Department of Industrial and Management Engineering

Indian Institute of Technology Kanpur

Forum of Regulators

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Distribution Tariff Determination & Tariff Rationalisation

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Regulatory & Tariff reforms

- **IPPs policy 1991**
  - Utilities don't have money to pay IPPs
- **1995-1998: Utilities financial condition has to be improved**
  - depoliticalise through independent regulator
  - Transparency & accountability
  - Reduction in T&D losses
  - Bring Operational efficiency
  - Tariff reforms
    - Tariff provides only 70% of the cost of supply
    - Non-transparent, political tariff
    - Misuse of Energy as well as non-transparent subsidy
- **Electricity Regulatory Commission Act 1998**
- **Electricity Act 2003 and National Tariff Policy**

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Options for Tariff Determination

Options	Description
Performance based regulation (PBR)	Characterised by RPI-X+Y formula Base cost set at beginning of control period (3-7 yrs ordinarily) based on historical cost data Efficiency gains/losses to account of utility Pass through of external costs (Y) allowed
Reference Utility regulation (RUR)	Based on forward looking (incremental) cost framework Hypothetical "ideal" utility modelled based on load and generation configuration for control period (upto 10 years) Tariffs for "ideal" utility set in advance and subject to only a few pass through elements (primarily fuel)
Target based regulation (TBR)	Specific targets set for important operating elements (e.g. losses, collections, quality of service) for control period All other cost elements subject to normal cost-plus regulation Improvements on targets to account of utility or shared with consumers and vice-versa

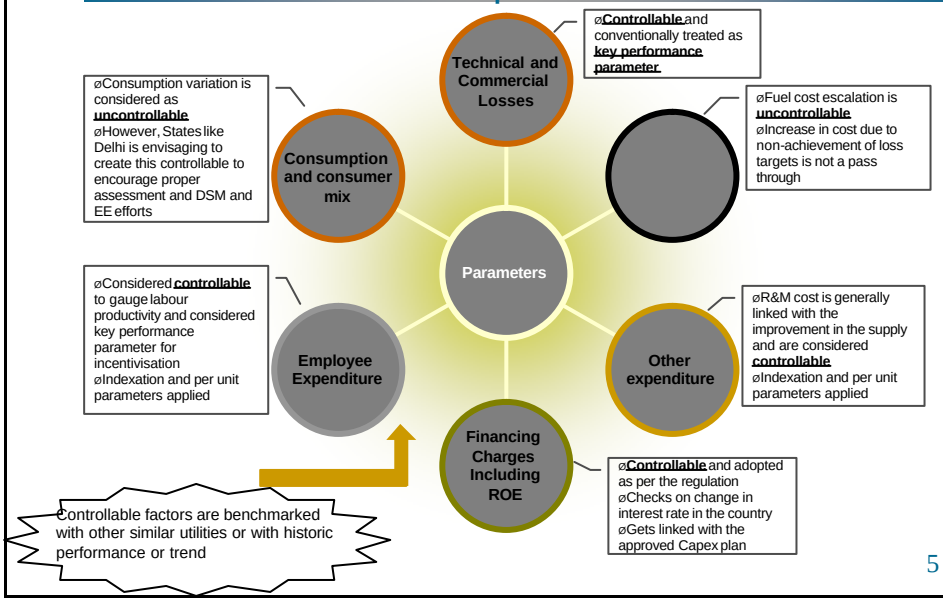
Evaluation of MYT framework in India

Criteria	PBR	Reference Utility	Targeted Incentives
Power of incentives	High	High	Medium
Degree of regulatory intervention	Low	Low	High
Data requirement for framework design	High	Medium	Medium
Measurement requirements for implementation	Low	Low	Med/High
Identified focus on critical issues	Medium	Low	High
Time consuming	Medium	Low	High

Mix of PBR and Targeted Incentives

Selecting appropriate framework and incentive scheme

Identification of controllable and uncontrollable parameters



Sales- Metered

Approaches

- CAGR of sales for the last 3, 5 years or more
- Forecast based on methods such as use of Average annual load factor
- Econometric modeling

Prudent adjustment for

a) Abnormal addition of consumers in any given area (on the basis of proposed city plan, tax holidays, Government incentives for industrial establishments, e tc.)
b) Inflection point in economic cycle (boom, slowdown, recession or expansion)
c) Variations in weather conditions
d) Materially significant findings during audit check.

Issues

•Availability of audited numbers on slab-wise sales figure

•Regular check of meters

Sales - Unmetered

Background

- Billing of un-metered consumers on flat rate - on INR/HP/Month
- T&D loss camouflage
- While some SERCs accept norms specified by licensees, select SERCs conduct studies to determine the consumption norm. Licensees and SERCs remain almost always in disagreement with the norm calculated by each other.

Possible Forecasting Methodology

- An Independent study with Distribution licensee to be conducted to assess actual consumption.
- Distribution licensee to conduct year long month-wise study to establish base line norms.
- Results to be submitted to the Regulator.
- The study shall cover actual consumption in the zones (hours of usage, specifications of motor (power etc.)) demonstrating seasonal impact, economic development, demographics, consumption pattern, etc. Stratified sampling shall be used for the study.

Un-metered Sales (Cont..)

Study- States without significant feeder (Agriculture) separation

- Monitoring of consumers selected in the sample- Meter installation either at consume premises or at DT . DTR meters shall be less prone to tampering.
- Monthly monitoring of change in loading of selected DTRs .
- Establishment of consumption pattern with month -wise yearly data. Month-wise analysis of data to be submitted to the Regulator for directions /suggestion.

Study- States with significant feeder (Agriculture) separation

- Meter installation at the S/S. Determination of Technical losses through load flow studies. Agriculture consumption= Meter Reading – Technical losses
- SERC to work out the percentage of commercial loss, if any, with Distribution licensee during the tenure of the study.
- Study report to be submitted to SERCs by October 31st to have enough time to conduct validation check by the Regulator with an independent agency.

Distribution Losses

Background

- Baseline loss: Absence of standard methodology for setting baseline loss level. States have adopted a variety of approaches.
  - Estimation of loss level remains further a concern considering the large quantum of un-metered sales to agriculture consumers.
- Historically, in many states utilities have not been able to achieve loss reduction targets as the baseline loss levels determined by the states were higher than actual.
- Most of the states were not able to achieve the loss reduction targets. SERCs relooked into the baseline data for AT&C or Distribution losses.
- Some states the licensees are in disagreement with the approach followed by the SERCs for determination/approval of losses.

Distribution and AT&C Losses (Cont..)

- Billing of metered and un-metered sales to be done as discussed before
- Distribution licensee to ensure that input and output points of licensee's operations are metered/normalized as efficiently as possible to aid in Energy accounting and audit required for the purpose of estimation of baseline AT&C losses
- Proposed Annual loss reduction (by RAPDRP) against the existing loss levels

Below 15%	Below 1%
15%-20%	1% to 2%
20%-30%	2% to 3%

- OTHER Options- Where Distribution Licensee is unable to reduce losses-
- Circle-wise Distribution loss reduction targets shall be approved.
- Circle-wise differential tariff shall also be implemented to mobilize support/push from the consumer on the Distribution Licensee to drive loss reduction.
- Distribution Franchisee

Approval for Power Purchase quantum/cost

Background

- Inappropriate Sales Forecast › Inappropriate power procurement plan › High short term power purchase cost › Financial losses to Distribution licensee.
- Significant difference in actual and approved Power purchase quantum/cost
- Lack of true-up practice or delay in true-up exercise and ultimately disallowance of short term power purchase during true up, if any, further augments losses of the Distribution Licensee to a considerable extent.

Possible Methodology for base level approval for Power Purchase quantum/Cost

- Comprehensive Power Procurement Plan- To be a component of MYT petition
  - Procurement plan for medium & long term shall be addressed by competitive bidding (separately for peak and base requirement)
  - States with generation mix having less coal or hydro resource: JV with coal bearing states.
  - Procurement from renewable energy sources as stipulated by SERC

Approval for Power Purchase quantum/cost

Methodology and Treatment of Power Purchase quantum/Cost through short term

- Cost of short term power procurement could be capped by quarterly weighted average cost of bilateral purchases and power exchange prices
- Cost of short term power could be directly passed to the customer without prior approval of SERC: If there is short term requirement of power over and above as stipulated by the Distribution licensee and approved by the SERCs.
- Factors beyond the control of the utility (fuel shortage/ snow capping of hydro resources inhibiting power generation in sources stipulated in the plan, unplanned outages of power generating units or acts of God)

Treatment of Incremental fuel/Power procurement cost

- In most of the states the process of approval of such charges takes a long time and adjusted during the true up exercise.

Gujarat Maharashtra	**SERCs adjust the variation in fuel and power purchase charges on quarterly basis**
AP	Licensee is allowed to recover or refund fuel surcharge adjustment charges with approval of SERC- Delay in approval and recovery leads to high carrying cost for the licensee.
Punjab	Quarterly filing of fuel surcharge petition by the licensee. However, it is approved with the final tariff order only
West Bengal	Annual adjustment of increase in power purchase cost along with tariff petition.
Some SERCs	Remain silent on this aspect.

- Delay in approval of genuine cost due to change in fuel surcharge and short term power leads to high carrying cost for Distribution licensee.
- Short term borrowings undertaken by Distribution licensees to address these costs further burden the consumers as they have to bear the carrying cost latter.

O&M Expense- Employee Cost

- Employee cost can be computed as approved baseline employee cost escalated by consumer price index (CPI) adjusted by provisions for expenses beyond control of the Distribution Licensee and one time expected expenses, such as hike in Dearness allowance, implications of pay commission, arrears & Interim Relief, governed by following formula.

EMP n = (EMP b * CPI inflation) + Provisions

Where:

EMP n: EMP expense for the year n

EMP b: Baseline EMP expense as per the annual study

CPI inflation: is the average increase in the Consumer Price Index (CPI) for immediately preceding three years

Provision: Provision for expenses beyond control of the Distribution Licensee and expected one-time expenses as specified above

O&M Expense- Repair & Maintenance

- Repairs and Maintenance expense can be expressed as a baseline percentage of Gross Fixed Assets of last financial year as governed by following formula:

R&M n = K b* GFA n-1

Where:

R&M n: Repairs & Maintenance expense for nth year

GFA n-1: Gross Fixed Assets for n-1th year

K b: is a baseline percentage to be determined basis annual study considering approved R&M expense versus GFA by the SERC in the past.

O&M Expense- A&G Expense

- A&G expense can be computed as approved baseline A&G expense escalated by wholesale price index (WPI) adjusted by provisions for confirmed initiatives (IT etc. initiatives as proposed by the Distribution Licensee and validated by the SERC) or other expected one-time expenses, governed by following formula:

A&G n = (A&G b * WPI inflation) + Provision

Where:

A&G n: A&G expense for the year n

A&G b: Baseline A&G expense as per the annual study

WPI inflation: is the average increase in the Wholesale Price Index (CPI) for immediately preceding three years

Provision: Cost for initiatives or other one-time expenses as proposed by the Distribution Licensee and validated by the SERC

Treatment of Return on Equity

- Return on equity shall be computed on 30% of the capital base or actual equity, whichever is lower.
- Capital base= Original cost of asset

Excluding assets funded by capital subsidies/grant

- Provided that 16% of post-tax Return on Equity per annum shall be considered for tariff determination pertaining to the Distribution Licensee.
- In case the distribution licensee has not factored or claimed the return on equity in the ARR/MYT petition, the same shall be considered for tariff determination by the SERC.

Subsidy

- SERC to ensure that the subsidy provided for by the Government in its budget or declared as and when the ARR petition is in the public domain is factored in the tariff order
- Government's subsidy- documentary evidence of time schedule of payment, mode of the payment of the subsidy (cash subsidy or netting of against Electricity Duty) and categorization of the subsidiary amount into subsidized consumer categories
- SERC could approve two sets of tariffs, with and without subsidy support.
- Subsidized Tariff: If Government adheres to the subsidy schedule in terms of time of payment and quantum of payment.
- Tariff without subsidy: If the Government defaults for two consecutive installments, either in terms of time or quantum of payment.

Cross- Subsidy/Tariff Design

- Cross subsidy support- BPL consumer consuming power below 30 units per month.
- Tariff for such consumer to be 50% of the average cost of supply.
- SERC would notify revised roadmap within six months from the notification of these Regulations with a target that latest by the end of year 2015-16 tariffs are within ± 20 % of the average cost of supply.
- The road map would also have intermediate milestones, based on the approach of a gradual reduction in cross subsidy.

Treatment of Regulatory Assets

- Regulatory asset to be an exception and not norm: Regulatory assets shall be created only if the licensee incur losses on account of factorsbeyond its control.
- Regulatory Asset: Not to be created to cover the losses incurred in normal course of business.
- Financial arrangement or capital restructuring shall be deployed to cover the gap.
- Amortization schedule corresponding to the regulatory asset shall be prepared and put in effect along with creation of the regulatory asset.
- **Carrying cost** of the regulatory asset shall be line with the State Bank Advance Rate (SBAR) for the tenure for which regulatory asset has been created

Process of Filing Petition

- Licensee to file tariff petition by 30th November every year.
- Petition to include information of previous, current and ensuing year. Data for previous year to be based on audited accounts.
- To submit an statement on compliance of directives issued by the SERC in the last Tariff Order.
- Annual petition to include actual subsidy received vis-a-vis claimed by the licensee and True up petition for previous year
- SERC to seek clarifications within 14 days of petition filing. Distribution licensee to respond within 10 days to the SERC. SERC to admit the petition within 7 days after submission of response so that the Tariff order shall be issued within 120 days.
- **SERC to issue sue motto tariff order in case of delay/non submission of tariff application or additional information.**
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True up order

- SERCs to pass True-Up order either as part of the Tariff order or as a separate order preceding the Tariff order of ensuing year
- True-Up order to be passed on annual basis
- True-Up order shall be on the basis of expense estimates made in the beginning of the year under consideration and actual expenses booked in the audited books of account of the Distribution Licensee for the year
- Non availability of audited accounts: SERC to direct the Distribution Licensee to expedite the process of audit of books of accounts for the same to be available during True-Up process going forward.
- Provisional books of accounts shall be used for the True-Up process.
- Estimates of expenses for ensuing year (say FY 11-12) should be on the basis of corresponding figures in the True-Up order (of FY 09-10) and Actual & Tariff order of FY 10-11.

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Policy, Regulations and Reforms	Sector Strategy	Projects & Transaction	Project Monitoring & Mechanism	Capacity Building & BPR
	• Market assessment • Business planning • Project feasibility • Entry Strategy • Market Due Diligence	• Project Structuring • Contracts & Risk Management • Financial Due Diligence • Economic Impact Assessment		• Specialised Training/workshops • Institutional Strengthening • Business Process Re-engineering

Brief about CRISIL Infrastructure Advisory

CRISIL Infrastructure Advisory* provides practical and innovative solutions to governments, donor agencies and leading private sector entities in over 20 emerging economies across the world to

- **help improve infrastructure service delivery;**
- **transform performance of public institutions and sector efficiency;**
- **design and strengthen reform programs to catalyze private sector participation.**

Practice Areas

- **Energy Practice**
- Urban Practice
- Private Sector Solutions
- Public Private Partnerships

Energy Practice – Key Experience

Few Recent Notable Assignments in Indian Electricity Sector-Regulatory Area:

- Model Tariff Guidelines/Regulations for Determination of Adequacy of Tariff by SERCs/CERCs, 2011 – Power Finance Corporation Limited/FOR/MOP.
- Study of Various Distribution Models, 2010 – Power Finance Corporation Limited
- Study on Viability of Distribution Utilities, 2010 – Forum of Regulators C/o CERC
- Study on Analysis of Historic Tariff Orders & Other orders of State Electricity Regulatory Commissions (SERCs), 2009-2010 – Forum of Regulators C/o CERC
- Consulting Services: East Asia and Pacific Infrastructure Regulatory Forum (EAPIRF), 2009-2012 – World Bank
- Preparation of Annual Revenue Requirement & multiyear Tariff petition for the Deemed Distribution Licensee to regulator of Gujarat, 2010-13 – Kandla Port Trust

- More than 16 years of hands on experience in assisting different Commissions/Utilities/SEBs in the matter of tariff and ARR & determination of tariff in single year and MYT framework in India and African region.
- We have been assisting different commissions including but not limited to Forum of Regulators, MERC, DERC, PSERC, RERC, GERC during last five years in the matter of tariff and processing tariff applications and other related regulatory studies including analysis of tariff orders by various SERCs, viability of distribution utilities, Study of distribution models, Model Tariff Regulations for Determination of Tariff by different SERCs, Regulations for Protection of Consumer Interest and operation of parallel distribution licensees in a common operational area.
- We have also been assisting utilities including but not limited to J&KPDD, HPSEB, HPSEBL, JVVNL, AVVNL, JdVNNL, PSTCL, **NDMC***, BEST, **UTs of Daman and Diu***, **Kandla Port Trust***, CSPTCL, CSPDCL, CSPGCL in the matter of tariff and preparation of ARR & tariff petition in MYT and single year framework.
- International experience (Tanzania, Botswana, Mozambique) of assisting Regulatory Commissions and utilities in carrying out the performance review of the utilities as well as tariff review and rationalization.

***deemed distribution licensee**

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