

A TLG Roundtable Discussion

# India's Electricity Markets Development

## Issues Note

### When

Date: 21 June 2024

Time: 4:30 - 9:30pm

### Where

Oak Room  
India Habitat Centre  
Lodhi Road, New Delhi  
Delhi 110003, India

With the enactment of the Electricity Act in 2003, India delicensed generation and selected the path of market led development of the power sector, though state owned entities at Centre and States continued to have a significant role in generation, transmission and distribution. Power exchanges began operations in 2008 and long-term power procurement through tariff-based competition became the norm around the same time. India opted for the instrument of Renewable Purchase Obligations for promoting renewables along with the Renewable Energy Certificate (REC) mechanism.

India has achieved remarkable success in generation capacity addition (meeting 250 GW peak load recently), expansion of transmission along with investor friendly access through General Network Access and Point of Connection transmission pricing, universal access to electricity, and one of the most competitive solar and wind generation costs in the world.

But major challenges remain in terms of the tight demand supply position, dominance of fossil fuels in electricity generation, price volatility in the short-term market due to low liquidity, rigidity in retail tariffs in the regime of free/highly subsidised electricity, heavy dependence of long term PPAs, general reluctance of distribution companies to contract enough renewable power, and meeting the requirement of flexible resources, which need to be addressed in the near future to ensure secure and reliable grid operations.

While the electricity markets were still gaining maturity, a new dimension has been added in terms of national commitment to decarbonise the power sector with the projected very large share of solar generation, followed by a significant share of wind, whereas prospects of support from nuclear, hydro or gas-based capacity addition appear to be very modest at least in the next ten years.

The present situation can be briefly summarised by the lack of new PPAs by discoms, emergence of PPAs by C&I consumers to meet their green obligations, plummeting prices of RECs, some discoms opting for Firm Dispatchable RE (FDRE) contracts, few capacity contracts for BESS, price cap in exchanges remaining in place for more than a year, regulatory attempts at seeking optimisation through market coupling of exchanges with SCED, and deferment of MBED implementation.

It is in this background, Ministry of Power had set up a Group in year 2022 to recommend a roadmap for development of the electricity market in India. Its TOR focused on how to change the structure and system of power purchase and sale in the country, including the reforms needed in PPAs for increasing investment, efficiency and competitiveness of the markets. It was also to examine the feasibility of converting existing long term PPAs to market mechanism. In its report submitted in March 2023, the Group has given several recommendations including comprehensive Resource Adequacy planning, competitive procurement of RE for market participation supported with revenue protection mechanisms, introduction of standardised exchange-based capacity contracts initially for short-term and thereafter long-term capacity contracts, implementation of MBED in 2-3 years for the entire Inter State Generation Fleet, and the introduction of products for hedging of price volatility in spot markets

While there are generation plans issued by CEA, administrative decisions are being made to have 500 GW of non-fossil based capacity and an additional approximately 90 GW coal based capacity by 2030. Resource Adequacy guidelines have been recently issued in 2030 but the planning frameworks being used are mostly those relevant for the era of fossil fuel dominated generation.

The Roundtable aims to present expert knowledge and international experience on implementation of such measures for informed deliberations among the key stakeholders in the power sector of India including financial institutions, in order to assist the process of developing the electricity markets.

Some of the key questions we would like to address in the deliberations are:

1. Whether the framework being used currently for Resource Adequacy is appropriate for a high RE scenario.
2. Whether the procurement auctions should be taken up by individual states or should be taken up centrally.
  - a. If each state develops its own resource Adequacy Plan, what mechanisms / institutions / design of capacity markets be implemented so that capacity development at the national level is optimised, and the instances of stranded assets is minimised?
  - b. If each state develops its own Resource Adequacy Plan, what processes could be implemented to ensure that the distribution of resources (Hydro, Solar, Wind, Biomass) is optimally utilised?
  - c. When solar and wind resources are concentrated in a few states, who should procure balancing capacities that may be located in different states, e.g. hydro and gas resources may be located in different states. Another example, with high solar in places like Khavda (Gujarat) and Leh, who should bear the costs of investing in the corresponding balancing assets?
  - d. What contracting mechanism could lead to lower costs of integrating RE assets: (i) Should the developer ensure RTC or FDRE supply at its metering point?. Or (ii) Should the DISCOMs be responsible for procuring supplies from varied resources such that the supply availability at the state boundary is firm and dispatchable?
  - e. Which of the above is more amenable to a capacity market design construct?
3. Are capacity credits reliable measures for procuring RE capacities? What are the risks of using the concept of capacity credits? Are there any alternatives? How does this impact the design of capacity markets?
4. What should be the key elements in the design of capacity contracts or CFD so that while investors are protected from the risks of projected price volatility in high RE scenario in the next few years, the design also creates incentives for supporting efficient market processes.
5. How can the design of capacity markets concomitantly with CfDs and special government incentives for storage systems impact the efficiency of short-term markets? What market design considerations must be taken care of to prevent market inefficiencies?
6. Should capacities required for Ancillary Services be allowed to be procured from Capacity Markets? Who should procure, and when?
7. Whether the existing system of long term PPAs is appropriate in which most of the risk is borne by the buyers.
8. Whether the bid in procurement auctions be evaluated exclusively for the lowest LCOE or the process should also incorporate the impact of such procurement on overall system costs arrived at by deeply granular models for optimising the future capacity expansion.
9. How to socialise the costs involved in providing revenue protection to the investors.
10. Are conditions ripe in Indian power markets for introducing new types of procurement contracts.
11. What are the options available for transitioning the legacy PPAs to MBED.
12. How do generation-based Contracts-for-Difference (CfDs) differ from generation-independent CfDs, and what are the potential implications of these differences for the design and implementation of CfD schemes.

13. What are the challenges in the design of generation-based CfDs concerning distortive effects on intraday and balancing markets, and what further conceptual developments are needed to address these issues as the volume of renewable energy under CfD schemes increases?
14. To what extent can 'smarter' CfD designs mitigate weather-related risks for renewable energy producers, and what specific design features would be most effective in addressing these risks?
15. How do different CfD designs interact with other long-term market segments, such as Power Purchase Agreements (PPAs) and forward markets, and what impact does this have on the overall attractiveness and functionality of these markets?
16. What are the potential effects of CfD designs on hybrid plants that produce both electricity and hydrogen, as well as on plants with other types of self-consumption, and how can these designs be optimised to provide appropriate incentives?
17. How can secondary policy objectives be effectively integrated into CfD designs, and what are the advantages and disadvantages of addressing these objectives within CfD frameworks versus through general market rules or auction design specifications?

The Roundtable is the first such step and could be followed up by more such deliberations as we roll out the roadmap.