

STUDY ON EVOLVING AN APPROPRIATE MODEL FOR DISTRIBUTION MARGIN

Final Report

Submitted to

FORUM OF REGULATORS



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1. *Executive Summary*

In a meeting of the Forum of Regulators (FOR) in July 2008, it was decided that a Study should be conducted to examine the need and feasibility for implementing 'Distribution Margin' as the basis for allowing returns in distribution business, in accordance with the provisions of the Tariff Policy notified by the Ministry of Power, Government of India, and to formulate an appropriate model for Distribution Margin.

FOR has engaged ABPS Infrastructure Advisory Private Limited (ABPS Infra) for assistance in developing and recommending an appropriate model for implementation of Distribution Margin as a basis for providing returns to Distribution Licensees.

ABPS Infra has submitted the 'Inception Report & Phase I Report' as well as the 'Draft Report' earlier. ABPS Infra is pleased to now submit its Final Draft Report in this regard, after incorporating the suggestions and comments of the FOR Secretariat on the earlier submitted Draft Report.

Existing approaches for giving returns to Distribution Licensees

The Tariff Regulations notified by the SERCs typically provide for adoption of the following two basic approaches:

- a) Return on Equity (RoE)
- b) Return on Capital Employed (RoCE)

Among the above two methods, the RoE approach is far more prevalent, and only APERC, and to a certain extent DERC, have adopted the RoCE approach. However, depending on the prevailing circumstances, quality of data available and whether the Distribution Licensee has asked for returns in its Petition, the SERCs have followed different approaches as well, as summarized in the Inception Report & Phase I Report. In cases where the Distribution Licensee has not sought any return, the SERCs have typically not considered return while computing the Aggregate Revenue Requirement, while in some cases, the Return has not been allowed due to the poor performance of the Distribution Licensee, even though the Distribution Licensee may have sought approval for return. The specific approach followed by different SERCs



has been elaborated in the 'Inception Report & Phase I Report' submitted earlier to the FOR.

Need for implementing any other approach for giving returns to Distribution Licensees

The prevailing approaches to providing Returns to distribution licensees, viz., RoE and ROCE, are basically 'Cost Plus' approaches, also known as 'Cost of Service' or 'Rate of Return' regulation, wherein the Distribution Licensee is entitled to recover its legitimate costs as well as a specified return on its investment. The disadvantage of the Cost Plus approach is that since the licensee can recover the costs it incurs; it is under no pressure to reduce those costs, which can lead to inefficiency and higher tariffs for consumers. As a result, the retail tariffs are increasing every year, which defeats the objective of regulating the sector.

Regulation is intended to mimic a competitive environment in the absence of real competition, since electricity distribution and supply is usually a monopoly business in the country. Competition through Open Access and/or Parallel Licensee approach is yet to really take root in most States in the country. Against this background, the regulatory regime should result in reducing the electricity tariffs in the long-term, while at the same time; increase the focus on the consumer and quality of supply. It appears unlikely that tariffs will come down as long as the Cost Plus mechanism is in vogue. It is essential to quickly move towards a tariff setting system that rewards efficiency and results in lowering the retail tariffs. Hence, alternative approaches for giving returns to the Distribution Licensees need to be explored.

Options available for providing returns to Distribution Licensees

The alternative approach to the two Cost Plus approaches to regulation discussed above, is the Incentive Based Regulation (IBR) or Performance Based Regulation (PBR) as it is commonly known.

Rather than frequent reviews of Utility costs and tariff determination to reimburse Utilities for what they spend, PBR takes a longer term view and focuses on how Utilities perform. In a well-designed PBR, good performance should lead to higher profits, while poor performance should lead to lower profits. In general, PBR mechanisms provide Utilities with a fixed price or a fixed level of revenues, as opposed to a predetermined level of profits. As a result, Utilities can earn higher, or



lower, profits depending upon how efficiently they plan for and operate their systems. The most commonly discussed PBR mechanism is the Price Cap. Price Caps differ from the cost plus approach in two fundamental ways. First, prices are put in place for longer periods of time (e.g., three to five years) as compared to the annual tariff determination usually undertaken under the cost plus approach. The fixed prices over longer periods are intended to provide incentives to reduce costs. Second, Utilities are allowed to lower their prices to some customers, as long as all prices stay within the Cap (or Caps). This flexibility allows Utilities to provide competitive price discounts to customers that might otherwise leave their system.

A well-designed Price Cap scheme requires the initial rates for each customer category to be set in a fair manner, based upon an appropriate allocation of costs. The Price Cap is then allowed to increase from year to year to allow for inflation, with the increase being offset partly to reflect increased productivity. The generic Price Cap formula can be defined as:

$$\text{Price}_{(t)} \leq \text{Price}_{(t-1)} * [1 + (I - X)] + Z,$$

Where,

$\text{Price}_{(t)}$ is the maximum price that can be charged to a customer category or categories for the current period,

$\text{Price}_{(t-1)}$ is the average price charged to the same customer category or categories during the previous period,

I is the inflation factor,

X is the productivity factor, and

Z represents any incremental costs that are not subject to the Cap.

PBR mechanisms can also be designed using 'Revenue Caps' instead of price caps. Revenue Caps are based on the same principle as Price Caps, where the Cap in one year is based on the revenue in the previous year with adjustments for inflation and productivity, and can achieve many of the same objectives as Price Caps. However, Revenue Caps provide Utilities with significantly different incentives regarding energy efficiency and increased sales. The cost cutting incentives for Price Cap and Revenue Cap are identical. The main difference is that Price Caps may also encourage increased sales and hence, discourage end-use energy efficiency. Under the Revenue Cap approach, the incentive to invest in energy efficient range from



neutral to significant. Internationally, the PBR approach has typically been applied for the network businesses, which are natural monopolies, since the Supply Business is usually competitive.

Distribution Margin - the Concept

The Distribution Margin approach is proposed to be adopted for both, the Wires Business, as well as the Supply Business, by factoring in the peculiarities of the respective Businesses. The Distribution Margin approach has been proposed with the objective of improving the hitherto neglected aspect of Availability of the Distribution Business. The Distribution Margin has been conceived as a mechanism, which will provide the opportunity to the Utility to earn additional returns by getting additional ARR, i.e., the incentive/disincentive will be in terms of addition/reduction in percentage of ARR that can be earned/reduced for over-/under- achievement vis-à-vis the target availability. To start with, the additional ARR may be considered as $\pm 0.2\%$ of ARR for every percentage point increase/decrease in Availability vis-à-vis the normative levels, for Wires Business and Supply Business, separately.

The proposed Model envisages that the ARR of the distribution licensee would have segregated into the ARR of the supply business and the ARR of the network business. However, presently, segregation of ARR into supply business and network business would be difficult because licensees maintain combined accounts and there are tax related problems in segregation. However, the allocation of the expenses can be done by the licensee between the Supply and Wires business using some approximation and assumptions, giving detailed rationale for the same. Alternatively, the ERCs may stipulate the ratio of allocation of all the expense heads and return component, based on data obtained from the licensees, so that all licensees in the State adopt uniform assumptions.

For the Supply Business, it is proposed to link the Distribution Margin to the ARR of the Supply Business, after reducing the power purchase cost, which also truly reflects the costs incurred by the Supply Business in ensuring that the requisite supply is contracted for and the desired customer service is delivered.

The proposed Distribution Margin approach, linked to Network and Supply Availability, is appropriate for both, existing distribution licensees as well as new licensees.



Merits of Proposed Distribution Margin Approach

- (a) The licensees will be incentivised to reduce their costs and improve their efficiencies, which would lead to lower tariffs in the long-term, which is one of the objectives of regulating the sector.
- (b) The distribution licensees will get a clear message that their profits and hence, returns are linked to their performance
- (c) If the actual performance is lower than the normative levels, then the distribution licensee will be lower to the extent of the dis-incentive, thus, there will be a pressure on the distribution licensee to ensure at least the normative performance.
- (d) In case the actual performance is lower than the normative levels, then the costs allowed in the ARR will be reduced to the corresponding extent, giving some relief to the consumers
- (e) The linkage of Distribution Margin to the Network Availability and Supply Availability, will bring greater focus on these hitherto ignored factors for retail tariff determination, which will facilitate improved customer service.

Demerits of Distribution Margin Approach

- (a) The licensees may try to maximise their returns, by compromising on service quality standards and failure to meet universal service obligations.
- (b) Issues like load shedding and guaranteed supply to agricultural sector, etc., will have to be addressed and incorporated into the Availability definitions
- (c) Greater monitoring of distribution licensee will have to be undertaken by the SERCs, to ensure that the figures reported against Network Availability and Supply Availability are correctly represented.

International Experience of Distribution Margin Approach

Pakistan

Pakistan is one country where the distribution pricing methodology is called 'Distribution Margin' for the eight distribution Companies that were formerly part of the Water and Power Distribution Authority (WAPDA). Here, the end consumer tariffs are determined by taking the costs of generating and transmitting electricity charged to the distribution company and adding a 'Distribution Margin' to cover the costs of the Company plus a return on the distribution Company's assets.



The formula used for the average Distribution Margin is

$$\text{Margin} = \frac{[\text{O\&M} + \text{Depreciation} + \text{Return} - (\text{Amortisation} + \text{other income})]}{(\text{total unit sales})}$$

where, O&M are the operating expenses and maintenance costs and the return is determined using a weighted average cost of capital on the asset base of the Company.

Any increases in the costs of electricity purchased by the Distribution Company are passed directly on to consumer tariffs without affecting the margin the Distribution Company makes. However, this requires the tariffs to be adjusted on a frequent basis in times of rapidly changing energy prices. Under this Distribution Margin approach, the only incentives for the Distribution Company to encourage greater efficiency would be if the Distribution Margin was fixed for a suitably long period so that the Company is allowed to reduce its costs while retaining a margin that has previously been set, giving it extra profitability. The Distribution Company is not incentivised to try to procure energy at a better price, since whatever price it pays is passed through to the final consumer tariff. Similarly, there is no specific incentive to reduce its own costs (including financing costs) since these are included in the Distribution Margin and a lower cost will lead to a correspondingly lower margin being charged to consumers.

Great Britain

In Great Britain, the restructuring of the electricity supply industry is quite mature and the incentive based approach would at first appear to be quite different although there are in fact some similarities and points that are of interest in considering the Distribution Margin approach being considered in India.

Although distribution charges operate under an incentive approach, the method of setting those charges still uses the costs and rate of return of distribution activity as its basis. The incentives arise through a number of specific approaches:

- The costs used are not necessarily the costs of the distribution business, but what the Regulator determines (through benchmarking and similar approaches) would be the costs of an efficient distribution company. If the



Distribution Company fails to achieve these levels of efficiency, it will earn lower profits.

- The overall revenues are set for a period of time (5 years). If the Company can achieve greater efficiencies than that assumed by the Regulator, the Company makes more profit since tariffs are not adjusted during this period. The Regulator will have better information at the time of next tariff setting on what the level of costs of an efficient Company would be.
- If profits of the regulated Company are excessively high, the Regulator can intervene and reset tariffs before the fixed period expires. Conversely, if a company incurs significantly higher costs than were anticipated when the tariffs were set, the Company can ask the Regulator to “re-open” the price control to accommodate those costs.

Proposed Framework for Distribution Margin Approach

Proposed Formula for computing the Availability is:

$$\text{Wires Network Availability} = (1 - (\text{SAIDI} / 8760)) \times 100$$

Where,

$$\text{SAIDI} = \frac{\text{Sum of all Customer interruption durations}}{\text{Total number of customers served}}$$

Wires Network Availability is proposed to be measured over the course of a month and year and will be expressed in percentage terms.

Supply Availability is proposed to be computed in two parts, viz.,

Base load Supply Availability =

$$\frac{(\text{Actual Contracted Base Load Supply in MW}) \times (\text{No of Off-Peak hours})}{(\text{Base load in MW}) \times (\text{No of off Peak hours})}$$

$$(\text{Base load in MW}) \times (\text{No of off Peak hours})$$

Peak load Supply Availability:

$$\frac{(\text{Actual Contracted Peak Load Supply in MW}) \times (\text{No of Peak hours})}{(\text{Peak load in MW}) \times (\text{No of Peak hours})}$$

$$(\text{Peak load in MW}) \times (\text{No of Peak hours})$$



It is proposed that SERCs may specify Index for Supply Availability based on Base load Supply Availability and Peak load Supply Availability, with the weightage for Base load Supply Availability and Peak load Supply Availability being considered as, say, 75% and 25%, i.e., greater emphasis may be placed on meeting base load requirements. It is felt that the Supply Availability for base load should be 100% and concession, if any, may be given in the peak load supply availability, since as per the distribution licence conditions, the licensee is supposed to ensure supply on 24 x 7 basis, and there is no specific reference to load shedding under the EA 2003. It is envisaged that SERCs will specify Supply Availability trajectory based on past performance of Supply Business, however, it should not be lower than 90%, and should be progressively increased in a maximum of three years to 95% or 98%.

In case the actual supply is higher than the normative level, then the Supplier will be entitled to an incentive, and conversely, if the actual supply is lower than the normative level, then the Supplier will be subjected to a dis-incentive.

It needs to be noted that in some States, the function of procurement of electricity on long-term basis has been centralized at the State level either formally or informally, and the individual Utilities do not have discretion in the matter, since the central procurement agency enters into all the Contracts, and the contracted power is allocated between the DISCOMs. In such cases, it may be difficult to hold the individual licensees responsible for procuring inadequate quantum of electricity. While there is nothing improper if licensees come together and opt for joint procurement or through a central agency, the lead role in power procurement should be with the distribution and supply licensees. The licensees could also form an SPV for the purpose, since procurement through tariff based competitive bidding requires significant expert knowledge, which may not be available in-house with the Utility. However, even if the power is being procured through a central agency, the total requirement of energy and power is communicated to the central power procurement agency by the respective DISCOMs, and a collective failure to procure the required quantum of power would have to be passed on as a failure of all the DISCOMs, in proportion to their quantum of power requirement.

By design, the above measure of Supply Availability refers to the 'contracted' supply. The incentive/disincentive, therefore, should exclude the circumstances when the actual supply may differ from the contracted supply, due to force majeure



situations, weather conditions, extreme monsoon failure, station outages, etc. which are beyond the control of the distribution licensee.

Distribution Margin computation

It is proposed that the maximum additional return (if ROE method is being adopted) that can be earned/reduced under the Distribution Margin approach, is $\pm 2\%$. Thus, if the RoE for Generation and Transmission Business is considered as 15.5%, and RoE for Distribution Business is considered as 17.5%, then the return for the Distribution Business, after accounting for the Distribution Margin, can vary between 15.5% and 19.5%.

The rationale behind specifying the addition/reduction in ARR as $\pm 0.2\%$ of ARR for every percentage point increase/decrease in Availability vis-à-vis the normative levels is as under:

- If the Availability goes to 100%, then the maximum Distribution Margin, amounting to +2% of additional return will be available to the Distribution licensee

If the Availability goes to as low as 80%, then the reduction in ARR will be commensurate with a reduction of maximum 2% return.



2. Introduction

In accordance with Section 3 of the Electricity Act, 2003, the Ministry of Power, Government of India notified the Tariff Policy on January 6, 2006. The Tariff Policy stipulates as under:

“5.0 GENERAL APPROACH TO TARIFF

5.3 Tariff policy lays down following framework for performance based cost of service regulation in respect of aspects common to generation, transmission as well as distribution. These shall not apply to competitively bid projects as referred to in para 6.1 and para 7.1 (6). Sector specific aspects are dealt with in subsequent sections.

a) Return on Investment

Balance needs to be maintained between the interests of consumers and the need for investments while laying down rate of return. Return should attract investments at par with, if not in preference to, other sectors so that the electricity sector is able to create adequate capacity. The rate of return should be such that it allows generation of reasonable surplus for growth of the sector.

The Central Commission would notify, from time to time, the rate of return on equity for generation and transmission projects keeping in view the assessment of overall risk and the prevalent cost of capital which shall be followed by the SERCs also. The rate of return notified by CERC for transmission may be adopted by the State Electricity Regulatory Commissions (SERCs) for distribution with appropriate modification taking into view the higher risks involved. For uniform approach in this matter, it would be desirable to arrive at a consensus through the Forum of Regulators.

...

The Central Commission may adopt the alternative approach of regulating through return on capital.

The Central Commission may adopt either Return on Equity approach or Return on Capital approach whichever is considered better in the interest of the consumers.

The State Commission may consider ‘distribution margin’ as basis for allowing returns in distribution business at an appropriate time. The Forum of Regulators should evolve a comprehensive approach on “distribution



margin" within one year. The considerations while preparing such an approach would, inter-alia, include issues such as reduction in Aggregate Technical and Commercial losses, improving the standards of performance and reduction in cost of supply..."

Accordingly, a Group was established in the Forum of Regulators (FOR) in April 2006 to give its recommendations on Distribution Margin, as provided in the Tariff Policy. The Group examined the Distribution Margin concept as a restructuring model and concluded that the model (as originally proposed in Karnataka during 2001-02) could not be adopted inter-alia because of the pre-suppositions of the model (e.g., continuation of single buyer model) being inconsistent with the provisions of the Electricity Act, 2003. The Group, however, suggested that the Multi Year Tariff (MYT) framework could incorporate some essential features of the Distribution Margin approach.

Subsequently, in a meeting of the Working Group constituted by FOR on 'Multi Year Tariff Framework and Distribution Margin' in July 2008, it was decided that a Study should be conducted to examine the need and feasibility for implementing Distribution Margin as the basis for allowing returns in distribution business and to formulate an appropriate model for Distribution Margin.

In this context, FOR has engaged ABPS Infrastructure Advisory Private Limited (ABPS Infra) for assistance in developing and recommending an appropriate model for implementation of distribution margin as a basis for providing returns to Distribution Licensees.

ABPS Infra has submitted the 'Inception Report & Phase I Report' as well as the 'Draft Report' earlier. ABPS Infra is pleased to now submit its Final Draft Report in this regard, after incorporating the suggestions and comments of the FOR Secretariat on the earlier submitted Draft Report.

The Terms of Reference (TOR) for this study have been reproduced below:

1. Study of existing approaches to giving returns to investor:
 - a. RoE- merits and demerits
 - b. ROCE- merits and demerits



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2. Need for implementing any other approach for giving returns to investors
 3. Detailing principles of Distribution Margin concept
 4. Merits and demerits of using Distribution Margin as a basis for giving returns to investors
 5. Method to determine minimum revenue collection
 6. Method to specify incentive charge for revenue collection above minimum revenue collection. Whether any limit should be specified on incentive charge to Distribution Licensee? If so, rationale and basis for arriving at the same.
 7. Whether change in revenue collection due to changes in consumption mix should be normalized? If so, rationale and basis for normalisation?
 8. Treatment of capital expenditure incurred by the Distribution Licensee under the Distribution Margin approach.
 9. International experiences where Distribution Margin concept has been used to give returns and learning from such experiences.
 10. Applicability and appropriateness of Distribution Margin concept for existing licensees vs. competitive bidding situation.
 11. Feasibility of implementing Distribution Margin for Distribution Licensee and distribution franchisee
 12. Formulation of methodology for allowing returns under the Distribution Margin concept

ABPS Infra has undertaken this Study in a phased manner, as under:

- Phase I: Study of Existing Approaches
Phase II: Development of Distribution Margin Approach
Phase III: Feasibility and Formulation of Methodology for development of appropriate model for Distribution Margin

All the aspects identified in the TOR of the Study have been addressed in this Report, in addition to certain related aspects, which also needed to be addressed in order to complete the study on this issue. The Report has accordingly been structured along the following lines:

1. Executive Summary
2. Introduction
3. Existing approaches for giving returns to Distribution Licensees



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4. Need for implementing any other approach for giving returns to Distribution Licensees
 5. Options available for providing returns to Distribution Licensees
 6. Distribution Margin concept
 7. Merits and demerits of Distribution Margin Approach
 8. Minimum Revenue Collection (MRC)
 9. Incentive Charge for revenue collection above Minimum Revenue Collection
 10. Impact of changes in consumption mix on Minimum Revenue Collection
 11. Treatment of Capital Expenditure under the Distribution Margin approach.
 12. International Experiences of Distribution Margin concept
 13. Distribution Margin concept for existing licensees vs. competitive bidding situation
 14. Distribution Margin concept for Distribution Licensee and distribution franchisee
 15. Methodology for allowing returns under the Distribution Margin concept.



3. Existing approaches for giving returns to Distribution Licensees

The Tariff Regulations notified by the SERCs typically provide for adoption of the following two basic approaches as summarized in the Table below:

- a) Return on Equity (RoE)
- b) Return on Capital Employed (RoCE)

The ROE approach has been preferred by the CERC as well as majority of SERCs, as it is a simple approach to understand and adopt, where the return is computed on the equity approved by Commission. If the actual equity infusion is higher than the normative level, then the return is computed on the normative equity level, and the balance equity is considered as loan and normative interest is allowed. However, in case the actual equity infused is below normative level, the actual equity infused is used to compute return on equity. The rate base is computed by applying the debt:equity mix to the approved capital cost.

The merits and de-merits of the above two approaches have been discussed below:

Merits of RoE approach

- i) It is easy to compute and simple to implement
- ii) Tried and tested method and is hence, easily understood by all stakeholders.
- iii) The Utility is protected against the risk of fluctuation of interest rates, since interest expense is allowed as a pass through expense at actuals.

De-merits of RoE approach

- i) No incentives for Companies to bring down cost of capital, as return on equity invested is guaranteed and actual interest expenses expenditure incurred is also a pass through.
- ii) Utilities are not encouraged to practice financial engineering and optimise the financing mix by restructuring debt and equity, since the debt:equity ratio is allowed on normative basis (usually 70:30)



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- iii) Even if assets are depreciated fully, Utilities get assured return on equity invested.
 - iv) In case the equity on the Balance Sheet of the Utility is low, which is the case with quite a few State-owned Utilities as they have been largely funded through loans, then the resultant claim for RoE is also reduced, which may hamper the Utility's efforts to invest in future capital expenditure.

Merits of RoCE approach

- i) The ROCE approach incentivises financial planning to optimize the debt-equity mix and bring down the cost of capital.
- ii) This approach recognises that the consumers should pay for the capital employed to fund the assets used to serve the consumers.
- iii) The consumers are insulated from changes in debt-equity mix and changing interest rates, etc.
- iv) It also makes it easier for the Regulators as they do not have to monitor debt and equity component separately.
- v) Since the returns are linked to the investment in the business, once the asset is fully depreciated, then the Utility does not earn any return on its investment, and hence, the tariffs would also reduce to that extent.
- vi) State-owned Utilities, which may have a lower equity base, would not be adversely affected, since the Returns would be given on the total capital employed, rather than the equity invested in the business.

Demerits of RoCE approach

- i) The ROCE approach requires an estimation of the normative cost of debt and benchmarking of the debt-equity ratio, which could lead to windfall profits or abnormal losses depending on the ability of the Utility to undertake financial engineering to restructure its debt and equity.
- ii) There are many uncertainties in the tariff setting process and adoption of RoCE approach may create another aspect of uncertainty as regards the returns from the business.



iii) Upfront fixing of cost of debt for the Control Period may not be reflective of the actual cost of debt.

The summary of the actual approach adopted by different SERCs for giving returns to Distribution Licensees in their respective States, is summarised in the Table below:

Table I - Summary of approach adopted by various SERCs

Sl	SERC	Approach for giving returns	Summary
1.	APERC	RoCE	The Commission has adopted RoCE approach instead of RoE approach in the Tariff Order for MYT Control Period from FY 2006-07 to FY 2008-09.
2.	AERC	RoE @ 16% post tax	The Commission approved RoE of 7% on approved equity in the Tariff Order for FY 2007-08. However, the Commission has notified RoE @ 16% on post tax basis notified in AERC (Terms and conditions for determination of Tariff) Regulations, 2006.
3.	BERC	RoE - 14%	The Commission has notified RoE & RoCE approach in Tariff Regulations, 2007, providing RoE @ 14% on equity invested in the capital expenditure. The RoCE approach has also been notified in the same Regulations in case of MYT framework. However, no return provided to Licensee in tariff orders.
4.	CSERC	ROE - 14% post tax	The Commission has allowed RoE @ 14% on post tax basis on the equity employed in the capitalised gross fixed assets.
5.	DERC	ROE / RoCE	The Commission has allowed RoE @ 16% post-tax basis on equity and free reserves up to FY 2006-07. In the MYT Order for the Control Period from FY 2007-08 to FY 2010-11, the Commission has adopted the RoCE approach and allowed RoCE for wheeling business and retail supply margin for retail business which includes RoCE for retail business, all expenses of retail business and additional return in such a manner that the net RoE on Wheeling and Retail Supply Business shall not exceed 16%.



Sl	SERC	Approach for giving returns	Summary
6.	GERC	RoE - 14%	The Commission has allowed RoE @ 14% on average equity to all the DISCOMs in the MYT Order for the Control Period from FY 2008-09 to FY 2010-11.
7.	HERC	RoE - 14%	The Commission has notified RoE @ 14% on equity base in HERC Tariff Regulations. However, no claims for returns have been submitted by DISCOMs and hence no return has been allowed by the Commission.
8.	HPERC	RoE - 14% post tax	The Commission has approved RoE to the Distribution business @ 14% in the MYT Order for the Control Period from FY 2008-09 to FY 2010-11. However, the Commission has notified RoE @ 16% on post tax basis in HPERC Tariff Regulations, 2007
9.	JSERC	RoE - 14%	The Commission has approved ROE @ 14% in the Tariff Order for FY 2006-07.
10.	J&K SERC	RoE - 14% post tax	The Commission has notified ROE @ 14% on post tax basis in Terms and Conditions for Determination of Distribution Tariff Regulations, 2005. However, no RoE has been allowed in the Tariff Order for FY 2008-09.
11.	KSERC	RoE -14% post tax	The Commission has allowed RoE @ 14% in accordance with KSERC Tariff Regulations for KSEB, while a different approach has been followed for other Distribution Licensees.
12.	MPERC	RoE - 14% post tax	The Commission has allowed RoE @ 14% in the Tariff Order for FY 2008-09 in accordance with the Tariff Regulations.
13.	MERC	RoE - 16% post tax	The Distribution Licensee is allowed a post-tax return at the rate of 16 per cent per annum, on the amount of approved equity capital.
14.	OERC	RoE - 16% post tax	The Commission has approved ROE @ 16% in the Tariff Order for FY 2008-09 in accordance with OERC Tariff Regulations.
15.	PSERC	RoE - 14%	The Commission has allowed RoE @14% post tax in



SI	SERC	Approach for giving returns	Summary
		post tax	accordance with PSERC Tariff Regulations, which is as per CERC norms.
16.	RERC	RoE - 16% pre-tax	The Commission has notified RoE @ 16% on pre tax basis in RERC Tariff Regulations.
17.	TNERC	RoE - 14% post tax	The Commission has allowed RoE @ 3% on the Capital Base in in the only Tariff Order till date, i.e., for FY 2002-03 and FY 2003-04, which was issued before the enactment of the EA 2003. However, the Commission has notified RoE @ 14% on post tax basis notified in TNERC Tariff Regulations.
18.	TERC		As the Transfer Scheme is under finalisation, the exact percentage of return on equity is not yet pegged.
19.	UERC	RoE - 14% post tax	The Commission approved RoE @ 14% in the Tariff order for FY 2007-08 and 2008-09 in accordance with the UERC Tariff Regulations.
20.	UPERC	RoE - 16% pos tax	RoE for Distribution business is 16% in accordance with UPERC Tariff Regulations.
21.	WBERC	RoE - 14% post tax	The Commission has allowed RoE @ 14% on post tax basis in the Tariff Order for the Control Period from FY 2008-09 to FY 2010-11 in accordance with WBERC Tariff Regulations.

Depending on the prevailing circumstances, quality of data available and whether the Distribution Licensee has asked for returns in its Petition, the SERCs have followed different approaches as well, as summarized in the ‘Inception Report & Phase I Report’. In cases where the Distribution Licensee has not sought approval for returns, the SERCs have typically not allowed any returns, while in some cases, the Returns have not been allowed due to the poor performance of the Distribution Licensee, even though the Distribution Licensee may have sought approval for returns. The specific approach followed by different SERCs has been elaborated in the ‘Inception Report & Phase I Report’ submitted earlier to the FOR.



4. Need for implementing any other approach for giving returns to Distribution Licensees

The prevailing approaches to providing Returns to distribution licensees, viz., RoE and ROCE approaches, are basically 'Cost Plus' approaches, also known as 'Cost of Service' or 'Rate of Return' regulation, wherein the Distribution Licensee is entitled to recover its legitimate costs as well as a specified return on its investment. The disadvantage of the Cost Plus approach is that since the licensee can recover the costs it incurs; it is under no pressure to reduce those costs, which can lead to inefficiency and higher tariffs for consumers. This is precisely what is happening in most States in the country. Though the SERCs have attempted to weave in efficiency parameters into the Cost Plus approach for tariff determination, efficiencies are yet to improve significantly. As a result, the retail tariffs are increasing every year, which defeats the objective of regulating the sector.

Competition usually results in putting downward pressure on tariffs, while at the same time, improving the service provider's focus on the consumer and the quality of supply. In the power sector, this has been witnessed in the generation projects that have been awarded after a competitive bidding process, both Ultra Mega Power Projects (UMPPs) as well as other generation projects. The tariffs that have been discovered through the competitive bidding process are significantly lower than the tariffs agreed under the Memorandum of Understanding (MoU) route.

Regulation is intended to mimic a competitive environment in the absence of real competition, since electricity distribution and supply is usually a monopoly business in the country. Competition through Open Access and/or Parallel Licensee approach is yet to really take root in most States in the country. On account of the presence of very few players in the field and lack of required expertise to manage the electricity distribution business, this area has largely remained in the jurisdiction of the State Electricity Boards, most of which have been unbundled, and Companies have been created to manage the electricity distribution business. However, this has not really improved the efficiency of operations, as there is no real competition.

Against this background, the regulatory regime should result in reducing the electricity tariffs in the long term, while at the same time, increasing the focus on the consumer and quality of supply. The ground reality is far different, however. Retail



tariffs are showing no signs of reduction, except in States such as Chhattisgarh, where the tariffs have been reduced over the past three to four years, which has been enabled by the inherent surplus due to availability of low cost generation and good consumer mix, rather than any improvement in efficiency achieved by the State Utility.

It appears unlikely that tariffs will come down as long as the Cost Plus mechanism is in vogue. It is essential to quickly move towards a tariff setting system that rewards efficiency and results in lowering the retail tariffs. Hence, alternative approaches for giving returns to the Distribution Licensees need to be explored.



5. *Options available for providing returns to Distribution Licensees*

The alternative approach to the two Cost Plus approaches to regulation discussed above is the Incentive Based Regulation (IBR) or Performance Based Regulation (PBR) as it is commonly known.

Rather than frequent reviews of Utility's costs and determining tariffs to reimburse Utilities for what they spend, PBR takes a longer term view and focuses on how Utilities perform. In a well-designed PBR, good performance should lead to higher profits, while poor performance should lead to lower profits. The modern roots of PBR in electric Utility regulation can be found in National Association of Regulatory Utility Commissioners' (NARUC) 1989 Resolution, which called for ratemaking practices that align Utilities' pursuit of profits with the implementation of their least-cost plans. Section 111 of the Energy Policy Act of 1992 of the USA subsequently embraced this policy.

PBR is often considered as a means of addressing some concerns about the 'cost plus' approach to tariff determination. As mentioned earlier, the 'cost plus' or 'rate-of-return' approach does not provide sufficient incentive to Utilities to reduce costs. In general, PBR mechanisms provide Utilities with a fixed price or a fixed level of revenues, as opposed to a predetermined level of profits. As a result, Utilities can earn higher, or lower, profits depending upon how efficiently they plan for and operate their systems.

The most commonly discussed PBR mechanism is the Price Cap. Price Caps differ from the cost plus approach in two fundamental ways. First, prices are put in place for longer periods of time (e.g., three to five years) as compared to the annual tariff determination usually undertaken under the cost plus approach. The fixed prices over longer periods are intended to provide incentives to reduce costs. Second, Utilities are allowed to lower their prices to some customers, as long as all prices stay within the Cap (or Caps). This flexibility allows Utilities to provide competitive price discounts to customers that might otherwise leave their system.

A well-designed Price Cap scheme requires the initial rates for each customer category to be set in a fair manner, based upon an appropriate allocation of costs. The



Price Cap is then allowed to increase from year to year to allow for inflation, with the increase being offset partly to reflect increased productivity. The generic Price Cap formula can be defined as:

$$\text{Price}_{(t)} \leq \text{Price}_{(t-1)} * [1 + (I - X)] + Z,$$

Where,

$\text{Price}_{(t)}$ is the maximum price that can be charged to a customer category or categories for the current period,

$\text{Price}_{(t-1)}$ is the average price charged to the same customer category or categories during the previous period,

I is the inflation factor,

X is the productivity factor, and

Z represents any incremental costs that are not subject to the Cap.

PBR mechanisms can also be designed using 'Revenue Caps' instead of price caps. Revenue Caps are based on the same principle as Price Caps, where the Cap in one year is based on the revenue in the previous year with adjustments for inflation and productivity, and can achieve many of the same objectives as Price Caps. However, Revenue Caps provide Utilities with significantly different incentives regarding energy efficiency and increased sales. The cost cutting incentives for Price Cap and Revenue Cap are identical. The main difference is that Price Caps may also encourage increased sales and hence, discourage end-use energy efficiency. Under the Revenue Cap approach, the incentive to invest in energy efficient range from neutral to significant. Internationally, the PBR approach has typically been applied for the network businesses, which are natural monopolies, since the Supply Business is usually competitive.

Revenue Caps make more sense if one of the goals of the PBR is to encourage end-use energy efficiency and if cost does not vary with volume. Price Caps make more sense if end-use energy efficiency is not a goal and if costs vary with volume. The primary difference between Price Caps and revenue caps is the incentive created for demand-side management or end-use energy efficiency. With the Price Caps, the Utilities have an incentive to increase sales and do not have any incentive to encourage or directly invest in end-use energy efficiency.



Within this general framework, there are many issues to address in order to provide clear incentives to the Utility, prevent Utility ‘gaming’ of the system, and ensure customer protection. The most critical issues that need to be addressed in designing a fair PBR mechanism are summarized below:

- a. **Determining the Scope:** Price Caps and Revenue Caps can be applied to customers as a whole, or to individual customer categories. The number of Caps to use presents a trade-off to Regulators between the goals of protecting ‘core’ customers (i.e., those with no choice of electricity supplier), and moving the Utility toward the market. A single cap would provide maximum flexibility to the Utility to negotiate individual contracts. At the other extreme, a cap applied to every customer category would prevent cost-shifting between customer categories, and provide greater protection for smaller customers. In the Indian context, because of the prevalent cross-subsidy between different consumer categories and because of the lack of real competition, category-wise Price Caps would be required to be specified.
- b. **Inflation Rate:** The use of a general inflation index, such as the Consumer Price Index (CPI), has the advantage from a customer standpoint of being well understood and quite closely related to the customer’s general cost of living. However, a general inflation index might not bear close relation to changes in the Utility’s costs. In principle, the inflation factor, which could be a combination of inflation indices, should reflect the rate at which costs are growing in the Utility industry as a whole.
- c. **Productivity Factor:** The productivity factor will have important implications for Utility cost recovery and the rate at which prices are allowed to increase. However, an appropriate level of improved productivity is not easy to define. In most cases, it is based upon historical or projected analyses of productivity gains by the Utility and/or by the electric industry itself. It can also be used to set more ambitious goals for the Utility. A productivity adjustment may not be necessary if the Price Cap or Revenue Cap is benchmarked with input costs incurred or output prices charged by a comparable group of Utilities.
- d. **Z-factors:** This mechanism allows for recovery of specific costs that are not meant to be subject to the Price Cap or Revenue Cap. Z-factors usually



include costs over which, the Utility has no control, such as fuel costs for power purchase, change in tax rates, etc. They also include costs that are not meant to be subject to cost-cutting pressures, such as Demand Side Management (DSM) programme costs. The costs that are chosen to be recovered through the Z-factor can have important planning implications. For example, the costs of complying with environmental Regulations, even future Regulations, should generally not be recovered through the Z-factor, in order to provide the Utility with an incentive to minimize the costs of complying with future environmental Regulations.

- e. **Profit/Loss Sharing Mechanism:** Price Cap or Revenue Cap schemes can be combined with profit/loss sharing mechanisms that are intended to protect both the Company and consumers from the risk of over- or under-recovery of revenues. Profit/loss sharing mechanisms kick in if the Utility earns above or below a specified deadband around its allowed rate-of-return. Broad deadbands provide greater incentive for the Companies to reduce their costs, but narrow deadbands decrease the likelihood of the Company experiencing windfall gains or losses. In the absence of a sharing mechanism, extreme profits or losses could not only burden consumers or shareholders unfairly, but could potentially derail the PBR mechanism due to resulting political or financial pressure.
- f. **Targeted Incentives:** Regulators may wish to focus Utilities' management on areas of performance that deserve particular attention but would not be addressed under the general Price Cap. Targeted incentives can be combined with a Price Cap to ensure that such areas are addressed. For example, quality of service (e.g., billing, frequency of outages, duration of outages, etc.) may deteriorate under Price Cap regulation, because Utilities may be inclined to cut corners or even eliminate certain services. To prevent such deterioration, targeted incentives are often applied by defining service quality performance standards and imposing penalties on the Utility if the standards are not met. Targeted incentives and performance standards have also been applied to improve the performance of expensive or inefficient power plants.

The following Table presents a summary of the primary objectives of electricity Regulators, and lists some of the PBR options available to address those objectives.



This Table indicates the many forms that PBR can take, depending upon Regulators' priorities.

Table: PBR Options for Meeting Various Regulatory Objectives

Regulatory Objective	PBR Structure, Mechanism or Incentive
Price stability	Price cap, combination revenue-price cap
Lower prices	Productivity index, base-year price or revenue
Price flexibility	Price cap, revenue cap, combination revenue-price cap
Pricing equity	Price floors, price margins
Durable incentives	Duration of PBR
Improved power plant performance	Targeted incentives, generation price cap
Lower purchased power costs	Price cap, revenue cap, targeted incentives
Balance of shareholder and ratepayer interests	Profit/loss sharing mechanism
Maintain quality of service	Targeted incentives, performance standards
Maintain universal service	Targeted incentives, performance standards
Reliability of supply	Targeted incentives, performance standards
Support Utility-run DSM programs	Z-factor, lost revenue adjustment, revenue cap
Limit Utility sales promotion	Revenue cap, revenue-price cap
Utility support for energy efficiency vendors	Revenue cap, revenue-price cap
Promote distributed generation	Price cap, revenue cap, targeted incentives, amortization
Reduce Distribution losses	Price cap, revenue cap, targeted incentives
Improve power quality	Price cap, revenue cap, targeted incentives
Promote renewable resources	Targeted incentives, amortization patterns
Promote environmental protection	Targeted incentives, Z-factor

Selecting among and designing the PBR options listed in the Table above, tends to require significant analysis and oversight by Regulators, consumer representatives and other interested parties, for the following reasons:

- Designing a PBR mechanism to achieve any one particular objective can frequently require detailed analysis. For example, setting an appropriate



productivity index requires a complicated and sometimes contentious analysis of industry costs and operating trends.

- A PBR mechanism designed to achieve any one objective can create incentives that might conflict with other objectives, or even result in unintended consequences. For example, a Price Cap to promote price stability will create financial disincentives for energy efficiency investments.
- Most PBR mechanisms need to be reviewed over time, to monitor their effectiveness, to assess the impacts on consumers and shareholders, to prevent unintended outcomes, and to modify where appropriate.
- Some regulatory objectives cannot be met through PBR mechanisms alone, but need to be promoted through a combination of PBR and other policies.

The Strength of the Incentives

For either traditional 'cost plus' or more recent PBR based regulatory approaches, the strength of the incentives is determined by two factors. The first is the marginal impact of performance on profits. For example, if a cost saving of Rs. 100 results in an increase in profits of Rs. 100, the incentive to cut costs is as strong as possible. If Rs. 100 of savings produces an increase in profits of Rs. 50, the profit incentive, or cost cutting incentive, is obviously lower. Similarly, if revenue increase of Rs. 100 increases profits by Rs. 100, the incentive to increase revenues is much more potent than if the increase in profits is only Rs. 50.

Control Period

The time lag between regulatory reviews also impacts the benefits achieved through regulation. For cost plus regulation, the time limit can be either stated or undetermined. PBR generally includes a fixed number of years that a particular scheme will stay in place, typically three to five years, which is known as the Control Period. The longer the Control Period, the stronger the incentives. Thus, if Rs. 100 of annual savings can produce Rs. 100 increase in annual profits, the cost-cutting incentive is much more powerful if the profits are realized for five years than a system in which the profits of Rs. 100 lasts for just a single year. Obviously, it is critical that at the time of the review of the PBR, the savings would be reflected in new tariffs and would hence, no longer flow to the Utility or shareholders, and the Utility would have to further improve its operational efficiency in order to earn higher profits. Only then would the objective of reduction in tariffs in the long run, can be achieved.



Sharing Mechanisms

An important feature that influences the strength of the incentives created by PBR is the presence and design of any sharing mechanism. A typical PBR approach adopted in the USA allows Utilities to keep 100% of any savings they can achieve, provided that the rate of return is within a pre-determined range. Outside of this range, the costs or benefits of the PBR are shared between consumers and shareholders. For example, there may be no sharing if the ROE is within 100 basis points of a specified level, say 10%. Between 100 basis points, and say 200 basis points, consumers and shareholders may share the benefits (or costs) in some pre-specified way. Beyond 200 basis points, there may be even more sharing.

There are many variations of sharing mechanisms. Some, like the one described above, are symmetrical, others are more one-sided. The specific design is often a trade-off between different interests and theories. In general, the range within which there is no sharing is quite narrow, meaning that the necessity to share benefits kicks in quite easily. The lower the sharing, the stronger the incentives for the Utility to cut costs, thus, if the Utility saves Rs. 100, it must share 50% of the savings with consumers.

Fuel Adjustment Cost

Fuel Adjustment Cost (FAC) are common in many Regulatory regimes. Although the details differ from jurisdiction to jurisdiction, the basic operation is to protect Utilities from the financial effect of variation in fuel costs.

There are many justifications given for FAC, but the fact remains that FAC is contrary to the approach of incentivising improvement in performance and reduction in costs. FAC generally removes the incentive for any genuine efficiency. This can be mitigated to some extent, by ensuring that the recovery of variation in fuel costs is limited to the extent of normative parameters, viz., generation parameters like heat rate, auxiliary consumption, etc., and distribution parameters like distribution loss, so that distribution Utilities are incentivised to achieve and better the normative performance parameters. Another option is to sever the link between actual fuel expenses and allowed revenues by either adjusting only for changes in the price of fuel but not in the generating mix, or allowing recovery of only a portion of the variance between expected and actual fuel expense.



Formulating the PBR framework

The task of creating a good PBR is not complete until the specific numerical components of the PBR are reasonably set. This entails several important tasks, viz.,

- The starting point must be reasonable. The general format of a PBR is to set prices or revenues and then for a specified period of time prices or revenues are automatically adjusted according to pre-specified rules. At the outset of the PBR, initial prices or revenues must be set at a reasonable level. The most common approach is to start with prices or revenue set after a full cost of service review.
- During the PBR period, prices or revenues may be reset using a formula set in the PBR but costs are not reviewed until the end of the PBR period. Thus, the first step in getting the numbers right is to be sure that the initial prices or revenues are reasonable.
- The PBR formula must use the right inflator and coefficients. The most common formula for a PBR adjusts prices or revenues by Consumer Price Index (CPI). CPI is a measure of inflation and in theory the inflation measure used should be a reasonable measure of the costs that are subject to a PBR. Thus, if a PBR is to apply to a wires-only company, an inflation index that is heavily weighted toward fuel cost would be a poor choice.
- The X factor is a productivity factor that measures the extent to which the costs for the Utility in question rise faster or slower than the inflation. Thus, if a review of historical information showed that the utility has consistently kept its growth in costs at 1% below the CPI, a reasonable PBR formula might be $CPI - 1\%$.

The PBR route gives Regulators the responsibility and the opportunity to define objectives for the industry. This can set the groundwork for just what is expected in a more competitive environment and can provide the best vehicle to articulate what, in addition to low-cost energy services, is important for the industry to provide to customers. Even in the absence of competition, PBR offers a simpler and speedier regulatory process; one which emphasizes measurable results and does not depend on the myriad of inputs needed to conduct a cost-of-service study.



If the distribution licensee is more efficient, it will make greater profits in the short term but in doing so will reveal to the Regulator the level of costs that an efficient organisation needs to carry out its activities, which the Regulator can use in determining the Price Cap or Revenue Cap for subsequent Control Periods.

Disadvantages of this approach are:

- The distribution licensee may be exposed to unforeseen price shocks, which a company regulated on cost plus would be able to pass on to its consumers;
- Even without unforeseen price shocks, there is uncertainty about the return that the distribution licensee will make, since this will depend on the ability to meet or exceed the assumed efficiency improvements.

A further issue that can arise with an incentive based approach to regulation is that if a distribution company significantly outperforms its targets, it can make very large profits. While this gives the Regulator evidence for large price reductions in the future, the public may not find it acceptable in the short term to see a monopoly organisation making such large returns.

Also, market based arrangements generally involve some sharing of the risk of fuel cost/wholesale price increases – for example, prices set in long term contracts might comprise a fixed and variable element, with the variable element varying to some extent in accordance with changes in fuel costs or indexed to an independent source such as wholesale market indices. It is important to note that in most western markets, wholesale market prices are not regulated but are the result of competitive forces.

In market based systems, distribution Companies buy power from generators either on long term contracts or via exchanges (typically Pools or bilateral markets). However, the Companies are reasonably insulated from power price increases, because they can generally pass on costs reasonably incurred to their customers, following approval by the Regulator.

Although cost-plus (rate of return) and incentive regulation are often viewed as two very distinct approaches, they have many elements in common and are perhaps better thought of as different ends of a spectrum rather than two totally separate approaches. Many cost-plus systems have incentives added on to them while even a



very incentive based approach (as exists in the UK) requires a starting point of an assessment of the costs.

In this context, it should be noted that the Multi-Year Tariff (MYT) framework implemented by most of the SERCs, incorporates elements of both the 'cost plus' as well as 'Incentive Based Regulation' to some extent, since the base returns are allowed as specified in the Tariff Regulations, while the Utilities are subjected to incentive/dis-incentive mechanisms by undertaking sharing of the gains or losses on account of the over or under-achievement of the targets set for different parameters. Thus, if the Utility's distribution losses are higher than the specified norms, then the corresponding power purchase cost due to the excess distribution losses is shared between the Utility and consumer, or the additional revenue is imputed based on the normative losses and a part of it is added to the revenue. In both cases, the distribution licensee will earn lower than the mandated RoE (16% in most States) on this count. On the other hand, if the Utility's distribution losses are lower than the specified norms, then a part of the savings in power purchase cost due to the lower distribution losses is added to the revenue requirement, or the additional revenue is imputed based on the normative losses and is added to the revenue requirement. In both cases, the distribution licensee will earn higher than the mandated RoE (16% in most States) on this count. However, so far, most SERCs are determining tariffs for distribution licensees on an annual basis, rather than for the Control Period as a whole.



6. *Distribution Margin – the Concept*

It needs to be clarified that though the terminology used is 'Distribution Margin', the same can be made applicable for both, the Distribution Network (Wire) Business and the Supply Business. However, in order for this concept to work, it is essential that the Wires Cost is first segregated from the distribution and supply cost. This may not necessarily be a road-block, since in most States, the SERCs have separated the Wires cost based on available cost allocation data submitted by the Distribution Licensees, while determining the Wheeling Charges as a part of the Open Access charges.

The Distribution Margin approach is proposed to be adopted for both, the Wires Business, as well as the Supply Business, by factoring in the peculiarities of the respective Businesses, as elaborated below.

The design of the Distribution Margin concept depends on the primary objective that is intended to be achieved. If the objective is to facilitate improvement in operational efficiency, i.e., reduction of distribution losses, improvement in collection efficiency, etc., then the existing mechanisms of giving returns, viz., modified Cost Plus or the Performance Based Regulation, are sufficient, and there does not appear to be any need to create another mechanism under the Distribution Margin route for achieving the same objective. However, another objective that is presently not being achieved or targeted in the distribution sector is the linkage of returns with the Availability of the Network and Supply Business. FOR has also recommended that certain Availability norms should be specified for Network Availability and Supply Availability, and the incentive/disincentive should be given in terms of addition/reduction in ROE. Hence, the Distribution Margin approach has been proposed with the objective of improving the hitherto neglected aspect of Availability of the Distribution Business.

We are of the view that since the Distribution Margin is intended to be an approach different from either RoE or ROCE approach, the incentive/disincentive should not be linked to RoE/ROCE. Hence, the Distribution Margin has been conceived as a mechanism, which will provide the opportunity to the Utility to earn additional returns by getting additional ARR, i.e., the incentive/disincentive will be in terms of



addition/reduction in percentage of ARR that can be earned/reduced for over-/under- achievement vis-à-vis the target availability. To start with, the additional ARR may be considered as $\pm 0.2\%$ of ARR for every percentage point increase/decrease in Availability vis-à-vis the normative levels, for Wires Business and Supply Business, separately.

For the Supply Business, if the total ARR, which includes the power purchase cost, is considered for giving additional returns through Distribution Margin, then it could result in providing a perverse incentive to the Supply Business to procure costly power, since this will lead to a higher additional return, in case the Supply Availability is better than the normative levels. Hence, it is proposed to link the Distribution Margin to the ARR of the Supply Business, after reducing the power purchase cost, which also truly reflects the costs incurred by the Supply Business in ensuring that the requisite supply is contracted for and the desired customer service is delivered.

Thus, under this model, there will be two levels of incentive/disincentive for the Wires Business and Supply Business, as elaborated below:

1. Since the O&M expenses are being determined on a normative basis based on benchmarking with other comparable Utilities, in case if the O&M expenses of the concerned Utility is lower/higher than the normative levels, then the Utility will get an incentive/dis-incentive, since only the normative expenses will be allowed to be recovered through the tariff. This is the conventional mechanism of rewarding efficiency, through sharing of gains and losses on account of controllable factors, that is the basic premise of a Multi-Year tariff framework.
2. In case the Network Availability/Supply Availability are higher/lower than the normative levels, then the Utility will get an incentive/dis-incentive in terms of addition/reduction of percentage of ARR that the Utility will be able to recover. This is the additional Distribution Margin component that is proposed to be introduced.

The objective of the Distribution Margin approach is to provide a mechanism for providing additional returns in order to incentivise Availability of the distribution business, in addition to the conventional method of providing returns through RoE



or ROCE. At the same time, the mechanism should not lead to super-profits or abnormal losses. Hence, it is proposed that the maximum additional return (if ROE method is being adopted) that can be earned/reduced under the Distribution Margin approach, is $\pm 2\%$. Thus, if the RoE for Generation and Transmission Business is considered as 15.5%, and RoE for Distribution Business is considered as 17.5%, then the return for the Distribution Business, after accounting for the Distribution Margin, can vary between 15.5% and 19.5%.

Another type of Distribution Margin concept is one, which is probably more familiar, wherein the Distribution Licensee would be entitled to a combination of a relatively risk free base revenue, and an incentive payment for exceeding specified performance parameters. The revenue from customers will be first taken by the Distribution Licensee to meet its cost of distribution, including power purchase cost and transmission charges, with the guaranteed return on its investment, all distribution costs being covered at the current loss levels and current revenue collection. If any additional revenue is collected, the Distribution Licensee can keep certain portion of this and also cover the costs incurred for loss reduction and collection improvement, with due regulatory approval.



7. Merits and Demerits of the Proposed Distribution Margin Approach

The merits and demerits of the Distribution Margin approach have been discussed below:

Merits

- (f) The licensees will be incentivised to reduce their costs and improve their efficiencies, which would lead to lower tariffs in the long-term, which is one of the objectives of regulating the sector.
- (g) The distribution licensees will get a clear message that their profits and hence, returns are linked to their performance
- (h) If the actual performance is lower than the normative levels, then the distribution licensee will be lower to the extent of the dis-incentive, thus, there will be a pressure on the distribution licensee to ensure at least the normative performance.
- (i) In case the actual performance is lower than the normative levels, then the costs allowed in the ARR will be reduced to the corresponding extent, giving some relief to the consumers
- (j) The linkage of Distribution Margin to the Network Availability and Supply Availability, will bring greater focus on these hitherto ignored factors for retail tariff determination, which will facilitate improved customer service.

Demerits

- (d) The licensees may try to maximise their returns, by compromising on service quality standards and failure to meet universal service obligations.
- (e) Issues like load shedding and guaranteed supply to agricultural sector, etc., will have to be addressed and incorporated into the Availability definitions
- (f) Greater monitoring of distribution licensee will have to be undertaken by the SERCs, to ensure that the figures reported against Network Availability and Supply Availability are correctly represented.



8. *Method to determine Minimum Revenue Collection (MRC)*

The Minimum Revenue Collection would have to be determined, in case the second type of Distribution Margin is being adopted. Though the same is not being recommended as part of the study, the issue has been discussed in accordance with the Terms of Reference of the assignment. The base revenue, or the Minimum Revenue Collection (MRC), would have to be designed in such a manner that the bare minimum expense of the Distribution Licensee as well as the amounts payable to the generation companies/power suppliers and the transmission licensees under long-term contracts are recovered. Under any circumstances, the generating companies and the transmission licensees should not be exposed to the risk of non-achievement of the MRC by the Distribution Licensee, since they have no control over the same. The Distribution Licensee, which is in direct contact with the retail consumers and raises the bills to the consumers, has to bear the risk of any under-recovery, while at the same time having scope to earn higher returns in case of better performance as compared to the MRC.

The MRC could be either the existing revenue collection of the distribution licensee, or a value higher than the existing revenue collection. The Regulators will have to apply their judgement to assess the additional revenue, if any, to be considered while determining the MRC, since the same is dependent on several factors, viz., consumer mix, consumption mix, steps already taken to increase the revenue collection, etc.

Factors like revenue collection improvement methods already adopted by the licensee, allowance of costs associated with such revenue collection improvement in the past and proposed in the future, etc., would also need to be considered by the Regulators, while determining the MRC. For instance, if the distribution licensee has invested significantly in system strengthening and loss reduction, and the capital expenditure related expenses are already a part of the base ARR and hence, revenue, then any reduction in distribution losses would be attributable to such capital expenditure, rather than any operational improvement measures undertaken by the distribution licensee. In such cases, the Regulators may have to factor this aspect in and suitably increase the MRC, so that the additional incentives are payable only for additional revenue collected over and above the revenue that would have been collected in any case, even without the Distribution Margin approach.



It is not possible to formulate a standard methodology to determine the MRC, as it would depend on the circumstances of the case. However, as a general principle, the MRC should be specified higher than the existing revenue, so that it incentivises the distribution licensee to achieve tangible and conspicuous improvement in the revenue collection, by taking all necessary measures to achieve the same. This would facilitate reduction in the retail tariffs in the long run.



9. Incentive for additional revenue collection over and above MRC

The incentive charge for revenue collection above MRC may be specified either

- (a) as a lumpsum amount for additional revenue collected over MRC.
- (b) in terms of paise per unit of total sales, or
- (c) as a percentage of additional revenue collection
- (d) as a percentage of the ARR

The first option, viz., lumpsum amount, may not give adequate incentive to the Distribution Licensee to maximise the revenue collection, and the incentive to improve efficiencies and hence, reduce costs and tariffs would be lower, since the Distribution Licensee would not get any additional return over and above the fixed lumpsum amount, even if the revenue collection is increased further. Hence, this option is not recommended.

The second option, viz., paise per unit of total sales, can be used to give the appropriate signals, though the value of the signal to improve efficiencies would depend on the per unit incentive rate considered vis-à-vis the distribution cost per unit. For instance, the same incentive of 50 paise per unit of additional sales, would be very welcome, when the total cost to serve is say, Rs. 2 per kWh, whereas, if the cost to serve is say Rs. 5 per kWh, then this incentive of 50 paise per kWh would have lower significance.

The third option, viz., percentage of additional revenue collection, is simple and can also be used to give the appropriate signals, and the percentage could also be modified from time to time, depending on the response to the same. The additional return to the Distribution Licensee would be directly proportional to the additional revenue collection. The Distribution Licensee's share of the additional revenue could be modified from one Control Period to another, depending on the circumstances and desired objective. On the other hand, even if the Distribution Licensee's share of the additional revenue is retained at the same level, the additional return to the Distribution Licensee would vary in absolute terms, due to the increased base. For instance, in the first Control Period, the share of the additional revenue collection to be retained by the Distribution Licensee could be say 50%, which would give



differential additional returns to the Distribution Licensee over subsequent Control Periods, since the MRC itself would have been revised based on the actual revenue collected during the first Control Period.

The fourth option, viz., giving Distribution Margin as an additional percentage of ARR, has already been discussed in the earlier Section, and is appropriate under the proposed approach for Distribution Margin. As stated earlier, for the Supply Business, the ARR would be considered after deducting the power purchase expenses, so that there is no perverse incentive for increasing the power purchase expenses.

While specifying the incentive charge for revenue collection over the MRC, it has to be decided whether any limit needs to be specified on the incentive charge to distribution licensee. There are merits and demerits to the idea of specifying a limit on the incentive charge. The stipulation of a limit on the incentive charge may result in reducing the incentive to the Distribution Licensee to increase the revenue collection, which may be counter-productive to the overall objective of improving efficiencies and hence, reducing tariffs in the long-term. On the other hand, if there is no limit, it may result in a situation, where the Distribution Licensee is able to earn abnormal profits, in case the MRC is not specified properly and does not reflect the ground reality accurately. Given the quality of data prevalent in the country, it may be more prudent to specify a limit on the incentive charge that can be earned by the Distribution Licensee.

This limit may be specified either

- i) in absolute terms
- ii) as a proportion of the base return considered while determining the MRC

The first option, viz., limit in absolute terms, say, Rs. X crore, may be difficult to specify, without linkage to any parameter. Hence, it may be preferable to specify the limit as a proportion of the base return considered while determining the MRC. For instance, if the base return has been considered as RoE of 16%, then the limit may be specified such that the total RoE, after considering the incentive for additional revenue collection, shall not exceed, say $\pm 2\%$, or any other appropriate level.



10. Impact of Change in Consumer Mix on Revenue Collection

It is well known that the revenue of any Distribution Licensee is dependent on the consumer mix and consumption mix, and related issues such as prevailing cross-subsidy, paying capacity, collection efficiency for different categories, etc. Distribution Licensees having a favourable consumer and consumption mix, i.e., having a higher proportion of high paying (subsidising) consumers, are better placed to earn additional revenue, since typically; their collection efficiency levels are also good. On the other hand, Distribution Licensees having an unfavourable consumer and consumption mix, i.e., having a higher proportion of low paying (subsidised) consumers, are at a disadvantage, and are usually subjected to revenue stress due to low revenue collection.

Under these circumstances, the MRC determined as the starting point of the Distribution Margin approach, and the additional revenue earned by the Distribution Licensee are highly dependent on the changes in consumer and consumption mix. For instance, if two new large HT industrial consumers are added in a particular year, in the case of a Distribution Licensee, which has only 5 such large industrial consumers, then the consumption mix and hence, the revenue will be significantly affected in a positive manner. Conversely, if two large HT industrial consumers close down operations in a particular year for the same Distribution Licensee, then the consumption mix and hence, the revenue will be adversely affected. This impact may cause the Distribution Licensee to target addition of only high paying consumers at the expense of low paying consumers, which would defeat the objective of the EA 2003, which requires the Distribution Licensee to give new connections on demand within one month of receiving the application, provided no significant infrastructure development has to be done for giving supply.

Consequently, one of the issues to be addressed while determining the share of the additional revenue collection is whether the impact of changes in the consumption mix should be normalized. In favour of normalization is the need to insulate the Distribution Licensee from changes in the consumption mix, either targeted or natural, so that the Distribution Licensee always strives to meet the supply obligations, rather than discriminating against the lower paying categories in order to meet the revenue collection targets. It is worth noting that in most of the States where Multi Year Tariff framework has been implemented, the SERCs have



considered change in the sales quantum and change in consumption mix as an uncontrollable factor and any variation on account of change in sales or sales mix is a pass through under the Aggregate Revenue Requirement of the licensees. However, there are several practical limitations, before this aspect can be woven into the Distribution Margin framework, as discussed below.

The additional revenue is thus, dependent on the efficiency improvement brought in by the Distribution Licensee as well as the change in consumption mix. The impact of these two factors has to be clearly segregated and valued, to achieve the following objectives:

- (a) The Distribution Licensee gets a share of the additional revenue on account of efficiency improvement, either on account of reduction in distribution losses or improvement in the collection efficiency. Conversely, in case of deterioration in performance, the Distribution Licensee has to bear a share of the losses due to reduction in revenue vis-à-vis the MRC.
- (b) The Distribution Licensee remains neutral to changes in the consumption mix, and Universal Service Obligations are continued to be met.

The effect of improvement in collection efficiency can be easily identified, however, and the corresponding additional revenue collection can be shared in the specified manner between the Distribution Licensee and the consumers.

The impact of the change in the consumption mix may be assessed by computing the revenue based on the projected consumption mix in terms of sales to different consumer categories, vis-à-vis the actual consumption mix. At the same time, it is not easy to attribute the category-wise sales only to either natural causes or reduction in distribution losses. This is so, because, reduction in distribution losses may be manifested either in terms of reduction in the energy requirement or in additional sales. Moreover, there is a normal increase in specific consumption (consumption per consumer) every year, due to normal increase in size of operations of the consumer, including the residential consumers. The effect of the normal increase in consumption of the existing consumers would have to be first segregated, so that the increase due to the addition in the number of consumers can be clearly identified.



In view of the above complications, it is recommended that variation in the consumption mix should not be normalized, and only the change in revenue collection due to addition of new consumers or closing down of existing consumers, who are large consumers and clearly identifiable, should be normalized. The consumers' interest, in terms of quality of service and Universal Service Obligation can be protected by incorporating adequate safeguards in terms of strict requirement to comply with the provisions of the EA 2003 and the distribution licence issued to the Licensee.



11. Treatment of Capital Expenditure under Distribution Margin

For reducing the losses to a certain level, the Distribution Licensee is required to incur capital expenditure, which is usually approved at actuals by most SERCs. Some SERCs also give in-principle approval to the capital expenditure schemes, based on Cost Benefit analysis, which is usually linked to distribution loss reduction or with the objective of meeting load growth requirements and improvement in system reliability, in case of Distribution Licensees. Against this background, it is important to analyse the treatment of the capital expenditure incurred by Distribution Licensees under the Distribution Margin approach, to identify whether such capital expenditure incurred by the Distribution Licensees is on account of the normal load growth or system up-gradation programmes or it has been specifically undertaken for increasing the revenue collection to earn incentive under the Distribution Margin approach.

Distribution business is capital intensive in nature, very often requiring significant capital investment on a regular basis for meeting the electricity demand of existing and new consumers. The capital expenditure made by the Distribution Licensee and the capitalisation of assets by the Distribution Licensee has significant bearing on the Aggregate Revenue Requirement (ARR) of the Distribution Licensee in the form of depreciation, interest on loan, and Return on Investment expected for the assets added. The issue here is that since the Distribution Licensee is entitled to retain a share of the additional revenue collection due to the reduction of losses over and above the stipulated performance norms, whether the capital expenditure related expenditure heads should be allowed to be entirely pass through in the ARR. The argument here is that the impact of the capital expenditure can be offset by the share of additional revenue that the Licensee is allowed to retain.

Under the Distribution Margin concept, there may be no requirement to separately allow the impact of the capital expenditure to the Distribution Licensee. The Distribution Licensee has to undertake the necessary capital expenditure to achieve the desired performance levels, including distribution loss trajectory, such that the Licensee is able to earn the desired level of returns under the Distribution Margin concept. Thus, under this approach, there is no requirement for the SERC to



separately approve the capital expenditure to achieve the performance levels. However, adequate safeguards will have to be built in to ensure that the Distribution Licensee meets its supply obligations and does not discriminate between consumer categories while giving new connections. This may be achieved by separately approving the capital expenditure required to meet the projected load growth. Also, the details of the capital expenditure incurred by the Distribution Licensee to achieve the distribution loss levels may be sought separately from the Distribution Licensee for tallying the same with the increase in Capital Base.



12. International Experience of Distribution Margin Approach

Specific international experiences, where the Distribution Margin approach has been adopted, or where similar mechanisms have been attempted, and the learnings from the same, have been elaborated in the paragraphs below.

Pakistan

Pakistan is one country where the distribution pricing methodology is called 'Distribution Margin' for the eight distribution Companies that were formerly part of the Water and Power Distribution Authority (WAPDA). Here, the end consumer tariffs are determined by taking the costs of generating and transmitting electricity charged to the distribution company and adding a 'Distribution Margin' to cover the costs of the Company plus a return on the distribution Company's assets.

The formula used for the average Distribution Margin is

$$\text{Margin} = \frac{\text{[O\&M + Depreciation + Return - (Amortisation + other income)]}}{\text{(total unit sales)}}$$

where, O&M are the operating expenses and maintenance costs and the return is determined using a weighted average cost of capital on the asset base of the Company.

Any increases in the costs of electricity purchased by the Distribution Company are passed directly on to consumer tariffs without affecting the margin the Distribution Company makes. However, this requires the tariffs to be adjusted on a frequent basis in times of rapidly changing energy prices. The Multan Electricity Power Company petitioned the Pakistani Regulator (NEPRA) in 2008 seeking, amongst other things, to be allowed to adjust tariffs on a monthly basis to reflect power purchase costs.

Under this Distribution Margin approach, the only incentives for the Distribution Company to encourage greater efficiency would be if the Distribution Margin was fixed for a suitably long period so that the Company is allowed to reduce its costs while retaining a margin that has previously been set, giving it extra profitability.



The Distribution Company is not incentivised to try to procure energy at a better price, since whatever price it pays is passed through to the final consumer tariff. Similarly, there is no specific incentive to reduce its own costs (including financing costs) since these are included in the Distribution Margin and a lower cost will lead to a correspondingly lower margin being charged to consumers.

We have not been able to find any documentary evidence of how the Pakistani tariff setting process takes account of any difficulties with collection rates, or how it encourages improvement in the collection rates. It would appear that this remains an issue for the Distribution Companies, since they will be required to pay the generation and transmission charges regardless of whether they have collected all revenues from end users.

In Pakistan, the Distribution Company does not appear to have any “first call” rights to revenues collected and presumably must pay transmission and generation charges irrespective of its ability to collect from end consumers.

The distribution margin approach in Pakistan totally insulates the distribution company from fuel price risk, either leaving the risk with the generator or passing it straight through to the end consumer. In most market based situations it is quite common for the distributor to share some of this risk by, for example, entering into long term contracts with generators.

South East Europe

The Balkan countries of South East Europe (mainly Albania and countries that were part of the former Yugoslavia) are going through, or have recently gone through, a restructuring of their electricity supply industry. This is driven partly by the establishment of new regulatory agencies in the newly created countries and partly by the need to restructure for possible future EU membership.

Part of this restructuring includes creating distribution tariffs. These tariffs are based on a cost plus approach that has similarities to the distribution margin approach, though it is not referred to as Distribution Margin. One similarity is that the distribution company is responsible for collecting all revenues from customers and also pays the generators and transmission the regulated amount for those activities.



Historically, collection rates have been a major issue, particularly in countries such as Montenegro, Albania, Kosovo and Macedonia. To incentivise the Distribution Companies to improve their collection rates, the Regulator assumes a particular collection rate when determining what the tariff levels should be. If a Distribution Company fails to achieve at least this collection rate, it will therefore suffer a cost, which is not allowed as part of the tariff setting process; however, if it achieves a better collection rate then it keeps the additional revenues, increasing its profits beyond what was assumed at the time the tariffs were set. In this later case, the next time the Regulator is required to set tariffs he now knows that a higher collection rate is possible and will set tariffs accordingly.

A further factor in the distribution tariff setting process in these countries that has similarities with the Distribution Margin approach being considered is the desire to lower the rate of return for the distribution companies. In South East Europe this is because end user tariffs have been historically low and below costs including returns. Politically, it would be difficult to raise tariffs by the amount required to achieve full cost reflectivity immediately, so the Regulators in a number of countries are deliberately using a rate of return that is below a full commercial cost of capital. Over time, this will be increased (will need to be increased to meet their EU obligations) to reflect the full costs including the full cost of capital.

Ukraine

Ukraine uses a cost-plus methodology similar to that described above for South East Europe. As with the Balkan countries, the methodology is not a pure cost-plus one but includes incentives to reduce losses, both commercial (non-payment) and technical (line), by assuming a normative level of these losses so that the Distribution Company, if it seeks to maximise profits, will try to reduce losses as low as possible.

The cost-plus approach in Ukraine allows for the costs of operating expenditure, depreciation and repairs, and then adds a mark-up (profit) element for each regulated company. The Ukrainian Regulator has considerable discretion in determining the mark-up and it does not necessarily relate to a rate of return on assets that is more common with cost-plus approaches. This mark-up approach means that if the operating costs of a distribution company were to increase so too would the profits. Under a rate of return approach only the rate and the asset base, not operating costs, affect profits.



Great Britain

In Great Britain, the restructuring of the electricity supply industry is quite mature and the incentive based approach would at first appear to be quite different although there are in fact some similarities and points that are of interest in considering the Distribution Margin approach being considered in India.

The structure of the industry is quite different since the supply activity is fully separated from distribution. Suppliers charge consumers for their electricity and are responsible for purchasing the electricity from generators (often their own generation) and paying the charges for transmission and distribution.

The supply activity is not regulated. Suppliers are generally free to set their own prices, knowing that in a competitive market if prices are too high, customers can readily switch to other suppliers. Although collection rates are not a major issue, it is suppliers who bear the risk of poor collection. Suppliers are still required to pay generation, transmission and distribution network charges even if they fail to collect from customers.

Although distribution charges operate under an incentive approach, the method of setting those charges still uses the costs and rate of return of distribution activity as its basis. The incentives arise through a number of specific approaches:

- The costs used are not necessarily the costs of the distribution business, but what the Regulator determines (through benchmarking and similar approaches) would be the costs of an efficient distribution company. If the Distribution Company fails to achieve these levels of efficiency, it will earn lower profits.
- The overall revenues are set for a period of time (5 years). If the Company can achieve greater efficiencies than that assumed by the Regulator, the Company makes more profit since tariffs are not adjusted during this period. The Regulator will have better information at the time of next tariff setting on what the level of costs of an efficient Company would be.
- This incentive approach is not quite as pure as may at first be perceived. If profits of the regulated Company are excessively high, the Regulator can intervene and reset tariffs before the fixed period expires (as happened to



distribution prices in the mid 1990s). Conversely, if a company incurs significantly higher costs than were anticipated when the tariffs were set, the Company can ask the Regulator to “re-open” the price control to accommodate those costs; this would generally only happen if the additional costs were high enough to give the Company difficulty financing its activities and if those costs could not reasonably have been foreseen at the time the price control was set.

The approach to determining the rate of return assumed by the Regulator in Great Britain is one that uses the Capital Asset Pricing Model (CAPM) and determines a weighted average cost of capital to be applied to the regulatory asset base. The Distribution Company can make greater returns than this if it outperforms the Regulator’s efficiency assumptions, but may make lower returns if it underperforms.



13. National Experience similar to DM Approach

In the paragraphs below, we discuss some experiences of approaches adopted in the country, which have a lot of similarities with the DM Approach, primarily the second Option, linked to revenue collection, rather than Availability.

Bhiwandi Franchisee

One of the first successful attempts of implementing competitive bidding situation through franchisee concept was undertaken by Maharashtra State Electricity Distribution Company Limited (MSEDCL), when it conceptualised and appointed a Distribution Franchisee for its Bhiwandi Circle. A framework, very similar to the Distribution Margin approach, was adopted by MSEDCL for selecting and appointing the Franchisee.

Bhiwandi is known for its power loom units, and suffered from high level of distribution losses, equipment failures and poor collection efficiency. At the time of franchising the Circle, powerlooms accounted for around 60% of electricity consumption in Bhiwandi. The distribution losses were ranging around 45% to 50%, with collection efficiency of around 75%, resulting in Aggregate Technical & Commercial (AT&C) losses of around 55% to 60%.

MSEDCL developed the input based franchisee model for Bhiwandi to achieve:

- (a) Reduction in distribution losses
- (b) Improvement in collection efficiency
- (c) Improvement in the quality of supply to the consumers
- (d) Implementation of distribution best practices

In such a franchisee concept, the bidder has to pay for the amount for power injected by MSEDCL at input points in the Franchisee area for the entire term of Agreement after factoring the minimum and absolute reduction in the loss reduction trajectory, thus, providing an incentive to the bidder by allowing him to retain a portion of the additional revenue collected on account of achieving higher loss reduction and improved metering, billing and collection efforts. The employees of the area were



transferred to the Franchisee, with the related expenses being borne by the Franchisee.

After the handing over of Bhiwandi area to the Franchisee, the distribution losses were reduced by around 10% in the span of one year, and the average collection efficiency was also increased. The additional revenue to MSEDCL (including the saving on account of reduction of O&M expenses) was around Rs. 50 crore per year, on a base of around Rs. 250 crore, which is an increase of around 20%. The additional revenue alone accounted for around Rs. 20 crore as MSEDCL's share. The Franchisee has also retained its share of the additional revenue collection; the exact share is not known.

Subsequently, Input and Investment Based Franchisees have been appointed in Kanpur and Agra in Uttar Pradesh. In case of Nagpur in Maharashtra, and in few cities in Madhya Pradesh, the Input and Investment Based Franchisees were appointed, but due to some issues, the successful bidder is yet to take over the area. The bidding model adopted in these areas has been a variant of the model adopted for Bhiwandi, which is an input based Franchisee, responsible for all the activities of the distribution licensee in the Franchisee area.

The Distribution Margin concept was also proposed at the time of the intended privatisation of the distribution business in the State of Karnataka, which did not take place because of other developments.

The above examples all refer to a situation of appointment of Franchisee or privatisation of the distribution business based on a competitive bidding process.

For existing licensees, in most of the States where the MYT framework has been implemented, the Regulators have adopted the method of sharing of the gains or losses on account of the over or under-achievement of the targets set for different parameters, which has several similarities with the Distribution Margin approach. Thus, if the Utility's distribution losses are higher than the specified norms, then the corresponding power purchase cost due to the excess distribution losses is shared between the Utility and consumer, or the additional revenue is imputed based on the normative losses and a part of it is added to the revenue. In both cases, the distribution licensee will earn lower than the mandated RoE (16% in most States) on



this count. On the other hand, if the Utility's distribution losses are lower than the specified norms, then a part of the savings in power purchase cost due to the lower distribution losses is added to the revenue requirement, or the additional revenue is imputed based on the normative losses and is added to the revenue requirement. In both cases, the distribution licensee will earn higher than the mandated RoE (16% in most States) on this count.

For better understanding, the method adopted by the Maharashtra Electricity Regulatory Commission (MERC) and Rajasthan Electricity Regulatory Commission (RERC) for sharing of gains and losses have been elaborated below:

Regulation 19 of the MERC (Terms & Conditions of Tariff) Regulations, 2005 is reproduced below:

“19 Mechanism for sharing of gains or losses on account of controllable factors

19.1 The approved aggregate gain to the Generating Company or Licensee on account of controllable factors shall be dealt with in the following manner:

(a) One-third of the amount of such gain shall be passed on as a rebate in tariffs over such period as may be specified in the Order of the Commission under Regulation 17.10;

(b) In case of a Licensee, one-third of the amount of such gain shall be retained in a special reserve for the purpose of absorbing the impact of any future losses on account of controllable factors under clause (b) of Regulation 19.2; and

(c) The balance amount of gain may be utilized at the discretion of the Generating Company or Licensee.

19.2 The approved aggregate loss to the Generating Company or Licensee on account of controllable factors shall be dealt with in the following manner:

(a) One-third of the amount of such loss may be passed on as an additional charge in tariffs over such period as may be specified in the Order of the Commission under Regulation 17.10; and

(b) The balance amount of loss shall be absorbed by the Generating Company or Licensee.”

MERC has issued several Orders, wherein the above Regulation has been implemented.



Regulation 10 of the recently notified Rajasthan Electricity Regulatory Commission (Terms and Conditions for Determination of Tariff) Regulations, 2009, is reproduced below:

“10. Sharing of Gains and Losses on account of Controllable factors

(1) The approved aggregate gain to the Applicant on account of controllable factors shall be dealt with in the following manner:

(a) 50% of such gain shall be passed on as a rebate in tariffs over such period as may be specified in the Order of the Commission;

(b) The balance amount of gain may be utilized at the discretion of the Applicant.

(2) The approved aggregate loss to the Applicant on account of controllable factors shall be dealt with in the following manner:

(a) 50% of the amount of such loss may be passed on as an additional charge in tariffs over such period as may be specified in the Order of the Commission under; and

(b) The balance amount of loss shall be absorbed by the Applicant.”



14. Applicability of DM Approach for existing licensees vs. competitive bidding situation

As seen from the above paragraphs, approaches similar to the second Option of Distribution Margin approach have found favour in situations, wherein the distribution business was proposed to be privatised or where distribution franchisees have been appointed after a Competitive Bidding process. This is primarily so, because in a Competitive Bidding scenario, the prospective investor is able to bid for the distribution margin such that his expected costs are met and at the same time, he earns his desired return on investment. The investor submits his bid based on his assessment of the ground reality and his risk appetite and his ability to operate the distribution business and achieve better than normative performance so that his returns will be effectively higher.

The proposed Distribution Margin approach, linked to Network and Supply Availability, is appropriate for both, existing distribution licensees as well as new licensees.



15. Framework for Implementation of DM Approach for giving returns

Section 62 of the EA 2003 requires the State Electricity Regulatory Commission (SERC) to determine the tariff for Wheeling and Retail Supply of electricity. Section 42 of the EA 2003 requires the SERC to introduce open access in the distribution system in a phased manner and stipulates that the duties of the distribution licensee with respect to such supply shall be of a common carrier providing non-discriminatory open access. Also, under Section 9 of the EA 2003, captive consumers are required to pay wheeling charges for availing open access, and are exempted from payment of cross-subsidy surcharge and additional surcharge. Therefore, wheeling charges are to be paid by any person for availing open access using the distribution licensee's network.

For open access to succeed, the pre-requisite is to separate the Wires Business from the Retail Supply Business. There is also a need to segregate the network costs in terms of voltage level (HT and LT level).

In addition to open access, the EA 2003 also permits the issue of parallel distribution licenses in the same licence area. The second distribution licensee can either set up its distribution network or utilise the network assets of the existing distribution licensee. In the context of migration of consumers from one supply licensee to another, getting supply by utilisation of the wires laid down by one of the distribution licensees is an alternative option to the approach of incurring heavy capital expenditure for the network roll-out, so that the total cost is optimised.

Today, the problem is arising because the wire business and supply business are operating in an integrated manner, with the same entity having the distribution and supply licence. The EA 2003 provides for issue of integrated distribution and supply licence. However, for effective competition to be introduced, the Wire Business, both at the transmission and distribution level, should be segregated and regulated, whereas the Supply Business could be largely de-regulated in terms of pricing. Eventually, in order to have full scale retail competition, the Wires Business will have to be separated from the Supply Business, and it is essential to de-link the operation of the Wire Business from the operation of the Supply Business. Once this is done, one can have multiple supply licensees, who can procure the required quantum of power and supply to consumers using the common wire network. Such kind of



competition will enable the tariffs to go down, as well as enable further improvement in the quality of service and supply, since the supply licensees will have to create differentiation and brand identity by ensuring quality supply.

The international experience in introducing competition in retail supply also shows that instead of parallel networks, multiple suppliers are allowed to supply through a common network, as it is not economically viable to duplicate the distribution network, considering the sunk-cost associated with the existing network and the scale of economies derived from network operation. Also, only transmission and distribution segments are regulated under price cap mechanism, since they are natural monopolies, while the generation and supply business are freely competitive businesses. In this context, it becomes imperative to separate the supply from wire business to make retail supply competitive.

Apportioning of wires and supply cost

The proposed Model envisages that the ARR of the distribution licensee would have segregated into the ARR of the supply business and the ARR of the network business. However, presently, segregation of ARR into supply business and network business would be difficult because licensees maintain combined accounts and there are tax related problems in segregation. However, the allocation of the expenses can be done by the licensee between the Supply and Wires business using some approximation and assumptions, giving detailed rationale for the same. Alternatively, the ERCs may stipulate the ratio of allocation of all the expense heads and return component, based on data obtained from the licensees, so that all licensees in the State adopt uniform assumptions.

In addition to the expense heads such as power purchase expenses and transmission charges to be excluded while determining the wires cost, a portion of the O&M expenses related to the supply business also needs to be excluded. On the other hand, the majority of the capital expenditure related expenses, viz., depreciation, interest and Return on Equity, would have to be included under the Wires Business, rather than the Supply Business, since the wires network is required for the purpose of wheeling electricity from the point of injection to the point of drawal. The Supply Business would require only a small component of the capital expenditure towards billing and collection activity.



Presently, the allocation of expenses between the Wires and Retail Supply Business is being done based on certain assumptions. To bring uniformity and clarity on this issue, voltage level wise separate accounting of network related costs and supply related costs needs to be done for appropriate determination of wheeling charges.

In the long-term, the Wires Business (covering the distribution network) should be separated from Retail Supply Business. The retail supply licensees should be able to supply power to any consumer (irrespective of the load and supply voltage) through the existing distribution lines/network subject to payment of wheeling charges to the owner of the wire network. Requirement of meeting Universal Service Obligation (USO) would form an essential part of retail supply licence conditions, to prevent cherry picking of consumers.

However, this is a long-term solution, since the distribution licences issued to the distribution licensees would have to be amended accordingly, and the necessary legal and regulatory framework to ensure that the wires network is available seamlessly to the retail suppliers, irrespective of ownership of the network, and which addresses the related issues of metering, consumer complaint handling, balancing related issues, etc., would have to be put in place by the SERC.

In the interim, the Revenue Requirement and tariff of the Wires and Retail Supply Business would have to be determined separately. It is proposed that the Revenue Requirement of Wires and Supply Business be determined on a normative basis, by benchmarking the key expenses such as Operation & Maintenance (O&M) expenses, with that of comparable Utilities.

Performance of Wires and Supply Business

The Network Availability and Supply Availability has been identified as one of the key elements to measure the performance of Wires and Supply Business. Hence, it is necessary to study the parameters that can be used to measure the above Availability.

Network Availability

Reliability indices provide an effective tool to monitor the performance of distribution licensees. Commonly used reliability indices by Utilities in India are



1. **System Average Interruption Frequency Index (SAIFI):-** This index is designed to give information about the average frequency of interruptions per customer over a pre-defined area, which could be the entire distribution licence area or over smaller portions of the system, such as an operating area or individual feeder.

$$\text{SAIFI} = \frac{\text{Sum of all customer interruptions}}{\text{Total number of customers served}}$$

$$\text{SAIFI} = (\sum N_i) / N_T$$

SAIFI is measured in units of interruptions per customer over a fixed duration, usually a month or a year.

2. **System Average Interruption Duration Index (SAIDI):-** This index is commonly referred to as customer minutes of interruption and is designed to provide information about the average time the customers are interrupted.

$$\text{SAIDI} = \frac{\text{Sum of all Customer interruption durations}}{\text{Total number of customers served}}$$

$$\text{SAIDI} = (\sum r_i \times N_i) / N_T$$

SAIDI is measured in units of time, often minutes or hours expressed as interruption duration per customer, over a fixed duration, usually a month or a year.

3. **Customer Average Interruption Duration Index (CAIDI):-** CAIDI gives the average outage duration that any given customer would experience. CAIDI can also be viewed as the average restoration time.

$$\text{CAIDI} = \frac{\text{Sum of all Customer interruption durations}}{\text{Total number of customer interruptions}}$$

$$\text{CAIDI} = (\sum r_i \times N_i) / (\sum N_i) = \text{SAIDI} / \text{SAIFI}$$

CAIDI is measured in units of time, often minutes or hours, over a fixed duration, usually a month or a year.



Where,

- i An interruption event
- r_i Restoration time for each interruption event
- T Total
- N_i Number of interrupted customers for each interruption event during reporting period
- N_T Total number of customers served for the area being indexed

The Central Electricity Authority (CEA) publishes monthly reliability indices for selected towns using following formulae for calculating monthly Consumer and 11 kV reliability indices:

1. Consumer Reliability Indices

$$\frac{((\text{No of consumers} \times 24 \times \text{No of days in that month} \times 60) - (\text{Outage duration in minutes})) \times 100}{\text{No of consumers} \times 24 \times \text{No of days in that Month} \times 60}$$

2. 11 kV feeder Reliability

$$\frac{((\text{No of feeders} \times 24 \times \text{No of days in that month} \times 60) - (\text{Outage duration in minutes})) \times 100}{(\text{No of feeders} \times 24 \times \text{No of days in that Month} \times 60)}$$

The formulae indicated above are variants of System Average Interruption Duration Index (SAIDI). The accuracy of above mentioned formulae depends on outage duration estimation. However, it is difficult to verify the same, unless consumer indexing and tripping details are maintained properly.

Proposed Mechanism for measuring Network Availability

Network Availability is an indicator of how much time the distribution network is available to the supplier for supplying electricity. Hence, it is proposed to adopt a variant of the CEA formulae to indicate Network Availability.



It is important that Utilities maintain data on:

- Planned Maintenance Outage details
- Load shedding
- Force Majeure outages
- Trippings

While calculating the values of SAIDI, the interruptions due to Load Shedding, Interruptions caused by events outside the control of the Network Business and Interruptions due to natural calamities need to be excluded.

Proposed Formula is:

$$\text{Wires Network Availability} = (1 - (\text{SAIDI} / 8760)) \times 100$$

Where,

$$\text{SAIDI} = \frac{\text{Sum of all Customer interruption durations}}{\text{Total number of customers served}}$$

Wires Network Availability is proposed to be measured over the course of a month and year and will be expressed in percentage terms.

As mandated under the Tariff Policy, the Commission has to increasingly focus on regulation of the supply quality and service standards, rather than the regulation of costs. The Standards of Performance stipulated by the various State Electricity Regulatory Commissions (SERCs) for their respective State needs to be adhered to by Utilities strictly. Any variation in this regard has to be considered as a controllable factor, and sharing of gains/losses has to be undertaken.

In this context, the FOR Report on MYT framework and Distribution Margin recommends as under:

“5.4.2 A Composite Index of Supply Availability and Network Availability should be specified. The SERCs should give appropriate weightage to these two factors. Supply availability should be measured on the basis of power contracted by distribution licensees on a long-term basis for the power procurement plan submitted by the utility. Network availability should be measured on the basis of reliability indices such as



SAIDI, CAIDI and SAIIFI. Feeder Reliability Indices at 11 KV voltage level as specified by CEA would be appropriate till 100% consumer indexing is achieved in the licensee's area as the exact number of effected consumers by any interruption will be known only thereafter. The target achievement for Composite Index of Supply Availability and Network Availability may be specified as 95% for urban areas and 85% for rural areas. However, the SERC may initially fix a lower norm for network availability for rural areas keeping in view the present levels of service with trajectory for time bound improvement. For every 1% under-achievement in composite availability for urban or rural areas, ROE shall be reduced by 0.1% of equity. The SERC shall specify the mechanism of computing Composite Index of Supply Availability and Network Availability."(emphasis added)

Since, under the proposed framework, the Wires Business and Supply Business are being segregated, the performance indices of both Businesses may be kept separate, rather than determining a Composite Index.

Supply Availability

FOR has recommended that SERCs should specify Supply Availability. It is proposed that Supply availability may be measured on the basis of power contracted by distribution licensees on a long-term basis for the power procurement plan submitted by the Utility and may be represented in two sub-heads as under:

1. Base load Supply Availability: This parameter may be used to represent ability of Supply Business to meet its base load requirement. Proposed formula for calculation of this parameter is

Base load Supply Availability =

(Actual Contracted Base Load Supply in MW) x (No of Off-Peak hours)

(Base load in MW) x (No of off Peak hours))

2. Peak load Supply Availability: This parameter may be used to represent the ability of the Supply Business to meet its peak load requirement. Proposed formula for calculation of this parameter is



Peak load Supply Availability:

$$\frac{(\text{Actual Contracted Peak Load Supply in MW}) \times (\text{No of Peak hours})}{(\text{Peak load in MW}) \times (\text{No of Peak hours})}$$

Since the peak hours and off-peak hours could vary from one season to another, the above computations may be done in such a manner that the sum of off-peak hours and peak hours is 8760 hours, i.e., the total number of hours in a year.

It is proposed that SERCs may specify Index for Supply Availability based on Base load Supply Availability and Peak load Supply Availability, with the weightage for Base load Supply Availability and Peak load Supply Availability being considered as, say, 75% and 25%, i.e., greater emphasis may be placed on meeting base load requirements. It is felt that the Supply Availability for base load should be 100% and concession, if any, may be given in the peak load supply availability, since as per the distribution licence conditions, the licensee is supposed to ensure supply on 24 x 7 basis, and there is no specific reference to load shedding under the EA 2003. It is envisaged that SERCs will specify Supply Availability trajectory based on past performance of Supply Business, however, it should not be lower than 90%, and should be progressively increased in a maximum of three years to 95% or 98%.

In case the actual contracted supply is higher than the normative level, then the Supplier will be entitled to an incentive, and conversely, if the actual contracted supply is lower than the normative level, then the Supplier will be subjected to a disincentive.

It needs to be noted that in some States, the function of procurement of electricity on long-term basis has been centralized at the State level either formally or informally, and the individual Utilities do not have discretion in the matter, since the central procurement agency enters into all the Contracts, and the contracted power is allocated between the DISCOMs. In such cases, it may be difficult to hold the individual licensees responsible for procuring inadequate quantum of electricity. While there is nothing improper if licensees come together and opt for joint procurement or through a central agency, the lead role in power procurement should be with the distribution and supply licensees. The licensees could also form an SPV



for the purpose, since procurement through tariff based competitive bidding requires significant expert knowledge, which may not be available in-house with the Utility. However, even if the power is being procured through a central agency, the total requirement of energy and power is communicated to the central power procurement agency by the respective DISCOMs, and a collective failure to procure the required quantum of power would have to be passed on as a failure of all the DISCOMs, in proportion to their quantum of power requirement. Thus, even if the long-term power procurement is being done through a central agency, the above formulation of incentivising and dis-incentivising supply availability can be made applicable.

By design, the above measure of Supply Availability refers to the 'contracted' supply. The incentive/disincentive, therefore, should exclude the circumstances when the actual supply may differ from the contracted supply, due to force majeure situations, weather conditions, extreme monsoon failure, station outages, etc. which are beyond the control of the distribution licensee.

Distribution Margin computation

The Distribution Margin approach is proposed to be adopted for both, the Wires Business, as well as the Supply Business, by factoring in the peculiarities of the respective Businesses, as elaborated below.

Since the Distribution Margin is intended to be an approach different from either RoE or ROCE approach, the incentive/disincentive should not be linked to RoE/ROCE. Hence, the Distribution Margin has been conceived as a mechanism, which will provide the opportunity to the Utility to earn additional returns by getting additional ARR, i.e., the incentive/disincentive will be in terms of addition/reduction in percentage of ARR that can be earned/reduced for over-/under- achievement vis-à-vis the target availability. To start with, the addition/reduction in ARR may be considered as $\pm 0.2\%$ of ARR for every percentage point increase/decrease in Availability vis-à-vis the normative levels, for Wires Business and Supply Business, separately.

Thus, the objective of the Distribution Margin approach is to provide a mechanism for providing additional returns, in addition to the conventional method of providing returns through RoE or ROCE. At the same time, the mechanism should not lead to super-profits or abnormal losses. Hence, it is proposed that the maximum



additional return (if ROE method is being adopted) that can be earned/reduced under the Distribution Margin approach, is $\pm 2\%$. Thus, if the RoE for Generation and Transmission Business is considered as 15.5%, and RoE for Distribution Business is considered as 17.5%, then the return for the Distribution Business, after accounting for the Distribution Margin, can vary between 15.5% and 19.5%.

The rationale behind specifying the addition/reduction in ARR as $\pm 0.2\%$ of ARR for every percentage point increase/decrease in Availability vis-à-vis the normative levels is as under:

- If the Availability goes to 100%, then the maximum Distribution Margin, amounting to $+2\%$ of additional return will be available to the Distribution licensee
- If the Availability goes to as low as 80%, then the reduction in ARR will be commensurate with a reduction of maximum 2% return.

For the Supply Business, if the total ARR, which includes the power purchase cost, is considered for giving additional returns through Distribution Margin, then it could result in providing a perverse incentive to the Supply Business to procure costly power, since this will lead to a higher additional return, in case the Supply Availability is better than the normative levels. Hence, it is proposed to link the Distribution Margin to the ARR of the Supply Business, after reducing the power purchase cost, which also truly reflects the costs incurred by the Supply Business in ensuring that the requisite supply is contracted for and the desired customer service is delivered.

Thus, under this model, there will be two levels of incentive/disincentive for the Wires Business and Supply Business, as elaborated below:

1. Since the O&M expenses are being determined on a normative basis based on benchmarking with other comparable Utilities, in case if the O&M expenses of the concerned Utility is lower/higher than the normative levels, then the Utility will get an incentive/dis-incentive, since only the normative expenses will be allowed to be recovered through the tariff. This is the conventional mechanism of rewarding efficiency, through sharing of gains and losses on



account of controllable factors, that is the basic premise of a Multi-Year tariff framework.

2. In case the Network Availability/Supply Availability are higher/lower than the normative levels, then the Utility will get an incentive/dis-incentive in terms of addition/reduction of percentage of ARR that the Utility will be able to recover. This is the additional Distribution Margin component that is proposed to be introduced.

For ease of understanding, the proposed mechanism has been applied to selected distribution Utilities in the States of Maharashtra, Karnataka, Gujarat and Chhattisgarh, based on the latest Tariff Orders and by applying certain assumptions. The illustrations given below are intended only to explain the proposed Approach in a simple manner, and should not be considered for any other purposes.

The Utilities considered for the illustration are as under:

1. Reliance Infrastructure Limited (RInfra) - a private licensee, operating in the suburbs of Mumbai city
2. Maharashtra State Electricity Distribution Company Limited - the largest electricity distribution licensee in the country, State-owned, and supplying to entire State of Maharashtra, except parts of Mumbai city
3. Bangalore Electricity Supply Company (BESCOM) - Government owned distribution licensee in Karnataka, having both urban and rural mix
4. Chhattisgarh State Power Distribution Company Limited (CSPDCL) - Government owned distribution licensee in Chhattisgarh, having both urban and rural mix
5. Paschim Gujarat Vitaran Company Limited (PGVCL) - Government owned distribution licensee in the State of Gujarat, having both urban and rural mix

The first step is to segregate the total ARR of these Licensees into Wires ARR and Supply ARR. We have relied on the allocation of ARR between these businesses, as undertaken by the respective SERC, for the purpose of our simulation. The total ARR and the allocation between Wires ARR and Supply ARR for these five licensees is



given in the **Annexure** to this Report. Certain aspects to be noted in this regard and the implications of the same are as under:

- a. In case of RInfra, MSEDCL and BESCOM, most of the asset related expenses have been allocated to the Wires Business, while the O&M expenses have been allocated in some proportion between the two Businesses.
- b. In case of CSPDCL and PGVCL, only the power purchase expenses and transmission charges have been considered under Supply Business, whereas, all other expenses have been allocated to the Wires Business
- c. In case of CSPDCL and PGVCL, under the proposed approach, the Distribution Margin for the Supply Business is effectively being computed only on the transmission charges, since the power purchase expenses have not been considered. This however, does not seem appropriate, as the Distribution Margin needs to reflect the Availability of the respective Business and the cost incurred for the same. The solution to this problem appears to be that the expenses need to be accounted for separately, rather than being allocated. Also, all expenses related to metering, billing, collection and customer services, including processing new connections, as well as power purchase activity, and obligation to meet the Standards of Performance, etc., would have to be considered under the Supply Business, hence, considering only the power purchase expenses and transmission charges under Supply Business does not appear to be appropriate.

The Distribution Margin available to the above distribution licensees, i.e., the impact on the ARR, for every 1% increase/decrease in Availability has been shown in the Table below:

(Rs. Crore)

Particulars	Incentive linked to ARR				
	RInfra-D	MSEDCL	BESCOM	CSPDCL	PGVCL
Network Availability	1.24	5.67	1.22	1.34	1.80
Supply Availability	0.79	4.59	1.92	0.63	0.67

Note: The above has been computed by considering a 0.2% impact on the ARR for every percentage point increase/decrease in the availability for the Network Business and Supply Business, respectively.



ANNEXURE

Reliance Infrastructure Limited (RInfra) – Wires and Supply ARR

Particulars	FY 2007-08	Wires Business	Supply Business	Wires Business	Supply Business
	Rs Crore	%	%	Rs Crore	Rs Crore
Power Purchase Expenses	3,220	0%	100%	0	3220
Operation & Maintenance Expenses	500			0	0
Employee Expenses	266	65%	35%	173	93
Administration & General Expenses	99	63%	37%	63	37
Repair & Maintenance Expenses	134	94%	6%	126	8
Depreciation, including advance against depreciation	70	78%	22%	55	15
Interest on Long-term Loan Capital	59	87%	13%	52	8
Interest on Working Capital and on consumer security deposits	39	7%	93%	3	37
Bad Debts Written off	7	0%	100%	0	7
Income Tax	61	0%	100%	0	61
Transmission Charges intra-State	190	0%	100%	0	190
Contribution to contingency reserves	12	85%	15%	10	2
Adjustment for profit/loss on account controllable/uncontrollable factors	-7	50%	50%	-3	-3
Total Revenue Expenditure	4,150			477	3672
Return on Equity Capital	162	88%	12%	143	19
Aggregate Revenue Requirement	4,312			620	3692
Less: Non Tariff Income	77	0%	100%	0	77
Aggregate Revenue Requirement, after deducting power purchase expenses	4,235			620	395



Maharashtra State Electricity Distribution Company Limited (MSEDCL) - Wires and Supply ARR

Particulars	FY 2007-08	Wires Business	Supply Business	Wires Business	Supply Business
	Rs Crore	%	%	Rs Crore	Rs Crore
Power Purchase Expenses	15518	0%	100%	0	15518
Standby Charges					
Employee Expenses	1782	60%	40%	1069	713
Administration & General Expenses	189	50%	50%	95	95
Repair & Maintenance Expenses	436	87%	13%	379	57
Depreciation, including advance against depreciation	429	87%	13%	373	56
Interest on Long-term Loan Capital	234	87%	13%	204	30
Interest on Working Capital and on consumer security deposits	199	9%	91%	18	181
Bad Debts Written off	301	9%	91%	27	274
Other Expenses	5	0%	100%	0	5
Income Tax	0	87%	13%	0	0
Transmission Charges intra-State	1472	0%	100%	0	1472
Contribution to contingency reserves	52	92%	8%	48	4
Return on Equity Capital	475	80%	20%	380	95
Sharing of gains and losses due to controllable	418	50%	50%	209	209
Incentives/Discounts given to consumers	74	50%	50%	37	37
Less: Non Tariff Income	932	0%	100%	0	932
Aggregate Revenue Requirement, after deducting power purchase expenses	20650			2837	2295



Bangalore Electricity Supply Company (BESCOM) - Wires and Supply ARR

BESCOM -FY 2009-10					
Particulars	FY10	Allocation Matrix		Wires Business	Supply Business
	Total	Wires Business	Supply Business	Rs Crore	Rs Crore
Power Purchase	6325	0%	100%	0	6325
Transmission Charge	451	0%	100%	0	451
SLDC Charges	3	0%	100%	0	3
O&M Expense	485	56%	44%	272	213
Depreciation	125	88%	12%	110	15
Interest on long term loans	156	100%	0%	156	0
Interest on consumer deposit	111	0%	100%		111
Other interest & finance charges	3	100%	0%	3	0
Interest on Working capital	173	10%	90%	18	155
Total interest & Finance Charges	442	40%	60%	176	266
Total Expenditure	7832	7%	93%	558	7273
RoE @ 14%	127	80%	20%	102	25
Provision for Taxation	21	80%	20%	17	4
Gross Annual Revenue Requirement	7979	8%	92%	677	7303
Less Other Income	85	81%	19%	69	16
Aggregate Revenue Requirement, after deducting power purchase expenses	7894	8%	12%	608	962



Chhattisgarh State Power Distribution Company Limited (CSPDCL) - Wires and Supply ARR

CSPDCL					
Particulars	FY 2009-10	Wires Business	Supply Business	Wires Business	Supply Business
	Rs Crore	%	%	Rs Crore	Rs Crore
Power Purchase Expenses	2695	0%	100%	0	2695
Employee Expenses	519	100%	0%	519	0
Administration & General Expenses	28	100%	0%	28	0
Repair & Maintenance Expenses	90	100%	0%	90	0
Depreciation, including advance against depreciation	42	100%	0%	42	0
Net Interest & Finance Charges	108	100%	0%	108	0
Other Debits (incl. Prov for Bad debts)	35	100%	0%	35	0
Income Tax	4	100%	0%	4	0
Transmission Charges intra-State	314	0%	100%	0	314
Return on Equity Capital	98	100%	0%	98	0
Less: Non Tariff Income	251	100%	0%	251	0
Aggregate Revenue Requirement, after deducting power purchase expenses	3682			672	314



Paschim Gujarat Vitaran Company Limited (PGVCL) - Wires and Supply ARR

PGVCL					
Particulars	FY 2009-10	Wires Business	Supply Business	Wires Business	Supply Business
	Rs Crore	%	%	Rs Crore	Rs Crore
Cost of Power Purchase	4274	0%	100%	0	4274
Transmission Charges	337	0%	100%	0	337
O & M Expenses	427	100%	0%	427	0
Depreciation	165	100%	0%	165	0
Interest on Loans & Finance Charges	175	100%	0%	175	0
Interest on Working Capital	54	100%	0%	54	0
Other Debits	3	100%	0%	3	0
Provision for bad debts	10	100%	0%	10	0
Less : Interest & Expenses Capitalised	48	100%	0%	48	0
Sub-Total	5396	15%	85%	785	4611
ROE	179	100%	0%	179	0
Provision for Tax	1	100%	0%	1	0
Gross ARR	5576	17%	83%	965	4611
Less : non tariff income	66	100%	0%	66	0
Aggregate Revenue Requirement, after deducting power purchase expenses	5510	16%	84%	899	337