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Power Market Developments: A New Market Design

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The paper presents the status of development of power market in India with the creation of opportunities, restructuring of the sector through unbundling, opening up for private sector participation, establishing regulatory commission and permitting open access. The enactment of the Electricity Act, 2003 introduced the Indian Power Sector to a relatively new concept – Inter-state trading in electricity. It provides for non-discriminatory open access of the transmission network, de-licensing of generation including captive power generation. The Act also recognizes trading of electricity as a distinct activity. The paper elaborates on power market mechanism.

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Introduction

For decades, consumers of electricity in India have remained completely deprived of the benefits of a competitive market structure. The Electricity Supply Act,1948 provided a structure for power which could hardly be expected to generate electricity to be traded in a competitive market. Over 60 years Electricity Supply Act has given a monopolistic structure in the form of electricity boards giving hardly any choice to consumers1. The electricity consumers in India have long been served by vertically integrated State Electricity Boards (SEBs). The reform model adopted by a number of states resulted in restructuring of some of the SEBs, leading to separation of generation, transmission and distribution segments and their corporatisation. Regulatory reforms included setting up of Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs)2. The monopolistic nature of bulk supply as well as retail supply of electricity has been abolished with the enactment of the Electricity Act 2003. Indian power market has transitioned from a sheltered structure with limited players to a dynamic market with a large number of players.

Conceptualization of Electricity Exchanges:

A need for establishment of a platform, similar to a stock exchange, was therefore created where the buyers and sellers of electricity could carry out their transactions in a safe , reliable environment. The stepping stone for establishing such an exchange was laid in the Electricity Act, 2003. Power exchanges in India were conceptualized in 2005. An Electricity Power Exchange provides a spot market, mainly day-ahead, for electricity, which like any other market, matches demand and supply, while providing a public price index. The Power Exchange is a competitive bidding platform. The buyers compete with each other to get the commodity at the best possible price and the one who values electricity the most gets it. Likewise, the sellers compete with each other to offer the commodity at the lowest possible price. India is a unique country in the World which has opted for multiple Power Exchanges in a singly physical delivery market. Worldwide, there is only one Power Exchange in a single physical delivery market. The implementation of multiple Power Exchanges in India has ensured competition amongst the Power Exchanges, ensuring better quality of service to the market participants and the end users.

Electricity Act- 2003 : Promoting Competition:

The Act also brought in enabling provisions for promoting competition in the market and introduced the concept of non-discriminatory open access to the transmission and distribution networks which were heretofore owned by the Government. With the stage set by the Electricity Act, the country's power markets have been witnessing significant innovation. This has been furthered by positive regulatory moves to create a vibrant market and supported by the efforts of market operators to bring out new products and solutions that benefit consumers, suppliers and the sector as a whole.

Electricity is now a consumer good – it is possible to purchase any preferred quality and quantity at most attractive price on the national market. Largely unnoticed by consumers like us, electricity flows throughout India – and also from Nepal and Bhutan – across regional and national borders. From producers, it is transported via wholesalers and energy exchanges and over an extensive transmission network to state distribution companies, large consumer and finally from there to various categories of consumers4.

The enactment of the Electricity Act, 2003 introduced the Indian Power Sector to a relatively new concept – Inter-state trading in electricity. It provides for non-discriminatory open access of the transmission network, de-licensing of generation including captive power generation. The Act also recognizes trading of electricity as a distinct activity. Such provisions of the Act provide an enabling environment for development of bulk power market in the country. Phased open access of the distribution network by respective state utilities provides consumer choice subject to open access regulations, thereby paving the way for breaking the monopoly of the Government owned electricity departments/corporations.

Advantages of Electricity Trading Through Exchanges:

The most revolutionary contribution of the Act is to facilitate trading of power by setting up of day ahead Power exchanges in India. Some of the salient features of the day ahead Power Exchange in India are discussed below5:

- Power Exchange is a free un-biased platform, a market place, which provides the necessary electronic trading platform and associated infrastructure to facilitate buying and selling of electricity by the participants. Power Exchange in no way influences the price determination process, which is dependent on the offers and bids placed by the market participants i.e., the sellers and buyers.
- While trading through the Power Exchanges both the sellers and the buyers place bids on the electronic platform independent of each other. No negotiation is involved in the process and the buyer or seller do not know the identity of each other.
- As a market place, Power Exchange facilitates, in an unbiased manner, an auction mechanism where both the buyers and the sellers place bids and offers simultaneously during the bidding session. The Power Exchanges make available all market related information such as prices and volumes (current and past) on their websites, transparently for all users.
- The price discovery mechanism in the Power Exchange is based on the principle of Social Welfare Maximization. According to this principle, the algorithm of price discovery ensures that the welfare of all the market participants is maximized simultaneously. In other words, neither the buyer nor the seller receives any preferential treatment over the other, even inadvertently!

Variation of price of day ahead power traded through the exchange,

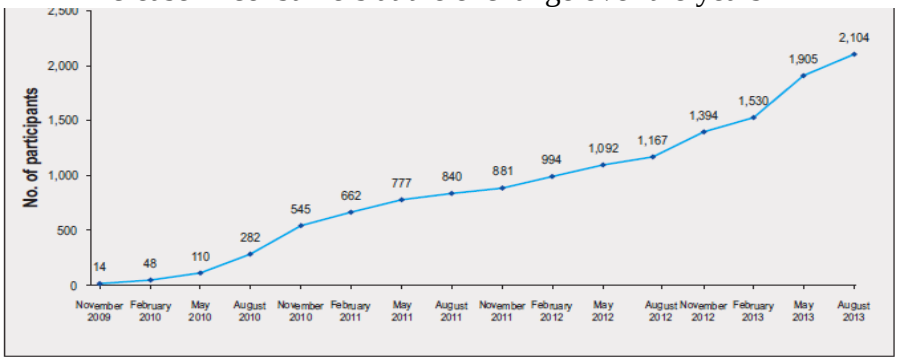
Source: Promoting competition: Role of power exchange, Power line, October 2013

- A day is divided into 96 time slots of 15 minute duration each. The Power Exchange declares a single price i.e., the Market Clearing Price (MCP) for each slot. The principle of uniform pricing adopted in the Power Exchange ensures that the offers are placed on the marginal cost principle.
- The price discovered on the Power Exchange ensures that the accepted buy bids are those that are more than or equal to the MCP. In other words, the consumer buys electricity at a price which is guaranteed to be lower than or at most equal to the price bid the consumer (buyer) had placed on the Power Exchange. This ensures a saving or a discount for the consumer over and above what he was willing to pay.
- From the seller's perspective, the price a seller gets is guaranteed to be more than or at best equal to the offer the seller has placed on the Power Exchange.
- An excellent concept of market splitting is possible through a power exchange at the time of congestion in a transmission line/corridor. The market is split in the Power Exchange into different price areas split across the congested corridor. The prices in the deficit area (which is a net buyer area) are increased to reduce demand and increase supply. On the other side of the congested corridor, the prices in the surplus area (which is a net seller area) are reduced to decrease supply and increase demand. This is continued till the flow on the constrained corridor is restricted to the quantum permitted. In this process a price differential is created between the two areas and the inclusion/exclusion of bids and offers is done purely on a merit basis without any bias. It is important to mention here that market splitting may not necessarily result in a reduction in the total volumes traded.
- The contracts traded on the Power Exchange are standardized contracts, terms and conditions of which are well known upfront to all the market players, thus reducing the transaction costs.
- The Power Exchange trading platform is a fully automated electronic platform. Each Member/Client is allotted a secure access to the trading platform where he can place the bids, know the trading results, settle payments and gain insight into other trade related information.
- Payment is an important area of concern for all market participants. The Power Exchanges follow a strict regime for payments wherein, payments by or to the participants are ensured on a pre-determined time frame. The buyers are required to deposit the payment within one day of the date of trade, and the sellers receive their payments within two days.

- An important function discharged by the Power Exchanges is that of Risk management. All Members of the Power Exchanges are required to maintain adequate collateral margins, in proportion of the trades being carried out, with the Power Exchanges to cover any payment defaults.

The Power Exchange platform has brought about a transformation in the Electricity Market in India. It has turned the vision of harnessing the captive generation and bringing in small participants into a reality. Power Exchanges have provided a competitive, fair, neutral and transparent market. It has facilitated nondiscriminatory access to a pan-India electricity market thereby empowering the stakeholders besides bringing in the much needed economy and efficiency. The acceptability of in the power exchange by the consumers can be gauged from the following graph:

Increase in consumers at the exchange over the years



Source: Promoting competition: Role of power exchange, Power line, October 2013

Better Utilisation of Resources:

India has traditionally faced power supply shortages, with concerns related to security and reliability of supply. The creation of a physical national grid has been supported by commercial contracts assigned on the exchange platform, wherein large volumes of electricity have been transferred across the country. The short-term markets have been instrumental in incentivizing the mobilization of resources in electricity generation. The power exchanges have helped in bringing electricity from surplus to deficit regions. For instance, it is not uncommon to observe power flows from areas in eastern States of Meghalaya, Tripura, Manipur, Mizoram and Nagaland, West Bengal to southern States of Andhra and Karnataka, Kerala, Tamil Nadu.

Power trading through exchanges has also resulted in higher utilisation of generation plants across the country. The plants in regions that have an off-peak or seasonal surplus no longer need to curtail generation as surplus power can be sold through competitive power markets to meet the available demand. Higher asset utilisation is indeed a positive effect of trading, resulting in higher efficiency of the capital employed. During the summer, the northern region is a net seller as generation from hydro assets is relatively higher. The ability to sell power on a short term provides a ready platform for these generators to ramp up production6.

Private Sector Participation in Generation Capacity Addition:

The prices on the exchanges have encouraged independent power producers (IPPs), captive power producers and merchant power producers (MPPs) to consider short-term markets in their portfolios. Prior to operationalisation of the power exchanges, surplus power from these suppliers could be contracted only bilaterally, which was time-consuming and involved long administrative processes. The power exchanges have helped the sector by facilitating electricity flow to customers in a transparent manner. The IPPs have been selling increasing volumes on the

IEX especially after June 2009, when high prices were discovered on the IEX. Further, depending on the states where they are based, IPPs and MPPs are required to sell a certain percentage of their generation to the state utilities, which have been selling power on the IEX. The revenues of state utilities from sale in short-term markets outside the states are also invested in the power sector.

Increasing Load-Serving Ability of Electricity Distribution Utilities and Enabling Power Access to Consumers

The exchanges provide an option for buying power in the short-term markets close to real time requirements. The electricity distribution companies also have the opportunity to create an optimal mix of long-term and short-term contracts to hedge the risk of consumer migration. They can optimise power purchase costs by replacing costlier power procurement under long-term contracts with cheaper power available on the exchanges. Today, the state utilities contribute about 60 per cent of the volumes transacted on the exchange on a daily basis. Even large retail consumers approach the exchange to ensure uninterrupted power supply at a competitive tariff, which was earlier curtailed during evening peak hours. Given the predictability of day ahead prices, a large number of industrial customers have entered the day ahead market to supplement their off take from utilities and reduce effective power purchase costs. This is expected to create immense value for these businesses. The participation of open access customers on the power exchanges has increased significantly. Power availability at competitive prices from has led to the revival and resurgence of several sick industrial units, particularly those in Punjab and Tamil Nadu, which were either shut down or running for two to three days a week. These units are now running by procuring power through the exchanges at cheaper prices.

The exchanges have played an important role in furthering the objectives of the Electricity Act by facilitating competition and open access as well as in realizing the impact of delicensing generation. The creation of a physical national grid has been supported by commercial contracts set up on the electricity exchange, wherein huge volumes of electricity have been transferred across India to improve the reliability and security of supply in both surplus and deficit regions. ■

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