



Parametric Analysis of Power Trading in India

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ABSTRACT

India currently suffers from a major shortage of electricity generation capacity. Regulatory environment for power trading in India is dynamically changing with CERC acting as a facilitator and regulator. Short term Power trading in India accounts for 9% of the net generation. Price has been the major driver of demand in short term power trading market. Bilateral transaction is preferred over transaction through power exchanges.

KEYWORDS : power trade, power exchange, regulation, installed capacity

INTRODUCTION

With the enactment of Electricity Act 2003, along with other recent initiatives, Government of India has outlined the contours of a suitable enabling framework for the overall development of wholesale Electricity market by introducing competition at various sectors [1]. Restructuring of the power industry aim at abolishing the monopoly in the generation and trading sectors, thereby, introducing competition at various levels wherever it is possible [2]. Electricity cannot be stored and a constant monitoring system is required to stabilize a balance between supply and demand; both are often expressed by a nonlinear relationship [3]. The MCP is the lowest price that would provide enough electricity from accepted sale bids to satisfy all the accepted purchase bids [4]. The intersection of Demand Supply Curve gives the Market Clearing Price (MCP). Restructured electricity markets may provide opportunities for producers to exercise market power, maintaining prices in excess of competitive levels [5]. As electricity markets are liberalized, consumers become exposed to more volatile electricity prices and may decide to modify the profile of their demand to reduce their electricity costs [6]. Indian electricity market is trading with power transactions through power exchanges. Practically, Indian power market structure consists of the central generating station, state generation and power producers [7]. Central Electricity Regulatory Commission (CERC) also facilitated competition through the regulatory framework of availability based tariff, India Electricity Grid Code, open access in interstate transmission, interstate trading and power exchanges [8].

BRIEF INTRODUCTION TO INDIAN ELECTRICITY SECTOR

India currently suffers from a major shortage of electricity generation capacity. The electricity sector in India had an installed capacity of 298Gigawatt (GW) as of March 2016, the world's fifth largest. Captive power plants generate an additional 34.44GW. Thermal power plants constitute 70% of the installed capacity, hydroelectric about 14 % and rest being a combination of wind, small hydro, biomass, waste-to-electricity, and nuclear.

In terms of fuel, coal- fired plants account for 58.5 % of India's installed electricity capacity, compared to South Africa's 92%; China's 77%; and Australia's 76%. In December 2011; over 300 million Indian citizens had no access to electricity. Over one third of India's rural population lacked electricity, as did 6% of the urban population; of those who did have access to electricity in India; the supply was intermittent and unreliable. India continues to be characterized by low per capita consumption of energy, poor quality of energy infrastructure, skewed distribution and inaccessible and costly energy availability [9].

Plant load Factor-There was increase in Plant load factor since 2005-06 onwards till 2009-10 and then there was regular decrease in plant load factor and in 2013-14 plant load factor is 70.76. The major reason for low plant load factor is unavailability of fuel i.e. coal and also in some cases there is transmission constraints as NEW grid has limited TTC (Total transmission capacity) to Southern grid and generating station located in NEW grid region not able to sell their power to southern grid this led to their unit remaining idle.

Per-Capita consumption of electricity-Per-capita consumption of Electricity in 2011-12 is 879.22kWh. , in contrast to the worldwide per capita annual average of 2600 kWh and 6200 kWh in the European Union. Temperature difference could be the reason for consumption of electricity as these European countries are colder and they require more heating equipments which consumes more unit of electricity.

AT & C Losses-India is gradually improving in aggregate technical and commercial loss. In 2004-05 India's AT&C loss was 34.33% and in 2010-11 it improves to 26.15% it is still very high and government is taking initiatives like R-APDRP (Restructured accelerated power development and reform program) to improve it to below 12%.

INDIAN POWER SECTOR POLICY REVIEW

The following are the main features of the new policies/ regulations:

Inception of Power Trading Corporation, 1999

- Facilitator for market participant in finding counterparts.
- Low volume relative to huge demand

Availability Based Tariff, 2002-03

- Incentive for generator for efficient operations and central dispatching.
- Grid security problems due to over-draw on high UI charges

Electricity Act, 2003

- Identified trading as a distinct licensed activity.
- Provided provision for open access
- De-Licensing of Generation
- Development of multi buyer & multi seller market in power
- Introduced trading & competitive bidding for procurement of electricity

National Electricity Policy, 2005

- Measures to promote competition aimed at consumer benefits
- Promote competition for optimal pricing of power

Open Access Regulations, 2008

- Impetus for bilateral trading.
- Bilateral trading based on voluntary agreement of participants.
- Lacked transparency in price discovery.
- Transaction cost hindered smaller players from entering market
- Separation of transmission ownership and system operation
- Universal open access to transmission networks

Power exchange, 2008

- The electricity prices in transparent manner.
- Facilitating efficient trading among the player.
- Easy access to new entrants is possible.
- Clear signals for capacity addition.

National action plan on climate change, 2008

- Promotion of renewable power market through power exchanges
- Introduction of REC trading

Power market regulations, 2010

- Providing a regulatory framework for competitive markets
- Guidelines and prudential norms for setting up and operating power exchanges
- Guidelines on listing contracts on power exchanges

CERC issues new trading margin regulations 2006

Trading margin shall apply only to short term buy – short term sell contracts for the inter-state trading.

Trading margin shall not exceed 4 paisa per unit if the sell price of electricity is less than or equal to Rs.3 per unit. The ceiling of trading margin shall be 7 paisa per unit in case the sell price of electricity exceeds Rs.3 per unit.

If more than one trading licensees are involved in a chain of transactions, the ceiling on trading margin shall include the trading margins charged by all the traders put together

CERC had earlier fixed a trading margin of 4 paisa per unit in year 2006. The earlier regulations were reviewed keeping in view the increase in the risk faced by traders this is also a function of the prices of electricity. Long term agreements have been exempted from trading margin.

CERC checks price volatility in Day-Ahead Markets-2009

- The price band is only for interstate day-ahead power market.
- The price band would be from 10 paisa per unit to Rs.8 per unit.
- This would be applicable to power exchanges and also to bilateral markets.
- The order would lapse after 45 days.

CERC Trading License Regulation 2009

The Commission has notified the Central Electricity Regulatory Commission (Procedure, Terms & Conditions for grant of Trading License and other related matters) Regulations, 2009, dated 16.2.2009. As on September 2015, the Commission has awarded trading licenses in four categories to 43 applicants for inter-state trading in electricity.

INDIAN POWER TRADING SCENARIO

Short term Power trading in India accounts for 9% of the net generation. Trading basically involves unscheduled exchange, bilateral trading and trading through power exchange. Unscheduled exchange accounts for around 40-45% of the total power traded, followed by 40- 43% bilateral trade and rest through power exchanges. The proportion of unscheduled power exchange is expected to decline in coming years due to Power Ministry continuous effort to maintain grid discipline. In bilateral trade there are sub-sections like short term trading, medium and long term trading and cross border trading. Two Power exchanges are operational in India namely M/s Indian Energy Exchange Ltd.(IEX), New Delhi and M/s Power Exchange India Ltd. (PXIL), Mumbai.

Price has been the major driver of demand in short term market- The demand in short term market has varied inversely with the prices prevailing in the market. Lower power prices have seen higher demand and higher prices have pulled the demand down. Also it is interesting to mark that the demand in short term market has varied inversely with the overall demand for electricity.

The cause for lower prices for electricity has been due to lowering of overall demand and that in return had caused the demand in short term market to hike. This quite clearly shows that as the market moves from a deficit situation to a surplus situation the demand in short term market is going to go up and the popularity of long term agreement is going to decrease.

Bilateral transaction preferred over transaction through power exchanges- The preference shown by the generators as well as the buyer is tilted towards the bilateral transaction. The bilateral transactions make almost half of total short term transaction. The main reason for this is discussed below:

Since the available product in power exchanges are term ahead and day ahead transaction so they have least priority in regards to transmission capacity allocation. On the other hand, transaction through

trading licensee one can be sure of allocation of transmission capacity 3 months in advance which have lesser chance of being curtailed. So a buyer can buy power through trading licensee and be more assured of getting the power.

In case of bidding in power exchange the corresponding time block is of one hour. On the other hand, the bidding time block in case of trading through trader is 15 minutes. The closer the bidding time the easier it is to access or predict about the real time scenario. So buyer would prefer to bid on 15 minutes basis rather than on hourly basis. This makes the bilateral transaction through the trader more popular.

A trader buys power from a generator, which may be on long term or short term and sells it to a buyer then the risks associated with the short term market are transferred from the generator to the traders. This way of risk mitigation makes bilateral trading through trader quite popular among generators.

CONCLUSIONS

India currently suffers from a major shortage of electricity generation capacity. CERC facilitated competition through the regulatory framework of availability based tariff, India Electricity Grid Code, open access in interstate transmission, interstate trading and power exchanges. Price has been the major driver of demand in short term power market. Bilateral transaction is preferred over transaction through power exchanges.

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