EU-INDIA
CLEAN ENERGY & CLIMATE PARTNERSHIP

EUI FLORENCE SCHOOL OF REGULATION

5TH EU-INDIA WORKSHOP SERIES ON "ENERGY REGULATION"

THE FIRST DEBATE ON
"ELECTRICITY TRADE – WHAT DOES THE FUTURE HOLD?"

APRIL 30, 2021
FROM 14.00 - 16.00 IST (10.30-12.30 CET)

PROCEEDINGS

Webinar: First online debate on "Electricity Trade – What does the future hold?"

On 30th April 2021, the EU-India Clean Energy and Climate Partnership (CECP) project in collaboration with the Florence School of Regulation (FSR) hosted the first of the six webinars, as part of the 5th EU-India workshop series on Energy Regulations. The theme of the series is 'Enablers for India's Renewable Energy Transition: Competition and Market Design for the Power Sector'.

The first online debate was organized on the topic "Electricity Trade – What does the future hold?", which was attended by close to 275 participants, representing policy makers, regulators, power system operators, electricity trade organizations, utilities, think tanks, consultants and academia.

1.1. Inaugural Session

Mr. Jean-Michel Glachant, Director, Florence School of Regulation welcomed the participants. He praised the cooperation between EU and India in the sectors of energy and climate change. He thanked the Indian stakeholders, including the Ministry of Power, Central Electricity Regulatory Commission (CERC) and Power System Operation Corporation Limited (POSOCO) for extending full support throughout the partnership and in the webinar series. He praised the skilled and innovative researchers and managers working in the energy domain both in EU and in India, and the added value of working together.

Mr. Florian Ermacora, Head of Unit, DG ENER, European Commission, expressed appreciation for the work being conducted with India, especially in the context of the Clean Energy and Climate Partnership. He emphasized that India is a strategic partner for the EU and that the EU has a lot of interest in working together with India. He welcomed the support by the political leaders of both the EU and India for the partnership; climate and energy will be one of the key areas of interest when the leaders meet on 8th of May, 2021. He further appreciated cooperation on smart grid and electricity market regulations with the Ministry of Power, CERC, and the Indian Smart Grid Forum (ISGF). He emphasized that decarbonization is at the center of interest in EU, as well as the security of supply, and cost of supply. The functioning of a competitive market is a key instrument for a cost effective decarbonization and security of supply; it is important to get the market structure right.

The topic of the webinar series is built around electricity as it is the most important energy carrier in the transition towards decarbonization. With wind and solar, in particular, electricity can be decarbonized most effectively. To get electricity market design right, integration of Renewable Energy (RE) into the market is needed, alongside short-term trading and an economically based dispatch (instead of priority dispatch). There is a need for a more flexible market, better market response and storage integrated into the market. There is also a need to have pro-active consumers in the market, who are able to choose suppliers, produce decentralized electricity and connected through smart grids to be involved in demand management. For decarbonization, the subsidy component would need to be reduced for fossil fuels and priority would need to be given to the grid

Mr. P. K. Pujari, Chairman, Central Electricity Regulatory Authority (CERC), expressed his appreciation for the selection of the topic which is timely and relevant in the context of Indian power sector. He provided the following key inputs:

- India's power sector is transitioning with an increasing RE share in the power system. This is a result of the Government of India's pledge to reduce emission intensity of GDP; and achieve about 40% of cumulative power installed capacity from non-fossil fuel-based energy resources by 2030.
- India has achieved RE installed capacity of 93 Giga Watt (GW) and has set a target to install 175GW of RE by 2022. Further, a target of 450GW by 2030 has been set, which would translate to five-fold increase from current RE capacity (installed as of February 2021).

- As part of the power sector reform process, India has moved from vertically integrated to market-based services; and regulators have played an important role in the creation of a market structure for the power sector.
- CERC has been working for the last several years to bring a market structure in the power sector. A lot of reforms have happened in the last few years and few are ongoing, to be achieved in the coming years. In this context, this workshop series is very topical.
- CERC has recently notified power market regulations, considering market evolution in the last ten years and looking towards future markets. The new regulations will enable innovative market, product designs, widening and deepening of the power market.
- The objective of Real Time Market (RTM) is to bring flexibility in the market to bring required real time balance while ensuring optimal utilization of available surplus capacity in the system. RTM is a half hourly market price discovery mechanism, similar to Day Ahead Market (DAM).
- Despite of the intermittency of RE sources, organized market mechanisms like RTM can enable buyers and sellers to meet their energy requirement. RTM has attracted a good liquidity and there has been an impressive participation of Distribution Companies (Discoms) as well.
- CERC will provide additional avenues for short-term transactions of RE power and has approved the introduction of Green Term Ahead Market (GTAM) to power exchanges. The objective of GTAM is to incentivize the RE capacity beyond their Renewable Purchase Obligation (RPO), which is in turn expected to promote margin capacity of RE.
- GTAM will not only benefit the RE seller by providing access to the pan India market; it will also benefit the buyers of RE through competitive pricing and flexible procurement. Energy schedule through GTAM contracts is considered as deemed RPO compliance for the buyers. CERC is also working on market based ancillary services, which are an indispensable part of the power system operations, which is required to improve and enhance the reliability of the power system.
- CERC is also engaged in discussions for a framework for Market Based Economic Dispatch (MBED), which envisages improvement in DAM to provide further optimization in scheduling and economic dispatch of generation capacity on day ahead basis. However, there are some difficulties such as treatment of legacy contracts, to be addressed. MBED will help tap competition in the market and improve efficiency.
- Announcement in the Union budget 2021-22 is aimed at bringing competition in the retail supply business. CERC is in discussions with various international regulators and think tanks to understand experience and best practices to redesign the wholesale electricity market in India, as well as to create an electricity framework for integration of intermittent RE sources.
- Discussions with EU experts can help India in drawing lessons from European experiences and would suggest possible solutions for policy makers and regulators.

Mr. K.V.S Baba, Chairman and Managing Director, Power System Operation Corporation Limited (POSOCO), mentioned that the current knowledge sessions are conducted at the right time, wherein India is transitioning at various fronts towards power optimization. POSOCO, as a system operator, always tries to assess the most economical power availability to the consumers. He reiterated the point made by Mr. Florian that the availability of transmission grid is key to efficient and excellent market. India has one of the largest grids, which is efficient and has helped enable policies and regulations to facilitate and enhance the market participation. He emphasized the move towards economic scale and optimization of power, and indicated that there is tremendous scope for information exchange between stakeholders.

Flexibility in generation, transmission, distribution and markets is a corollary to renewable energy and POSOCO as a system operator is also trying to incorporate the dynamics in its operations. Several interventions, for example security constrained economic dispatch have been tested for improving the

economics of operations. He stressed the need for a strong knowledge base for the efficient electricity sector; and these webinars will facilitate exchange of knowledge and practices across India and Europe and will be very beneficial to help develop the electricity markets.

1.2. Panel Discussion

Mr. Alberto Pototschnig, Deputy Director, Florence School of Regulation, provided a presentation on EU's experience in promoting competition in wholesale electricity trading. He made the following points:

- He compared the Indian power market to the Europe's market, as the power consumption in India is 2/3rd of Europe's and India is geographically spread with a single jurisdiction. He suggested that the experience of Europe would be relevant for India.
- The EU Energy Liberalization Model includes competition in generation and distribution, unbundling of Transmission and Distribution (T&D), power exchange for wholesale electricity trading. The trading at power exchanges in Europe happens as-
    - single-price, two-sided auctions; and
    - hourly products (except for Great Britain which has half-hourly products).
- The EU Internal electricity market has gradually integrated from National markets to Regional markets and then merged into EU Internal electricity market.
- The EU Electricity Target Model, which also contains DAM, has transitioned from Long-term Physical Bilateral Trading (Power Purchase Agreement - PPA) to-
    - Physical trading on short-term (spot markets), and
    - Hedging through long-term financial instruments.
- Due to non-storability of electricity, the trading outcome determines the pattern of production. Liquid organized trading increases welfare gains by facilitating the matching of demand and supply.
- Multiple Organized Market Places (OMP) help in competitive activity. A well-functioning short-term spot market can be achieved with OMP operating in the same market areas. In the EU, both monopolistic OMP and OMP competitions are allowed. However, countries like Italy and Spain work on monopolistic OMP.
- Liquidity in electricity trading – EU market coupling requires the sharing of order books, thus promoting pooling of liquidity. Nordic countries allow cross-zonal trades, whereas Italy allows purchases by the single buyer.
- DAM coupling in EU has helped increase efficiency from 61% in 2010 to 88% in 2019; with an estimated annual benefit of Euro 1 Billion to the EU energy consumers.

Mr. Arnold Weiss, Senior Regulatory Manager, EPEX SPOT, mentioned that power trading is the third pillar in the electricity value chain. He discussed -

- How an organized market provides access to an anonymous market, level playing field between members, financial guarantees through the clearing house, few standardized but liquid products, calculation and publication of transparent and neutral price references, and is easy to regulate.
- EPEX SPOT is a spot power exchange which organizes DAM and intraday markets in Europe.
- DAM involves auctions at noon, 7 days a week, and year-round; 24 hours of the following day are traded with hourly products, with focus to optimize liquidity. Intraday market, on the other hand, is a continuous trading and price formation which happens 24 hours a day, 7 days a week, year-round. with

products from 15/30/60 minutes. Both market segments support cross-border trading in single day-ahead and intraday coupling, respectively;

- The overall share of power traded on power exchanges (including derivatives and cleared trades) has increased from roughly 15% in 2010 to 40% in 2019. RE has expanded considerably during this time, and contributed to the increasing role of exchanges for short-term markets.
- Taking monthly wind generation in Germany as an example, volumes of aggregators in EPEX SPOT day ahead markets generally correlate highly with the generation of renewables. The DAMs are used as a major tool to market RE based electricity. Intraday volumes of aggregators have been increasing since the introduction of direct marketing. RE intraday trade on exchange directly depends upon forecast errors for intermittent renewable generation.
- A preferred market design is one which is a combination of Short-Term, Small-Sized and Fast Trading Mechanism, supported with regulatory framework and business environment. Short-term would mean successful lead time reduction on EPEX SPOT Intraday markets; Small-sized would mean sub-hourly contracts, such as 15/30 minutes, responding to market needs; and fast with the support of robots and Application Programming Interface (API).

Dr. Rajib K. Mishra, Director (Business Development & Marketing), PTC India, briefed about the company's portfolio in the trading domain.

- PTC India started with 1.6 Billion Unit (BU)s traded in the financial year[1] 2002 and has grown to trade 80BUs in the financial year 2021.
- In India, short term market has maintained a share of 10% of total electricity generation. Short term market has grown at rate of 8% since 2009-10. About 65% of all electricity traded is undertaken by power exchanges or traders, and balance are either directly traded between Discoms or as part of Demand Side Management (DSM).
- During 2020-21 which witnessed COVID-19 pandemic, the short-term trading has increased from average 10% to a peak of 15%.
- Unlike Europe, India has come up with products in terms of green energy market, which has evolved in three stages –
    - Feed-in-Tariff (FiT),
    - Renewable Energy Certificate (RECs), and
    - bidding for long-term Power Purchase Agreement (PPAs) for green electricity.
- RTM is a new market segment which started trading in June 2020. The RTM facilitates 15-minute contracts, double sided anonymous auction bidding, delivery can be made within 1.5 hours of requisition, and delivery point is regional periphery.
- GTAM was launched in August 2020 by Indian Energy Exchange (IEX) and in March 2021 by PXIL. GTAM trades based on solar and non-solar electricity and through intraday, Day Ahead Contracts, daily and weekly.
- MBED is expected to redesign trading across DAM in India. It is further expected to increase trading volume substantially and help reduce cost of power procurement.

He iterated the need to create a market base in India, and facilitate knowledge sharing between buyers and sellers.

[1] Financial year in India spans from 01st April of the current year to 31st March of the following year. Financial year 2021-22 would mean 01st April 2021 to 31st March 2022.

Mr. Rajesh Mediratta, Director- Strategy & Regulatory, IEX shared that in the last few months, IEX has traded 20-25% volume in RTM. He appreciated RTM market as it suits Indian context and is expected to replace Intraday market largely in India, and some parts of DAM and DSM as well. He further shared -

- IEX started with RTM trading in August 2020 with 3-4 Million Units (MUs)/day, which has now increased to 10-15 MUs/day. IEX is planning to bring Green DAM in next three months and will have a separate unit within IEX for green trading.
- India's DAM is similar to Europe's DAM, and has moved from an hourly market to 15-minute market back in 2012. Feedback from the stakeholders has suggested that as of now, there is no need to move towards a 5-minute market, but with increase in RE share in times to come, the option can be explored.
- Cross Border Trade (CBT) has also increased and it constitutes 5% of total DAM at present. CBT is expected to evolve as a separate market segment, and it is expected to create bigger regional markets across South-East Asia.
- As of now, IEX is facilitating trade with Nepal, and will soon work towards Bangladesh, Bhutan and Myanmar and may expand the entire market on the lines of OSOG – One Solar One Grid framework. This kind of arrangement will help support better energy security for the market. This will also help diversify energy mix while exploring high hydro potential in countries like Nepal and Bhutan, and with thermal and gas-based generation in Bangladesh. Coupling, as undertaken in Europe, will help India once CBT grows further.
- More lessons should be drawn from Europe and should be included in next webinars. One such product is Contract For Difference (CFD) which can be implemented in India.
- CFD would work on a voluntary basis. In India, long term PPAs is required for RE, however, buyers may not be sure if they would have the demand for next 25 years; hence CFD can be beneficial in such cases. In this case, an aggregator can seek expected price from the RE project owner and can sell electricity in the market at strike price. The difference between the strike price and the expected price of the seller can be settled by the participants. This model can be very relevant to attract more RE capacity.
- CFD can enable a mechanism wherein Multi-National Companies (MNCs) looking for green capacity can sign a contract and sell electricity in the market, and the green attributes generated from the RE electricity can be accrued to their account. However, such mechanism does not exist in India, as on date.
- Another segment that can be considered is Futures and Derivatives, which Europe has already undertaken, and is expected to be launched in India in the current financial year – 2021-22.
- Europe can help India in bringing in the aggregators or virtual power plants, which can help system operators improve system balancing, which will be win-win for all participants.
- India has a sizable demand in agriculture load which can play an important role in RE integration. He mentioned that the agriculture constitutes about 20% of the total load. Industrial loads can also be managed to source increased supply from RE depending upon resource availability such as solar irradiation.

Mr. Prabhajit Sarkar, Managing Director and Chief Executive Officer, Power Exchange India Limited (PXIL) briefly discussed about evolution of competitive power market in India through policies and regulations, and subsequent setting up of power exchanges in India. Through a presentation, he discussed -

- PXIL has traded 79 BUs of electricity in the year 2020-21 and traded 0.92 Million Renewable Energy Certificates (RECs) during the same period.
- Product portfolio on power exchanges can be categorized between certificate trading and energy trading. Of all the electricity generated, only 4% transactions are managed through power exchanges in India.

- In the future, it is expected that some more trade mechanisms such as Integrated Day Ahead Spot (separate price discovery for RE power), longer tenure contracts (no delivery restrictions), capacity contracts, integration of CBT (Nepal, Bhutan and Bangladesh to begin with) and financial contracts in form of electricity derivatives can be introduced.
- The current power exchange market in India, wherein two exchanges – IEX and PXIL undertake the power trade, which has in turn resulted in monopoly in the market. Experience from Europe can help in market coupling, and in allowing multiple Nominated Electricity Market Operators (NEMOs) to operate in the same geography in the benefit of competition.
- He suggested next steps for the power market in India –
    - Transactions at ease within the country
        - Issues of open access still block most industrial consumers from participating directly,
        - Ability to purchase and manage load-generation balance responsibility,
    - Appropriate price signal for energy
        - Split order-books for in Day Ahead Spot demonstrate sub-optimal outcomes,
    - Assured payments for energy transactions, which have been achieved to a large extent already,
    - Provide transactional avenues for specialized forms of generation, especially for RE.
    - Single price signal for contracts,
    - Price signal for siting generation/transmission investments,
    - Optimum utilization of generation resources through means such as MBED
    - Integration of all sources of energy and link with incentives on demand supply side.

  He suggested that the correct market design would enable the growth of the power markets in a robust and scalable manner.

1.3. Questions and Answers

There were few questions asked by the moderator, based on the questions received from participants, from the panelists.

- Question – what are the quick one/two lessons from Europe for India?
    - Response by Mr. Alberto Pototschnig – India has a very sophisticated power trade mechanism.
        - Power exchanges should compete for services provided,
        - Market coupling with increase in CBT.
- Question – How to undertake reconciliation between physical and institutional flows, given network codes? and what can commercial NEMOs take away from European experience?
    - Response by Mr. Arnold Weiss – Market coupling can learn from Europe wherein capacities are allocated; they take orders at the border and try to link them and optimize for exchange of power. NEMOs have to follow coordinated procedures to ensure all comply to same rules to calculate capacities on respective borders. He suggested to allow market participants to choose their market access. He highlighted that too binding rules might harm efficiency of the market. He suggested to set right incentives like choosing price signal is more reliable can help.
- Question – what would be the wish-list given the products possibly available for India?

- Response by Dr. Rajib K Mishra – Future and derivatives will need some time to be established in India. CFD and aggregation model, and promotion of RE would be interesting in Indian market in next 1-2 years.
- Mr. Rajesh Mediratta – CFD, with clarity whether it would be a financial instrument and the regulatory body to manage the same. One learning from Europe is that all trades which happen before real time are financial trades. Transaction charges should be applied only on the net transactions; and participants should be allowed to correct their schedules. Another learning can be to disallow any revision to Day Ahead schedules beyond a point, as it creates risks for the other parties.
- Mr. Prabhajit Sarkar – Greater degree of RE integration through defined marketplaces, such as spot market. Allowing market-based mechanism to ensure adjustments in terms of portfolio management, rather than adopting DSM or revision in schedules. Visiting spot market structure, in terms of market coupling and one market with common price, which will ensure buyers and sellers have an optimized experience while participating. This would pave the way for all other contracts that can subsequently come in and ride on the liquidity of such kind of collective spot markets.

1.4. Closing remarks

Mr. Matthieu Craye thanked all the panelists for the presentations and rich discussion, which brought out avenues for mutual benefit to India and EU. He highlighted that the reliability and security of supply, and economic cost for customers through market-based mechanisms are key. Market coupling would inspire in designing the way forward. He stressed upon need to integrate more renewable energy into the grid, which once done through market mechanisms would lead to reduced costs and subsequently reduced electricity prices for end consumers.