

# Tariff Realization: A Review by Analysis of Three States

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**Abstract**— Electric power is a vital pre-requisite in any modern economy and is important for socio-economic development. With sector regulation undergoing vital changes and its structure need improvement from time to time to keep this development process continuous. Also at the same instant, it is necessary to improve the health of the sector and to ensure investment in the sector, reforms and amendments were brought in the act and regulations. Creation of Electricity Regulatory Commission in both centre and state level was one of the major reform for regulating the power sector and especially the tariff. Before the creation of ERC the job of TARIFF setting was in the hands of state government and they used this authority to their own benefit. The main reason for creation of ERC was setting up of optimum and transparent tariff for different sections of societies. “Recovery of cost from tariff from each category of consumers” this is what precisely mentioned in Electricity regulatory commission act 1998, Electricity Act 2003, National Electricity Policy 2005, National Tariff Policy 2006. In other words it is also known as cost reflective tariff or Tariff Rationalization i.e. the actual cost has to be recovered from specific section of consumer imposing the cost on the system for retrieving the power supply. Generally, in the context of Indian power system, tariffs for domestic and agricultural consumers have been heavily subsidized either by the state through subsidies and subventions or through cross subsidization by other consumer categories or within the category, primarily the consumers using electricity at high voltages or consuming more number of units.

**Keywords**— TRP, Tariff Realization

## I. INTRODUCTION

Electricity is an important, basic infrastructural element, required for human development. In industries inadequate supply of power will lead to idle capacity, low production, and scarcity of essential goods, inflation, and a steady decline in the future growth prospects of the Indian economy. Electric energy occupies the apex level in the energy hierarchy. It finds various uses in home, industry, agriculture even in transport. Even the per capita consumption of electricity in any country is an index of the standard of living of the people in that country. Rightly electricity can be considered as the status for development.

One of the reasons which forced the government for reform and restructuring is the interference from state government/politicians in tariff formulation. In the recent Indian experience, the clear lesson we received is that the most critical challenge faced by the power sector lies at the distribution end of the Generation --> Transmission --> Distribution value chain. The dismal and deteriorating financial health of the power distribution entities is already seen as the prominent factor that has led to inadequate investments in the sector. As we all know that timely tariff hikes are considered as very politically sensitive issue in

current scenario now days. The fact to be noticed is that many states have not revised tariffs in the last many years, and some for even over a decade.

## II. TARIFFS – CATEGORIES & STRUCTURAL COMPONENTS

Once connection revenues are determined, remaining distribution and transmission costs to be recovered in use-of-system (UoS) charges should be allocated based on the cost of serving different customer categories. Furthermore, the structure of tariff components (energy, capacity, fixed, etc.) should reflect the structure of the cost of service.

### A. Tariff Categories

Tariff categories are classes of customers with common/shared characteristics that are grouped together for ease and consistency of charging.

Low voltage customers are divided by the domestic and commercial use of the connected remises. Business customers are often sub-categorized according to their size and what metering is in place – electromechanical metering or Maximum Demand metering. Larger Customers, on the other hand, are associated with the voltage level at which they are connected.

### B. Tariff Components

Tariff components refer to the number and nature of the charges applicable to customers in a given customer category. Components can be fixed monthly charges or depend on customer usage during the billing period, can be blocked, and can be time-differentiated in various ways.

### C. Cost-Components

Tariff components should be primarily based on the cost structure of providing service. Typical components include:

#### 1) Fixed Customer Charges (per customer per month)

Fixed Charges are charges that are not a function of the customer’s usage during the billing period and are often used to recover costs that vary with the number of customers being served.

#### 2) Generation (Market Price) Charges (per kWh)

Energy charges, with the commencement of the new market, will be based on the MAE spot price.

#### 3) Capacity Charges (per kVA of MIC)

Capacity charges (as the term is used in Ireland) are another form of fixed charge as they are assessed on the customer’s kVA of MIC (Maximum Import Capacity), a cost that does not vary unless additional investment is made to increase or reduce MIC.

The term capacity charge may also be associated with maximum demand at peak.

#### 4) Network Energy Charges (kWh)

Network facilities are sized to handle their expected peak loads and to ensure that customers’ capacity requirements can be met on an ongoing basis, assuming that peak load is the more significant driver. It is important to note that it can

occur at different times in different parts of the network, and at times other than the time of the peak demand on the system as a whole. Since load growth at times when capacity is adequate does not require additional capacity, it is important to recover these network costs on a time-of-day usage basis for customers with time-of-use metering, and on a seasonal basis for customers with simple metering. Because the exact time of the peaks on various facilities cannot be predicted with complete accuracy, it is appropriate to recover these costs on the basis of energy used within the critical periods when the peaks are likely to occur.

#### 5) Demand Charges (per KW of metered peak demand during the billing period)

An alternative to time-differentiated per-kWh network charges is time-differentiated (or seasonal) charges per kW of monthly-metered demand. 'Maximum' demand charging i.e. charging customers on the basis of their maximum demand in any given, say, quarter hour in a billing period has traditionally been used as a means to recover capacity costs described above in (d), the idea being that the maximum usage of a customer in a billing period is a proxy for that customer's contribution to the need to invest in capacity to cover peak demand.

#### 6) Other Charges

**Low Power Factor Penalties** Certain types of loads and generators consume (or produce) reactive power in addition to real power. The relationship between real and reactive power is called "power factor." The network operators must compensate for power factors outside a normal range in order to keep voltage within safe limits. The DSO and PES currently charge or penalize larger customers with a low power factor.

### III. TARIFF RATIONALIZATION

Tariff rationalization is also known as "cost reflective tariff" and it means that tariff should be set in such a manner that it reflects the true cost of supply. It is one of the key features of reforms and restructuring. The extent of tariff rationalization carried out at the retail level has been captured in terms of calculating average realization for each consumer category as a % of average cost of supply while also capturing consumer category-wise tariff levels vis-à-vis average cost of supply in absolute terms.

One of the key objectives of setting up the SERCs is rationalization of tariffs. This is a critical Activity, as the tariff structure is marked by high levels of cross subsidies and no. of consumer Categories/ slabs. The Act and the NTP issued there under thrust upon reducing the subsidy with Tariff progressively reflecting the cost of supply of electricity. The NTP mandates the SERC to notify roadmap within six months with a target that latest by the end of year 2010-11 tariffs are within  $\pm 20\%$  of the average cost of supply. Most of the SERCs have taken initiatives for reducing the cross subsidy and rationalizing the no. of consumer categories/ slabs while also creating new consumer categories, as and when required. However, a clear roadmap with milestones to bring down the cross subsidy levels to within  $\pm 20\%$  of the average cost of supply has not been notified by any SERC.

Methods to achieve Tariff rationalization

- Two part tariff

- Time of day tariff
- Reliability charges

#### A. Tariff Rationalization of Andhra Pradesh

In the background of the deteriorating situation on the power front and the new initiatives by the Government of India to attract private investment, the then State Government of Andhra Pradesh contemplated to restructure the power sector. Reforms in power sector were brought about in multiple steps. The Government of Andhra Pradesh (GoAP) approached the World Bank for a structural adjustment loan to tide over the fiscal crisis. Bank suggested comprehensive reforms in the power sector going beyond the recommendations of the Hiten Bhayya Committee.

Some important components of the reforms proposed by the World Bank are:

- Corporatizing the power utilities and ensuring that they operate without Governments' interference,
- Increasing the tariff rate to agriculture to at least 50 paise/kWh in the near term and continuing to adjust tariffs to cover costs and reduce cross subsidies,
- Defining a structure for the sector consistent with privatization of distribution and private sector development in generation.

#### B. Tariff Rationalization of Gujarat

In view of the above, Government of Gujrat decided to reform the power sector in the state with a two-fold objective:

- Addressing the concerns of the investors
- Creating a business environment conducive to improving the sector's operational efficiency, financial viability, and service to consumers GoG proposed to achieve its above mentioned objectives through a number of reforms.

Some of the important measures which GoG decided to take in order to achieve the targets were:

- Greater competition at all levels of the sector wherever practicable
- Corporatization and commercialization of existing sector entities
- Private sector participation in the generation and distribution segments
- Tariffs enabling cost recovery as well as reasonable profits
- An independent regulator
- Transparent, reasonable, direct, and quantified subsidies to vulnerable sections of consumers.

First step towards reform was creation of the Gujarat Electricity Regulatory Commission on 12th November, 1998 under provisions of Electricity Regulatory Commissions Act, 1998. The vertically integrated GEB was unbundled into seven companies one each for generation and transmission, four distribution companies (Discoms) and a holding company known as Gujarat Urja Vikas Nigam Limited (GUVNL). The generation, transmission and

#### C. Tariff Rationalization of Punjab

The GOP set out to carry on the power sector reforms and formed the Punjab State Electricity Regulatory Commission (PSERC) in March 1999 under section 17 of the Electricity

Regulatory Commissions Act, 1998 with the objective of rationalization of electricity tariff, advising in matters relating to electricity generation, transmission and distribution in the State. Thereafter the Electricity Act, 2003 was enacted under which the state electricity boards were supposed to bring about massive restructuring of the power sector in order to make them economically viable entities in all the states, as the state electricity boards continued to be in huge losses and were the cause of fiscal deficits in almost all the states. It sought 13 extensions from the Union government on one pretext or the other. Thereafter in April 2010, the Punjab Cabinet decided to corporatise PSEB by creating two separate companies - Punjab State Transmission Corporation Limited (TRANSCO) to look after the transmission and Punjab State Power Corporation Ltd. (POWERCOM) to manage generation and distribution of power in the State.

Category	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	68.64	65.46	59.97	64.10	60.51
Commercial	160.71	148.04	132.62	135.29	127.87
Agricultural	4.39	3.95	3.74	6.80	10.96
Industrial	146.18	146.09	135.31	141.69	125.53

Table 1: Tariff realization as % category wise of cost of supply

Category	2007-08	2008-09	2009-10
Domestic	2587.526	2804.873	3456.254
Commercial	1604.429	2236.752	2553.502
Agricultural	124.5387	142.9523	172.4119
Industrial	5622.942	6550.058	7321.504
Total	9939.436	11734.64	13503.67

Table 2: Revenue (in Crs)

Particulars	2005-06	2006-07	2007-08	2008-09	2009-10	Total
Revenue (Crs)	1199	1362	1661	2280	2421	8925
Expenditure (Crs)	1181	1371	1655	2265	2417	8891
Profit/Loss (Crs)	184	-90	57	152	35	336

Table 3: Profit and loss statement (with Subsidy)18

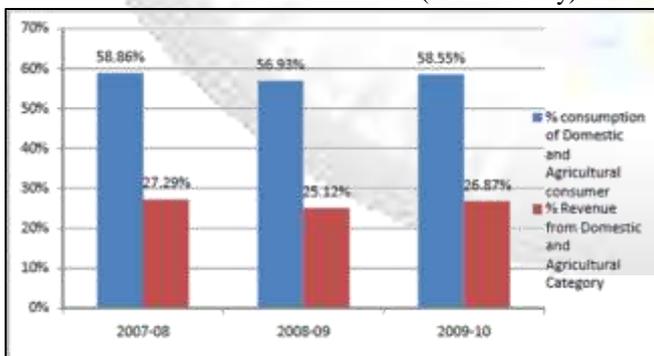


Fig. 1: Consumption and revenue of domestic and agricultural

Category	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	77.94	81.73	84.82	87.52	87.23
Commercial	124.54	121.47	127.51	132.75	133.91

Agricultural	30.51	42.54	40.10	41.47	41.19
Industrial	116.92	115.83	123.98	123.98	124.42

Table 4: Tariff realization as % of cost of supply

Category	2007-08	2008-09	2009-10
Domestic	2309.49	2963.482	3121.524
Commercial	1724.19	2014.117	2205.28
Agricultural	1308.564	2316.755	2266.554
Industrial	9269.054	11234.26	11897.5
Total	14611.3	18528.62	19490.85

Table 5: Revenue (in Crs)

Particulars	2005-06	2006-07	2007-08	2008-09	2009-10	Total
Revenue	1021	1223	1364	1669	1756	7035
Expenditure	8	7	8	1	4	8
Profit/Loss	1016	1214	1360	1665	1746	7004
	1	6	9	9	9	4
	57	91	39	32	95	314

Table 6: Profit and Loss statement (after subsidy) (in Rs crs)

23

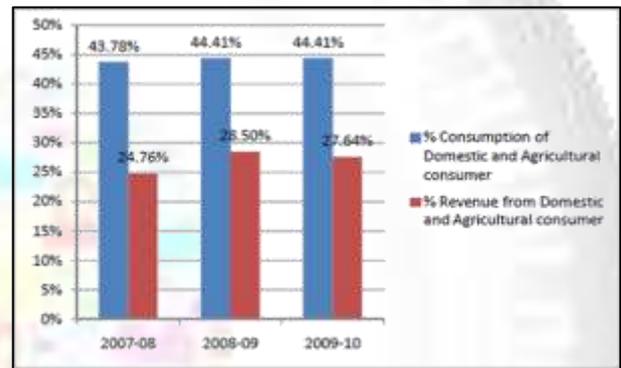


Fig. 2: Consumption and revenue of domestic and agricultural

Category	2007-08	2008-09	2009-10	2010-11	2011-12
Domestic	72.93	72.06	72.01	74.67	81.13
Commercial	123.91	123.38	120.97	117.36	111.63
Agricultural	-0.52	0.00	0.00	15.30	68.83
Industrial	105.83	106.03	105.56	100.81	97.80

Table 7: Tariff realization as % average of cost of supply

Category	2007-08	2008-09	2009-10
Domestic	1592.661	1695.9527	2031.928
Commercial	788.63923	852.61734	990.93898
Agricultural	18.037908	0	0
Industrial	3844.004	4032.7216	4520.449
Total	6243.3426	6581.2917	7543.316

Table 8: Revenue (in Crs)

Particulars	2005-06	2006-07	2007-08	2008-09	2009-10	Total
Revenue	8335	8709	1108	1191	1221	5225
Expenditure	3	5	0	2		
Profit/Loss	8247	1035	1258	1284	1336	5739
	4	4	9	1	4	
	88	-	-	-934	-	-
	1645	1501		1151	5142	

Table 9: Profit and Loss statement (after subsidy) (in Rs Crs)

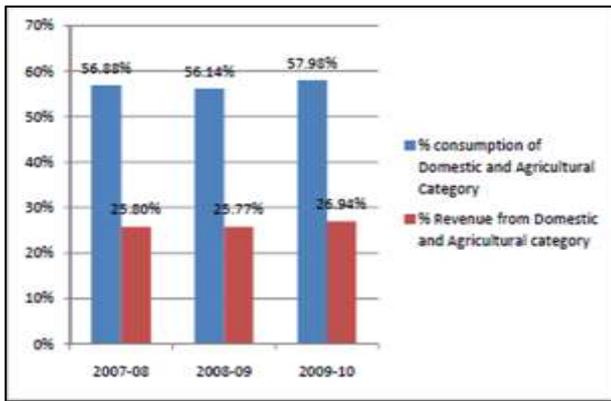


Fig. 3: Consumption and revenue of domestic and agricultural

State	Category	2007-08	2008-09	2009-10	2010-11	2011-12
Gujarat	Domestic	77.94	81.73	84.82	87.52	87.23
	Commercial	124.54	121.47	127.51	132.75	133.91
	Agricultural	30.51	42.54	40.10	41.47	41.19
	Industrial	116.92	115.83	119.55	123.98	124.42
A.P	Domestic	68.64	65.46	59.97	64.10	60.51
	Commercial	160.71	148.04	132.62	135.29	127.87
	Agricultural	4.39	3.95	3.74	6.80	10.96
	Industrial	146.18	146.09	135.31	141.69	125.53
Punjab	Domestic	72.93	72.06	72.01	74.67	81.13
	Commercial	123.91	123.38	120.97	117.36	111.63
	Agricultural	0.52	0.00	0.00	15.30	68.83
	Industrial	105.83	106.03	105.56	100.81	97.80

Table 10: Tariff realization as % of cost of supply for entire state under consideration

#### IV. CONCLUSION OF TARIFF REALIZATION:

Reform process was started long back in year 1991 with the aim to take care of the deteriorating health of the SEBs. This was followed by restructuring of SEBs which started in year 1995, when Orissa SEB was unbundled into separate generation, transmission and distribution. Then came Electricity act 2003 which mandated minimal reform i.e Transmission should be unbundled from SEB as is done by Punjab and Tamil Nadu. Apart from this the act also says commission while specifying the terms and conditions for the determination of tariff shall be guided by that the tariff progressively reflects the cost of supply of electricity and also, reduces cross-subsidies in the manner specified by the Appropriate Commission. This is also known as cost reflective tariff or tariff rationalization. National Tariff policy which came up in 2006 mentioned that the SERC would notify roadmap within six months with a target that latest by the end of year 2010-2011 tariffs are within  $\pm 20\%$  of the average cost of supply for achieving the objective that

the tariff progressively reflects the cost of supply of electricity. Higher tariff and lower tariff which is not at all reflection of cost affects the socio-economic development of the country. Cross subsidy leads to inefficient and unproductive use of scarce electricity and sends a wrong signal to consumers who pay less. It also undermines the operation of the utility in the long run as because the cross-subsidizing category leave the utility's system and switch to self-generation. For the development of the competitive power market Tariff Rationalization is very important.

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