



दिसम्बर, 2020 मासिक मार्केट मॉनिटरिंग रिपोर्ट

Monthly Market Monitoring Report

December, 2020



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केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

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REPORT FOR MONTH: DECEMBER, 2020

OVERVIEW OF ELECTRICITY TRANSACTIONS ON POWER EXCHANGES IN INDIA

1. DAY AHEAD MARKET (DAM)

- 1.1. The total volume of electricity transacted on both the power exchanges, viz., IEX and PXIL in the Day Ahead Market (DAM) in the month of December, 2020 was **5,611 MU**. The total energy supplied in the country during the month of December, 2020 was **105,623 MU**. Thus, the volume of electricity transacted on the power exchanges in DAM was **5.31 %** of the total energy supplied in the country. The total volume of electricity transacted in DAM during November, 2020 on both the power exchanges was **4,909.08 MU** which was **5.07%** of the total energy supplied [**96,883MU**] in the country during November, 2020. Similarly, the total volume of electricity transacted in DAM during December, 2019 was **4,333.78 MU** which was **4.29%** of the total energy supplied [**101,081MU**] in the country during December, 2019.
- 1.2. The volume of electricity transacted on IEX and PXIL during December, 2020 were **5,605.58 MU** and **5.42 MU** respectively, which means that the total volume transacted on IEX was **99.90 %** of the total volume on power exchanges. The volume of electricity transacted on IEX and PXIL during November, 2020 were **4860.46 MU** and **48.62 MU**, respectively, which means that the total volume transacted on IEX was **99.01 %** of the total volume on power exchanges. Also, the total volume of electricity transacted during December, 2019 on IEX and PXIL was **4,333.32 MU** and **0.46 MU**, respectively, which means that the total volume transacted on IEX was **99.99%** of the total volume on the power exchanges.
- 1.3. The Average Market Clearing Price (MCP) on IEX during the month of December, 2020 was **Rs 2.83/kWh**, which shows an increase of **3.66 %** and decrease of **3.41%** when compared with average MCP's for the month of November, 2020 and December, 2019, which were **Rs 2.73/kWh** and **Rs 2.93/kWh**, respectively. On PXIL, the average MCP during the month of December, 2020 was **Rs 3.25/kWh**, which shows an increase of **13.24%** and **10.92%**, when compared with average MCP's for the month of November, 2020 and December, 2019, which were **Rs 2.87/kWh** and **Rs 2.93/kWh**, respectively.

2. SUMMARY OF THE MARKET CLEARING PRICE, AREA CLEARING PRICE AND FINAL SCHEDULED VOLUME IN THE POWER EXCHANGES

- 2.1. **A comparison of the Minimum, Maximum and Average of Daily MCP during the month of December, 2020 with that of November, 2020 and December, 2019 is given in Table- 1A&1B:**

(a) December, 2020 vis- a -vis November, 2020

Daily MCP (Rs/kWh)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Minimum	2.54	2.13	19.25	2.40	2.42	-0.83
Maximum	3.25	3.23	0.62	4.55	3.35	35.82
Average	2.83	2.73	3.66	3.25	2.87	13.24

Table: 1A**(b) December, 2020 vis- a –vis December, 2019**

Daily MCP (Rs/kWh)	IEX			PXIL		
	December, 2020	December, 2019	% Change	December, 2020	December, 2019	% Change
Minimum	2.54	2.59	-1.93	2.40	2.89	-16.96
Maximum	3.25	3.25	0.00	4.55	2.96	53.72
Average	2.83	2.93	-3.41	3.25	2.93	10.92

Table: 1B

- 2.2. The maximum Area Clearing Price (ACP) of **Rs 6.05/kWh** in IEX was observed in all 13 regions during the time block **09:30-09:45Hrs** on 23rd December, 2020. As there was no congestion in transmission system, the MCP for this time-block was also **Rs 6.05/kWh**. However, the Daily MCP in IEX on pan India basis on 23rd December, 2020 was **Rs 3.20 /kWh**. Whereas, in PXIL, the maximum ACP of **Rs 5.99/kWh** was observed in all 13 regions during the time period from **17:30-18:00 Hrs** on 7th December, 2020 i.e two consecutive time blocks starting 17:30-17:45 Hrs. As there was no congestion in transmission system, the MCP for above time blocks was also **Rs 5.99/kWh**. However, the Daily MCP in PXIL on 7th December, 2020 was **Rs 3.27/kWh**.
- 2.3. The minimum ACP of **Rs 1.57/kWh** in IEX was observed in all 13 regions during the time block **03:45-4:00 Hrs** on 10th December, 2020. As there was no congestion in transmission system, the MCP for this time-block was also **Rs 1.57/kWh**. However, the Daily MCP in IEX on pan India basis on 10th December, 2020 was **Rs 2.55/kWh**. Whereas, in PXIL, the minimum ACP of **Rs 2.00/kWh** was observed in all 13 regions on 18th December, 2020 (for time periods **07:00-17:00Hrs**), (starting time periods **07:00-07:15Hrs**) during December, 2020. As no congestion was there in transmission system, the MCP for the above time blocks was also **Rs 2.00/kWh**. However, the Daily MCP in PXIL on 18th December, 2020 were **Rs 2.40/kWh, respectively**.
- 2.4. **A comparison of the Minimum and Maximum Area Clearing Price (ACP) during the months of December, 2020 with that of November, 2020 and December, 2019 is given in Table-2A&2B:**

(a) December, 2020 vis- a -vis November, 2020

ACP (Rs/kWh)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	Novem ber, 2020	% Change
Minimum	1.57	1.00	57.00	2.00	1.23	62.60
Maximum	6.05	6.00	0.83	5.99	6.00	-0.17

Table: 2A**(b) December, 2020 vis- a- vis December, 2019**

ACP (Rs/kWh)	IEX			PXIL		
	December, 2020	December, 2019	% Change	December, 2020	December, 2019	% Change
Minimum	1.57	1.70	-7.65	2.00	2.89	-30.80
Maximum	6.05	6.12	-1.14	5.99	2.96	102.36

Table: 2B

- 2.5. A comparison of the Minimum, Maximum and Average of Final Scheduled Volume (FSV) of electricity transactions happened on IEX and PXIL for a day during the months of December, 2020 with that of November, 2020 and December, 2019 is given in Table-3A&3B:

(a) December, 2020 vis- a- vis November, 2020

Final Scheduled Volume (MU)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Minimum	143.02	95.12	50.36	0.02	0.03	-33.33
Maximum	207.05	204.76	1.12	0.38	3.62	-89.50
Average	180.83	162.02	11.61	0.18	1.62	-88.89

Table: 3A**(b) December, 2020 vis- a- vis December, 2019**

Final Scheduled Volume (MU)	IEX			PXIL		
	December, 2020	December, 2019	% Change	December, 2020	December, 2019	% Change
Minimum	143.02	109.72	30.35	0.02	0.020	0.00
Maximum	207.05	167.76	23.42	0.38	0.046	726.09
Average	180.83	139.78	29.37	0.18	0.035	414.29

TableTable: 3B

- 2.6. The total volume of electricity transacted in DAM on both the power exchanges during the period April, 2020 to December, 2020 is **43,373.92 MU**. The same was **36,106.47 MU** during the period April, 2019 to December, 2019, which shows an **increase of 20.13 %**.

3. TERM AHEAD MARKET (TAM)

Term Ahead Market (TAM) (on Trade Date Basis)

- 3.1. The total volume of electricity transacted on both the power exchanges in Term Ahead Market on trade date basis in December, 2020 was **1295.67 MU**, out of which, **371.59 MU (28.68 %)** was transacted on IEX and **924.08 MU (71.32%)** was transacted on PXIL.
- 3.2. The total volume of electricity transacted on both the power exchanges in Term Ahead Market on trade date basis in November, 2020 was **933.35 MU**, out of which, **189.00 MU (20.25 %)** was transacted on IEX and **744.35 MU (79.75%)** was transacted on PXIL.
- 3.3. Similarly, total volume of electricity transacted during December, 2019 in Term Ahead Market on trade date basis in both the power exchanges was **473.68 MU**, out of which, **371.14 MU (78.35 %)** was transacted on IEX and **102.54 MU (21.65 %)** was transacted on PXIL.
- 3.4. With respect to the total energy supplied during the month of December, 2020 in the country, the volume of electricity traded on the power exchanges in TAM represents **1.23 %** of the total energy supplied. The same was **0.96 %** in November, 2020 and **0.47 %** in December, 2019.
- 3.5. The total volume of electricity transacted in TAM **on trade date basis** on both the power exchanges cumulatively during the period April, 2020 to December, 2020 is **6,025.94 MU**, which shows a decrease of 6.94 % as compared to **6,474.99 MU** during the period April, 2019 to December, 2019.
- 3.6. In Term Ahead Market (TAM), there was transmission congestion of **109.68 MU** in IEX, out of which **109.66 MU** was in Daily/Anyday contract and **0.018 MU** was in intraday Contract respectively. Whereas, in PXIL, there was transmission congestion of **34.01 MU** in Daily/Anyday Contract.
- 3.7. **The comparison of total volume of electricity transacted on both the power exchanges in Term Ahead Market (TAM) during December, 2020 with November, 2020 and December, 2019 is given in Table- 4A & 4B:**

(a) December, 2020 vis- a- vis November, 2020 (on Trade Date Basis)

Contract Type	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Intra Day (MU)	5.04	6.46	-21.98	18.70	20.35	-8.11
Day Ahead Contingency (MU)	14.69	13.66	7.54	No Transaction		

Daily/ Any Day (MU)	351.86	168.88	108.35	905.38	724.00	25.05
Weekly (MU)	No Transaction			No Transaction		

Table: 4A**(a) December, 2020 vis- a- vis December, 2019 (on trade Date Basis)**

Contract Type	IEX			PXIL		
	December, 2020	December, 2019	% Change	December, 2020	December, 2019	% Change
Intra Day (MU)	5.04	46.18	-89.09	18.70	18.54	0.86
Day Ahead Contingency MU)	14.69	65.04	-77.41	No Transaction		
Daily/ Any Day (MU)	351.86	159.12	121.13	905.38	84.00	977.83
Weekly (MU)	-	100.80	NA	No Transaction		

Table: 4B**Term Ahead Market (TAM) (on Delivery Date Basis)**

- 3.8. The total volume of electricity transacted on both the power exchanges in Term Ahead Market on delivery date basis in December, 2020 was **1,365.45 MU**, out of which, **435.72 MU (31.91 %)** was transacted on IEX and **929.73 MU (68.09%)** was transacted on PXIL.
- 3.9. The total volume of electricity transacted on both the power exchanges in Term Ahead Market on delivery date basis in November, 2020 was **1,118.01 MU**, out of which, **245.41 MU (21.95 %)** was transacted on IEX and **872.60 MU (78.05%)** was transacted on PXIL.
- 3.10. Similarly, total volume of electricity transacted during December, 2019 in Term Ahead Market on delivery date basis in both the power exchanges was **577.05 MU**, out of which, **474.37 MU (75.27 %)** was transacted on IEX and **142.68 MU (24.73 %)** was transacted on PXIL.
- 3.11. With respect to the total energy supplied during the month of December, 2020 in the country, the volume of electricity traded on the power exchanges in TAM represents **1.29 %** of the total energy supplied. The same was **1.15 %** in November, 2020 and **0.57%** in December, 2019.
- 3.12. The total volume of electricity transacted in TAM **on delivery date basis** on both the power exchanges cumulatively during the period April, 2020 to December, 2020 is **6,047.47 MU**, which shows a decrease of 5.46 % as compared to **6,396.99 MU** during the period April, 2019 to December, 2019.
- 3.13. In Term Ahead Market (TAM) during the month of December, 2020, there was real time curtailment in IEX of **2.35 MU** in Daily/ Any day contract, whereas in PXIL, there was real time curtailment of **28.53 MU** in Daily/ Any day contract during December, 2020.

3.14. The comparison of total volume of electricity transacted in both the power exchanges in Term Ahead Market (TAM) on delivery date basis during December, 2020 with November, 2020 and December, 2019 is given in Table – 4C&4D:

(b) December, 2020 vis- a- vis November, 2020 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Intra Day (MU)	5.04	6.46	-21.98	18.70	20.35	-8.11
Day Ahead Contingency (MU)	14.47	13.67	5.85	No Transaction		
Daily/ Any Day (MU)	416.21	170.08	144.71	911.03	852.25	6.90
Weekly (MU)	-	55.20	NA	No Transaction		

- : No transaction happened

NA: Not applicable

Table: 4C

(b) December, 2020 vis- a- vis December, 2019 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	December, 2020	December, 2019	% Change	December, 2020	December, 2019	% Change
Intra Day (MU)	5.04	45.95	-89.03	18.70	19.53	-4.25
Day Ahead Contingency MU)	14.47	70.11	-79.36	No Transaction		
Daily/ Any Day (MU)	416.21	162.47	156.18	911.03	123.15	639.77
Weekly (MU)	-	155.84	NA	No Transaction		

- : No transaction happened

NA: Not applicable

Table: 4D

4. REAL TIME MARKET (RTM)

The transaction of Electricity in Real Time Market was started from 1st June, 2020 with the approval of the CERC in both the power exchanges i.e. IEX and PXIL. The Final Scheduled Volume (FSV), Daily Market Clearing Prices (MCP), Area Clearing Prices (ACP), Real Time Curtailment and details of Transmission Congestion in Real Time Market during the month of December, 2020 as compared with November, 2020 are as given in table 5A, 5B& 5C:

(i) Final Scheduled Volume:

Final Scheduled Volume (MU)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Total	1,129.09	893.62	26.35	No transaction		
Minimum	24.09	19.01	26.72	No transaction		
Maximum	51.34	40.60	26.45	No transaction		
Average	36.42	29.79	22.26	No transaction		

Table-5A

(ii) Daily Market Clearing Price (MCP):

Daily MCP (Rs/kWh)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December, 2020	November, 2020	% Change
Minimum	2.40	1.87	28.34	No transaction		
Maximum	3.76	3.38	11.24	No transaction		
Average	2.94	2.75	6.91	No transaction		

Table-5B**(iii) Area Clearing Price (ACP):**

ACP (Rs/kWh)	IEX			PXIL		
	December, 2020	November, 2020	% Change	December , 2020	November , 2020	% Change
Minimum	0.90	0.05	1700.00	No transaction		
Maximum	15.00	6.80	120.59	No transaction		

Table -5C**5. GREEN TERM AHEAD MARKET (GTAM):**

The transaction of electricity in Green Term Ahead Market was started in IEX w.e.f. 21st August, 2020 onwards. The total volume of electricity transacted in GTAM in Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during December, 2020 on trade date basis and delivery date basis has been shown in Tables 6A to 6D.

On Trade date basis

The Final Scheduled Volume and the Price of electricity transacted in GTAM in IEX during December, 2020 and its comparison with November, 2020 has been shown in Table 6A & 6B below.

(i) Final Scheduled Volume:

Types of Contract	Period	Final Scheduled Volume MU)			
		Total	Minimum	Maximum	Average
Day Ahead Contingency	December, 2020	82.61	0.41	7.17	2.66
	November, 2020	161.15	1.61	8.04	5.37
	% Change	-48.74	-74.53	-10.82	-50.47
Intraday	December, 2020	0.52	0.02	0.18	0.13
	November, 2020	3.13	0.01	1.15	0.52
	% Change	-83.39	100.00	-84.35	-75.00
Weekly	December, 2020	6.05	2.45	3.60	3.03
	November, 2020	No Transaction			
	% Change	NA	NA	NA	NA

Table-6A

Note: No transaction of electricity happened in Daily or Any day contract under Green TAM in December, 2020

(ii) Daily Market Clearing Price (MCP):

Types of Contract	Period	Prices (Rs/kWh)		
		Minimum	Maximum	Average
	December , 2020	3.55	4.25	3.93

Day Ahead Contingency	November , 2020	3.41	3.98	3.74
	%Change	4.11	6.78	5.08
Intraday	December , 2020	3.40	4.00	3.72
	November , 2020	3.64	4.00	3.89
	%Change	-6.59	0.00	-4.37
Weekly	December , 2020	3.70	3.85	3.78
	November , 2020	No transaction		
	% Change	NA	NA	NA

Table-6B

On Delivery date basis

The Final Scheduled Volume and the Price of electricity transacted in GTAM in IEX during December, 2020 and its comparison with November, 2020 has been shown in Table 6C & 6D below.

(i) Final Scheduled Volume:

Types of Contract	Period	Final Scheduled Volume MU)			
		Total	Minimum	Maximum	Average
Day Ahead Contingency	December, 2020	89.65	0.41	7.75	2.89
	November, 2020	159.13	1.61	8.04	5.30
	% Change	-43.66	-74.53	-3.61	-45.47
Intraday	December, 2020	0.52	0.02	0.18	0.13
	November, 2020	3.13	0.01	1.15	0.52
	% Change	-83.39	100.00	-84.35	-75.00
Weekly	December, 2020	6.65	0.95	0.95	0.95
	November, 2020	No Transaction			
	% Change	NA	NA	NA	NA

Table-6C

(ii) Daily Market Clearing Price (MCP):

Types of Contract	Period	Prices (Rs/kWh)		
		Minimum	Maximum	Average
Day Ahead Contingency	December , 2020	3.55	4.25	3.91
	November , 2020	3.41	3.92	3.64
	%Change	4.11	8.42	7.42
Intraday	December , 2020	3.40	4.00	3.72
	November , 2020	3.57	4.00	3.88
	%Change	-4.76	0.00	-4.12
Weekly	December , 2020	3.78	3.78	3.78
	November , 2020	No transaction		
	% Change	NA	NA	NA

NA: Not Applicable

Table-6D

6. BILATRAL TRANSACTIONS:

The total volume of electricity transacted through **Bilateral transactions** in the month of December, 2020 for buy and sell were **5,337.91 MU** and **5,335.91 MU** respectively. The total

buy volume of electricity transacted during December, 2020 in bilateral market through direct transactions and traders were **1,779.40 MU** and **3,558.51 MU** respectively. Similarly, the total sell volume of electricity transacted during December, 2020 in bilateral market through direct transactions and traders were **1,682.95 MU** and **3,652.23 MU** respectively. The details of Bilateral buy and sell Transactions of Electricity happened during December, 2020 have been shown in Tables Below:

Volume (MU)	Buy		Total Buy (MU)	Sell		Total Sell (MU)
	Direct	Traders		Direct	Traders	
Total	1779.40	3558.51	5,337.91	1,682.95	3652.23	5,335.91
Maximum	1095.19	985.05	-	537.24	596.21	-
Minimum	1.75	0.01	-	0.74	0.05	-

Table -7A

The region-wise maximum/ minimum volume of electricity for buy and sell happened bilaterally during December, 2020 is given in tables below:

(i) Region-wise Buy Volume:**Table -7B**

Region-wise Volume (MU)	ER		WR		NR		SR		NER	
	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader
Total	209.01	459.78	1220.18	54.29	274.17	2,282.38	22.46	703.43	53.59	58.64
Maximum	118.36	148.77	1095.19	23.34	77.23	985.05	15.65	703.39	53.59	34.49
Minimum	4.18	5.55	3.53	0.01	1.75	37.51	3.38	0.04	53.59	5.86

(ii) Region-wise Sell Volume:**Table -7C**

Region-wise Volume (MU)	ER		WR		NR		SR		NER	
	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader
Total	259.77	198.61	444.81	1998.42	873.33	830.78	51.46	566.38	53.59	58.05
Maximum	118.36	106.28	205.41	596.21	537.24	430.34	25.06	464.72	53.59	50.84
Minimum	9.80	0.05	0.74	0.36	1.75	2.48	3.53	30.63	53.59	0.65

6.1. The **top 5 buyers** on bilateral transaction through direct transactions in the month of December, 2020 are Madhya Pradesh, Jharkhand, Chhattisgarh, Rajasthan and West Bengal, which constituted **82.09%** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of December, 2020 are Punjab, Tamil Nadu, Himachal Pradesh, Rajasthan and Uttarakhand, which constituted **77.27%** of the market volume. **[Annexure III]**

6.2. The **top 5 sellers** on bilateral transaction through direct transactions in the month of December, 2020 are Punjab, Uttar Pradesh, Chhattisgarh, Adhunik Power and DVC, which

constituted **73.03%** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of December, 2020 are Gujarat, Raipur Energen, SEIL Project-2, Punjab and Raigarh Energy, which constituted **62.39%** of the market volume. **[Annexure III]**

- 6.3. The total volume of Deviation observed in the month of December, 2020 were **1781.21 MU** in import and **1920.90 MU** in export, respectively.
- 6.4. A comparison of volume of electricity transacted through both the Power Exchanges together in DAM and Bilateral **Buy (i.e. Direct and through traders)** in the month of December, 2020 is shown in **Figure 1:**

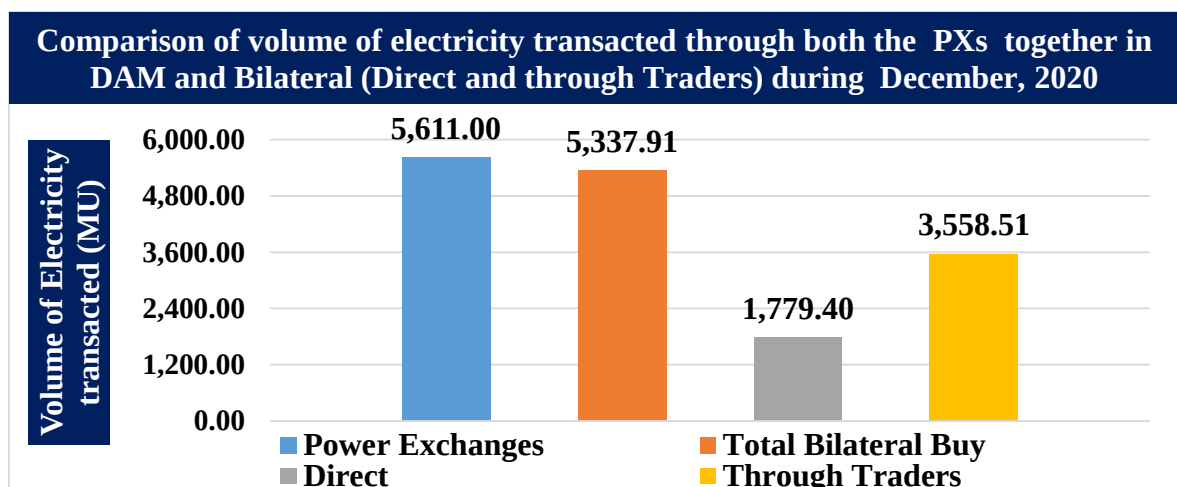


Figure -1

7. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN DAM DURING DECEMBER, 2020

A regression analysis has been carried out on the Day Ahead Market data taken from IEX website. Also, data was plotted in various graphs to observe patterns for each day of the December, 2020 month. The observations made are as under:

- 7.1. In order to find out the determinants which are responsible for the Daily MCP, a regression analysis has been carried out where the Daily MCP is the dependent variable and the independent variables are peak demand, total purchase bid, total sell bid, coal generation, hydro generation, wind generation and solar generation.
- 7.2. A double log function was used so that elasticity of Daily MCP could be read off from the coefficients of independent variables. The regression analysis revealed that the significant variables were the total purchase bid and total sell bid, whereas all the other variables were found to be insignificant. Further, the regression analysis revealed that the elasticity of the Daily MCP with respect to total purchase bid was **0.38**. In effect, the regression reveals that the most important variable which determines daily market clearing price is the total purchase bid in the month of December, 2020.

7.3. The same relationship is visible from the analysis carried out from the plot in **Figure 2**.

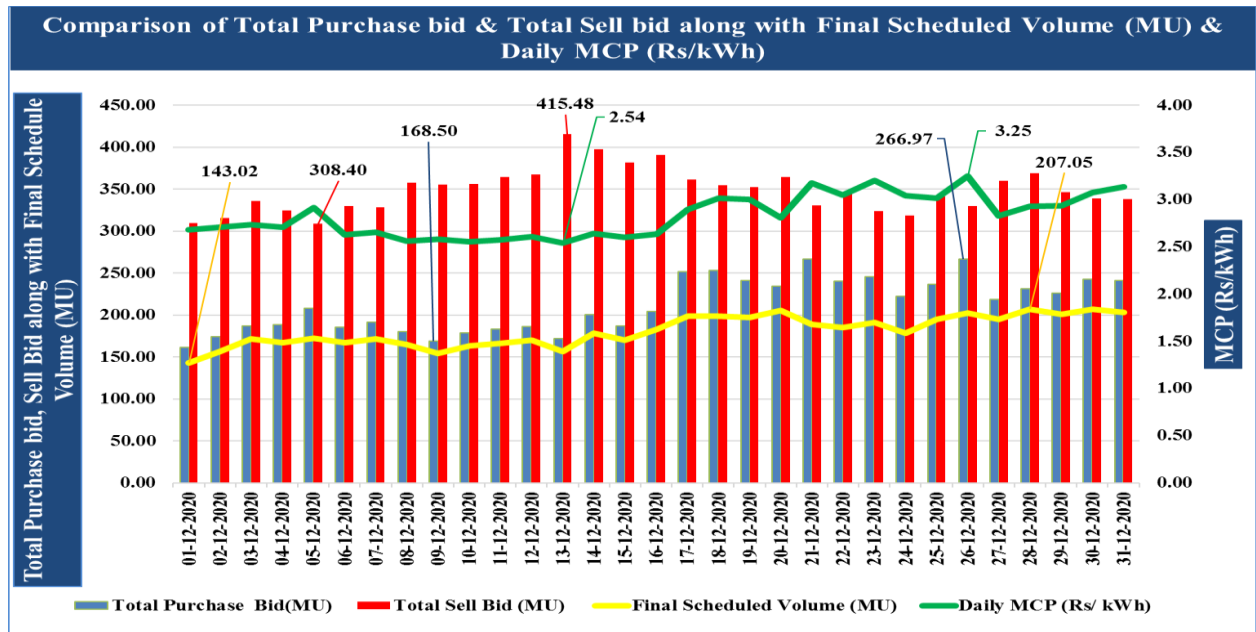


Figure -2

7.4. Invariably, the Final Scheduled Volume (MU) and the Daily MCP (Rs/kWh) showed decreasing trend on Sundays as the demand of electricity in the country is less compared to other days of week. However, in the month of December, 2020, it is observed that on third Sunday (i.e. 20th December, 2020), FSV showed increasing trend in comparison to Saturday (i.e. 19th December, 2020) and decreasing trend on third Monday (i.e. 21st December, 2020). The detailed analysis on this is given at **Appendix-I**.

7.5. A comparison of maximum, minimum, daily, non-peak time, peak time MCP is shown in **Figure -3**. The same are also tabulated in **Annexure IV**.

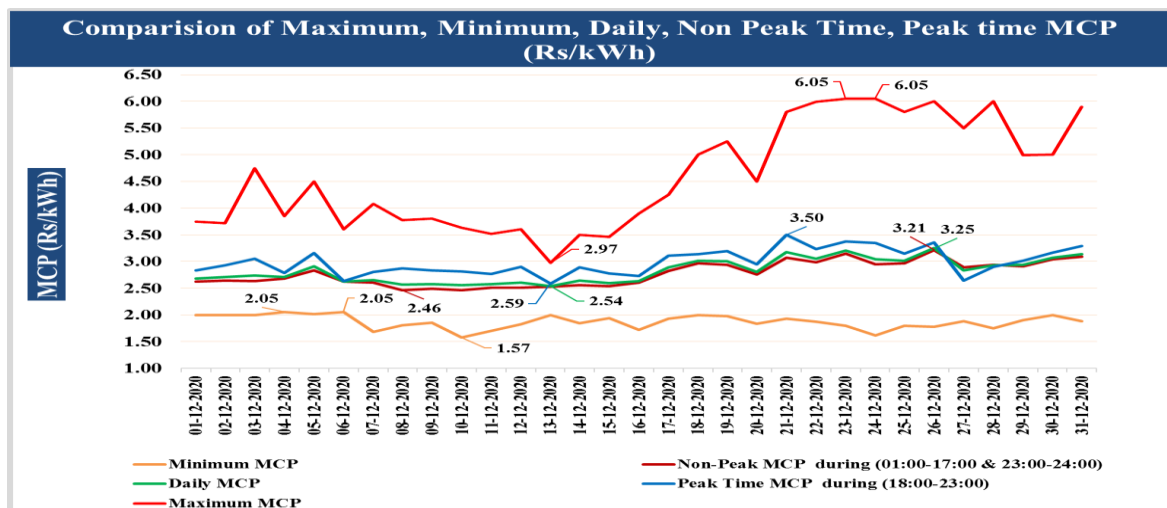


Figure -3

7.6. The Purchase Bids and the MCP discovered in each of the 15-minute time block during the month almost followed the same trend [**Annexure V**]. This is also corroborated with the outcome of regression analysis mentioned in at para 7.1 and 7.2 above.

- 7.7. On **17 days** during the month, the maximum FSV occurred during the **time period 07:15-08:30 Hrs** and also on 12 days , the maximum FSV occurred during the **time period 18:00 – 18:30 Hrs. [Annexure VI]**
- 7.8. On all **22 days** during the month, the maximum MCP occurred during the **time period 08:45-10:00 Hrs. [Annexure VI]**
- 7.9. On **11 days** during the month, the minimum FSV occurred during the **time period 22:30-24:00 Hrs. [Annexure VI]**
- 7.10. On **30 days** during the month, the minimum MCP occurred during the **time period 03:00-04:15 Hrs. [Annexure VI]**
- 7.11. The maximum demand met during the month of December, 2020 in the country occurred on **30th December, 2020 at 182.89 GW**, which is 13.75% more than the maximum demand occurred during **November, 2020 [i.e. 160.78 GW on 3rd, November, 2020]** and is 7.27% more than the maximum demand occurred during December, 2019 i.e. **[170.49 GW on 26th December, 2019]**.
- 7.12. One nation One Price was observed for **30 days** in IEX in December, 2020, as there was a congestion of **0.18 MU** on 19th December, 2020 in transmission system. In PXIL, there was no congestion in transmission system during December, 2020, so one nation one price was observed on all 30 days during which transaction of electricity happened (1st and 3rd – 31st December, 2020). In the month of November, 2020, there was no congestion in transmission system in IEX, hence, one nation one price was observed for all 30 days on IEX in the month of November, 2020. In PXIL also, there was no congestion in transmission system during November, 2020, so one nation one price was observed on all 30 days during the month. Similarly, in the month of December, 2019, there was congestion in transmission system to the tune of **12.04 MU** in IEX on 10 days (13th, 17th – 21st and 23rd – 26th December, 2019, hence, one nation one price was observed for **21 days** on IEX. In PXIL, there was no congestion in transmission system, so one nation one price was observed on all **13 days** during which transaction of electricity happened (1st, 3rd to 10th, 14th and 18th – 20th December, 2019).
- 7.13. There was **no** real time curtailment in IEX and PXIL in December, 2020, respectively. Further, there was no real time curtailment in IEX and PXIL in November, 2020. In December, 2019 also, there was no real time curtailment in IEX and PXIL.
- 7.14. The **top 10 sellers** on the power exchanges in DAM in the month of December, 2020 are **West Bengal, Uttar Pradesh, Odisha, Jindal Power Ltd. Stg-II, Jindal Power, Jaypee**

Nigrie, Chhattisgarh, Madhya Pradesh, Teesta -3 and DB Power, which constituted **66.19 %** of the market volume. [**Annexure VII**]

- 7.15. The **top 10 purchasers** on the power exchanges in DAM in the month of December, 2020 are **Andhra Pradesh, Maharashtra, Tamil Nadu, Gujarat, Telangana, Rajasthan, UT of J&K and Ladakh, Delhi, Haryana and Uttar Pradesh**, which constituted **81.85 %** of the market volume. [**Annexure VII**]
- 7.16. The total volume of electricity purchased by Discoms/Licensees in DAM in the month of December, 2020 was **5,410.84 MU**, which constituted **96.43 %** of total volume of electricity purchased on both the power exchanges.
- 7.17. Similarly, the total volume of electricity sold by Discoms/Licensees in DAM in the month of December, 2020 was **3,397.33 MU**, which constituted **60.55 %** of total volume of electricity sold on both the power exchanges.

8. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN REAL TIME MARKET (RTM) TRANSACTIONS IN DECEMBER, 2020

- 8.1. Similar to the regression analysis carried out for Day Ahead Market, the regression analysis for Real Time Market was also done. The regression analysis revealed that the significant variables was the total purchase bid, whereas all the other variables were found to be insignificant. Further, the regression analysis revealed that the elasticity of the Daily MCP with respect to total Purchase Bid was **0.30**. In effect, the regression reveals that the most important variable, which determines daily market clearing price is **total Purchase** in the month of December, 2020 for RTM transactions.
- 8.2. The Purchase Bids and the MCP discovered in each of the 15-minute time block during the month almost followed the same trend [**Annexure IX**]. This is also corroborated with the outcome of regression analysis mentioned in at para 8.1 above

8.3. The Total Purchase Bid, Total Sell Bid, Daily MCP and FSV are shown in Figure-4 below:

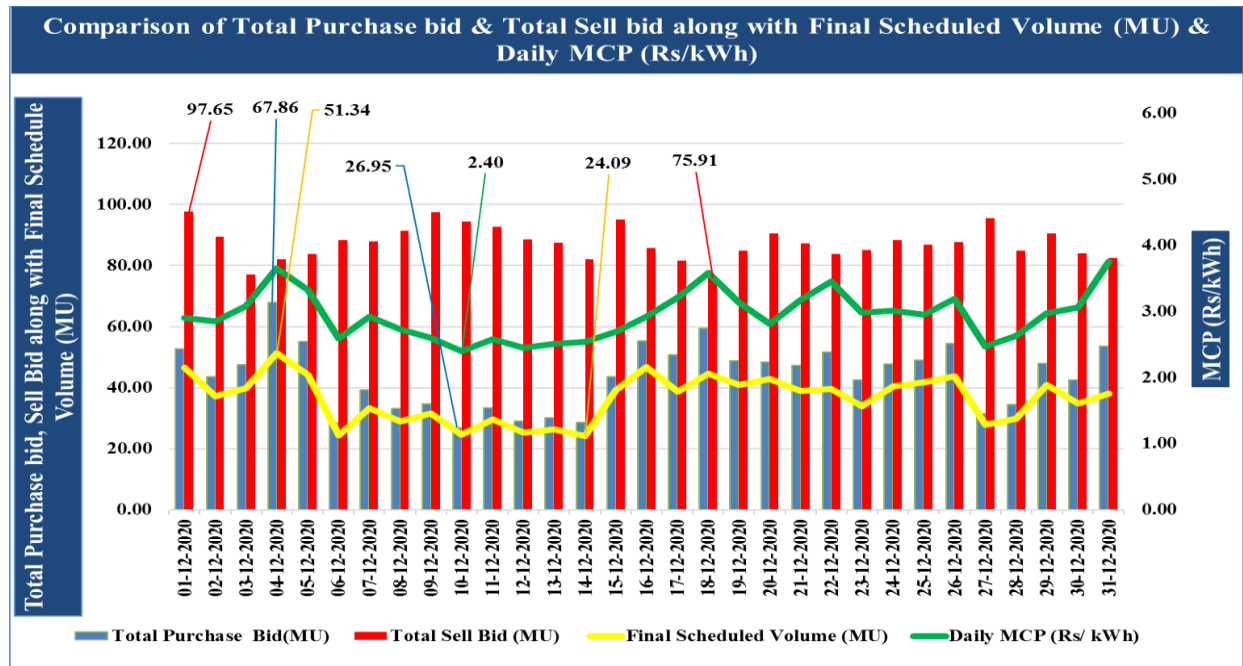


Figure-4

8.4. A comparison of maximum, minimum, daily, non-peak time, peak time MCP is shown in Figure-5. The same are also tabulated in Annexure VIII.

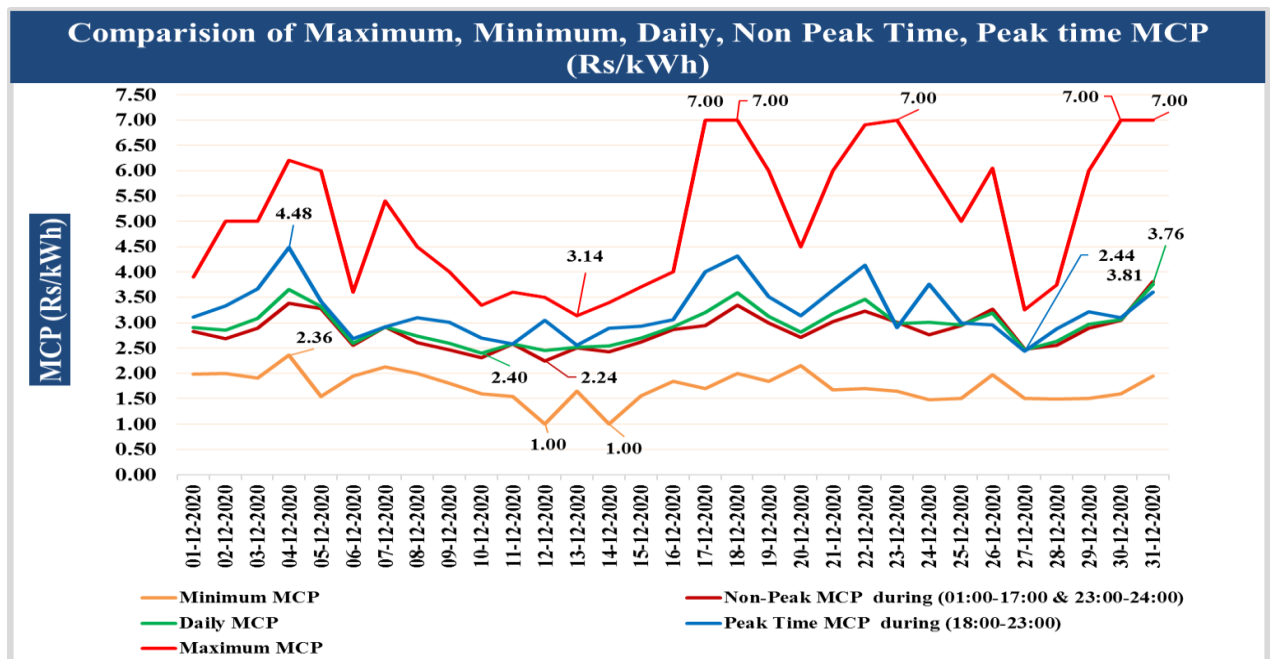


Figure-5

8.5. On 15 days during the month, the maximum MCP occurred during the time period 18:00-19:45 Hrs. [Annexure X]

8.6. On 14 days during the month, the minimum FSV occurred during the time period 06:15-08:00 Hrs. [Annexure X]

- 8.7. There was **no real time curtailment** in IEX in Real Time Market during December, 2020 and November, 2020, whereas, no transaction of electricity happened in PXIL during December, 2020 and November, 2020.
- 8.8. In the month of December, 2020, there was congestion of **0.02 MU** in transmission system in IEX in Real Time Market on **four days** (i.e. 1st, 2nd, 14th and 31st December, 2020), hence, one nation one price was observed for **27 days** in IEX. Whereas, in PXIL, no transaction of electricity happened in December, 2020 in Real Time Market. Further, in the month of November, 2020 there was congestion of **0.01MU** in transmission system in IEX in Real Time Market on **two days**, hence, one nation one price was observed for **28 days** in IEX. Whereas, in PXIL, no transaction of electricity happened in November, 2020 in Real Time Market.
- 8.9. The **top 10 sellers** on the power exchanges in RTM in the month of December, 2020 are **NLC TPS-II Stg-2, Jharkhand, Kakrapar Atomic Power Station, Chamera-I HEP, RKM Power, Auraiya-Liquid Fuel, Anta-RLNG Fuel, Dadri TPS, Mouda Stg-1 and Dadri-RLNG Fuel**, which constituted **59.24%** of the market volume. **[Annexure XI]**
- 8.10. The **top 10 purchasers** on the power exchanges in RTM in the month of December, 2020 are **UT of J&K and Ladakh, Rajasthan, Telangana, Andhra Pradesh, Maharashtra, Uttar Pradesh, Delhi, Odisha, Chhattisgarh and Gujarat**, which constituted **86.03%** of the market volume. **[Annexure XI]**
- 8.11. The total volume of electricity purchased by Discoms/Licensees in RTM in the month of December, 2020 was **1,111.04 MU**, which constituted **98.40 %** of total volume of electricity purchased on both the power exchanges.
- 8.12. Similarly, the total volume of electricity sold by Discoms/Licensees in RTM in the month of December, 2020 was **162.25 MU**, which constituted **14.37 %** of total volume of electricity sold on both the power exchanges.

-
- Source DAM, TAM and RTM data: IEX and PXIL
 - Source Entity wise sale and purchase on PXs data: NLDC
 - Source Total Energy supplied: CEA
 - Source Generation & other data for Regression: NLDC and IEX

Annexure-I
Final Scheduled Volume, Average MCP and Real-Time Curtailment in Day Ahead Market (DAM) for the months of April, 2020 to December, 2020 of IEX and PXIL

Quarter	Months	Final Scheduled Volume (MU)		Market Clearing Price (Rs/kWh)		Real Time Curtailment (MU)	
		IEX	PXIL	IEX	PXIL	IEX	PXIL
Quarter -I	April, 2020	3,692.04	-	2.42	NA	0	NA
	May, 2020	5,573.73	22.24	2.57	2.58	0	0
	June, 2020	4,174.34	15.03	2.35	2.56	0	0
Total Quarter -I	April - June, 2020	13,440.11	37.27			0	0
Quarter-II	July, 2020	4,486.71	-	2.47	NA	0	NA
	August, 2020	4,484.36	14.10	2.43	2.64	0	0
	September, 2020	4,780.99	60.20	2.69	270	0	0
Total Quarter -II	July – September, 2020	13,752.06	74.30			0	0
Quarter-III	October, 2020	5,500.53	49.57	2.74	2.80	0.16	0
	November, 2020	4,860.46	48.62	2.73	2.87	0	0
	December, 2020	5,605.58	5.42	2.83	3.25	0	0
Total Quarter -III	October-December, 2020	15,966.57	103.61			0.16	0
Total April - December, 2020		4,3158.74	215.18			0.16	0

- : No Transaction happened

NA: Not Applicable

Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2020 to December, 2020 of IEX and PXIL (Delivery and Trade date basis)

Quarter	Months	Final Scheduled Volume (MU) on Delivery Date Basis		
		IEX	PXIL	Total
Quarter -I	April, 2020	359.94	191.30	551.24
	May, 2020	431.38	284.38	715.76
	June, 2020	100.34	74.88	175.22
Total Quarter -I	April - June, 2020	891.66	550.56	1,442.22
Quarter-II	July, 2020	62.45	28.29	90.74
	August, 2020	120.53	321.22	441.75
	September, 2020	106.64	472.44	579.08
Total Quarter -II	July – September, 2020	289.62	821.95	1,111.57
Quarter-III	October, 2020	219.16	791.06	1010.22
	November, 2020	245.41	872.60	1118.01
	December, 2020	435.72	929.73	1365.45
Total Quarter -III	October-December, 2020	900.29	2,593.39	3,493.68
Total April - December, 2020		2,081.57	3,965.90	6,047.47

Quarter	Months	Final Scheduled Volume (MU) Trade Date Basis		
		IEX	PXIL	Total
Quarter -I	April, 2020	340.52	282.72	623.24
	May, 2020	377.67	218.35	596.02
	June, 2020	72.28	51.36	123.64
Total Quarter -I	April - June, 2020	790.47	552.43	1342.90
Quarter-II	July, 2020	60.27	117.13	177.40
	August, 2020	146.93	270.72	417.65
	September, 2020	98.30	510.42	608.72
Total Quarter -II	July – September, 2020	305.50	898.27	1203.77
Quarter-III	October, 2020	276.80	973.45	1250.25
	November, 2020	189.00	744.35	933.35
	December, 2020	371.59	924.08	1295.67
Total Quarter -III	October-December, 2020	837.39	2641.88	3479.27
Total April - December, 2020		1933.36	4092.58	6025.94

Top Five Entities (Buyers and Sellers) in Bilateral transactions in the month of December, 2020

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
MP	1095.19	61.55%	Punjab	985.05	27.68%
Jharkhand	118.36	6.65%	TAMILNADU	703.39	19.77%
Chhattisgarh	95.54	5.37%	Himachal Pradesh	469.01	13.18%
Rajasthan	77.23	4.34%	Rajasthan	339.38	9.54%
West Bengal	74.34	4.18%	Uttarakhand	252.87	7.11%
Total Volume	1460.66	82.09%	Total Volume	2749.70	77.27%
Total Volume in Bilateral	1779.40		Total Volume in Bilateral	3558.51	

(ii) Top five Sellers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Punjab	537.24	31.92%	Gujarat	596.21	16.32%
Uttar Pradesh	289.95	17.23%	Raipur Energen	524.13	14.35%
Chhattisgarh	205.41	12.21%	SEIL Project-2	464.72	12.72%
Adhunik Power	118.36	7.03%	Punjab	430.34	11.78%
DVC	78.04	4.64%	Raigarh Energy	263.41	7.21%
Total Volume	1228.99	73.03%	Total Volume	2278.80	62.39%
Total Volume in Bilateral	1682.95		Total Volume in Bilateral	3652.23	

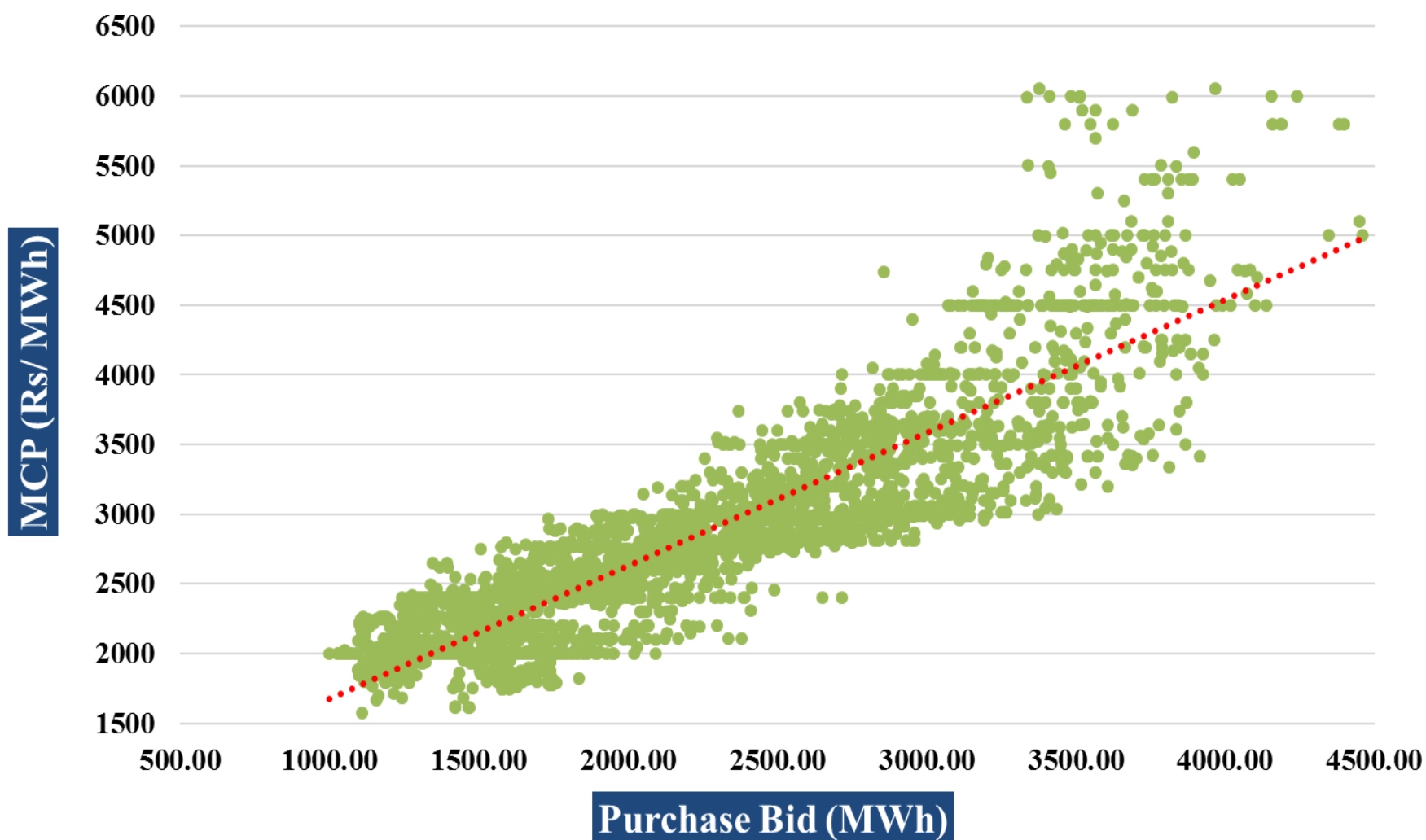
Annexure-IV**Peak Time MCP, Non-Peak MCP, Maximum MCP, Minimum MCP, Average MCP and Final Scheduled Volume (MU) in DAM**

Date	MCP during (01:00-06:00, 23:00-24:00)	MCP during (07:00-10:00)	MCP during (11:00-17:00)	Peak Time MCP during (18:00-23:00)	Non-Peak MCP during (01:00-17:00 & 23:00-24:00)	Maximum MCP	Minimum MCP	Average MCP	Final Scheduled Volume (MU)
01-12-2020	2.04	3.09	2.94	2.84	2.63	3.75	2.00	2.68	143.02
02-12-2020	2.18	2.97	2.91	2.92	2.64	3.72	2.00	2.71	156.16
03-12-2020	2.19	3.08	2.82	3.05	2.63	4.74	2.00	2.73	171.35
04-12-2020	2.19	3.28	2.82	2.79	2.68	3.85	2.05	2.71	166.86
05-12-2020	2.21	3.57	3.03	3.16	2.83	4.50	2.01	2.91	171.94
06-12-2020	2.26	3.08	2.72	2.64	2.62	3.60	2.05	2.63	166.94
07-12-2020	1.97	3.14	2.93	2.81	2.60	4.08	1.68	2.66	171.43
08-12-2020	1.99	3.09	2.57	2.87	2.46	3.78	1.80	2.56	164.61
09-12-2020	1.99	3.13	2.63	2.83	2.49	3.80	1.85	2.58	154.10
10-12-2020	1.95	2.92	2.72	2.82	2.46	3.63	1.57	2.55	163.54
11-12-2020	1.98	3.00	2.76	2.77	2.51	3.52	1.70	2.57	166.30
12-12-2020	2.01	2.97	2.75	2.90	2.51	3.61	1.83	2.61	170.13
13-12-2020	2.13	2.80	2.76	2.59	2.52	2.97	2.00	2.54	156.40
14-12-2020	2.01	2.98	2.87	2.89	2.56	3.50	1.85	2.64	178.51
15-12-2020	2.06	3.02	2.75	2.77	2.54	3.46	1.94	2.60	170.33
16-12-2020	1.95	3.27	2.88	2.73	2.61	3.90	1.72	2.64	182.49
17-12-2020	2.04	3.48	3.23	3.11	2.82	4.25	1.93	2.89	198.33
18-12-2020	2.04	3.81	3.42	3.14	2.97	5.00	2.00	3.01	198.71
19-12-2020	2.04	3.88	3.29	3.19	2.94	5.25	1.98	3.00	196.73
20-12-2020	2.05	3.48	3.06	2.95	2.76	4.50	1.83	2.81	205.37
21-12-2020	2.09	4.11	3.46	3.50	3.07	5.80	1.93	3.18	188.60
22-12-2020	2.07	3.80	3.44	3.23	2.99	5.99	1.87	3.05	184.67
23-12-2020	1.96	4.25	3.69	3.37	3.14	6.05	1.80	3.20	191.36
24-12-2020	1.87	3.95	3.44	3.35	2.94	6.05	1.62	3.04	177.99
25-12-2020	1.95	4.17	3.30	3.15	2.97	5.80	1.80	3.01	194.85
26-12-2020	1.97	4.56	3.69	3.35	3.21	6.00	1.77	3.25	202.43
27-12-2020	2.04	4.10	3.05	2.64	2.89	5.50	1.88	2.83	194.66
28-12-2020	1.88	4.09	3.32	2.90	2.93	6.00	1.74	2.93	207.05
29-12-2020	2.06	3.79	3.26	3.02	2.91	5.00	1.90	2.94	200.69
30-12-2020	2.07	4.13	3.40	3.17	3.04	5.00	2.00	3.07	206.78
31-12-2020	2.02	4.28	3.47	3.29	3.09	5.90	1.88	3.14	203.25
Maximum	2.26	4.56	3.69	3.50	3.21	6.05	2.05	3.25	207.05
Minimum	1.87	2.80	2.57	2.59	2.46	2.97	1.57	2.54	143.02
Average	2.04	3.52	3.08	2.99	2.77	4.60	1.87	2.83	180.83

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,976 Time Blocks during the month of December, 2020



Time Blocks during the Month [96 time blocks in a day x 31 days = 2,976]

Annexure-VI**Maximum Final Schedule Volume (FSV), Minimum FSV, Maximum Market Clearing Price (MCP) and Minimum MCP in DAM**

Date	Max. FSV (MU)		Max. MCP (Rs/kWh)		Min FSV (MU)		Min. MCP (Rs/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-12-2020	18:00 - 18:15	2.49	09:30 - 09:45	3.75	05:00 - 05:15	0.90	05:45 - 06:00	2.00
02-12-2020	18:15 - 18:30	2.52	18:15 - 18:30	3.72	04:30 - 04:45	0.97	04:00 - 04:15	2.00
03-12-2020	08:00 - 08:15	2.68	18:15 - 18:30	4.74	04:45 - 05:00	1.05	03:45 - 04:00	2.00
04-12-2020	08:00 - 08:15	2.57	09:15 - 09:30	3.85	04:45 - 05:00	1.11	03:45 - 04:00	2.05
05-12-2020	18:00 - 18:15	2.63	09:15 - 09:30	4.50	23:45 - 24:00	1.20	03:15 - 03:30	2.01
06-12-2020	08:00 - 08:15	2.53	09:00 - 09:15	3.60	23:15 - 23:30	1.27	03:30 - 03:45	2.05
07-12-2020	18:00 - 18:15	2.79	18:15 - 18:30	4.08	01:30 - 01:45	1.09	04:00 - 04:15	1.68
08-12-2020	18:15 - 18:30	2.61	08:45 - 09:00	3.78	02:30 - 02:45	1.11	03:45 - 04:00	1.80
09-12-2020	18:15 - 18:30	2.63	08:45 - 09:00	3.80	03:15 - 03:30	1.01	03:45 - 04:00	1.85
10-12-2020	18:15 - 18:30	2.84	18:15 - 18:30	3.63	01:45 - 02:00	1.01	03:45 - 04:00	1.57
11-12-2020	18:15 - 18:30	2.75	18:15 - 18:30	3.52	23:45 - 24:00	1.02	04:00 - 04:15	1.70
12-12-2020	18:15 - 18:30	2.76	18:15 - 18:30	3.61	02:30 - 02:45	1.10	03:45 - 04:00	1.83
13-12-2020	07:45 - 08:00	2.42	08:45 - 09:00	2.97	00:00 - 00:15	1.01	03:45 - 04:00	2.00
14-12-2020	18:00 - 18:15	2.84	18:30 - 18:45	3.50	02:30 - 02:45	1.10	04:00 - 04:15	1.85
15-12-2020	18:00 - 18:15	2.79	18:30 - 18:45	3.46	23:30 - 23:45	1.06	03:45 - 04:00	1.94
16-12-2020	08:00 - 08:15	3.01	09:30 - 09:45	3.90	00:45 - 01:00	1.08	03:45 - 04:00	1.72
17-12-2020	16:30 - 16:45	3.07	09:00 - 09:15	4.25	00:00 - 00:15	1.07	03:15 - 03:30	1.93
18-12-2020	07:45 - 08:00	3.03	09:00 - 09:15	5.00	00:00 - 00:15	1.11	03:45 - 04:00	2.00
19-12-2020	18:00 - 18:15	2.95	09:00 - 09:15	5.25	00:00 - 00:15	1.12	04:00 - 04:15	1.98
20-12-2020	08:00 - 08:15	3.04	09:30 - 09:45	4.50	00:00 - 00:15	1.23	04:00 - 04:15	1.83
21-12-2020	08:15 - 08:30	2.75	09:30 - 09:45	5.80	00:00 - 00:15	1.14	04:00 - 04:15	1.93
22-12-2020	08:00 - 08:15	2.71	09:30 - 09:45	5.99	00:00 - 00:15	1.24	03:15 - 03:30	1.87
23-12-2020	19:00 - 19:15	2.79	09:30 - 09:45	6.05	22:45 - 23:00	1.23	04:00 - 04:15	1.80
24-12-2020	07:45 - 08:00	2.71	09:30 - 09:45	6.05	00:00 - 00:15	1.16	03:45 - 04:00	1.62
25-12-2020	08:00 - 08:15	2.87	09:15 - 09:30	5.80	22:30 - 22:45	1.29	03:15 - 03:30	1.80
26-12-2020	07:15 - 07:30	2.98	09:00 - 09:15	6.00	22:45 - 23:00	1.33	03:30 - 03:45	1.77
27-12-2020	07:15 - 07:30	3.01	07:45 - 08:00	5.50	22:45 - 23:00	1.25	03:15 - 03:30	1.88
28-12-2020	07:45 - 08:00	3.22	09:30 - 09:45	6.00	22:45 - 23:00	1.29	03:00 - 03:15	1.74
29-12-2020	08:00 - 08:15	3.00	09:45 - 10:00	5.00	22:45 - 23:00	1.22	03:15 - 03:30	1.90
30-12-2020	07:15 - 07:30	3.08	08:45 - 09:00	5.00	23:00 - 23:15	1.09	03:00 - 03:15	2.00
31-12-2020	07:30 - 07:45	3.12	09:45 - 10:00	5.90	03:15 - 03:30	1.08	03:15 - 03:30	1.88

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Annexure-VII**Sellers and Purchasers in Day Ahead Market (DAM) in the month of December, 2020**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	West Bengal	674.81	12.03%	Andhra Pradesh	1094.84	19.51%
2.	Uttar Pradesh	560.37	9.99%	Maharashtra	626.85	11.17%
3.	Odisha	551.09	9.82%	Tamil Nadu	531.92	9.48%
4.	Jindal Power Ltd. Stg-II	444.18	7.92%	Gujarat	472.42	8.42%
5.	Jindal Power	437.06	7.79%	Telangana	444.53	7.92%
6.	Jaypee Nigrie	283.00	5.04%	Rajasthan	429.45	7.65%
7.	Chhattisgarh	223.60	3.99%	UT of J&K and Ladakh	282.61	5.04%
8.	Madhya Pradesh	206.53	3.68%	Delhi	253.53	4.52%
9.	Teesta -3	168.01	2.99%	Haryana	241.67	4.31%
10.	DB Power	165.34	2.95%	Uttar Pradesh	214.74	3.83%
11.	RKM Power	154.09	2.75%	Arcel or Mittal Nippon steel (ESIL)	192.55	3.43%
12.	Sembcorp Gayatri	145.65	2.60%	Punjab	159.32	2.84%
13.	Raipur Energen	131.11	2.34%	Uttarakhand	135.10	2.41%
14.	Rajasthan	126.41	2.25%	Karnataka	77.45	1.38%
15.	Adani Power STG2	100.00	1.78%	Jharkhand	68.51	1.22%
16.	Assam	95.38	1.70%	Himachal Pradesh	66.45	1.18%
17.	Thermal Powertech	90.59	1.61%	Assam	49.33	0.88%
18.	Karnataka	89.01	1.59%	Bihar	47.36	0.84%
19.	Bihar	88.11	1.57%	Madhya Pradesh	46.31	0.83%
20.	Delhi	83.37	1.49%	Dadra & Nagar Haveli	36.14	0.64%
21.	Himachal Pradesh	80.55	1.44%	Kerala	35.59	0.63%
22.	Raigarh Energy Ltd.	61.79	1.10%	Odisha	25.11	0.45%
23.	Essar Power MP Ltd	53.18	0.95%	Goa WR	19.16	0.34%
24.	GMR Kamalanga	48.72	0.87%	Daman & Diu	18.40	0.33%
25.	MB Power	48.69	0.87%	Meghalaya	8.86	0.16%
26.	Spectrum Coal	44.76	0.80%	Chandigarh	7.81	0.14%
27.	Telangana	30.33	0.54%	Manipur	7.50	0.13%

28.	Kerala	29.32	0.52%	KAPS 3&4	7.34	0.13%
29.	Jindal Steel	23.35	0.42%	Chhattisgarh	4.05	0.07%
30.	Jhabua Power	20.95	0.37%	Nagaland	3.04	0.05%
31.	Korba Stg 3	17.37	0.31%	West Bengal	2.82	0.05%
32.	ACBIL	16.92	0.30%	Meenakshi Energy	0.24	0.004%
33.	Maruti Clean Coal Power	16.80	0.30%			
34.	Andhra Pradesh	16.61	0.30%			
35.	AD Hydro	14.69	0.26%			
36.	Karcham Wangtoo	14.39	0.26%			
37.	BALCO 2	14.18	0.25%			
38.	Adani Power STG3	14.17	0.25%			
39.	Maharashtra	13.91	0.25%			
40.	Goa WR	13.03	0.23%			
41.	Tripura	11.50	0.20%			
42.	SingoliBhagwati	10.92	0.19%			
43.	GMR Warora	10.64	0.19%			
44.	Gujarat	10.32	0.18%			
45.	Dikchu	10.19	0.18%			
46.	Adhunik Power	10.17	0.18%			
47.	Haryana	9.95	0.18%			
48.	Sainj HEP	8.62	0.15%			
49.	Ramagundam Stg-1	7.89	0.14%			
50.	Khargone STPP	7.48	0.13%			
51.	SKS Power	7.30	0.13%			
52.	Farakka Stg 3	6.80	0.12%			
53.	Punjab	6.74	0.12%			
54.	Kameng HEP	6.65	0.12%			
55.	NLC TPS-II	6.64	0.12%			
56.	Chandigarh	6.31	0.11%			
57.	Arunachal Pradesh	6.20	0.11%			
58.	Sikkim	5.18	0.09%			
59.	DVC	5.09	0.09%			
60.	IL&FS	4.72	0.08%			
61.	Bongaigaon	4.66	0.08%			

62.	Tamil Nadu	4.09	0.07%			
63.	NLC TPS-II Stg-2	3.48	0.06%			
64.	NTPL	3.11	0.06%			
65.	Simhadri Stg-2	3.00	0.05%			
66.	NLC	2.90	0.05%			
67.	NLC TPS-II Expn	2.47	0.04%			
68.	Mizoram	2.41	0.04%			
69.	JITPL	2.35	0.04%			
70.	Jorethang	2.18	0.04%			
71.	Tashiding HEP	1.63	0.03%			
72.	Chuzachen	1.59	0.03%			
73.	Dadra & Nagar Haveli	1.56	0.03%			
74.	Meenakshi Energy	0.96	0.02%			
75.	Jharkhand	0.88	0.02%			
76.	Ramagundam Stg-3	0.81	0.01%			
77.	Dhariwal	0.72	0.01%			
78.	LancoBudhil	0.52	0.01%			
79.	Nagaland	0.47	0.01%			
80.	Mouda Stg-2	0.43	0.01%			
81.	Palatana	0.05	0.001%			
	Total Volume of top 10	3,713.99	66.19%	Total Volume of top 10	4,592.56	81.85%
	Total Volume in PXs	5,610.99		Total Volume in PXs	5,610.99	

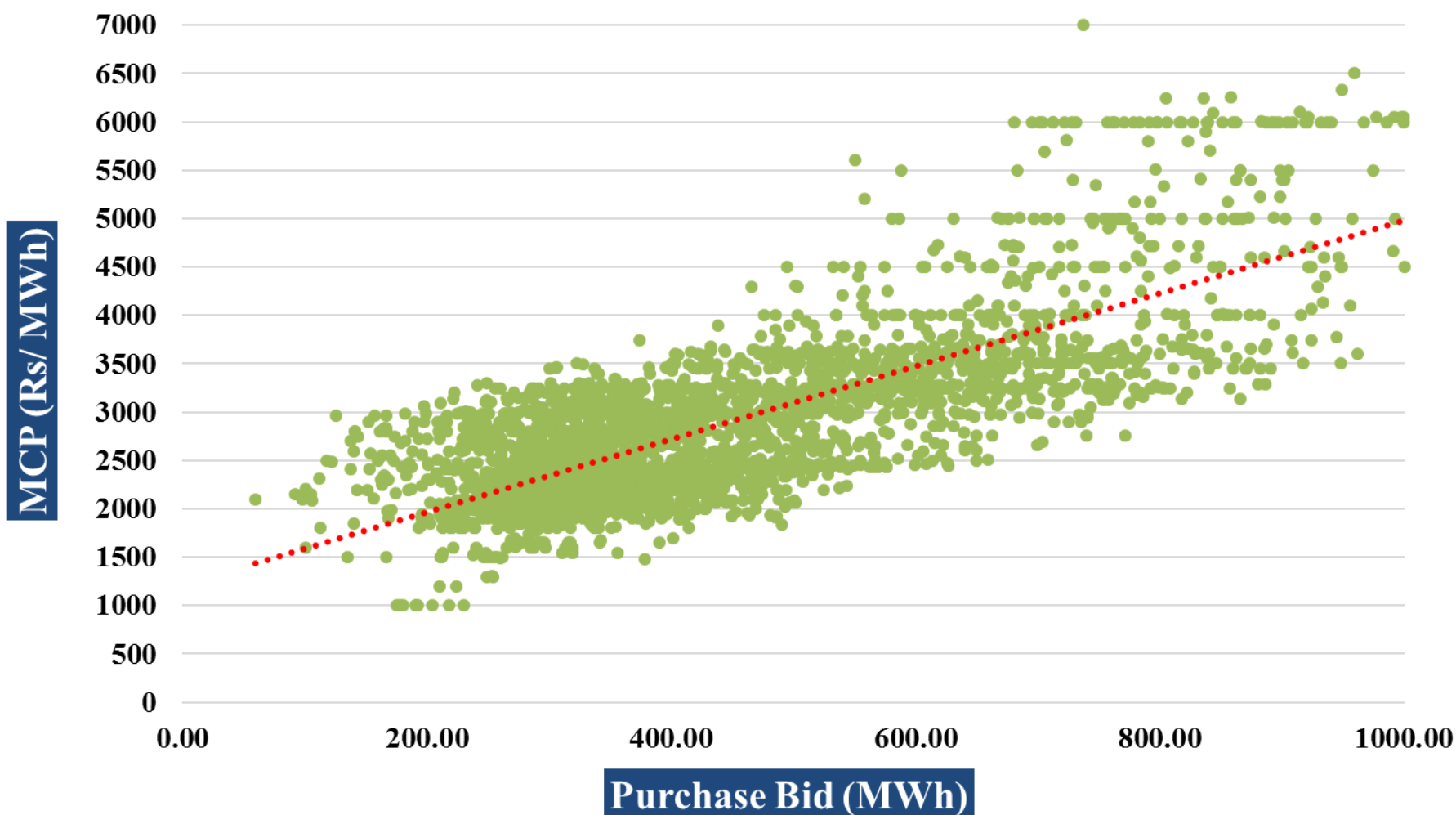
Annexure-VIII**Peak Time MCP, Non-Peak MCP, Maximum MCP, Minimum MCP, Average MCP and Final Scheduled Volume (MU) in RTM**

Date	MCP during (01:00-06:00, 23:00-24:00)	MCP during (07:00-10:00)	MCP during (11:00-17:00)	Peak Time MCP during (18:00-23:00)	Non-Peak MCP during (01:00-17:00 & 23:00-24:00)	Maximum MCP	Minimum MCP	Average MCP	Final Scheduled Volume (MU)
01-12-2020	2.24	3.36	3.12	3.12	2.83	3.90	1.99	2.90	46.52
02-12-2020	2.17	3.16	2.92	3.33	2.68	5.00	2.00	2.85	37.10
03-12-2020	2.34	3.49	3.08	3.66	2.88	5.00	1.90	3.08	39.70
04-12-2020	2.53	4.06	3.85	4.48	3.38	6.20	2.36	3.66	51.34
05-12-2020	2.31	4.39	3.63	3.42	3.28	6.00	1.55	3.32	44.11
06-12-2020	2.17	2.69	2.87	2.69	2.56	3.60	1.95	2.59	24.28
07-12-2020	2.26	3.17	3.44	2.92	2.92	5.40	2.13	2.92	33.33
08-12-2020	2.19	2.93	2.84	3.10	2.60	4.50	2.00	2.73	29.03
09-12-2020	1.99	2.69	2.80	3.01	2.46	4.00	1.80	2.60	31.51
10-12-2020	2.01	2.55	2.45	2.70	2.30	3.35	1.60	2.40	24.56
11-12-2020	2.12	2.98	2.82	2.58	2.58	3.60	1.54	2.58	29.64
12-12-2020	1.86	2.06	2.73	3.04	2.24	3.50	1.00	2.44	25.27
13-12-2020	2.07	2.83	2.75	2.55	2.50	3.14	1.65	2.51	26.35
14-12-2020	1.57	2.82	3.03	2.89	2.42	3.40	1.00	2.54	24.09
15-12-2020	1.96	3.13	2.98	2.92	2.61	3.70	1.55	2.69	39.05
16-12-2020	2.08	3.43	3.33	3.06	2.87	4.00	1.84	2.92	46.65
17-12-2020	2.19	3.50	3.38	4.00	2.94	7.00	1.70	3.21	38.73
18-12-2020	2.31	4.14	3.91	4.31	3.34	7.00	2.00	3.58	44.55
19-12-2020	2.25	3.95	3.20	3.51	3.00	6.00	1.84	3.13	40.99
20-12-2020	2.32	3.21	2.80	3.14	2.70	4.50	2.15	2.81	42.87
21-12-2020	2.16	4.06	3.28	3.64	3.02	6.00	1.67	3.17	38.95
22-12-2020	2.07	4.17	3.85	4.14	3.23	6.90	1.70	3.46	39.58
23-12-2020	2.08	3.84	3.44	2.91	3.00	7.00	1.65	2.98	33.87
24-12-2020	2.12	3.47	2.97	3.76	2.75	6.00	1.48	3.01	40.42
25-12-2020	2.04	3.19	3.69	3.00	2.94	5.00	1.50	2.95	41.69
26-12-2020	2.15	4.79	3.52	2.95	3.27	6.05	1.96	3.19	43.69
27-12-2020	2.12	2.84	2.62	2.44	2.47	3.25	1.50	2.47	27.89
28-12-2020	2.01	2.82	2.94	2.88	2.55	3.74	1.49	2.63	29.73
29-12-2020	2.06	3.02	3.64	3.21	2.89	6.00	1.50	2.97	40.88
30-12-2020	2.02	4.07	3.47	3.10	3.04	7.00	1.60	3.06	34.75
31-12-2020	2.18	4.48	5.05	3.60	3.81	7.00	1.94	3.76	37.96
Maximum	2.53	4.79	5.05	4.48	3.81	7.00	2.36	3.76	51.34
Minimum	1.57	2.06	2.45	2.44	2.24	3.14	1.00	2.40	24.09
Average	2.13	3.40	3.24	3.23	2.84	5.06	1.73	2.94	36.42

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,976 Time Blocks during the month of December, 2020



Time Blocks during the Month [96 time blocks in a day x 31 days = 2,976]

Annexure-X**Maximum Final Schedule Volume (FSV), Minimum FSV, Maximum Market Clearing Price (MCP) and Minimum MCP in RTM**

Date	Max. FSV (MU)		Max. MCP (Rs/kWh)		Min FSV (MU)		Min. MCP (Rs/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-12-2020	10:15-10:30	0.75	09:15-09:30	3.90	23:30-23:45	0.25	01:30-01:45	1.99
02-12-2020	07:30-07:45	0.63	18:30-18:45	5.00	23:45-24:00	0.22	03:00-03:15	2.00
03-12-2020	15:45-16:00	0.55	19:00-19:15	5.00	14:00-14:15	0.27	00:15-00:30	1.90
04-12-2020	20:00-20:15	0.75	19:00-19:15	6.20	08:45-09:00	0.34	03:45-04:00	2.36
05-12-2020	11:00-11:15	0.74	08:00-08:15	6.00	02:00-02:15	0.29	03:00-03:15	1.55
06-12-2020	16:15-16:30	0.45	16:00-16:15	3.60	06:30-06:45	0.13	23:15-23:30	1.95
07-12-2020	10:30-10:45	0.55	10:45-11:00	5.40	19:00-19:15	0.23	05:00-05:15	2.13
08-12-2020	16:30-16:45	0.51	18:15-18:30	4.50	04:45-05:00	0.19	04:00-04:15	2.00
09-12-2020	10:15-10:30	0.57	18:15-18:30	4.00	05:00-05:15	0.17	04:00-04:15	1.80
10-12-2020	13:15-13:30	0.42	19:00-19:15	3.35	18:00-18:15	0.12	03:45-04:00	1.60
11-12-2020	10:30-10:45	0.53	18:15-18:30	3.60	07:30-07:45	0.20	23:00-23:15	1.54
12-12-2020	01:15-01:30	0.39	18:15-18:30	3.50	17:00-17:15	0.15	05:45-06:00	1.00
13-12-2020	10:30-10:45	0.43	10:30-10:45	3.14	18:00-18:15	0.16	21:45-22:00	1.65
14-12-2020	13:00-13:15	0.38	19:30-19:45	3.40	07:30-07:45	0.10	03:15-03:30	1.00
15-12-2020	19:30-19:45	0.76	08:45-09:00	3.70	07:15-07:30	0.19	01:15-01:30	1.55
16-12-2020	15:45-16:00	0.78	08:45-09:00	4.00	07:45-08:00	0.25	04:30-04:45	1.84
17-12-2020	16:30-16:45	0.59	18:45-19:00	7.00	06:30-06:45	0.18	03:00-03:15	1.70
18-12-2020	20:00-20:15	0.73	09:00-09:15	7.00	06:15-06:30	0.31	02:00-02:15	2.00
19-12-2020	17:15-17:30	0.66	18:15-18:30	6.00	02:30-02:45	0.25	02:00-02:15	1.84
20-12-2020	19:15-19:30	0.83	18:30-18:45	4.50	14:00-14:15	0.30	13:00-13:15	2.15
21-12-2020	18:45-19:00	0.83	08:45-09:00	6.00	06:30-06:45	0.21	04:45-05:00	1.67
22-12-2020	10:30-10:45	0.69	09:45-10:00	6.90	23:30-23:45	0.24	04:30-04:45	1.70
23-12-2020	10:30-10:45	0.58	10:00-10:15	7.00	06:45-07:00	0.10	23:15-23:30	1.65
24-12-2020	09:45-10:00	0.61	18:00-18:15	6.00	07:15-07:30	0.22	03:45-04:00	1.48
25-12-2020	13:00-13:15	0.72	16:45-17:00	5.00	07:00-07:15	0.15	21:45-22:00	1.50
26-12-2020	13:45-14:00	0.74	08:15-08:30	6.05	21:15-21:30	0.22	02:45-03:00	1.96
27-12-2020	08:30-08:45	0.45	19:15-19:30	3.25	18:00-18:15	0.04	17:45-18:00	1.50
28-12-2020	09:45-10:00	0.51	16:45-17:00	3.74	06:30-06:45	0.10	01:30-01:45	1.49
29-12-2020	14:15-14:30	0.76	19:15-19:30	6.00	06:15-06:30	0.17	21:45-22:00	1.50
30-12-2020	19:00-19:15	0.62	09:30-09:45	7.00	06:30-06:45	0.15	23:45-24:00	1.60
31-12-2020	19:45-20:00	0.65	09:15-09:30	7.00	10:30-10:45	0.09	02:15-02:30	1.94

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Annexure-XI**Sellers and Purchasers in Real Time Market (RTM) in the month of December, 2020**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	NLC TPS-II Stg-2	144.42	12.79%	UT of J&K and Ladakh	482.94	42.77%
2.	Jharkhand	111.40	9.87%	Rajasthan	117.21	10.38%
3.	Kakrapar	77.90	6.90%	Telangana	99.14	8.78%
4.	Chamera-I	69.16	6.13%	Andhra Pradesh	77.72	6.88%
5.	RKM Power	60.94	5.40%	Maharashtra	59.28	5.25%
6.	Auraiya_Liquid Fuel	50.90	4.51%	Uttar Pradesh	42.04	3.72%
7.	Anta_RLNG Fuel	43.60	3.86%	Delhi	30.06	2.66%
8.	Dadri TPS	39.58	3.51%	Odisha	22.30	1.98%
9.	Mouda Stg-1	35.68	3.16%	Chhattisgarh	21.82	1.93%
10.	Dadri_RLNG Fuel	35.29	3.13%	Gujarat	18.82	1.67%
11.	LancoKondapalli	30.52	2.70%	West Bengal	17.29	1.53%
12.	Tripura	26.95	2.39%	Bihar	15.82	1.40%
13.	Chamera-III	24.90	2.20%	Himachal Pradesh	14.10	1.25%
14.	Simhapuri Energy	23.03	2.04%	Haryana	13.32	1.18%
15.	Dulhasti	22.72	2.01%	Tamil Nadu	13.28	1.18%
16.	KSK Mahanadi	21.54	1.91%	Punjab	13.14	1.16%
17.	RAPP-B	20.95	1.86%	DVC	10.62	0.94%
18.	Adani Green Energy	19.57	1.73%	Meghalaya	8.36	0.74%
19.	NAPP	19.14	1.70%	Karnataka	7.14	0.63%
20.	Kahalgaoon-II	16.27	1.44%	ArcelorMittal Nippon	6.46	0.57%
21.	Korba Stg 3	15.99	1.42%	Jindal Power Ltd. Stg-II	6.28	0.56%
22.	Kameng HEP	14.30	1.27%	Manipur	6.25	0.55%
23.	SKS Power	14.24	1.26%	Assam	5.67	0.50%
24.	Talcher Stg-2	10.54	0.93%	Jharkhand	5.56	0.49%
25.	UT of J&K and	10.51	0.93%	Kerala	4.51	0.40%
26.	Jhajjar	9.83	0.87%	Jindal Power	3.27	0.29%
27.	Dadri_Liquid Fuel	9.10	0.81%	Dadra & Nagar Haveli	1.97	0.17%
28.	Vallur	8.42	0.75%	Uttarakhand	1.47	0.13%
29.	Kawas_NAPM	7.81	0.69%	Goa WR	1.24	0.11%
30.	BRBCL	7.38	0.65%	Madhya Pradesh	0.92	0.08%
31.	GMR Kamalanga	7.03	0.62%	Nagaland	0.50	0.04%
32.	Mouda Stg-2	6.98	0.62%	Daman & Diu	0.29	0.03%
33.	Raipur Energen	6.64	0.59%	Chandigarh	0.18	0.02%
34.	Dadri Stg-2	6.52	0.58%	Meenakshi Energy	0.04	0.00%
35.	Rampur HEP	6.20	0.55%	Sikkim	0.02	0.00%
36.	Auraiya	6.02	0.53%	Arunachal Pradesh	0.02	0.00%
37.	Odisha	5.86	0.52%	Raigarh Energy Ltd.	0.01	0.00%
38.	Parbati-3	5.46	0.48%			
39.	Kawas_Liquid Fuel	5.45	0.48%			

40.	Singrauli	4.78	0.42%			
41.	Manipur	4.73	0.42%			
42.	Karcham Wangtoo	4.70	0.42%			
43.	Neyveli New Thermal	4.50	0.40%			
44.	Jorethang	4.36	0.39%			
45.	NTPC Sholapur	4.35	0.39%			
46.	HVDC Mundra APL	3.92	0.35%			
47.	Rihand-III	3.87	0.34%			
48.	OPGC Unit-4	3.67	0.33%			
49.	TRN Energy	3.64	0.32%			
50.	Sasan UMPP	2.78	0.25%			
51.	Unchahar-IV	2.69	0.24%			
52.	NTPC Lara	2.63	0.23%			
53.	AD Hydro	2.43	0.22%			
54.	DVC	2.33	0.21%			
55.	Bongaigaon	2.10	0.19%			
56.	NLC	1.82	0.16%			
57.	Adani Power STG2	1.00	0.09%			
58.	Raigarh Energy Ltd.	0.97	0.09%			
59.	Dadri GPP	0.96	0.08%			
60.	Palatana	0.84	0.07%			
61.	Malana HEP	0.78	0.07%			
62.	Simhadri Stg-1	0.74	0.07%			
63.	Anta	0.72	0.06%			
64.	Maruti Clean Coal	0.68	0.06%			
65.	Unchahar-I	0.60	0.05%			
66.	Auraiya_RLNG Fuel	0.59	0.05%			
67.	NTPL	0.57	0.05%			
68.	Unchahar-III	0.50	0.04%			
69.	Tanakpur	0.49	0.04%			
70.	AGBPP	0.38	0.03%			
71.	Lanco	0.34	0.03%			
72.	Uttar Pradesh	0.26	0.02%			
73.	AGTPP	0.22	0.02%			
74.	Pondicherry	0.17	0.02%			
75.	RGPPPL_Others	0.12	0.01%			
76.	Khandong	0.04	0.00%			
77.	Arunachal Pradesh	0.03	0.00%			
78.	Sainj HEP	0.02	0.00%			
79.	Gandhar	0.02	0.00%			
80.	Uri 1	0.01	0.00%			
	Total Volume of top 10	668.87	59.24%	Total Volume of top 10	971.34	86.03%
	Total Volume in PXs	1129.09		Total Volume in PXs	1129.09	

Appendix-I**Analysis for change in trend of Final Scheduled Volume in DAM on 3rd Sunday and Monday of December, 2020 (i.e. 20th and 21st December, 2020)**

During the month of December, 2020, it is observed that on third Sunday (i.e. 20th December, 2020), FSV showed increasing trend in comparison to third Saturday (i.e. 19th December, 2020). Whereas, on third Monday (i.e. 21st December, 2020) FSV showed decreasing trend in comparison to third Sunday (i.e. 20th December, 2020). On analysis of this variation in trends of FSV on above days during December, 2020, it has been observed as under:

- (i) On Sunday (20th December, 2020), although there was increase in purchase on power exchange by some of the States in comparison to Saturday (19th December, 2020) by **25.75 MU** [i.e. Gujarat (13.63 MU), Punjab (2.80 MU), Telangana (2.67 MU), Uttarakhand (2.18 MU), etc.], there was also decrease in purchase on power exchange by some of the States by **17.20 MU** [i.e. Maharashtra (6.54 MU), Tamil Nadu (4.51 MU), Haryana (2.92 MU, etc.)] This resulted in an overall increase in FSV by **8.55 MU** on Sunday (20th December, 2020).
- (ii) On Monday (21st December, 2020), although there was increase in purchase on power exchange by some of the States in comparison to Sunday (20th December, 2020) by **17.43 MU** [i.e. Telangana (5.53 MU), Uttar Pradesh (3.81 MU), Delhi (2.32 MU), Haryana (2.27 MU), etc.], there was also decrease in purchase on power exchange by some of the States by **34.19 MU** [i.e. Gujarat (15.42 MU), Punjab (10.40 MU), Maharashtra (2.56 MU), Tamil Nadu (1.81 MU), Rajasthan (1.22), etc.] This resulted in an overall decrease in FSV by **16.76 MU** on Monday (21st December, 2020)

Definitions/ Terminologies used in the Report

1. **Area Clearing Price (ACP)** is price discovered in each time block of concerned bid area. The country has been divided into 13 bid areas for the purpose of calculating prices in Power Exchanges.
13 Bid area are as under:
N1:Jammu and Kashmir, Himachal Pradesh, Chandigarh, Haryana; **N2:** Uttar Pradesh, Uttaranchal, Rajasthan, Delhi; **N3:** Punjab; **E1:** West Bengal, Sikkim, Bihar, Jharkhand; **E2:** Odisha; **W1:** Madhya Pradesh; **W2:** Maharashtra, Gujarat, Daman and Diu, Dadar and Nagar Haveli, North Goa; **W3:** Chhattisgarh; **S1:** Andhra Pradesh, Telangana, Karnataka, Pondicherry (Yanam), South Goa; **S2:** Tamil Nadu, Pondicherry (Puducherry), Pondicherry (Karaikal), Pondicherry (Mahe); **S3:** Kerala; **A1:** Tripura, Manipur, Mizoram, Nagaland; **A2:** Assam, Arunachal Pradesh, Meghalaya.
2. **Average MCP** is the average of daily MCP of the days during the month on which transaction happened.
3. **Bilateral Transaction** means a transaction for exchange of electrical energy (MWh) between a specified buyer and a specified seller, from a specified point of injection to a specified point of drawal for a fixed or varying quantum of power (MW) for any time block during a month.
4. **Daily MCP** is the average of MCP of all 96 Time Blocks of the day during which transaction happened.
5. **Day-Ahead Market (DAM)** on the power exchanges are market for electricity where market participants purchase and sell electricity at financially binding day-ahead prices for the following day.
6. **Elasticity** is percentage of change in MCP with respect to change in independent variable viz. peak demand, average purchase bid, average sell bid, generation from coal based plants, generation from hydro based plants, generation from wind based plants and generation from solar plants.
7. **Energy Supplied** is the total energy (MU) available at the States' periphery.
8. **Final Scheduled Volume** is the total of scheduled volume of all 96 time blocks in a day during the month in which transaction happened.
9. **Green Term Ahead Market (GTAM)** is based on the principles of current Term Ahead Market (TAM) and will offer trade through Intra-Day Contracts, Day ahead contingency Contracts, Daily Contracts and Weekly Contracts for both solar and non-Solar Renewable Energy (RE) generation. GTAM is a market-based mechanism, where RE surplus and RE deficit States can trade RE Power and balance their RPO targets.
10. **MCP** is the price discovered in each of the 15 Minute Time Block. The day is divided in 96-time blocks of 15 minutes each.

- 11. Real Time Market (RTM)** on the power exchanges is the market for electricity where market participants buy/ sell electricity on a half-hourly market and would commence with the end of the right to revision of schedule or declared capability and would end with gate closure. The auction sessions would be conducted every half an hour for the delivery of power for the duration of 30 minutes in two time blocks of 15 minutes each to commence from one hour after the closure of the RTM trading session.
- 12. Term Ahead Market (TAM)** on the power exchanges is the market for electricity where market participants buy/sell electricity on a term basis ranging from 3 hours before actual despatch (i.e. intra-day) and up to 11 days in advance. There are 4 types of contracts in TAM, namely; Intra-day, Day Ahead Contingency, Daily and Weekly.