable but flattening per capita demands and revenue and the utilities' generally low elasticities of demand for services. In such circumstances, revenue cap is more likely to ensure that revenues are adequate to cover costs.

- **Nature of Incentives**

  One of the most important considerations in assessing different options is the nature of incentives inherent in a particular option. The regulatory approach must not only ensure efficiency gains are achieved but that these gains benefit consumers and are eventually passed on to them. In this respect, a revenue cap (also price cap) with periodic re-determinations based partly on building blocks procedures, can be most effective.

- **Fair Prices**

  The RIC's approach to introducing a new set of regulatory arrangements must, of necessity, be cautious as it has no information necessary to assess the outcome of the new arrangement. T&TEC and WASA are currently faced with serious revenue shortfalls and are unable to meet their operating costs much less their total costs. By determining a fair and reasonable level of revenue and setting a revenue cap for the initial regulatory period, along with some secondary price controls to limit price shocks to consumers, the RIC would be better able to set a fair price for the services, balancing both the interests of consumers and service providers.

  In light of the above considerations, the RIC is inclined to utilize a revenue cap for the initial regulatory period. **Specific details of how this form of regulation is to be implemented, including issues associated with determining the initial level of allowed revenue, will be decided as part of the process of preparing the draft rate determination.**

The RIC welcomes comments on:

- ***the broad form of regulation most suited to regulating T&TEC and WASA;***

- ***any other alternative regulatory models that stakeholders believe warrant consideration;***

- ***its preference to use a revenue cap for the initial regulatory period; and***

- ***all other issues relevant to the form of economic regulation.***

4. DETERMINING REVENUE REQUIREMENT

Broadly, the process of developing and assessing proposed prices involves:

(i) the establishment of forward looking revenue requirement for efficient delivery of services over the regulatory period;

(ii) the specification/determination of service requirements/obligations to be met over the regulatory period; and

(iii) the translation of revenue requirement into a control on prices (price controls) that are sufficient to recover the revenue requirement over the regulatory period.

In addition to the above steps, the implementation of incentive regulation involves consideration of and action on a number of issues. These issues are discussed in Section 7. The section which follows, considers the establishment of forward-looking revenue of the service provider on which to base a price control.

An integral part of the pricing process is the submission of a Business Plan by the service providers. The Plan should set out the services to be delivered over the regulatory period, together with the revenue required and the resulting prices. The Plan will provide the basis for the RIC's assessment of the proposed revenue requirements and the resultant determination of proposed prices to apply over the regulatory period.

4.1 Methods for Determining Price/Revenue Controls

The RIC must be satisfied that price/revenue controls comply with the regulatory principles outlined in the RIC Act. Specifically, the RIC Act [Section 67 (2) (3) and (4)] requires price/revenue control to be set so as to:

- allow the recovery of least-cost operating expenditure;
- allow the recovery of replacement capital cost expenditure;
- allow the recovery of return of capital (depreciation) and return on rate base;
- take into account the funding and ability of the service provider to perform its functions;
- take into account the interest of shareholders of the service provider;
- take into account the ability of consumers to pay rates;

- take into account the standard of service being offered by the service provider; and

- provide the service provider with incentives to pursue efficiency improvements and to promote the sustainable use of resources.

The first step in determining price/revenue controls is to establish the allowable revenue of the service provider on which to base a price control. The approach is to set the maximum allowable base year revenue requirement for each regulatory control period and to test the notional revenue requirement to ensure that they allow the regulated firm to remain financially viable. The X-factor determines the amount by which revenues will move up or down over the regulatory control period in real terms. The service provider is given incentives to beat the X-factor because it may not be reviewed for the duration of the regulatory period. The benefits of efficiency improvements are returned to customers when the price control is reviewed.

There are two broad approaches that are commonly used to determine price/revenue controls. The first approach (cost-linked) involves linking the service provider's cost to the revenue earned or prices charged. Therefore, prices will track cost more closely and customers are likely to pay prices near to actual costs of service. There would also be less room for error in determining allowed revenue and less chance of a service provider not being able to finance its operations. Since the service provider would be given incentives to out-perform benchmarks, based on its costs, the effort to strive for efficiency gains may be lower. Furthermore, as the regulator would be required to perform a detailed cost scrutiny, the information and regulatory burden involved would be high. The use of this approach has been criticized, in some circles, on the grounds that it recognizes a high degree of firm-specific information and that it may tend to merge into ROR regulation.

In the second approach (cost-unlinked), the controls are not directly determined by reference to the costs of the service provider, instead they may be set by reference to the prices or costs of utilities elsewhere. In the determination of the level of costs under this approach, a variety of approaches is utilized including; benchmarking, econometric analysis or frontier methods such as Data Envelopment Analysis and Stochastic Frontier Analysis.

As this approach would allow a greater deviation of prices from the specific costs of service providers, the outcome would be generally consistent with the operation of a competition market. Furthermore, the rate of efficiency improvement is likely to be higher and the benefits derived there from will redound to customers. However, there are a number of serious concerns with setting price/revenue controls completely independent of the service provider's costs:

- the approaches used to set prices independent of costs require comprehensive data that are generally not available;

- the benchmarking techniques may not adequately reflect the local service providers' costs, especially as they face significant capital expenditure requirements for network replacement, growth and service standards requirements;

- any reliance on the prices or costs of other utilities may not enable the initial prices to be set at levels which are reasonable, especially, given that the local service providers are currently experiencing large revenue short-falls in their operations;

- benchmarking techniques used for the estimation of efficient costs are approximate at best and involve too many practical problems on which to place total reliance; and

- the degree of certainty required to encourage efficient new investment may not be provided when prices are set completely independent of the service providers' costs.

In light of the above concerns, it is difficult to conceive of circumstances where external benchmarks could become a complete substitute for service provider – specific cost data. A starting point for determining revenue requirements and rate of change in prices would invariably be determined by reference to service provider's costs. In fact, there are very few examples of the pure application of either approach and there is likely to be significant advantage in combining the two approaches.

Although the RIC Act provides no specific guidance on the exact approach to be used, it embodies a strong presumption that service provider – specific cost and comparative data should be the main basis for determining the revenue requirements (Sections 67 (2) (3) and (4)). By setting regulated revenue with reference to service provider's cost, and adjusted by reference to the costs of similar utilities elsewhere, forward looking revenues can be set which deliver strong incentives for future efficiency improvements.

The RIC invites comments on the relative merits of using cost-linked/ cost-unlinked approach to setting price/revenue controls.

4.2 Cost Building-Block Analysis

The cost building-block approach is the framework typically utilized under a cost-linked approach to the determination of the efficient costs of service providers. The building-block approach determines the expenditure that an efficient service provider would need to incur to provide service over the regulatory period.

The building-block approach typically determines a forward-looking revenue requirement by summing:

- the operating and capital expenditure that an efficient service provider would require to maintain and/or improve reliability and quality of service over the regulatory period (as opposed to the service provider's actual costs);
- an amount reflecting the depreciation over the regulatory period; and
- a return on the initial assets.

The sum of the above components provides the estimate of the efficient cost of delivering the service over the regulatory period. The building-block approach is consistent with the RIC Act [Section 67(4)] which requires the RIC to have regard to, inter alia:

- replacement capital cost expended;
- least-cost operating expenses which may be incurred;
- annual depreciation; and
- return on the rate base.

Consequently, the RIC's legal mandate and regulatory objectives and the industry specific context make it appropriate to adopt the building-block approach to establish the price controls. As discussed, the building-block approach requires a benchmark revenue requirement to be determined for the regulatory period, which in turn is to be estimated on the basis of forecasts of the efficient costs of providing the service.

Therefore, before the beginning of each review period, the RIC will estimate the revenue required by an efficiently managed service provider to cover its costs and to yield a fair return on its assets, based on the following formula:

$$R_t = OC_t + D_t + OA_t * r$$

Where:

R_t = Required revenue

OC_t = Efficient Operating and Maintenance Expenditure

D_t = Depreciation

OA_t = Opening Assets value

r = Rate of Return

t = 1, ….5, (years of the review period)

In performing its regulatory duties, the RIC must balance competing interests. The most important of these is the incentives for long-term cost efficiency, while simultaneously protecting consumer interests. Specifically, the RIC will take into account the following:

- Efficient use of resources;
- Long run average incremental costs;
- Social equity considerations in terms of affordability of minimum required amounts of services by low income households;
- Non-discriminatory tariffs; and
- Minimization of cross subsidies between customers.

The RIC invites comments on the use of the building-block approach for determining service providers' revenue requirement.

4.3 Application of the Building-Block Approach

In setting a revenue or price cap, the RIC must take into account the revenue requirements of the service provider during the relevant financial years having regard to:

(i) the right of the service provider to recover reasonable and efficient costs of operation and maintenance;

(ii) the service provider's cost of capital applicable to the network;

(iii) the provision of a return on efficient investment undertaken by the service provider in order to maintain or extend network capacity consistent with the commercial and regulatory risks involved;

(iv) the on-going commercial viability of the service provider;

(v) the service standards applicable/imposed by the regulator; and

(vi) the potential for efficiency gains to be realized by the service provider in expected operating, maintenance and capital costs.

The first four components are discussed below, while the fifth and sixth components will be discussed in Sections 5 and 7 respectively.

4.3.1 Operating and Maintenance Expenditure

Operating and maintenance expenditure (Opex) is one of the key components of the building-block approach and the major goal is to evaluate both the current and the efficient levels of Opex. Opex includes variable costs, which vary with volume, and fixed costs, which occur regardless of volume. Opex forecasts may be based on either exogenous information or firm-specific information. Firm-specific costs are not likely to provide a totally reliable picture. The use of exogenous information (i.e. benchmarking across the industry, benchmarking overtime or benchmarking with the best performer) may, on the other hand, provide sharper incentives. Such an approach could be undertaken at 'the total business level' or for specific components of expenditure. However, combining firm-specific information with exogenous information is likely to lead to a more sustainable outcome.

In determining costs therefore, the RIC will require service providers to submit forecasts of expenditure. These forecasts will be utilized as a basis for determining the expenditure benchmarks required by an efficient service provider. The RIC will undertake an internal analysis of the major cost drivers that underpin the expenditure forecasts submitted by service providers, and will also consider historical cost performance in forming an overall view of "efficient" expenditure. Additionally, the service providers will be invited to propose the rate of change in operating and maintenance expenditure, as well as supporting information on the proposed rate of change. The RIC will conduct its own analysis to establish a view on the rate of change put forward by service providers.

The RIC also intends to utilize external benchmarking, where possible, as part of the process of analyzing service providers' expenditure forecasts. This is consistent with the RIC Act which requires the RIC to have regard to, among other things:

- maximum efficiency in the use and allocation of resources to ensure that services are reliable and provided at the lowest possible cost; and

- rates charged by competing service providers for providing an alternative service.

Comparative performance will be assessed using relevant quantitative techniques, ranging from comparison of simple cost ratios to regression, partial and total factor productivity analysis. The RIC will also use evidence, where appropriate, of best practice performance from other jurisdictions.

Some of the other issues with respect to Opex are:

- determining an appropriate method for allocation of common costs between customer classes or segments as there are a number of approaches to allocate common or fixed costs. Non-asset related costs can be allocated on the basis of fully distributed costs, peak usage responsibility, while asset related operating costs can be allocated on the basis of throughput.

- the appropriate methodology for benchmarking. General measures of efficiency use approaches such as Total Factor Productivity and Ordinary Least Squares Regression Analysis, while partial efficiency measures can include, for example cost per customer or employee, cost per kilometre of network etc. However, the main difficulties in the application of these approaches are the scarcity of information and relevant comparators.

- ensuring that appraised efficient Opex does not imply unreasonable trade-off in service quality.

The RIC will encourage service providers to adopt approaches aimed at improving their efficiency. These approaches may include outsourcing or undertaking joint projects/activities which may achieve synergies and reduce expenditure. Additionally, the regulatory arrangements can be designed to provide incentives to achieve efficiencies. The public reporting of comparative financial and service performance information provides one such incentive. The details of a performance reporting framework are discussed in Section 5. The RIC will also consider the implementation of an efficiency carry-over mechanism (discussed in detail in Section 7) in recognition of savings in controllable costs achieved through specific management initiatives.

The RIC invites comments on the most appropriate approaches for assessing the efficiency of Opex of service providers and appropriate methods for

allocating asset related and non-asset related common costs.

4.3.2 Capital Expenditure

The forecasts of capital expenditure (Capex) and Opex have an impact on the revenue determination in different ways. The Opex forecasts are added as a separate component of the revenue requirement. However, the Capex forecasts are added to the value of the regulatory asset base, thereby increasing the invested capital, and from this value, the capital financing components of the revenue requirement are calculated. Capital expenditure also impacts directly on the capacity and reliability of the service providers' networks and so on the quality of service they provide. The service providers will benefit from higher capital expenditure forecasts. First, a return on capital expenditure is included in the revenue requirement for the regulatory period. Second, the forecast level of capital expenditure has bearing on the future out-performance to be rewarded through the efficiency carry-over mechanism. The justification and appropriateness of capital expenditure forecasts will therefore need careful consideration.

Given the fact that investment in network industries is both lumpy and can be postponed or brought forward by the service provider, two major problems emerge:

- how the investment forecast and the efficacy and the adequacy of the proposed capital programme to be assessed; and

- how the regulator deals with divergences between expected and out-turn capital expenditure at each regulatory review.

The RIC will establish a clear framework for assessing Capex. Its assessment of forecasts of efficient Capex will be based on service providers' business plans which they will be required to submit to the RIC. In conducting this assessment, benchmarking and engineering estimates will be utilized in forecasting the efficient amount of capital expenditure required. The RIC also reserves the right to seek expert advice. Additionally, where possible, the RIC will use other non-intrusive techniques, including cost driven analysis, comparative analysis with other similar utilities to assess the efficiency and efficacy of capital programmes.

In preparing their capital expenditure projections, the service providers will be required to distinguish between the following main purposes of capital expenditure:

- capital expenditure on replacement and refurbishment of existing assets, including the assumptions made regarding the condition and serviceability of the existing network, the life expectancy of assets, replacement factors and unit costs;

- expenditure to meet any proposed increases in performance standards;

- expenditure to meet network reinforcement and expansion of network coverage;

- expenditure to meet the cost of connecting new customers to the network; and

- expenditure required to meet environmental, safety or other legal obligations imposed by other statutory agencies.

It is inevitable that there will be divergence between expectations and outcomes. For example, possible reasons for under-spend could include:

- non-necessity of funding due to unanticipated efficiency savings;

- delayed expenditure due to a variety of reasons; and

- overestimation by the service provider.

The regulatory treatment of this divergence has implications for incentives to invest. One of the common issues is whether under-spend should be **clawed** back. In principle, clawing back unspent money creates perverse incentives and as such goes against the philosophy of incentive regulation. Furthermore, if the clawing back principle is established, then the service providers may utilize all forecast spending, thus removing the incentives to become efficient.

Some of the ways of overcoming this problem may include detailed scrutiny by the regulator and/or consultants, reporting by the service providers of annual investment out-turn figures with sufficient information to determine the levels, and possibly the causes of unanticipated savings.

Similarly, a number of questions arise for the regulator if there is prudent over-spend of capital expenditure by the operators. Should service providers be compensated fully or partially? If they are to be compensated, would it create an expectation that they will also be compensated in the future? Is this a one-off situation? Full recovery of this expenditure would transfer business risk to the customer. Non-recovery of unexpected but prudent capital expenditure can lead to a decline in investment to meet demand and maintain service standards. Should unexpected operating expenditure be treated the same way especially since there is the issue of trade-off between operating and capital expenditure? In principle, overspending and underspending of capital should be treated similarly.

The RIC invites submissions/views on the most appropriate method of treating underspending and overspending of capital and operating expenditure, bearing in mind the implications for incentives to invest.

4.3.3 Dealing With Uncertainty

An important issue for the regulator is dealing with uncertain or unforeseen events that may have significant implications for the forecast revenue over the regulatory period. It is possible that a service provider may face a significant increase or decrease in costs or levels of demand over which it has little or no control. This can have implications for the financial viability of the service provider.

A number of options have been used by regulators for addressing any substantial costs associated with unforeseen events that arise during the regulatory period. Some of these are:

- adjusting prices at the end of the regulatory period to reflect any significant changes that occur as a consequence of events that were not assumed at the commencement of the regulatory period. This option underscores the importance of ensuring that the forecasts are accurate and well founded;

- allowing for significant variations for unforeseen events to be assessed and prices adjusted to reflect the costs associated within the regulatory period; and

- reflecting any uncertainty in the expenditure forecasts as a separate cost item, especially for unforeseen events that may be known but uncertain in scope.

The RIC's initial view is that adjusting prices at the end of the regulatory period would be the most reasonable approach, as it would provide certainty and stability with respect to the prices to be charged over the regulatory period. It would also ensure that the prices set do not recover inefficient expenditure by including an allowance for uncertainty.

The RIC invites comments on the most appropriate method of addressing uncertainties associated with unforeseen events that may have significant cost implications.

4.3.4 Forward Capital Expenditure

Capital expenditure, by adding to the regulatory asset base, increases costs and prices to customers. The magnitude of this increase can be substantial. Therefore, one of the key issues will be the likely significant capital expenditure programme planned by service providers and the key drivers of the capital expenditure. The regulator has to be totally convinced that the proposed capital expenditure represents an efficient means of meeting the demand for services and that system loss reduction and demand management solutions are fully taken into consideration as alternatives to network augmentation. It is obvious that system loss reduction and demand management solutions can provide cost-effective ways of enhancing network capacity. Therefore, it is incumbent on the regulator to request evidence that the demand side options were considered by service providers as potential solutions to network constraints.

The RIC encourages service providers and other stakeholders to make submissions on the role of demand management and specific demand management solutions as alternatives to network augmentation.

4.3.5 Determining the Capital Financing Components

The final step in the determination of revenue requirement is the establishment of the service provider's requirements to cover its capital financing costs. Given the capital intensive nature of networks, capital related costs form the largest component of the revenue requirement, accounting for nearly sixty percent of the revenue requirement.

The key components that will be utilized to assess the capital-related costs are:

- The **Regulatory Asset Base (RAB)** which represents the regulator's view of the value of the existing investment in the regulated entity at any point in time. The objective is to provide a revenue stream that has a present value equal to the regulatory asset base;

- **Regulatory Depreciation** which represents the return of the capital that the service provider has invested in the entity over time; and

- The **Regulatory Weighted Average Cost of Capital (WACC)** which is the annual rate of return that investors demand for their investment.

This section examines the issues the RIC will have to address in reaching decisions on these capital components of the revenue requirement.

4.3.5.1 Determining the Initial Value of the Regulatory Asset Base

To estimate both the return on capital and return of capital (depreciation) components of the revenue requirement, the opening value of the regulatory asset base (RAB) must be established. This is the value on which the owners of the business earn a return (return on capital), and the value that is returned to the asset owners over the economic life of the assets (as depreciation).

Numerous methods of valuing assets are available and are used in different circumstances and for different reasons. Some of the regulatory objectives for asset valuation include:

- the ability of the service provider to finance new investment;
- the assurance that the service provider's revenue is sufficient to allow it to maintain the asset in its current condition;
- the assurance that tariffs are no higher than is necessary;
- the avoidance of rapid and large increases in tariffs, if possible;
- the assurance that the costs of inefficient or imprudent investments are not borne by customers; and
- the provision of incentives for efficient investment and maintenance.

There are a range of options for valuation of assets. These methods can be characterized under two main approaches; value based and cost based. A third approach, which is sometimes used, considers both value and cost. **Figure 2** represents these approaches. In reality, the choices are even more complex and there are several sub-categories within each of the approaches shown in **Figure 2**. Furthermore, a mix of the above methodologies may be used. For example, infrastructure assets might be valued using an alternative approach. Additionally, different asset valuation approaches may be used for different purposes within a single regulatory process.

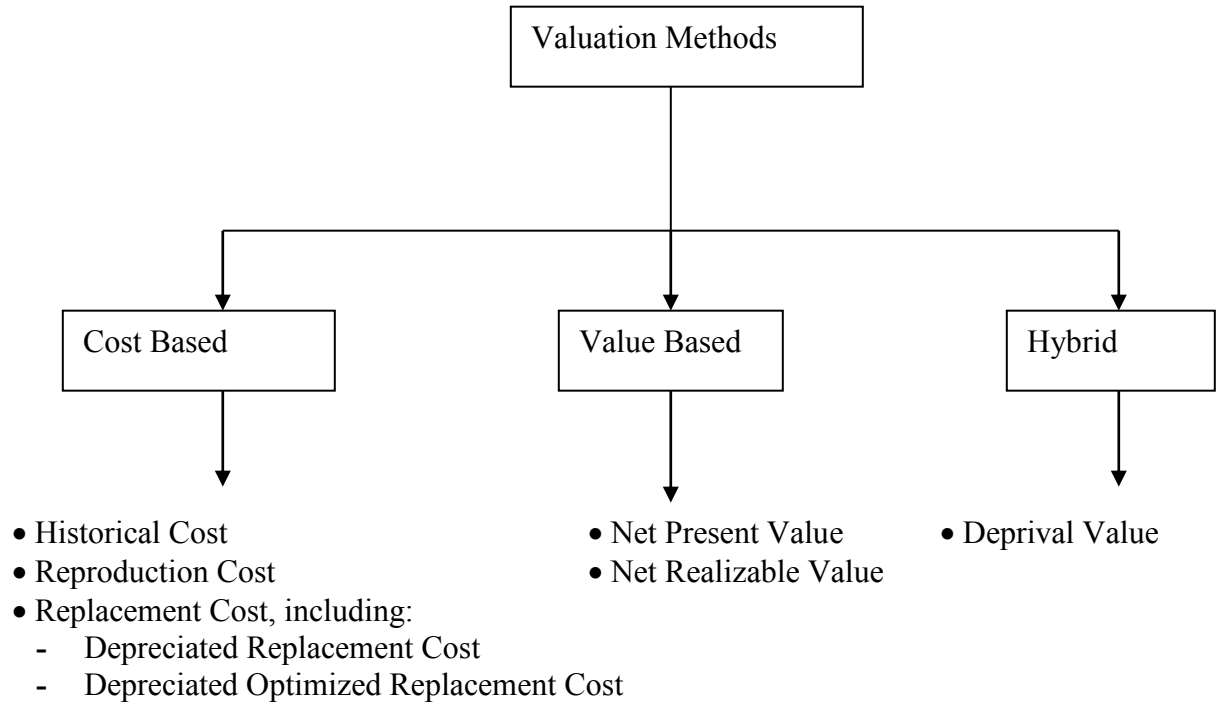
Most network system assets are specialized, and hence their costs are sunk, that is, their opportunity cost is close to zero. Given this issue and other problems of network system assets, the most commonly used valuation approaches are:

- Historical Cost Approach;
- Current Cost Approach;
- Optimized Deprival Value; and
- Net Realizable Value.

The choice of valuation methodology could, among other things, depend on industry specific issues. However, any methodology chosen must:

- support outcomes that are efficient;
- facilitate the identification of excess profits; and
- achieve valuation objectives for regulatory purposes at lowest cost.

Figure 2: Asset Valuation Approach



Regulators in the UK and Australia have generally used two valuation methods, the flotation price paid by shareholders and current cost (or replacement cost) of assets. However, the UK regulators' approach has been to establish an appropriate valuation of shareholders' funds, rather than a valuation of specific assets.

Currently, both T&TEC and WASA use the historical cost approach, which does not take account of the service potential of asset or technological obsolescence. On the other hand, unacceptable price increases could result if the RAB were to reflect, for example, the current cost method.

The RIC proposes to appoint a consultant to determine the most appropriate asset valuation method for determining the value of the assets of T&TEC and WASA. The consultant's report will be made public.

The RIC invites submissions/comments on the most appropriate asset valuation method for determining the initial value of assets of T&TEC and WASA, as well as other issues which should be considered as part of the asset valuation process.

4.3.5.2 Roll-Forward of the RAB

The opening value of the RAB, once established, needs to be adjusted to reflect changes for the following review periods. This process is called "roll-forward". Other options include carrying over the initial base unadjusted, reassessing the asset base annually, or reassessing the asset base at the commencement of the next review period. Roll-forward avoids the costs of asset revaluation. However, there are two main issues in rolling forward assets, that is, the choice of an appropriate index and the timing of the addition of new investment.

(i) Indexing of RAB

Adjusting initial RAB by price changes over time ensures that shareholders earn a reasonable return on investment in real terms. Generally, two methods are used for adjusting the RAB:

- current cost index; and
- indexing by the general purchasing power index, such as RPI.

The current cost index attempts to capture changes in the current cost of replacing the specific assets. Such an index can lead to disputes over the identification of an appropriate index. Consequently, RPI is generally used. It is readily available, simpler to use, its use reduces uncertainty and is thought to encourage technical progress.

(ii) Timing of the addition of New Investment

The main issue here is not whether new investment should be included in the RAB, rather it is whether projected or actual expenditure be included in the RAB. The general practice is to add projected investment at the commencement of a regulatory period to determine the price cap and then adjust for actual capital expenditure in the subsequent regulatory period based on one of the following options:

- **Full claw-back** – that is, adjusting the RAB for actual capital expenditure for the past regulatory period and claw-back any excess returns or compensate for over-spend;

- **Partial claw-back** – that is, adjusting the RAB for actual capital expenditure without any claw-back or compensation; and

- **No claw-back in the immediately following regulatory period** – that is, for the second price-cap period, keep the RAB at the level determined by projected investment but during the third period, actual investment is substituted for projected investment.

The above methods all have pros and cons. **Full claw-back** removes the incentives to exaggerate investment but also removes the incentives for capital efficiency. **Partial and No claw-back** provide incentives to economize investment but create incentives to inflate the projected investment. Additionally, **no claw-back** is much more complex to implement. Some jurisdictions add projected capital expenditure to the RAB indexed at half the RPI rate. In short, there are many issues that the RIC will need to resolve in determining the methodology to roll forward the value of the RAB.

Another issue relates to the question of when the new assets should be recognized in the asset base. Should the assets be included in the year that they were commissioned, when the capital expenditure occurred, or when the assets actually came into productive service? Each approach has its implications. Many regulators recognize new assets in the year in which the capital expenditure occurred. For modeling purposes, the expenditure may be recognized halfway through that year. This appears to be the simplest and fairest approach.

The RIC invites comments on:

- ***the appropriate index for adjusting the RAB;***
- ***the method for including the new investment in the RAB; and***
- ***whether capital expenditure should be included in the determination of revenues in the year that it is incurred.***

4.3.6 Depreciation

Depreciation is an allowable expense for the purpose of tariff calculation and it can account for a significant proportion of the costs. Depreciation can be defined in both accounting and regulatory terms. Depreciation, in accounting terms, measures the consumption of an asset's economic benefits due to wear and tear and obsolescence and is computed on the expected useful life of the asset.

Depreciation, in regulatory terms, may represent either a **return of capital** or a **replacement of capital**, a charge for the replacement of the assets consumed. The return of capital view is consistent with the use of the RAB as the basis for assessing the investment attributable to shareholders. The replacement of capital approach assesses the depreciation charges on the basis of an estimate of the economic life and the current cost of the capital.

However, the key question is whether depreciation should be based on the RAB or the current cost of assets, as different approaches can be used to serve different regulatory objectives. Depreciation based on current costs will result in higher tariffs in the short term but lower tariffs in the long-run, thus creating inter-generational issues. On the other hand, depreciation based on the RAB will lead to lower tariffs in the short-run but higher tariffs in the long-run as RAB will increase over time towards replacement cost. The RAB approach is more attractive in cases where immediate and significant capital investment is required. The current cost (or replacement cost) to depreciation is attractive where current replacements or renewals are at or below their steady level. There is no one "best" approach to calculating depreciation and under particular circumstances one depreciation profile might be preferred to another.

Irrespective of the approach, there are three issues that must be considered in calculating depreciation:

- the depreciation method;
- the depreciation rate; and
- the base on which the rate is to be applied (discussed in Section 4.3.4.1 of this paper).

There are four common depreciation methods. A simple and widely used method is a **Straight Line Method (SLM).** Under this method, the depreciation is determined by dividing the depreciable cost by estimated years of life. The **Double Declining Value** method is used to encourage investments in assets as twice the straight line rate per year is applied to the declining balance each year, thereby bunching most of depreciation in the earlier years of the estimated useful life. The **Sum of the Digits Method** is also an accelerated method of depreciation where the number of years of useful life is added up and the depreciation of each year is in a decreasing progression on a constant base. The **Renewals Annuity Method** considers the infrastructure asset network as an integrated, renewable system to be maintained in perpetuity, rather than a collection of individual assets with its own asset life. This method generates an annuity cash flow that reflects the future cash flow required to maintain the operating capacity of the asset.

Although some utilities have used the renewals annuity method, the main disadvantage is the difficulty of developing realistic long-term asset management

plans. Internationally, the Straight Line Method is most commonly used. Its adoption:

- is consistent with economic efficiency;
- may be expected to generate reasonably constant prices over the long-term; and
- is simple and consistent with what is currently being used by the service providers locally.

The depreciation rate forms the basis upon which the carrying amount of an asset is reduced to reflect the consumption of the asset's economic benefits. In determining the depreciation rate, an asset's useful life is determined and is defined in terms of the asset's expected utility to the enterprise. The economic lives of the assets are estimated having regard to the presence of substitutes for the service and potential technological change. However, these issues may be less relevant for the electricity and water sectors in light of the unique and essential nature of these services and the relatively stable technologies involved.

The RIC invites comments on the relative merits of the alternative depreciation profiles discussed above and the usefulness of utilizing the straight line method of depreciation for the first regulatory control period.

4.3.7 Calculating the Cost of Capital

One of the most important parts of the price control review process is the estimation of Weighted Average Cost of Capital (WACC) associated with the provision of service. The return on capital component of the building block is calculated by multiplying the WACC by the asset base. The actual rate of return earned by the service provider will depend on the extent to which it is able to out-perform the forecasts incorporated in the revenue requirement.

Once the RAB has been determined, it is essential therefore to establish the cost of capital. The allowable earnings of an operator should cover the cost of capital of the business. This cost of capital is the supply price of funds (equity and debt) needed to finance operations i.e. its fixed assets and working capital. Linking the rate of return to fixed assets only runs the risk of not providing sufficient revenue to compensate investors for the risks assumed. The common method for determining a fair return on capital employed involves:

- estimation of the capital attraction rate for each component of the firm's capital; and

- combination of the various rates into one overall rate in accordance with the percentages each bears to the overall capitalization.

The cost of the capital so established is normally applied to the net assets of the firm. There are a number of factors that need to be considered in determining the appropriate rate of return:

- the firm's monopoly status;
- debt/equity ratio;
- returns of other enterprises having corresponding risks;
- the annual revaluation of assets; and
- country risk and vulnerability of the revenue stream to exchange rate movements.

Given the significance of the return on capital in determining the forward looking revenue requirements and the degree of imprecision in its estimation, the assessment of cost of capital generally generates significant controversy during regulatory reviews. The standard approach to computing the Weighted Average Cost of Capital (debt plus equity) is:

$$\text{WACC} = [(1-g)*r_e]+[g*r_d]$$

Where:

g - is the level of gearing.

r_d - is the cost of debt finance and is measured as risk free rate, r_f , plus a debt premium over this rate, p_d ; and

r_e - is the cost of equity finance.

The use of the WACC approach promotes the efficient allocation of resources by ensuring a state-owned network provider operates under the same financial conditions as a network provider in the private sector and will ensure returns are equal to the opportunity cost of capital.
There are a number of models used to estimate the cost of equity funds, including the Capital Asset Pricing Model (CAPM), Dividend Growth Model, Price Earnings Ratio and Arbitrage Pricing Theory.

The CAPM is the simplest and most widely adopted method by regulators, where the cost of equity is measured by:

$$r_e = r_f + \beta_e(r_m - r_f)$$

Where:

r_f - the risk-free rate on treasury securities;

β_e - is the equity beta which measures the relative riskiness of the firm compared to the market;

r_m - is the level of market return; and

$r_m - r_f$ - is the market risk premium (i.e. the amount of added expected return that investors require to hold a broad portfolio of common stock instead of risk-free treasury securities).

Due to the lack of robust information for many of the parameters, the CAPM estimate is generally supplemented with other methods for estimating the cost of capital, including:

- observations of comparable industry returns;
- arbitrage pricing theory and the dividend growth model; and
- estimates implied by the ratio of a entity's market value to its regulatory asset value.

Approximations and close comparators are generally used when developed capital markets do not exist. The average asset beta, for example in infrastructure is around 0.7 for high powered incentive regimes and 0.3 for low powered incentive regimes. The alternative is to use benchmark ratios based on international best practice. Consequently, there are several aspects in the determination of the WACC that will be subject to public debate, including the basis for determining:

- equity beta for the service providers;
- market risk premium;
- debt premium; and
- capital structure.

The RIC invites comments on the appropriateness of the above methods for the calculation of the WACC and the determination of cost of equity by the CAPM.

4.3.8 Cost of Working Capital

There is an amount of working capital that a firm needs to maintain in order to fulfill all its commitments between cash inflows and outflows. This amount also includes the inventories which the firm must hold. This is the net working capital i.e. the excess of current assets over current liabilities. It is, therefore, generally suggested that this capital should earn a rate of return equal to the WACC. However, there are a few regulators who do not include an allowance for the cost of maintaining an investment in working capital into the allowable revenue requirement.

The RIC invites comments on the inclusion of a return on working capital in the revenue requirement.

4.4 Revenue Requirements and Financial Viability

As discussed above, the estimation of the future revenue requirements is achieved by aggregating the four main building blocks, i.e.:

- future projections of operating and maintenance expenditure;
- the return on capital;
- the return of capital (depreciation); and
- an efficiency carryover element (discussed in Section 7).

Having determined these estimates, an annual revenue requirement for each year of the regulatory period can be derived. The regulated revenue estimated by these variables comprise the substantial majority of the revenue received by the service provider. However, the RIC will need to be satisfied that the estimated revenue is consistent with the continuing financial viability of the service provider, that is, the future cashflow needs are sufficient to cover operations, maintenance and administrative costs, return on capital and return of capital. Therefore, the RIC will undertake the analysis of the implications of the proposed revenue requirements for the financial viability of the service provider. The financial analysis generally focuses on the two main components of viability:

- the ability of the service provider to raise and service debt; and
- the ability of the service provider to attract capital in the future.

To satisfy the above components of viability, a number of financial ratios are generally analysed. For example, to satisfy the first component, it is necessary to analyse if the cash flows implied by the estimated revenue would sustain the service provider. Notwithstanding the intention to assess the financial viability, the RIC must strike the right balance between ensuring financial viability of service providers and protecting consumer interests. However, the financial viability cannot be supported if it is due to risky financial decisions or poor management.

Having evaluated the financial viability implications of the proposed revenue estimates, the next step is to establish the annual profile of estimated revenue requirements for the full regulatory period. It must be noted that the estimated revenue requirements are not "caps" on the allowed return of the service provider because the service provider's actual return will be higher (lower) than that implied by, for example, WACC utilized to estimate the return on capital, if a service provider introduces efficiency gains that either enhance revenues or reduce costs.

The RIC invites comments on the approach to assess the impact on the future financial viability of service providers.

5. QUALITY OF SERVICE STANDARDS

The supply of reliable and quality services are issues of prime importance to consumers. The need to maintain or improve service quality is one of the key cost drivers of operating and capital expenditure. To ensure that any reductions in expenditure are not due to deterioration in service, the regulators have recognized the importance of clearly specifying service targets and providing adequate incentives to achieve those targets.

Under all forms of regulation of monopolies (and more so under incentive regulation), there is a risk that firms may increase profits by lowering the quality of service. Most regulators, therefore, include measures directed at regulating service standards in the regulatory regimes. They may take the form of financial penalties/incentives and/or obligations contained in a licence or legislation.

There are at least three (3) broad mechanisms that exist for regulating service standards. None of these approaches preclude the use of any other option, and the best approach may well be a combination of the following options:

- **Comparative (Performance) Reporting** – One method of providing incentives for service providers to improve their level of service is to establish a regime aimed at disclosing information about performance, thereby increasing the accountability and transparency of service providers. Under the comparative benchmarking and reporting option, the service provider is required to report its performance against a specified set of measures. While, on the face of it, comparative reporting may not appear to be a strong option for encouraging improved performance, this approach encourages service providers to maintain and improve service quality to a level that is more in line with customers expectations by exposing them to critical assessment. It is relatively a straight forward approach and is arguably a pre-requisite of other forms of incentive. This approach generally uses trend analysis of service providers' performance, although benchmarking of performance with other utilities has been commonly conducted. The RIC is committed to implementing an annual monitoring and reporting framework covering the service and financial performance of service providers, as monitoring of service performance will operate as a more overt customer protection measure.

- **Financial Incentives for Service Performance –** Another method of providing incentives to improve service performance is by linking actual service performance to prices. There are two approaches:

  (i) ***Guaranteed Payments*** – Under this approach, the service provider is required to make guaranteed payments to customers who receive service below a certain benchmark. Currently, this is one of the most common approaches used by the regulators to control service

standards. The standards are generally divided into guaranteed and overall standards.

Guaranteed standards set service levels that must be met in the provision of service to each individual consumer. Failure to meet guaranteed standards requires a specified payment to be made to the affected customer. Overall standards cover areas of service that affect all or a large group of customers and, therefore, compensatory payments are not feasible. However, even in such circumstances it is desirable for the firm to provide service at a predetermined minimum quality. Under this approach, the primary purpose is to provide an incentive to improve key aspects of service rather than to provide some form of compensation.

The RIC Act specifies the establishment of service standards and the imposition of sanctions for non-compliance. In fact, the RIC's process for establishing guaranteed and overall standards is far advanced and has already been implemented in the electricity sector.

(ii) ***Performance Incentive Mechanism (S-Factor)*** - Some utilities have included a service standards incentive mechanism in the price control equation, " S-factor", which provides an incentive for the firm to increase service levels by allowing the firm to collect additional revenue. Such a mechanism would establish a linkage between the price level and performance indicators. Out-performance could be rewarded through a higher price, while failure to achieve standards could result in a lower price (referred to as symmetric mechanism). Where only penalties are applied, it is known as asymmetric mechanism. Although this approach provides incentives to achieve or exceed the service targets and standards, an "S-factor" incentive regime has practical difficulties, including:

- the exact form of the S-factor and the availability of data to support it;
- the choice of performance indicators to be included; and
- the level of revenue that should be put at risk.

These difficulties generally outweigh the potential benefits. The RIC believes that until it has considered all these issues it may be inappropriate to include a performance incentive mechanism in the regulatory regime.

- **Legal Compensation and/or Application of Statutory Penalties** – Under this approach, service providers face incentives from the possibility of awards of compensation by the courts or the application of statutory penalties by the regulator. This approach carries high transaction costs but can be an effective incentive of last resort.

The RIC seeks comments on the merits of establishing absolute minimum quality of service standards (guaranteed and overall) vs incentive mechanism (S-Factor).

6. PRICE CONTROLS

The final step in the building-block approach is the translation of estimated revenues into an explicit formula/control that limits average price movements over the regulatory period. The key issue is the nature of the price control formula adopted to translate the annual revenue requirement into specific tariff proposals (price controls) and the incentives implied by the different options that are available.

As discussed in Section 3, there are different forms of price control (pure revenue cap, revenue yield, pure price cap etc.), and the RIC would be assessing the incentives provided by these different alternatives before proposing a price control formula/mechanism. In adopting an explicit price control, the RIC considers that the form of price control should:

- encourage the alignment of underlying costs and prices;
- provide incentives that encourage efficient behaviour;
- manage and allocate the risks of demand uncertainty in an efficient way; and
- minimize administrative complexity and intrusiveness.

Having specified an explicit formula/control, the service providers will be required to submit annually their proposed prices for each year of the regulatory period to the RIC for approval, consistent with the specified price control formula. The RIC will publish a more detailed consultation paper on the different forms of price control mechanisms and tariff design and structure.

The RIC invites comments on the alternative price control options.

7. KEY ISSUES UNDER INCENTIVE REGULATION

To implement incentive regulation, the regulator will need to consider and address a number of issues, including:

- the specification of the formula and other factors that may be included in the formula;
- the calculation of the X factor;
- the period of regulation;
- the sharing of benefits and incentive carryover;
- correction (adjustment) factor; and
- contributed assets and capital subsidies.

7.1 RPI - X Incentive Regulation

An incentive-based approach (e.g. RPI-X) to regulation is formula driven. Therefore, the determination of variables to be included in the formula becomes critical. There are mainly three sources of cost changes in a regulatory period with which price adjustment factors need to concern themselves. They are:

- **Cost Inflation** - external inflationary increases in the purchase price of inputs used to produce output;
- **Productivity Gains** - whether from improved input productivity or growth; and
- **Cost Passthrough** - where the costs of external changes or shocks are passed through to customers.

7.1.1 Cost Inflation

Ideally, the different components of the service providers cost base should be indexed using specific deflators. However, traditionally, regulators have adopted the Consumer Price Index (Retail Price Index, RPI) and to lesser extent, GDP deflator, as an overall deflator. Despite known limitations, they remain recognized measures of inflation for macroeconomic policy management and are widely used for general indexation of public and private contracts and charges.
The inflation index should therefore:

- attempt to reflect the changes in the industry;

- be broad based such that it reflects changes of a large bundle of goods and services;

- be available from an independent source, on a timely bases; and

- not be subject to manipulation or significant revisions.

Although the RPI possesses most of these features, one of its main disadvantages is that it measures the average price level of domestic output in the economy.

7.1.2 X-Factor and Productivity Gains

The key design issue for both revenue and price caps are the selection of the X-factor. The 'X' provides the regulated firm with incentives to become efficient. It is an expectation of future productivity gains and the firm has the discretion as to the effort it will make to achieve efficiency gains. The incentive arises from the fact that initial revenues and the revenue process are set at the commencement of the regulatory control period and any efficiency gains over the price control period can be kept by the regulated firm.

The key parameters of the RPI - X approach are:

- The initial price at the start of the regulatory period (P_o);

- The rate of required annual efficiency gains (X-factor);

- The length of the regulatory period; and

- The basis for setting P_o and X-factor at the commencement of a regulatory period.

There are several approaches to the setting of X-factor during the regulatory period. One approach is to set a common X-factor for each year of the regulatory control period. Another approach is to allow for a one-off adjustment in the initial year of the regulatory period and then set a fixed X-factor for the remaining years of the price determination. Finally, the X-factor could vary over the entire length of the regulatory period.

Methods for Determining the Value of X-Factor

There are several methods for determining the value of X-factor. They are broadly separated into cost linked (firm specific) or cost unlinked (not directly related to the firm's costs). Under cost linked approach (at times referred to as subjective or indirect approach), the building-block methods are used to indirectly derive X-factor. Other less common approaches include frontier methods (using

analytical tools such as data envelopment analysis and stochastic frontier analysis), econometric benchmarking and engineering economic models. By basing regulatory parameters on firm specific costs, incentives for efficiency can be weakened under cost linked approaches. The cost unlinked approach (sometimes referred to as index-based methods) relies heavily on total factor productivity analysis (TFP). Approaches based on TFP studies have also been referred to as objective approaches or direct approaches, because they tend to minimize the scope for regulatory discretion.

Generally, the productivity offset or X-factor should take into account a number of factors, including:

- the ability of the regulated firm to finance its operations;
- the capacity of the firm to lower costs without compromising quality of service;
- the future scope for productivity improvements in the regulated firm relative to productivity growth in the economy;
- Consumer Productivity Dividend (stretch factor) i.e. a dividend to consumers resulting from streaming of regulation and increased incentives for efficiency under incentive regulation;
- the competition adjustment which could be a positive or negative figure; and
- an allowance for a period of adjustment to new rates.

The regulators in some jurisdictions factor into the expenditure the scope for cost reductions and the X-factor is used to "smooth" the price path during the regulatory period. As assumptions about cost reduction and demand growth are already taken into account, the X-factor need not bear any relationship to expected future productivity growth. Broadly, there are three 'revenue smoothing' approaches to deliver the notional revenue requirement over the regulatory period:

- Net Present Value (NPV) approach with single X-factor – a single X-factor is set to ensure expected revenue equals expected notional revenue requirement, in NPV terms;
- NPV approach with P-nought adjustment – an initial X-factor (P-nought) is set to allow prices to rise sufficiently to ensure expected revenue is equal to notional revenue requirements in the first year of the regulatory period, with a second X-factor to apply over the remainder of the regulatory period; and

- Straight line revenue smoothing (glide path) – a single X-factor is set so that prices change smoothly over the regulatory period in real terms to ensure that the expected revenue in the final year of the regulatory period equals the notional revenue requirements in that year.

The RIC Act imposes a requirement outlining what the X-factor should represent. Section 67(3)(h) states that the RIC will have regard to future prospective increases in productivity by the service provider when setting out principles on which rates chargeable should be based. Consequently, the RIC may have to rely on index-based methods. Given the technical nature of this topic, the RIC will publish a more detailed consultation paper on the topic.

7.1.3 Cost Passthrough

A cost passthrough allows a service provider to adjust (upward or downward) its price or revenue cap in response to an increase (decrease) in an input cost that is beyond the service provider's control. However, such costs may arise from unforeseen events or they can be known upfront. The regulator's function is to provide the regulated entity with incentives to cut costs that are under its control but insulate it from losses and abnormal profits arising from costs that are outside its control. The categories of costs that may be considered outside of firm's control, and thereby eligible for pass-through may include cost changes due to:

- changes in statutory requirements;
- unexpected and easily identifiable events; and
- significant changes in cost drivers.

An obvious candidate for pass-through may be the conversion and fuel costs to T&TEC, which are approximately 70% of T&TEC's total costs. They are outside T&TEC's control as they are subject to long-term contractual arrangements.

A cost passthrough approach is generally seen as a way of avoiding windfall gains or losses for the regulated firm and does not compromise long-term efficiency incentives. However, it may be seen as shifting the risk associated with a specific input cost from the firm to the customer.

The RIC seeks comments on the circumstances under which significant changes in costs to the regulated firms may be passed through.

7.2 Period of Regulation

In order to achieve efficiency gains, the regulatory control period must be long enough for management initiatives to be implemented and take effect. The period must also be long enough to discourage measures to increase profitability in the short-term at the expense of long-term considerations. The length of the regulatory period generally depends on the level of confidence in costs and productivity improvements forecasts. Efficiency gains made during the regulatory control period (i.e. over and above X-factor) are shared by owners and users. Therefore, the longer the owners are able to retain the benefits of increased efficiency through higher profits, the greater the incentives to pursue these initiatives but the longer the customer must wait to share the benefits. A longer period can:

- provide greater incentives to increase efficiency, by allowing service providers to retain gains over a longer period;
- provide a more stable and predictable regulatory environment which may lower business risk and lead to better investment decisions; and
- lead to fewer regulatory reviews thus lowering of regulatory costs.

On the other hand, a longer regulatory period can lead to greater exposure to unforeseen cost increases thus leading to financial uncertainty and/or viability. Consumers may also be exposed to increased risks if there are implications for the long-term level of prices.

Section 48 of the RIC Act specifies that the Commission shall review the principles for determining rates and charges every five years or, where the licence issued to the service provider prescribes otherwise, at such shorter interval as it may determine. This requirement appears to suggest that the RIC may adopt a regulatory period shorter than 5 years, if that were considered to be appropriate.

The incentive-based regulatory regime is being introduced for the first time in Trinidad and Tobago and as such a longer regulatory control period may result in a significant disparity between costs and revenues towards the end of the period. Therefore, it may be appropriate to set a shorter rather than longer control period for the first review.

The RIC invites comments on the appropriateness of a five-year regulatory control period.

7.3 Incentives for Efficiency and Efficiency Carryover Mechanism

The essence of incentive regulation involves two equally important aspects:

- offering the service provider an incentive to outperform the X-factor; and
- fair sharing with consumers the benefits greater than the value implied by the X-factor.

The RIC will have to ensure that the service providers have sufficient incentives to minimize the cost of providing a particular level of service, while ensuring the delivery of desired level of service during the regulatory period. There are various effective incentive mechanisms which have been generally adopted, including:

(i) **X-Factor** – setting a price path for the duration of the regulatory period on the basis of forward looking revenue requirements and then allowing service providers to retain any benefits from outperformance;

(ii) **Efficiency Carryover Mechanism** – enhancing incentives to achieve efficiencies within the regulatory period by allowing service providers to carryover into the next regulatory period i.e. retaining the gains for a fixed number of years;

(iii) **Financial Incentives for Service Performance** – there are two approaches under this scheme:

- ***Guaranteed Payments*** – where service provider is required to make guaranteed payments to customers who receive service below certain targets,
- ***Performance Incentive Mechanism (S-Factor)*** – where service standards incentive mechanism is included in the price control equation (S-Factor), thus providing an incentive for the firm to increase service levels by allowing the entity to collect additional revenue once targets are surpassed; and

(iv) **Performance Reporting** – reporting and auditing the performance against various indicators, thereby increasing the accountability and transparency of service providers.

The efficiency carryover mechanism is discussed in more detail in this section, while the other mechanisms are discussed in Section 5.

The objective of an efficiency carryover mechanism is to encourage the firm to continuously find ways to achieve efficiency gains. The carryover mechanism strengthens the incentive for efficiency improvements by providing service providers with a financial reward (or penalty) for achieving efficiency gains (losses) beyond those already inherent in the use of RPI - X approach. Under the RPI - X regulatory regime, the firms have incentives to achieve efficiency gains in the early years of a regulatory period, as opposed to the later years. A well-designed efficiency carryover mechanism can remove the incentives that would otherwise exist to deter the implementation of efficiencies from one regulatory period to the next. The incentive to outperform is likely to be undermined if the regulated firm believes its out performance will be returned to customers at the end of the regulatory period. The efficiency carryover mechanism, therefore, should be designed to achieve the following objectives:

- it should focus on efficiency gains that can be influenced by management;
- there should be minimal or no re-opening of prior forecasts;
- there should be equal incentives to make efficiency gains in any given year and equal incentives with respect to Opex and Capex; and
- the mechanism should be transparent, easy to administer and should not be at the expense of service standards.

The development of an appropriate form of efficiency carryover mechanism gives rise to a number of questions, including:

- the form of the sharing arrangements;
- the appropriate sharing ratio;
- the period over which the outperformance should be shared with customers;
- the design of the efficiency carryover mechanism;
- how actual expenditure above forecast will be treated and whether carryover mechanism should apply to both Capex and Opex;
- how the regulator can ensure that efficiency gains are not at the expense of deferred maintenance; and
- what assumptions are to be made about expenditure in the final year of a regulatory period as actual expenditure in the final year may not be known prior to a price control decision for the next regulatory period.

Among the several possible approaches for sharing the benefits with customers are:

- **A Glide Path,** i.e. gains are passed on to customers either entirely (full glide path) or, partially (partial glide path) over time (e.g. the out-performance may be spread over the next regulatory review period). This approach allows the service provider to pursue efficiency gains in excess of the X-factor.

- **One-off Reductions** (normally called P_o Adjustment) – that is, gains in excess of those specified by X in the previous control period are passed on to consumers in the development of new prices for the next rate review and then a fixed X-factor is set for the remaining years of the price determination. Under this approach, the service provider has little incentive to invest in efficiency enhancements towards the end of the regulatory period.

- **Gains Maintenance** – that is, the full gains for each year are retained by the service provider for a pre-specified time (e.g. five to ten years) unconnected to any regulatory review. Thereafter, gains are passed on to customers in a one-off or phased reduction. This approach increases the incentive to pursue cost savings.

Generally, any outperformance is kept by the firm for the length of the regulatory control period, that is, the savings in the first year of the control period are retained for the full five years, while savings made in the last year are kept for less than one year. This mechanism leads to strong incentives for outperformance in the early years while providing little incentives towards the end of the control period. Therefore, many regulators allow the firm to keep outperformance for a five-year period, regardless of the year in which the savings were made.

There is no pre-determined "optimal" sharing ratio for efficiency gains as there is no precise relationship between business efficiency responsiveness and the share of gains retained. However, the optimal sharing ratio is about 50% if one assumes that the relationship is linear.

The efficiency carryover mechanism may be designed in several ways but two methods are most commonly used. Under the **rolling carryover mechanism**, efficiency gains are calculated by comparing actual expenditure against forecasts for each year of a regulatory period and efficiency gains or losses are carried forward for a specified number of years following the year in which they were incurred. Under the second method, **glide path mechanism**, efficiency gains are calculated by comparing actual expenditure achieved in the last year of a regulatory period with the forecast level of expenditure for that year. Forecasts for the subsequent regulatory period are then based on actual expenditure for the

last year of the previous period, and the resulting efficiency gain or loss being phased out over a specified number of years.

It is to be noted that in the case of T&TEC and WASA, this would be the first regulatory period under the new regulatory arrangement, and as such the application of an efficiency carryover mechanism will not have any practical implications for prices until the second regulatory period.

The RIC invites comments on the approach to sharing of benefits and the adjustment of revenues during the regulatory control period, as well as on the approach and merits of an efficiency carryover mechanism.

7.4 Correction (Adjustment) Factor

It is reasonable to include a correction (adjustment) factor in the rate control formula to allow for adjustments arising in the current regulatory period to be carried forward into the next regulatory period. Broadly, there are two situations where the correction factor may be applied, and these are discussed below.

7.4.1 Unders and Overs

The regulatory regime based on a revenue cap may include an "unders and overs" account for differences between forecast and actual revenue, as, at the end of the regulatory period, there is likely to be a balance in service provider's account. The issue for the regulator is how to treat this balance. A correction factor to carry forward the balance is one option. Alternatively, the revenue requirement could be adjusted for the unders and overs. But this may raise two additional issues. One is the length of the period, as this will depend upon the magnitude of the account balance and on the methodology for determining the X factor. The length of the period gives rise to inter-generational equity issues. The second issue for the regulator is whether a positive balance, for example, should be treated as a customer capital contribution or as prepaid revenue and incorporated within the allowable revenue over the next regulatory period. A positive balance would reduce RAB or allowable revenue and hence prices. The converse is also true.

7.4.2 Treatment of Capital and Operating Expenditure

The second type of situation, in which the regulator may consider using a correction factor, is the treatment of a positive or negative balance of capital and operating expenditure. Once again, the issue arises whether to treat additional expenditure as revenue foregone or to be provided for in the next regulatory period. If it is to be provided for in the next period, then the regulator may use a correction factor to adjust the revenue requirement.

The RIC invites comments on the proposal of using a correction factor in the rate control formula and on the appropriate means of dealing with any residual balances in the revenue requirement or capital and operating expenditure.

7.5 Contributed Assets and Capital Subsidies

7.5.1 Contributed Assets

Contributed assets are those assets that are funded by a user or group of users for their own benefit or for the collective benefit of users. Types of contributed assets may include an up-front lump sum payment for a specific asset (e.g. a direct up-front capital contribution), an annual capital charge in lieu of an up-front lump sum payment (e.g. a user meeting certain capital costs) and security deposits. It is generally recognized that "double-charging" of contributed assets should be avoided. However, the major issue is to identify what constitutes a contributed asset. Once contributed assets are identified, it is important that service providers amend the revenue requirement accordingly.

7.5.2 Capital Subsidies

Capital subsidies are a specific form of contributed assets. T&TEC and, more so, WASA have benefited from subsidies for capital works or capital grants from Government and other agencies such as the Self-Help Commission. Other schemes have also provided assistance for the development/extension of the network systems. The purposes of capital subsidies include the reduction of service costs to a particular consumer group, the meeting of funding shortfalls, etc. Some of the options for dealing with capital subsidies include:

- Recognizing the subsidy as revenue in the period in which it was received and including it in the firm's asset base;
- Treating it as an equity injection, with no consequent changes to pricing arrangements; and
- Amortizing the value of any past grants over the life of the relevant assets, in addition to including the amount as revenue.

The RIC invites comments on the treatment of contributed assets and capital subsidies.

8. ADDITIONAL ISSUES

8.1 Restructuring Tariffs

Tariffs have an important role in signaling the economic costs of network use and the influence that this has on the level of network investment. Tariffs that diverge from costs can lead to distortions in network use and investment, resulting in the misallocation of network resources. Improved price signals can result in better utilization of existing network capacity, thereby reducing the need for costly network augmentation. Tariff restructuring therefore is a major issue, especially if the existing tariff structure is not the most efficient one. The structure of prices plays an important role in facilitating efficient investment by service providers and efficient consumption decisions by customers.

The ability to introduce new tariffs is an important aspect of network development and the service provider would be encouraged to introduce efficient tariffs, subject to the constraint of the overall revenue cap. Procedures will be developed for introducing new or restructured tariffs during the regulatory period. However, the key issue is the extent to which the RIC needs to guide service providers to ensure price structures provide appropriate signals to customers about the costs of providing particular services and promote conservation and sustainability of use.

The RIC invites comments on approaches to restructuring of tariffs so as to provide appropriate price signals.

8.2 Reset and Revocation of a Determination

One of the major issues in incentive regulation is the commitment by the regulator to its price or revenue cap decision. The regulator faces many challenges to maintain commitments under incentive regulation.

First, the setting of price limits applies to a specific time period (i.e. the five year review period). Although details of the regulatory arrangement can be specified within the review period, many of the benefit sharing aspects of incentive regulation relate to regulatory actions at the subsequent review. Therefore, a key issue will be the extent to which current determinations or statements of approach can or should bind the actions of future regulatory decisions.

Building confidence in the regulatory regime requires that commitments are honored and that the regulators do not behave opportunistically and should resist any pressure for retrospective adjustments if revenue outcomes exceed expectations, as repeated confiscation of the benefits of efficiency improvements combined with uncertainty can contribute to poor performance and poor investment practices.

On the other hand, the regulator may find that the price determination is unworkable and could cause great financial hardship for the regulated firm. Under these circumstances, the regulator may cater for some sort of "reset" or "substantial effect" clause or even an "interim determination" mechanism. A reset may be applied:

- if there were an exogenous shock (e.g. natural disaster);
- if accurate information were not available when setting the price cap parameters; or
- if distortions in the parameters (e.g. rate of inflation) occur due to rapid unforeseen changes.

Section 48 of the RIC Act makes provision for "reset" events but it does not specify any event. It is generally recognized that a service provider should be able to apply for interim determination if there have been changes to its costs and revenues amounting to more than a certain percent of turnover.

The RIC invites comments on the types of events that might trigger the "reset" of the price determination.

8.3 Approach to Miscellaneous Charges

Apart from prescribed tariffs, both T&TEC and WASA apply miscellaneous charges for some of their services. There are a number of challenges and issues in relation to the regulation of these services and charges, including:

- **Setting maximum charges**. If the regulator is to set a maximum charge that includes recovery of all associated costs, it would require detailed information on the total cost base for the provision of miscellaneous charges.
- **Setting a revenue cap**. This would include the maximum allowable revenue for these miscellaneous services in the total revenue of the firm.

Many regulators allow the regulated firms to determine their own charges for miscellaneous services, as long as these charges are fair and reasonable.

The RIC invites comments on the appropriateness of regulating miscellaneous charges and the approach to regulating such services.

8.4 Tariff Re-balancing and Side Constraints

The purpose of "side constraints" is to limit the variation of tariffs for all or particular customer groups from year to year. For example, a side constraint may limit an annual increase in tariffs to a specific increase over the previous year. Another example may be to impose a price constraint on the first block of consumption to limit the price increase on the lower income consumers to an affordable level. The regulator can also establish limits on the extent to which a service provider can rebalance individual tariffs within the limits imposed by the price control so as to ensure that particular customer classes did not experience significant tariff increases in a single year.

Although the side constraints provide price stability for customers, they are likely to have adverse effects in terms of the ability of the regulated firm to fully recover its revenue requirement.

The side constraints may also be used to establish performance benchmarks to be met by the service provider, such as, for the reduction of system losses, the reduction of employee costs to certain levels or the requirement for customers to be metered over a certain timeframe. For instance, the tariff regime may include a "K Factor" or a surcharge on bills, the proceeds from which would be used exclusively to purchase and install meters in order to increase meter penetration in the country.

The RIC Act requires the RIC to have regard to the ability of consumers to pay rates. Two issues arise from this requirement; the issue of affordability and the design or structure of prices. To the extent that price increases are likely to be onerous in terms of the impact on customer bills, the phasing in of tariffs or limiting the amount by which prices can increase on an annual basis may be possible solutions. Where the service providers are asked to provide a service at a less than efficient or uneconomic price, the service providers will need to propose a mechanism to recover the unrecovered portion of costs. There are at least two options:

- Recover the costs across some or all of the other customers, or
- Fund the deficit from the Government budget.

The RIC invites comments on:

- ***the appropriateness of side constraints and the circumstances under which they should be applied; and***
- ***how should the service providers take into account the interests of customers.***

9. SUMMARY OF ISSUES FOR CONSULTATION

Throughout this Issues Paper the RIC has identified a number of issues for further comment. The range of issues identified is not intended to be exhaustive and stakeholders are encouraged to identify any further issues that they consider should also be addressed. After receiving the responses, the RIC will then indicate how it intends to resolve the various issues.

METHODS OF REGULATION

The RIC welcomes comments on the above discussed methods of regulation.

FORM OF ECONOMIC REGULATION

The RIC welcomes comments on:

- ***the broad form of regulation most suited to regulating T&TEC and WASA***
- ***any other alternative regulatory models that stakeholders believe warrant consideration***
- ***the RIC'S preference to use a revenue cap for the initial regulatory period.***

DETERMINING REVENUE REQUIREMENT

The RIC invites comments on the relative merits of using a cost linked approach to setting price/revenue controls.

The RIC invites comments on the use of a "building-block" approach for determining service providers' revenue requirement.

The RIC invites comments on the most appropriate approaches for assessing the efficiency of Opex of service providers and appropriate methods for allocating asset related and non-asset related common costs.

The RIC invites submissions/views on the most appropriate method of treating underspending and overspending of capital and operating expenditure, bearing in mind implications for incentives to invest.

The RIC encourages service providers and other stakeholders to make submissions on the role of demand management and specific demand management solutions as alternatives to network augmentation.

The RIC invites submissions/comments on the most appropriate asset valuation method for determining the initial value of assets of T&TEC and WASA, as well as other issues which should be considered as part of the asset valuation process.

The RIC invites comments on:

- ***the appropriate index for adjusting the RAB;***
- ***the method for including the new investment in the RAB; and***
- ***whether capital expenditure should be included in the determination of revenues in the year that it is incurred.***

The RIC invites comments on the relative merits of the alternative depreciation profiles and the usefulness of utilizing the straight line method of depreciation for the first regulatory control period.

The RIC invites comments on the appropriateness of the above methods for the calculation of the WACC and the determination of cost of equity by the CAPM.

The RIC invites comments on the inclusion of a return on working capital in the revenue requirement.

The RIC invites comments on the approach to assess the impact on the future financial viability of service providers.

QUALITY OF SERVICE STANDARDS

The RIC seeks comments on the merits of establishing absolute minimum quality of service standards (guaranteed and overall) vs incentive mechanism.

PRICE CONTROL

The RIC invites comments on the alternative price control options.

KEY ISSUES UNDER INCENTIVE REGULATION

The RIC seeks comments on the circumstances under which significant changes in costs to the regulated firms may be passed through.

The RIC invites comments on the appropriateness of a five-year regulatory control period.

The RIC invites comments on the approach to sharing of benefits and the adjustment of revenues during the regulatory control period, as well as on the approach and merits of an efficiency carryover mechanism.

The RIC invites comments on the proposal of using a correction factor in the rate control formula and on the appropriate means of dealing with any residual balances in the revenue requirement or capital and operating expenditure.

The RIC invites comments on the treatment of contributed assets and capital subsidies.

ADDITIONAL ISSUES

The RIC invites comments on approaches to restructuring of tariffs so as to provide appropriate price signals.

The RIC invites comments on the types of events that might trigger the "reset" of the price determination.

The RIC invites comments on the appropriateness of regulating miscellaneous charges and the approach to regulating such services.

The RIC invites comments on:

- ***the appropriateness of side constraints and the circumstances under which they should be applied; and***

- ***how should service providers take into account the interests of customers.***