

# Promising Platform

Power exchanges aim to promote competition

**Satyajit Ganguly, Head, Operations, Power Exchange India Limited**

The Indian power sector has a history of only about 125 years. It has come a long way from a single small hydro unit set up in Darjeeling in 1880, followed by commercial production and distribution in Kolkata in 1889. The sector is poised to produce over 750 billion units in 2008-09.

The real thrust in the power sector has come with the enactment of the Electricity Act, 2003. Under the Act, trading has been recognised as a distinct licensed activity, which is expected to help in resource optimisation. One of the most important features of the Act is open access, which is set to facilitate non-discriminatory access over transmission corridors and distribution networks. Further, the Central Electricity Regulatory Commission (CERC) has issued guidelines for setting up power exchanges (PXs) to boost competition.

Giving a further fillip to the sector, the National Electricity Policy 2005 recognises electricity as a "basic human need" and aims at a per capita availability of 1,000 units per annum by the end of 2012 from the present level of 704 units. It calls for a capacity addition of 78,577 MW during the Eleventh Five Year Plan period.

## Power sector overview

India's installed capacity, as of January 2009, is 147,457 MW, of which about two-thirds is thermal. The country is facing an actual shortfall in peak deficit and energy deficit of about 14 per cent and 11 per cent respectively, which is more pronounced in the western region.

Of the total power generated in the country, short-term transactions account for only 6.83 per cent. Of this, about 3.2 per cent is traded bilaterally, unscheduled interchanges (UI) com-

prise 3.1 per cent and the remaining 0.6 per cent is traded through power exchanges. This level of transaction can be attributed to inadequate interregional links coupled with problems in intra-state open access. With the National Power Grid expected to be in place by the end of the Eleventh Plan (that is, 2012), the interregional capacity is likely to be augmented from 17,000 MW at present to 37,700 MW, enabling scheduled and unscheduled exchange of power, boosting open access and encouraging competition in the power market.

As per the Electricity Act, 2003, open access means the non-discriminatory provision of the transmission lines, distribution system and associated facilities for use by any licensee, consumer or person engaged in generation, in accordance with the regulations specified by the appropriate commission. In other words, open access means enabling non-discriminatory sale/purchase of electricity between two parties, utilising the transmission/distribution systems of a third party, and not blocking it on unreasonable grounds.

Though there has been considerable success in inter-state open access, a lot needs to be done for intra-state open

access so that the investments of smaller players are harnessed properly.

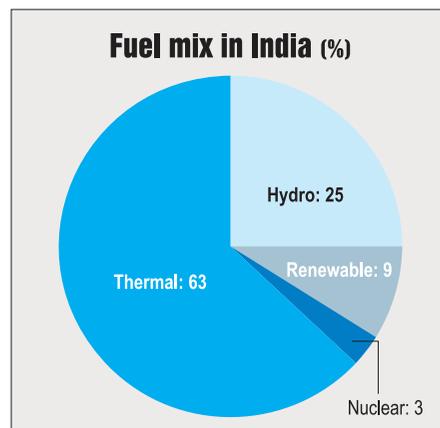
Power in India is transacted mainly through long-term power purchase agreements. However, it is neither feasible nor economical to meet short-term, seasonal or peaking demand through long-term contracts. The Electricity Act, 2003 has promoted competition in the sector by recognising trading as a distinct licensed activity. The introduction of open access for interstate transmission as per the act has facilitated bilateral trading, but the market still remains opaque with no clear price signals emerging to promote investment where it is needed the most. Although bilateral trading volumes have increased, which has led to better resource optimisation within an overall deficit scenario, the existing mechanism suffers from deficiencies such as:

- Transmission access has to be arranged separately;
- Contracts traded are non-standard and non-firm;
- Auctioning of surplus electricity is resulting in discriminatory pricing;
- There is a pancaking of transmission charges;
- There are a limited number of participants for trading; and
- There are no clear price signals for investment growth.

Recognising the fact that price signals from an organised market promote competition and can induce investments in the areas where they are needed most, the CERC kickstarted the process of organising the electricity market by releasing a staff paper for developing a common platform for trading electricity in July 2006. It followed it up by issuing guidelines for setting up and operating power exchanges in February 2007.

## Power market

The Indian power system operates on a two-market concept: a day-ahead spot market, where the market clearing price (MCP) represents the electricity energy price; and a real-time market, where the price represents the system capability to



balance generation and consumption in real time. The real-time market is operated by the regional load despatch centres (RLDCs), which are in turn operated by the central transmission utility.

A power exchange contributes significantly to facilitating trade and distribution of market information, promoting competition and creation of liquidity in a deregulated power market. The day-ahead spot market provides a neutral, transparent reference price for both the wholesale and retail markets. Further,

- It provides a reference price for bilateral power trade;
- It serves as a reliable counterparty;
- It provides easy access to a physical market at low transaction costs;
- It serves as a grid congestion management tool;
- It creates the possibility of balancing portfolios close to operation;
- It distributes relevant neutral market information and
- It is a non-mandatory power exchange, as an alternative to bilateral contract trade.

#### Benefits of an organised market

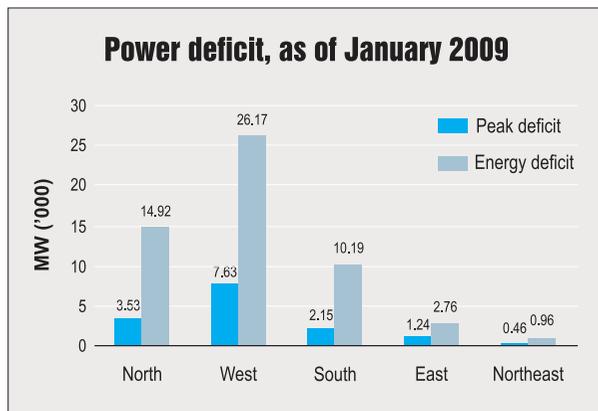
An organised electricity market will inspire a lot of confidence amongst people who want to invest in the Indian power sector.

It will not only provide them with a transparent easy-to-access market but also, as spot market prices get accepted by the market at large, give an impetus to the development of hedging mechanisms for mitigating the volatility associated with electricity prices.

Price signals from this market will clearly help identify corridors where the augmentation of transmission capacities is needed the most and also act as a catalyst for additional investment in generation.

#### Rationale for power exchanges

- To set up adequate infrastructure for trading, clearing and settlement of electricity contracts for Indian power



sector participants: Traditional trading in most markets has been opaque and discriminatory with one set of participants reaping the benefits of information asymmetry. Modern-day trading is totally transparent, with all participants on an equal footing. Electronic exchanges worldwide have provided the platform for traders to move on to such automated, reliable and fair markets.

- To provide single-window clearance for traded electricity contracts: The exchanges aim to simplify the trading procedure and, ideally, reduce the number of interfaces for participants to only one, that is, the exchange.
- To provide a market for distribution entities to meet top-up demand: The exchanges aim to provide a reliable marketplace for buyers to meet any additional demand they have over and above the demand that is at present being met through long-term PPAs.
- To help reduce peaking power deficit by providing an equitable marketplace for new merchant capacities (including hydro, IPPs, cogeneration and renewable) and augment existing supplies through untapped sources (for example captives).
- To develop a transparent and fair price discovery mechanism that can signal massive potential investments.

#### Exchange operations so far

Indian Energy Exchange was the first exchange in the country to start operations, June 27, 2008. Power Exchange India Limited (PXIL) started operations on October 22, 2008. Both exchanges have been operating successfully. The MCP of both exchanges follows a similar

pattern and remains at maximum during peak periods and minimum during off-peak periods. The MCPs during peak for both exchanges are very close to each other. There are instances of various bilateral transactions taking place based on the hourly MCP of the power exchange.

At present, both the exchanges provide a platform for next-day physical delivery. The spot concept

is based on bids for purchase and sale of proper contracts of one-hour duration that cover all 24 hours of the next day. As soon as the 12-hour deadline to submit bids has passed, all buy and sell orders are compiled into two curves for each power-delivery hour – an aggregate demand curve and aggregate supply curve. The MCP for each hour is determined by the intersection of the aggregate supply and demand curves. Buy trades are settled at or below the quoted price and sell trades are settled at or above the quoted price, thereby ensuring maximum benefits to both buyers and sellers of electricity.

The power market is currently partitioned into 10 separate bidding areas that can have separate prices if the unconstrained solution flow between bidding areas exceeds the available transfer capability (ATC). If there is no such constraint, the MCP will be uniform across the country. However, in case of constraint, the congestion management is done by market splitting, that is, by increasing the price in the deficit area and decreasing the price in the surplus area so as to facilitate power flow from the surplus to deficit area. The market splitting phenomenon is explained in Figure 1 (for two market areas – 'A' surplus market and 'B' deficit market).

The power system is divided into two synchronous grids, the NEW grid comprising the northern region, eastern and north-eastern region and western region; and the SR grid comprising the southern region. Power exchanges have already witnessed congestion between

the NEW grid and the SR grid for certain hours of the day, quite often resulting in market splitting.

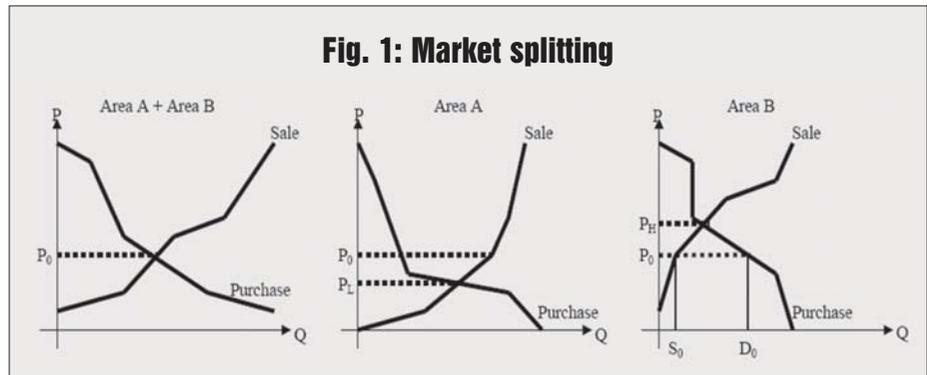
### Matching philosophy

The trading engine may operate either through the auction method or the continuous method. The auction trade system is based on pairs of price/volume bids that are submitted to the PX. The PX accumulates all demand and supply bids and forms an aggregate demand and supply curve for each hour. An MCP and corresponding volume is determined for each hour at the intersection of the demand and supply curves. Except for the ELEX and inter-day market at the Nord Pool Elbas, all major spot market exchanges in the world are based on the auction concept. In a continuous trade system, the participants place orders/bids on purchase and sale of spot contracts continuously throughout the opening period each day. An agreement is made wherever two participants meet on price. Unlike an auction trade where all trades are based on the same price, trade on a continuous trade system is based on different prices for each trade.

### Supporting regulations

In line with the CERC Open Access Regulations, 2008, effective April 1, 2008, collective transactions are a set of transactions discovered in the PX by anonymous, simultaneous competitive bidding by buyers and sellers. It mandates:

- The National Load Despatch Centre (NLDC) to be the nodal agency for collective transactions.
- Both buyers and sellers to absorb the loss with the buyer drawing less than the contracted power and the seller injecting in excess of contract by loss.
- Transmission charges of Rs 30 per MWh for each point of electricity injection and drawal.
- Operating charges at Rs 5,000 per day to the NLDC for each state involved and at Rs 2,000 per day for the SLDC involved for each point of transaction.
- State load despatch centre (SLDC) concurrence, specifying the MW quantity up to which the entity may submit a buy or sell bid.



### Products in the pipeline

Worldwide, the conventional wisdom has been to initially introduce only those products that already exist in the bilateral market. Second, the philosophy should be to work within the existing policy and regulatory framework. This familiarity leads to easy acceptance of new products for market participants and system operators.

In line with market aspirations for longer tenor products, particularly in view of rising demand in summer and anticipating a large shortfall, both the exchanges propose to introduce month/ week and day contracts which can be traded on a three month, two month, month ahead and week ahead basis respectively. In addition, PXIL is also proposing to introduce a day-ahead contingency contract for trade of surplus power on a day-ahead basis, which may not have been successfully matched in the first session.

### Open access issues

The open access regulation permits the use of spare transmission capacity through a transparent process which facilitates choice and freedom to buy and sell power. The open access regulations 2008 (effective April 1, 2008) permitted both bilateral (up to three months) and collective transactions (only day-ahead).

Interstate open access has been a success story, with power transactions taking place across the most distant states, resulting in merit order operation. However, intra-state open access is yet to be put into practice successfully. Access to the market is often denied to intra-

state players, resulting in the bottling up of spare capacities.

### The way ahead

Power exchange is a relatively new concept in India. It would need support from the regulators, policy-makers and market participants in the following areas:

- To increase the depth of participants
- Helping captive generation capacities to bring their surplus on board
- Providing a platform to IPPs for merchant sales
- Providing large load consumers access to “on-demand electricity”
- To increase the liquidity of transactions
- Work towards the introduction of products of longer term and hedging instruments
- Wide basing the scope by introducing energy efficiency products, RECs, etc.
- Knowledge partnership with regulators and policy-makers.
- Assist and support regulators and policy-makers to develop the power market in India.

### Conclusion

The Indian power market is currently poised at a juncture where the participants look for the introduction of newer products on the exchange platform. While the state utilities have already started accepting the platform, though in a limited way, the market has not seen much participation from large IPPs and captives with open access coming in the way. It is important that the state utilities work in cooperation with the regulators, policy-makers and market participants in order to resolve the open access issue and allow the market to enter the next logical state of development. ■