

Tariff Principles and Structures

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This document summarizes the principles of rate setting, the various price structures typically used in electricity utilities and finally, the key factors that have an impact on tariff structures for the second price control period.

Summary
Document

PURPOSE OF THE DOCUMENT

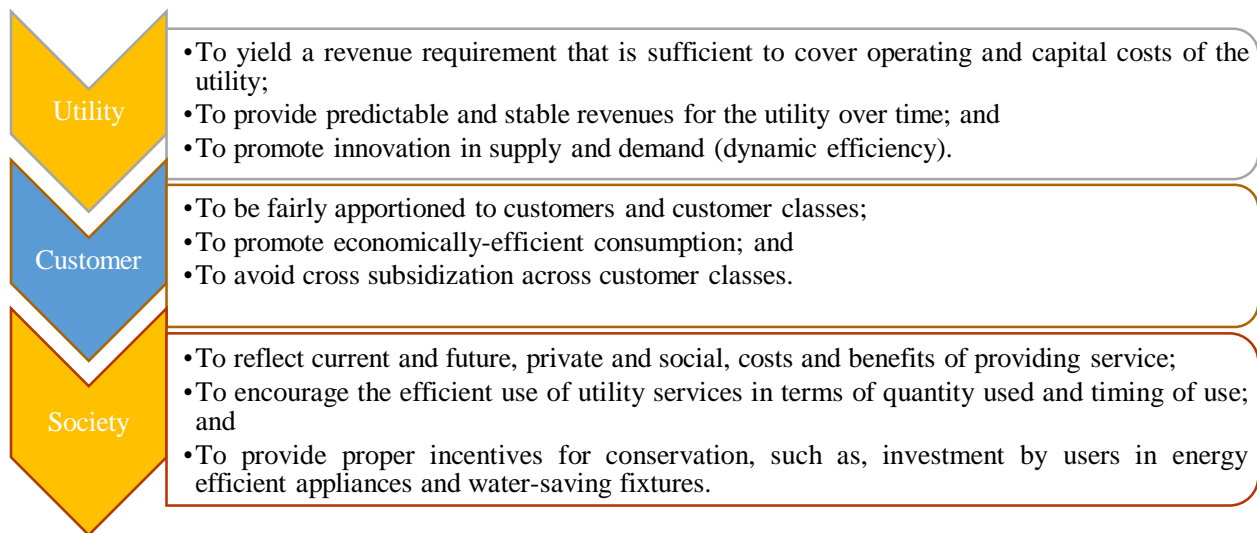
This document briefly highlights the fundamental principles that regulators need to take into consideration when setting electricity prices. It examines various pricing structures that are used in the electricity sector. Finally, the paper will briefly examine the existing tariff structure for T&TEC and present recommendations on the way forward.

PRINCIPLES OF RATE DESIGN

Rates charged for utility services serve four primary functions namely:

Capital attraction	to enable utilities to provide service and to make provision for expansion and continuation of the service.
Efficiency incentive	to simulate competitive outcomes in the provision of utility services by bringing cost and price in closer alignment.
Demand control	to influence consumer behavior by eliciting demand-inhibiting choices with respect to consumption of utility services.
Compensatory income transfer	to determine a rate that is reasonable for different types of utility consumers.

OBJECTIVES OF RATE DESIGN



COST BASIS FOR ALLOCATION AND TARIFF DESIGN

Two broad methodological cost-based approaches have evolved for the purposes of allocating costs, and ultimately, establishing tariffs; one is a Marginal Cost approach while the other is an Embedded Cost approach.

Allocating Cost and Establishing Tariffs	
<p style="text-align: center;">Marginal Cost Approach</p> <ul style="list-style-type: none"> - Marginal cost pricing is the most efficient approach to allocating resources. - Rates based on marginal cost sends signals to consumers and producers that encourage them to balance the benefits from consuming the good or service with the costs of providing same. - Marginal cost pricing cannot guarantee that revenue will match the total costs of service provision. While marginal cost pricing can lead to an over-recovery of revenue, it is more common to be faced with the problem of under-recovery in a utility sector that operates under conditions of natural monopoly. 	<p style="text-align: center;">Embedded Cost Approach</p> <ul style="list-style-type: none"> - This approach, also known as the fully-distributed cost (FDC) approach, involves the allocation and assignment of total annual costs to broadly defined classes of customers, which derives the aggregate revenue that the utility requires based solely on costs of production. - The general approach to cost apportionment is based on the principle of cost causality. - The advantage of the embedded cost approach is that it allows the service provider to recover the fixed and common costs that may sometimes not be recovered by marginal cost pricing. On the other hand an embedded approach does not offer the same price signaling advantages that are inherent in marginal cost pricing.

TARIFF STRUCTURES

Most tariffs are a combination of a fixed charge, a volumetric charge and a minimum charge. These are derived from one or more methodological approaches, described below.

<p>Linear Prices</p> <p>Linear tariffs are essentially uniform or simple tariffs, where one rate applies for all units consumed regardless of type of customer.</p>
<p>Non-linear Prices</p> <p>There are two basic types of non-linear tariff structures:</p> <ul style="list-style-type: none"> - Increasing Block Tariffs (IBTs) - Consumption is organized into ‘blocks’ for rate making purposes. The first block of electricity consumed is usually set as the “lifeline block” and charged at a certain rate. - Declining block tariffs - The first block of electricity consumed is charged at a given rate and the succeeding blocks are charged at progressively lower rates. Declining block encourages an increase in consumption so that the utility can achieve economies of scale.
<p>Multipart Tariffs</p> <p>Tariffs with several billing components are called multi-part and can take on various forms. The simplest form of this method is the two-part tariff, where customers pay a fixed charge plus a volumetric charge (variable or usage charge). The volumetric portion can be flat (linear) or have a block tariff structure (non-linear).</p>

Ramsey Prices

This is known as inverse pricing rule because prices are increased in inverse proportion to their elasticity of demand. The basis of Ramsey pricing is that pricing as close as possible to marginal cost maximizes utility profits and leads to an economically efficient outcome.

Time -Variant (Dynamic) Pricing

Time-variant rates are based on the fact that there are certain periods during the day when the demand on the electricity network is highest and includes Time-of-Use rates. During these periods, the utility incurs additional resources in order to meet this short-term demand peak. It is utilized to recover the true cost of electricity at different periods during the day as well as influence consumer behavior toward shifting their demand to off-peak periods or reducing demand overall.

Seasonal Pricing

Seasonal pricing is normally characterized by higher volumetric rates during certain months of the year (seasons), over which demand is notably higher.

SETTING TARIFFS FOR THE SECOND CONTROL PERIOD

On a periodic basis, it is prudent for the regulator to review whether its past approach was effective or whether any changes are required. Accordingly, there are some core issues that directly impact tariff structures and rates, which the RIC must address in its approach for the second Price Review. These are discussed further below.

Suitability of IBTs

In 2010, cumulative residential consumption of electricity below 1000kWh was 32.3% while this decreased to 24.6% by 2017, indicating a general shifting of consumption into higher tiers.

The percentage increase from 2010 to 2017 in the 1001-1500, 1501-2000 and >2000kWh consumption bands were 18%, 73% and 45% respectively.

Income elasticity of electricity demand is relatively elastic in relation to demand for household appliances that consume large amounts of electricity. However, the magnitude of income elasticity requires further analysis.

The government introduced a low-income assistance programme in December 2016, which was initially intended to target 120,000 electricity customers but has actually benefitted more than 220,000 customers of T&TEC, which is more than 50% of T&TEC's residential customer base.

It is difficult to estimate the responsiveness of demand for electricity to changes in price (elasticity) when those prices have not changed for some time, income levels would have allowed the purchase of more household appliances to improve quality of life and electricity consumption distortions may have resulted from poorly-targeted government support programmes.

RIC's consideration on IBTs

The magnitude of price elasticity for electricity demand is not known at this time therefore, caution must be adopted when considering changes to the tariff structure, especially without first considering the impact of moving to cost-reflective rates.

Implementation of cost-reflective rates, on the existing three-tiered block structure, will send appropriate pricing signals to customers regarding the true cost of electricity.

The RIC would have to ensure that the magnitude of the price changes and consequently, the price differential between successive blocks, impact the final bills in such a manner (on a percentage basis), to achieve the desired demand response.

Stability in the tariff structure is important to influence consumer behaviour where electricity consumption is concerned. By adjusting the price and keeping the existing tariff structure constant, it will be easier for consumers to see the direct link between their bill and level of consumption.

Customer Classifications

The use of technical characteristics of service for identifying classes and sub-classes of customers is a simple but highly effective approach that has been traditionally used by utilities and regulators.

Creating a new name for a certain set of customers based on end-use factors, does not change the fact that the characteristics of service of these customers have to be assessed for the purposes of determining cost of service.

Significant administrative burden (and cost) would be imposed on the utility if new classes (or sub-classes) are introduced without a proper cost-based justification for doing so.

Feasibility of Time-of-Use (TOU) Pricing

Implementation of TOU rates is difficult when prices in the electricity sector are set on an embedded-cost basis.

Establishing time-variant pricing at this time would be introducing a significant risk factor into a price-setting process that has been relatively stable.

When the cost of producing electricity does not vary by time-of-day or when there is no competition in the generation market, as is the case in the local electricity sector, TOU pricing may result in over-recovery of costs during peak periods.

T&TEC has several take-or-pay contracts with generators, therefore, there is no incentive to restrict demand (through TOU or otherwise) as T&TEC is obligated to pay for all of the contracted generation capacity.

TOU rate structure relies heavily on the results of detailed load studies. However, the RIC is not aware of any detailed load studies from T&TEC regarding the feasibility of TOU and their recommendations in this regard.

Billing Frequency

The frequency of the billing cycle is an issue that may come under scrutiny during a Price Review because the frequency of revenue collection of revenue has a direct impact on the cash flow of the utility and therefore, delays in collecting rates can negatively impact the operations of the utility.

Some argue that bi-monthly billing is unfair under the current IBT tariff structure on the basis that combining their consumption over two months forces them to consume in the higher block, thereby being charged at a higher rate.

The first Price Review utilized a Revenue Cap approach and rates set by the RIC were designed with the current bi-monthly cycle, to return the required revenue for a two-month period at a time. If all things were held constant, reducing the cycle to monthly billing would have resulted in an increase in rates for the lifeline and first block, to ensure that the utility recovers the cost of providing service for that month.

Conclusion

In deciding on appropriate tariff structures, the RIC will continue to focus on aligning the rates for all categories of consumers with the cost of supply and will be examining other options for addressing affordability and broader hardship issues more effectively.

Responding to the Document

All persons wishing to comment on the main document are invited to submit their comments by March 30th, 2018 by post, fax or e-mail to:

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