



जनवरी, 2020 मासिक मार्केट मॉनिटरिंग रिपोर्ट

Monthly Market Monitoring Report

January, 2020



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

आर. ए. प्रभाग/ Regulatory Affairs Division

मार्केट मॉनिटरिंग सेल /Market Monitoring Cell

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TABLE OF CONTENTS

S.N.	Title	Page
1.	Day Ahead Market (DAM)	1
2.	Summary of the market in the power exchanges	1
3.	Term Ahead Market	2
4.	Analysis of movement of prices observed in DAM during January, 2020	3
TABLES		
1.	Table: 1 MCP of IEX and PXIL	1
2.	Table: 2 ACP of IEX	2
3.	Table: 3 Scheduled Volume of IEX and PXIL for January, 2020 vs January, 2019	2
FIGURES		
1.	Figure: 1 Comparison of Total Purchase, Sell bids along with FSV and Daly MCP	4
2.	Figure: 2 Comparison of Maximum, Minimum, Daily, Non Peak Time, Peak Time MCP (Rs/kWh)	4
ANNEXURES		
1.	Annexure-I: Final Scheduled Volume and the Average MCP in Day Ahead Market (DAM) for the months of April, 2019 to January, 2020 of IEX and PXIL	6
2.	Annexure-II: Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2019 to January, 2020 of IEX and PXIL	7
3.	Annexure-III: All MCP viz: Peak Time MCP, Non-Peak MCP, Maximum MCP, Minimum MCP, Average MCP and Final Schedule Volume (MU)	8
4.	Annexure-IV: Comparison of MCP w.r.t. Purchase Bid for 2976 Time Blocks during the month of January, 2020	9
5.	Annexure-V: Max. FSV, Min FSV, Max MCP and Min MCP w.r.t all Time blocks	10
6.	Annexure-VI: Top Ten Entity (Sellers and Purchaser) during the month of January, 2020	11
APPENDIX		
1.	Appendix-I: Definitions/ Terminologies used in the Report	12

REPORT FOR MONTH: JANUARY, 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 in the month of January 2020 was **4,791.88 MU**. The total energy supplied in the country during the month of January, 2020 was **104,759 MU (Provisional)**. The volume of electricity transacted on the power exchanges in DAM represents 4.57% of the total energy supplied in the country. The total volume of electricity transacted in January, 2019 was **3,280.86 MU** which was 3.24% of the total energy supplied in the country in January, 2019 [**101,161 MU**].
- 1.2. The volume of electricity transacted on IEX and PXIL during January, 2020 are 4,790.96 MU and 0.92 MU, respectively, which means that the total volume transacted on IEX is 99.98 % of the total volume on the power exchanges. The total volume of electricity transacted during January, 2019 on IEX was 3,280.86 MU whereas no transaction happened on PXIL in January, 2019.
- 1.3. The Average Market Clearing Price (MCP) on IEX during the month January, 2020 was Rs 2.86/ kWh, which shows a decline of 14.11% when compared with average MCP for the month of January, 2019, which was Rs 3.33/ kWh. Similarly, on PXIL, the Average MCP during January, 2020 was Rs 2.85/kWh, whereas no transaction happened on PXIL during January, 2019.

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

- 2.1. A comparison of the Minimum, Maximum and Average of daily MCP during the months of January, 2020 and January, 2019 are as given below:

MCP (Rs/kWh)	IEX			PXIL		
	January, 2020	January, 2019	% Change	January, 2020	January, 2019 [©]	% Change
Minimum	2.55	2.63	-3.04	2.64	N.A.	-
Maximum	3.08	4.16	-25.96	3.35	N.A.	-
Average	2.86	3.33	-14.11	2.85	N.A.	-

©: No Transaction happened on PXIL during the month January, 2019

Table: 1

- 2.2. The maximum Area Clearing Price (ACP) in IEX was observed in all 13 regions at **Rs 5.00 /kWh** during the time block 8:15-08:30 on 25th January, 2020. As there was **no** congestion in transmission system, the MCP for this time-block was also **Rs 5.00/ kWh**. However, the Daily MCP on pan India basis on 25th January, 2020 was **Rs 3.02/ kWh**.
- 2.3. The minimum ACP in IEX was observed in southern region at **Rs 0.99 /kWh** during the time block 04:00-04:15 on **11th January, 2020**, whereas the MCP for this time-block was **Rs 1.79kWh**, as there was transmission congestion in southern region. However, the Daily MCP on pan India basis on 11th January, 2020 was **Rs 2.78/ kWh**.
- 2.4. A comparison of the Minimum and Maximum ACP during the months of January, 2020 and January, 2019 in IEX are as given below:

ACP (Rs/kWh)	IEX		
	January, 2020	January, 2019	% Change
Maximum	5.00	7.81	-35.98
Minimum	0.99	1.50	-34.00

Table: 2

- 2.5. A comparison of the Minimum, Maximum and Average Scheduled Volume of electricity transactions happened on IEX and PXIL for a day during the months of January, 2020 and January, 2019 are as given below:

Scheduled Volume (MU)	IEX			PXIL		
	January, 2020	January, 2019	% Change	January, 2020	January, 2019 ^ψ	% Change
Minimum	121.03	80.44	50.46	0.025	-	-
Maximum	182.11	119.73	52.10	0.087	-	-
Average	154.55	105.83	46.04	0.044	-	-

ψ: No Transaction happened on PXIL during the month January, 2019

Table: 3

- 2.6. The total volume of electricity transacted on both the power exchanges during the period, April, 2019 to January, 2020, was 40,898.35 MU. The same was 43,989.05 MU during the period from April, 2018 to January 2019, which shows a decline of 7.03%. A comparison of Final Scheduled Volume and the Average MCP for the period of April, 2019 to January, 2020 of IEX and PXIL are given at **Annexure-I**.

3. TERM AHEAD MARKET (TAM)

- 3.1. The total volume of electricity transacted on both the power exchanges in term ahead market in January, 2020 was **299 MU** (i.e. 270.35 MU on IEX and 28.65 MU on PXIL),

which means that the total volume transacted on IEX was 90.42% and PXIL was 9.58% of total volume in term ahead market in both the power exchanges. The total volume of electricity transacted during January, 2019 in term ahead market on both the power exchanges was **184.62 MU** (i.e. 105.41 MU on IEX and 79.21 MU on PXIL), which means that the total volume on IEX was 57.10% and PXIL was 42.90% of the total volume on the power exchanges. This shows an increase of 61.95% in TAM during January, 2020 as compared to January, 2019.

- 3.2. With respect to the total energy supplied during the month of January, 2020 in the country the volume of electricity traded on the power exchanges in TAM represents **0.28%** of the total energy supplied. The same was **0.18%** in January, 2019.
- 3.3. The Total Volume of electricity transacted on both the power exchanges during the period, April, 2019 to January, 2020 in TAM, was 6,721.16 MU. The same was 2,466 MU during the same period April, 2018 to January, 2019, which shows an increase of 172.55%. A comparison of Final Scheduled Volume for the months of April, 2019 to January, 2020 of IEX and PXIL are given at **Annexure-II**.

4. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN DAM DURING JANUARY, 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 January, 2020 month. The observations made are as under:

- 4.1 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.
- 4.2 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 only the total purchase bid and total sell bid. All the other variables were found to be insignificant. The regression analysis further revealed that the maximum elasticity of the Daily MCP was with respect to total purchase bid and elasticity figure was around 0.20. 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 January, 2020.

4.3 The same relationship is visible from the analysis carried out from the plot in **Figure 1**.

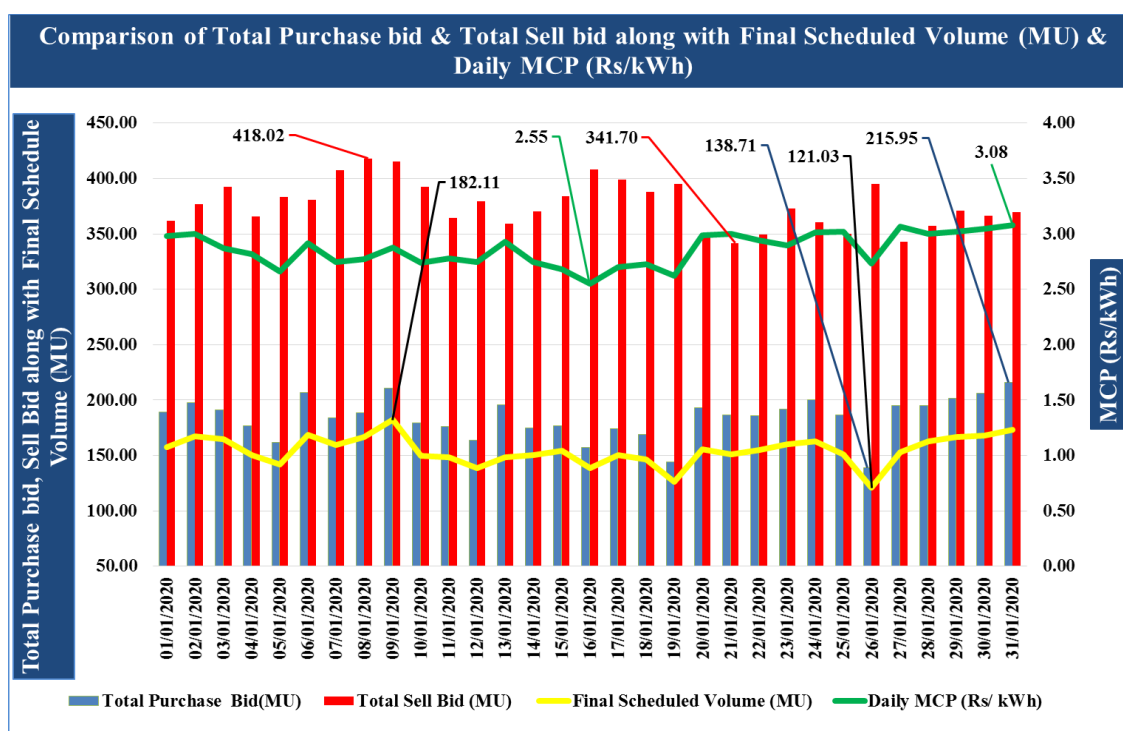


Figure -1

4.4 The Final Scheduled Volume (MU) and the Daily MCP (Rs/ kWh) invariably showed decreasing trend on Sundays as the demand of electricity in the country is less compared to other days of week [**Figure 1**].

4.5 A comparison of maximum, minimum, daily, non-peak time, peak time MCP is shown in **Figure -2**. The same are also tabulated in **Annexure III**.

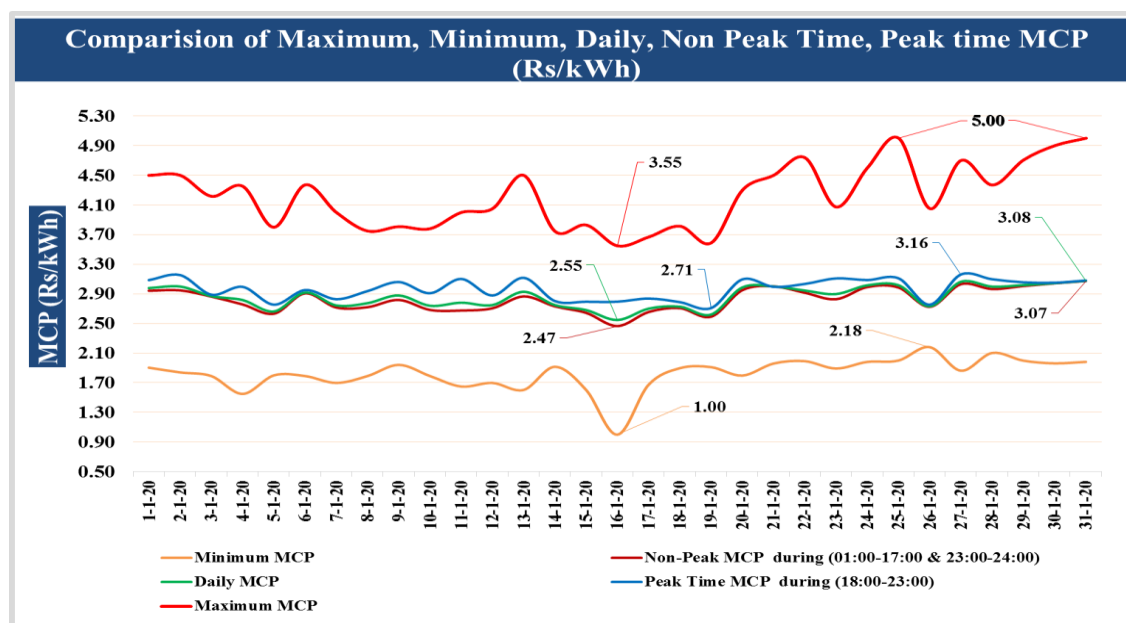


Figure -2

4.6 The Purchase Bids and the MCP discovered in each of the 15-minute time block during the month almost followed the same trend [**Annexure IV**]. This is also corroborated with the outcome of regression analysis mentioned in at para 4.1 and 4.2 above.

- 4.7 On **30 days** during the month, the maximum FSV occurred during the **time period 07:15 to 09:30 [Annexure V]**.
- 4.8 On **25 days** during the month, the minimum FSV occurred during the **time period 22:00 – 23:30 [Annexure V]**.
- 4.9 On **19 days** during the month, the maximum Daily MCP occurred during the **time period 07:45 – 09:00 [Annexure V]**.
- 4.10 On **14 days** during the month, the minimum Daily MCP occurred during the **time block 04:00-04:15 [Annexure V]**.
- 4.11 The maximum demand met during the month of January, 2020 in the country occurred on **28th January 2020 at 171.06 GW**, which is 5.31% more as compared to maximum demand during the month of January, 2019 i.e. **[162.43 GW on 18th January, 2019]**.
- 4.12 One nation One Price was observed for **24 days** during the month, as there was transmission congestion for 7 days (i.e. 2nd, 3rd, 6th, 10th, 11th, 12th and 31st January, 2020) during the month. Whereas in the month of January, 2019, transmission congestion happened on 13 days, so one nation one price was observed for **18 days** in January, 2019.
- 4.13 In January, 2020 due to real time curtailment **1.04 MU** could not be transacted on the IEX on 5th, 6th, 11th and 13th January, 2020. The curtailment happened on 5th January, 2020 during 71st to 75th and 79th to 93rd time-blocks, 6th January, 2020 during 1st to 8th, 20th to 25th and 31st to 48th time-blocks, 11th January, 2020 during 83rd to 85th time-blocks, and on 13th January, 2020 during 69th to 72nd and 83rd to 94th time-blocks. Further, there was no real time curtailment on PXIL in January, 2020. Also, there were no real time curtailment in January, 2019 on both the power exchanges.
- 4.14 The cumulative real time curtailment during the period April, 2019 to January, 2020 was **13.72 MU** in DAM. During months of April, 2018 to January, 2019 the real time curtailment was **72.84 MU** in DAM. The month wise real time curtailment is given at **Annexure-I**
- 4.15 **The top 10 sellers** on the power exchanges during the month are: **Sembcorp Gayatri, Madhya Pradesh, GMR Chhattisgarh, Adani Power STG2, Odisha, MB Power, Rajasthan, Jaypee Nigrie, Uttar Pradesh and DB Power** which constituted **59.00%** of the market share. **[Annexure VI]**
- 4.16 **The top 10 purchaser** on the power exchanges during the month are: **Telangana, Gujarat, Maharashtra, Tamil Nadu, J&K, Delhi, Rajasthan, Bihar, Punjab and Haryana**, which constituted **77.79%** of the market share. **[Annexure VI]**

Final Scheduled Volume, Average MCP and Real-Time Curtailment in Day Ahead Market (DAM) for the months of April, 2019 to January, 2020 of IEX and PXIL

Months	Final Scheduled Volume (MU)		Market Clearing Price (Rs/kWh)		Real Time Curtailment (MU)	
	IEX	PXIL	IEX	PXIL	IEX	PXIL
April, 2019	4,005.41	31.43	3.22	3.75	3.090	-
May, 2019	3,772.47	1.17	3.34	3.45	0.217	-
June, 2019	4,206.68	0.42	3.32	3.48	4.910	-
July, 2019	4,800.37	0.35	3.38	3.21	0.039	-
August, 2019	4,674.88	0.35	3.32	3.10	4.420	-
September, 2019	3,487.57	1.03	2.77	2.85	-	-
October, 2019	3,391.49	9.81	2.71	2.62	-	-
November, 2019	3,388.84	0.42	2.85	3.01	-	-
December, 2019	4,333.32	0.46	2.93	2.93	-	-
January, 2020	4790.96	0.92	2.86	2.85	1.038	-
Total	40,851.99	46.36			13.714	-

- There was no real time curtailment.

[Source: IEX and PXIL]

Annexure-II**Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2019 to January, 2020 of IEX and PXIL**

Months	Final Scheduled Volume (MU)		
	IEX	PXIL	Total
April, 2019	334.13	293.47	627.60
May, 2019	326.72	122.10	448.82
June, 2019	368.84	139.22	508.06
July, 2019	523.59	224.35	747.94
August, 2019	808.07	555.51	1,363.58
September, 2019	354.33	390.45	744.78
October, 2019	430.16	447.21	877.37
November, 2019	458.83	131.16	589.99
December, 2019	371.14	142.88	514.02
January, 2020	270.35	28.65	299.00
Total	4246.16	2475	6,721.16

[Source: IEX and PXIL]

Annexure-III

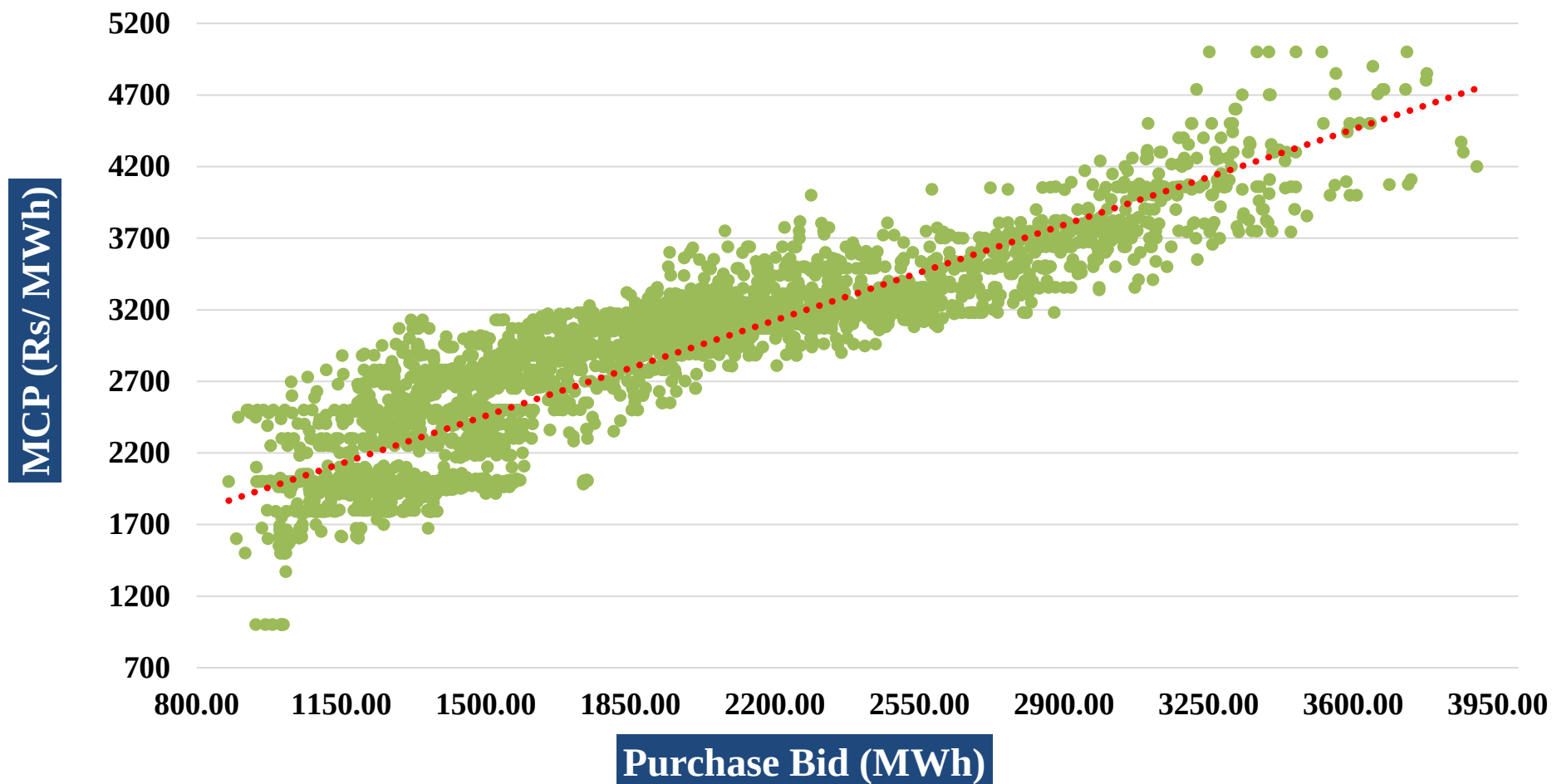
Date	MCP during (01:00-06:00, 23:00-24:00)	MCP during (07:00-10:00)	MCP during (11:00-17:00)	Peak Time MCP during (18:00-23:00)	Non-Peak MCP during (01:00-17:00 & 23:00-24:00)	Maximum MCP	Minimum MCP	Average MCP	Final Scheduled Volume (MU)
01/01/2020	2.02	3.55	3.52	3.09	2.94	4.50	1.90	2.98	157.64
02/01/2020	1.96	3.57	3.58	3.15	2.95	4.50	1.84	3.00	167.18
03/01/2020	1.97	3.45	3.42	2.89	2.86	4.22	1.79	2.87	164.49
04/01/2020	1.83	3.46	3.29	3.00	2.76	4.35	1.55	2.82	150.22
05/01/2020	1.99	3.12	3.00	2.75	2.63	3.80	1.80	2.66	142.04
06/01/2020	1.97	3.62	3.44	2.95	2.91	4.37	1.79	2.92	168.44
07/01/2020	1.89	3.44	3.13	2.83	2.72	4.00	1.70	2.74	159.43
08/01/2020	1.92	3.40	3.13	2.94	2.72	3.75	1.79	2.77	167.03
09/01/2020	2.05	3.44	3.23	3.06	2.82	3.81	1.94	2.88	182.11
10/01/2020	1.95	3.28	3.08	2.91	2.68	3.78	1.79	2.74	149.81
11/01/2020	1.88	3.45	3.03	3.10	2.68	4.00	1.65	2.78	148.76
12/01/2020	1.93	3.45	3.06	2.88	2.71	4.05	1.70	2.75	138.77
13/01/2020	1.91	3.73	3.33	3.12	2.87	4.50	1.60	2.93	148.70
14/01/2020	2.05	3.43	3.01	2.80	2.73	3.74	1.92	2.75	150.33
15/01/2020	1.82	3.26	3.11	2.79	2.64	3.83	1.60	2.68	154.11
16/01/2020	1.50	3.12	3.06	2.79	2.47	3.55	1.00	2.55	138.54
17/01/2020	1.91	3.34	3.01	2.84	2.66	3.67	1.67	2.70	150.08
18/01/2020	2.03	3.38	3.00	2.79	2.71	3.81	1.90	2.73	146.43
19/01/2020	2.03	3.15	2.84	2.71	2.59	3.59	1.91	2.62	126.06
20/01/2020	2.03	3.80	3.39	3.10	2.95	4.30	1.80	2.99	155.57
21/01/2020	2.21	3.80	3.33	3.00	3.00	4.50	1.96	3.00	151.26
22/01/2020	2.22	3.81	3.10	3.03	2.92	4.74	1.99	2.95	154.92
23/01/2020	2.12	3.60	3.09	3.11	2.83	4.07	1.89	2.90	160.06
24/01/2020	2.28	3.92	3.17	3.09	2.99	4.60	1.98	3.02	162.73
25/01/2020	2.34	4.12	2.98	3.11	2.99	5.00	2.00	3.02	151.24
26/01/2020	2.43	3.46	2.60	2.76	2.73	4.05	2.18	2.73	121.03
27/01/2020	2.20	3.91	3.36	3.16	3.03	4.70	1.86	3.06	153.26
28/01/2020	2.35	3.79	3.11	3.10	2.97	4.37	2.10	3.00	162.92
29/01/2020	2.25	3.86	3.28	3.06	3.01	4.71	2.00	3.02	166.54
30/01/2020	2.24	4.03	3.28	3.05	3.04	4.90	1.96	3.04	168.30
31/01/2020	2.33	4.05	3.26	3.08	3.07	5.00	1.98	3.08	172.98
Maximum	2.43	4.12	3.58	3.16	3.07	5.00	2.18	3.08	182.11
Minimum	1.50	3.12	2.60	2.71	2.47	3.55	1.00	2.55	121.03
Average	2.05	3.57	3.17	2.97	2.82	4.22	1.82	2.86	154.55

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

[Source: IEX]

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



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

Annexure-V

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
01/01/2020	19:30 - 19:45	2.40	09:45 - 10:00	4.50	05:30 - 05:45	1.02	03:15 - 03:30	1.90
02/01/2020	08:45 - 09:00	2.55	10:45 - 11:00	4.50	22:15 - 22:30	1.00	02:45 - 03:00	1.84
03/01/2020	08:30 - 08:45	2.56	10:15 - 10:30	4.22	22:15 - 22:30	0.89	02:45 - 03:00	1.79
04/01/2020	08:30 - 08:45	2.64	09:15 - 09:30	4.35	23:00 - 23:15	0.92	03:15 - 03:30	1.55
05/01/2020	09:15 - 09:30	2.60	09:15 - 09:30	3.80	22:15 - 22:30	0.91	03:30 - 03:45	1.80
06/01/2020	08:45 - 09:00	3.00	09:30 - 09:45	4.37	22:00 - 22:15	1.01	03:15 - 03:30	1.79
07/01/2020	08:30 - 08:45	2.58	09:30 - 09:45	4.00	22:15 - 22:30	1.03	04:00 - 04:15	1.70
08/01/2020	08:45 - 09:00	2.67	08:45 - 09:00	3.75	22:15 - 22:30	1.11	03:15 - 03:30	1.79
09/01/2020	08:45 - 09:00	2.99	08:45 - 09:00	3.81	22:30 - 22:45	1.11	04:00 - 04:15	1.94
10/01/2020	08:30 - 08:45	2.27	07:45 - 08:00	3.78	22:30 - 22:45	1.04	03:15 - 03:30	1.79
11/01/2020	08:45 - 09:00	2.41	18:00 - 18:15	4.00	05:00 - 05:15	0.90	03:15 - 03:30	1.65
12/01/2020	08:30 - 08:45	2.66	08:15 - 08:30	4.05	04:00 - 04:15	0.86	03:15 - 03:30	1.70
13/01/2020	08:45 - 09:00	2.66	08:45 - 09:00	4.50	22:45 - 23:00	0.78	03:15 - 03:30	1.60
14/01/2020	08:30 - 08:45	2.39	08:15 - 08:30	3.74	22:45 - 23:00	0.98	04:00 - 04:15	1.92
15/01/2020	09:00 - 09:15	2.49	09:30 - 09:45	3.83	23:15 - 23:30	0.94	03:15 - 03:30	1.60
16/01/2020	08:30 - 08:45	2.19	09:30 - 09:45	3.55	22:30 - 22:45	0.87	04:45 - 05:00	1.00
17/01/2020	08:30 - 08:45	2.59	09:15 - 09:30	3.67	22:15 - 22:30	0.80	03:30 - 03:45	1.67
18/01/2020	08:15 - 08:30	2.61	08:15 - 08:30	3.81	22:30 - 22:45	0.79	04:00 - 04:15	1.90
19/01/2020	08:45 - 09:00	1.92	08:45 - 09:00	3.59	22:00 - 22:15	0.79	04:00 - 04:15	1.91
20/01/2020	08:15 - 08:30	2.51	09:15 - 09:30	4.30	22:15 - 22:30	0.77	04:00 - 04:15	1.80
21/01/2020	08:15 - 08:30	2.46	08:30 - 08:45	4.50	22:30 - 22:45	0.91	04:00 - 04:15	1.96
22/01/2020	08:00 - 08:15	2.52	08:15 - 08:30	4.74	22:00 - 22:15	0.94	04:00 - 04:15	1.99
23/01/2020	08:00 - 08:15	2.59	08:00 - 08:15	4.07	22:45 - 23:00	1.00	04:45 - 05:00	1.89
24/01/2020	08:00 - 08:15	2.50	07:45 - 08:00	4.60	22:00 - 22:15	0.94	04:00 - 04:15	1.98
25/01/2020	07:45 - 08:00	2.46	08:15 - 08:30	5.00	05:15 - 05:30	0.92	04:00 - 04:15	2.00
26/01/2020	07:15 - 07:30	2.42	07:45 - 08:00	4.05	22:00 - 22:15	0.75	17:30 - 17:45	2.18
27/01/2020	08:00 - 08:15	2.47	07:45 - 08:00	4.70	05:15 - 05:30	0.80	04:00 - 04:15	1.86
28/01/2020	08:00 - 08:15	2.62	08:00 - 08:15	4.37	22:00 - 22:15	1.00	04:00 - 04:15	2.10
29/01/2020	07:45 - 08:00	2.88	08:15 - 08:30	4.71	05:15 - 05:30	1.04	02:15 - 02:30	2.00
30/01/2020	07:30 - 07:45	2.81	08:15 - 08:30	4.90	22:00 - 22:15	1.04	04:00 - 04:15	1.96
31/01/2020	08:00 - 08:15	2.72	08:15 - 08:30	5.00	22:00 - 22:15	1.14	04:00 - 04:15	1.98

[Source: IEX]

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Top Ten Entity (Sellers and Purchaser) during the month of January, 2020

Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent		(MU)	Percent (%)
Sembcorp Gayatri	527.61	11.01%	Telangana	920.63	19.21%
Madhya Pradesh	493.24	10.29%	Gujarat	526.09	10.98%
GMR Chhattisgarh	374.35	7.81%	Maharashtra	435.67	9.09%
Adani Power STG2	328.11	6.85%	Tamil Nadu	382.17	7.97%
Odisha	219.90	4.59%	J&K	349.19	7.29%
MB Power	211.68	4.42%	Delhi	311.39	6.50%
Rajasthan	200.41	4.18%	Rajasthan	303.62	6.34%
Jaypee Nigrie	171.66	3.58%	Bihar	206.97	4.32%
Uttar Pradesh	162.55	3.39%	Punjab	153.00	3.19%
DB Power	138.10	2.88%	Haryana	139.41	2.91%
Total	2827.61	59.00%	Total	3728.15	77.79%
Total Volume in	4792.75		Total Volume in PXs	4792.75	

[Source: POSOCO]

Definitions/ Terminologies used in the Report

Area Clearing Price (ACP) is area clearing price in each time block in each of 13 bid areas. 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.

1. **Daily MCP** is the average of MCP of all 96 Time Blocks of the day during which transaction happened.
2. **Average MCP** is the average of daily MCP of the days during the month on which transaction happened.
3. **Average Scheduled Volume** is the average of scheduled volume of the days during the month on which transaction happened.
4. **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.
5. **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.
6. **Energy Supplied** is the total energy (MU) available at the States' periphery.
7. **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.
8. **Term Ahead Market (TAM)** on the power exchanges are 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, Intraday, Day Ahead Contingency, Daily and Weekly.