

# Power Chronicle

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## Editorial

The power market has observed increased competition in short-term transactions, while long-term market remains mixed with continued reliance on regulated tariffs for conventional capacity and reliance on RE competitive bidding. A vacuum in the mid-term market exists that discover price through competitive bidding. The DEEP platform offers limited solutions due to the lack of standard contracts.

Introduction of several trading products may disrupt liquidity and hence, competitiveness for price discovery of existing products leading to cannibalisation. Phased introduction of new products can address this to some extent. Relevance of long-term RE products may suffer due to non-reliability of long-term RE forecast. Success of such products depend on contract availability which allow traders to hedge risks associated with RE generation. Proliferation of additional contracts should also consider power exchanges for introducing competition in the short-term market. Under such context, 'any-day' contracts, akin to the illiquid DEEP platform contracts, are far less competitive.

MBED aims to introduce a mandatory mechanism for a national level price discovery wherein all existing long-term contracts would be placed for bidding and market clearing. The introduction of 'Gross Bidding' is essentially a 'voluntary' MBED mechanism. Given the broader economic merits of enhancing the optimisation space, these may bring benefits under certain conditions. Gross Bidding may serve the purpose of 'a regulatory sandboxing for MBED'. It also provides an opportunity to integrate banking transactions through market-based mechanisms, a first in the Indian power sector.

'Gross Bidding', as proposed, is akin to voluntary implementation of MBED. This may be acceptable if gains are demonstrated to market participants. Implementation of MBED requires changes in the generation tariff framework for inter-state generating stations, which provide exceptions leading to incentives that are asymmetric and uneconomical. A competitive mechanism with anonymous bids cannot consider impact, post market clearing.

**Anoop Singh**

Founder & Coordinator, Energy Analytics Lab



Register at [eal.iitk.ac.in](http://eal.iitk.ac.in) to access data and resources

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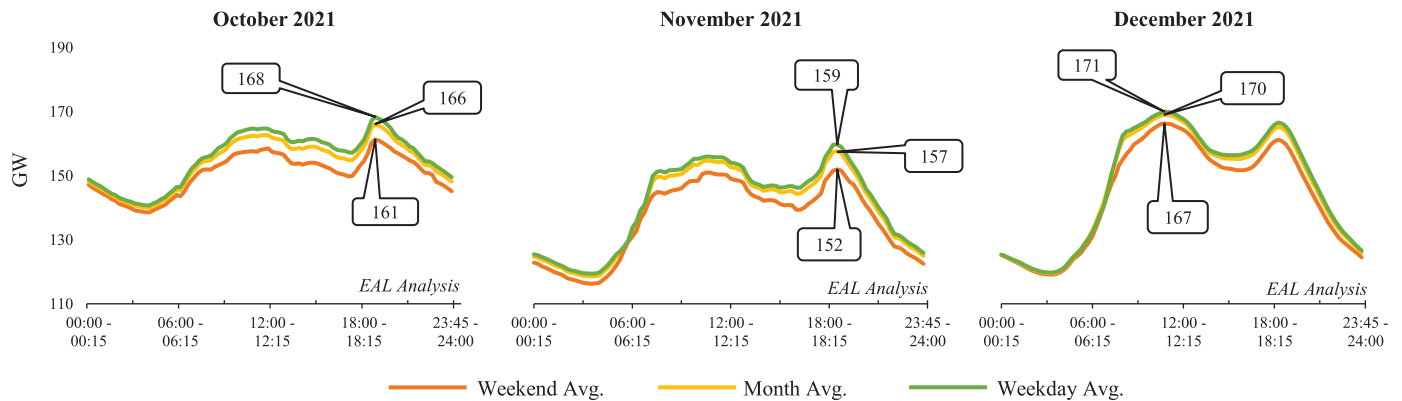
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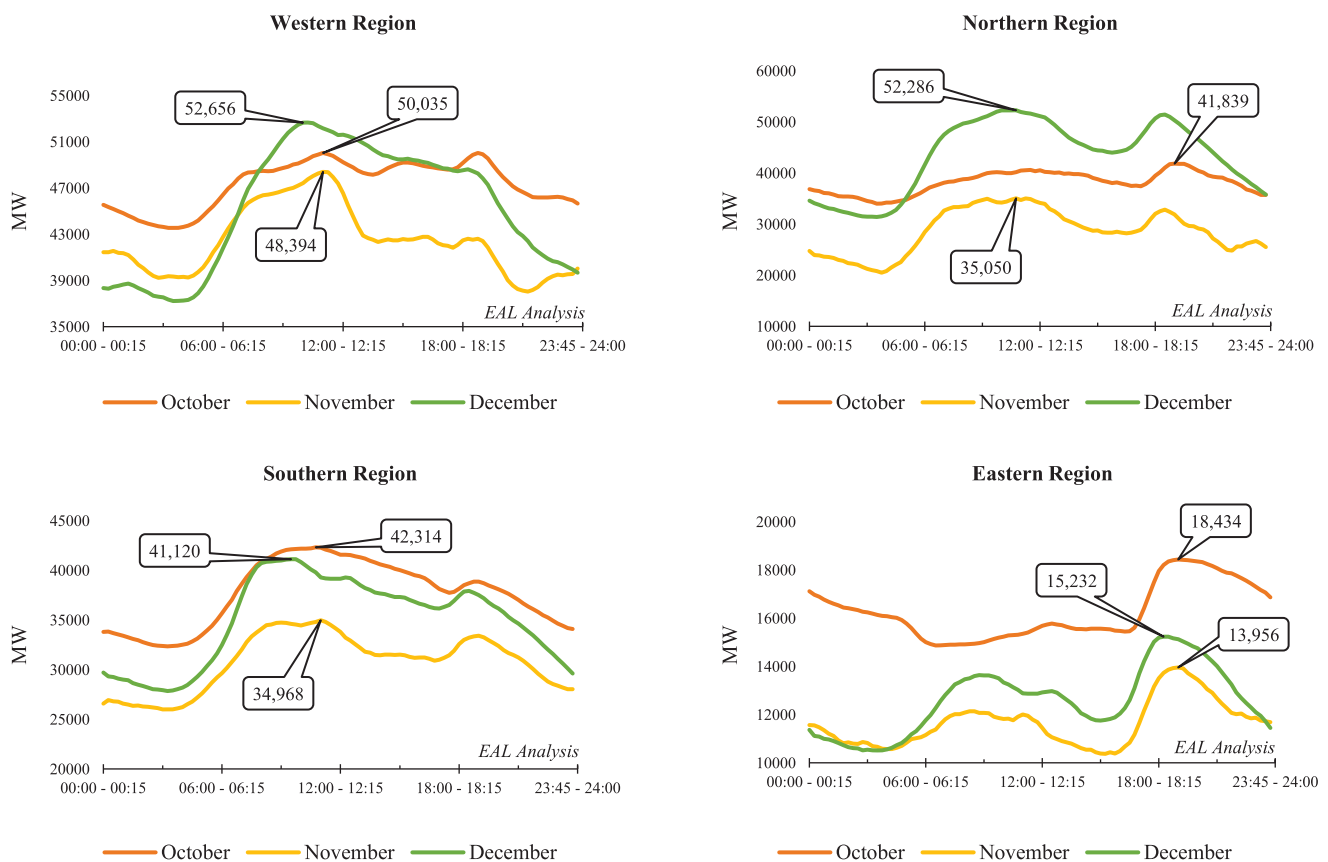
## Power System Overview & Analysis

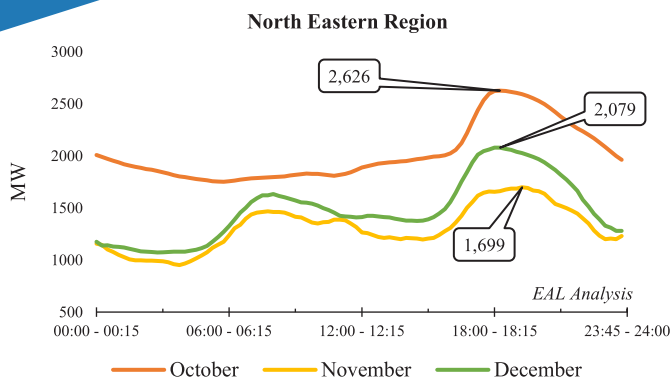
### All India Demand Met Profile



From October to December quarter, all India peak demand reached 183.08 GW (10:45 - 11:00) on 24<sup>th</sup> December 2021, about 0.24% higher than the previous year's peak demand recorded at 182.65 GW (09:45 - 10:00) on 30<sup>th</sup> December 2020, during the same quarter.

### Region-wise Demand Met Profile





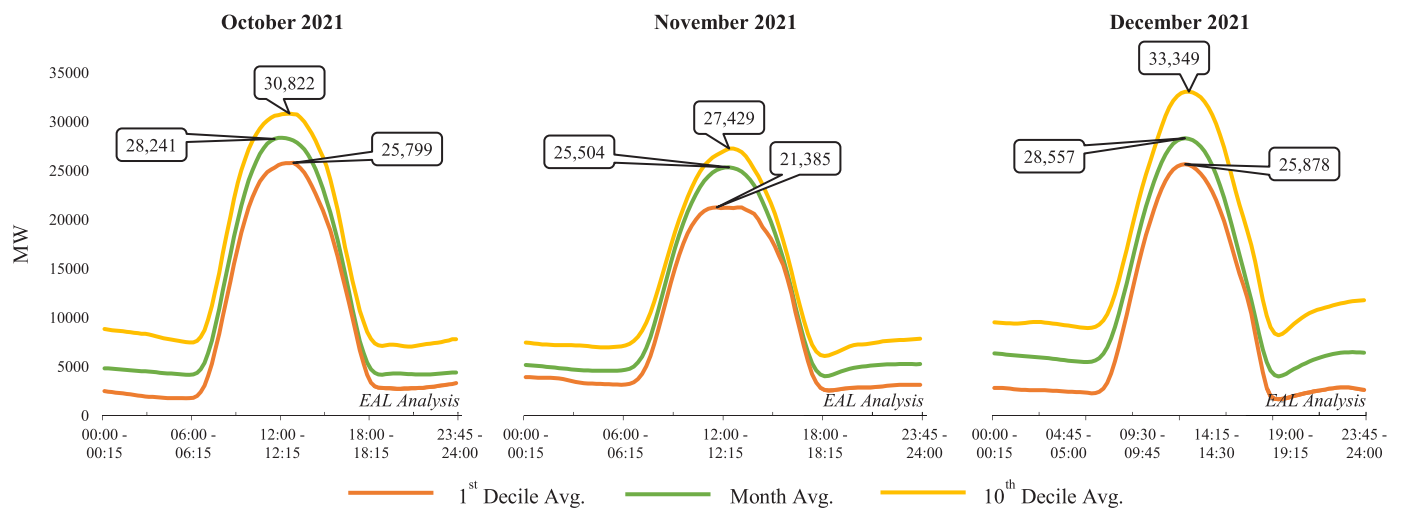
Significant reduction in the demand profile can be seen in the month of November across Northern and Southern region as compared to month of October and December. Average Demand is found to be higher for Western region as compared to the other regions in the month of December.

Significant rise in the demand during the evening time between 19:00 – 23:00 hours for the North Eastern and Eastern regions in the month of October.



Demand and generation profiles at national, regional, and state-level can be accessed on EAL's web portal.

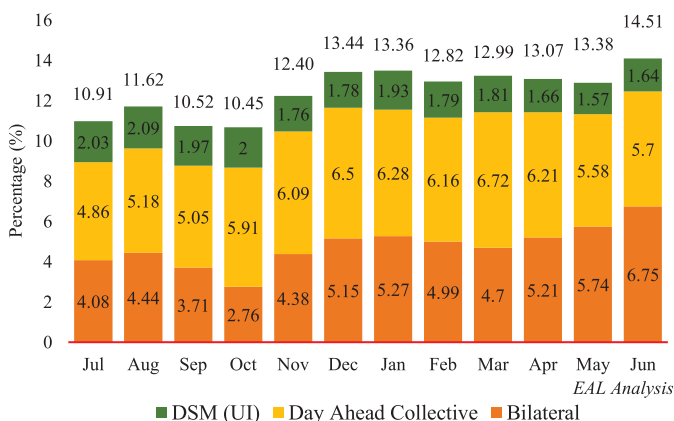
## All India Renewable Energy (RE) Generation Profile



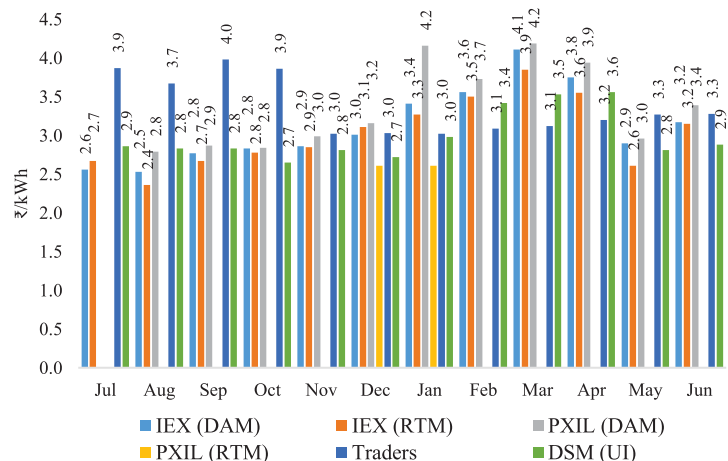
All India peak for RE generation reached 35.45 GW (12:30 - 12:45) on 19<sup>th</sup> December 2021, about 26.25% higher than the previous year's peak of 28.08 GW (11:15 – 11:30) on 21<sup>st</sup> December, 2020 during the same quarter.

## Short-term (ST) Energy Transactions

Share of Short-term Energy Transactions in Total Electricity Generation (2020-21)



Weighted Average Prices of Short-Transactions (2020-21)

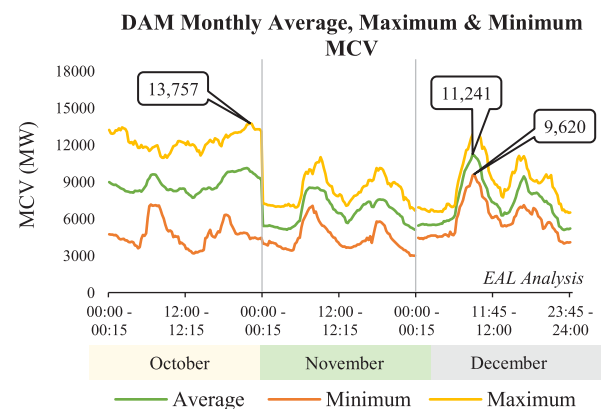
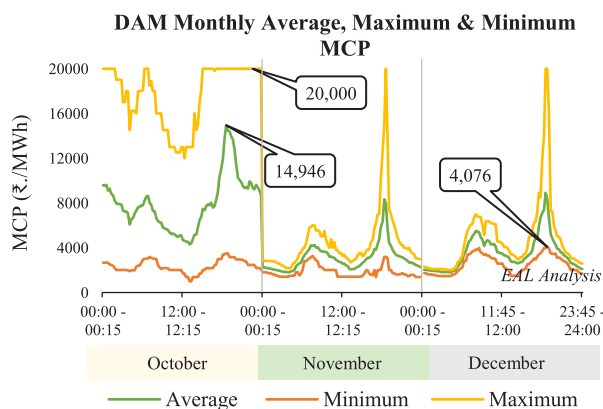


## Monthly Short-term Purchase and Sale Quantum across States

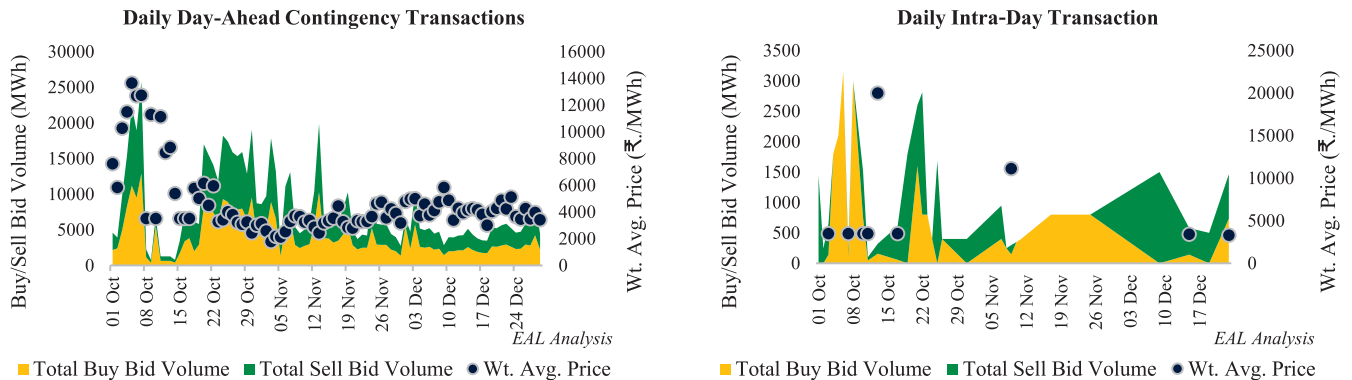


## Power Market Overview & Analysis

### DAM – Market Clearing Price (MCP) & Market Clearing Volume (MCV)

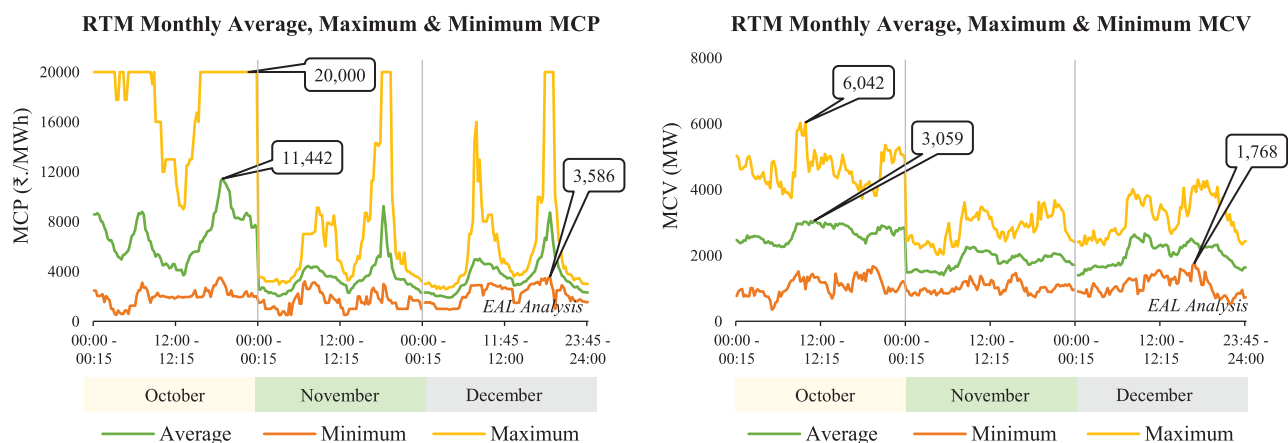


## Term-ahead Market (TAM)

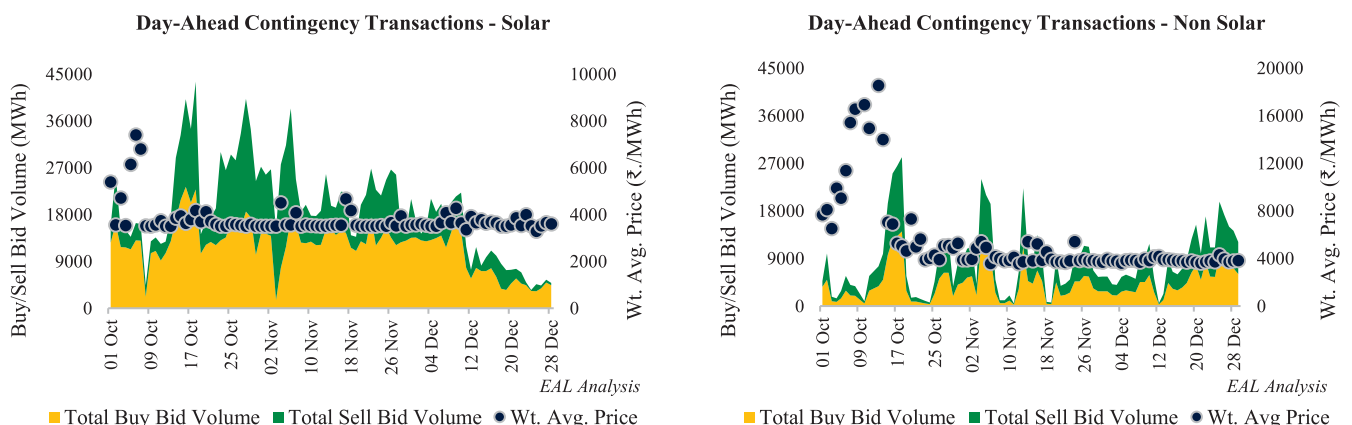


The proportion of sell bids is much higher when compared to purchase bids placed in the Term-ahead Market. Significant decline can be observed in this October to December quarter trading as compared to previous July to September quarter in Intra-day market.

## RTM – Market Clearing Price (MCP) &amp; Market Clearing Volume (MCV)



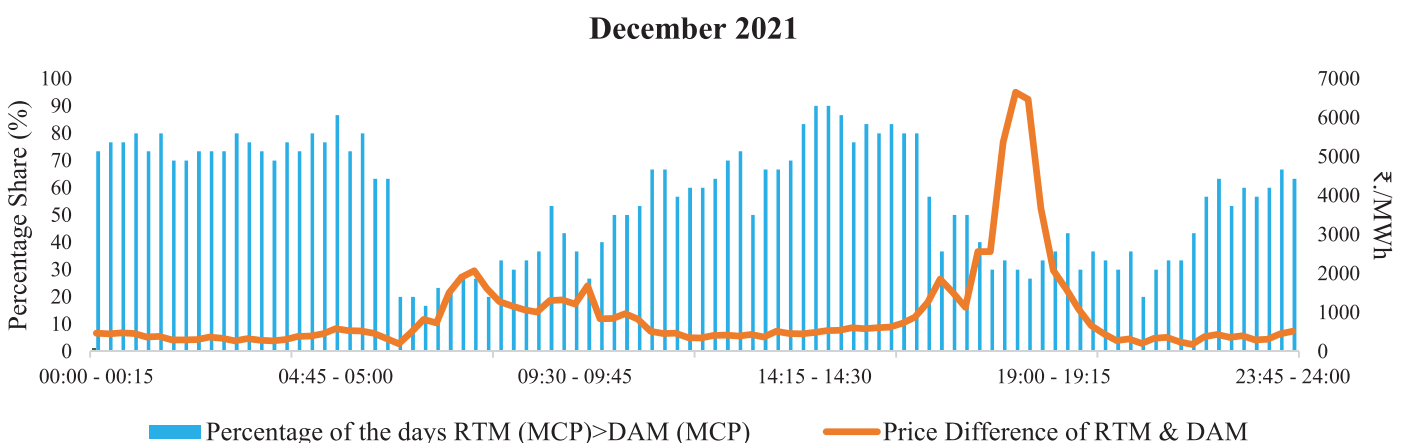
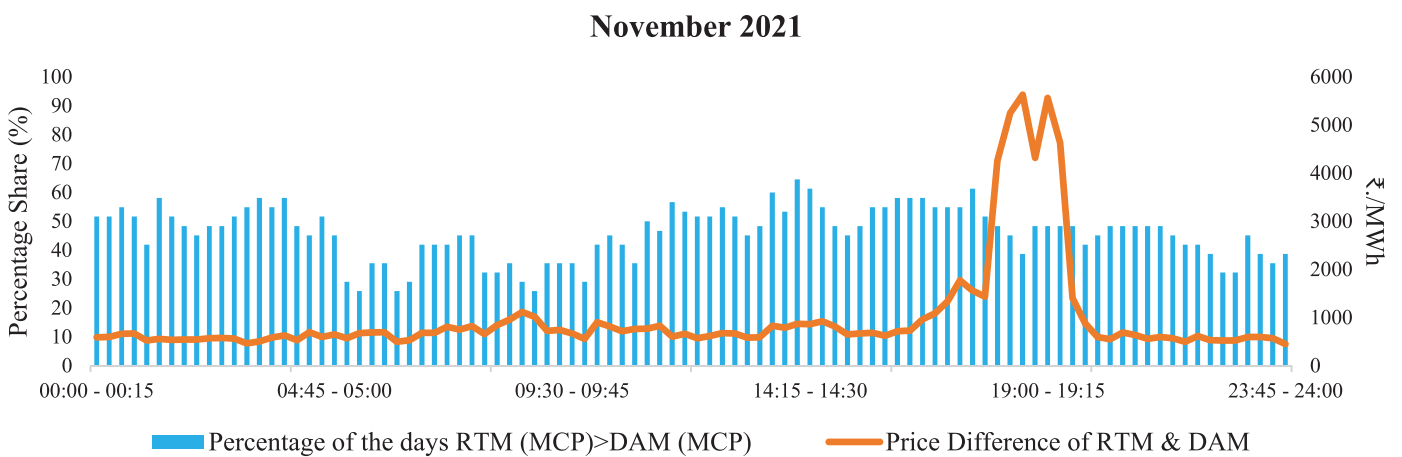
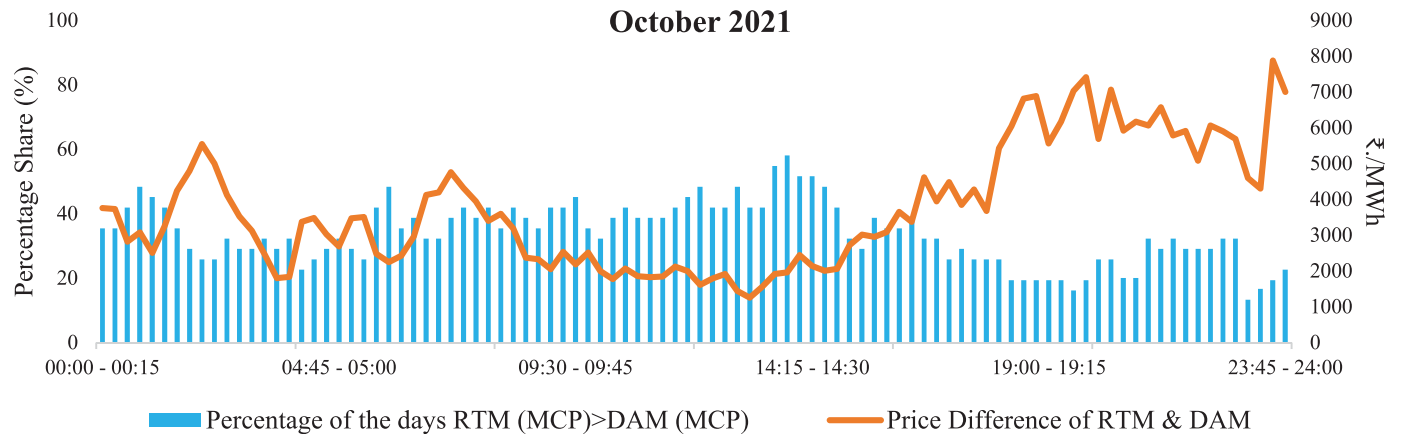
## Green Term-ahead Market (G-TAM)



The weighted average clearing price of Non-solar is higher in comparison to Solar in Day-ahead transaction during October to December quarter. The proportion of sell and purchase bids in Solar is higher when compared to the bids placed in Non-solar.

**Note:** The above power market overview and analysis are based on the data from IEX Website.

## RTM Vs DAM on Market Clearing Price (MCP)



- ⚡ The price difference between RTM and DAM is calculated only in cases where the former exceeds the latter. The block-wise RTM price exceeds the DAM price for about 33.89%, 46.08% and 55.56% of the days for the month of October, November and December, respectively.
- ⚡ For block (14:15 - 14:30 , 14:30 - 14:45), 90% of the days in the month of December, RTM prices surpass DAM prices.
- ⚡ Maximum difference between RTM and DAM price was observed to be ₹7881.28/MWh (23:30 - 23:45), ₹5631.74/MWh (18:30 - 18:45) and ₹6654.35/MWh (18:15 - 18:30) in October, November and December, respectively.



## Regulatory & Policy Perspective

### IEX: Approval of Introduction of Additional Term Ahead Contracts and Green Term Ahead Contracts Beyond T+11 Days

IEX filed a Petition (No. 219/MP/2021) before Hon'ble CERC on 8<sup>th</sup> October, 2021, for the approval of introduction of additional Term-ahead Contracts and Green Term-ahead Contracts beyond T+11 days. During initial hearing of this petition, CERC has directed IEX on 30<sup>th</sup> November, 2021 to upload the petition on its website to seek suggestions from the stakeholders and individuals. The key highlights of this petition are given below:-

**Need for Term-ahead Contracts for duration beyond T+11 days:** Due to large power capacity addition in recent years, the country has moved from a power deficit to a power surplus scenario. As of 31<sup>st</sup> August, 2021 installed capacity has reached 388.13 GW, but Peak Demand is 182.55 GW in which RE Capacity is 100.68 GW, which is 25.93% of the installed capacity. Unlike preference for long-term PPA contracts during the earlier deficit scenario, DISCOMs prefer short-term contracts from mostly Day-ahead to 1-3 year contracts, which provide more flexibility to the DISCOMs and do not require paying fixed charge. They now have a limited choice in meeting such short-term power upto one year through the Discovery of Efficiency Electricity Price (DEEP) portal under the short-term guidelines of Ministry of Power, GOI. The present Term-ahead Market (TAM) has a low liquidity level and a comparatively poor participation, which is 5% of the overall traded at the exchange platform, and there a strong need for introducing additional TAM and G-TAM contracts beyond T+11 days, since the legal issues are now resolved.

**Objectives for TAM and G-TAM for duration beyond T+11 days:**

- ❖ To fulfil short-term demand (monthly, quarterly) and reduce the power purchase cost of distribution licensees.
- ❖ To give the seller a market to sell their excess power and for entities obligated participating in G-TAM to fulfil their RPO compliance.
- ❖ Robust Payment Security to the sellers participating in the short-term bilateral transactions.
- ❖ Small Participants (OA/ CPP) will be able to purchase power at competitive rates in order to meet energy requirements for a longer period.
- ❖ Opportunity to DISCOMs to hedge their risk *w.r.t* transmission corridor availability and against volatility in spot prices.

**Framework of the Proposed Contracts:** The following are the key features of the proposed contracts-

- ❖ Transmission congestion has reduced significantly to 0.1% and hence now the Exchange may launch National and Regional contracts, and these contracts are less likely to be curtailed (modified) due to congestion.
- ❖ Minimum Volume Quotation for TAM is 1 MW and, for G-TAM it is to be reduced from 0.220 MW to 0.1 MW based on feedback received from the market.
- ❖ 15% downward quantity variation in MWh against contracted quantity by both buyer/ seller when minimum contract period is 7 days, and the delivery of Contracts is beyond T+11 days.
- ❖ Revision of Scheduled and penalty under the Cancellation of Trade as may be specified by the Exchange.
- ❖ Right to reject: Cancel the trade before the application is made to the concerned Load Dispatch Center for scheduling purposes.
- ❖ Default Penalty is specified by the exchange in advance. The penalty amount will be 5% of the trade value when the duration of the contract is up to 15 days and 1% for contract duration beyond 15 days. In case of revision the application of scheduling is submitted, the penalty amount will be 20% of the value of remaining quantity to be delivered subjected to a cap of max 30 days of equivalent scheduled quantity value.
- ❖ For all the proposed contracts under TAM and G-TAM and the Pay-in and Pay-out will be D-1 day and D+1 day basis, respectively, to the generators.
- ❖ Reverse and Forward Auction, currently used in DEEP portal for price discovery is used for bid matching mechanisms in single-sided contracts. For this, initial margin is to Rs. 30,000/ MW/ month and, additional margins for contracts up to 7 days is 15%, and beyond 15 days are 50%, 25% and 20% of the trade value respectively, after the trade gets executed.

Table: Type of Contracts

Market	Type of Contracts	Definition	Trading Hours	Price Discovery
DAM & G-DAM		Block-wise, next day	Auction timing : 10:00 to 12:00 hrs	Closed, Double-sided Auction
TAM & G-TAM	Day Ahead Contingency	Hourly and/or Block wise, next day	15:00 to 23:00 hrs	
	Intra-day Contracts		TAM: 00:30 to 22:00 hrs G-TAM: 00:00 to 24:00 hrs	
	Daily Contracts	full day, T+2 onwards (beyond T+11)	12:00 to 17:00 hrs	
	Weekly Contracts	Weekly, T+5 to T+11/ Weekly, Weekdays and Weekend		
	Fortnightly Contracts	15 days (1 <sup>st</sup> -15 <sup>th</sup> or 16 <sup>th</sup> -30 <sup>th</sup> of a Month)	12:00 to 17:00 hrs on trading days	
	Monthly Contracts	Monthly, Quarterly, Half Yearly, Yearly etc.		
	Any-day(s) Contracts	Any-day(s) and Any Block : user defined		
	Any-day(s) Single Sided Contracts			
RTM		Block-wise	22:45 to 23:00 then 23:15 to 23:30 hrs	Closed, Double-sided Auction

## EAL Opinion

⚡ **Contract Proliferation and Loss of Liquidity:** The proposal to introduce numerous new contracts should be vetted against their impact on the liquidity and competition in the market for existing contracts. This can be avoided to some extent by ensuring that the long-term contracts are 'closed' before the shorter ones. For example, the market clearing for the monthly contracts should precede the bidding window for the fortnightly contract and so on.

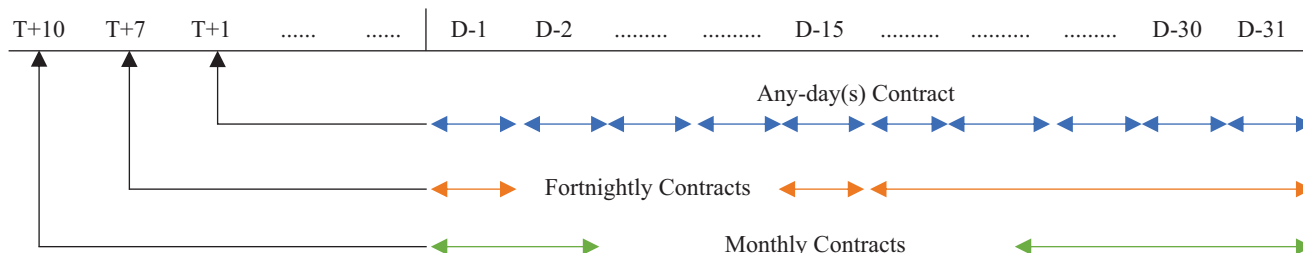


Fig. Timeline for Proposed Contracts

⚡ **Issue with the Proposed Contracts in G-TAM (Clause No. 22):** Introduction of multiple contracts for the G-TAM may be delayed till this market segment attracts significant liquidity. Furthermore, due to their dependence on weather, it is difficult to forecast generation from renewables 1 month or even a week in advance.

⚡ **Fortnightly Contracts (Clause No. 22(a)(iii)):** The duration of the second fortnight under a Fortnightly Contracts should be flexible and relate to the number of days in a calendar month. For example, in February the length of the second Fortnightly Contracts may be either for 14 days or for 13 days, and, for a month with 31 days the length of the Fortnightly Contracts would be 16 days.



**Any-day(s) Single-sided Contracts (Clause No. 22(a)(vi)):** Any-day(s) single-sided Contracts are akin to the contracts currently executed through the DEEP Portal but with a wider applicability for all kinds of buyers and sellers. In any case, single-sided contracts should be avoided as it will not have competition on the demand side.

For Example: In Reverse Auction, Buyer A will buy 50 MW for one day and Buyer B will buy 100 MW for the same day. In such case, it should be clarified whether the bids would be cleared on pro-rata basis.

**Proposed Contracts (Clause No. 22(a)):**

- ❖ The Monthly, Fortnightly and Weekly Contracts should be standardised in terms of quantum covering all the blocks for all the days in the respective contracts.
- ❖ If Any-day(s) Contracts, or small duration contracts are closed before the longer duration contracts, then the liquidity for the longer duration contracts would be significantly affected.
- ❖ The presence of Any-day(s) Contracts which can be used to buy and sell power for any block of any of the days as defined by the user, and which will be traded in a double-sided closed auction is essentially replicating what is already happening in Day-ahead market. In the absence of any significant differentiation of such contracts, any day contract may end up cannibalising the longer term contracts as these may chip away larger blocks of capacity that may have been traded enbloc under longer contracts.

## IEX: For Amendments In Business Rules For Introduction Of Gross Bidding On IEX Platform

IEX filed a Petition (No. 218/MP/2021) before Hon'ble CERC on 7<sup>th</sup> October, 2021 for amendments in Business rules for the introduction of Gross Bidding on IEX platform. During initial hearing of this petition, CERC has directed to IEX on 6<sup>th</sup> December, 2021 to upload the petition on its website to seek suggestions from the stakeholders and individuals. The key highlights of this petition are given below:

### Background:

As per the current agreement, DISCOMs are participating on the Exchange platform on a “Net Pool” basis. This results in the following inefficiencies in the Exchange market;

- ❖ Poor Liquidity: Transaction volume taking place through Power Exchanges (PXs) has remained stagnant between 3-4% of overall volume.
- ❖ Sub-optimal cost optimisation by the DISCOMs: DISCOMs are not able to avail the benefits of exchanges due to the uncertainties associated with transactions in power exchanges.
- ❖ Stranded Generating Stations: During the power surplus scenario, the costlier generators are not getting scheduled from DISCOMs, resulting into stranded assets.

**Mechanism:** In Gross Bidding, a DISCOM shall place both buy & sell bids simultaneously in the market, which would otherwise have been scheduled through bilateral arrangement. The sell bids are expected to be placed at the charge agreed upon in the PPA, whereas the buy bid is expected to be at the maximum price of Rs. 20/ unit (compulsory buy) to avoid any volume risks.

Following scenarios may emerge during Gross Bidding in the market;

- ❖ MCP > PPA Price: DISCOM will pay the generator as agreed upon the PPA; hence there are no additional losses. If DISCOM has a lesser requirement, then it will gain on account of positive difference between MCP and energy price in PPA.
- ❖ MCP = PPA Price: Bids will be selected fully or partially. DISCOMs will buy at the same price a PPA and also pay to the Generator the PPA price. There will be no loss or gain to the DISCOM.
- ❖ MCP < PPA Price: DISCOMs will buy from market at lower price than PPA and no energy charges will be paid to the generator. Thus the DISCOMs will gain, reducing its power procurement cost.

### Benefits:

The concept of Gross Bidding will be beneficial in following terms :

Buyer's perspective	Seller's perspective	Market perspective:
(i) Cost Optimisation. (ii) Hedged against loss.	(i) Higher Dispatch ability. (ii) No change in terms of bilateral agreement.	(i) Liquidity & efficient price discovery. (ii) Merit Order Dispatch. (iii) Social Welfare.

**Challenges:** During Gross Bidding, as transactions shall be shifted from bilateral route to Exchange platform, some additional transmission charges & losses will be applicable. There are two possible scenarios in which DISCOMs may procure power from Intra & Inter-state Generator.

❖ **Intra-state Generator participating in Gross Bidding:**

In this case, the Generator gets scheduled through the Exchange instead of bilateral route, and certain transmission charges and losses shall be incurred. The DISCOM's power procurement cost will increase in case of Gross Bidding on account of the applicability of additional transmission charges and losses. Some of these charges will get adjusted in the long-term charges of the DISCOMs.

❖ **Inter-state Generator participating in Gross Bidding:**

In this case, the Generator gets scheduled through the Exchange instead of bilateral route, and certain transmission charges and losses shall be incurred. The DISCOMs will have to bear short-term ISTS charges to the inter-state Generators for participating in the Exchange. It may be noted that the DISCOM being the long/medium term beneficiary of the Generator is already incurring LTA/ MTOA charges. Thus the ISTS charge could become a burden.

It is requested that the commission may consider providing adjustment of 100% short-term ISTS charges paid by ISGS with the LTA charges paid by the beneficiaries whose power has been sold in short-term market.

## EAL Opinion

✍ **MBED as Gross Bidding:** The overall design & philosophy of the proposed 'Gross Bidding' is similar to that proposed under the Market Based Economic Dispatch (MBED) framework. While theoretical merits of the proposal are understood, there are numerous implications arising out of the existing operational constraints as well as regulatory framework for determination of generation tariff for inter as well as intra-state generation assets. Some of these are discussed herein.

Given that the proposed bidding framework has significant implications for the overall market design and its outcome, it is important that this should be discussed thoroughly at a broader level and be implemented with a clear market direction with regulatory oversight. While relevance and role of the concepts are relatively clear, the preparedness and capacity building needs of the participating DISCOMs need to be addressed.

✍ **SCED vs Gross Bidding:** The prevailing framework for Security Constrained Economic Despatch (SCED) allows for optimisation of 'marginal' power procurement. From a DISCOM's perspective, gross bidding would be favorable than SCED as it provides a larger canvass for optimisation than currently available (being limited largely to the inter-state generators). In financial terms also, DISCOM would gain as it would be able to receive full benefit (MCP-PPA) due to sale of part or full capacity of its marginal PPA to another market platform through Gross Bidding.

✍ **Framework for Optimisation of Power Procurement Cost by DISCOMs:** The DISCOMs, while undertaking economic load dispatch/unit commitment to optimise their power procurement cost on a daily basis, should take into account following factors:

- ❖ Declared Capacity (DC)
- ❖ Variable cost of the different power purchase contracts including state's own generation assets.
- ❖ Applicable transmission losses and transmission charges.
- ❖ Technical minimum limit of generating stations.
- ❖ Up and down Ramping constraints; minimum up and down-time.

- ❖ Start-up and shut-down costs.
- ❖ Transmission constraints, if any.

The optimal solution for the DISCOM may differ from that obtained through a centralised bidding until the applicability of losses for those cleared on Grossed Bidding terms and which are consumed for intra-state generators, these should be excluded from ISTS Losses in the case of Gross bidding.

⌘ **Treatment of Incentives/ Penalty/ Compensation under the Prevailing Regulatory Framework:** The existing regulatory framework particularly for the inter-state generating stations, under the applicable CERC's (Terms and Conditions of Tariff) Regulation, provides for the following specific charges/ incentive/ penalty.

Compensation part load operation - Incentive structure for higher availability during the peak/ off-peak hours - Incentive/ penalty for demonstrating/ failure to demonstrate ramping capability of the generating plants.

These charges would continue to be borne by the respective beneficiary. In the emerging market environment, it is advisable to do away with such digressions that vitiate the market price discovery.

⌘ **Need to Run MoD before participation in Gross Bidding:** The optimal scheduling and dispatch practices ensure that the 'required' plants are operated at technical minimum and also operated within the ramping limits. However, the 'Gross Bidding', or to that matter any other bidding on the PX, ignores such constraints. To avoid such a situation, the participating DISCOM can undertake prior optimisation exercise on a stand-alone basis, and then use the results to decide its 'bidding strategy' under gross bidding. This approach would be necessary till the development of a wide-spectrum and efficient market for ancillary services.

⌘ **DSM Charges due to Variation in Declared Capacity before 'Gate Closure':** The generators are not in a position to provide a firm Declared Capacity (DC) much ahead in advance even in the case of day ahead scheduling. The declared capacity is subjected to change and can be revised up to 7<sup>th</sup>/ 8<sup>th</sup> block in advance. In such a scenario, it should be clarified, which entity will bear the risk of change in the DC of a plant. Since a DISCOM would have placed the sell bid assuming higher DC of a plant, which entity would it be subjected to the deviation charges under the prevailing Deviation Settlement Mechanism (DSM) as the system operator would have been informed of the 'schedule' (cleared volume) of the respective generator.

⌘ **Price limit on DISCOMs Price Bid:** In case a DISCOMs demand bid exceeds its supply bids, the DISCOM should specify price bids for the excess quantum which should not be 'expected' and bid at the maximum bid of Rs. 20/kWh, so as to avoid the high price discovery in the market. In fact, if the demand and supply quantum bids are equal, the maximum buy bid should be limited to the highest energy charge of the PPAS that the DISCOM would bid into the Gross Bidding. It is important to note that the DISCOMs, and hence the consumers need to be safeguarded from price volatility in the market. Careful market considerations and vigilant market monitoring are required to ensure the same. Risks associated with such participation need to be identified by the DISCOMs and be addressed both in terms of their power procurement planning as well as bidding behavior across market segments.

⌘ **Participation of Banking Transactions:** Participation of Banking transaction is also feasible as these can be bid at zero 'energy charges'. If allowed, this would be the first time that banking transactions would also find place on a market platform.

⌘ **Payment Mechanism for Cleared Gross Bids:** Existing By laws and contract design of PXs provides for advance fund availability for the participating entities. Since DISCOMs would place both buy as well as sell bid, the need for such advance funding would be netted out. It may be clarified if there are any legal implications wherein a generator, while not having participated directly on the PX, may seek the payment guarantee from the PX.

## EAL News

## Regulatory Certification Programme

Regulatory Certification Programme provides an opportunity to learn fundamentals and technical concepts of economics, finance, engineering, operations, and law to supplement regulatory research and analyse key issues in the Indian power sector. It is designed to enable rapid capacity development on regulatory aspects and power sector policy.

These programs are suitably designed for Commissioners and Officers from ERCs, Relevant Ministry and Government Departments, Stakeholders from Generating Companies, Energy Companies, Licensees (Transmission, Distribution, and Trading), Power Exchanges, Open Access Consumers, Load Dispatch Centers, Financial Institutions and Investors, Consultants, Faculty, Researchers and Students from Academic Institutions, Consumer Organisations, NGOs and other stakeholders who want to enhance their understanding of this multi-disciplinary area. For further program details including key topics, registration fee, resource persons, please visit <https://cer.iitk.ac.in/olet/rcp>

The 2<sup>nd</sup> Regulatory Certification Programme (RCP) on "Power Market Economics and Operations" was commenced between 20<sup>th</sup> November, 2021 to 20<sup>th</sup> December, 2021. The program was conducted under the aegis of Centre for Continuing Education (CCE), IIT Kanpur. More than 80 working professionals from different organisations have shown interest in this program. The online sessions (about 25 hours) were taken by leading National and International experts.

## Announcement of Editorial Advisory Board/ Editorial Board

EAL, IIT Kanpur is pleased to announce the formation of the "Editorial Advisory Board/ Editorial Board (EAB/ EB)" for its newsletter "Power Chronicle" for FY 2022-23. EAL is delighted to introduce Dr. Carl Pechman (Director, National Regulatory Research Institute, Washington, D.C.), Mr. Sushil Kumar Soonee (Former Advisor, POSOCO, New Delhi), Prof. S. N. Singh (Professor, Department of Electrical Engineering, Indian Institute of Technology Kanpur), Shri. Pardeep Jindal (Invited) (Chief Engineer (Power System Planning & Appraisal-II Division), Central Electricity Authority, New Delhi), Dr. Abheejeet Mohapatra (Assistant Professor, Department of Electrical Engineering, Indian Institute of Technology Kanpur) and Dr. Anoop Singh (Professor, Department of Industrial & Management Engineering, Indian Institute of Technology Kanpur) as Members of the EAB/ EB. The guidance and suggestions of these experts would help us improve in all aspects, including the impact and reach of the newsletter.



We request your feedback for making EAL and this newsletter more relevant to the sector.  
Log on to our portal or write to us at:

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## Other Initiatives



Centre for Energy Regulation



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