MINUTES OF THE 66th MEETING

OF THE

FORUM OF REGULATORS (FoR) HELD AT NEW DELHI

Venue	**:**	**Upper Ground Floor** **Central Electricity Regulatory Commission** **Chandralok Building, Janpath, New Delhi-110001**
Day / Date	**:**	**Friday, the 18 January, 2019**
List of Participants	**:**	**At Annexure-I (Enclosed)**

The meeting was chaired by Shri P.K.Pujari, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FoR). The Chairperson, CERC/FoR welcomed all the Members of the Forum to the Meeting. He extended a warm welcome to Shri Shambhu Dayal Meena, Chairperson, Karnataka Electricity Regulatory Commission who was attending the meeting for the first time after he assumed charge.

Thereafter, the Forum took up the agenda items for consideration.

AGENDA ITEM NO. 1: CONFIRMATION OF THE MINUTES OF THE 65th MEETING OF THE FORUM OF REGULATORS HELD ON 13 NOVEMBER 2018 AT BHUBANESWAR.

The Forum endorsed the Minutes of the 65th Meeting held on 13 November, 2018 at Bhubaneswar (enclosed as **Annexure-II**).

AGENDA ITEM NO. 2: COMPENDIUM ON REGULATIONS ISSUED BY CERC & SERCs AND COMPENDIUM ON POLICIES ISSUED BY MNRE AND STATE GOVERNMENTS ON RENEWABLE ENERGY SOURCES IN INDIA.

Representative of Central Board of Irrigation and Power (CBIP) made a presentation before the Forum (enclosed as **Annexure-III**) on the compendia brought out by CBIP on "Regulations issued by CERC & SERCs" and "Policies notified by the MNRE and State Governments on Renewable Energy Sources". The compendia included consolidated orders / regulations along with summary as well as comparative statements and hosted dowloadable versions on their website for the benefit of the stakeholders. The Forum appreciated the efforts of CBIP.

AGENDA ITEM NO. 3: OUTPUT AND ACTIVITIES OF CENTRE FOR ENERGY REGULATION (CER), IIT-KANPUR AND RELEASE OF MONOGRAPH ON "REGULATORY FRAMEWORK FOR LONG-TERM DEMAND FORECASTING AND POWER PROCUREMENT PLANNING"

A presentation was made by Dr. Anoop Singh, Centre for Energy Regulation (CEC), IIT-Kanpur elucidating the activities of CER. It was informed the CER has been established with the objective to provide support to regulatory-academia-utility interaction, development of regulatory knowledge base / data repositories, act as a platform to facilitate peer-to-peer learning, develop collaborative research network etc. CER also extended an invitation to the Members of FoR entering into collaboration with regard to conduct of regulatory research camps, regulatory research projects, development of databases / online learning tools etc. It was agreed that the Members of FoR would collaborate at their institutional level directly with CER.

Subsequently, the Chairperson, CERC / FoR released the Monograph on "Regulatory Framework for Long Term Demand Forecasting and Power Procurement Planning" brought out by the Centre for Energy Regulation (CEC), IIT-Kanpur. The monograph is based on the study carried out during the CER's First Regulatory Research Camp wherein officers of State Electricity Regulatory Commissions of Andhra Pradesh, Delhi, Gujarat, Madhya Pradesh, Odisha, Punjab, Uttar Pradesh etc. participated.

Dr. Anoop Singh made a presentation (enclosed as **Annexure-IV**) on the above study on Demand Forecasting and Procurement Planning. Cost of power procurement being more than 70% of the total cost of supply, the distribution utilities necessarily forecast load accurately and reliably. The Study observed that factors to be considered for forecast include *inter alia*, Economic indicators, Anticipated load growth, Disruptive technology / technological development, New consumer growth, Climatic condition etc. Based on the forecasting, the utilities are required to manage power procurement, while doing so, should consider Network constraints, Renewable energy penetration, Captive generation, Demand side management etc. The Study recommended for carrying out long-term demand projection for 10 years duration while updating the projection annually.

The Forum appreciated the study and presentation.

AGENDA ITEM NO.4: PRICE DISCOVERY MECHANISM ON POWER EXCHANGES

During the 65th Meeting of FoR, while discussing on the issue of surge in prices experienced in the power exchanges during the months of September – October, 2018, it was decided that the power exchanges may be invited to make presentations before the Forum on "Price Discovery Mechanism on Power Exchanges".

Accordingly, representatives of Indian Energy Exchange and Power Exchange India Limited made presentations (enclosed as **Annexure-V** and **Annexure-VI**) on the "Price Discovery Mechanism on Power Exchanges", before the Forum of Regulators. It was informed that price is discovered for each time block (96 time blocks separately). All purchase bids and sell bids for each time block are aggregated to form an aggregated demand curve and an aggregate supply curve and the intersection point of these two curves gives Market Clearing Price (MCP) and Market Clearing Volume (MCV) which is the equilibrium for price and quantity. It was informed that key reasons for high Buy bid volume in Sept '2018 include *inter-alia* insufficient coal stock, decline in hydro and wind generation, festive season, compulsory buy to avoid load shedding, while high rainfall and higher availability of power in northern discoms were the key reasons for high sell bid volumes.

It was further informed that during the months of September, 2018 and October, 2018 on IEX, the market clearing volume at market clearing price of more than Rs.12/- constituted around 1% and 3% of the total volume cleared in each month respectively. However, the PXs observed that high MCP was not for very significant period.

AGENDA ITEM NO. 5: REVAMPED WEBSITE OF FORUM OF REGULATORS

The FoR Secretariat in association with MIS Division of CERC has proposed to re-design of the website of FoR with an aim to make it more secure, responsive, dynamic and user friendly. In this regard, Deputy Chief (MIS), CERC made a presentation (enclosed as **Annexure-VII**) before the Forum. It was informed that the proposed new design would facilitate compatibility with various browsers/resolutions, easy navigation, user-friendly search

facility, discussion forums / dash boards etc. The Forum appreciated the effort and authorized the Chairperson CERC / FoR to finalize the website design.

AGENDA ITEM NO. 6: DIRECTIVES TO RPCs BY CERC REGARDING PERIODIC AUDIT OF RELAY / PROTECTION SYSTEMS

CERC, while disposing of the petition No. 09/SM/2015, directed the Regional Power Committees to ensure periodic audit of relays / protection system and file half-yearly exception reports to the Commission and RPCs are required to take up protection audit and relay setting in transmission system / distribution system within the States. The Commission further directed that the matter may also be brought before the Forum of Regulators for necessary action at their level.

The Forum discussed the matter and identified the importance for carrying out protection audit and relay setting in transmission system / distribution system within the States. The Chairperson, CERC / FoR urged the Members of Forum to take up the matter at State-level for necessary compliance. The Members noted the suggestion.

AGENDA ITEM NO. 7: UPDATE ON FoR STANDING TECHNICAL COMMITTEE

Joint Chief (Regulatory Affairs), CERC updated the Forum on the activities of the FoR Standing Technical Committee. He informed the Forum that a Sub-Group was constituted under the Chairpersonship of Chairperson, KSERC to deliberate upon the issues of Aggregators / Qualified Coordinating Agencies (QCAs) and also to prepare a model agreement clearly

explaining the roles and responsibilities of the stakeholders. Preparation of the Report is in the final stages and will be shortly submitted to the FoR Standing Technical Committee.

It was decided during the deliberation that the standing nature of the Technical Committee would imply that the Committee always be headed by the Technical Member of CERC. But, the members of the Committee would change as per the subject(s) under consideration, so as to ensure representation of all States by rotation. Its composition of the Member would be decided by the Chairperson, CERC / FoR in each case..

The Forum appreciated the initiatives taken and executed by the FoR Standing Technical Committee.

AGENDA ITEM NO. 8: OVEVIEW OF REC REGULATORY FRAMEWORK

Advisor (Renewable Energy), CERC made a presentation (enclosed as **Annexure-VIII**) before the Forum on REC Regulatory Framework. It was highlighted that over the period, RECs have helped the obligated entities to comply with Renewable Purchase Obligation, as RE power sources are not evenly spread across the country. Procurement of RECs is an effective option for small sized OA/CPPs to meet RPO compliance, and currently 49% of the RECs are purchased by them.

In response a query of one of the Members on mechanism for determination of floor and forbearance price, it was explained that RE generation cost, pooled cost of power purchase, RPO targets etc. are taken into consideration to determine the floor and forbearance price.

It was also informed that Regulatory Impact Assessment Study on REC Mechanism has been initiated which is mandated to look into the floor and forbearance price fixation methodology among others.

The Forum appreciated the presentation.

Joint Chief (Regulatory Affairs), CERC thanked the dignitaries present in the meeting. He also thanked the staff of FoR Secretariat for their arduous efforts in organizing the meeting.

The Chairperson, CERC/ FOR conveyed to the Members of Forum that the next FOR Meeting will be held in Amritsar, date and time of which would be informed in due course of time.

The meeting ended with a vote of thanks to the Chair.

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Annexure – I

LIST OF PARTICIPANTS ATTENDED THE 66TH MEETING

OF

FORUM OF REGULATORS (FOR)

HELD ON 18TH JANUARY, 2019 AT NEW DELHI.

S. No.	NAME	ERC
01.	Shri P.K. Pujari Chairperson	CERC / FOR – in Chair.
02.	Shri R.P. Singh Chairperson	APSERC
03.	Shri Subhash Chandra Das Chairperson	AERC
04.	Shri S.K. Negi Chairperson	BERC
05.	Shri D.S. Misra Chairperson	CSERC
06.	Shri Jageet Singh Chairperson	HERC
07.	Shri S.K.B.S. Negi Chairperson	HPERC
08.	Dr. Arbind Prasad Chairperson	JSERC
09.	Shri M.K. Goel Chairperson	JERC (State of Goa & UTs)
10.	Shri Ngangom Sarat Singh Chairperson	JERC for M & M
11.	Shri Shambhu Dayal Meena Chairperson	KERC
12.	Dr. Dev Raj Birdi Chairperson	MPERC
13.	Shri Imlikumzuk Ao Chairperson	NERC

14.	Shri U.N. Behera Chairperson	OERC
15.	Ms. Kusumjit Sidhu Chairperson	PSERC
16.	Shri Shreemat Pandey Chairperson	RERC
17.	Shri S. Akshayakumar Chairperson	TNERC
18.	Shri Subhash Kumar Chairperson	UERC
19.	Shri Mukesh Khullar Member	MERC
20.	Shri Durgadas Goswami Member	WBERC
21.	Dr. Sushanta K. Chatterjee Joint Chief (RA)	CERC
SPECIAL INVITEES		
22.	Dr. M.K. Iyer Member	CERC
23.	Shri M.K. Anand Chief (Fin.)	CERC
24.	Shri T. Rout Chief (Legal)	CERC
25.	Shri S.C. Shrivastava Chief (Engg.)	CERC

Annexure – II

MINUTES OF THE 65th MEETING OF THE FORUM OF REGULATORS (FOR) HELD AT BHUBANESWAR, ODISHA

Venue	**:**	**Empress Hall** **Hotel The Crown, Bhubaneswar**
Day / Date	**:**	**Tuesday, the 13th November, 2018**
List of Participants	**:**	**At Annexure-I (Enclosed)**

The meeting was chaired by ShriP.K.Pujari, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). The Chairperson, CERC/ FOR welcomed all the Members of the Forum to the Meeting. He specifically welcomed Chairperson, Uttar Pradesh Electricity Regulatory Commission and Chairperson, Chhattisgarh Electricity Regulatory Commission who were attending the meeting for the first time after they took over charge in their respective offices. He also informed the Forum that Chairpersons of Karnataka and Meghalaya would be demitting office before the next FOR meeting. He placed on record the valuable contribution by both the Chairpersons to the FOR meetings

Thereafter, the Forum took up the agenda items for consideration.

BUSINESS SESSION – I

AGENDA ITEM NO. 1: CONFIRMATION OF THE MINUTES OF THE 64th MEETING OF THE FORUM OF REGULATORS HELD ON 24th AUGUST 2018 AT NEW DELHI.

Chairman, Tamil Nadu Electricity Regulatory Commission referred to Agenda Item No 3 pertaining to "Launch of Report of POSOCO on Renewable Energy Certificate Mechanism in India" and stated that currently there are no takers for REC as the prices of RE have shown a declining trend and hence, there should be a rethink on the REC mechanism. Chairman, SERC, Odisha argued on the other hand that the mechanism provides an alternative route for RPO compliance and the obligated entities decide based on cost of compliance whether to go for RECs or green power. Chairperson, CERC/ FOR I nformed the Forum that as CERC has already taken an initiative to conduct the Regulatory Impact Assessment of RECs, the study can also examine the relevance of RECs in the current market conditions.

After deliberations, the Forum while endorsing the minutes of the 64th Meeting of FOR, held on 24th August, 2018 at Ranchi, Jharkhand, stated that the relevant extract of the minutes of the said agenda Item may be amended as follows:

" .....In this matter, the Forum was informed that CERC is in the process of taking up a Study on Regulatory Impact Assessment of RECs and the issues as raised by the members regarding relevance of REC mechanism in the context of current scenario will get covered in the said study. ....."

AGENDA ITEM NO. 2: REPORT OF 'FOR' TASK FORCE FOR NORTH-EASTERN REGION

A. ShriAnand Kumar, Chairman, GERC and Chairman of the Task Force for North Eastern Region gave a brief background on the constitution and objective of the Task Force.

B. The recommendations of the Task Force included Functional Segregation of Generation, Transmission and Distribution Business , Bridging the Gap between ACOS and Per unit average revenue realized (ARR), Issuance and Implementation of DSM Regulations, Preparation of a roadmap for catering to future growth in demand, Energy Audit at Sub-Station and Feeder level, Reduction in AT&C Losses, Region specific Data Portal, Strengthening of SLDCs of N-E States, Region specific Core Groups for knowledge exchange and capacity building and Institutional Strengthening of State Regulatory Commissions in the N-E Region.

C. The Way Forward recommended by the Task Force included the North-Eastern States to take up a continuous process for performance enhancement by periodic monitoring of the performance parameters discussed in this Report during ARR/APR processing of Utilities; SERCs and other stakeholders such as State Utilities and State Governments in the N-E Regions to undertake effective and time bound implementation of schemes like UDAY, UJALA, implementation of SAMAST, DSM to implement grid discipline in the N-E Region and Creation of Knowledge exchange platform for sharing regulatory developments/ innovations amongst NE States

which can include core groups of Discoms and SLDCs in the N-E region.

D. After deliberations on the report, the Forum endorsed the recommendations and Way forward of the Task Force. Additionally, they recommended that:

i. North-Eastern SERCs/ JERC should direct their Utilities to regularly monitor progress against the parameters specified in the report through a compliance format as part of the ARR process. SERCs could use the formats/ templates used for this exercise to undertake quarterly/ six monthly review in case of some of the technical parameters e.g. distribution loss/ ATC loss, distribution transformer failure rate, defective meter replacement, pending connections etc.

ii. The FOR Standing Technical Committee will monitor the progress of implementation of parameters (discussed in the report) periodically and submit a status report to the FOR.

iii. The Report of the FOR on the North East Region may be sent to all the State Governments of the North-Eastern Region for their reference.

AGENDA ITEM NO. 3: 'FOR' WORKING GROUP ON EVOLVING RATES OF DEPRECIATION FOR DISTRIBUTION ASSETS, RETURN ON INVESTMENT AND OPERATING NORMS ON DISTRIBUTION SECTOR

Joint Chief (RA), CERC updated the Forum on the deliberations and recommendations finalised in the 1st meeting of the Working Group of FOR. The Working Group of FOR headed by Chairman, CERC/ FOR and comprising Chairpersons/ Members of AERC, BERC, GERC, KSERC and WBERC are mandated to evolve standard rates for Depreciation,

Standards for Return on Investment and Operating Norms for distribution sector based on the provisions in the Tariff Policy, 2016.

During discussions, classification of distribution assets, applicability of depreciation rates on these assets, salvage value of assets, Return on Investment currently prescribed by SERCs, basis of arriving at ROI (Bond rate or G-Sec rate along with risk premium rates) were deliberated. After discussion, the Forum endorsed the recommendations of the Working Group which included:

a. Depreciation: To be calculated as per Straight Line Method; Weighted average method for calculation of useful life; 12 years for loan repayment; Asset salvage value to be 10%; 70% debt recovery to be considered.

b. Return on Investment: RoE approach with 16% ceiling rate to continue.

c. Operating norms: Linking recovery of fixed and variable cost to availability index.

d. Conduct the following studies:

i. To ascertain useful life of different components of distribution assets

ii. Update 2009 Study of FOR on " Evolve an appropriate model for distribution margin" along with a study on Depreciation

iii. Study on "Benchmarking of financial norms for distribution companies"

AGENDA ITEM NO.4: IMPLEMENTATION OF E-COURT WEBTOOL FOR ALL SERCs/ JERCs

The FOR members were updated on the revised proposal received from NIC for developing a webtool for implementation of E-Court in all SERCs/ JERCs. While the revised proposal from NIC was at a cost of Rs 50.86 lacs (excluding taxes), NIC had also informed of retaining copyrights on the webtool with them. Additionally, NIC had stated that if FOR members wanted any changes in the webtool, written permission is required to be sought from the NIC for effecting the same.

The members were also appraised that as FOR Secretariat had made a provision of only Rs. 30 lakhs from the Plan Funds of MoP for this project (based on the earlier estimate received from NIC), FOR does not have requisite balance funds to pay NIC for the new proposal received from them. Therefore, FOR Secretariat had sent a proposal to the Ministry of Power for a one-time grant of Rs. 62 lakhs (inclusive of taxes) to fund this E-Court initiative under the Digital India Program.

The Forum members felt that as NIC is a government organisation handling all IT initiatives of the Government, NIC would ensure effective, reliable and timely implementation of the project for the SERCs/ JERCs. However, on the issue of copyrights and written permissions to be taken from NIC by SERCs each time a change was sought in the webtool, the FOR members felt that this would be cumbersome. Hence, they felt

that the copyrights should ideally be retained with FOR. FOR Secretariat was also asked to follow up with the Ministry of Power for early release of funds so that the proposal submitted by NIC could be finalised and the exercise of implementation of E-Court in all the SERCs/ JERCs could commence at the earliest.

AGENDA ITEM NO. 5: APPLICABILITY OF GST ON FORUM OF REGULATORS

Deputy Chief (RA), CERC apprised the Forum of the applicability of GST on the FOR and as concurred by FOR, FOR has registered itself for GST and is paying GST on the membership fees since January 2018. In view of the recent notification dated 01.10.2018 regarding applicability of TDS on GST on value of supply under a contract exceeding Rs. 2.50 lakhs per annum, FOR would be deducting TDS on GST for the respective vendors in FOR.

The Forum endorsed the applicability of TDS on GST on FOR w.e.f. the date of registration (November 2018).

AGENDA ITEM NO. 6: MODEL REGULATIONS AND REPORT ON "GAP ASSESSMENT FOR COMPREHENSIVE METERING AND ACCOUNTING FRAMEWORK FOR GRID CONNECTED SOLAR ROOFTOP PV IN INDIA "

Joint Chief (RA), CERC informed the Forum that this was previously discussed in the 64th FOR meeting held on 24th August 2018 at Ranchi. Certain issues were raised during the meeting and the Report was subsequently discussed in the 21st and 22nd meeting of the Standing Technical Committee meetings of FOR. Based on the feedback received in these meetings, the consultant (M/s E&Y engaged by World Bank under the Technical Assistance program) made a presentation **(*Annexure II)***on the Model Regulations and the revised Report.

The discussions centred on defining premises which will qualify for Roof top/ ground mounted solar installations, scope of demand aggregation and compensation on net billing as the Standing Technical Committee had made some recommendations on these issues. The Forum was apprised that the Technical Committee had made the following recommendations:

a. Definition of Premises: Only residential consumers be allowed to interconnect ground-mounted solar systems under net-metering/ net-billing and that it should be limited to their maximum contracted demand.

b. Scope of demand aggregation: Discoms to do demand aggregation and such aggregation be restricted to residential consumers only.

c. Compensation for Net billing: Each State may decide to choose appropriate option such as Commission determined reference price or price discovered from SECI/ discom RTS bids.

After deliberations, the Forum endorsed the Model Regulations and Report subject to the following modifications in the Report and Regulations:

a. Focus should be on Roof Top installations and their treatment.

b. Net billing concept will be adopted for the Roof top.

c. The treatment of Distributed Energy Resources (other than rooftop) should be studied further and presented to the FOR.

BUSINESS SESSION – II

SHRI NAVEEN PATNAIK, HON'BLE CHIEF MINISTER OF ODISHA JOINED THE "FOR" MEETING

ShriP.K.Pujari, Chairperson, CERC/ FOR in his welcome address extended a warm welcome to the Hon'ble Chief Minister of Odisha and thanked him for accepting the invitation to grace the 65th Meeting of FoR. He stated that Odisha has been a pioneer in bringing regulatory reforms in the electricity sector by unbundling the erstwhile vertically integrated State Electricity Board and setting up separate entities for generation, transmission and distribution. He informed that the FOR is a body consisting of the State Electricity Regulators of the country and that the objective of the Forum was to provide a common platform to the electricity regulators to share their experiences and best practices. In pursuance of its mandate under the Act, the Forum has undertaken various studies on important issues in the electricity sector. The Forum has also brought out model regulations on important issues crucial in the power

sector. Though the Forum does not have the powers to enforce its regulations or decisions on individual State Commissions, it has succeeded in putting in place several reforms with far reaching consequences. As the power sector is transitioning gradually to market based operation and the Regulators are responsible for market development, CERC has initiated discussions in several futuristic regulatory initiatives such as reforms in the Deviations Settlement mechanism and Redesigning the real time energy market. Market monitoring and market surveillance have also become the crucial responsibility of the regulators. Hence, regulators have the responsibility of balancing the interests of the utilities and consumers. In this context, the Forum looked forward to the thoughts and insights of the Hon'ble Chief Minister.

Shri Naveen Patnaik, Hon'ble Chief Minister, in his address to the Forum stated that he was delighted to inaugurate the meeting of Regulators in the capital city of Odisha. During his address, he stated that Odisha was the 1st State to unbundle the Electricity Boards and to establish the 1st Electricity Regulatory Commission in the country. He also took pride in the fact that Odisha is a power surplus State and that it had achieved 100% village electrification while 100% electric connections to households will be achieved by December 2018. On the proposed amendments in Electricity Act 2003, he remarked that as Electricity is a concurrent subject, some of the proposed amendments to the Electricity Act are not in conformity with the federal structure of the country. He stated that the views of the State Government should be given due importance and requested the Forum of Regulators to make valuable recommendations to the Centre keeping the State and consumer interest in

mind. He invited the Forum to visit Make-in-Odisha conclave to witness the socio-economic growth of the State. He stated that he wished the Forum would have fruitful discussions during the course of the meeting.

On conclusion of this session, ShriU.N.Behera, Chairperson, OERC proposed vote of thanks. In his address, he thanked the Hon'ble Chief Minister for taking time out of his busy schedule to address the FOR. He thanked Chairperson, CERC/ FOR and Chairpersons of all SERCs/ JERCs, Officers of CERC, OERC and the State Government for their association with this meeting. He remarked that the State Government is supporting the power sector of the State in a massive way to provide economic and reliable electricity to the consumers and infrastructure support to the generators. He thanked the Hon'ble Chief Minister for addressing and interacting with the Members of the Forum and other delegates of the meeting for making it a success.

BUSINESS SESSION – III

AGENDA ITEM NO. 7: REPORT OF SUB-GROUP OF 'FOR' TECHNICAL COMMITTEE ON LOAD DESPATCH CENTRES – INSTITUTIONAL BUILDING AND STRENGTHENING

The Report on Capacity building of LDCs (CABIL) was formally released by Chairperson, CERC/ FOR, Chairperson, GERC, Chairperson, OERC and Secretary, CERC. Thereafter, Advisor POSOCO and Chairman of the Sub-Group of the FOR Standing Technical Committee presented the report **(*Annexure III)*** and highlighted the following points:

a. Institutional capacity building of LDCs is essential for implementation of various regulatory initiatives such as framework for forecasting, scheduling and deviation settlement of RES through SAMAST, National Open Access Registry (NOAR), Ancillary services, valuing flexibility services etc.

b. The report is an outcome of extensive consultation and collaboration with the various stakeholders. It provides a 365 days road map for implementation of recommendations on financial and functional autonomy of LDCs through adequate man-power with appropriate skillset, strengthening real time operation desks, robust infrastructure, information and communication systems, automation and decision support tools, appropriate working environment, HR capacity building, collaborative learning through FOLD, provision for LDC empowerment reserve, certification retainer-ship, KPI linked incentives, benchmarking and reward programs etc.

c. The resources required would vary for emerging, medium and large sized LDCs. At All India level, it would be in the range of 3500-4000 persons and Rs. 900-1400 crores per annum which would be less than 1% of the resources deployed in the electricity sector.

d. A model regulation on LDC fees and charges evolved by deriving the best practices of existing Fees and Charges regulations of the CERC/ SERCs could be suitably adopted by the Appropriate Commissions.

The Forum appreciated the efforts of the sub-group and acknowledged the role of load dispatch centres in the sector. The Forum while adopting the

report of the sub-group (as endorsed by the FOR Technical Committee) also advised as under:

a. The Report may be disseminated to the SERCs/ JERCs

b. The FOR Standing Technical Committee to monitor the implementation of the Report at regular intervals in its meetings

AGENDA ITEM NO. 8: REFERENCE FROM OERC, PSERC AND UPERC REGARDING PROPOSED AMENDMENTS TO TARIFF POLICY AND ELECTRICITY ACT, 2003

The Forum discussed the provisions in the proposed amendments to the Tariff Policy 2016 and Electricity Act 2003. Some of the members viz. Chairpersons of OERC, PSERC and UPERC, opined that some of the which were previously being handled by SERCs are now proposed to be under the purview of the Central Government as per the draft amendment to the Policy and the draft amendment to the Act . They felt that as these issues are purely pertaining to the States, the jurisdiction on these issues should remain with SERCs.

After deliberations, the Forum decided as under:

a. In order to study the amendments proposed in the Tariff Policy and Electricity Act 2003, a Working Group may be constituted under the Chairmanship of Chairman, CERC/ FOR. Other members of the Working Group would be Chairpersons of Andhra Pradesh Electricity

Regulatory Commission, Odisha Electricity Regulatory Commission, Punjab State Electricity Regulatory Commission, Delhi Electricity Regulatory Commission and Uttar Pradesh Electricity Regulatory Commission.

b. The Working Group would recommend the comments to be adopted by FOR and to be conveyed to the Ministry of Power.

AGENDA ITEM NO. 9: ANALYZING THE RECENT SURGE IN ELECTRICITY PRICES ON THE POWER EXCHANGES

Advisor (Power Markets), CERC made a presentation ***(Annexure IV)*** on the movement of electricity prices on the Power Exchange in the month of September-October 2018. The analysis showed that the electricity prices in the DAM (day-ahead market) segment had surged towards the end of September 2018 and remained at an increased level during the month of October 2018 touching an all-time high price of Rs. 18.29 per unit in a particular time block.

The Forum after deliberations opined that the transactions on the Power exchanges should be monitored by CERC. Joint Chief (RA), CERC confirmed that CERC conducts regular audit of the Power Exchanges as a part of the monitoring mechanism. It was agreed that a detailed presentation on the price discovery mechanism would be arranged in a future meeting of FOR.

AGENDA ITEM NO. 10: ANY OTHER ITEMS WITH THE PERMISSION OF THE CHAIR

Reference from Gujarat ERC regarding Capacity building program in "Legal, Regulatory and Policy framework for Power sector in India"

Chairperson, GERC apprised the Forum about the need for capacity building program on legal aspects of Regulations, especially for the new Chairpersons and Members for all SERCs/ JERCs. He informed that GERC has collaborated with Gujarat National Law University to design a two day workshop to cover topics such as legal interpretation and drafting, regulatory and policy changes in the power sector etc. He requested FOR Secretariat to conduct the workshop under the aegis of FOR as the cost of the program is expected to be Rs. 5 lakhs.

The Forum discussed this proposal and also suggested that eminent practicing advocates from Supreme Court may also be invited to take sessions. GERC was requested to formally send a proposal to FOR Secretariat so that the same can be presented as an agenda item in the next FOR meeting.

On conclusion of the meeting, ShriShankarlingeGowda, Chairperson, Karnataka Electricity Regulatory Commission informed the Forum that he is demitting office on 19th December 2018. He recalled that every FOR meeting was an occasion of learning where issues of importance to the power sector were discussed and deliberated. He thanked the Forum for

the interactions during his tenure and Chairperson OERC for his hospitality during the 65th FOR meeting.

ShriSanoj Kumar Jha, Secretary, CERC/ FOR thanked the Chairperson, Members, Secretary and staff of the Odisha State Electricity Regulatory Commission (OERC) for their painstaking efforts to host the 65th Meeting of FOR at Bhubaneswar. He also thanked all the dignitaries present in the meeting. He thanked the staff of FOR Secretariat for their arduous efforts in organizing the meeting.

The Chairperson, CERC/ FOR conveyed to the Members of Forum that the next FOR Meeting will be held in New Delhi, date and time of which would be informed in due course of time. The meeting ended with a vote of thanks to the Chair.

/ ANNEXURE – I /

LIST OF PARTICIPANTS OF THE 65TH MEETING

OF
FORUM OF REGULATORS (FOR)

HELD ON 13TH NOVEMBER, 2018 AT BHUBANESWAR (ODISHA)

S.N.	NAME	ERC
01.	Shri P.K. Pujari Chairperson	CERC / FOR – in Chair.
02.	Justice (Shri) G. Bhavani Prasad Chairperson	APERC
03.	Shri R.P. Singh Chairperson	APSERC
04.	ShriSubhash Chandra Das Chairperson	AERC
05.	Shri S.K. Negi Chairperson	BERC
06.	Shri D.N. Misra Chairperson	CSERC
07.	Justice (Shri) S.S. Chauhan Chairperson	DERC
08.	ShriAnand Kumar Chairperson	GERC
09.	ShriJageet Singh Chairperson	HERC
10.	Shri S.K.B.S. Negi Chairperson	HPERC

11.	Dr. Arbind Prasad Chairperson	JSERC
12.	Shri M.K. Goel Chairperson	JERC (State of Goa & UTs)
13.	ShriNgangomSarat Singh Chairperson	JERC for M & M
14.	Shri M.K. ShankaralingeGowda Chairperson	KERC
15.	Shri U.N. Behera Chairperson	OERC
16.	Ms. KusumjitSidhu Chairperson	PSERC
17.	Shri S. Akshayakumar Chairperson	TNERC
18.	Shri Ismail Ali Khan Chairperson	TSERC
19.	Shri Raj Pratap Singh Chairperson	UPERC
20.	ShriSubhash Kumar Chairperson	UERC
21.	ShriMukulDhariwal Member	MPERC
22.	ShriPrithviraj Member	RERC
23.	ShriDurgadasGoswami Member	WBERC

24.	ShriSanoj Kumar Jha Secretary	CERC
25.	Dr. Sushanta K. Chatterjee Joint Chief (RA)	CERC
26.	Ms. RashmiSomasekharan Nair Dy. Chief (RA)	CERC
	SPECIAL INVITEES	
27.	Dr. M.K. Iyer Member	CERC
28.	ShriAswini Kumar Das Member	OERC
29.	ShriSauri Kant Parhi Member	OERC
30.	Shri S.K. Soonee Adviser	POSOCO
31.	ShriJogendraBehera, Adviser (Power Markets)	CERC
32.	ShriAjitPandit, Director	Idam Infrastructure Advisory (P) Ltd

****

Annexure-III

PRESENTATION ON

- Compendium of Regulations & Tariff Orders Issued by CERC and all SERC's on Renewable Energy Sources in India

- Compendium of Central and State Governments Policies on Renewable Energy Sources in India

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BY

CENTRAL BOARD OF IRRIGATION & POWER(CBIP)

ABOUT CBIP

1. Central Board of Irrigation and Power, is a Premier Institution set up by the Government of India in 1927. CBIP has been rendering dedicated services to the professional organizations, engineers and individuals in the country related to Power, Water Resources and Renewable Energy Sectors for the last 92 years

2. CBIP is also the Indian chapter for 10 international organizations related to Power, Renewable Energy & Water resources sectors.

3. It is a knowledge bank and an exchange for dissemination of knowledge and experience.

MAIN OBJECTIVES

1. Dissemination of knowledge through various modes:
   - Organizing National & International Conferences, Seminars, Workshops, Training Programs and Symposiums.
   - Publications of technical documents e.g. manuals, technical reports, guidelines and journals
   - To impart training to the engineers/professionals.
   - To provide research and professional excellence.
   - Recognition of technical excellence through annual awards
   - To provide information about technological developments and to provide online information to the professionals.
   - To provide linkages to Indian Professionals with their counterparts in other countries
   - Collection, compilation and analysis of technical data at national as well as international level

ORGANISATION OF THE BOARD

- The affairs of the Board are administered, directed and controlled by an Executive Committee consisting of President, three Vice Presidents (Water Resources, Power & Renewable Energy) and one representative from each member organization.
- The Executive Committee presently comprises of more than 250 members from within the country and also from Bhutan , Sri Lanka and Germany.
- The General Body presently comprises of more than 3000 members of the level of Chief Engineers/equivalent & above
- More than 300 retired professionals are also enrolled as life members of CBIP.
- Member organizations make annual contributions to CBIP for providing technical services to them.

ACTIVITIES

- **Conferences**

  Held more than 2000 Conferences in Water Resources, Power and Renewable Energy Sectors attended by more than 3 lacs delegates.

- **Publications**

  Brought out more than 5000 publications, including Manuals, Technical Reports, Guidelines and Journals etc.

  Providing free access of CBIP Publications to more than 35,000 officers of Member organizations including Government departments, Regulatory Commissions, PSU's, Central & State Power utilities, Engineering Colleges. Research Institutes and Leading Private Sector Organizations etc.

ACTIVITIES

(Contd.)

- **Training Activities**

1. CBIP has imparted training for more than 1.5 lacs mandays to various professionals in the country
2. CBIP has established Centre of Excellence at Gurgaon (Haryana),, for imparting long and short term training.
3. CBIP has been recognized by Ministry of Power, Government of India, as Category-1 training institute.
4. CBIP has been recognized as a Training Provider by NSDC, PSSC, SCGJ.
5. CBIP provides Post Graduate Diploma in Transmission and Distribution in Engineering and Post Graduate Diploma in Thermal Engineering to B. Tech. Engineers.
6. CBIP has recently undertaken construction of another building at Gurgaon as part of extension of its Centre of Excellence, in Gurgaon (Haryana).
7. Realising the constraints being faced by the professionals in leaving their stations/headquarters for attending various training programs organized by CBIP at New Delhi and other places, CBIP has also taken the initiative to provide Door Step/Onsite training at the project sites and organizations desired stations.

RELEASE OF COMPENDIUMS OF REGULATIONS & POLICIES ON RENEWABLE ENERGY BY HON'BLE MINISTER OF STATE (I/C),POWER AND NEW & RENEWABLE ENERGY, SHRI R.K. SINGH

COMPENDIUM OF REGULATIONS ON RENEWABLE ENERGY SOURCES

- Compendium on Regulations & Tariff Orders issued by CERC and SERC's on Renewable Energy Sources in India.

  This compendium contains the following:

  1. All the original regulations issued by CERC and all SERC's .
  2. All the amendments to the regulations.
  3. Consolidated orders wherein all amendments have been incorporated.
  4. Summary of each regulation which includes only the important points.
  5. Comparison table of all tariff regulations separately for solar, wind, small hydro, biogas/biomass, municipal waste etc.

- This compendium has been uploaded in CBIP's website (www.cbip.org) and can be also be accessed by the following link:

  http://www.cbip.org/RegulationsData/REHome.aspx

COMPENDIUM OF POLICIES ON RENEWABLE ENERGY SOURCES

- Compendium on Central and State Governments Policies on Renewable Energy Sources in India.

  This compendium contains the following:

  1. All the original policies issued by Central and State Governments .
  2. All the amendments to the policies.
  3. Consolidated orders wherein all amendments have been incorporated.
  4. Summary of each policy which includes only the important points.
  5. Comparison table of policies for solar and wind.

- This compendium has been uploaded in CBIP's website (www. cbip.org) and can be also be accessed by the following link:

  http://www.cbip.org/Policies2019/policies.aspx

LIST OF RELATED DOCUMENTS/ COMPENDIUMS BROUGHT OUT BY CBIP

CBIP with its objective of knowledge dissemination has come out with the following compendiums that have benefitted vast sections of our power society:-

- Compendium of State Government Policies on Renewable Energy Sector in India, 2010
- Compendium of State Government Policies on Renewable Energy Sector in India, 2014
- Atlas of Potential Land for Renewable Energy Projects in India, 2015
- Compendium of Policies, Regulations, Technical Standards & Financing Norms for Solar Power Projects, 2015
- Compendium of Regulations & Tariff Orders Issued by Regulatory Commissions for Renewable Energy Sources in India, 2016

CENTRAL BOARD OF IRRIGATION & POWER

ESTD. 1927

NEW DELHI

Thank you

Annexure-IV

Supported by

UK Government

A presentation on

"Regulatory Framework for Long-Term Demand Forecasting and Power Procurement Planning"

Centre for Energy Regulation

Department of Industrial Management and Engineering

Indian Institute of Technology Kanpur

Anoop Singh

Associate Professor , IIT Kanpur

Historical Power Supply Position in India

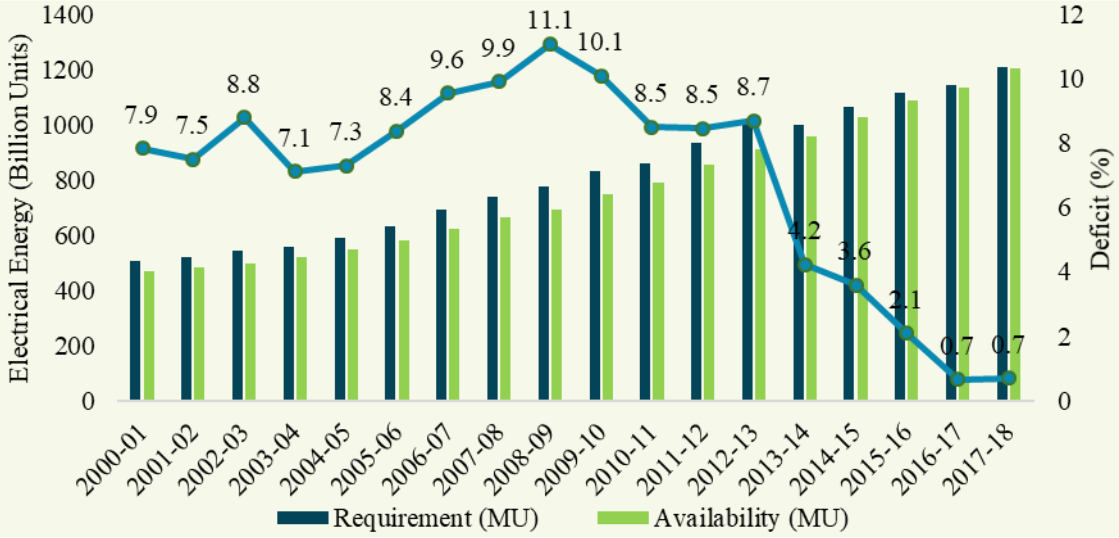


Figure: All India historical power supply position, energy-wise

The total cost of power procurement across the country adds to about 5.25 lakh crore.

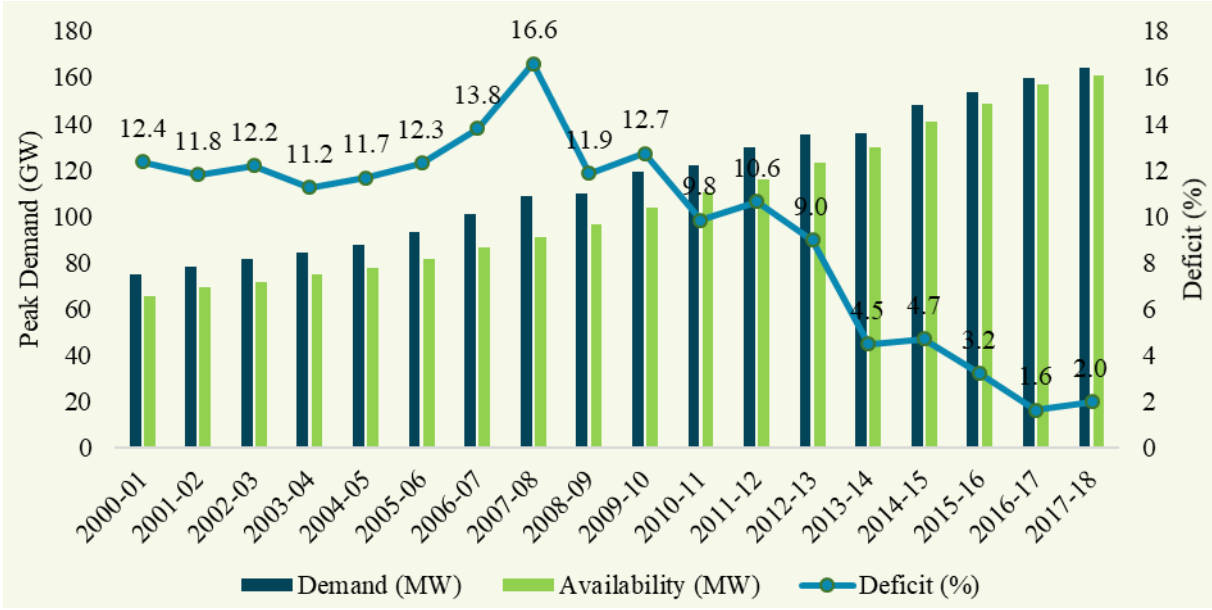


Figure: All India historical power supply position, peak-demand-wise

Hence, it deserves due attention

Importance of Long-term Demand Forecasting

- Ensuring energy availability
- Key input to power procurement planning
- Key input to network planning
- Decisions for large investments on capacity addition
- Inaccurate demand forecast placing the investors' capital at risk
- Electricity adequate supply impact economical activities

Long-term (more than 5 years)

- For Base load requirement, Addition of capacity, Long-term PPAs, Network Planning

Medium-term (1 to 5 years)

- YoY load growth, Seasonal load variations, small capacity addition

Short-term (less than 1 year)

- Daily peak load, Contingency load requirement, festival or seasonal load requirement

Importance of Power Procurement Planning

- Power procurement 70-80 percent of total cost of electricity served
- Critical expenditure head in ARR
- Overestimation leads
  - Burden of fixed charges
  - Higher consumer tariffs
- Underestimation leads
  - Power shortages, system imbalances
  - Costly power purchase

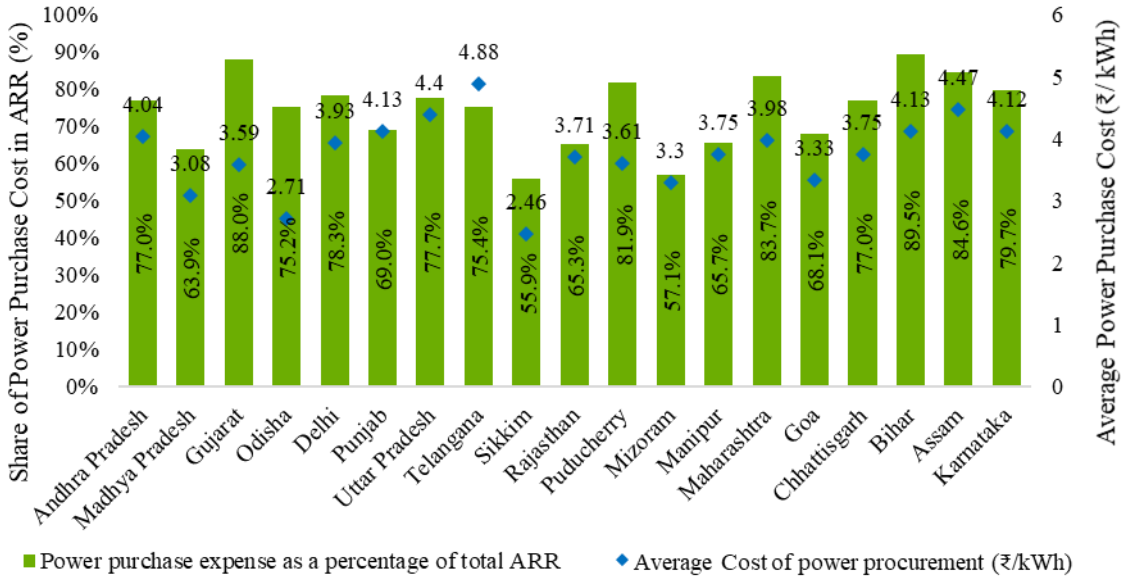


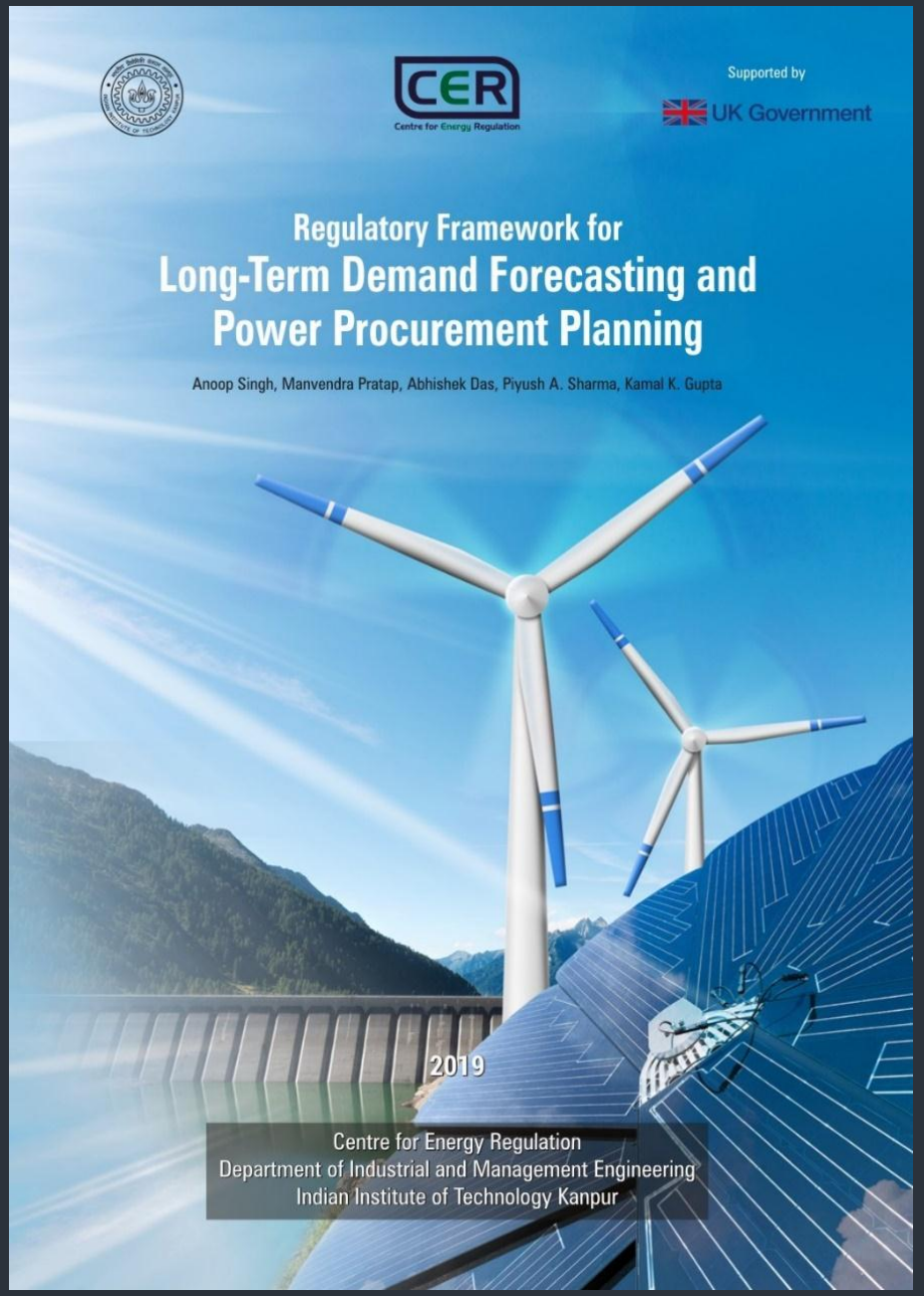
Figure: Share of power purchase expense in total ARR, and average cost of power procurement

Supported by
UK Government

Regulatory Framework for Long-Term Demand Forecasting and Power Procurement Planning

Anoop Singh, Manvendra Pratap, Abhishek Das,
Piyush A. Sharma, Kamal K. Gupta

Centre for Energy Regulation
Department of Industrial Management and Engineering
Indian Institute of Technology Kanpur



Contents

- National and International Experiences
- Existing Legislative and Policy Provisions in India
- Forecast by CEA
  - *Methodology*
  - *Peak Demand and Energy Requirement*
- Existing Practices across States
- Recommendations on Regulatory Framework
  - *Long-Term Demand Forecating*
  - *Power Procurement Planning*

Participants of CER's First Regulatory Research Camp

Mr. Kanti J. Bhuva Deputy Director (Technical) Gujarat Electricity Regulatory Commission	**Mr. Vivek Dikshit** Superintending Engineer Uttar Pradesh State Load Despatch Centre
Mr. M. S. Vidyasagar Deputy Director (Planning & Power Procurement) Andhra Pradesh Electricity Regulatory Commission	**Mr. Sukhjot Singh Sidhu** Additional Superintending Engineer Punjab State Power Corporation Limited
Mr. Himanshu Chawla Deputy Director (Tariff & Engineering) Delhi Electricity Regulatory Commission	**Mr. Rajeev Keskar** Chief General Manager Madhya Pradesh Power Management Company Limited
Mr. Anil Panda Joint Director (Tariff & Engineering) Orissa Electricity Regulatory Commission	**Mr. Kamal Kumar Gupta** Project Engineer Indian Institute of Technology Kanpur

RRC Coordinator

Dr. Anoop Singh

Coordinator, Centre for Energy Regulation

Associate Professor

Department of Industrial and Management Engineering

Indian Institute of Technology Kanpur

Literature & Reports Survey

- International Experience
- Existing Legislative and Policy Provisions in India

International Experience

- Australia
- Japan
- Thailand
- Singapore
- CEER Member States, Europe
- California, United States
- West Virginia, United States

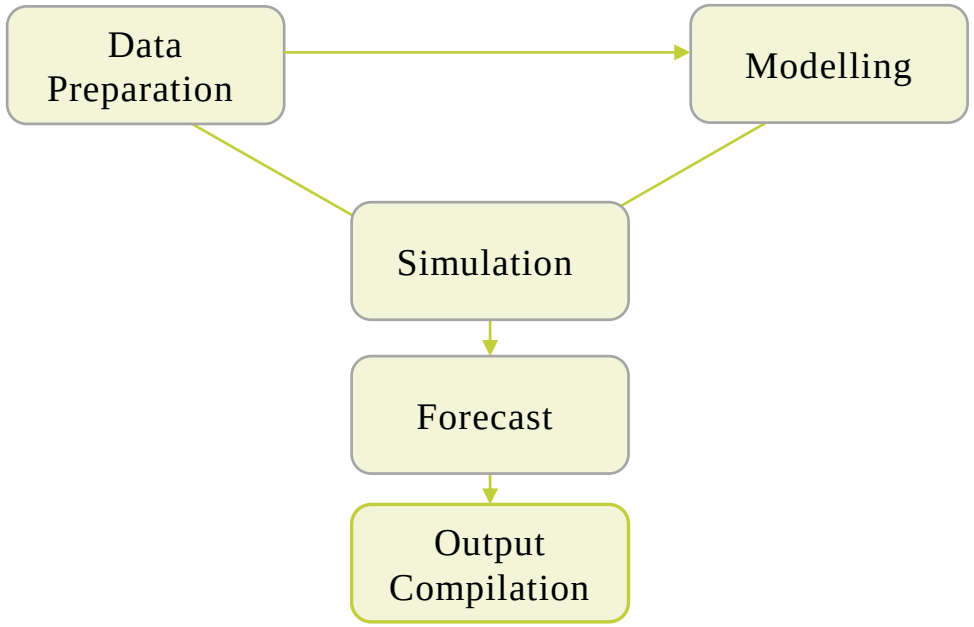


Figure: General workflow of maximum demand analysis for NEFR

International Experience Summary

	Australia	Japan	Thailand	Singapore	European Countries	California	West Virginia
Objective	Network planning	3E+S (Safety, Energy security, Economic efficiency and Environment)	Energy security, Economy and Ecology	Attracting investment in generation asset	Assessment of electricity generation adequacy	Preparing Integrated Energy Policy Report	Energy security
Responsible organisation	National Transmission Planer (NTP)	Ministry of Economy, Trade and Industry (METI)	Ministry of Energy, along with the Electricity Generating Authority of Thailand (EGAT)	Energy Market Authority (EMA)	European Network of Transmission System Operators for Electricity	California Energy Commission	Public Service Commission of West Virginia
Forecast range	20 years	15 years	20 years	10 years	Seasonal, mid-term, 10 years	12 years	10 years
Frequency of forecast	Annual	Updated at least once in every 3 years	Revised in every 3 years	Annual	Updated annually	Updated annually for the next 10 years	Updated annually
Factors considered for forecast	Economic growth, weather conditions, electricity prices	Economic growth, Energy efficiency and conservation measures, population growth	Social (Population) and economic (long-term GDP) growth, Energy efficiency target, RE development target	Economic and Consumer growth	Economic growth, temperature, policy, demographics	Economics, demographics, weather, electric vehicle, etc.	Consumer growth, Annual growth rate
Peak Load or Energy	Both	Energy	Both	Both	Peak load	Both	Peak load
Forecast scenario	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Single
Corrective action(s) for forecast	Not defined	Reviewed at least once in every 3 years	Reviewed once in every 3 years	Annual forecast	Annual update	Annual update	Not defined

Existing Legislative and Policy Provisions in India

The Electricity Act, 2003

- **Clause 61 (c)** - State/Central/Joint Electricity Regulatory Commissions (SERCs/ CERC/JERCs), as and when required, must consider encouraging competition, efficiency, economical use of resources, better performance and optimum investments while determining the tariff

- **Clause 61 (d)** - Emphasises protection of consumers' interests and cost-recovery

Act Empowers ERCs to

- **Section 62 clause (1)** - Determine the tariff for licensees
- **Section 86 clause (1) (b)** - Regulate the power purchase process
- **Section 73(i)** - Central Electricity Authority (CEA) to carry out studies pertaining to cost, efficiency, competitiveness and associated matters (Load Forecasting and power procurement planning)

Existing Legislative and Policy Provisions in India (Cont…)

National Electricity Policy, 2005

- Clause 3.2 of NEP also directs CEA to make short-term and long-term demand projections

Tariff Policy, 2006

- Envisioned electricity access to all
- Economic, efficient and reliable
- Transparent, consistent and predictable regulatory practices

Tariff Policy, 2016

- Directs the ERCs to mandate
  - DISCOMs to forecast load and plan power procurement
- **Clause 8 -** *"The appropriate Commissions must mandate DISCOMs to undertake the exercise of load forecasting and power procurement planning every year"*

Long-term Electricity Demand Forecast by CEA

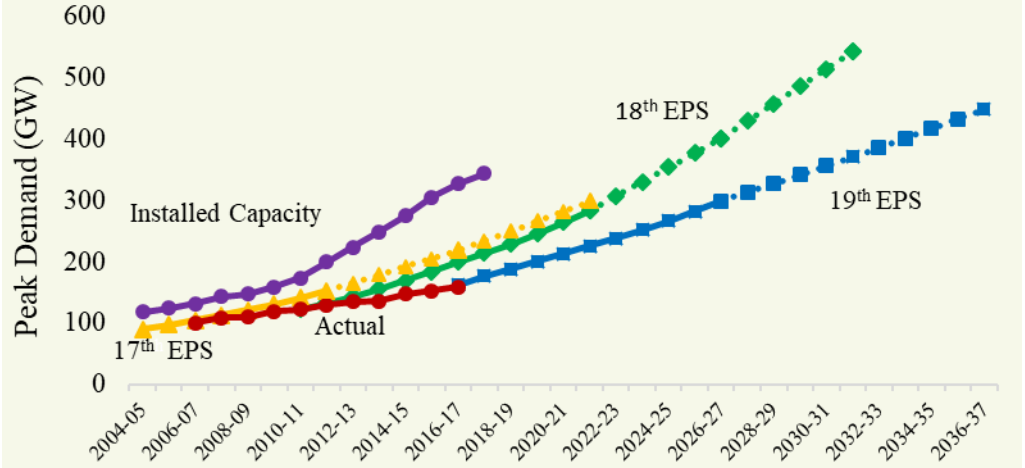
- Methodology
- Existing Peak Demand and Energy Requirement Projections

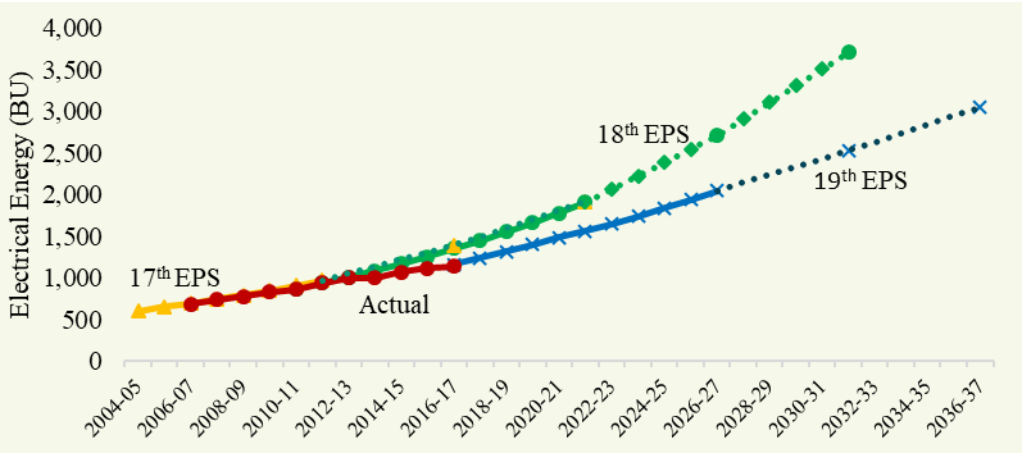
Methodology & Forecasts

Energy Requirement Analysis
- Partial End Use Method
- Time Series Analysis

Peak load Requirement
- Load Factor
- Diversity Factor for Regional Peak

Year	Peak Electricity Demand					
	Actual demand (MW)	18th EPS Projections (MW)	Overestimated Demand in 18th EPS (MW)	19th EPS Projections (MW)	Overestimated Demand in 19th EPS (MW)	Difference between 18th and 19th EPS (MW)
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6) = (2) – (5)	(7) = (3) – (5)
2015-16	1,53,366	1,83,902	30,536			
2016-17	1,59,542	1,99,540	39,998	1,61,834	2,292	37,706
2017-18	1,64,066	2,14,093	50,027	1,76,897	12,831	37,196
2021-22		2,83,470		2,25,751		57,719
2026-27		4,00,705		2,98,774		101,931





Long-term Demand Forecasting and Power Procurement Planning – Existing Practices across States

- Andhra Pradesh
- Madhya Pradesh
- Uttar Pradesh
- Delhi
- Gujarat
- Odisha
- Punjab

State	Agency	Objective	Forecasting Horizon	Deadline	Information/data Sharing Responsibility	Compliance	Forecasting Methodology	Internal Review	Relevant Regulations
AP	DISCOM and STU	Tariff and transmission planning	10 years; first 5 years – detailed, next 5 years – simple	One year before the start of control period	DISCOM to furnish data to STU and ERC		Not specified	Public consultation; the Commission might need to independently assess, verify and validate	Guidelines for load forecast, resource plans and power procurement, Dec 2006; Reg 4 of 2005; Reg 10 of 2013; Reg 5 of 2005; Transmission and bulk supply licence regulations (17.12), Distribution and retail supply licence regulations (19.2)
DL	DISCOM	MYT and transmission planning	5 years	31st July of the base year	DISCOM to furnish data to ERC		Must consider all consumer types, DSM measures, policies, net metering and economic data		Grid Code; Regulations 5.7, 23.1 and 23.2 of MYT Regulation, 2017
GJ	DISCOMs	Transmission and power procurement planning	10 years; hourly peak and energy for first 5 years, annual peak and energy for next 5 years	31st January of every year	DISCOM to furnish data to STU SLDC		Trend analysis and reasonable assumptions for future (after considering consumer types, DSM measures, policies and economic data)		Grid Code, 2013; Guideline for power procurement by Distribution Licensee (2 of 2013); Regulations 19.2, 96.1 and 96.2 of MYT Regulations, 2016

State	Agency	Objective	Forecasting Horizon	Deadline	Information/data Sharing Responsibility	Compliance	Forecasting Methodology	Internal Review	Relevant Regulations
MP	DISCOM	MYT and transmission planning	5 years, on a rolling basis	31st March (DISCOM to STU)	STU to maintain database		DISCOM to adopt appropriate method (Part IV of Power Purchase & Procurement Process Regulations, 2004,)	Operation and Coordination Committee (OCC)	Grid Code; Power purchase & Procurement Process Regulations, 2004
OR	STU and DISCOMs	Transmission planning	First 5 years by DISCOM, next 5 years by STU	31st Dec (DISCOM to STU), 31st March (STU to ERC)	DISCOM to furnish data to STU for submitting the compiled data to ERC	STU shall approach OERC in case of non-compliance	Must consider past trends and economic data	Operation and Coordination Committee (OCC)	Clauses 3.10 (1) and (2) and 3.8 of Orissa Grid Code, 2015; Regulations 5 and 7.3 of Terms and Conditions for determination of Wheeling & Retail Supply Tariff, 2014
PB	STU	Transmission and power procurement planning	10 years, month-wise	30th April (DISCOM to STU), 30th Nov (STU to ERC)	DISCOM to furnish data to STU for submitting the compiled data to ERC		Month-wise peak/off-peak load considering paddy/non-paddy seasons		Clauses 3.4.3 and 3.5.1 of Grid Code, 2013
UP	DISCOM	MYT	5 years	1st June (along with business plan)	DISCOM to furnish the forecasts to ERC		Must consider economic indicators of the state		MYT Regulations; Grid Code

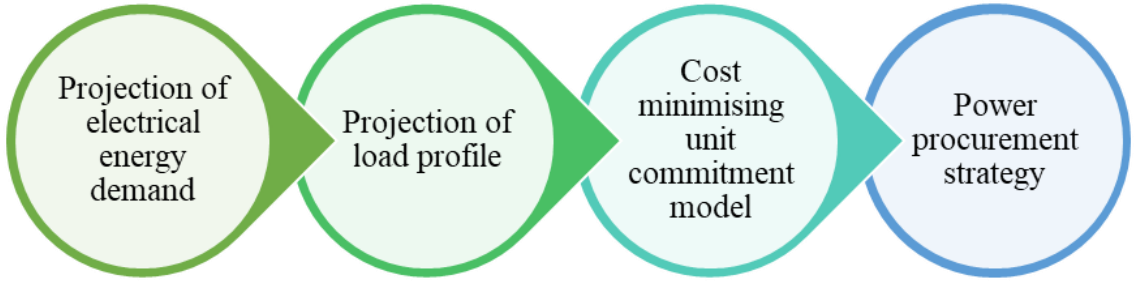
Prevailing Practices of Power Procurement Planning in the Select Indian States

	Who	By When	Horizon	Regulations
AP	DISCOMs	One year before the start of the control period	MYT	Guidelines for Load Forecast, Resource Plans and Power Procurement, 2006; Regulations 4 of 2005; Regulations 10 of 2013; Distribution license;
DL	DISCOMs	31st July	B Plan	Multi-Year Tariff Regulations 2017;
GJ	HoldCo/DISCOM	31st Jan	Rolling 5 year	Power Procurement Guidelines 2013; Multi-Year Tariff Regulations 2016;
MP	HoldCo/DISCOM	31st Oct	Rolling 5 year	Power Purchase and Procurement Regulations, 2004;
OR	HoldCo	30th Nov	10 year, revised yearly	Terms and Conditions for determination of Wheeling & Retail Supply Tariff, 2014; Grid Code
PB	DISCOM	30th Nov	Rolling 10 year	Power Purchase and Procurement regulations 2012;
UP	Holdco/DISCOM	1st June	B Plan	MYT Regulations

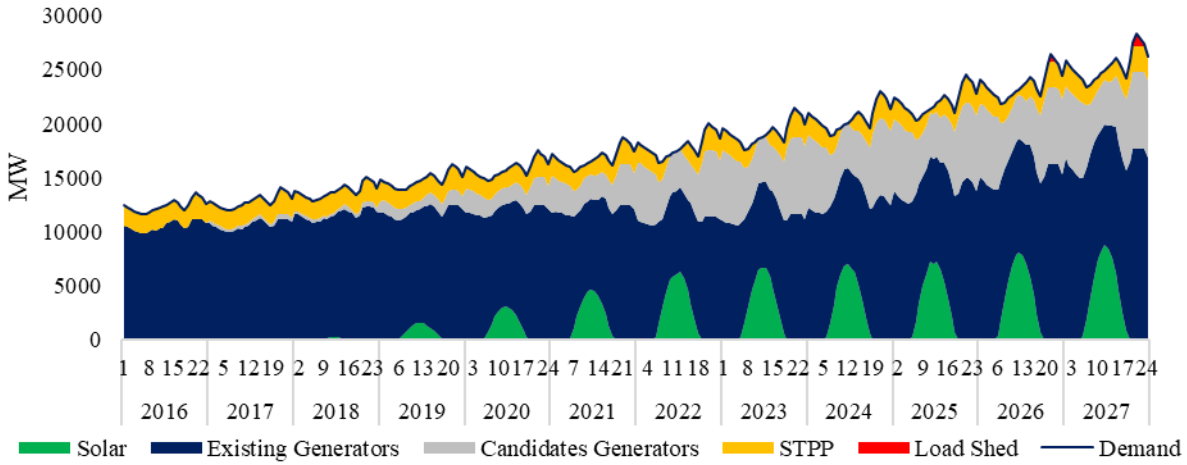
Power Procurement Strategy for Uttar Pradesh Power Corporation Limited (UPPCL) – A Study by IIT Kanpur

Methodology

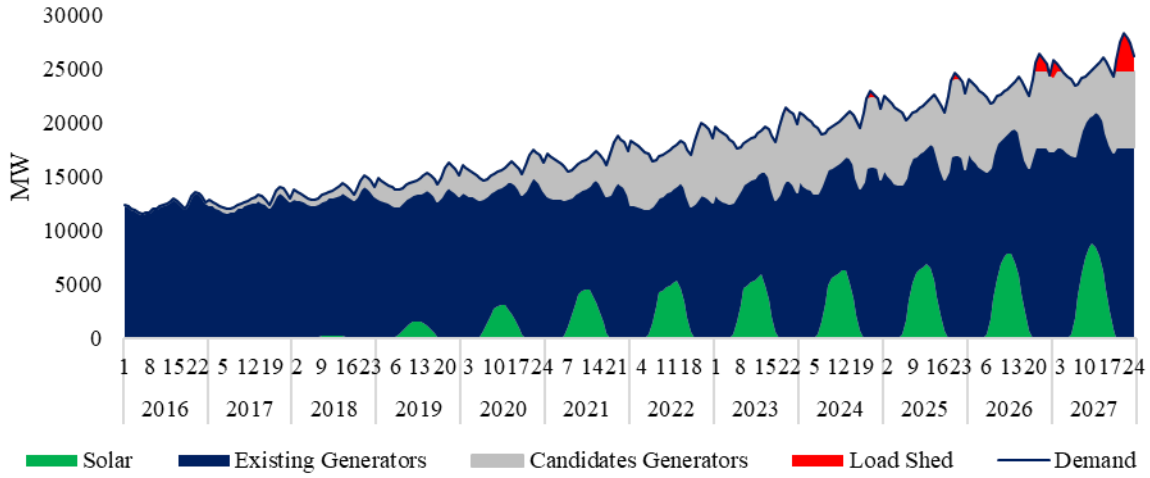
- Econometric models for long-term energy requirement
- Load profile and load duration curve analysis & projections
- GAMS simulations for different demand scenario / procurement options



Long-term Power Procurement Portfolio for FY 2016 to FY 2027



Long-term Power Procurement Portfolio for FY 2016 to FY 2027

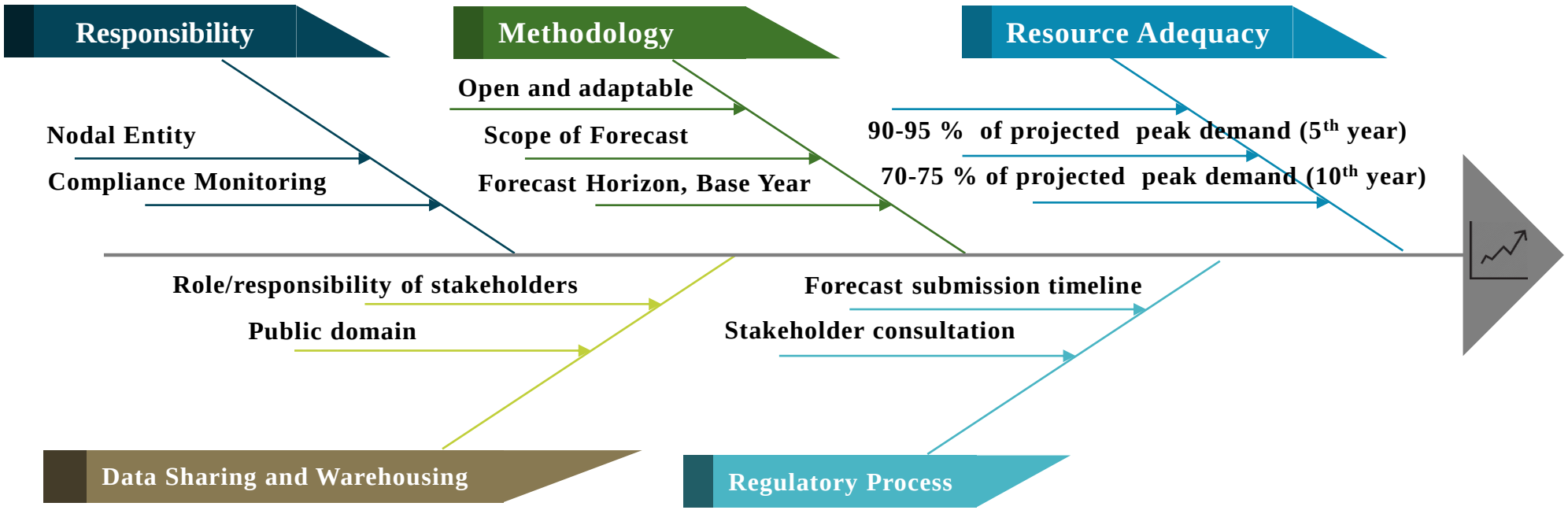


Model
Long-term Load Forecast and Power Procurement Planning Regulation – Key Ingredients

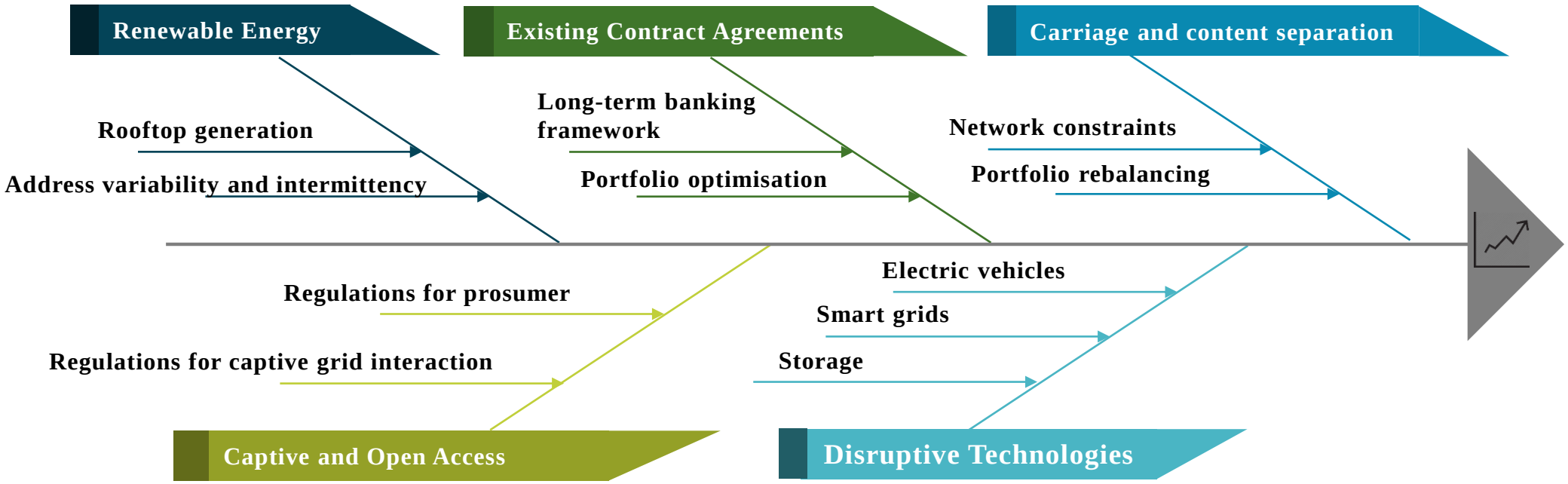
Recommendations on Regulatory Framework for

- Long-Term Demand Forecasting
- Power Procurement Planning

Recommendations on Regulatory Framework for Long-Term Demand Forecasting



Recommendations on Regulatory Framework for Power Procurement Planning



Conclusion

- Diversity exists in
  - Scope, objective, time horizon, entity responsible
- Power Procurement Plans should consider
  - Long-term, Medium-term, short-term, ancillary services, banking
- Responsible Entities
  - Forecasts - distribution utility level
  - Monitoring
- Demand Projection Frequency
  - Long term for at least 10 years
  - Update every year

Conclusion (cont..)

- Factors to be considered for forecast
  - Economic indicators
  - Anticipated load growth
  - Disruptive technology / technological development
  - New consumer growth
  - Climatic condition

- Factors to be considered for power procurement plans
  - Network constraints
  - Renewable energy penetration
  - Captive generation
  - Demand side management

A healthy ‘CEREAL’ for the Power Sector

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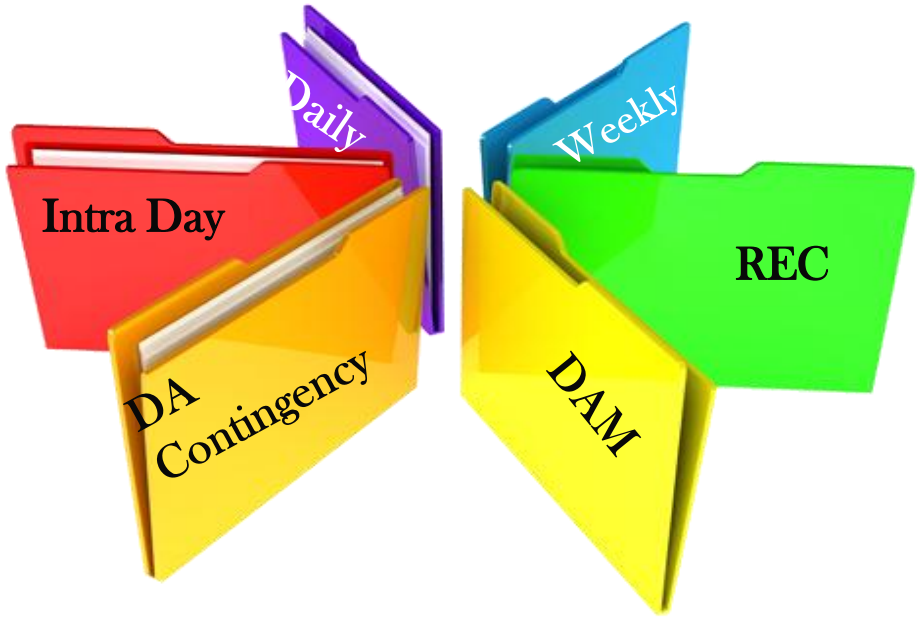
PRICE DISCOVERY MECHANISM AT IEX



Introduction to Product Portfolio

IEX Market Segments

Day-Ahead Market since June,08	• *Delivery for next day* • *Price discovery: Closed , Double-sided Auction*
Intraday Market & Day-Ahead Contingency Round the clock since Jul'15	• *Intraday: For Delivery within the same day* • *Day Ahead Contingency: Another window for next day* • *Gate closure : 3 hours*
Term-Ahead Contracts since Sep,09	• *For delivery up to 11 days* • *Daily Contracts, Weekly Contracts*
Renewable Energy Certificates since Feb,11	• ***Green Attributes as Certificates*** • ***Sellers :*** *RE generators not under feed in tariffs* • ***Buyers:*** *Obligated entities; 1MWh equivalent to 1 REC*
Energy Saving Certificates since 27 Sep'17	• *1 Ecert= 1 Mtoe(Metric Tonne Oil Equivalent)* • *Trading Session on every Tuesday of the Week* • *Trading time 1300 hrs to 1500 hrs*

Auction **Continuous**

Day Ahead Market-Trading Process

Double sided Closed Auction

- Double side closed auction is a process where buyers and seller submits their bids (intention) during the stipulated auction period for buying or selling electricity.
- The participation is anonymous in nature.
- On closure of the auction time period (market time), the process of “Price Discovery” is run in the system.
- Price discovery: Price is discovered for each time block (96 time blocks separately). All purchase bids and sell bids for **each time block** will be aggregated to form a buy curve and a sell curve which is linear (sloping) in nature.
- The intersection point of these two curves will give Market Clearing Price (MCP) and Market Clearing Volume (MCV) which is the equilibrium for price and quantity.
- Volume quoted by individual participants corresponding to this Market Clearing Price is allocated to them.

Closed Auction

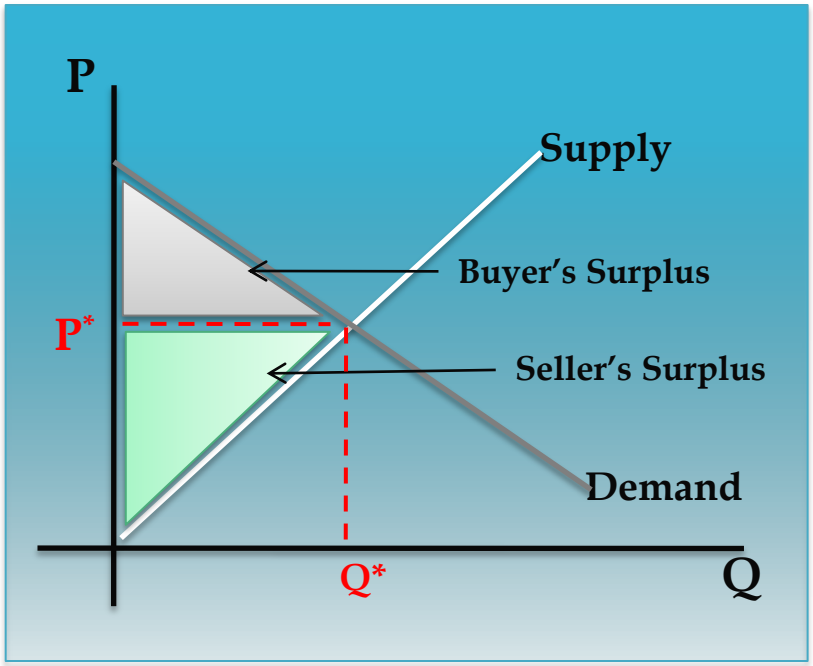
Orders accumulated during call phase (no matching)

Orders matched after call period

Orders are used for calculation common price i.e. Equilibrium Price.

All successful orders matched at Equilibrium Price.

Auctioned Day-Ahead Market



P* - Cleared Price
Q* Cleared/Traded Volume

- Nation-wide, on-line, automated
- Double-sided closed auction system
- 15.min block day-ahead contracts (MWh)
- Physical delivery based
- Central counter party: IEX
- Equilibrium price for 15 min time block (Rs./MWh)
- 15 min block volumes/prices published
- Pool based (collective) scheduling of traded power by NLDC (POSOCO)

Bid Types in DAM

Single Bid

- Single Bids for each 15 min can be entered
- Varying price and quantum pairs
- Allow partial execution

Block Bid

- Block Bid for any 15 min
- Mother or child bid
- No circular links
- No partial execution

Understanding of Block Bid

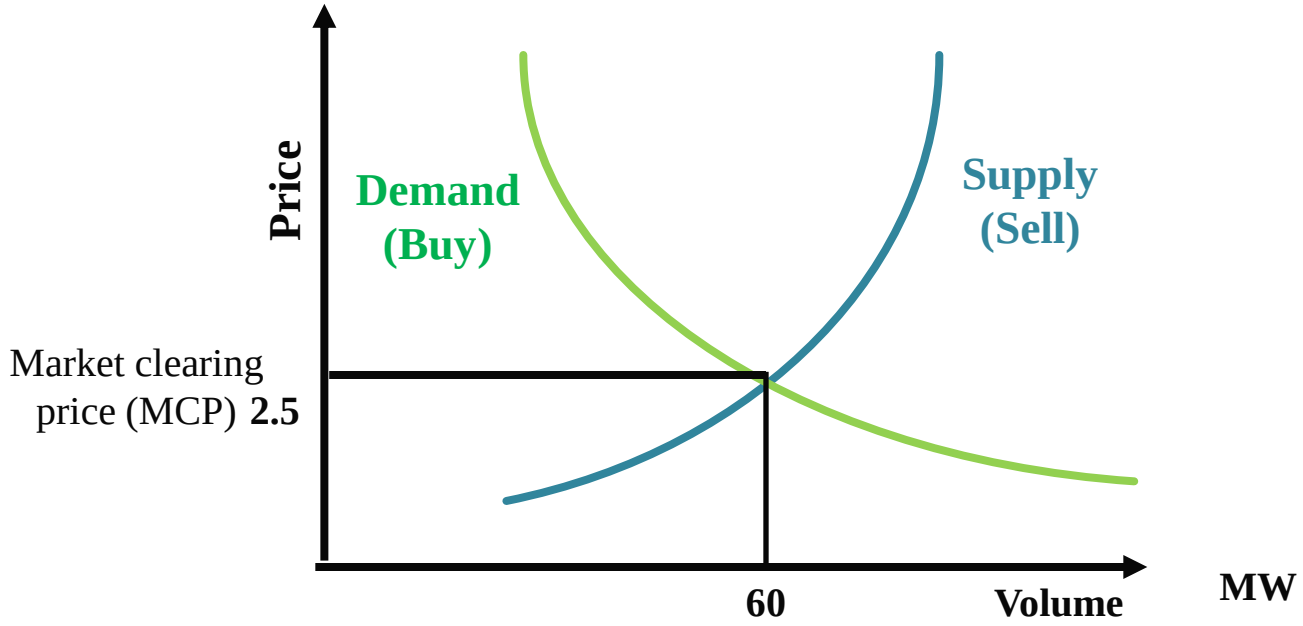
- A block bid is used for the procurement or sale of power which is specific to a block of hours (e.g. base load, peak or user defined).

- Block bid is selected for the entire time period bidded (All or None concept) unlike in single bid where the selection can be partial also.

- A block bid is selected if the bid price is better than the average system price of power in respective block hours.

Model Price Calculation algorithm

	Price Tick (Rs.)	0	1	1.1	2	2.1	2.5	3	3.1	4	4.1	5	---	---	----	20
Bid Quantum by different portfolios	Portfolio A, MW	20	20	20	20	20	20	20	10	0	0	0	0	0	0	0
	Portfolio B, MW	60	60	60	60	50	40	40	40	40	40	20	20	20	20	20
	Portfolio C, MW	40	20	0	0	-40	-60	-80	-81	-120	-120	-120	-120	-120	-120	-120
	Total Buy Quantum received, MW	120	100	80	80	70	60	60	50	40	40	20	20	20	20	20
	Total Sell Quantum received, MW	0	0	0	0	-40	-60	-80	-81	-120	-120	-120	-120	-120	-120	-120
	Net Transaction, MW	120	100	80	80	30	0	-20	-31	-80	-100	-100	-100	-100	-100	-100



HIGH AVERAGE PRICE IN POWER EXCHANGE

Increase in Price in FY 2018-19

- ✓ Overall increase in peak demand by 7.6% during Apr-Oct 2018 over last year.

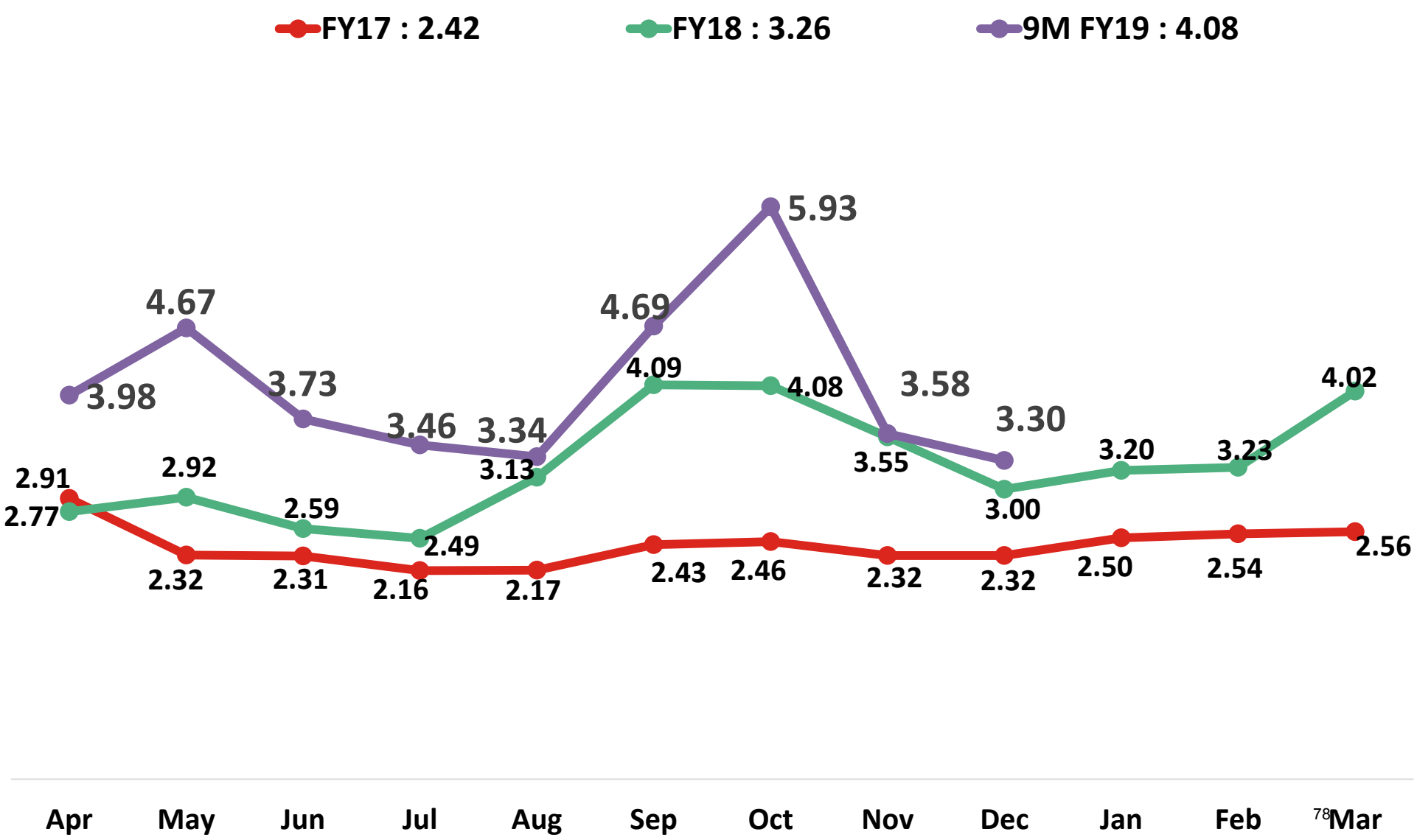
  Highest ever peak demand of 176.5 GW recorded on 18th Sep 18.
- ✓ Overall demand met increased by 7.1% in H1 2018 over same period last year. Demand increase in October 18 ~14% over last year.
- ✓ Traditionally buying at Power Exchange increases in Sep & Oct months due less availability with state Discoms.
- ✓ Demand increase in IEX around 20% (For Apr-Sept H1 compare to last year).
- ✓ Wind generation in Oct 18 dropped by 40 % as compared to Sep 18.
- ✓ Buy bids from all Major Discoms like Tamil Nadu, Gujarat, Maharashtra, Bihar, West Bengal, J&K, Telangana, & AP have significantly increased.
- ✓ Coal shortage continues and E-Auction prices are very high (100% increase over notified price). Steep Increase in USD and high imported coal cost has also adversely impacted generation cost.

Reasons for High Buy and Sell bids in Exchange

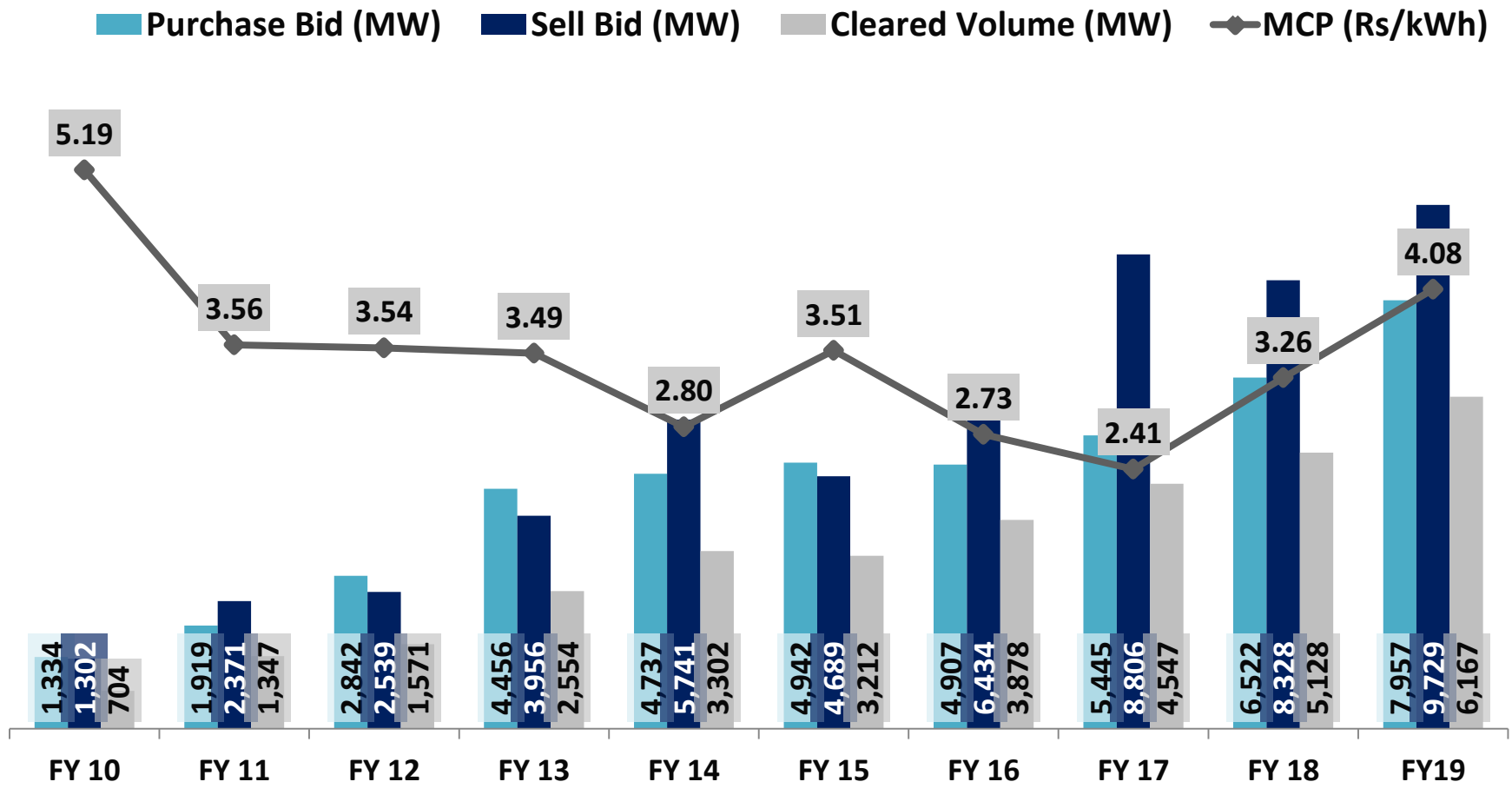
- **Key Reason for high Buy bid volume in Sept '2018**
- Insufficient coal stock
- Decline in Hydro and Wind generation
- Festive Season
- Compulsory Buy to avoid load shedding

- **Key Reason for high Sell bid volume**:
- High Rainfall in Northern Region
- Higher availability with North Discom

IEX Monthly Average Price (Rs./kWh) Trend

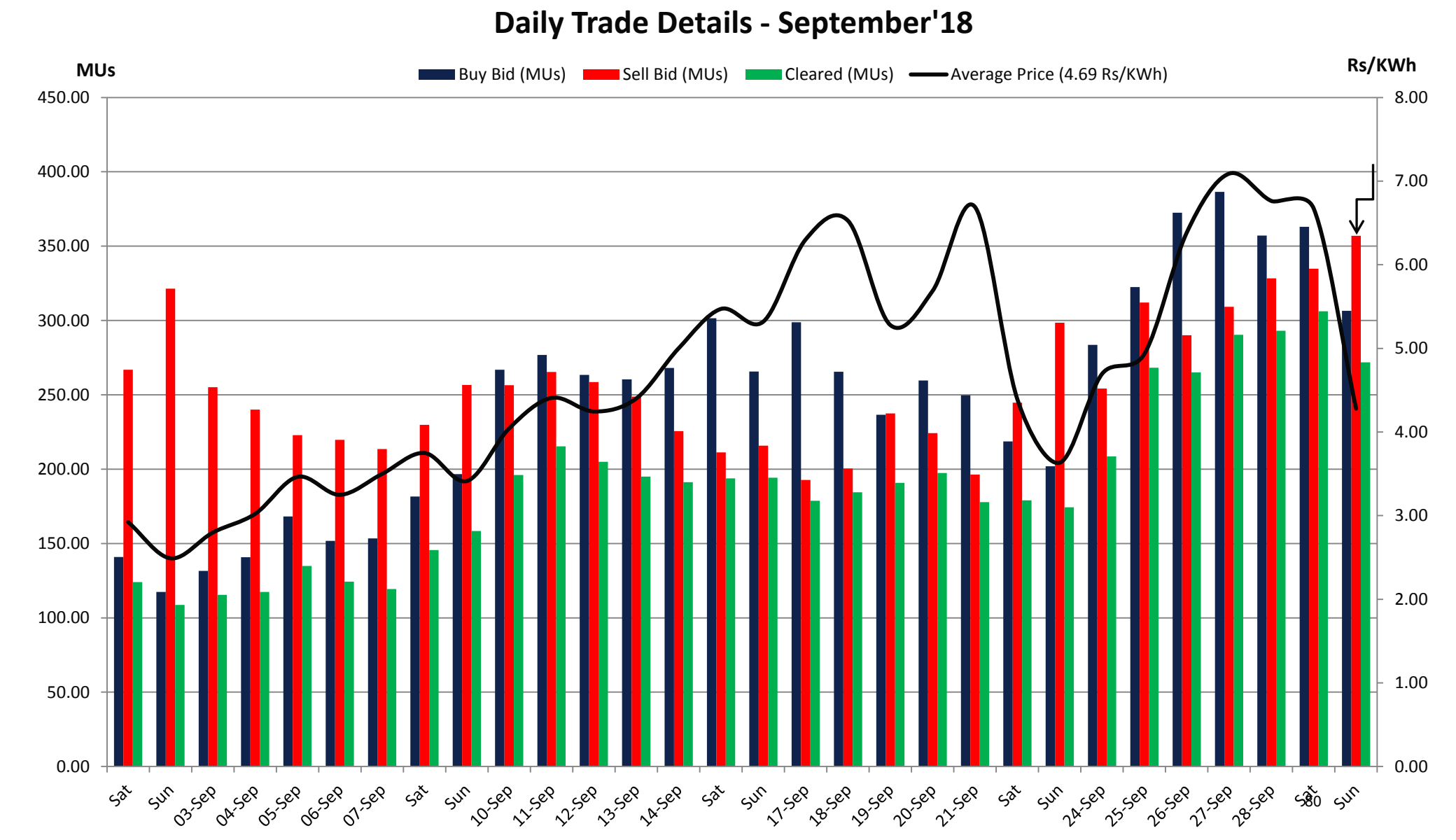


Day Ahead Market Volume Trend

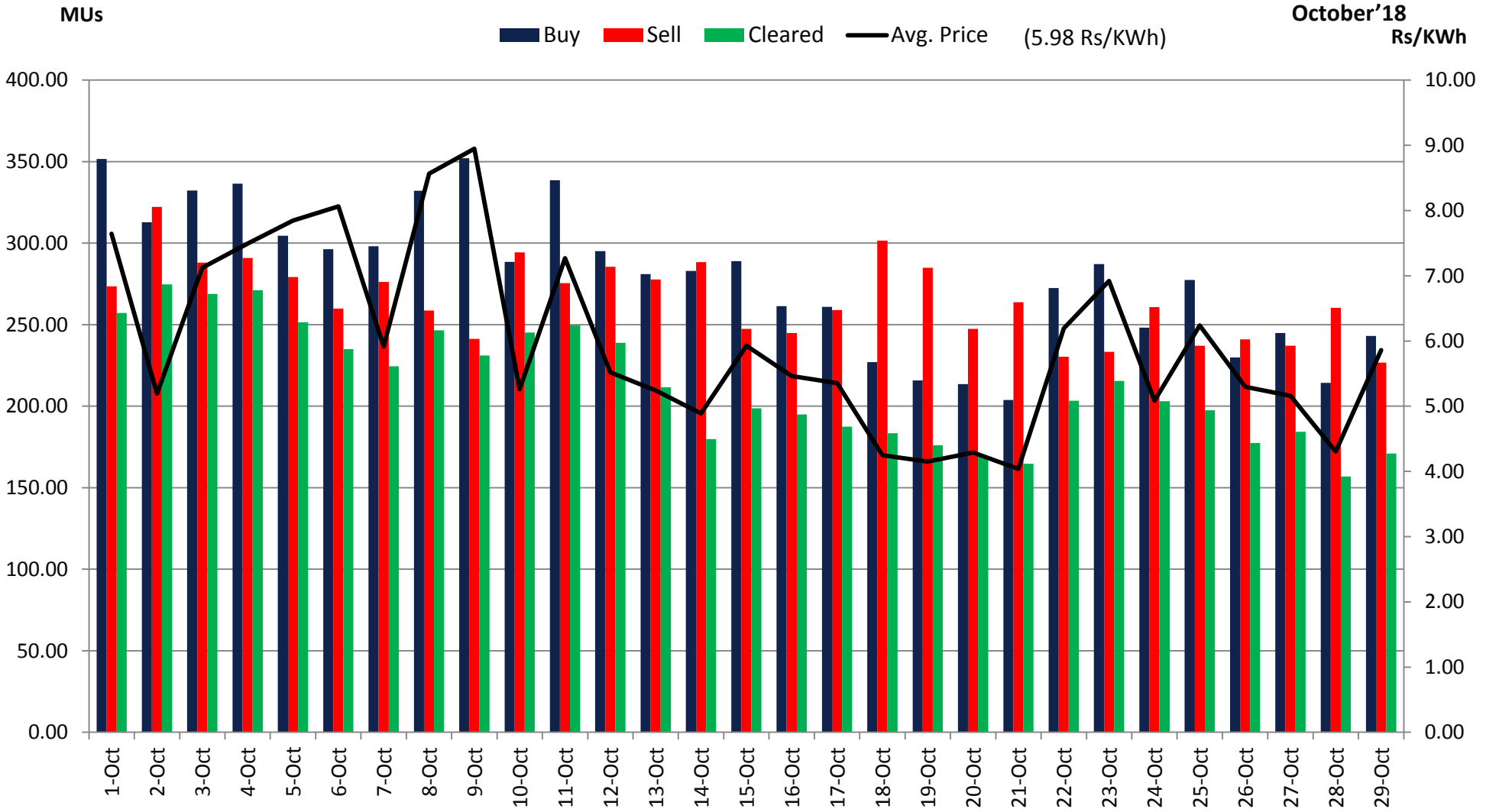


Increase in generation capacity pushed the prices down except FY 18 & FY 19 when prices increased primarily due to coal shortage

Trade Details –SEP'18



Trade Details –OCT'18

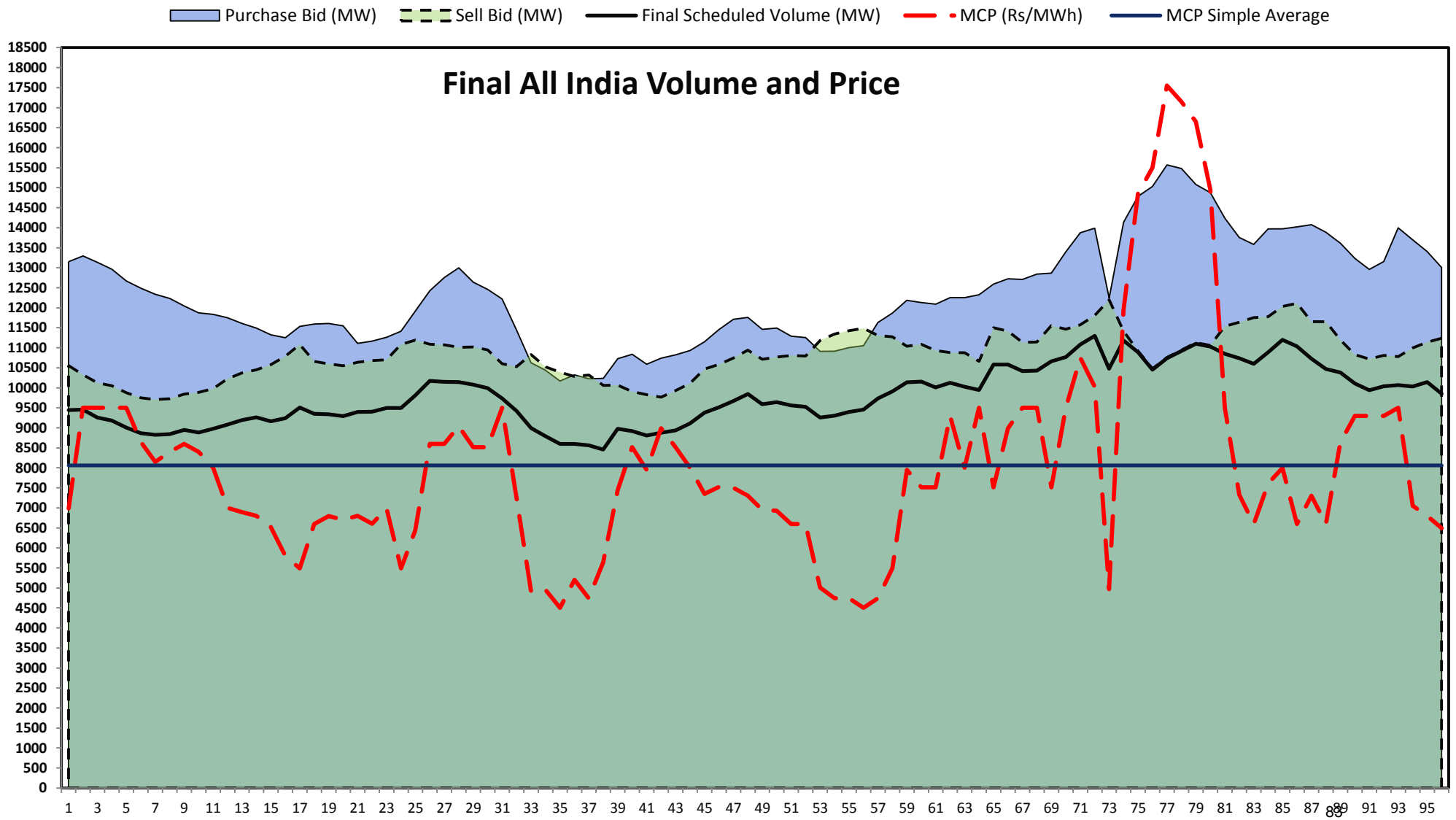


September & October (Price and Volume Concentration)

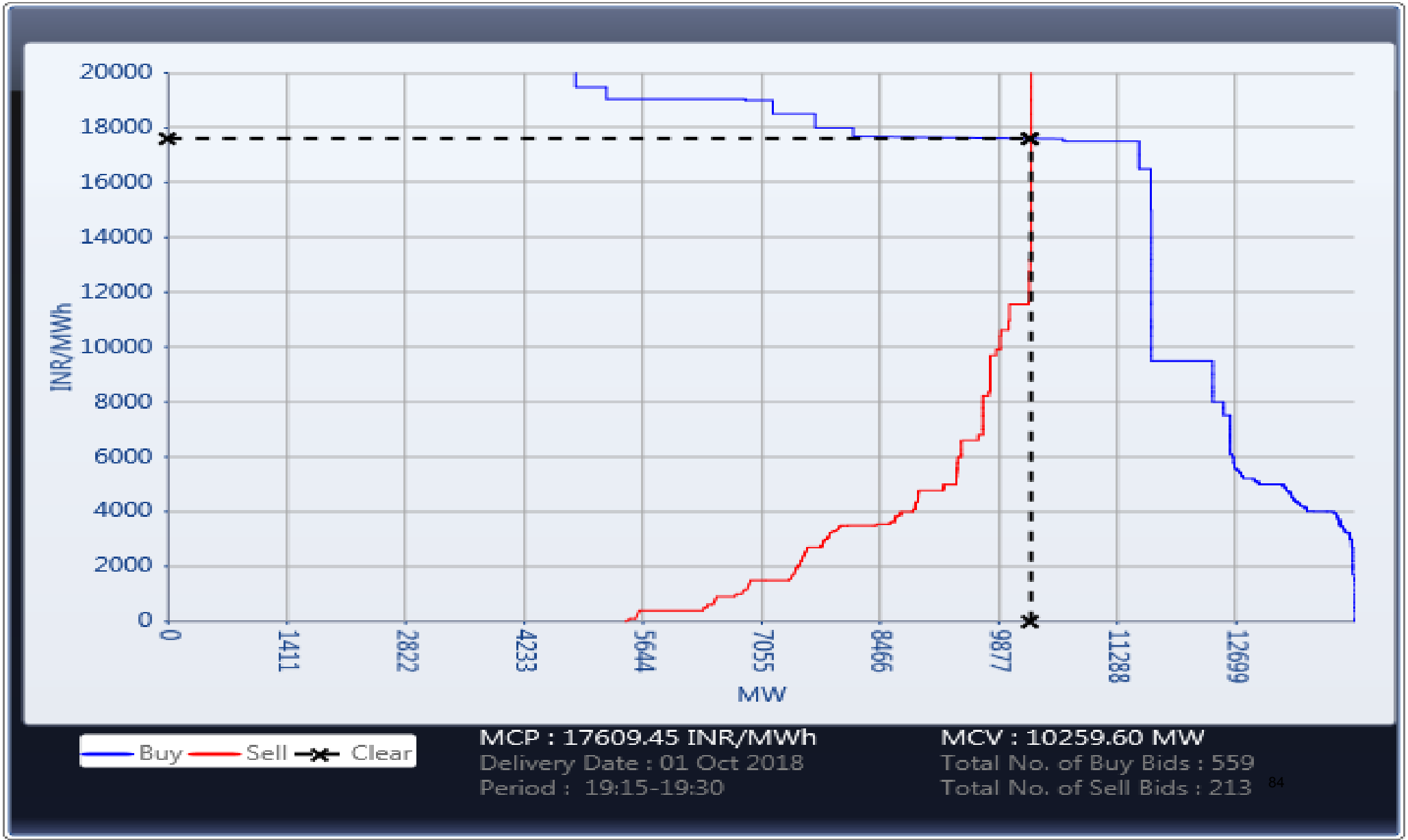
Price Slab (Sept)	Volume (MU)	% volume
<4	2242	39%
4-6	2206	39%
6-10	1123	20%
10-12	71	1%
>12	83	1%
Total	5725	

Price Range (Oct)	Volume (MUs)	% Age
<4	859	13%
4-6	3140	48%
6-10	2119	32%
10-12	226	3%
>12	161	3.1%
Total	6505	

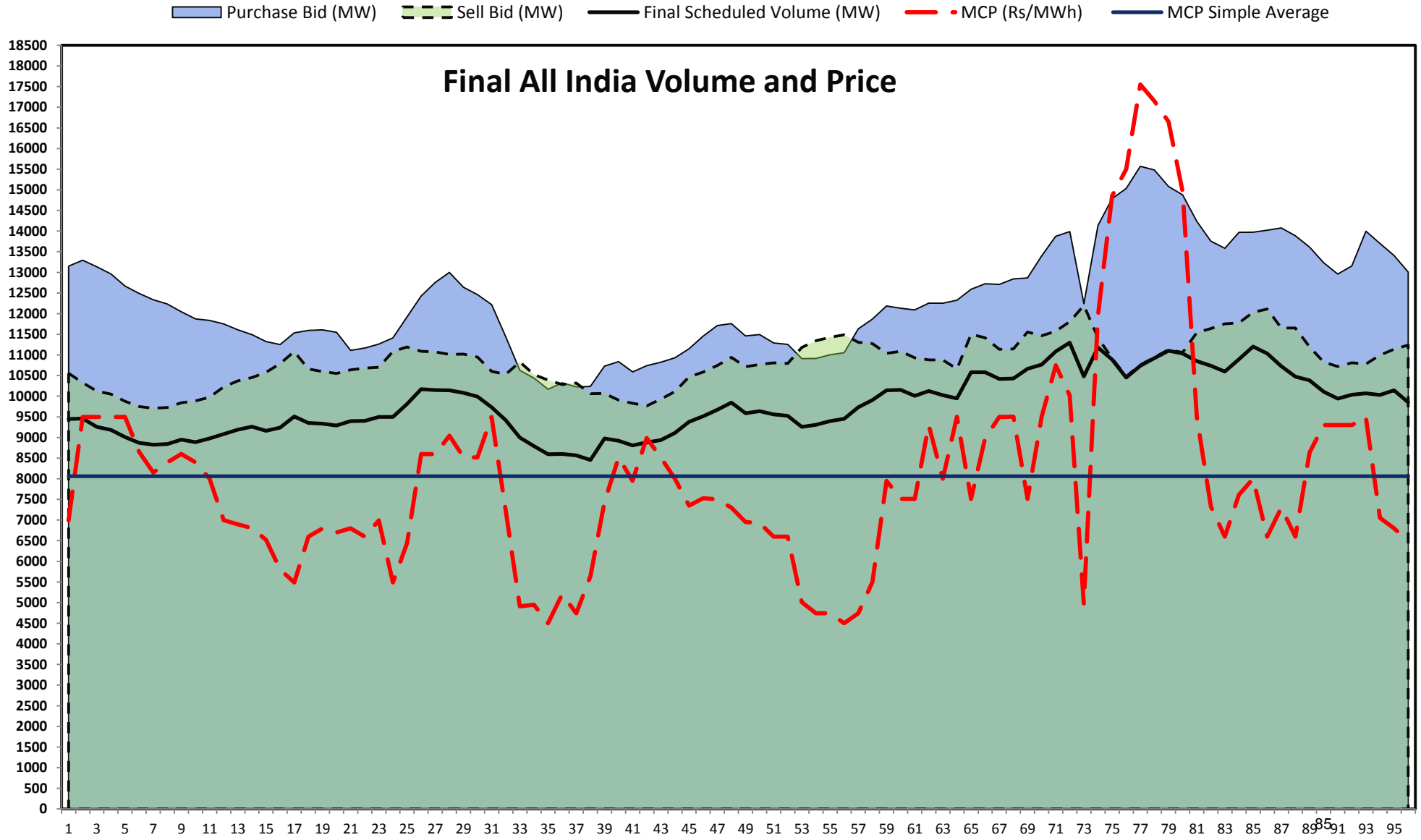
Buy and Sell Position for Trade date_31-Sep-2018



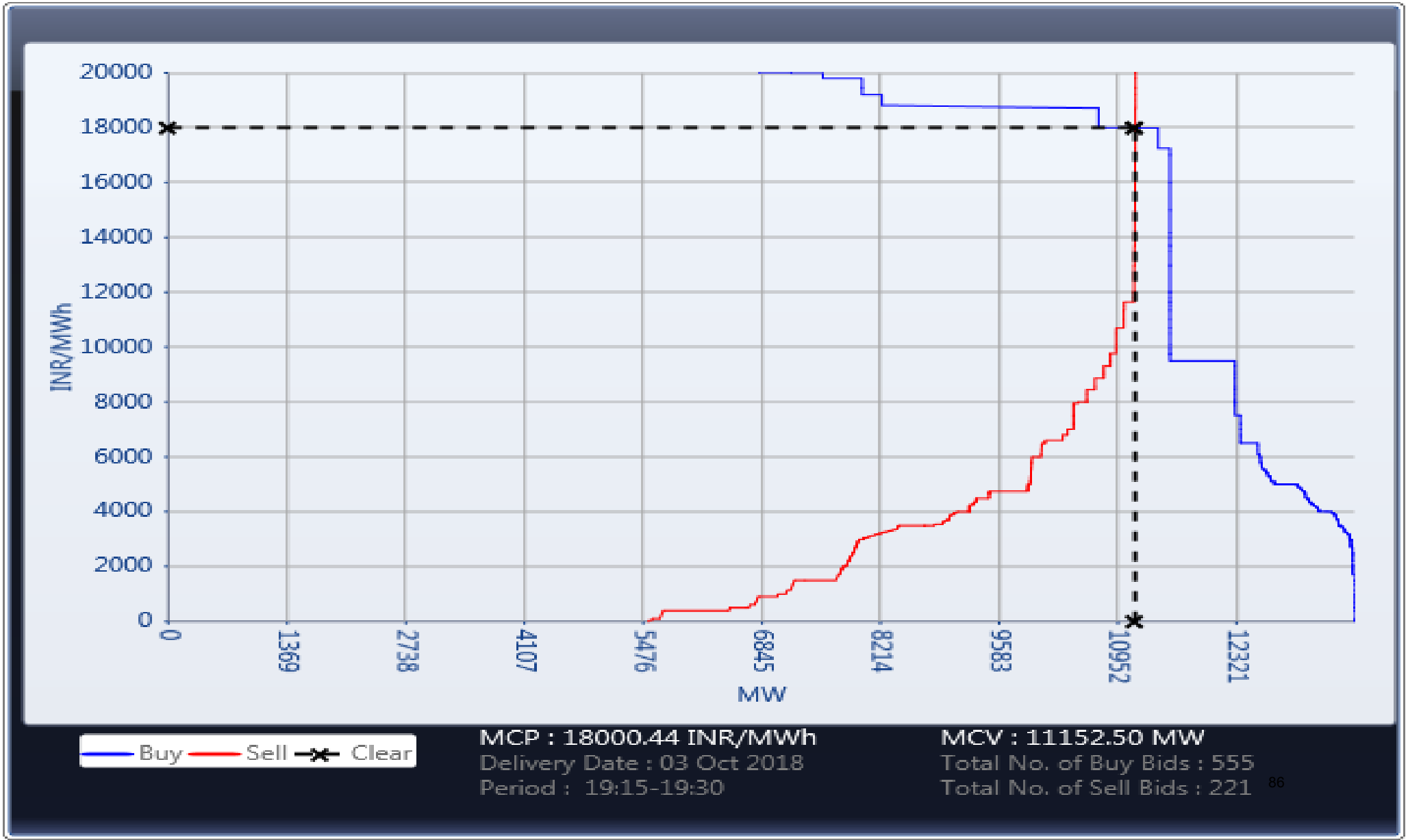
Buy and Sell Curve of Trade date 31-Sep-2018



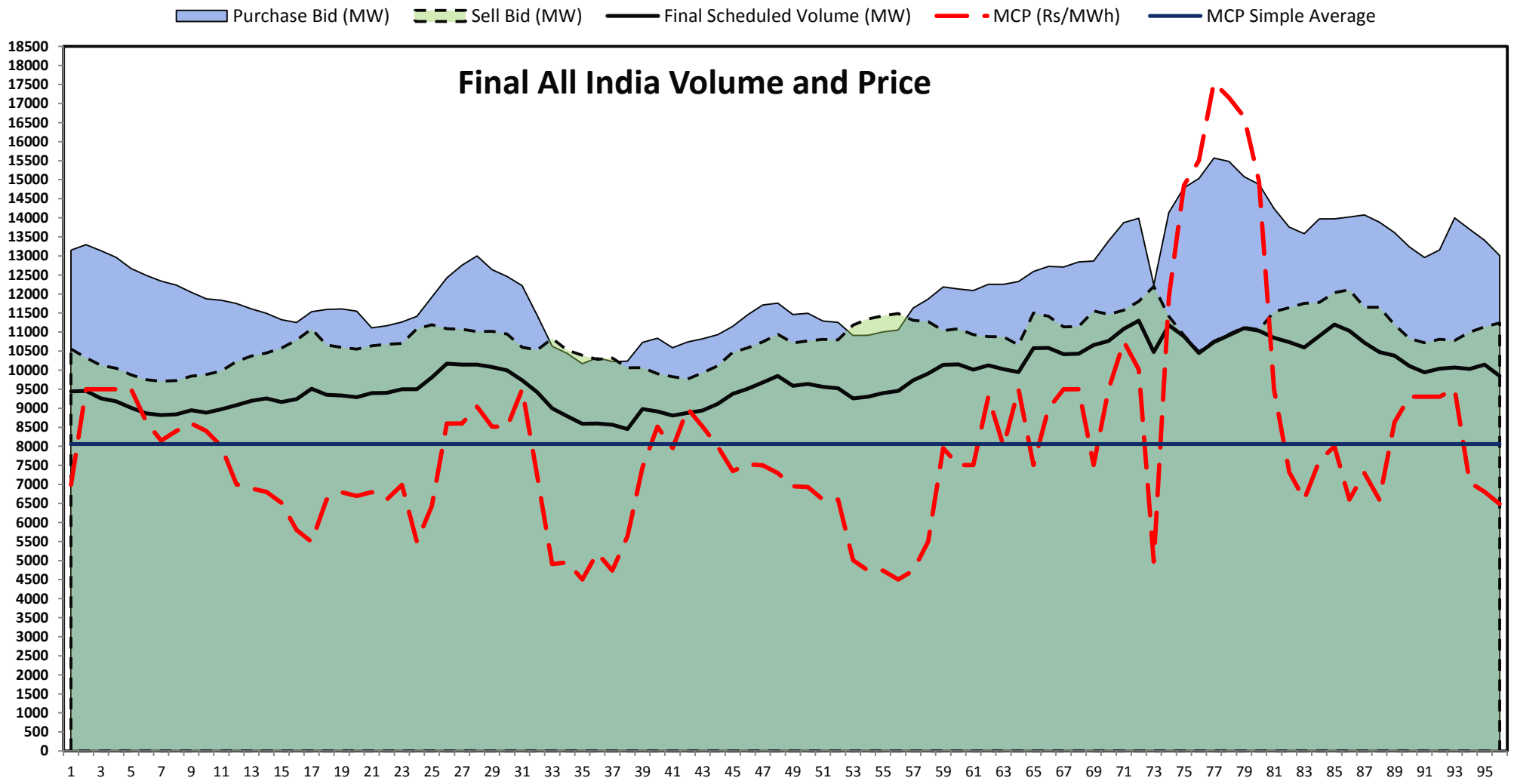
Buy and Sell Position for Trade date_02-Oct-2018



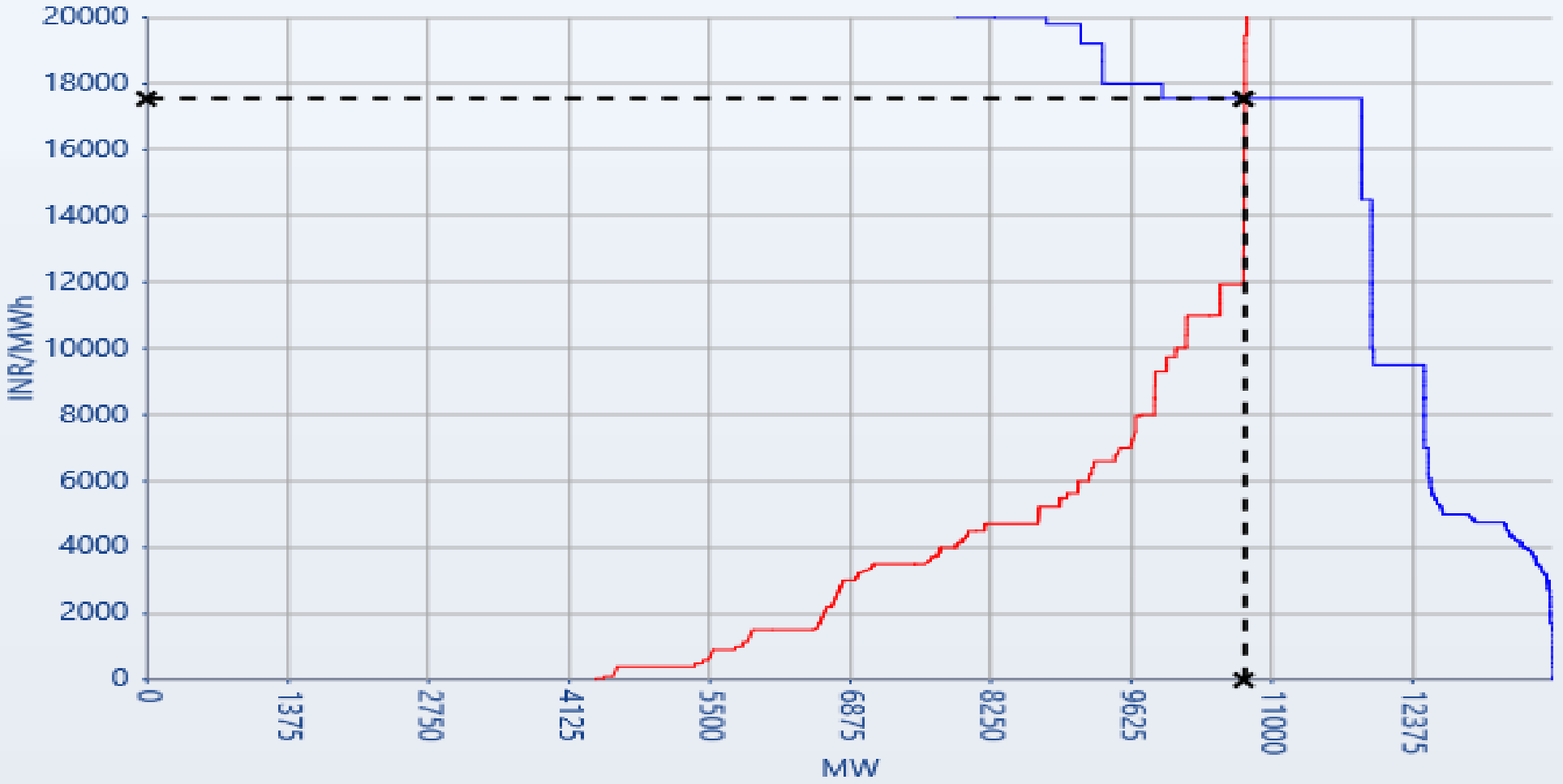
Buy and Sell Curve of Trade date 02-Oct-2018



Buy and Sell Position for Trade date_05-Oct-2018



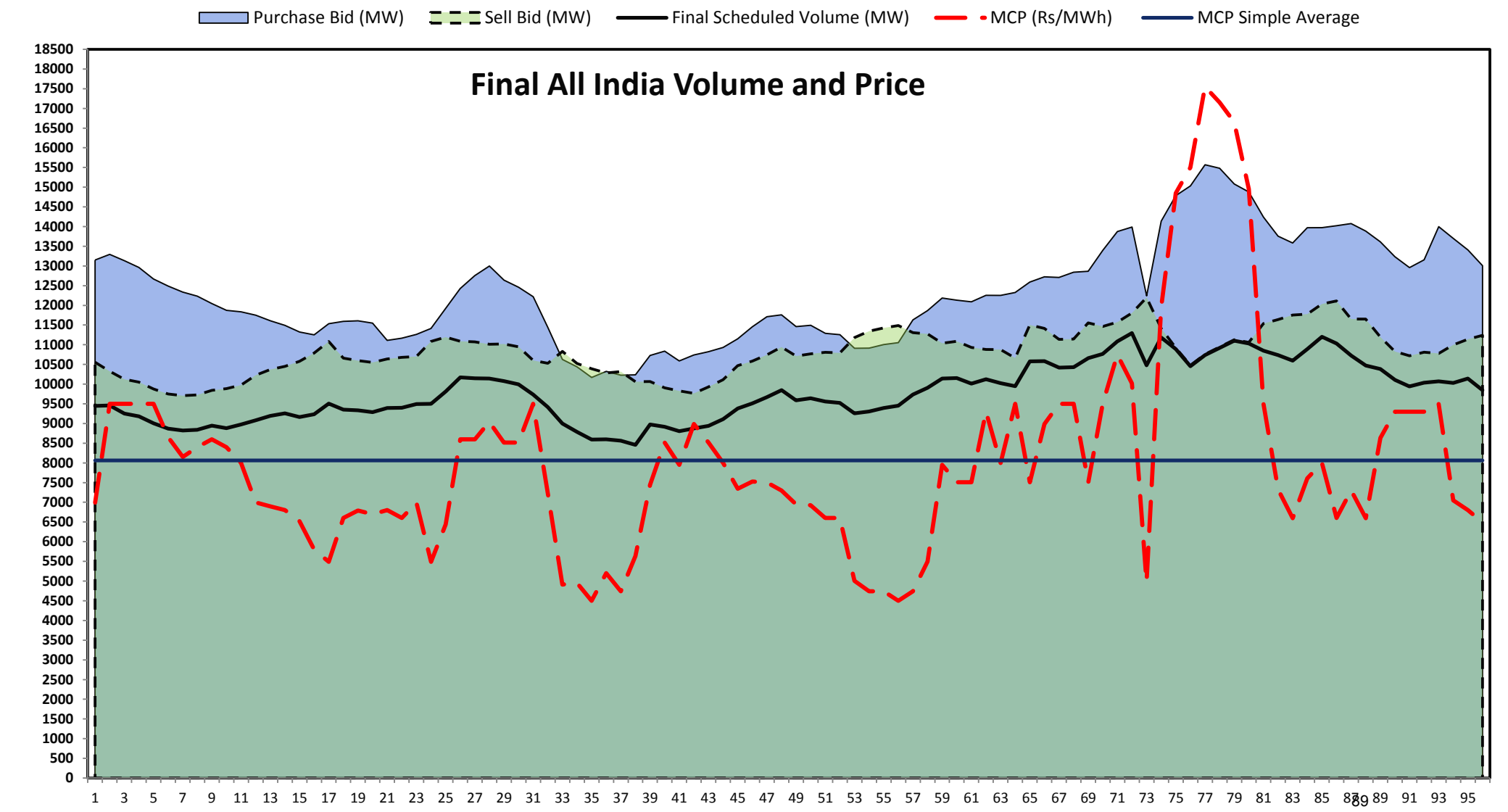
Buy and Sell Curve of Trade date 05-Oct-2018



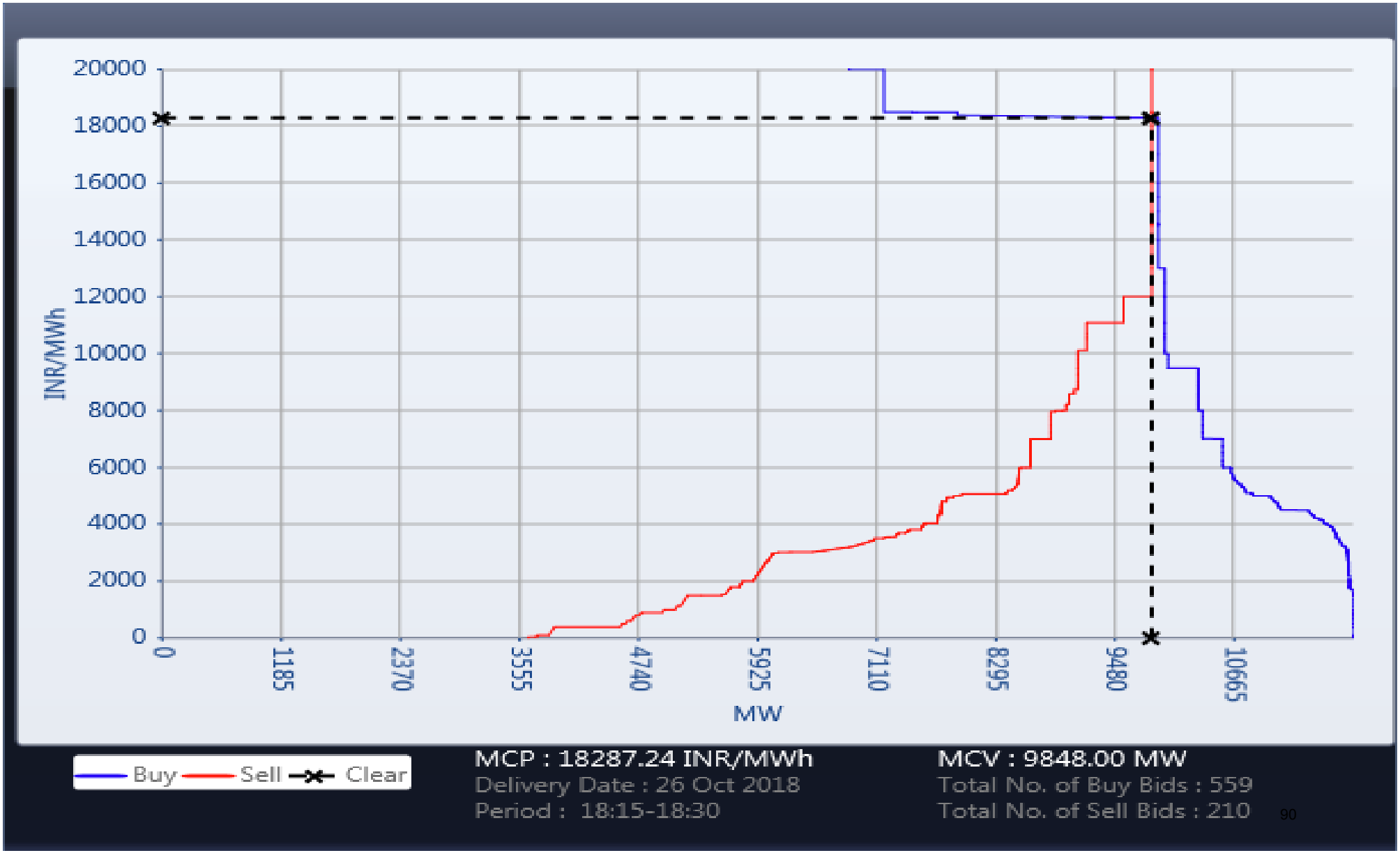
MCP : 17550.58 INR/MWh
Delivery Date : 06 Oct 2018
Period : 19:00-19:15

MCV : 10736.90 MW
Total No. of Buy Bids : 603
Total No. of Sell Bids : 214

Buy and Sell Position for Trade date_25-Oct-2018



Buy and Sell Curve of Trade date 25-Oct-2018



Suggestions to cool off high prices

- High prices are not for very significant period
- Increase supply of coal
- Introduction of concept of gate closure and freely allow sell of URS power in day ahead market
- Introduction of demand response products
- Introduction of real time market
- Introduction of price hedging products – derivatives

THANK YOU

IEX
INDIAN ENERGY EXCHANGE

Annexure-VI

PXIL

Transforming Power Markets

Presentation to Forum of Regulators on Price discovery mechanism on Power Exchanges

18th Jan-2019

Background

PXIL
Transforming Power Markets

- PXIL started its exchange operations on 22nd Oct-2008
- Initially, Day ahead market was approved by CERC that operates under provisions of 'Procedure for scheduling Collective transaction'
- Later, Term Ahead products were approved by CERC that operate under provisions of ‘Procedure for scheduling Bilateral transaction’
- PXIL complies to provisions of CERC (Power Market) Regulations, 2010, and has adopted the following practices:
  - ✓ Ensures fair, neutral, efficient and robust price discovery
  - ✓ Designs standardised contract and work towards increasing liquidity in contracts
  - ✓ Provides extensive and quick price dissemination
  - ✓ Runs approved Price discovery mechanism for each Product

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Regulatory provisions

PXIL
Transforming Power Markets

- Price discovery mechanism across products at PXIL platform

S no	Product name	Price discovery methodology	Remarks
1	Day Ahead Spot (DAS) Product	Collective Uniform Pricing mechanism	Regulation 11 of CERC (Power Market) Regulations 2010
2	Term Ahead Products (Day Ahead Contingency, Intra Day, Week Ahead and Any Day Ahead)	Discriminatory pricing mechanism / Continous matching	CERC Order dt. 31/08/2009 approved and 12/7/2011. PXIL has implemented Discriminatory pricing mechanism
3	Renewable Energy Certificate Product	Collective Uniform Pricing mechanism	CERC Order dt. 17/09/2010
4	Energy Efficeincy Certificates	Collective Uniform Pricing mechanism	Regulation 9 of CERC (ESCert) Regulation 2016

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Regulatory provisions for Day ahead market

PXIL
Transforming Power Markets

- Regulation 11 A of CERC (Power Market) Regulations, 2010 prescribes Price discovery mechanism for Day ahead market

  (i) The economic principle of social welfare maximisation and to create buyer and seller surplus simultaneously during price discovery.

  (ii) The bidding mechanism shall be double sided closed bid auction on a day ahead basis.

  (iii) The price discovered for the unconstrained market shall be a uniform market clearing price for all buyers and sellers who are cleared

  (iv) In case of congestion in transmission corridor, market splitting mechanism shall be adopted

  (v) The delivery / drawl of power shall be considered at the regional periphery

Regulatory provisions for Day ahead market

PXIL
Transforming Power Markets

- The matching algorithm integrated in PXIL's platform is based on a world class optimisation engine FICOXpress developed by FICO, US
- The matching algorithm is capable of catering to various types of bids of both Buyers & Sellers including block bids on Buy/sell side, differential bids, normal bids, etc.
- The optimisation algorithm has been developed in association with IIT Bombay
- In compliance with Regulation 11 and Regulation 55 of PMR, a Review was carried out by an independent auditor, viz. KPMG and the matching algorithm was certified as meeting all regulatory requirements including certification that *"the exchange uses an optimisation algorithm which maximises social welfare for price discovery"*

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Products following Uniform Price Auction

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Energy Trading	**Day Ahead Spot**	Collective uniform price auction for day ahead delivery Bidding hours : 10:00 to 12:00 hrs	**Double sided Closed Auction** **Contract unit: 15 min**
Certificate Trading	**Renewable Energy Certificate (REC)**	Tradable certificate for **Environmental** attribute of **RE Generation** Validity of REC: **1,095 days** Transaction: Last Wednesday of the Month (between 13:00 to 15:00 hrs) **Sellers**: RE Generators **Buyers**: Obligated Entities – (Distribution licensees, Captive Generators, OA consumers) and Voluntary Participants	**Double sided Closed Auction**
	Energy Savings Certificate (ESCert) under provisions of Energy Conservation Act 2001	Tradable certificate under Energy Efficiency program Validity of ESCert: **Upto next PAT cycle (currently 2nd cycle in progress)** Transaction: Last Tuesday of the Month (between 13:00 to 15:00 hrs) **Buyers / Sellers: 621 designated consumers**	

Day Ahead Market – Bid receipt

PXIL
Transforming Power Markets

Bidding Window: 10:00 AM to 12 Noon

Sellers	Qty (MW)	Price (Rs./kWh)
S1	50	2.5
S2	150	3
S3	200	4.5
S4	150	5
S5	300	6
S6	80	6

Buyers	Qty (MW)	Price (Rs./kWh)
B1	150	5
B2	100	4.5
B3	100	3.5
B4	200	3
B5	400	2.5

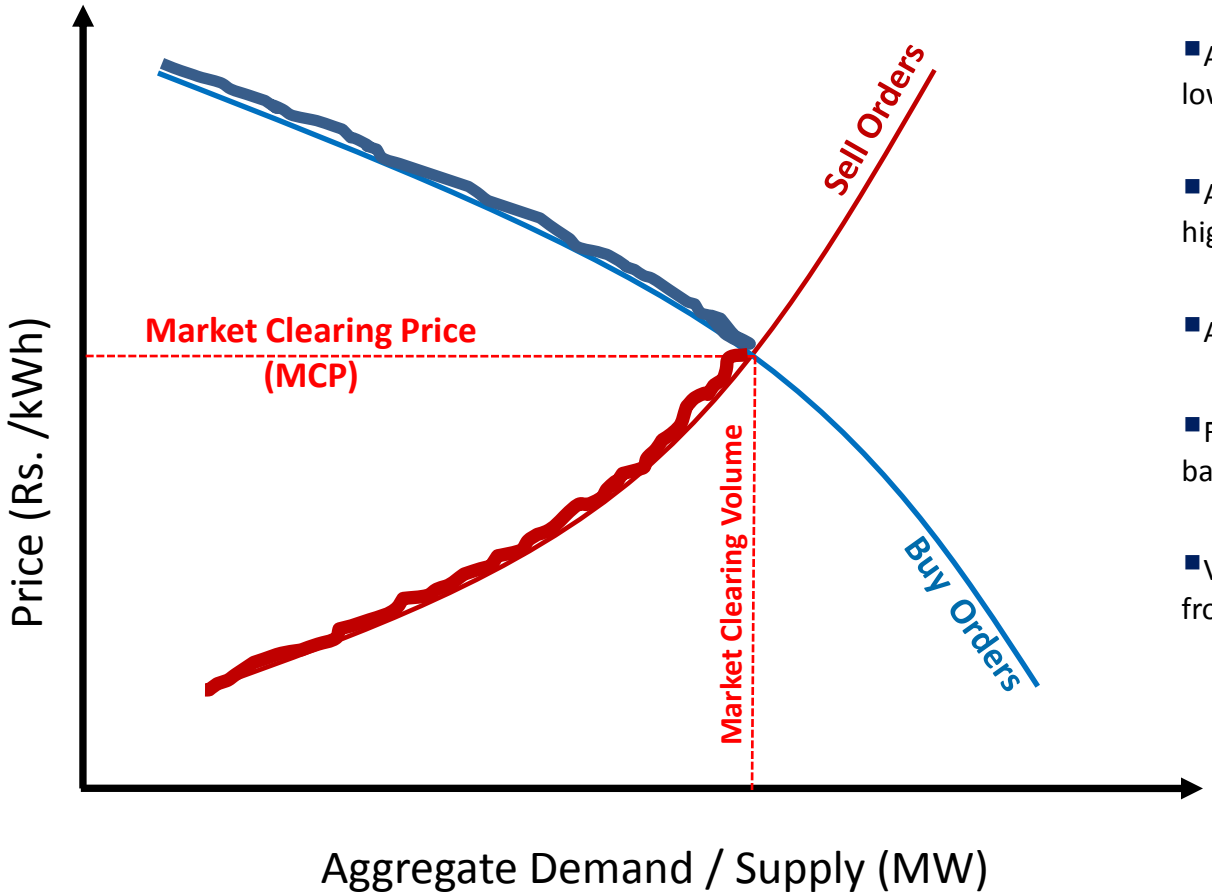
After Gate Closure at 12 noon

(Exchange aggregates Offers & Bids at all price points)

Price (Rs./ kWh)	Aggregate Supply (MW)
2.5	50
3	200
4.5	400
5	550
6	930

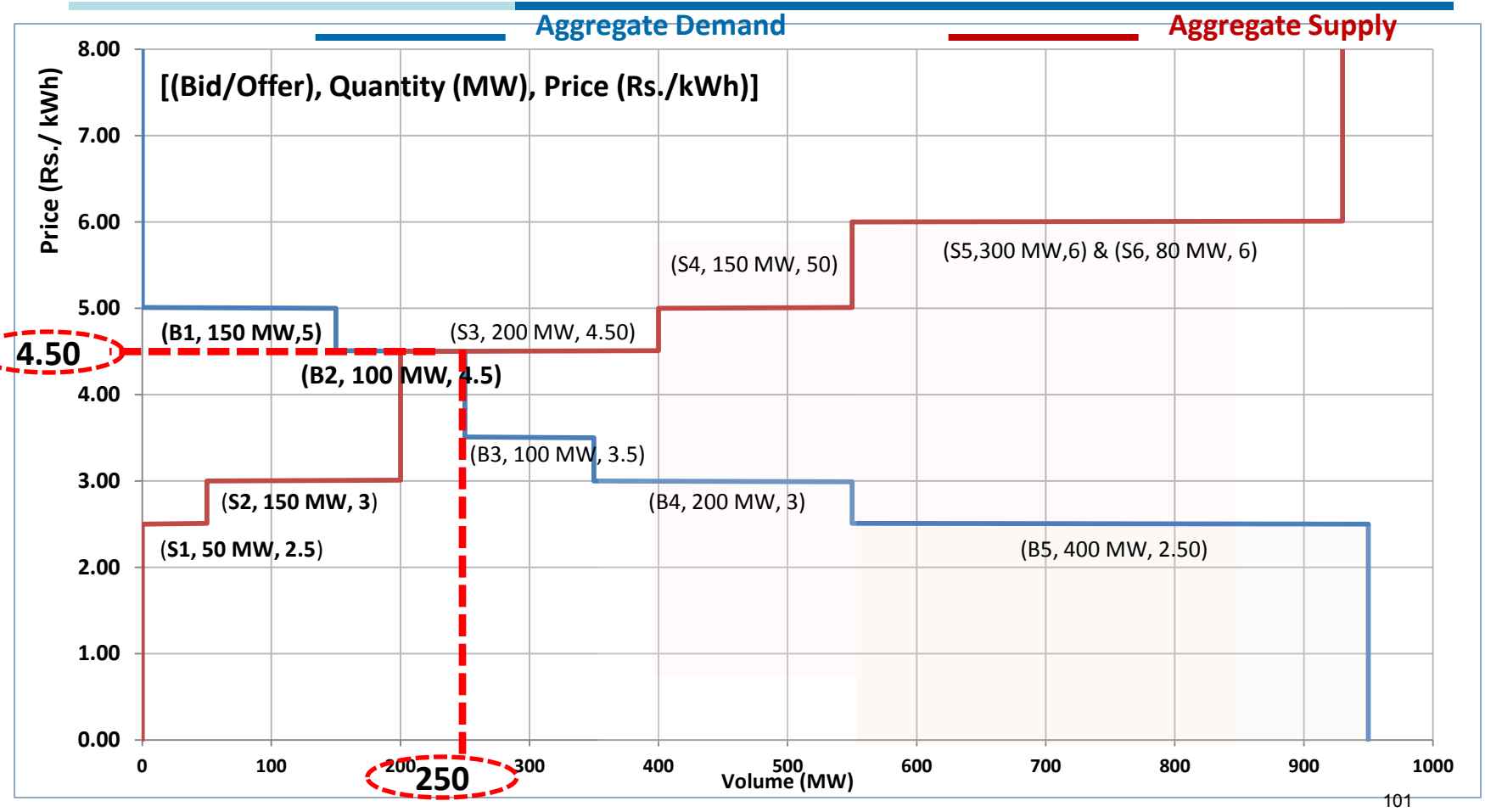
Price (Rs./ kWh)	Aggregate Demand (MW)
5	150
4.5	250
3.5	350
3	550
2.5	950

Demand – Supply Matching



- All sell at Price equal to or lower than MCP is cleared
- All buy at Price equal to or higher than MCP is cleared
- All Trades are Settled at MCP
- Financial transactions settled based on PX schedule
- Variations in Supply or Drawl from schedule Settled under UI

Working Methodology



Day Ahead Contracts

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Eligible bids & Offer for contract determination

Sellers	Qty (MW)	Price (Rs./kWh)
S1	**50**	**2.5**
S2	**150**	**3**
S3	**200**	**4.5**
S4	150	5
S5	300	6
S6	80	6

MCP at 4.50

Aggregate Supply (MW)
50
200
400
550
850
930

Buyers	Qty (MW)	Price (Rs./kWh)
B1	**150**	**5**
B2	**100**	**4.5**
B3	100	3.5
B4	200	3
B5	400	2.5

MCP at 4.50

Aggregate Demand (MW)
150
250
350
550
950

- ✓ **Total Sell Eligible – 400 MW, Total Buy – 250 MW, Cleared quantum- 250 MW**
- ✓ **Eligible Buyer: B1-150 MW, B2- 100 MW**
- ✓ **Eligible Seller: S1- 50 MW, S2- 150 MW, S3- 50 MW**

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Products following Double sided open auction

PXIL
Transforming Power Markets

Energy Trading

Term Ahead Market

Day Ahead Contingency: After DAS (from 16:00 to 17:00 hrs)

Weekly: Monday (00:00:01 hrs) to Sunday (23:59:00 hrs) of next Week
: Operates on Wednesday & Thursday

24 X 7 Intra-Day: Delivery can cover next day's 24-hr requirement

Any Day: Operates for a Delivery period of 11 days
(Discriminatory pricing mechanism)

Double sided Open Auction

Contract unit: Hourly / Block of hours

Term Ahead Products matching system

PXIL
Transforming Power Markets

- Term Ahead Products
  - ✓ DAC, Week Ahead, Intra-Day and Any Day
  - ✓ CERC Order dt. 31/08/2009 approved and 12/7/2011
    - *"The **best buyer (highest paying buyer) shall be matched against the best seller (lowest asking seller)** and the **mid-point of their two quotes be decided as the agreed traded price** (average of the matched buyer and the seller`s quoted price). **The same logic shall be extended till the buyer or seller volume is exhausted**."*

Sellers	Qty (MW)	Price (Rs./kWh)
S1	5	2.5
S2	10	4

Buyers	Qty (MW)	Price (Rs./kWh)
B1	10	4.5
B2	15	3

Entity	Matched quantity (MW)	Price (Rs./kWh)	Matched counterpart
S1	5	3.5	B1
S2	5	4.25	B1

First transaction

Second transaction

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Disclaimer:

This presentation seeks to present the factual position relating to PXIL and our point of view on the prospects of Power Exchanges in general in the country. This presentation is thus only a compilation of such points of view and does not guarantee anything in particular. The user of this presentation is advised to verify the data and refer to the applicable Acts and Rules and Regulations before forming an opinion and taking any decision based on this presentation. This document is prepared on the understanding that PXIL, its employees and consultants are not responsible for the results of any action taken on the basis of the information in this document or for any error in or omission from this document. Further PXIL, its employees and consultants expressly disclaim all and any liability responsibility to any person who reads this document in respect of anything, and of the consequences of anything, done or omitted to be done by such person in reliance, whether wholly or partially, upon the whole or any part of the content of this presentation.

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PXIL
Transforming Power Markets

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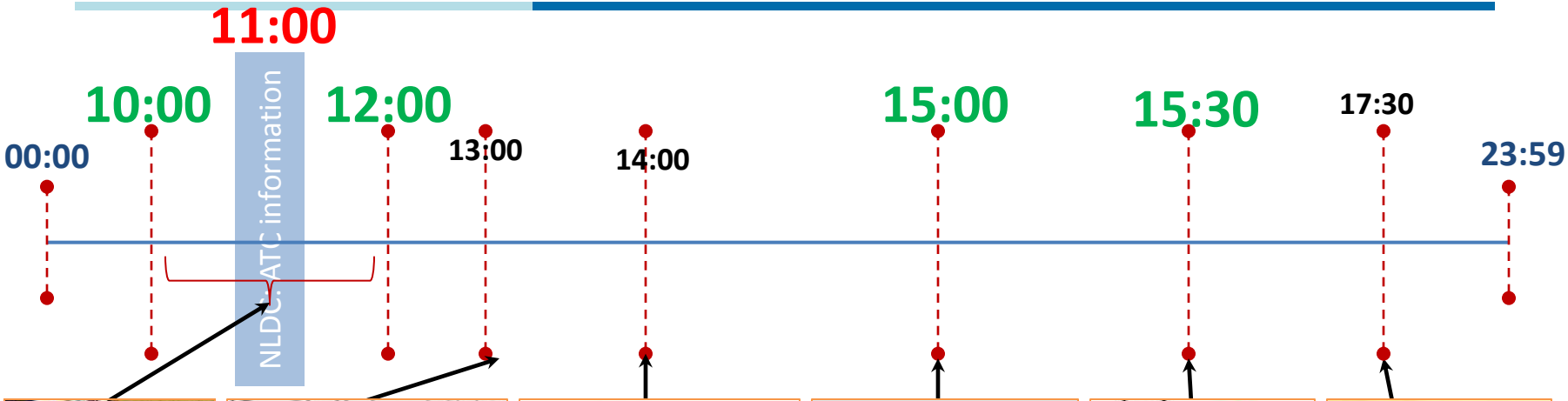
Tel: +91-22-4009 6600 Fax: +91-22-4099 6633
Email-id: info@pxil.co.in website: www.powerexindia.com
CIN:- U74900MH2008PLC179152

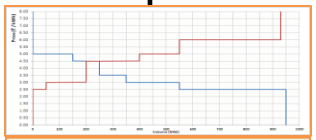
Operational timeline - DAS



Market Participant submit their bids **(Enter, Modify, Delete, Validate & Store)**

1) **Matching by PXs**
2) Identify & submit **Unconstrained flow requirement** to NLDC

1) NLDC inform PXs about Congestion, if any [Period of congestion and available margins]
2) **Margins verified by PX**



Final Matching of Orders
PX to submit final transaction report and application for Scheduling to NLDC

Obligation
PX to issue next days Obligation to all Participants

NLDC to convey Acceptance for Scheduling to PX

Contract Specs

PXIL
Transforming Power Markets

Type of Market	Day Ahead
Trading System	PXIL - Entrim
Trading Methodology	Double sided closed bid auction with Uniform market clearing price
Auction Timings	10.00 am to 12.00 noon (Day D)
No. of contracts per day	**96 nos. of 15-min duration Contracts for next day delivery (Day D+1)**
Minimum Bid Volume	1 MW
Minimum Volume Quotation Step	1 MW
Minimum Value Quotation Step	Rs. 10 per MWh
Delivery Point	Periphery of Regional Transmission System in which the grid-connected exchange entity, is located.
Transmission charges	1. **Regional Transmission System**: As Per Central Electricity Regulatory Commission (Open Access in inter-State Transmission) Regulations, 2008. 2. **State Transmission System**: As per the concerned State Electricity Regulatory Commission's Regulations/ CERC (Open access) Regulations, 2008.
Transmission Losses	Payable in kind from delivery point to its grid connection point.
Settlement Price(s)	The Market Clearing prices of the respective Bid Zones

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Redesigning & Development of FOR Website

Central Electricity Regulatory Commission
18th January 2019

Background & Objective

- **The website of FORUM OF REGULATORS (FOR) is http://www.forumofregulators.gov.in/. This website is a static website. It is hosted on NIC cloud. At present uploading on website is done by CERC MIS division.**

- **The main objective of redesigning FOR website is to make it website more secure, responsive, dynamic and user friendly.**

- **The FOR Website will be redesigned and developed by CERC MIS Division .**

Main Features

- **Compatible to various browsers and resolutions.**
- **Easy Navigation, Printer & Mobile friendly version.**
- **Search Facility within the website on the basis of key words.**
- **Discussion Forum where suggestion/ideas/views/ feedback may be sought about regulations, important relevant power sector topics.**
- **Events Dashboard/Calendar etc.**
- **Site Map, Bilingual, FAQ's and any other information or static page as desired by FOR.**

Website Designs

Design1 –

- http://192.168.0.141:85/
- http://192.168.0.141:84/
- http://192.168.0.141:82/

Design 2 –

- http://192.168.0.142/wordpress

Design 3

- http://192.168.0.141:83/

Design 4

- http://192.168.0.141:86/
- http://192.168.0.141:88/


THANK
YOU