



DELHI ELECTRICITY REGULATORY COMMISSION

APPROACH PAPER ON

TARIFF RATIONALISATION

OBJECTIVE

The objective of this Approach Paper is to examine the existing Regulatory framework in Electricity Retail Tariff and develop a strategy for creating Competition in this market within the present legal frame work of the Electricity Act, 2003.

The Electricity Act enacted in 2003, aims to reform electricity sector to bring in participation of private sector and to encourage competition. While as a first step, policy for procurement of power through competitive bidding was introduced way back in 2006. To further this aim for the distribution sector, Electricity (Amendment) Bill, 2014, was introduced in Lok Sabha vide Press Release of MoP dated 19/12/2014, which has proposed the amendment for Separation of Carriage & Content in the Distribution sector to facilitate consumers to choose his supplier, besides Tariff Rationalization .

In the above back drop, this Approach paper has been divided into following six segments for better understanding of the existing regulatory framework and identify the areas needing attention:

- A Roles and Responsibilities of Regulatory Commissions,
- B Present Structure of Electricity Tariff,
- C International Practices in Electricity Tariff,
- D Issues & Challenges, and,
- E Way forward.

A ROLES AND RESPONSIBILITIES OF REGULATORY COMMISSIONS

The Central Electricity Regulatory Commission was established under section 3 of the Electricity Regulatory Commissions Act, 1998 and State Electricity Regulatory Commissions were established by the respective State Governments under section 17 of the Electricity Regulatory Commissions Act, 1998.

Subsequently, an Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidental thereto was enacted by Parliament, hereinafter referred to as Electricity Act 2003 or Electricity Act.

It is imperative to discuss the key provisions regarding Powers, Functions, role and responsibilities of the State Regulatory Commissions under the Electricity Act which will be

handy to create conducive environment for the promotion of competition specially in the Distribution Sector.

- Section 86 of the Electricity Act describes one of the major functions of State Commissions is promotion of competition, efficiency and economy in activities of the electricity industry.
- Section 181 of the Electricity Act empowers the State Commissions that it may by notification, make regulations consistent with this Act and the rules generally to carry out the provisions of this Act.
- Section 30 of the Electricity Act enumerates that the State Commission shall facilitate and promote transmission, wheeling and inter-connection arrangements within its territorial jurisdiction for the transmission and supply of electricity by economical and efficient utilization of the electricity.
- Section 42 (2) of the Electricity Act allows the State Commission to introduce competition in the form of open access in such phases and subject to such conditions, (including the cross subsidies and other operational constraints) as may be specified within one year and such surcharge and cross subsidies shall be progressively reduced and eliminated.
- Section 61 of the Electricity Act recommends the factors which would encourage competition, efficiency, economical use of the resources, good performance and optimum investments shall be considered by the appropriate Commission for specifying the terms and conditions for the determination of tariff.
- Section 62 of the Electricity Act advocates the competition in retail tariff and provides that in case of distribution of electricity in the same area by two or more distribution licensees, the appropriate Commission may, for promoting competition among distribution licensees, fix only maximum ceiling of tariff for retail sale of electricity.

B PRESENT STRUCTURE OF ELECTRICITY TARIFF

Presently tariff is determined by the appropriate Commissions in India based on the Annual Revenue Requirement (ARR) of Generation, Transmission and Distribution companies. General Cost and Tariff component of Generation, Transmission and Distribution companies has been analyzed as follows:

GENERATION TARIFF

Tariff of Generation companies are either determined by the appropriate Commission under Section 62 of the Act based on the nature of cost or adopted by the Commission based on levelized tariff discovered through competitive bidding process under Section 63 of the Act.

Generation Tariff can be generally divided into two parts based on the nature of cost:

- i. Fixed Cost: Return on Equity, Interest on Loan, Depreciation, Operation & Maintenance

Charges, Interest on Working Capital etc.

ii. **Variable Cost:** Fuel Cost

The tariff for Generation Companies is determined /adopted in two part, consisting of Fixed Charge (recovery for Fixed Cost) and Variable Charge (recovery for Variable Cost). Fixed charges and operational parameters of a generating station is approved by the appropriate commission for a Control Period and energy charge is based on the actual price of the fuel prevailing during the period of bill on monthly basis for projects under Section 62 of the Act whereas the billing for the projects which have been adopted under section 63 is also in two parts based on the capacity charge, escalation factor etc. based on which levelized tariff is discovered.

TRANSMISSION TARIFF

ARR of Transmission Licensees has all the components in fixed nature, therefore tariff of Transmission Licensees are determined in single part only.

DISTRIBUTION TARIFF

ARR of Distribution Licensees has two types of cost component based on their nature:

- i. **Fixed Cost:** Fixed charges of Generating stations, Transmission charges, Return on Equity, Interest on Loan, Depreciation, Operation & Maintenance Charges etc.
- ii. **Variable Cost:** Fuel Cost of Generating stations

Accordingly, the tariff for Distribution Licensees is also determined in two parts, comprising of Fixed Charge and Energy Charge.

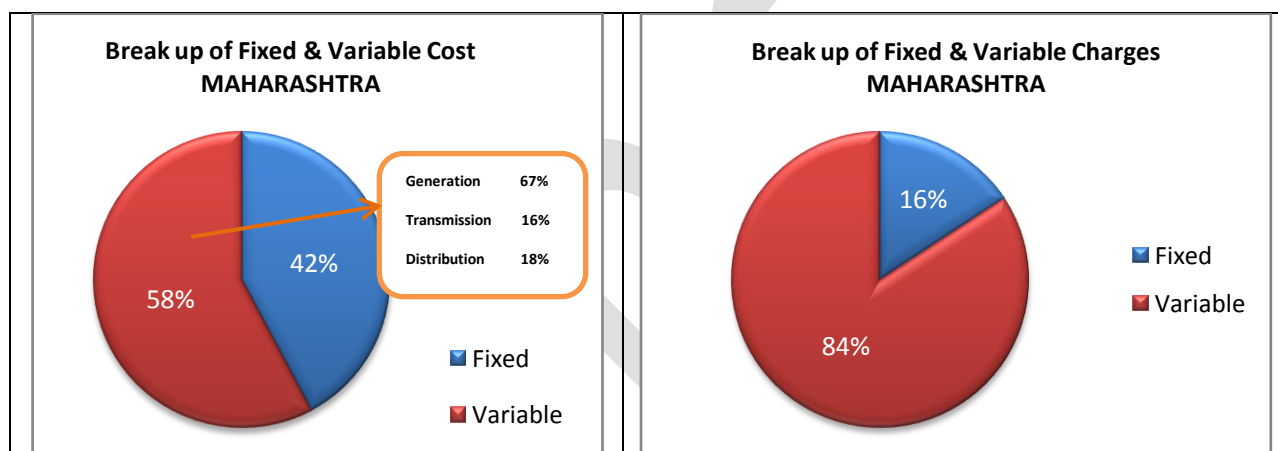
Ideally the fixed cost should be recovered through fixed charges and variable cost should be recovered through energy charges of the tariff respectively. However, the present retail tariff applicable in most of the states in India includes only a part of the fixed cost into recovery as fixed charges, whereas major portion of the fixed cost is recovered through energy charge component of the retail tariff.

This kind of tariff structure leads to mismatch in the cash flow of the utilities as the Distribution Licensee have obligations to pay fixed monthly charges to GENCOs & TRANSCO's irrespective of the quantum of power procured besides their own fixed cost liabilities.

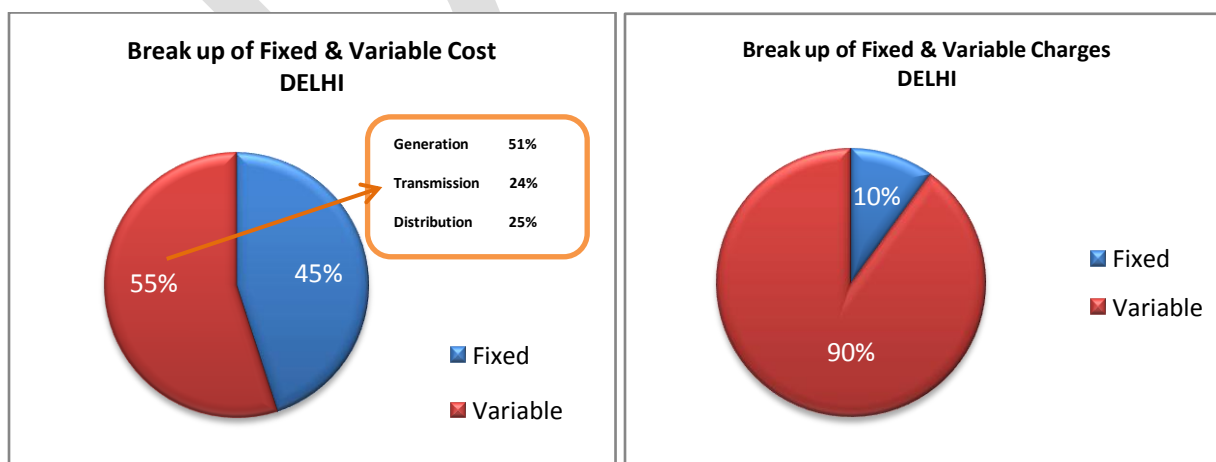
As the major part of fixed cost is recovered through energy charges and the monthly collection on account of energy charge is dependent on sales, which varies by more than 50% due to seasonal/weather conditions i.e., sales is maximum in Summer season & minimum in Winter season, therefore there is always a mismatch between the real fixed cost liability v/s the

amount collected thereof through tariff.

Ministry of Power constituted two committees for simplification of tariff categories of consumers and rationalization of tariff structure and Price Waterhouse Coopers (PwC) has been appointed as a consultant to assist for the assignment. During the combined meeting of the committees at Ministry of Power on 8th December, 2016, PwC had presented an analysis on the present cost and revenue component of the distribution licensees prevalent in the state of Maharashtra. It is observed from the ARR that total fixed cost in the ARR is 45% to 55% against revenue from fixed charges of 10% to 15% whereas variable cost component in ARR is 45% to 55% against revenue from variable charges of 80% to 85%.



Taking a cue from the above study, the Commission has analyzed the present cost and revenue component of the distribution licensees prevalent in the state of Delhi and it is observed from the ARR that total fixed cost in the ARR is 45% to 55% against revenue from fixed charges of 8% to 10% only. Whereas variable cost component in ARR is 45% to 55% against revenue from variable charges of 90% to 92%.



It is pertinent to state that major reason of variation in cost breakup of Delhi and Maharashtra is due to reasons like Majority of power required is generated within the state of Maharashtra

whereas in Delhi Majority of power required is procured from outside Delhi.

C INTERNATIONAL PRACTICES IN ELECTRICITY TARIFF

The Commission has also looked into the Tariff structures prevailing in the other countries, which have been summarized in three groups of countries as described in the succeeding discussion.

EUROPEAN UNION (EU)

In each EU country the tariff structure is defined by the national regulator or Distribution System Operator (DSO) according to certain customer segmentation. In most cases the segments are defined by voltage level, while in some countries tariffs are defined in terms of consumers' class ('household', 'industrial', etc.).

The main variables considered in the definition of tariff structures are:

- Voltage level. Tariff levels are defined for specific voltage ranges at the point of connection to the distribution grid. Usually there are three levels: High Voltage (higher than 36 kV), Medium Voltage (between 1-36 kV) and Low Voltage (less than 1 kV). In some countries the distribution networks only operate Medium Voltage and Low Voltage networks.
- Contractual capacity/power. Tariff levels are defined for ranges of contractual power according to users demand profile.
- Consumer group. Users are segmented according to their characteristics. Customer categories are often differentiated by the type of user (Small house, Household, Farm, Business Customers, Small Industrial, Public lighting systems, Public recharging of electric vehicles, etc.)
- Metering system. Tariff levels are designed according to the capabilities of metering devices to obtain data (Smart metering: Time of use consumption, Peak demand power, etc.)
- Annual consumption. Tariff levels are sorted out according to different intervals or bands of annual consumption (kWh/year).
- Geographic zone. In some countries the geographic zone is one of the variables used to define tariff levels.

The most common components in Electricity networks are:

- Fixed component: In some countries it is known as standing charge or service charge by connection point/costumer. (€/day, €/month, €/year).
- Capacity component: component to charge the users for the availability to use a maximum power. Usually for the household user the maximum power is controlled through a circuit breaker. For the industrial user the maximum power is controlled and metered through

peak demand meters (maxi-meters). In most countries, the user will face considerable charges, if they exceed this maximum contractual capacity (€/kW).

- Active Energy component: charge for the actual usage of energy. It is the volumetric component of the tariff. In some countries it is known as commodity or variable charge (€/kWh).
- Reactive energy/power component: charge for reactive energy (€/ VArh).
- Loss energy component: it is a per energy component used to charge the technical distribution network losses. In most of the countries the losses are included in the active energy component.

Major components of Retail Tariff for Household & Industrial consumers applicable in various EU's countries:

Country	Fixed Charge		Capacity charge		Energy charge		Energy reactive		Other	
	HH	Ind	HH	Ind	HH	Ind	HH	Ind	HH	Ind
Great Britain	YES	YES	NO	YES	YES	YES	NO	YES	NO	YES
France	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO
Germany	YES	NO	NO	YES	YES	YES	NO	YES	NO	NO

HH – Household

Ind- Industrial

SINGAPORE

The Distribution Tariff is split into following charges:

- Energy Cost (~70.1%) → Market dependent
- Network Charges (27.7%)
- Market Support Services (MSS) Fee (1.9%)
- Market Administration & Power System Operator (PSO) Fee (0.3%)

There are two types of consumers → Contestable (Commercial & Industrial above 2 MW) and Non-Contestable.

- Non-Contestable pay Regulated Tariff approved by Energy Market Authority (EMA) which is bundled Tariff.
- Contestable Tariff has various power pricing plans like Flat tariff, Time of use Tariff, Tariff Indexed Pricing, Fuel Indexed Pricing and Hybrid Pricing.

CALIFORNIA

Tariff Determination: The investor-owned utilities periodically submit an Application to the California Public Utility Commission (CPUC) requesting to collect a certain amount of revenue

from its customers. This amount of revenue is intended to cover the utility's costs plus a pre-approved rate of return, established in the Cost of Capital proceeding. The CPUC reviews this request and approves or modifies the amounts requested. Type of Tariff applicable is as follows:

Volumetric-only rates→ A volumetric-only rate charges a ¢/kWh rate for electricity consumed. Most residential and small commercial rates are volumetric only. There are two types of volumetric-only rates, tiered and time-of use.

A tiered rate has different prices for different amounts of usage. As usage increases over the billing period, customers pass from the lower priced block of usage to the higher priced blocks. The lowest price block of usage is called baseline.

A time of use rate has different prices for when energy is used. Electricity consumed at peak times is charged at a higher price than electricity used at off-peak times. These times are stated within the tariff.

Demand rates→ A demand rate charges customers a \$/kW for their demand as well as a ¢/kWh rate for electricity consumed. Demand charges are common for commercial, industrial and agricultural rates. Demand charges can be either coincident or non-coincident. Coincident charges are different amounts based on when the highest amount of energy is demanded. Peak times have the highest charges while off-peak have the lowest. Non-coincident charges are based on a customer's highest demand, regardless of when it occurs.

D ISSUES & CHALLENGES

With this backdrop of present tariff structure & nature of cost prevailing in India and tariff components applicable in other countries, it is observed that although some of the Regulatory Commissions have promoted limited competition in retail tariff for bulk consumers having sanctioned load above 1MW through notification of Regulations and facilitated the consumers to opt for Open Access in most of the States in India under the aforementioned Section 42 of the Electricity Act, however there is a need for rationalizing the tariff structure and broaden the scope of competition to a larger segment of consumer base.

It is pertinent to state that Ministry of Power has also invited comments on "*Consultation Paper on Issues Pertaining to Open Access*" vide its letter dated 24th August, 2017 and highlighted the issues and challenges under present framework of Open Access.

There are primarily five issues that impact a fair play between consumers and utilities under Open Access mechanism resulting into hindrances for creating a conducive environment to promote competition as follows:

a. FREQUENT SHIFTING OF OPEN ACCESS CONSUMERS:

DISCOMs are unable to manage power procurement efficiently due to frequent shifting of Open Access consumers between DISCOM and other source of power. Particularly for short term open access consumers who procure energy from collective market or power exchanges, there is high degree of uncertainty in their power procurement from Power Exchange and DISCOMs. Considerable variation in schedule and actual energy drawl is observed on regular basis for short term open access consumers. Also, based on the market clearing price determined in exchanges for each block, the energy drawl of open access consumer fluctuates significantly within a day. Despite of such uneven drawl throughout the day, the Open Access consumers continue to enjoy the freedom of rescheduling their energy drawl on the basis of their daily load requirement and the price at which energy is available in the power exchange markets. Such variation in energy drawl makes it difficult for the DISCOM to forecast time block wise energy requirement for the following day. Therefore, DISCOMs incur heavy penalties for deviation from their schedule in the form of applicable DSM charges.

Some of the initiatives that State Electricity Regulatory Commissions have endeavoured to address this issue are as follows:

- Mandatory to schedule power from open access for the entire duration of 24 hours in a day,
- Maintain uniform energy drawl for at least a period of continuous 8 hours,
- Restriction on variation in drawl to maximum of 25% of maximum schedule, penalizing variation in drawl, etc.
- Quantum of drawl from DISCOM during any time of the day should not exceed the drawl of electricity from the DISCOM in such time block wherein Open Access drawl is the maximum.
- The quantum of drawl of electricity by an open access consumer from the distribution licensee during any time block of a day should not exceed the “Admissible Drawl of Electricity by Open Access Consumer” which is the difference of contract demand and maximum quantum of open access for which approval has been granted by Nodal Agency.
- Temporary Charges on any drawl above the sum total of “Scheduled Open Access quantum” and “Admissible Drawl of Electricity by Open Access Consumer”

b. CROSS SUBSIDY SURCHARGE:

The Cross Subsidy Surcharge (CSS) recovered from Open Access consumers is normally insufficient to recover the entire loss of cross subsidy on account of consumers procuring

power through the Open Access route. Some SERCs use Average Cost of Supply (ACoS) for calculation of CSS instead of category wise Cost of Supply (CoS). For high voltage consumers like Industrial & Commercial consumers, where CoS is less than ACoS, using ACoS would result in lower CSS.

The Tariff Policy 2016 mandates SERCs to determine roadmap for reduction of cross subsidy and bring tariff at +/- 20% Average Cost of Supply, however, in case the consumer tariff is more than 120% of Average Cost of Supply, DISCOM will not be able to recover losses through cross subsidy surcharge in case consumer opts for open access.

c. ADDITIONAL SURCHARGE:

Under the sub section (4) of the Electricity Act 2003, DISCOMs have a universal supply obligation and are required to supply power as and when required by the consumers in its area of supply. Considering the sales forecast approved by the State Commission during Multi Year period, the DISCOM enter into long term Power Purchase Agreements (PPA) with sellers (generators/ traders etc.) so as to ensure supply of power for the envisaged increase in the load. Whenever any consumer opts for open access and takes intermittent supply through open access, the DISCOMs continue to pay fixed charges in lieu of its contracted capacity with generation stations.

However, DISCOMs are unable to sufficiently recover such fixed cost obligation from the open access consumers. The cost recovered from fixed charges in the tariff schedule is generally less than the fixed cost incurred by the DISCOM for supplying energy. This leads to the situation where the DISCOM is saddled with the stranded cost on account of its universal supply obligation. In such cases, fixed charges for such stranded assets should be borne by the customers as part of additional surcharge.

Additional surcharge to recover stranded cost on account of Long term Power Purchase Agreements (PPAs) and distribution assets due to consumers procuring power through Open Access have in most cases not been factored appropriately. Tariff Policy and regulations putting the onus on DISCOMs to conclusively demonstrate that the power purchase commitments have been and will continue to remain stranded primarily due to the consumers frequently switching their mode of supply between DISCOM and open access. It becomes difficult for the DISCOM to assess the quantum of power that will continue to remain stranded. Moreover, the quantum of stranded power does not remain constant throughout the year or a month or a week or even a day. This leads to under recovery of power procurement expenses from the Open Access consumers and over recovery of Fixed Cost through Tariff from other (Non-Open Access) embedded consumers of DISCOMs.

d. STAND-BY CHARGES:

Stand-by arrangements is required by Open Access consumers to tide over deficits in cases of

situations such as outages of generator, transmission system etc. In such situations the Open Access consumer has to take power from an alternate source e.g. DISCOM. The charges for maintaining standby arrangements for such consumers is not reflective of the costs incurred by DISCOMs for providing these support services.

Standby charges for long term open access consumers is as per contract signed with distribution licensees whereas standby charges for short term open access consumers are generally defined from time to time by the SERCs. In case of determination of stand by charges, it is not necessarily linked to the actual cost incurred by the DISCOMs to maintain capacity for standby power and may not be revisited in a periodic manner resulting in inefficient recovery of the costs incurred to maintain capacity for standby power.

e. TARIFF DESIGN AND RATIONALISATION:

The retail supply tariff is two-part tariff mechanism viz. Fixed Charge/Demand Charge and Energy Charge. Fixed Charge/Demand Charge is designed to recover the costs of the DISCOM which are fixed in nature such as the capacity charges payable to power generators, transmission charges, operation & maintenance expenses, depreciation, Interest on loans, return on equity etc. This is generally recovered on the basis of sanctioned load/connected load / contract demand or maximum demand of the consumer. Energy Charge is designed to recover the costs of the DISCOMs which are variable in nature such as variable cost component of power purchase etc. These costs are recoverable on the basis of the actual consumption of the consumers during the billing period (per kWh or per kVAh basis).

However as discussed above in *“the present scenario”* section, there is a mismatch between the actual Fixed and Variable Cost liability incurred by DISCOMs to the proportion of cost recoverable through Fixed Charge and Energy Charge.

Under the present Regulatory framework to promote competition through Open Access, if the tariff designed is not reflective of the proportion of fixed and variable cost liability of DISCOMs, there will be insufficient recovery of the fixed charges by the DISCOM. However, if demand/fixed charges are reflective of actual fixed cost liability of DISCOM, Open Access consumer may be less inclined to maintain contract demand with the DISCOM and for Open Access consumers maintaining part of their contract demand, tariff shall be reflective of the prudent incurred cost.

Further, some Open Access consumers maintain at least part of their contract demand with the DISCOM in order to save on the payment of standby charges. This practice tends to have an adverse impact on the DISCOM. However, in most of the states, fixed costs includes the cost of wheeling business of the DISCOMs, which will be recovered through fixed/demand charges. As all the DISCOMs are recovering wheeling charges from the Open Access consumers as a

separate charge, charging entire fixed cost including wheeling cost from Open Access consumers will lead to over recovery.

E WAY FORWARD

Based on the aforesaid discussion, the issues identified have to be tackled for creating a level playing field for the existing distribution licensees and the new incumbent players, who want to participate in retail supply of electricity. Following strategies may be adopted for introduction of competition in retail tariff keeping in view the present regulatory framework in distribution sector in Delhi:

1) CROSS SUBSIDY:

The bifurcation between Fixed charges and Energy charges should be adjusted gradually, say over a period of three to five years, so as to make the retail tariff reflective of the actual Fixed Cost, so as to minimize the Cross Subsidy between Fixed & Energy Charges. This will compensate the unrecovered portion of Fixed Charges' of retail tariff to avoid additional burden on the consumers of the existing distribution licensees.

2) CARRIAGE AND CONTENT BUSINESS:

The competition may be introduced in Retail Supply business only as the competition in wheeling business will create duplication of network resulting into stranded capacity and waste of national resource. The business of existing distribution licensee should be divided into Carriage and Content business. Total Distribution cost of existing distribution licensee should be split into Carriage & Content based on actual expenditure incurred by the Distribution Licensee in the form of Actual Fixed Cost & Actual Variable Cost, in line with the proposed amendment in Electricity (Amendment) Bill, 2014.

In the event of separation of Carriage and Content following steps will merit consideration :

- Liability on account of fixed charges of existing Long Term Power Purchase Agreements will have to be included in the ARR of the utility performing the wheeling function,
- Subsidized Consumers class (based on income, consumption, load etc.) for which Regulated Tariff shall be determined, will have to be Identified,
- Every consumer other than the Subsidized Consumers class, then can have the option to avail Open Access, with a minimum lock-in period to avoid frequent switching, as deemed appropriate,
- Ceiling Tariff may have to be determined in order to protect the consumer interest and avoid possibility of cartelization & supernormal profit due to entry barrier in electricity industry as it is high capital intensive sector and longer gestation period, and

- Identification of a licensee to perform Universal Service Obligation.

3) **UNIVERSAL SERVICE OBLIGATION (USO):**

In a landmark ruling, the Hon'ble Madras High Court has said electricity supply is a legal right and denial of power supply is a violation of human rights. The Hon'ble Justice Manikumar said *"Lack of electricity denies people equal opportunities in the matter of education and consequently suitable employment, health, sanitation and other socio-economic rights. Right to electricity of a person occupying government land is recognized in the distribution code and it is integral to the achievement of socio-economic rights."*

In view of the above ruling, every citizen has a right to get electricity and the international practices for providing the supply of electricity to the lower income group of consumers at affordable rates, cross subsidy among the different consumer category can't be eliminated. This would, however, call for identifying a retail supply licensee which may be amongst the existing distribution licensee, for the purpose of USO and ensure electricity at regulated rate to every consumer as mandated under the Act. To attain the objective of USO, a portion of cheaper source power plants may have to be allocated to the USO supplier as being followed in Singapore.

F REFERENCES

- 1) The Electricity Act, 2003
- 2) The Electricity (Amendment) Bill, 2014
- 3) California Public Utilities Commission - <http://www.cpuc.ca.gov>
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- 5) Study on Tariff Design for Distribution Systems commissioned by DG Energy to the consortium of AF-Mercados, REF-E and Indra dtd. 28/01/2015
- 6) Presentation of Price Waterhouse Coopers (PwC) on simplification of tariff categories of consumers and the committee on rationalization of tariff structure at Ministry of Power on 8th December, 2016.
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- 8) Ministry of Power, Gol "*Consultation Paper On Issues Pertaining To Open Access*" dtd. 24/08/2017