Electricity Markets of the Future

Supporting Structural Reforms in the Indian Power Sector

Anish De, Partner and Head- ENR, KPMG in India

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Outline
The dynamics of energy sector investments are changing

Low-carbon power & grids accounted for 85% of total power spending in 2018
Investment in battery storage rose by 45% to a record of over $4 billion in 2018
China and India will remain the largest market for renewables investment in Asia

Source: IEA World Energy Investment 2019
Increasing RE penetration will drive the need for flexibility solutions

1 Illustrative Example: California load curve net of solar and wind in FY 2017

2 Illustrative Example: Typical Indian load curve net of solar and wind in FY 2022

To counter the variable and uncertain nature of RE, demand for balancing & ancillary markets and consequently for new business models and products will grow
Renewables are assuming centrality in power sector. Due to **variability** and **intermittency** planning, commercial and regulatory arrangements, systems and processes need radical changes.
Other critical challenges that need to be addressed

1. Power purchase and dispatch mechanisms
2. Fuel Allocation mechanisms
3. Stressed Assets
4. Network utilization and system operations
5. Utility sustainability
Current state of play:

- Long term contracts (up to 35 yrs): 90% of all trades
- Bilateral short-term contracts (1 yr or less): 4% of all trades
- Day ahead market: 3-4% of all trades
- Intra-day market: Negligible volumes
- UI/AS Regulated Mechanism (2% of market)

Possible changes:

- Shorter, more flexible contracts
- More exchange traded contracts, Trading in Futures and Derivatives
- More liquidity over time with changes in long term contracts
- Real Time Market (RTM)
- Transition from administere d to multi-product AS market mechanism
- Tightened imbalance settlement band. High deviation costs
- Potential game changing impact on market if Carriage & Content separation is legislated and implemented

In the progression to deeper markets future exchange traded products could include (a) OTC forwards with standardised contracts (b) Contract for Differences (CfD) (c) Financially settled trades (d) Derivatives
For markets to have significant impact, choices are to be made

Archetype A: LT contract driven Command & Control structures

- Mandatory demand coverage/capacity adequacy
- Enforcement and penalties for above
- Centralised merit order dispatch

Archetype B: Thin markets (present markets)

- LT contract dominated. Trading in residuals
- Mandatory demand coverage/capacity adequacy
- Enforcement and penalties for above

Archetype C: Significant markets

- Markets serve as reference for transactions
- More platform traded products. Large market share of such products
- Transmission access overhaul
- Practicability in federal structure/state ownership
- Adequacy of price signaling by thin markets

Archetype D: Full markets

- Substitution/migration of traditional LT contracts. Vibrant DAM
- Deep financial markets
- Very strong surveillance
- Deep distribution reforms

Requisites for success

Considerations

Discussions on AS and RTM have generated significant awareness and momentum. The general view that is emerging is that subject to requisite ground-work, the stage could now be set for significantly deeper markets
Getting the building blocks right…

- Better planning and forecasting
- Transmission planning and access
- Revision of gate closure norms
- Institutional capacity creation
- Enforcement of capacity adequacy measure
- Step up governance
- Fuel market reforms
- Data disclosure
Way forward: What could be done from here…

**Long Term Market**
- Redesign PPAs – shorter term with flexibility for periodic review
- Signal capacity addition using long term planning and forecasting, gradually moving to Capacity Markets
- Move towards retail competition
- ‘Obligation to Serve’ to subsume quality of supply

**Medium to Short Term/ Day Ahead**
- Increase supply in electricity markets – by reducing price volatility and encouraging participation of Discoms/ Gencos/ IPPs
- Equip Discoms and LDCs with tools to support forecasting, scheduling and dispatch
- Ensure compliance with Declared Capacity
- Discourage contract reneging on DEEP portal
- Alternative for post-facto bill revision to reflect change in Variable Cost
- Fuel Market Reforms – increase fuel availability and access to IPPs, reduce price volatility, induce competition in mining
- Introduce Financial products such as Contract for Difference (CfD), Derivatives

**Real Time/ Intra-Day**
- Introduction of Gate Closure mechanism to increase URS supply
- Introduce Auction based mechanisms in Intra-Day market
- Market based on System Marginal Price
- Need for more granular intra-day products, especially in RE rich states
- Transition from AS mechanism to AS market – introduce new products, generators and technologies
- Approach for market power mitigation
- Introduce Real Time market

**Regulations for ensuring Data Availability and Disclosure**

**Institutional and People Capacity Creation**
A possible time line for changes: Reforms happen in Modules

Modularity Framework of Reforms

- **Module Wholesale Electricity Markets**: DAMs, RTMs
- **Module Balancing and Ancillary Services Markets**
- **Module Transmission Access Rights**
- **Module Distribution Access**
- **Module Retail Markets**

**A version of DAM is already in place – Increase in depth will require changes in fuel and capacity adequacy mechanisms.**

RTMs expected within the year 2019

Associated Financial Products and CfDs (along with deepening of DAMs by 2020)

AS Markets – last quarter of 2019 / early 2020

Distribution Access – Already exists in “parts” but will be strengthened concomitantly with RTM

The above will happen concomitantly with **Module Long Term Contracts** and **Module Capacity Markets/ Mechanisms** and also **Module Decarbonisation** (which has been implemented in parts but without a strong overall framework that supports reliable and predictable deployment)*

* Excludes Module Fuel Markets due to jurisdictional issues. However power market reforms would greatly benefit from reforms in the fuel markets, which have been otherwise slow or have stalled
Thank You