Power Trading in India- Way Forward

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India, with a population of 1.3 billion and an area of 3.29 million square km, is the third largest economy in the world in terms of Purchasing Power Parity. India is in a period of unprecedented opportunities, challenges, and ambition in its developmental path.

Power is one of the most critical components in creating and maintaining infrastructure and is crucial for the economic growth and welfare of the nation.

Multiple drivers (Industrial expansion, growing per capita incomes) are leading to growth in power demand. India is set to become a global manufacturing hub with investment across the value chain. India's power demand is expected to rise to 1905 TWh by FY 2022. Industrial sector has a share of more than 40% in the total electricity consumption in India. Future investment will benefit from strong demand fundamentals, policy support and increasing government focus on infrastructure. Government is committed to fulfill its vision of ensuring 24x7 affordable and quality power for all. Per capita electricity consumption in India is expected to grow from the current level of 1181 kwh at a CAGR of more than 5%.

Overview of the Power sector

India has been the third largest producer and the third largest consumer of electricity in the world with an installed power capacity reaching 370.49 GW as of May 2020.

Indian Power Sector is characterized by multiplicity of players across all segments of the Value Chain. There are more than 600 generating stations, 30+ transmission licensees, 70 odd distributions licensees, 3 Power Exchanges, 40 odd trading licensees ,the load dispatchers at the Centre, in each of the five regions and in each of the 29 states. The total installed generation capacity of 370 GW is segmented as under-:

1.	Thermal (62.4%)	
	Coal	198.5 GW
	Gas & Lignite	25.0 GW
	Diesel	0.5 GW
2.	Renewable (23.4%)	
	Wind	37.75 GW
	Solar	34.90 GW
	Others	14.70 GW
3.	Hydro (12.3%)	45.70 GW
4.	Nuclear (1.85%)	6.80 GW

As on May 31, 2020, India had an installed renewable energy capacity of 87.38 GW.

Wind energy is estimated to contribute 60 GW, followed by 100GW from solar power and 15 GW from biomass and hydropower by 2022. The target for renewable energy has been increased to 175 GW by 2022.

The Government plans to double the share of installed electricity generation capacity of renewable energy to 40 per cent till 2030.

100 per cent FDI is allowed under the automatic route in the power segment and renewable energy.

India's power sector is forecast to attract investment worth Rs 9-9.5 trillion (US$ 128.24-135.37 billion) between FY19-FY23.

Total FDI inflow in the power sector reached US$ 14.98 billion between April 2000 and March 2020.

Overview of Power Trading and New Developments

Power Trading is in a transition phase and the energy mix is changing in a big way. The transmission infrastructure has improved a lot in the last 3-4 years. There are also challenges attached to the power sector like inefficiencies in the distribution value chain with large outstanding discoms dues. With more renewable energy (RE) integration, there will be a robust RE market available for better integration and to better absorb RE power into the grid. The need of the hour is to introduce new initiatives in the market like market based ancillary services and also working towards having bilateral contracts in power exchange and also the initiatives for renewable power to be traded through an efficient market.

The renewables need to be allowed a free market. According to the Electricity Act 2003, anyone who is a bulk consumer with more than 1 mega watt (MW) consumption, should be given open access and should get his own supply on his own terms which means, the choice of the type of power and provider lies with the consumer. There are some states where this has not picked up because of certain charges restraining true open access. Their cross subsidy charges are on a higher side. States should ideally enable discoms to source power as per their need and hence ensure a proliferation of open access. There is a need to recognize the benefits of a competitive market trade and deepen the market to let consumers having access to round the clock power.

The real time market will definitely help to deal with the concerns of uncertainty that renewables face with regards to forecasting and profiling.

Let a separate green market platform be launched by the power exchanges. With this, there will be a trade in green energy on an exclusive basis along with competitive price discovery of renewable energy in the market, and

buyers will also be able to meet renewable purchase obligation (RPO).

People have started complying with RPOs in the last few years. It is the expectation that REC prices will come down over time as more generators are issued RECs for selling power.

In the recent past, the Power Exchanges have introduced several new products (new order types). This is a positive move, as introduction of new products will allow participation by new and emerging players. Besides the concerns of the small players should also be addressed by providing a level playing field to all participants.

With only 4 per cent of India's generated power transacted through the exchanges, there is enough headroom for the exchanges to expand their operations.

At the policy and regulatory levels, a significant impact can be made to increase the volumes traded on the exchange if the state generators are encouraged and enabled to participate in the market. Further, with the increase in the liquidity in the Power Trading market, financial contracts/ derivatives may also be introduced after a due consultation process to make the market more vibrant. In this arrangement, power delivery under all the contracts including the long term PPAs will take place through the Power Exchanges at the MCP. The difference between the MCP and the bilateral contract price will be separately settled. Thus the short –term Power Trading market is slated to witness the next milestone in its evolution with the above initiatives.

The Indian Power sector is gradually moving away from multi –decade generation contracts with limited dispatch flexibility to short term and spot electricity markets. This transition is mainly owing to a rapid decline in the cost of power from solar photovoltaic and wind projects, aggressive national renewable energy targets, renewable purchase obligations, greater flexibility in the allocation of coal to thermal power plants (recently commercial mining of thermal coal has also been allowed), and ongoing efforts to improve the financial health of discoms. However, in order to facilitate the transition towards spot and short term markets from the policy and regulatory stand point, there is a need for proper contract regulations and spot market design, incentives for spot market participants, tools to hedge risks and maintaining competition in the markets.

The market segments of the Power reveal that the market share of the short term Power trading is increasing with the passage of time as shown hereunder:-

	FYI 2009	FY 2019
Long Term		
PPA for over 25 years through long term	93.86%	88.3%
Short-Term	6.1%	11.7%
Exchanges	0.4%	4.0%
Through traders	3.2%	4.1%
Direct Bilateral	0.5%	1.5%
Unscheduled interchange	2.1%	2.0%

The Product segments in the short term market are of the following types-

- Day-Ahead Market
- Intraday Market & Day-Ahead Contingency
- Term-Ahead Contracts
- Renewable Energy Certificates
- Energy Saving Certificates
- Real Time Market

Real Time Market

A major milestone was achieved in the history of Indian Power sector on 1st June, 2020 with the introduction of the real-time market (RTM) for electricity trading. This RTM platform will provide buyers and sellers an organized platform for Power trading just an hour before delivery, enabling Discoms and Industrial open access users to manage their demand while allowing Gencos to sell unexpected surplus power. Hitherto, electricity could be delivered through spot contracts on the same day, next day or on a weekly basis. This development has put Indian electricity market amongst the league of the few electricity markets in the world that have a real-time market.

Short-term Power Trading Trends :-

During 2019-20, short term trading volumes were recorded at 137.16 billion units (BUs), which accounted for 11% of the total generation (excluding renewables and captive generation) during the year. The remaining 89% power was procured by discoms through long term contracts and short term intra –state transactions.

Since 2014-15, the volume of short term transactions has grown at a compound annual growth rate(CAGR) of around 6.7%. Power generation, meanwhile, grew at a much slower pace, with a CAGR of only 3.54 per cent during this period.

Of the total volume transacted in the short term market during 2019-20, the volumes traded through trading licensees and power exchanges together accounted for around 63% (86.4BUs). The remaining share came from volumes transacted through the deviation settlement mechanism (DSM) transactions and bilateral transactions between discoms that accounted for share of 16.5% (22.59BUs) and 20.5%(28.17BUs), respectively.

During 2019-20, an aggregate volume of 56.45 BUs was transacted on the two power exchanges in the day –ahead market (DAM) and the term –ahead market (TAM).This was an increase of 5.5% from53.52 BUs recorded in the previous year.

Of the total volume traded, 49.16BUs were traded in DAM, while the remaining 7.29BUs were traded in TAM.DAM is the electricity trading market for delivery on the following day, while TAM allows delivery of electricity up to a duration of one week

The majority of the Day ahead volume was traded on the country's first and largest exchange, the Indian Energy Exchange (IEX) at 49.11BUs. In TAM, a volume of 4.77 BUs was transacted on the IEX platform, while

the remaining 2.52BUs were transacted on PXIL platform. The monthly weighted average price of electricity traded through the exchanges during 2019-20 ranged from Rs2.56 per unit to Rs3.58 per unit at IEX, and fromRs2.58 per unit to Rs 3.71 per unit at PXIL.

During2019-20, about 29.95BUs of electricity were transacted bilaterally through traders. In 2019-20, the weighted average price of electricity transacted through traders ranged from Rs3.61 per unit to Rs 5.15/unit.

A growing number of industrial consumers have turned to power exchanges owing to competitive prices. In 2018-19, over 4950 open access (OA) consumers procured power through the two exchanges, as compared to around 4807 consumers in 2017-18.

REC Trading

During 2019-20, 8.8 million renewable energy certificates (RECs) were transacted on the two power exchanges, compared to 12.6 million RECs during 2018-19. The market clearing volume of solar and non-solar RECs was 2.31 million and 6.49 million, respectively, during 2019-20.

The monthly weighted average market clearing price for solar RECs ranged between Rs 1800 per MWh and Rs 2400 per MWh on the two exchanges, while for non-solar RECs, it ranged between Rs1000 per MWh and Rs 2,200 per MWh.

As mentioned earlier, in June2020, real –time market (RTM) trading was launched by IEX and PXIL. Currently, consumers, including discoms or captive users, can buy power one day in advance in DAM at Power Exchanges where trading is done for two hours daily from 10 am to 12 noon. Under the RTM framework, there would be 48 sessions of half an hour each in a day, which means the trading of electricity would be done round the clock and power delivery can be scheduled at an interval of one hour.

The development is expected to help utilities and OA consumers manage power demand supply variation and meet 24x7 power supply aspirations in a flexible, efficient and dynamic way.

Power Market Regulations, Market Coupling and MBED

CERC have notified the draft Power Market Regulations in July '2020. These Regulations will apply to the Power Exchanges, the OTC market and also the other Market participants. These Regulations in their scope will cover all the contracts transacted on the Power Exchanges, Renewable Energy certificates, Energy saving certificates as well as contracts in the OTC Market.

Among other things, the draft regulations provide for a new concept called Market Coupling.

Market Coupling means that all the buys and sell bids would be matched by a 'market coupling operator' so as to arrive at a uniform market clearing price. The CERC defines 'market coupling' as a process whereby collected bids from all the power exchanges are matched, after taking into account all bid types, to discover the uniform market clearing price. When this happens, it will not matter through which exchange you trade. The Government wants to bring it in for electricity trading with a view to bring down the market price of power. Market Coupling comes along side another power market reform called Market-Based Economic Dispatch (MBED) of electricity. Under MBED, all buyers and producers of electricity must buy and sell power only through exchanges even if they have bilateral PPAs. The generators will be paid the fixed charges as per the agreement, but they will have to compete in the market on their variable cost, the cheapest generators get to sell first, a big boom for the renewable energy producers.

These regulations have come in the backdrop of the Government allowing electricity to be traded as any other commodity with Forward contracts and derivatives on exchanges.

It is now being envisaged that in the times to come, India will be heading towards 100 per cent trading of power through Power Exchanges.

Way Forward

The urgency for change in Indian power markets is very real, given the pains the sector is feeling at the moment. The power markets in India are maturing with power becoming more a tradable commodity. The portfolio of different types of power – Thermal (Coal / Gas), Hydro, Solar, Wind, Nuclear and Storage – is becoming complex due to price variations, uncertainties involved and geographical distribution. The market is becoming more price sensitive with private players gradually becoming more dominant on the generation side and also increasing their presence in the distribution side. Under such circumstances, the role of bilateral PPAs is likely to get reduced in the coming times and more & more power is expected to be traded on the power exchanges. Reducing prices for the end consumers is a key goal for any market design.

New energy procurement and sale contracts like the day-ahead contracts through Power Exchanges and short-term contracts are expected to constitute a significant portion of the trading volumes. Cross border trade of electricity is also expected to increase in the coming years

CERC has been working on this model for more than a year and has now floated a draft notification of the Power Market Regulations for public comments. These regulations cover a wide range of subjects and would establish a base for real time trading in the power markets. The optimism has already set in the market with a new Power Exchange getting registered only recently (by Pranurja Solutions Ltd , promoted by BSE,ICICI Bank and PTC) and a number of others in the offing.

In the end, it is reiterated as a matter of caution, that since monitoring and surveillance of power market development is an integral part of this process, it needs to be ensured that this capability first gets properly developed before such a market is rolled out.