Power Trading

CMA Mukeshkumar Kaka
Contact : 987954181 • E-mail : kakasanket@yahoo.com

Background: Trading activity in electricity is recognized as a distinct activity under Electricity Act 2003. The concept of power trading though well established now has been ever evolving and taking forms and shapes from time to time. Trading of power was earlier started with conventional bilateral trading and banking arrangements but it has now evolved with new methods and practices. In the Indian scenario, 90% of base load power requirement is satisfied through Long term Power Purchase Agreements while balancing short term requirement is mitigated through exchange of power between surplus entities and deficit entities via bilateral arrangements, banking, Traders, UI/ DSM occurrence and even through Power Exchanges.

Gujarat State Utility, Gujarat Urja Vikas Nigam Ltd. (GUVNL) (erstwhile GEB) started power trading long back before enactment of Electricity Act 2003 when trading was a fledgling concept. GUVNL has traded power utilizing the different formats from time to time like exchange of power in Unscheduled Interchange mechanism (UI) and banking arrangements, sale / purchase of power through traders and bilateral arrangements with other states and even through Power Exchanges.

Evolution of Power Trading: Bulk electric power supply in India is mainly tied in long-term contracts. The bulk suppliers are mostly the Central or State Owned Generating Stations, IPPs, etc. Previously the bulk buyers were generally the SEBs, which post-unbundling are the Distribution Companies (DISCOMs). The power allocations from various generating stations are being assigned to DISCOMs and the Appropriate Commission regulates the price of bulk supply of a Generating Station to DISCOMs. Thus, most of the existing bulk supply is locked up in Long Term Contracts having station-wise tariff, usually in two - parts viz. fixed charge (capacity charge) and variable charge (energy charge).

The SEBs / DISCOMs who have the obligation to provide electricity to their consumers mainly rely on supplies from these long-term contracts. However, it is neither feasible nor economical to meet short term, seasonal or peaking demand through long-term contracts which makes Power Trading essential to cater the short term demand at an optimum cost. Similarly, power trading is essential for DISCOMs for selling short-term surpluses in order to optimize the cost of procurement. The CPPS participate in trading in order to optimize their operating cost and in the process, supply electricity to the grid.

Market Development: Conventionally, trading among SEBs / DISCOMs was on Bilateral basis where the price was settled on mutual negotiations. In the legal framework before enactment of the new Electricity Act, the development of power market was highly constrained as the industry structure was horizontally and vertically integrated. With the enactment of Electricity Act, 2003 that came into force from 10th June, 2003, the earlier Indian Electricity Act, 1910; Electricity (Supply) Act, 1948; and Electricity Regulatory Commissions Act, 1998 got repealed. After the enactment of Electricity Act in 2003, the concept of Power Trading was actually introduced. Since generation and consumption of power is not evenly distributed in India, the concept of Power trading enables surplus generation of power from one Region to flow to another Region which is deficit in power or flow of power within the same Region.

The Electricity Act 2003 brought qualitative transformation of the electricity sector through a new paradigm by consolidating 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.

Trading Licensees: Traditionally, a trading licensee has been viewed as seller of electricity who fulfills the needs of the distribution companies (DISCOMs) by arranging electricity supply at the DISCOMs' desired delivery point. Trading licensee can provide customized contracts according to the requirements of the buyers / sellers. Pertinently, a trading licensee acts as risk absorber between Generators and DISCOMs ensuring that Generators are paid on time by bringing in their finances in case there is a delay in payment by a buyer. It absorbs both liquidity risks as well as credit risk of the DISCOM and insulates the Generator from the financial condition of a DISCOM.

Trading in electricity has been a licensed activity since the year 2003. Central Electricity Regulatory Commission (CERC) constituted by the Electricity Act 2003 ensures that "electricity" is given the widest scope and is interpreted to extend to all ancillary or subsidiary matters which can fairly and reasonably be comprehended in it. Regulatory Commissions as expert bodies have been created under the Act and empowered to govern all matters related to Power Sector.

Electricity Traders have played critical role in transferring electricity from surplus regions to deficit regions in the country through "Intra-State trading" i.e. purchase of electricity for re-sale within the territory of the same State and "Inter-State trading" i.e. purchase of electricity from one State for re-sale in another State, including electricity imported from any other country for re-sale within India or exported to any other country subject to compliance with applicable laws and clearance by appropriate authorities. There are 43 Trading Licensees that are actively undertaking trading activity and the top 5 trading licensees viz. PTC India Ltd., Mittal Processors (P) Ltd., Manikaran

Power Ltd., Tata Power Trading Company (P) Ltd., and JSW Power Trading Company Ltd are having the market share of approximately 78 - 80% in the total volume traded in short term transactions of electricity. The "short-term transactions of electricity" refers to the contracts of less than one year period, for electricity transacted (inter-State and intra-State) through inter-State Trading Licensees and directly by the Distribution Licensees, Power Exchanges (Indian Energy Exchange Ltd (IEX) and Power Exchange India Ltd (PXIL)), and Deviation Settlement Mechanism (DSM) earlier known as Unscheduled Interchange (UI) Settlement.

Post unbundling; GUVNL has been entrusted with one of the vital functions of power supply management in addition to supervision and co-ordination of the activities of the subsidiary companies. As part of the power supply management, GUVNL has been trading power as a deemed Licensee.

Power Exchanges: Power Exchanges have commenced operations since 2008 with a broad view to develop a market where power sector participants can efficiently buy and sell power that is not tied up in long term PPAs and for catering short term balancing needs which arise from time to time in the power sector. Power Exchanges are simply financial entities, allowing buyers and sellers to trade transparently at a common price. Power Exchanges have been playing twin role of helping in price discovery of electricity in the spot market mainly, Day Ahead market and price dissemination electronically in the country. Power Exchanges have created a comprehensive market structure and enabling the transaction, execution and contracting all types of possible products in the electricity markets. Power Exchanges are discovering the market prices which are market driven and determined through push and pull of demand and supply rather than conventional mechanism of arriving at the prices on cost plus basis. This type of institution has opened up a new vista and today there is a propensity of 10% trade in Power Market, apart from the existing 90% under Long Term PPA. The creation of a common platform for trading has helped in streamlining the trading process, standardization of electricity as a tradable product, provide a payment security mechanism through a Clearing House and increase business confidence in the power sector.

Power Exchanges have ushered into short term power market with new dynamism offering regaling features like anonymous bidding, electronic platform, and transparency, minimum bid size of 1 MW etc, standardized power trading contracts, with fair, efficient and robust price discovery mechanism through electronic algorithms.

Central Regulator - CERC has permitted trading of Electricity through Power Exchange with effect from June 2008. Presently, there are two Power Exchanges (PXs) currently functional in India (1) Indian Energy Exchange

(2) Power Exchange India Ltd which facilitate an automated on-line platform for physical day-ahead contracts. IEX India Ltd is a company promoted by Multi Commodity Exchange of India Ltd (MCX) while PXIL is a company promoted by National Stock Exchange of India Ltd (NSE India Ltd) and National Commodity and Derivatives Exchange Ltd (NCDEX). While IEX is benefited with the first mover advantage and is having a strong hold in the Short Term Power Market, PXIL is competing with IEX and making efforts to become financially sustainable to consolidate its operations and earn profits. However, the market participants including GUVNL are participating on both Platforms so as to promote competition and prevent monopolistic situation of single Exchange.

In the PXs the entities like Inter-State Generating Stations (ISGSs), Distribution Licenses, Independent Power Producers (IPPs), Captive Power Producers (CPPs), Open Access Customers, Electricity traders, State Generating Stations, can participate by becoming a Member. The Selling entities are Merchant Power Plants, Captive Generators, Independent Power Producers and Distribution Companies having surplus power whereas buying entities are Open Access Consumers (mainly Industrial Consumers) and State

/ Private distribution companies. GUVNL has experienced conduciveness of Day Ahead Market in particular in taking position of buy / sale for next day. Platform of Power exchange has tamed domineering buyers / sellers exploiting market hitherto under bilateral arrangements by providing day-to-day discovered reference prices for taking informed price decisions.

Bidding in the Power Exchanges (PXs) are anonymous and closed bid auction unlike the case of BSE and NSE wherein the bidder can view the quantum as well as the price for consummating transaction. The Power Exchange Bidding Mechanism is double sided closed bid auction on a Day Ahead basis. The Market Clearing Price (MCP) and Market Clearing Volume (MCV) are discovered by Power Exchanges separately for each 15-minute time block in a day which is dependent upon the number of participants (Bids) along with the volume bided by them. At the end of bidding session for day ahead power, MCPs and MCVs are determined by running Iteration Algorithm which shall apply to the all market participants across the board. The delivery / drawl of power is at the Regional Periphery. The Market Clearing Price of the PXs is purely dependent on the eccentricities of participation from both buyers and Sellers side. In India, Power Exchange is shallow and ill-liquid, due to want of healthy participation from both sides. It is pertinent to mention that PXs in India have observed that sometimes there are participations of only sellers with very less buyers and on the other times there are participations from only buyers with very few sellers. Resultantly, the quantum clearances and price discovery are hugely affected and erratic. Buyers are not getting their targeted required quantum clearance as bidded by them (for e.g. Buy bid of 100 MW Round the clock (RTC) gets cleared like 70 MW for block period 00-08 hrs, then 08-12 hrs Nil, then 62 MW for 12-15 hrs, 15-18 hrs again Nil, 18-23 hrs again Nil and then for 23-24 hrs 100 MW). Further, MCPs are reflection of magnitude of participation from buyers and seller side. On a particular day, if sellers are in majority, MCPs are tilted on lower side while when buyers are in majority, MCPs are shooting up. At present, there is no healthy match of push and pull from demand and supply as ideally desirable for a mature market.

It is relevant to point out that PXs have even discovered Market Clearing Prices (MCPs) as low as 17 paise / unit and as high as Rs. 14 / unit. During the year 2009, Hon'ble CERC has temporarily imposed price cap of Rs. 8 / unit on power trading to cool off the hyper pricing. At present there is no such price cap. Presently, the price of power on Power

Exchanges is depressing since the capacity addition is continuously outstripping the demand.

The Country as a whole is facing peaking power shortage in addition to overall energy shortage. The Power Market in India is not a matured market. Matured Markets are generally power surplus markets where capacities are set aside for Power Exchanges and buyers source certain percentage of their demand from the Exchanges. Unlike Indian Market, the Overseas Matured Markets do not suffer from Systematic Issues faced by Indian Power Market. In fact Exchanges despite being 7 years old are still peripheral players and are functioning as more of a balancing market rather than growing into a market serving base load capacities. Further the problems like erratic participation, unidirectional bids, low liquidity and the characteristics of shallow, seasonal and cyclical market has significantly affected the growth of PXs. In addition to the above, there are issues of transmission corridor congestion, non-availability of distribution network downstream, etc plaguing the growth of Short Term Markets. The demand and availability of power of any entity (Consumer / Generator) is dynamic which undergoes changes on day to day basis on account of various reasons like rains, holidays, temperature variation, festivals and non availability of generating stations due to forced and planned outages etc. Thus, Generators / DISCOMs are selling their left out surplus power in bits and pieces on day to day basis during lean load period during night hours, holidays, less agricultural demand period, rainy season etc. While buyers like Industrial Consumers and Power deficit State Utilities prefer to go for committed power. Bulk Consumers (1MW and above) are Industrial Consumers and mainly into Manufacturing Business. They need quality uninterrupted power supply for continuously running their Industries. Generally Bulk Consumers are avoiding buying power through PXs due to the problems like non-clearance of full quantum requirement due to less sell-bid, transmission corridor congestion etc. In order to avoid the above uncertainties, Bulk Consumers (1MW and above) are hesitantly participating in the PXs and preferring to source committed power. Whereas, power deficit Distribution Companies are also sourcing the committed power from power surplus utilities through Bilateral Arrangements in order to plan their smooth grid operations and to avoid load shedding. Power Surplus distribution companies or Generators are selling their left out surplus power by pushing the same in PXs while power deficit DISCOMs are grappling with cash crunch and utilizing rampant load shedding instead of buying power to mitigate their demand.

At present, short term power market comprises of bilateral transactions undertaken through traders / direct bilateral arrangements between State Utilities, Unscheduled interchange Mechanism, Power Exchanges.

Buying and Selling of power under bilateral contracts are done at buyer's and seller's periphery respectively and buyer has to bear Open Access Charges, Scheduling Charges and other incidential charges from the seller's periphery onwards. The traders are also charging the trading margin from buyer. However, buying and selling of power through PXs is done at Regional Boundary and therefore seller has to bear transmission charges and losses up to their regional boundary and buyer has to bear the transmission charges and losses from there-onwards to carry the power to their end.

Power Exchanges offer several products for trading electricity viz. Day Ahead, Contingency, Week Ahead, Intra Day, etc. Intraday Markets and Contingency Markets are operated in parallel to Day Ahead Market on Day to day basis. Power Exchanges also provide platform to trade on intra-day basis, but presently the volumes traded are negligible. Week Ahead Market opens on Wednesday and Thursday. The transactions consummated on these days shall be executed for 1 week starting from the next Monday. Apart from the Short Term Products, PXs are mulling to introduce Month Ahead, Quarter Ahead and Longer Tenure Products to cater specific needs.

Bidding time	-	Day Ahead Market in PXs:
10AM-12PM	-	Bidding period
11.00 AM	-	NLDC to inform PX interfaces on which unconstrained flows are to be advised by PX
1.00 PM	-	PXs to furnish unconstrained flow information to NLDC
2.00 PM	-	NLDC to inform PXs about congestion, if any
3.00 PM	-	PXs to submit application for scheduling to NLDC
4.00 PM	-	NLDC to send details of collective transactions to RLDCs
5.00 PM	-	RLDCs to confirm acceptance to NLDC
5.30 PM	-	NLDC to convey acceptance for Scheduling PX

Types of Transactions:

1. **Bilateral transactions:** Bilateral transactions are the transactions for exchange of energy (MWh) between a specified buyer and a specified seller, directly or through a trading licensee or discovered at Power Exchange through anonymous bidding, from a specified point of injection to a specified point of drawl for a fixed or varying quantum of power (MW) for any time period during a month. In bilateral transactions a PPA is signed between the buyer and seller, which are generally facilitated by a trader for a little margin.
2. **Collective transactions:** Collective transactions are a set of transactions discovered in power exchange through anonymous, simultaneous competitive bidding by buyers and sellers. In case of collective transactions the electricity is traded through exchanges, by exchange members for a very small margin fixed by commission. Currently India has two exchanges PXIL and IEX.

A variety of products are available in the Bilateral Market namely advance, first-come-first-serve, day ahead and contingency (intra-day). Power Exchange is a neutral platform facilitating a transparent price discovery. The Collective Transactions through the Power Exchange always present a balanced portfolio to the System Operator(s). Hence, the Collective Transactions are given a priority and are processed before allowing day-ahead and contingency category Bilateral Transactions. In case due to congestion in real time, need arises for curtailment of Open Access

Transactions, Bilateral Transactions are curtailed first before Collective Transactions.

The total available margins for short term open access transactions are assessed by the respective Regional Load Despatch Centers (RLDCs) / National Load Despatch Center (NLDC) in advance through simulation studies and made available to the public through the respective websites. The balance margin available after permitting advance and first-come-first-serve bilateral transactions is used for processing the Collective Transactions through Power Exchange. It is pertinent to mention here that the available margins are not allocated in advance to the Power Exchanges. The Power Exchanges work out a provisional solution after closure of the bidding window and submit to the NLDC for validation. NLDC validates the provisional trades against the available margins and in case of congestion; the limits are indicated to the Power Exchanges. The Power Exchanges then re-work out the final solution honoring the limits given by NLDC. This methodology is akin to the flow based method. The window for day ahead and contingency transactions reopens after the collective transactions have been scheduled, to utilize the balance available margins, if any.

India has two 'Electrical Regions' namely NEW Grid (North, East, North-East and West i.e., NEW Grid) and South Grid. The balancing market guiding vector is frequency dependent and thus there are two real time balancing market prices. Multiple Power Exchanges are implemented and each gives a price signal. Thus, in an unconstrained scenario, there are four price signals - two on a day-ahead basis and two in the real time. In case of congestion, there is market splitting in each of the Exchanges and this makes the scenario further complex. Introduction of the third Power Exchange would increase the number of price signals. Convergence of the multiple price signals for further development of the market (derivatives) is a challenge.

Trading Margin: The CERC has taken cognizance of the fact that the traders are providing different types of products by entering into contracts on long-term, medium-term and short-term basis and the risk profile of each of these contracts is different. Accordingly, CERC vide Central Electricity Regulatory Commission (Fixation of Trading Margin) Regulations, 2010 has prescribed the margin cap for short term buy - short term sell contracts for the inter-State trading in electricity undertaken by a licensee, taking into consideration the traders' requirements of meeting expenses incurred to mitigate risks, expenses incurred towards Operations and Maintenance and return on net worth. As per Hon'ble CERC Trading Margin Regulation, the traders shall charge maximum margin of 4 paisa / unit (for power price below Rs. 3/- unit) and 7 paisa / unit (for power price above Rs. 3/- unit). As per Hon'ble CERC Power Market Regulations 2010, Power Exchanges are charging transaction charges which is at present 2 Paisa / unit from every participant for every unit transacted.

Trading of Renewable Energy Certificates: The National Action Plan on Climate Change (NAPCC) released by the Central Government in 2008 released eight Missions, one of which was the National Mission for Enhanced Energy Efficiency (NMEEE) that laid emphasis on promoting innovative policies and regulatory regimes for creating and sustaining markets for energy efficiency to be achieved in a time bound schedule. The Electricity Act 2003 and the policies under the NAPCC provide for a roadmap for increasing the share of renewable in the total generation capacity in the country, there are constraints in terms of availability of RE sources evenly across different parts of the country.

Hon'ble CERC and State Regulators have prescribed various regulations for promotion of Green and Clean Energy to address the concern of climatic changes and depleting fossil fuel reserves. Moreover, the Central Govt. / Ministry of New and Renewable Energy has set the ambitious target to increase share of renewable energy in energy mix to 100 GW for Solar and 60 GW for Wind by the year 2022. The Regulators have prescribed minimum stipulation (RPPO) on DISCOMs for the purchase of RE as a percentage of their total consumption. Hon'ble CERC has visualized that some states / areas are well endowed in RE Potential while others are not. Hon'ble CERC through its Regulation has brought out Renewable Energy Certificate (REC) Mechanism to circumvent the above issue.

Renewable Energy Certificate (REC) mechanism is a market based instrument to promote renewable energy and facilitate compliance for renewable purchase obligations (RPO) under inter-state transaction of RE generation. REC mechanism is aimed at addressing the mismatch between availability of RE resources in state and the requirement of the obligated entities to meet the renewable purchase obligation (RPO).

One REC is equivalent to 1 MWh electricity injected into the grid from renewable energy sources. The REC is exchanged only in the Power Exchanges approved by CERC within the band of a floor price and forbearance (ceiling) price as notified by CERC from time to time. The first REC trading session was held on power exchanges in March, 2011.

Under the REC mechanism, cost of electricity generation from renewable energy sources is classified as cost of electricity generation equivalent to conventional energy sources and the cost for environmental attributes. These environmental attributes can be exchanged in the form of Renewable Energy Certificates (REC). Thus, RE generators will have two options i) either to sell the renewable energy at preferential tariff or ii) to sell electricity generation and environmental attributes associated with RE generations separately.

RE Generators not having power purchase agreement with DISCOMs can sell the electricity component to local DISCOM and get the Average Pooled Power Purchase Cost (APPC) from them and can redeem environmental component (REC) by selling it on PXs. The DISCOMs who are having lower RE Potential can mitigate their RPPO requirements by buying the REC from PXs. Hon'ble CERC has fixed floor price and forbearance prices of REC under Non-Solar and Solar Categories. The price fixed for control period 01.04.2012 to 31.03.2017 is as under -

	Non-solar REC (Rs/Mwh)	Solar REC (Rs/Mwh)
Forbearance Price	3300	13400
Floor price	1500	9300

Recent Developments:

- **e-bidding Portal** - Ministry of Power, Govt. of India vide notification dated 30.03.2016 has revised Guidelines for Short Term Procurement of Power by

Distribution Licensees through tariff based bidding process. The Government has replaced the conventional tendering process for power purchase by state power distributors with an e-bidding platform in an attempt to make the bidding more efficient and transparent by bringing power procurement contract details to the public domain.

MoP has introduced web based portal for e-tendering cum Reverse Auction as per revised guidelines called 'Discovery of Efficient Electricity Price (DEEP)' e-bidding portal. The first e-bidding process was held in April 2016.

The idea is to tie-up power through competitive price discovery in more transparent manner and to bring down the cost of short term power and pass on the benefit to Consumers. The web portal is a common e-bidding platform with e-Reverse Auction facility. The advantages include dissemination of information on nationwide power procurement to a wider network including the stakeholders in power sector; Uniformity in the process of power procurement and enabling Distribution Licensees to procure power in a short time. Bidders have the option to bid multiple bids from separate logins either from same or different sources. Bidders also can quote their best prices and need not match or bid lower price against the prevailing lowest Bidder. The portal builds confidence through transparency and efficiency in the procurement of power.

Power procurement through DEEP e-bidding portal has entailed more uniformity and transparency in power procurement and promoted competition in the Power Sector.

- "**Vidyut PRAVAH"** Web / Mobile Application for Electricity, Price Availability and Highlights - Recently, MoP has launched an application "Vidyut PRAVAH" which provides highlights of the power availability in the country on real time basis. The Web / Mobile App provides a wealth of information pertaining to the current demand met, shortages if any, surplus power available and the prices in the Power Exchange. The real time data and comparison with previous day / year data is also available.

This endeavour is towards the direction that the DISCOMs take advantage of current price scenario in the market and try to reduce its power purchase cost.

Way forward:

- **Extended Market Session** - In order to provide the entities with measures to respond optimally and in pursuance of development of market, the Central Regulator had explored additional contracts to be operated as Extended Market Session after the gate closure of the regular Day Ahead Market.

  (i) 24x7 intraday/contingency contracts - Operating day ahead contingency contracts in remaining hours after gate closure of day ahead market on power exchanges and operating intraday contracts on 24x7 basis;

  (ii) Evening market - Operating Day ahead auction based on collective transaction in the evening on power exchanges; and operating intraday contracts on 24x7 basis.

However, the evening market / 24x7 Intraday Contingency Market based on collective transactions was kept in abeyance till upgradation of software, infrastructure and deployment of human resources for necessary coordination with Banks for clearing and settlement of transactions and

Hon'ble CERC vide Order dated 08.04.2015 directed both the Exchanges to commence operating Extended Market Sessions. Following the CERC's directives, the two power exchanges i.e. IEX and PXIL started their operations on extended market session with effect from 20.07.2015.

Of late, on 13.05.2016 a review has been made by Hon'ble CERC on the functioning of round the clock intraday / contingency market. Based on their analysis for operation of Extended Market by PXs during the period from July 2015 to Jan 2016, Hon'ble CERC has stated that the introduction of extended market session may not impact System Operator POSOCO because it has to function 24x7 even otherwise. It has been analyzed by Hon'ble CERC that more volume was transacted at lower price during extended hours when compared with normal hours which is certainly beneficial to the market participants. Besides, it has been analyzed that there is no increase in the volume of electricity transacted through intraday and day ahead contingency contracts, and hence it may not be beneficial to the power exchanges.

The Extended Market Session / Evening market / 24x7 Intraday Contingency Market is yet to be exploited in a major way by the Market Players.

- **Cross border trading** - Indian Energy Exchange Ltd (IEX) has filed a Petition before the Central Electricity Regulator CERC for grant of consent for enabling cross border transaction at IEX platform for further development of the electricity market. Certain significant developments towards enabling cross border electricity trade through Exchanges have already been taken place namely (i) Government of Bangladesh is in advance stage of finalizing entity for procurement of additional power of 30-50 MW through Power Exchange.

  (ii) In State of Bhutan, merchant power sale from Dagachu power station is expected through IEX platform. (iii) Government of Nepal is engaged in cross border transmission interconnection and grid connectivity envisages cross border electricity trading though Power Exchanges.

  The Central Regulator is now awaiting a policy direction from the Union Power Ministry on the proposal of IEX being allowed to transact cross-border power trading.

- Trading of Energy Saving Certificates (ESCerts) - CERC has recently come up with a regulation on "Terms and Conditions for dealing in Energy Saving Certificates" to facilitate the trading mechanism of transferable and saleable ESCerts on Power Exchanges.

The Energy Saving Certificates (ESCerts) issued by MoP, GoI in electronic form with each ESCert being equivalent to one metric ton of oil equivalent of energy (MTOe) consumed, to the designated consumers notified by Central Govt under the Energy Conservation Act and for which a target is notified under the Statutory Orders issued by GoI from time to time shall now be able to transacted on Power Exchange Platform by the ESCert Holder. The Power Exchanges shall permit the ESCert Holder to either place buy or sell bids subject to confirmation of availability of ESCerts by Registry during Exchange Session and the market price of ESCerts shall be as discovered through the process of bidding at the respective Power Exchange.

The detailed procedure for trading of ES Certs is awaited.

Multi Year Tariff

CMA Mukeshkumar Kaka
Research Scholar (Commerce Faculty, M.S.Univercity Baroda)
Contact : 987954181 • E-mail : kakasanket@yahoo.com

I. BACKGROUND

One of the key objectives of regulation is to reward good utility performance while simultaneously penalising the utilities for their failure to perform as per expectations. Reduction of risks of utilities is also an important objective of regulation. Multi Year Tariff (MYT) regulation is one of the key means for achieving these objectives. From the perspective of customers as well as from that of utilities, MYT regulation provides certainty on costs that the utilities can legitimately be held accountable for. MYT regulation also seeks to reduce the cost of regulation and regulatory intervention in routine utility matters. Section 61 (f) of the Electricity Act, 2003 explicitly states that the Electricity regulatory Commissions are required to be guided by the principles of MYT.

At present, tariff determination for generation, transmission and distribution activities is an annual exercise in various States. Further, there have been significant differences in the amount claimed by the Utilities and the actual awards of the Commission, leading to disputes and litigation. There are significant difference of opinion between the Commission and the Utilities on several key issues including sales (hours of supply to agriculture), Revenues, R&M costs, Working Capital requirement, return on equity, interest on PF bonds, depreciation on BBMB assets, interest and finance charges. A number of orders of SERC have been challenged by Utilities in Appellate Tribunal (ATE).

In reality, the utility results have been significantly worse than the expectations and assumptions inherent in the orders of the Commission. In the absence of well-defined and accepted principles of cost attribution and responsibility allocation for such adverse performance, a clear strategic direction does not emerge from the present mode of regulation. This assumes further importance in light of the future trends expected in utility performance and costs. Detailed modelling of operations and finances by Mercado indicates that the utility finances are likely to worsen considerably in the coming years in the Business As Usual (BAU) scenario, unless urgent action is taken to improve the operations and finances of the utilities.

The detailed assumptions and methodology used for development of the forecasts. Even as the assumptions are open for review and opinions, the data does communicate the need for urgent action to improve efficiencies, contain costs and enhance revenues. Above, all it underscores the need for a clear incentive and disincentive, mechanism and a stable policy and regulatory environment to ensure that the consumers' interests are protected, while the utility finances are in better shape than at present.

A stable and well defined multi-year tariff (MYT) framework provides an alternative to the present regulatory systems with respect to tariff determination.

II. OBJECTIVE

The main aims of this paper are;

- To examine different multi-year tariff (MYT) framework approaches for Generation, Transmission and Distribution, and
- To address the key issues that is involved while formulating an MYT framework in the context of State.

The broad objectives of an MYT regulation are summarized below:

- **Cost reduction:** This is the most important objective of an MYT regulation. In theory, increasing incentives to reduce costs is one of the easier tasks to build into the MYT framework. However, meeting this goal often conflicts with other objectives, such as sharing the benefits (cost savings) with consumers and improved Quality of Supply to consumers.
- Innovation: Innovation in the context of an MYT framework can mean, (a) encouraging the utilities in State to find effective ways to reduce costs or (b) designing incentives to develop new and creative service offerings.
- Improving customer service and satisfaction: This generally requires the MYT principles to be accompanied with a reward/penalty provision to encourage compliance.
- Risk allocation: MYT principles determine whether the utility or the consumer can bear particular risks most efficiently and evaluate how investment decisions get influenced by various risk allocations.
- Other objectives : From the point of view of various stakeholders who are involved in the MYT framework, some of the other goals that MYT regulations seek to address are ;
- Simplification of the regulatory process - regular lays down tariff methodologies for a defined future time period that are simple, unambiguous and understood by all stakeholders who are then able to plan accordingly.
- Efficiency improvement and risk mitigation - design of incentives, as a part of the MYT exercise to help promote efficiency. Further MYT principles can help

licensees mitigate risks in electricity supply on account of factors beyond the reasonable control of the utility such as fuel prices, gross calorific value of coal, varying consumer mix etc.

- Economically efficient supply to consumers.

III KEY MULTI YEAR TARIFF DESIGN ASPECTS

There are some key aspects that need to be considered while designing an MYT framework, which include,

- **Measurability:** Measurability of the element around which incentivisation will be planned is important for design and correct implementation.
- **Materiality:** Risk mitigation mechanisms become necessary around those elements that have the potential to significantly affect the performance of the utility.
- **Controllability:** The element will need to be controllable to the utility to enable them to beat regulatory targets.
- **Predictability:** The element will need to be predicable because the ability to determine a prudent level of regulatory target is crucial for the incentivisation process.

Within these broad elements, the MYT (on in general Performance Based regulation) mechanisms can be designed in many ways, and can be tailored to achieve many different objectives. Efficient operation and low costs are not the only objectives of electric utilities and their regulators. Regulators are also concerned about price stability, price equity, reliability, quality of service, promotion of energy efficiency, environmental protection, and more. Many of these objectives require even more attention as the electricity industry is restructured.

IV MULTI YEAR TARIFF APPROACH - OPTIONS GENERATION:

MYT in generation will be limited to state owned projects or those developed through the MoU route (norms to be applicable to all existing and new Generating Stations for which tariffs will be determined by the under section 62 of the EA 2003. The thrust of MYT approach is to provide incentives to Generating Stations to achieve norms/benchmarks for controllable parameters for economically efficient performance.

The central Electricity regulatory Commission (CERC) sets tariffs for central generating stations on a performance based approach using benchmarks. The state may follow such a performance based approach using appropriate benchmarking techniques. However, the choice of techniques for benchmarking would be important since there may be a need to vary the norms as compared to projects regulated by the CERC which are generally close to the fuel sources.

One of the MYT approach for the Generating Utility in SERC can be similar to that has been adopted by CERC. In this approach, norms are set for certain operating parameters which are within the control of the Generating Station for the control period of 5 years and tariffs are determined upfront for the control period based on these norms. Any impact of over/under performance of these operating parameters by the generating station is entirely to the account of the utility. The parameters for which norms have been set by CERC for thermal power generating stations including the tariff components are,(a) Availability (b) Gross station heat rate (c) Secondary fuel consumption (d auxiliary consumption (e) fixed charges (O&M, working capital requirement, interest rates, depreciation rates) (f) Debt Equity ratio (g) return on Equity (h) Incentives.

The normative parameters set by CERC for hydro power generating stations are, (a) Normative annual plant availability, (b) auxiliary consumption, (c) fixed charges (O&M), working capital requirement, interest rates, depreciation rates), (d) Debt : Equity ratio, (e) Return on Equity, (f) incentive. With regard to renewable energy based plants, feed-in tariffs based on a capital cost benchmarking approach as notified by CERC would be followed.

Salient Features of CERC Tariff regulation 2014-19

Return on Equity: Base rate for allowing return on equity raised from 14% to 15.5% to attract Investment; Additional 0.5% for timely completion of projects; Base rate to be grossed up by applicable tax rate for the company; Benefit of tax holiday to be available to the project developer; This higher ROE will also become benchmark for Distribution business and for renewable tariff.

Depreciation: Depreciation rates for initial 12 years approximate 5.28%; Spread over beyond 12 years; No provision for Advance Against Depreciation (AAD).

Norms of Operation : Target availability for recovery of fixed cost for thermal plants raised from 80% to 85%; Station heat rate, tightened for existing stations; For new stations, a new methodology with operating margin of 6.5% with respect to design heat rate; Maximum permissible heat rate to ensure that inefficient machines are not procured; Norm for secondary fuel oil consumption reduced from 2 ml per unit to 1 ml per unit; Savings in secondary fuel oil consumption to be shared with the beneficiaries in the ratio of 50:50.

O&M Norms: Pay hike factored into O&M norms; Escalation for O&M expenditure @ 5.72%

Other Highlights:

- Thermal power projects to have two options to take care of R&M beyond useful life: Option-I: Special allowance on the basis of per MW per year; Option-II: Comprehensive R&M with cost benefit analysis.
- Incentive linked to availability; to incentivise higher availability (instead of plant load factor) of power plants
- Upfront tariff fixation for regulatory certainty. Truing up along with next tariff period

- Benchmark norms for prudence check of capital cost of thermal and transmission projects
- IDC, financing charges and FERV during construction period on the equity beyond 30% norm
- 33% of net benefits on re-financing of loan now to be retained by developer
- De-scaling factor for O&M norms of thermal projects to take care of economy of scale

V KEY ISSUES

1. INTRODUCTION

Issues relating to MYT implementation can be broadly categorised on two basic aspects:

- Common issues relating to all regulated entities in the sub-segments (generation, transmission and distribution).
- Specific issues relating to each of the sub-segments.

The common issues that would need to be considered include those relating to aspects like ;

(i) Mechanisms for incentivising utility performance

(ii) Basis of computation of working capital requirements.

(iii) Return on Capital Employed (RoCE) vs. Return on Equity (RoE).

(iv) Treatment of interest rate variations.

ISSUES RELATING TO GENERATION 1.

CONTOURS OF MYT REGULATION

CERC follows a norm based benchmark regulation mechanism for MYT in generation (and transmission) where the set of norms are established prior to the commencement of the control period for key parameters. Currently, the norms notified by the respective state Electricity regulatory Commission (SERC) are broadly based on the CERC norms of 2004. However these norms are applied on an annual basis for the generation sector.

The norm based approach is extremely simple to implement and does not require any major institutional or process change. The data requirement from the utilities in State for use of this approach is also low. Hence it may be appropriate to adopt a norm based approach with necessary modifications to the normative levels to suit the conditions in State, and also align the norms to the recent CERC methods and benchmarks (as reflected in CERC's Terms and Conditions of Tariff for 2009). The possible approaches to determination of norms based on the use of benchmarking techniques have been discussed in a separate concept paper.

2. CONTROL PERIOD

Control Period means a time period determined by the Commission, for which the principles for determination of the allowable revenue and the applicable norms remain unchanged. The length of the control period is key element which determines the incentives available to the utility as the surplus available consequent to superior performance can be retained for the length of the control period. The reverse is also true as losses too have to be retained for the control period. Several aspects need to be considered while deciding the length of the control period.

The control period should be sufficiently long so that utilities make the necessary investments and recoup the benefits during the control period. Also, it should not be too long since this could result in inflexibility and lead to excess profits or losses for the utilities. Appropriately it could be in the range of 5 to 10 years. However, in two part tariff will reveal data issues on availability, coal accounting and capital expenditure planning. There have been instances when operating norms had to be reset when reliable data became available. It s, therefore, proposed that initial control period to be of a shorter duration with sufficient flexibility. The flexible shorter duration framework allows the regulator to quickly address issues which can adversely impact the interest of various stakeholders. The experience gained during the first control period would be of immense help in designing a more robust framework for subsequent control periods.

3. CONTROLLABLE AND NON CONTROLLABLE PARAMETERS (NEW AND OLD PALNTS)

For classification of operating parameters into controllable and non-controllable, only those parameters merit consideration hat impacts the cost of generation. Any operating parameter that Generating utility can control with reasonable effort can be considered as controllable. In the MYT framework norms are established for these controllable parameters and the impact of over/under performance on account controllable parameters is to the account of Utility whereas the impact of the uncontrollable factors is passed on to the beneficiaries.

The controllable parameters in the context of the thermal Generating Utility considered by CERC, SERC and Regulatory Commissions elsewhere are ;

- Operating parameters like Availability, station heat rate (SHR), secondary fuel consumption, auxiliary consumption, transit losses
- Operating & Maintenance expenditure
- Capital expenditure
- Working Capital requirement
- Interest rate
- Debt Equity ratio

There is considerable debate on whether some of the factors listed above can be considered to be within utility at this juncture. For the initial period, it may be necessary to aim for a more conservative framework where only the factors that are established to be within utility control and meet with the criteria of measurability, materiality, controllability and predictability are included. It is proposed as controllable in the context of State.

The uncontrollable parameters proposed are;

- Terminal benefits of the employees,

- Gross calorific value of coal and oil,
- Prices of coal and secondary fuel,
- Force Majeure Events,
- Changes in law, judicial pronouncements and Orders of the central Government, State Government or Commission,
- Economy-wide influences, such as unforeseen changes in inflation rate,
- Market-interest rates, taxes and statutory levies.

It is proposed to discuss in detail with the Commission other parameters that can be considered as uncontrollable. Further the methodology for computation of the impact of these parameters on tariffs, the frequency of pass through to beneficiaries and mechanism of collection of these charges are to be developed. Such a framework is necessary to insulate the cash flow of the generating company from the adverse impact of the uncontrollable factors.

4. MYT IMPLEMENTATION PROCESS

It would be appropriate to define in the MYT framework the activities that need to be completed at the start of the control period, during the control period and at the end of the control period. These are elaborated below:

(a) Process at the beginning of the control period.

(i) The Generating Company to be required to do following at the beginning of the control period:

1. Prepare and file Business Plan for all Power Stations separately for each year of the Control period with the respective State Electricity Regulatory Commission.

2. Submit Investment plan for each Power Plant for each year of the Control Period along with the financing plan, capitalization schedule and the benefits that are likely to accrue from the proposed capex plan.

3. Projection of aggregate revenue requirement for each Power Station for each year of the Control Period.

4. Proposal for tariff for each Power Station for each year of the Control Period.

5. Projection of revenues of each Power Station at existing and proposed tariffs for each year of the Control Period.

6. Proposal for targets on controllable performance parameters for each power station for the control year.

(ii) Based on the filing of the HPGCL, the Commission to determine Aggregate Revenue Requirement (ARR) and tariffs for each Power Station for each year of the Control Period at the beginning of the Control Period.

1. Based on a detailed review of the filings and taking into account the suggestions and views expressed in public hearings, performance targets for each Power Station, applicable for the control period, to be determined.

2. The targets to be set for controllable operating parameters.

3. Assessment of baseline data to be done and incentive/ penalty framework developed.

(iii) The Commission to also separately provide for the truing up for the year prior to the Base Year at start of the control period.

(b) Process during the control period

CERC does not provide for annual filing by the Generating Companies as the Generating Companies are expected to transparently account for the impact of uncontrollable parameters. From a cost of regulation perspective this is also preferable. However, in the first control period, the Generating Company may be required by regulation to validate the computation of the Impact of uncontrollable parameters before it is passed onto the beneficiaries as MYT. Accordingly the generating company would have to file its application every year for truing up on account of variations in the uncontrollable factors like fuel price, GVC, terminal benefits. The details to be filed to include costs actually incurred for previous, current year and the expected values for the ensuing year. The Commission have to approve two part tariff (fixed and variable) for the year for each power station separately after incorporating the impact of uncontrollable factors.

(c) Process at the end of the control period

The Commission may review the effectiveness of the implementation of the MYT principles and the success in achieving the intended objectives.

The procedures and the methodologies used for the next Control Period based on the experience of the first Control Period to be suitably modified. A comprehensive review may take into account, among other things, the sector reality, consumer and other stakeholder expectations and licensees' requirements at that point in time to be conducted.

The review may be conducted sufficiently in advance to avoid a gap between two Control Periods. The process will be consultative and the Commission may publish for public discussion a paper containing.

1. Review of performance/outcomes of the first Control Period.
2. Review of proposals for the next Control period.

4. VERIFICATION

All key heads of data that have a material bearing on the incentive / disincentive mechanism should be subject to independent verification by reputed third parties. For Generation this would include Power Station availability, capex fuel cost and Gross calorific value. To the extent possible such verification may be incorporated in the external audit process of the utility. However, whenever the Commission deems it fit, the verification can be done by specialist third parties.