



भारत सरकार/ Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority
आर. ए. प्रभाग/ Regulatory Affairs Division

Subject: Monthly Market Monitoring Report for the month of November, 2021-reg.

The monthly market monitoring report for the month of November, 2021 with detailed overview of electricity transaction happened in the power exchanges and other short term markets is annexed below for reference.

The report comprises total volume of electricity transacted, prices discovered, transmission congestion, real-time curtailment, top buyers and sellers, share of discoms, analysis of variation in prices discovered, factors affecting price discovery during the month and many other observations for Day Ahead Market, Real time Market, Green Day Ahead Market, Term Ahead Market and Green Term Ahead Market.

(Pardeep Jindal)
Chief Engineer (RA)

To

All Stake holders



सत्यमेव जयते

नवंबर, 2021 मासिक मार्केट मॉनिटरिंग रिपोर्ट

Monthly Market Monitoring Report

November, 2021



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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MARKET MONITORING REPORT
FOR THE MONTH OF NOVEMBER, 2021

SUMMARY

SUMMARY FOR MONTH: NOVEMBER, 2021

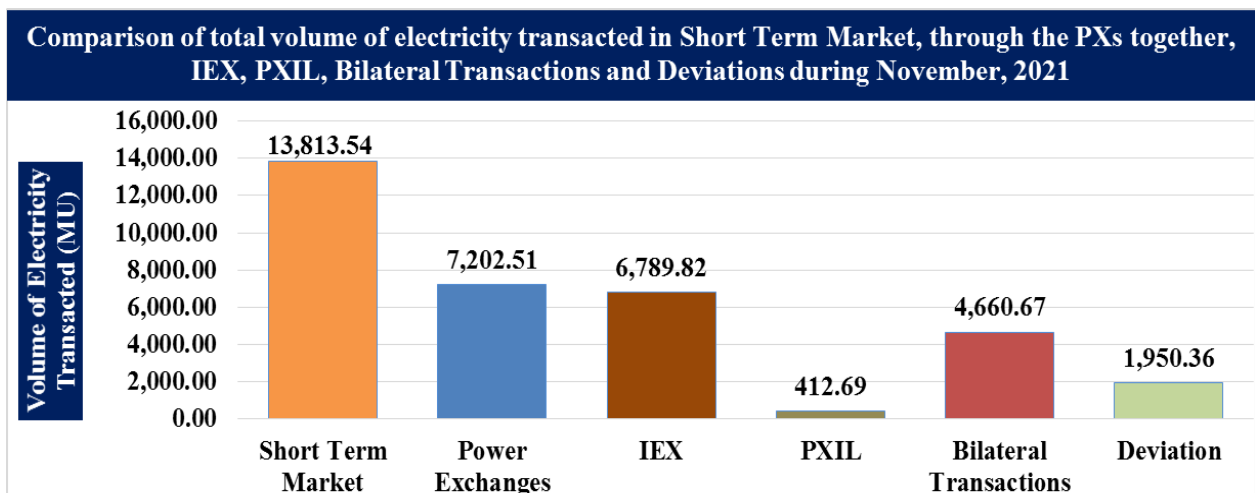
SUMMARY OF ELECTRICITY TRANSACTIONS ON POWER EXCHANGES IN INDIA

- A total volume of **7,202.51 MU** electricity was transacted in both the power exchanges i.e. IEX & PXIL, during the month of November, 2021. This volume of electricity is on delivery date basis and includes transactions through DAM, GDAM, RTM, TAM and GTAM market segments.

Segment	Transactions happened in PXs (IEX and PXIL combined)			
	FSV (MU)	Average MCP (Rs/kWh)	Congestion	Real Time Curtailment
DAM	4,719.50	3.39	-	0.41
GDAM	149.47	4.48	-	-
RTM	1,311.35	3.48	-	-
TAM	579.13	4.33	0.91	5.22
GTAM	443.06	3.90	-	0.70
Total in PXs	7,202.51	3.54*	0.91	6.33

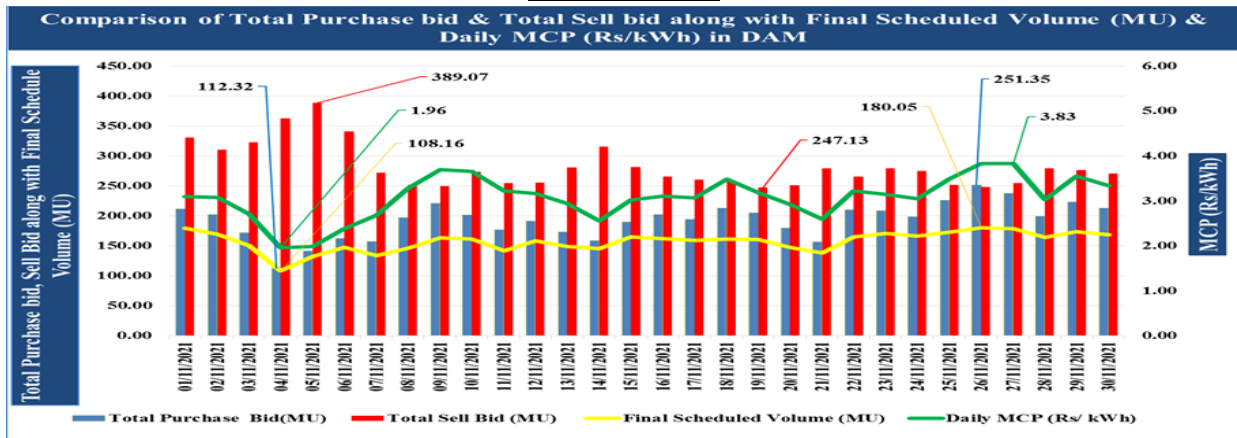
* The total average is weighted average of all market segments.

- Under the Bilateral trade a total of **4,660.67 MU** of electricity was transacted and **1,950.36 MU** was transferred as deviation. Thus a total of **13,813.54 MU** of electricity was transacted as short term trade. In the month of November, 2021 a total of **99,324 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in November was **13.91 %**.

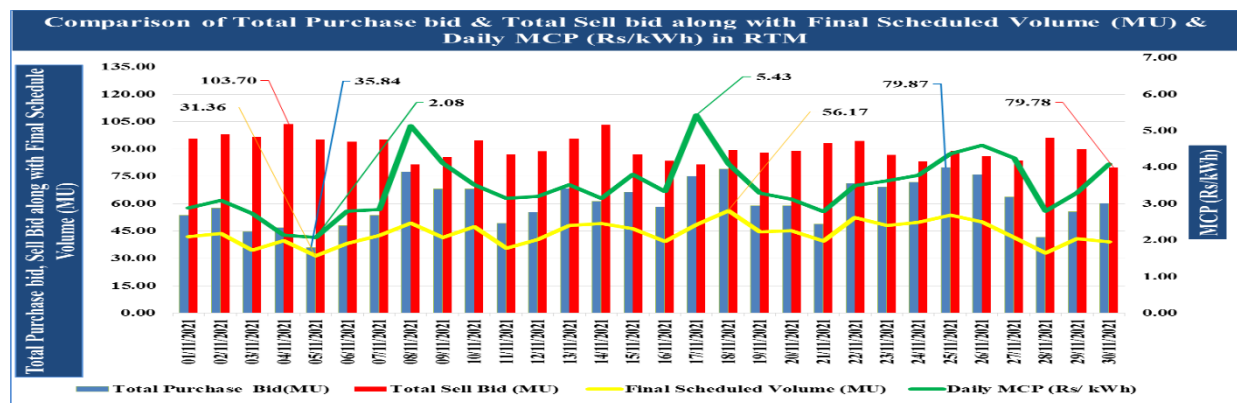


- The total volume of congestion that happened during the month of November, 2021 was **0.91 MU** which is only 0.007 % of the total volume of electricity transacted in the power exchanges and 0.00092 % of total energy supplied during the month of November, 2021. There was no congestion observed in DAM, GDAM, RTM and GTAM in November, 2021, whereas there was congestion in TAM under Day Ahead Contingency contract on 24th November, 2021. The total volume of real time curtailment reported in the month of November, 2021 was only **6.33 MU**.
- The variation of Purchase and Sell bids, Final Scheduled Volume and Daily MCP in DAM and RTM during the month of November, 2021 are shown in following figures:

DAM Volume

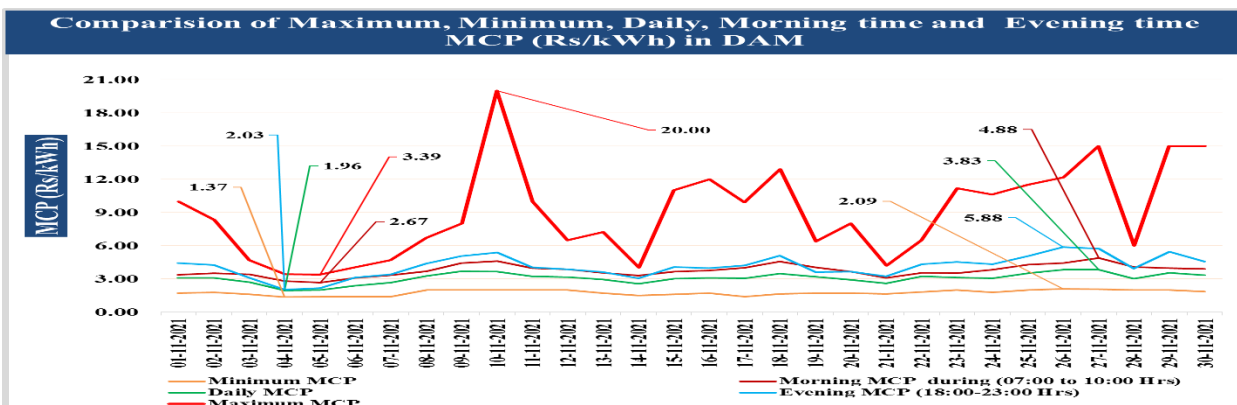


RTM Volume

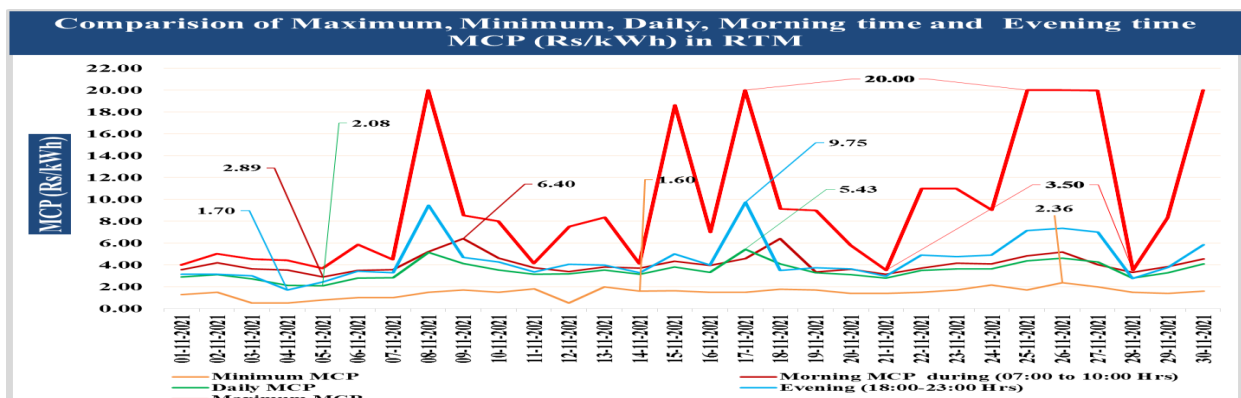


- The variation of Maximum, Minimum, Daily, Morning and Evening time MCPs in DAM and RTM during the month of November, 2021 are shown in following figures:

DAM Prices



RTM Prices



OVERVIEW OF REPORT

REPORT FOR MONTH: NOVEMBER, 2021

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 November, 2021 was **4,719.50 MU**. The total energy supplied in the country during the month of November, 2021 was 99,324 MU. Thus, the volume of electricity transacted on both the power exchanges in DAM during November, 2021 was 4.75 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month .i.e. October, 2021, it was **6,568.68 MU** which was 5.82% of the total energy supplied [1,12,797 MU] in the country during October, 2021. Similarly, the total volume of electricity transacted in DAM during previous year .i.e. November, 2020, it was **4,909.08 MU** which was 5.08 % of the total energy supplied [96,883 MU] in the country during November, 2020.
- 1.2. The volume of electricity transacted on IEX and PXIL during November, 2021 were **4,718.76 MU and 0.74 MU**, respectively, which means that the total volume transacted on IEX was **99.98 %** of the total volume on power exchanges. The volume of electricity transacted on IEX and PXIL during October, 2021 were **6,568.31 MU and 0.37 MU**, respectively, which means that the total volume transacted on IEX was **99.99 %** of the total volume on power exchanges. Also, the volume of electricity transacted on IEX and PXIL during November, 2020, were **4,860.46 MU and 48.62 MU** respectively.
- 1.3. There was Cross Border Transactions of Electricity of **26.21 MU** in DAM in IEX during November, 2021. Whereas, no Cross Border Transactions of Electricity happened in October, 2021.
- 1.4. The Average Market Clearing Price (MCP) on IEX during the month of November, 2021 was **Rs 3.08/kWh**, which shows a decrease of **61.55 %** and an increase **12.82 %** when compared with average MCP's for the month of October, 2021 and November, 2020, which were **Rs 8.01/kWh and Rs 2.73/kWh**, respectively. On PXIL, the average MCP during the month of November, 2021 was **Rs 3.71/kWh**, which shows a decrease of **48.26 %** and an increase of **27.06 %** when compared with average MCP's for the month of October, 2021 and November, 2020, which were **Rs 7.17/kWh and Rs 2.92/kWh** respectively.

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

- 2.1. A comparison of the Minimum, Maximum and Average of Daily MCP during the month of November, 2021 with that of October, 2021 and November, 2020 is given in Table- 1A & 1B:

(a) November, 2021 vis- a -vis October, 2021

Daily MCP (Rs/kWh)	IEX			PXIL		
	November, 2021	October, 2021	% Change	November, 2021	October, 2021	% Change
Minimum	1.96	2.37	-17.30	2.99	4.59	-34.86
Maximum	3.83	16.42	-76.67	4.99	9.99	-50.05
Average	3.08	8.01	-61.55	3.71	7.17	-48.26

Table: 1A

(b) November, 2021 vis- a –vis November, 2020

Daily MCP (Rs/kWh)	IEX			PXIL		
	November, 2021	November, 2020	% Change	November, 2021	November, 2020	% Change
Minimum	1.96	2.13	-7.98	2.99	2.43	23.05
Maximum	3.83	3.23	18.58	4.99	3.54	40.96
Average	3.08	2.73	12.82	3.71	2.92	27.05

Table: 1B

2.2. The maximum Area Clearing Price (ACP) of **Rs 20.00/kWh** in IEX was observed in all 13 regions during the time block 18:30-18:45 on 10th November, 2021. As there was no congestion in transmission system, the MCP for this time-block dates was also **Rs 20.00/kWh**. However, the Daily MCP in PXIL on 10th November, 2021 was **Rs 3.66/kWh**. Whereas, in PXIL, the maximum ACP of **Rs 5.99/kWh** was observed in all 13 regions during the time block **17.45-18:00 Hrs** on 19th, 20th & 22nd November, 2021. As there was no congestion in transmission system, the MCP for above time block was also **Rs 19.50/kWh** on 19th, 20th & 22nd November, 2021. However, the Daily MCP in PXIL on 19th, 20th & 22nd November, 2021 were **Rs 4.11/kWh, Rs 4.07/kWh & Rs 3.94/kWh**.

2.3. The minimum ACP of **Rs 1.37/kWh** in IEX was observed in all 13 regions during the time block **23:45-24:00 Hrs** on 4th November, 2021. As there was no congestion in transmission system, the MCP for this time-block was also **Rs 1.37/kWh** on 4th November, 2021. However, the Daily MCP in IEX on pan India basis on 4th November, 2021 was **Rs 1.96/kWh**. Whereas, in PXIL, the minimum ACP of **Rs 2.99/kWh** was observed in all 13 regions during the time period **00:00-00:15 to 06:45-07:00 Hrs & 08:30-08:45 to 08:45-09:00 Hrs** on 26th November, 2021 and **20:00-20:15 to 20:15-20:30 Hrs** on 30th November, 2021. As no congestion was there in transmission system, the MCP for the above time periods were also **Rs 2.99/kWh**. Moreover, the Daily MCP in PXIL on 26th & 30th November, 2021 were **Rs 3.06/kWh & Rs 2.99/kWh** respectively.

2.4. A comparison of the Minimum and Maximum Area Clearing Price (ACP) during the months of November, 2021 with that of October, 2021 and November, 2020 is given in Table-2A&2B:

(a) November, 2021 vis- a -vis October, 2021

ACP (Rs/kWh)	IEX			PXIL		
	Novemb er, 2021	October, 2021	% Change	November, 2021	October, 2021	% Change

Minimum	1.37	1.00	37.00	2.99	3.65	-18.08
Maximum	20.00	20.00	0.00	5.99	19.50	-69.28

Table: 2A**(b) November, 2021 vis- a- vis November, 2020**

ACP (Rs/kWh)	IEX			PXIL		
	November, 2021	November, 2020	% Change	November, 2021	November, 2020	% Change
Minimum	1.37	1.00	37.00	2.99	1.23	143.09
Maximum	20.00	6.00	233.33	5.99	6.00	-0.17

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 November, 2021 with that of October, 2021 and November, 2020 is given in Table-3A & 3B:

(a) November, 2021 vis- a- vis October, 2021

Final Scheduled Volume (MU)	IEX			PXIL		
	November, 2021	October, 2021	% Change	November, 2021	October, 2021	% Change
Minimum	108.16	115.18	-6.09	0.02	0.03	-33.33
Maximum	180.05	281.82	-36.11	0.20	0.16	25.00
Average	157.29	211.88	-25.76	0.07	0.09	-22.22

Table: 3A**(b) November, 2021 vis- a- vis November, 2020**

Final Scheduled Volume (MU)	IEX			PXIL		
	November, 2021	November, 2020	% Change	November, 2021	November, 2020	% Change
Minimum	108.16	95.12	13.71	0.02	0.03	-33.33
Maximum	180.05	204.76	-12.07	0.20	3.62	-94.48
Average	157.29	162.02	-2.97	0.07	1.62	-95.68

Table: 3B**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 in November, 2021 on trade date basis was **573.44 MU**, out of which, **291.20 MU** (50.78 %) was transacted on IEX and **282.24 MU** (49.22 %) 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 October, 2021 was **521.89 MU**, out of which, **298.11 MU** (57.12 %) was transacted on IEX and **223.78 MU** (42.88 %) was transacted on PXIL.
- 3.3.** Similarly, total volume of electricity transacted during November, 2020 in Term Ahead Market on trade date basis on both the power exchanges was **933.39 MU**, out of which, **189.00 MU** (20.25 %) was transacted on IEX and **744.39 MU** (79.75 %) was transacted on PXIL.

- 3.4. With respect to the total energy supplied during month of November, 2021 in the country, the volume of electricity traded on power exchanges in TAM on trade date basis represents **0.58 %** of the total energy supplied. The same was **0.46%** in October, 2021 and **0.96 %** in November, 2020.
- 3.5. In the month of November, 2021, there was transmission congestion to the tune of **0.91 MU** in Day Ahead Contingency contract in IEX in TAM, whereas, there was no transmission congestion in PXIL in TAM in the month of November, 2021.
- 3.6. The comparison of total volume of electricity transacted and Average MCP on both the power exchanges in Term Ahead Market (TAM) during November, 2021 with October, 2021 and November, 2020 is given in Table- 4A, 4B & 4C:

(a) November, 2021 vis- a- vis October, 2021 (on trade Date Basis)

Contract Type	IEX			PXIL		
	November, 2021	October, 2021	% Change	November, 2021	October, 2021	% Change
Intra Day (MU)	0.15	1.28	-88.28	1.66	4.17	-60.19
Day Ahead Contingency(MU)	106.25	156.67	-32.18	246.98	219.61	12.46
Daily/ AnyDay (MU)	184.80	140.16	31.85	33.60	-	-
Weekly (MU)	-	-	NA	-	-	NA

- : No Transaction happened

NA: Not Applicable

Table: 4A

(b) November, 2021 vis- a- vis November, 2020 (on trade Date Basis)

Contract Type	IEX			PXIL		
	November, 2021	November, 2020	% Change	November, 2021	November, 2020	% Change
Intra Day (MU)	0.15	6.46	-97.68	1.66	20.39	-91.86
Day Ahead Contingency(MU)	106.25	13.66	677.82	246.98	-	-
Daily/ AnyDay (MU)	184.80	168.88	9.43	33.60	724.00	-95.36
Weekly (MU)	-	-	NA	-	-	NA

- : No Transaction happened

NA: Not Applicable

Table: 4B

(c) Average MCP, November, 2021 vis- a- vis November, 2020 and October, 2021 (on trade Date Basis)

Exchange	Period	Average MCP (Rs/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	November, 2021	11.15	3.37	3.22	-
	October, 2021	6.25	6.86	5.49	-
	%Change (Month over Month)	78.40	-50.87	-41.35	NA
	November, 2020	3.21	2.83	2.73	-
	%Change (Year over Year)	247.35	19.08	17.95	NA
PXIL	November, 2021	4.58	3.22	3.40	-
	October, 2021	11.38	8.12	-	-
	%Change	-59.75	-60.34	NA	NA

	(Month over Month)				
	November, 2020	3.55	-	2.75	-
	%Change (Year over Year)	29.01	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table: 4C**Term Ahead Market (TAM) (on delivery Date Basis)**

- 3.7. The total volume of electricity transacted on both the power exchanges in Term Ahead Market in November, 2021 on delivery date basis was **579.13 MU**, out of which, **302.75 MU** (52.28 %) was transacted on IEX and **276.38 MU** (47.72 %) was transacted on PXIL.
- 3.8. The total volume of electricity transacted on both the power exchanges in Term Ahead Market on delivery date basis in October, 2021 was **459.34 MU**, out of which, **224.78 MU** (48.94 %) was transacted on IEX and **234.56 MU** (51.06 %) was transacted on PXIL.
- 3.9. Similarly, total volume of electricity transacted during November, 2020 in Term Ahead Market on both the power exchanges on delivery date basis 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. With respect to the total energy supplied during the month of November, 2021 in the country, the volume of electricity traded on the power exchanges in TAM on delivery date basis represents **0.58 %** of the total energy supplied. The same was **0.41 %** in October, 2021 and **1.15 %** in November, 2020.
- 3.11. In the month of November, 2021, there was real time curtailment of **1.99 MU** in IEX and **3.23 MU** in PXIL in Day Ahead Contingency contract in TAM.
- 3.12. **The comparison of total volume of electricity transacted and Average MCP in both the power exchanges in Term Ahead Market (TAM) on delivery date basis during November, 2021 with October, 2021 and November, 2020 is given in Table – 4D, 4E & 4 F:**

(a) November, 2021 vis- a- vis October, 2021 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	November 2021	October, 2021	% Change	November, 2021	October, 2021	% Change
Intra Day (MU)	0.15	1.28	-88.28	1.66	4.17	-60.19
Day Ahead Contingency(MU)	107.24	153.90	-30.32	241.12	230.39	4.66
Daily/Any Day (MU)	195.36	69.60	180.69	33.60	-	-
Weekly (MU)	-	-	NA	-	-	NA

- : No transaction happened

NA: Not Applicable

Table: 4D

(b) November, 2021 vis- a- vis November, 2020 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	November, 2021	November, 2020	% Change	November, 2021	November, 2020	% Change
Intra Day (MU)	0.15	6.46	-97.68	1.66	20.35	-94.84
Day Ahead Contingency MU)	107.24	13.67	684.49	241.12	-	-
Daily/ Any Day (MU)	195.36	170.08	14.86	33.60	852.25	-96.06
Weekly (MU)	-	55.20	NA	-	-	NA

-: No transaction happened

NA: Not Applicable

Table: 4E**(c) Average MCP, November, 2021 vis- a- vis November, 2020 and October, 2021 (on Delivery Date Basis)**

Exchange	Period	Average MCP (Rs/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	November, 2021	11.15	3.37	3.19	-
	October, 2021	6.25	7.01	7.58	-
	%Change (Month over Month)	78.40	-51.93	-57.92	NA
	November, 2020	3.28	2.78	2.60	2.58
	%Change (Year over Year)	239.94	21.22	22.69	NA
PXIL	November, 2021	4.58	3.22	3.40	-
	October, 2021	11.38	8.24	-	-
	%Change (Month over Month)	-59.75	-60.92	NA	NA
	November, 2020	3.48	-	2.60	-
	%Change (Year over Year)	31.61	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table: 4F**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 - IEX and PXIL. The total volume of electricity transacted on both the power exchanges in Real Time Market in November, 2021 was **1,311.35 MU**, out of which, **1,311.35 MU** (100 %) was transacted in IEX and no transaction happened in PXIL. The Final Scheduled Volume (FSV), Daily Market Clearing Prices (MCP) and Area Clearing Prices (ACP) in Real Time Market during the month of November, 2021 as compared with October, 2021 and November, 2020 are as given in table 5A, 5B & 5C:

(i) Final Scheduled Volume:

Exchange	Period	Final Scheduled Volume (MU)			
		Total	Minimum	Maximum	Average
	November, 2021	1,311.35	31.36	56.17	43.71
	October, 2021	1,999.17	28.16	96.91	64.49

IEX	Change % (Month over Month)	-34.41	11.36	-42.04	-32.22
	November, 2020	893.62	19.01	40.60	29.79
PXIL	Change % (Year over Year)	46.75	64.97	38.35	46.73
	November, 2021	-	-	-	-
	October, 2021	-	-	-	-
	Change % (Month over Month)	NA	NA	NA	NA
	November, 2020	-	-	-	-
	Change % (Year over Year)	NA	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table-5A**(ii) Daily Market Clearing Price (MCP):**

Exchange	Period	Daily MCP (Rs/kWh)		
		Minimum	Maximum	Average
IEX	November, 2021	2.08	5.43	3.48
	October, 2021	2.53	15.81	6.91
	Change % (Month over Month)	-17.79	-65.65	-49.64
	November, 2020	1.87	3.38	2.75
	Change % (Year over Year)	11.23	60.65	26.55
PXIL	November, 2021	-	-	-
	October, 2021	-	-	-
	Change % (Month over Month)	NA	NA	NA
	November, 2020	-	-	-
	Change % (Year over Year)	NA	NA	NA

-: No transaction happened

NA: Not Applicable

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

Exchange	Period	ACP (Rs/kWh)	
		Minimum	Maximum
IEX	November, 2021	0.50	20.00
	October, 2021	0.50	20.00
	Change % (Month over Month)	0.00	0.00
	November, 2020	0.05	6.80
	Change % (Year over Year)	900.00	194.12
PXIL	November, 2021	-	-
	October, 2021	-	-
	Change % (Month over Month)	NA	NA
	November, 2020	-	-
	Change % (Year over Year)	NA	NA

-: No transaction happened

NA: Not Applicable

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, whereas, in PXIL, GTAM (Non-Solar) was started w.e.f. 24th March, 2021 and GTAM (Solar) w.e.f. June, 2021 onwards. The total volume of electricity transacted in both the power exchanges in GTAM on trade date basis and delivery date basis were **423.75 MU** and **443.06 MU**, respectively. The total volume of electricity transacted in Solar Energy

Segment in GTAM in Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during November, 2021 on trade date basis and delivery date basis has basis been shown in Tables 6A to 6H.

5.1. Solar Energy Segment in GTAM (On Trade date basis)

The Final Scheduled Volume and the Price of electricity transacted in GTAM in IEX & PXIL during November, 2021 and its comparison with October, 2021 has been shown in Table 6A & 6B below.

(i) Final Scheduled Volume:

Exch-ange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	173.88	0.50	13.00	5.80
		October, 2021	227.84	2.21	18.77	7.35
		%Change (Month over Month)	-23.68	-77.38	-30.74	-21.09
		November, 2020	142.02	1.17	7.50	4.73
		%Change (Year over Year)	22.43	-57.26	73.33	22.62
	Intraday	November, 2021	1.52	0.04	0.06	0.05
		October, 2021	3.26	0.04	1.68	0.14
		%Change (Month over Month)	-57.37	0.00	-96.43	-64.29
		November, 2020	3.13	0.01	1.15	0.52
		%Change (Year over Year)	-51.44	300.00	-94.78	-90.38
IEX	Daily/ Anyday	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	49.56	0.96	4.84	1.98
		October, 2021	25.74	0.44	3.30	1.98
		%Change (Month over Month)	92.54	118.18	46.67	0.00
	Intraday	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/ Anyday	November, 2021	52.75	9.80	26.95	17.58
		October, 2021	0.04	0.04	0.04	0.04

		%Change (Month over Month)	131775.0 0	24400.00	67275.00	43850.0 0
	Weekly	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table-6A

(ii) Daily Market Clearing Price (MCP):

Exchange	Solar Energy Contract	Period	Prices(Rs/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	3.24	4.40	3.72
		October, 2021	3.16	10.76	5.23
		%Change (Month over Month)	2.53	-59.11	-28.87
		November, 2020	3.33	3.85	3.56
		%Change (Year over Year)	-2.70	14.29	4.49
		November, 2021	3.50	3.50	3.50
	Intraday	October, 2021	3.00	9.16	3.67
		%Change (Month over Month)	16.67	-61.79	-4.63
		November, 2020	3.64	4.00	3.89
		%Change (Year over Year)	-3.85	-12.50	-10.03
		November, 2021	-	-	-
	Daily/Anyday	October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
		November, 2021	-	-	-
	Weekly	October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
		November, 2021	3.30	4.00	3.66
PXIL	Day Ahead Contingency	October, 2021	2.42	4.03	3.40
		%Change (Month over Month)	36.36	-0.74	7.65
		November, 2021	-	-	-
	Intraday	October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	3.50	3.60	3.53
	Daily/ Anyday	October, 2021	3.50	3.50	3.50
		%Change (Month over Month)	0.00	2.86	0.86
		November, 2021	3.30	4.00	3.66
		October, 2021	2.42	4.03	3.40

	Weekly	November, 2021	-
		October, 2021	-
		%Change (Month over Month)	NA

-: No transaction happened

NA: Not Applicable

Table-6B

5.2. Solar Energy Segment in GTAM (On Delivery date basis)

The Final Scheduled Volume and the Price of electricity transacted in GTAM in IEX & PXIL during November, 2021 and its comparison with October, 2021 has been shown in Table 6C & 6D below.

(i) Final Scheduled Volume:

Exch -ange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	177.20	0.50	13.00	5.91
		October, 2021	222.37	2.21	18.77	7.17
		%Change (Month over Month)	-20.31	-77.38	-30.74	-17.57
		November, 2020	140.22	1.17	7.50	4.67
		%Change (Year over Year)	26.37	-57.26	73.33	26.55
	Intraday	November, 2021	1.52	0.04	0.06	0.05
		October, 2021	3.26	0.04	1.68	0.14
		%Change (Month over Month)	-53.37	0.00	-96.43	-64.29
		November, 2020	3.13	0.01	1.15	0.52
		%Change (Year over Year)	-51.44	300.00	-94.78	-90.38
	Daily/ Anyday	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	48.61	1.16	4.84	2.03
		October, 2021	25.74	0.44	3.30	1.98
		%Change (Month over Month)	88.85	163.64	46.67	2.53
	Intraday	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
	Daily/Anyday	November, 2021	65.26	1.40	11.22	2.84
		October, 2021	-	-	-	-

		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	November, 2021	-			
		October, 2021	-			

-: No transaction happened

NA: Not Applicable

Table-6C

(ii) Daily Market Clearing Price (MCP):

Exchange	Solar Energy Contract	Period	Prices(Rs/kW)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	3.24	4.40	3.72
		October, 2021	3.16	10.76	5.26
		%Change (Month over Month)	2.53	-59.11	-29.28
		November, 2020	3.33	3.85	3.55
		%Change (Year over Year)	-2.70	14.29	4.79
	Intraday	November, 2021	3.50	3.50	3.50
		October, 2021	3.00	9.16	3.67
		%Change (Month over Month)	16.67	-61.79	-4.63
		November, 2020	3.64	4.00	3.89
		%Change (Year over Year)	-3.85	-12.50	-10.03
	Daily/Anyday	November, 2021	-	-	-
		October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	November, 2021	-	-	-
		October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	3.30	4.00	3.67
		October, 2021	2.42	4.03	3.40
		%Change (Month over Month)	36.36	-0.74	7.94
	Intraday	November, 2021	-		
		October, 2021	-		
	Daily/Anyday	November, 2021	3.50	3.60	3.53
		October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	November, 2021	-		
		October, 2021	-		

-: No transaction happened

NA: Not Applicable

Table-6D

- In November, 2021, there was no transmission congestion in GTAM (Solar) in both IEX & PXIL in November, 2021.
- In November, 2021, there was no real time curtailment in GTAM (Solar) in IEX, whereas in PXIL there was real time curtailment of **0.70 MU** in Daily/Anyday contract of GTAM (Solar) during November, 2021

5.3. Non-Solar Energy Segment in GTAM (On Trade date basis)

The total volume of electricity transacted on both the power exchanges in non-Solar Energy Segment in GTAM in Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during November, 2021 on trade date basis and delivery date basis has been shown in Tables 6E to 6H.

The Final Scheduled Volume and the Price of electricity transacted in Non-Solar GTAM in IEX & PXIL during November, 2021 on trade date basis and its comparison with October, 2021 has been shown in Table 6E & 6F below.

(i) Final Scheduled Volume:

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	125.92	0.22	12.01	4.20
		October, 2021	113.18	0.30	14.04	3.90
		%Change (Month over Month)	11.26	-26.67	-14.46	7.69
		November, 2020	19.13	0.36	3.03	0.64
		%Change (Year over Year)	558.23	-38.89	296.37	556.25
	Intraday	November, 2021	0.43	0.43	0.43	0.43
		October, 2021	1.42	0.30	1.12	0.71
		%Change (Month over Month)	-69.72	43.33	-61.61	-39.44
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/ Anyday	November, 2021	0.59	0.25	0.34	0.29
		October, 2021	2.02	2.02	2.02	2.02
		%Change (Month over Month)	-70.79	-87.62	-83.17	-85.64
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	November, 2021	0.34	0.34	0.34	0.34
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	17.50	0.30	0.89	0.58
		October, 2021	28.34	0.24	2.77	0.94
		%Change (Month over Month)	-38.25	25.00	-67.87	-38.30
		November, 2021	-	-	-	-

	Intraday	October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/ Anyday	November, 2021	-	-	-	-
		October, 2021	1.26	1.26	1.26	1.26
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	November, 2021	-			
		October, 2021	-			

-: No transaction happened

NA: Not Applicable

Table-6E

(ii) Daily Market Clearing Price (MCP):

Exchange	Non- Solar Energy Contract	Period	Prices(Rs/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	3.56	4.84	4.03
		October, 2021	3.64	18.70	7.94
		%Change (Month over Month)	-2.20	-74.12	-49.24
		November, 2020	3.42	4.10	3.91
		%Change (Year over Year)	4.09	18.05	3.07
	Intraday	November, 2021	3.65	3.65	3.65
		October, 2021	14.69	20.00	17.35
		%Change (Month over Month)	-75.15	-81.75	-78.96
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/ Anyday	November, 2021	4.65	4.65	4.65
		October, 2021	14.00	14.00	14.00
		%Change (Month over Month)	-66.79	-66.79	-66.79
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	November, 2021	4.65	4.65	4.65
		October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	4.02	4.27	4.13
		October, 2021	3.76	16.42	7.79
		% Change (Month over Month)	6.91	-74.00	-46.98
	Intraday	November, 2021	-	-	-
		October, 2021	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Daily/ Anyday	November, 2021	-	-	-
		October, 2021	5.10	5.10	5.10
		% Change	NA	NA	NA

		(Month over Month)			
	Weekly	November, 2021		-	
		October, 2021		-	

-: No transaction happened

NA: Not Applicable

Table-6F

5.4. Non-Solar Energy Segment in GTAM (On Delivery date basis)

The Final Scheduled Volume and the Price of electricity transacted in GTAM in IEX & PXIL during November, 2021 and its comparison with October, 2021 has been shown in Table 6G & 6H below.

(i) Final Scheduled Volume:

Exch- ange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	127.57	0.22	12.01	4.25
		October, 2021	114.40	0.30	14.04	3.94
		%Change (Month over Month)	11.51	-26.67	-14.46	7.87
		November, 2020	18.91	0.36	3.03	0.63
		%Change (Year over Year)	574.62	-38.89	296.37	574.60
	Intraday	November, 2021	0.43	0.43	0.43	0.43
		October, 2021	1.42	0.30	1.12	0.71
		%Change (Month over Month)	-69.72	43.33	-61.61	-39.44
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	November, 2021	0.43	0.05	0.05	0.05
		October, 2021	2.98	0.10	0.29	0.19
		%Change (Month over Month)	-85.57	-50.00	-82.76	-73.68
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	November, 2021	0.34	0.05	0.05	0.05
		October, 2021	0.84	0.12	0.12	0.12
		%Change (Month over Month)	-59.52	-58.33	-58.33	-58.33
		November, 2020	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	18.04	0.31	0.89	0.60
		October, 2021	30.31	0.24	2.81	1.01
		%Change (Month over Month)	-40.48	29.17	-68.33	-40.59
	Intraday	November, 2021	-	-	-	-
		October, 2021	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	November, 2021	-	-	-	-
		October, 2021	3.66	0.18	0.24	0.22

		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	November, 2021	-			
		October, 2021	-			

-: No transaction happened

NA: Not Applicable

Table-6G

(ii) Daily Market Clearing Price (MCP):

Exchange	Non- Solar Energy Contract	Period	Prices(Rs/kW)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	November, 2021	3.56	4.84	4.00
		October, 2021	3.70	18.70	8.03
		%Change (Month over Month)	-3.78	-74.12	-50.19
		November, 2020	3.42	4.10	3.89
		%Change (Year over Year)	4.09	18.05	2.83
	Intraday	November, 2021	3.65	3.65	3.65
		October, 2021	14.69	20.00	17.35
		%Change (Month over Month)	-75.15	-81.75	-78.96
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	November, 2021	4.65	4.65	4.65
		October, 2021	4.90	14.00	8.88
		%Change (Month over Month)	-5.10	-66.79	-47.64
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	November, 2021	4.65	4.65	4.65
		October, 2021	4.70	4.70	4.70
		%Change (Month over Month)	-1.06	-1.06	-1.06
		November, 2020	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2021	4.02	4.26	4.12
		October, 2021	3.76	16.42	7.91
		%Change (Month over Month)	6.91	-74.06	-47.91
	Intraday	November, 2021	-	-	-
		October, 2021	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	November, 2021	-	-	-
		October, 2021	4.50	5.10	4.75
		%Change (Month over Month)	NA	NA	NA
	Weekly	November, 2021	-		
		October, 2021	-		

-: No transaction happened

NA: Not Applicable

Table-6H

- In November, 2021, there was no transmission congestion in GTAM (Non-Solar) in both IEX & PXIL in November, 2021.
- In November, 2021, there was no real time curtailment in GTAM (Solar) in both IEX & PXIL in November, 2021.

6. **GREEN DAY AHEAD MARKET (GDAM):**

The transaction of electricity in Green Day Ahead Market (GDAM) has been started in IEX from 27th November, 2021 with the approval of the CERC. The total volume of electricity transacted in GDAM was **149.47 MU** in the month of November, 2021. The Final Scheduled Volume (FSV), Daily Market Clearing Prices (MCP), Area Clearing Prices (ACP), Real Time Curtailment and details of Transmission Congestion under these 3 segments in Green Day Ahead Market during the month of November, 2021 are given below:

i) **Final Scheduled Volume in IEX:**

Segment	Period	Final Scheduled Volume (MU)			
		Total	Minimum	Maximum	Average
Solar	November, 2021	129.25	1.06	7.16	4.31
	October, 2021	17.19	2.39	4.44	3.44
	% Change Month over Month	651.89	-55.65	61.26	25.29
Non Solar	November, 2021	20.22	0.18	1.44	0.67
	October, 2021	2.22	0.03	1.04	0.44
	% Change Month over Month	810.81	500.00	38.46	52.27
Hydro	November, 2021	-	-	-	-
	October, 2021	-	-	-	-

-: No transaction happened

NA: Not Applicable

Table-7A

ii) **Daily Market Clearing Price (MCP) and Area Clearing Price (ACP):**

Exchange	Period	Prices (Rs/kWh)				
		Daily MCP (Rs/kWh)			ACP (Rs/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
Solar and Non Solar	November, 2021	3.85	5.04	4.48	0.80	13.30
	October, 2021	4.37	8.35	5.36	3.40	18.70
	% Change Month over Month	-11.90	39.64	-16.42	-76.47	-28.88

-: No transaction happened

NA: Not Applicable

Table-7B

6.1. In the month of November, 2021, there was no transmission congestion in IEX in Green Day Ahead Market, hence one nation one price was observed for all **30 days** during the month. Similarly, in the month of October, 2021, there was no transmission congestion in IEX in GDAM, hence one nation one price was observed for all **5 days** during which transaction happened (i.e. 27th to 31st October, 2021)

6.2. There was **no** real time curtailment in IEX in Green Day Ahead Market during the month of November, 2021 and October, 2021, respectively.

6.3. The top 10 sellers on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of November, 2021 were **Karnataka, Telangana, Azure Power Forty Three Private Limited, Andhra Pradesh, Madhya Pradesh, Renew Solar Energy (Jharkhand Three) Pvt Ltd (RSEJTPL), J&K, Rajasthan, Himachal Pradesh and Uttarakhand**, which constituted **99.88 %** of the market volume.

6.4. The top 10 purchasers on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of November, 2021 were **Delhi, Dadra & Nagar Haveli, Maharashtra, Odisha, West Bengal, Haryana, Assam, Kerala, Tamil Nadu and Punjab**, which constituted **96.64%** of the market volume.

7. BILATRAL TRANSACTIONS:

The total volume of electricity transacted through **Bilateral transactions** in the month of November, 2021 was **4,660.67 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and traders in the month of November, 2021 were **1,793.38 MU** and **2,867.29 MU** respectively. The details of Bilateral transactions of Electricity happened during November, 2021 have been shown in Table Below:

November, 2021	Direct	Traders	Total Bilateral Transaction (MU)
Total	1,793.38	2,867.29	4,660.67
Minimum	0.55	2.02	-
Maximum	848.36	728.71	-

Table -8A

The region-wise maximum/ minimum volume of electricity transaction happened bilaterally during November, 2021 are given in table below:

(i) Region-wise Volume:

Region-wise Volume (MU)	ER		WR		NR		SR		NER	
	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader
Total	180.59	776.13	1262.10	990.29	341.70	861.44	8.98	171.14	0.00	68.30
Minimum	0.55	28.39	3.96	25.89	4.82	26.85	1.98	23.78	0.00	2.02
Maximum	129.75	466.35	848.36	728.71	255.74	297.56	4.31	110.40	0.00	55.47

Table -8B

7.1. The top 5 buyers on bilateral transaction through direct transactions in the month of November, 2021 were **Madhya Pradesh, Haryana, Maharashtra, Jharkhand and Gujarat**, which constituted **86.06 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of November, 2021 were **Gujarat, Odisha, Himachal Pradesh, Uttarakhand and Maharashtra**, which constituted **63.59 %** of the market volume. [Annexure III]

7.2. The top 5 sellers on bilateral transaction through direct transactions in the month of November, 2021 were **Punjab, Uttar Pradesh, Chhattisgarh, Delhi and Adhunik Power**, which constituted **54.13%** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of November, 2021 were **Raipur Energen, Delhi,**

JITPL, Raigarh Energy and JPNIGRIE_JNSTPP, which constituted **47.23%** of the market volume. **[Annexure III]**

7.3. Deviation Volume - The volume of Deviation observed in the month of October, 2021 in import and export were **1,910.89 MU** and **1,989.82 MU** respectively. The total volume of Deviation observed in the month of October, 2021 can be taken as **1,950.36 MU**.

7.4. A comparison of volume of electricity transacted through both the Power Exchanges together in DAM, TAM, RTM, GTAM, GDAM (on delivery date basis) with Bilateral transactions and Deviation in the month of November, 2021 is shown in **Figure 1**:

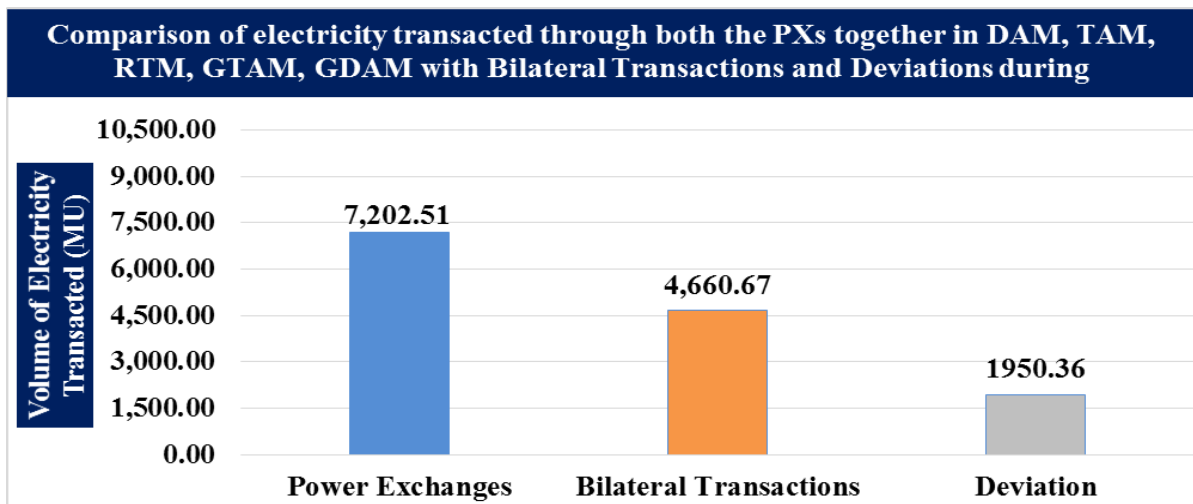


Figure -1

8. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN DAM DURING NOVEMBER, 2021

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 November, 2021 month. The observations made are as under:

- 8.1.** 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.
- 8.2.** 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 variable were the total purchase bid, sell bid and hydro generation, 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 **0.63**, which signifies that there is high multi-collinearity among the predictor variables/ independent variables used in regression analysis.

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

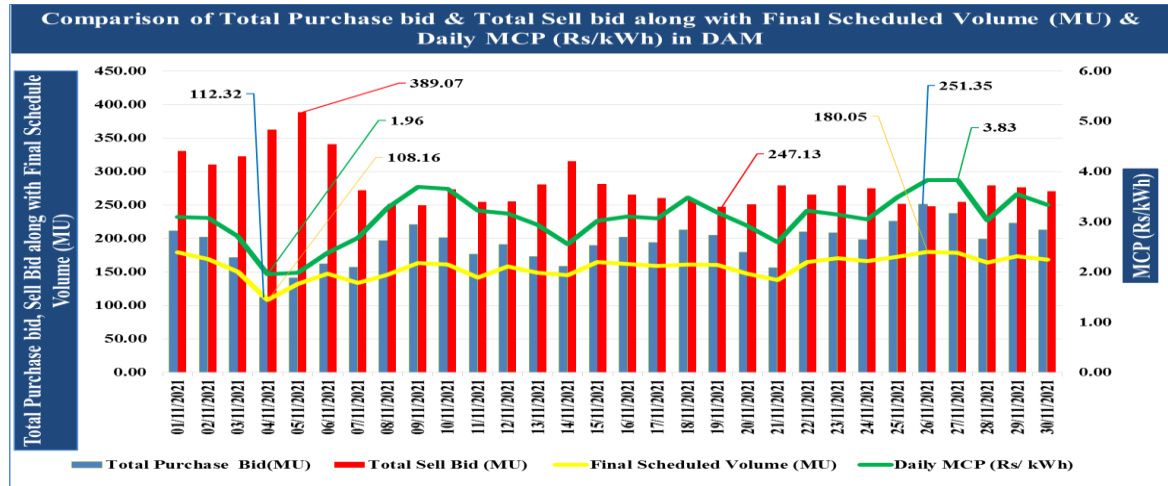


Figure -2

8.4. Invariably, the Final Scheduled Volume (MU) and the Daily MCP (Rs/kWh) showed decreasing trend on Sundays and increasing trend on Mondays as the demand of electricity in the country was less on Sundays as compared to other days of week.

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

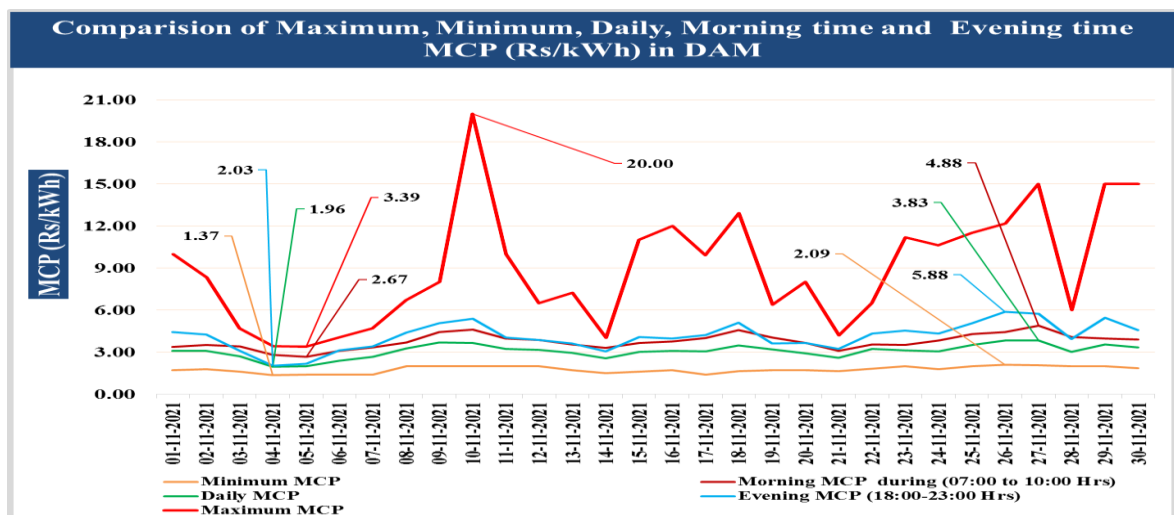


Figure -3

8.6. The Market Clearing Price duration curves for time block wise MCP for the month of November, 2021 is shown in **Figure 4**, whereas the day wise MCP duration curve for the period 1st April, 2021 to 31st November, 2021 is shown in **Figure 5**.

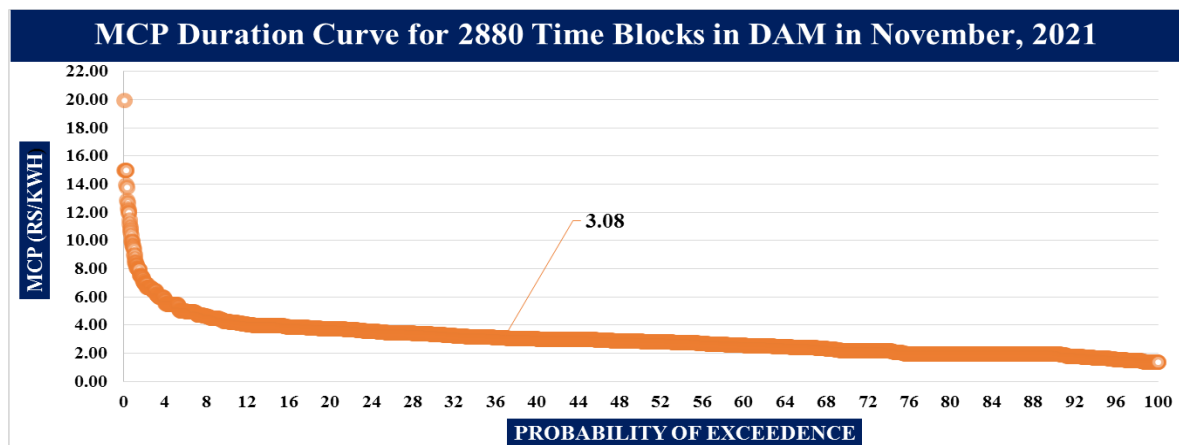


Figure-4

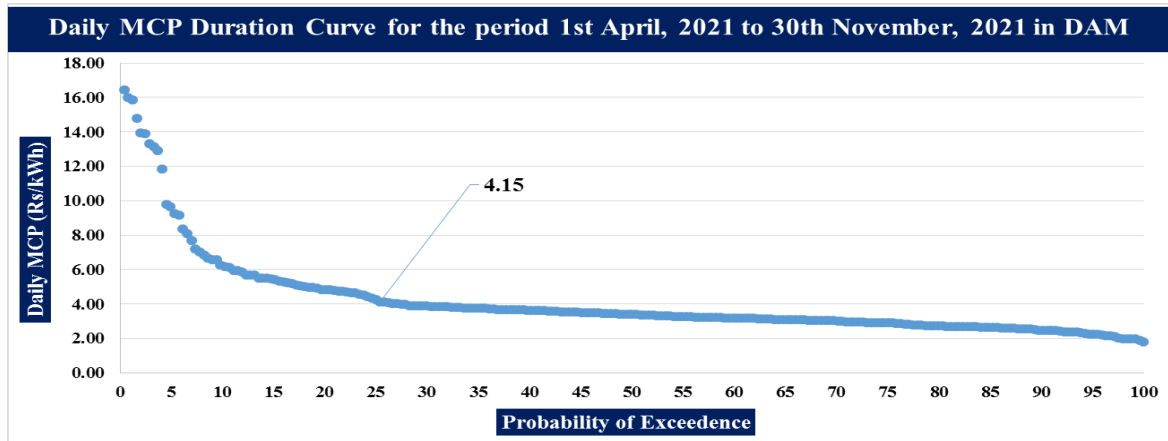


Figure-5

- 8.7. It can be seen in figure 4 above that in the MCP duration curve of November, 2021, for 37.46 % of the time MCP was above average MCP of the month (i.e. **Rs. 3.08/kWh**) and almost 62.54 % of the time MCP was below the average MCP of the month. Similarly, it can be seen in the cumulative MCP duration curve from 1st April, 2021 to 31st November, 2021 (figure 5), that for 25.41 % of the time the daily MCP was above the average MCP for the period (i.e. **Rs. 4.15/kWh**) and for 74.59 % of the time the daily MCP was below the average MCP for the period.
- 8.8. 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 at **para 8.1 and 8.2 above**.
- 8.9. In November, 2021, the maximum FSV occurred mostly during the **time period 7-10 AM** (on 27 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 6-7 PM** (on 24 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 11PM to 12 AM** (on 9 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 3-4 AM** (on 24 no. of days). [Annexure VI]
- 8.10. The maximum demand met during the month of November, 2021 in the country occurred on **16th November, 2021 at 166.19 GW**, which is 4.82 % less than the maximum demand occurred during **October, 2021 [i.e. 174.60 GW on 11th October, 2021]** and is 3.36 % more than the maximum demand occurred during November, 2020 i.e. **[160.78 GW on 03rd November, 2020]**.
- 8.11. In the month of November, 2021, One nation One Price was observed in IEX for **all 30 days** during the month, as there was no transmission congestion. Whereas, in PXIL also, there was no congestion in transmission system during November, 2021, so one nation one price was observed on **all 10 days** during which transaction of electricity happened (i.e. 19th to 20th, 22nd to 28th and 30th November, 2021). While in the month of October, 2021, One nation One Price was observed in IEX for **all 31 days** during the month, as there was no transmission congestion. Whereas, in PXIL also, there was no congestion in transmission system during October, 2021, so one nation one price was observed on **4 days** during which transaction of electricity happened (i.e. 1st, 2nd, 5th and 6th October, 2021). Similarly, 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.

- 8.12. In the month of November, 2021, there was real time curtailment of **0.41 MU** in IEX on 27th November, 2021, whereas, there was no real time curtailment in PXIL. Further, in the month of October, 2021, there was **no** real time curtailment in IEX and PXIL. Similarly, in November, 2020, there was **no** real time curtailment in IEX and PXIL.
- 8.13. The **top 10 sellers** on the power exchanges in **Day Ahead Market (DAM)** in the month of November, 2021 were **West Bengal, Bihar, Chhattisgarh, Kerala, Teesta-3, Odisha, Rajasthan, Assam, Himachal Pradesh** and **JITPL**, which constituted **70.74 %** of the market volume. **[Annexure VII]**
- 8.14. The **top 10 purchasers** on the power exchanges in **Day Ahead Market (DAM)** in the month of November, 2021 were **Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Rajasthan, Punjab, Arcelor Mittal Nippon steel (ESIL), Haryana, Uttar Pradesh** and **Telangana**, which constituted **86.71 %** of the market volume. **[Annexure VII]**
- 8.15. The total volume of electricity purchased by Discoms/Licensees in DAM in the month of November, 2021 was **3,391.41 MU**, which constituted **71.86 %** of total volume of electricity purchased on both the power exchanges.
- 8.16. Similarly, the total volume of electricity sold by Discoms/Licensees in DAM in the month of November, 2021 was **3,477.23 MU**, which constituted **73.68%** of total volume of electricity sold on both the power exchanges.

9. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN REAL TIME MARKET (RTM) TRANSACTIONS IN NOVEMBER, 2021

- 9.1. 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 were the peak demand, total purchase bid, total sell bid, and coal generation, 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 **0.72**. 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 November, 2021 for RTM transactions.
- 9.2. 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 at **para 9.1 above**.

9.3. The Total Purchase Bid, Total Sell Bid, Daily MCP and FSV are shown in Figure-6 below:

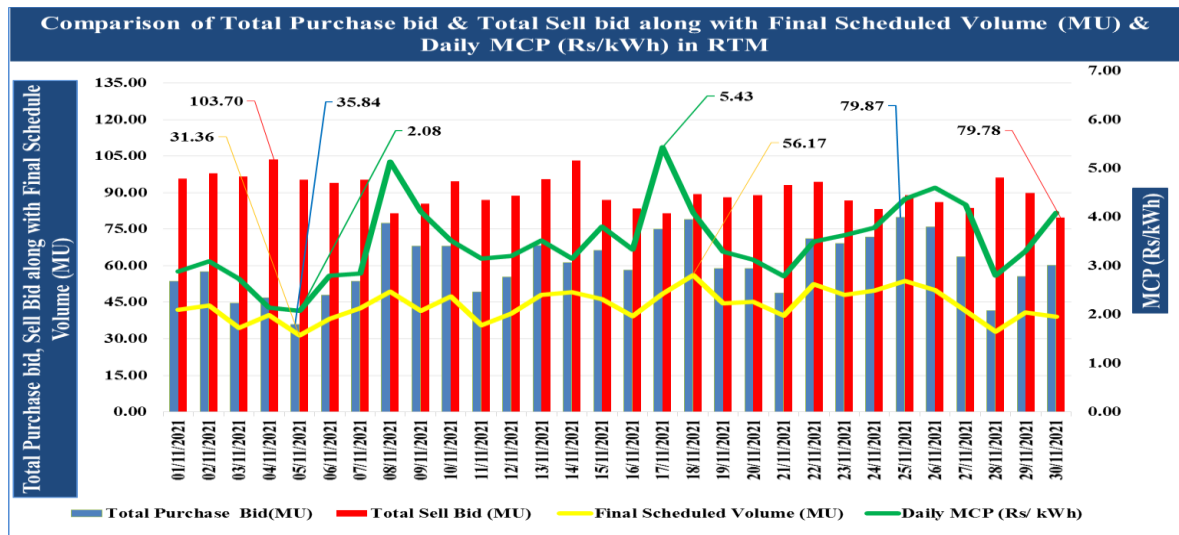


Figure-6

9.4. A comparison of maximum, minimum, daily, evening time MCP is shown in Figure-7. The same are also tabulated in Annexure-VIII.

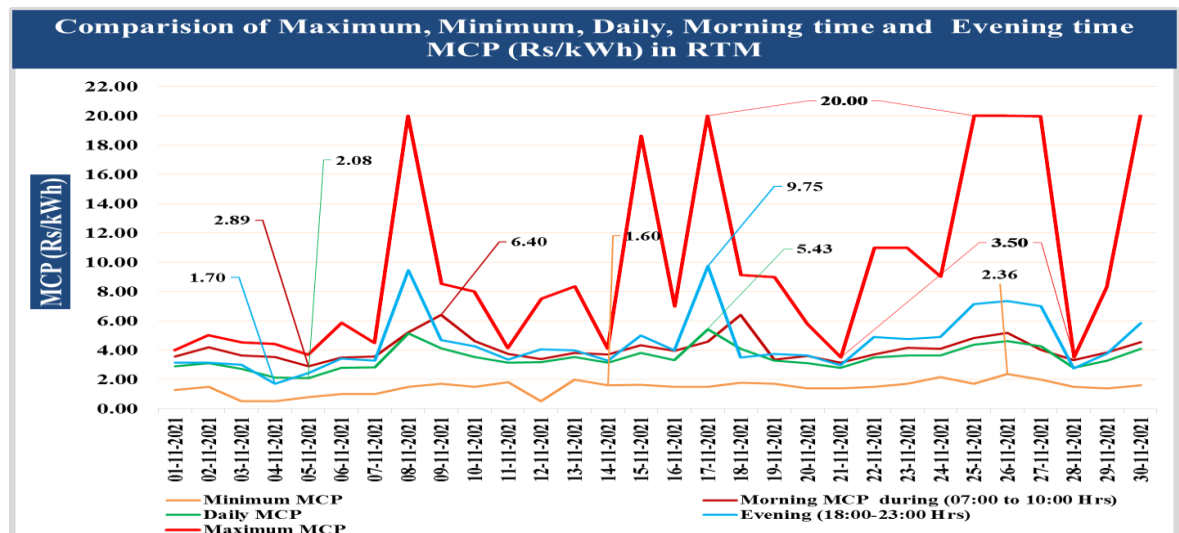


Figure-7

9.5. The Market Clearing Price duration curves for time block wise MCP for the month of November, 2021 is shown in Figure 8, whereas the day wise MCP duration curve for the period 1st April, 2021 to 31st November, 2021 is shown in Figure 9.

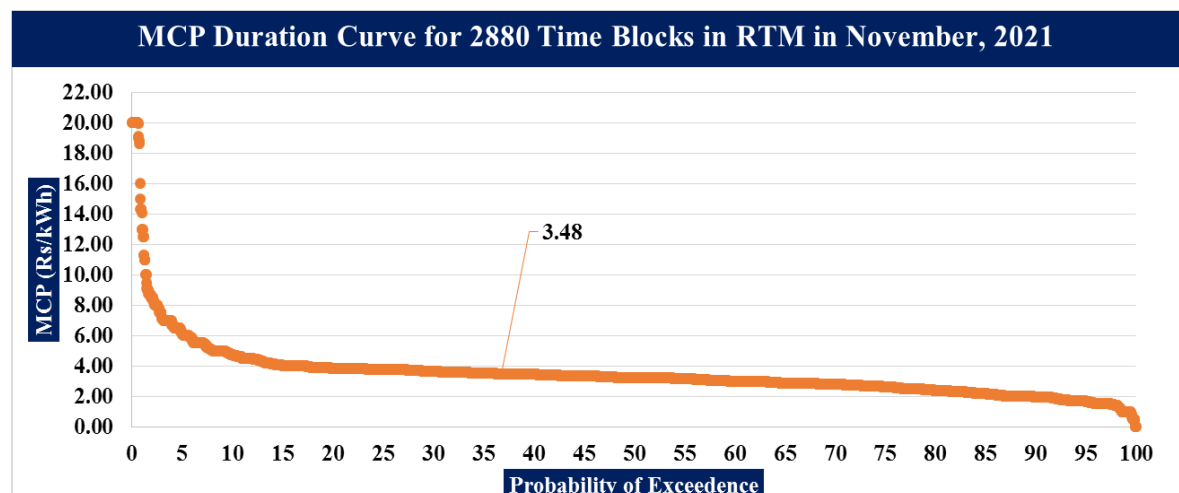


Figure-8

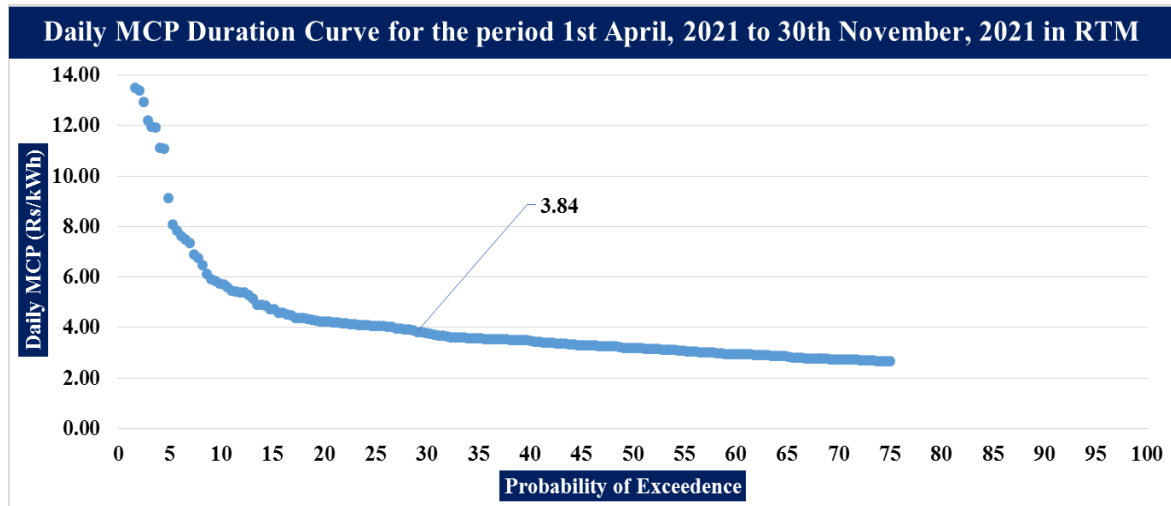


Figure-9

- 9.6. It can be seen in figure 8 above that in the MCP duration curve of November, 2021, for 36.32 % of the time the MCP was above the average MCP of the month (i.e. **Rs. 3.48/kWh**) and for 63.68 % of the time the MCP was below the average MCP of the month. Similarly, it can be seen in the cumulative MCP duration curve from 1st April, 2021 to 31st November, 2021 (figure 9) that, for 29.10 % of the time the daily MCP was above the average MCP for the period (i.e. **Rs. 3.84/kWh**) and for 70.90 % of the time the daily MCP was below the average MCP for the period.
- 9.7. In November, 2021, the maximum FSV occurred mostly during the **time period 8-9 AM and 9-10 PM** (on 12 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 6-7 PM** (on 23 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 5-6 PM** (on 6 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 1-2 PM** (on 11 no. of days). [Annexure X]
- 9.8. There was **no** real time curtailment in IEX in Real Time Market (RTM) during November, 2021 and October, 2021, whereas, no transaction of electricity happened in PXIL during November, 2021 and October, 2021. Similarly, in November, 2020, there was no real time curtailment in IEX, whereas, no transaction of electricity happened in PXIL during November, 2020 in Real Time Market (RTM).
- 9.9. In the month of November, 2021, there was **no** congestion in the transmission system, hence one nation one price was observed for all **30 days** in IEX during November, 2021, whereas, in PXIL, no transaction of electricity happened in November, 2021. Further, in the month of October, 2021, there was congestion to the tune of **1.14 MU** in IEX in Real Time Market on **5 days** (10th to 13th October, 2021 and 22nd October, 2021), hence one nation one price was observed for **26 days** only in IEX during October, 2021, whereas, in PXIL, no transaction of electricity happened in October, 2021 in Real Time Market. In the month of November, 2020, there was congestion of **0.01 MU** 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.
- 9.10. The **top 10 sellers** on the power exchanges in **Real Time Market (RTM)** in the month of November, 2021 were **Karnataka, West Bengal, Odisha, Telangana, Kameng HEP,**

Madhya Pradesh, Rajasthan, Kerala, Tripura and Chhattisgarh, which constituted **67.15 %** of the market volume. [Annexure XI]

9.11. The **top 10 purchasers** on the power exchanges in **Real Time Market (RTM)** in the month of November, 2021 were **J&K, Maharashtra, Rajasthan, Tamil Nadu, Gujarat, Andhra Pradesh, Uttar Pradesh, Telangana, Punjab and Delhi**, which constituted **89.06%** of the market volume. [Annexure XI]

9.12. The total volume of electricity purchased by Discoms/Licensees in RTM in the month of November, 2021 was **1,310.22 MU**, which constituted **99.91 %** of total volume of electricity purchased on both the power exchanges.

9.13. Similarly, the total volume of electricity sold by Discoms/Licensees in RTM in the month of November, 2021 was **1,025.39 MU**, which constituted **78.19 %** 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

Final Scheduled Volume, Average MCP and Real-Time Curtailment in Day Ahead Market (DAM) for the months of April, 2021 to March, 2022 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, 2021	5,699.22	4.73	3.70	3.69	0	0
	May, 2021	4,363.88	3.32	2.83	3.06	0	0
	June, 2021	4,314.17	21.91	3.06	3.35	2.35	0
Total Quarter -I	April - June, 2021	14,377.27	29.96			2.35	0
Quarter- II	July, 2021	4,238.25	2.76	2.95	3.02	0	0
	August, 2021	6,648.76	5.12	5.06	4.72	5.13	0
	September, 2021	6,418.27	1.27	4.40	6.52	0	0
Total Quarter- II	July- September, 2021	17,305.28	9.15			5.13	0
Quarter -III	October, 2021	6,568.31	0.37	8.01	7.17	0	0
	November, 2021	4,718.76	0.74	3.08	3.71	0.41	0
	December, 2021						
Total Quarter- III	October - December, 2021	11,287.07	1.11			0.41	0
Total April, 2021 - March, 2022		42,969.62	40.22			7.89	0

Annexure-II**Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2021 to March, 2022 of IEX and PXIL (Trade and Delivery date basis)**

Quarter	Months	Final Scheduled Volume (MU) on Trade Date Basis		
		IEX	PXIL	Total
Quarter -I	April, 2021	325.78	651.35	977.13
	May, 2021	425.63	344.03	769.66
	June, 2021	622.42	358.74	981.16
Total Quarter -I	April- June, 2021	1,373.83	1,354.12	2,727.95
Quarter- II	July, 2021	832.44	267.10	1,099.54
	August, 2021	483.31	284.40	767.71
	September, 2021	198.18	209.46	407.64
Total Quarter -II	July- September, 2021	1,513.93	760.96	2,274.89
Quarter- III	October, 2021	298.11	223.78	521.89
	November, 2021	291.20	282.24	573.44
	December, 2021			
Total Quarter- III	October - December, 2021	589.31	506.02	1,095.33
Total April, 2021 - March, 2022		3,477.07	2,621.1	6,098.17

Quarter	Months	Final Scheduled Volume (MU) on Delivery Date Basis		
		IEX	PXIL	Total
Quarter -I	April, 2021	348.58	576.72	925.30
	May, 2021	382.62	419.36	801.98
	June, 2021	640.91	312.66	953.57
Total Quarter -I	April- June, 2021	1,372.11	1,308.74	2,680.85
Quarter- II	July, 2021	761.26	332.72	1,093.98
	August, 2021	617.23	238.63	855.86
	September, 2021	192.87	251.17	444.04
Total Quarter -II	July- October, 2021	1,571.36	822.52	2,393.88
Quarter- III	October, 2021	224.78	234.56	459.34
	November, 2021	302.75	276.38	579.13
	December, 2021			
Total Quarter- III	October - December, 2021	527.53	510.94	1,038.47
Total April, 2021 - March, 2022		3,471	2,642.2	6,113.2

Top Five Entities (Buyers and Sellers) in Bilateral transactions in the month of November, 2021

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Madhya Pradesh	848.36	47.31%	Gujarat	728.71	25.41%
Haryana	255.74	14.26%	Odisha	466.35	16.26%
Maharashtra	236.90	13.21%	Himachal Pradesh	297.56	10.38%
Jharkhand	129.75	7.23%	Uttarakhand	167.36	5.84%
Gujarat	72.60	4.05%	Maharashtra	163.31	5.70%
Total Volume	1,543.34	86.06%	Total Volume	1,823.29	63.59%
Total Volume in Bilateral	1,793.38		Total Volume in Bilateral	2,867.29	

(ii) Top five Sellers in Bilateral transactions

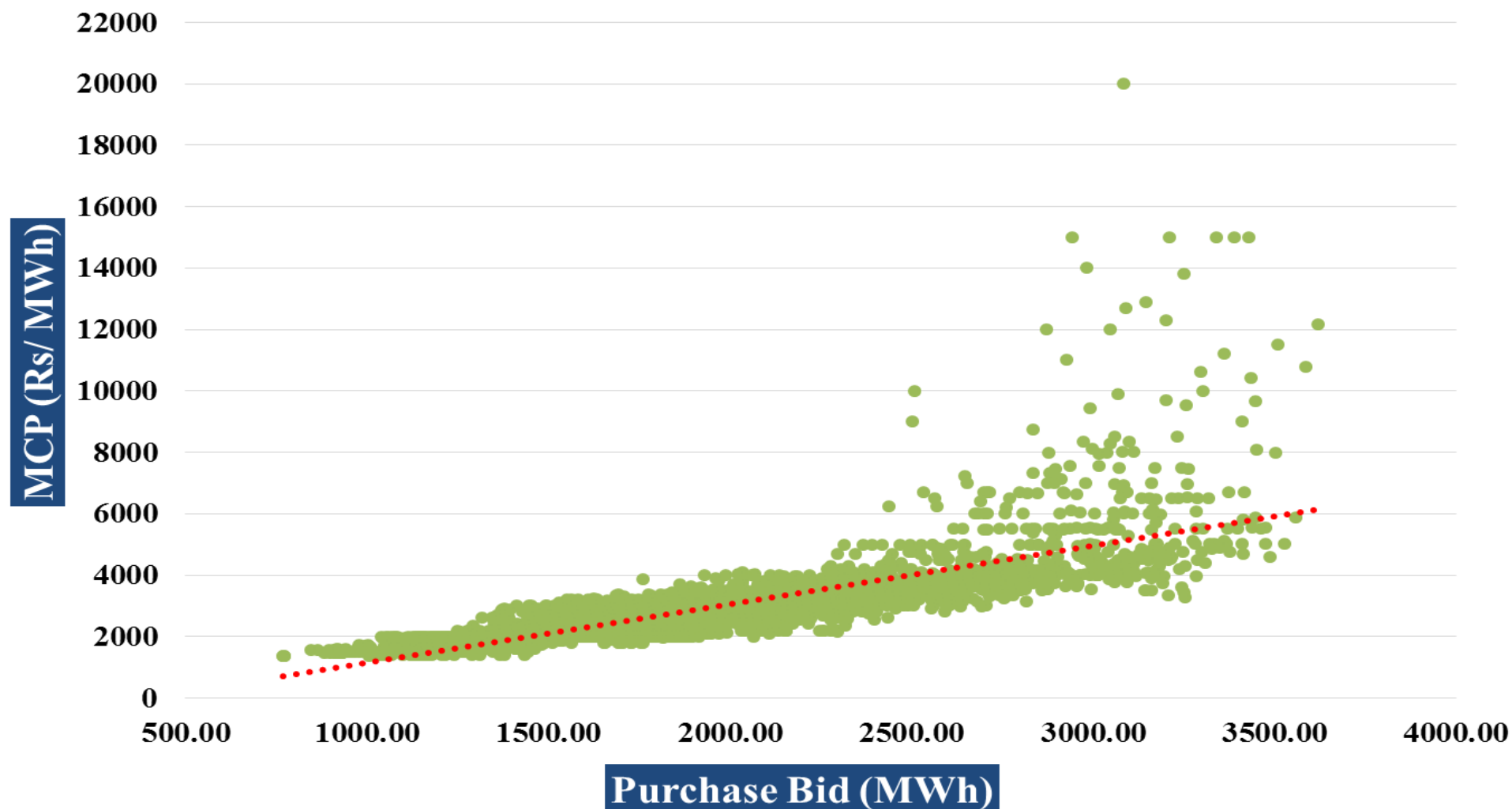
Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Punjab	328.37	18.49%	Raipur Energen	299.98	10.40%
Uttar Pradesh	195.23	10.99%	Delhi	273.31	9.48%
Chhattisgarh	164.14	9.24%	JITPL	266.67	9.25%
Delhi	144.00	8.11%	Raigarh Energy	263.81	9.15%
Adhunik Power	129.75	7.31%	JPNIGRIE_JNSTPP	258.33	8.96%
Total Volume	961.49	54.13%	Total Volume	1362.09	47.23%
Total Volume in Bilateral	1,776.15		Total Volume in Bilateral	2,884.11	

Annexure-IV**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (Rs/kWh) and Final Scheduled Volume (MU) in DAM**

Date	Morning MCP (07:00-10:00)	Day MCP (11:00-17:00)	Evening MCP (18:00- 23:00)	Night MCP (01:00- 06:00, 23:00-24:00)	Maximum MCP	Minimum MCP	Average MCP	Final Scheduled Volume (MU)
01-11-2021	3.38	2.76	4.42	2.14	10.00	1.71	3.10	179.10
02-11-2021	3.50	2.79	4.26	2.10	8.33	1.80	3.07	169.01
03-11-2021	3.39	2.74	3.09	1.97	4.68	1.60	2.71	150.33
04-11-2021	2.81	1.68	2.03	1.69	3.41	1.37	1.96	108.16
05-11-2021	2.67	1.67	2.17	1.76	3.39	1.40	1.99	132.06
06-11-2021	3.08	1.93	3.12	1.80	4.05	1.40	2.38	147.31
07-11-2021	3.33	2.01	3.42	2.33	4.68	1.41	2.68	134.05
08-11-2021	3.68	2.95	4.38	2.43	6.69	2.00	3.28	146.10
09-11-2021	4.45	3.09	5.08	2.70	8.00	2.00	3.70	163.32
10-11-2021	4.62	3.01	5.39	2.29	20.00	1.99	3.66	161.10
11-11-2021	3.97	3.03	4.03	2.30	10.00	1.99	3.23	141.44
12-11-2021	3.86	2.88	3.85	2.46	6.51	2.00	3.16	158.60
13-11-2021	3.53	2.94	3.61	2.05	7.25	1.71	2.95	148.80
14-11-2021	3.32	2.45	3.04	1.81	4.01	1.50	2.56	145.29
15-11-2021	3.64	2.81	4.06	1.98	11.00	1.60	3.02	164.73
16-11-2021	3.75	3.08	3.95	2.02	12.00	1.72	3.10	162.09
17-11-2021	4.01	2.86	4.22	1.75	9.91	1.41	3.07	159.47
18-11-2021	4.56	3.06	5.11	1.91	12.91	1.65	3.49	161.44
19-11-2021	4.04	3.48	3.62	2.03	6.39	1.72	3.19	160.75
20-11-2021	3.65	2.78	3.65	2.01	8.00	1.71	2.92	147.24
21-11-2021	3.09	2.41	3.23	1.96	4.20	1.65	2.60	138.27
22-11-2021	3.56	3.13	4.31	2.21	6.50	1.81	3.23	165.23
23-11-2021	3.50	2.69	4.52	2.20	11.20	1.98	3.14	170.69
24-11-2021	3.82	2.47	4.33	2.09	10.62	1.80	3.05	166.25
25-11-2021	4.28	2.83	5.06	2.38	11.52	2.00	3.49	172.87
26-11-2021	4.43	2.91	5.88	2.63	12.17	2.09	3.83	180.05
27-11-2021	4.88	2.97	5.75	2.45	15.00	2.08	3.83	178.91
28-11-2021	4.08	2.44	3.92	2.27	6.01	1.99	3.03	163.91
29-11-2021	3.99	3.08	5.46	2.14	15.00	1.99	3.55	173.62
30-11-2021	3.88	3.22	4.57	2.08	15.00	1.85	3.34	168.58
Maximum	4.88	3.48	5.88	2.70	20.00	2.09	3.83	180.05
Minimum	2.67	1.67	2.03	1.69	3.39	1.37	1.96	108.16
Average	3.76	2.74	4.12	2.13	8.95	1.76	3.08	157.29

MCP: Market Clearing Price (Rs/kWh)**FSV: Final Scheduled Volume (MU)**

Comparison of MCP w.r.t. Purchase Bid for 2,880 Time Blocks during the month of November, 2021 in DAM



Time Blocks during the Month [96 time blocks in a day x 30 days = 2,880]

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
01-11-2021	17:45 - 18:00	2.53	17:45 - 18:00	10.00	04:15 - 04:30	1.28	04:00 - 04:15	1.71
02-11-2021	07:30 - 07:45	2.43	18:30 - 18:45	8.33	04:15 - 04:30	1.30	04:00 - 04:15	1.80
03-11-2021	07:15 - 07:30	2.38	18:15 - 18:30	4.68	23:30 - 23:45	0.91	23:45 - 24:00	1.60
04-11-2021	07:15 - 07:30	1.99	07:15 - 07:30	3.41	23:30 - 23:45	0.75	23:45 - 24:00	1.37
05-11-2021	07:15 - 07:30	2.15	07:15 - 07:30	3.39	14:00 - 14:15	0.97	14:00 - 14:15	1.40
06-11-2021	07:15 - 07:30	2.24	18:30 - 18:45	4.05	23:30 - 23:45	1.08	13:15 - 13:30	1.40
07-11-2021	06:45 - 07:00	1.79	18:15 - 18:30	4.68	13:15 - 13:30	1.04	13:15 - 13:30	1.41
08-11-2021	07:30 - 07:45	2.02	18:30 - 18:45	6.69	03:45 - 04:00	1.08	03:45 - 04:00	2.00
09-11-2021	08:15 - 08:30	2.17	18:30 - 18:45	8.00	05:00 - 05:15	1.29	04:00 - 04:15	2.00
10-11-2021	08:30 - 08:45	2.29	18:30 - 18:45	20.00	23:45 - 24:00	1.21	03:45 - 04:00	1.99
11-11-2021	07:15 - 07:30	2.02	18:30 - 18:45	10.00	23:45 - 24:00	1.07	04:00 - 04:15	1.99
12-11-2021	09:45 - 10:00	2.19	18:15 - 18:30	6.51	04:45 - 05:00	1.25	04:00 - 04:15	2.00
13-11-2021	08:30 - 08:45	2.07	18:15 - 18:30	7.25	04:30 - 04:45	0.97	04:00 - 04:15	1.71
14-11-2021	08:45 - 09:00	2.32	18:30 - 18:45	4.01	02:45 - 03:00	0.98	04:00 - 04:15	1.50
15-11-2021	08:30 - 08:45	2.33	18:30 - 18:45	11.00	03:15 - 03:30	1.12	03:45 - 04:00	1.60
16-11-2021	07:00 - 07:15	2.32	18:15 - 18:30	12.00	02:45 - 03:00	1.18	03:45 - 04:00	1.72
17-11-2021	09:45 - 10:00	2.32	17:45 - 18:00	9.91	01:45 - 02:00	1.07	03:15 - 03:30	1.41
18-11-2021	09:45 - 10:00	2.25	18:30 - 18:45	12.91	03:15 - 03:30	1.24	03:30 - 03:45	1.65
19-11-2021	09:45 - 10:00	2.14	18:00 - 18:15	6.39	03:30 - 03:45	1.23	03:45 - 04:00	1.72
20-11-2021	08:30 - 08:45	1.96	18:30 - 18:45	8.00	23:45 - 24:00	1.01	03:45 - 04:00	1.71
21-11-2021	18:45 - 19:00	1.85	18:15 - 18:30	4.20	03:45 - 04:00	1.11	03:45 - 04:00	1.65
22-11-2021	09:30 - 09:45	2.21	17:45 - 18:00	6.50	02:30 - 02:45	1.29	03:45 - 04:00	1.81
23-11-2021	07:45 - 08:00	2.27	18:15 - 18:30	11.20	03:45 - 04:00	1.39	03:45 - 04:00	1.98
24-11-2021	08:45 - 09:00	2.31	18:15 - 18:30	10.62	13:00 - 13:15	1.34	04:00 - 04:15	1.80
25-11-2021	09:45 - 10:00	2.31	18:15 - 18:30	11.52	04:45 - 05:00	1.54	04:00 - 04:15	2.00
26-11-2021	09:45 - 10:00	2.21	18:15 - 18:30	12.17	23:45 - 24:00	1.66	13:15 - 13:30	2.09
27-11-2021	09:30 - 09:45	2.37	18:15 - 18:30	15.00	23:45 - 24:00	1.51	04:00 - 04:15	2.08
28-11-2021	08:00 - 08:15	2.34	07:45 - 08:00	6.01	13:15 - 13:30	1.26	04:00 - 04:15	1.99
29-11-2021	09:00 - 09:15	2.72	18:15 - 18:30	15.00	03:45 - 04:00	1.39	03:45 - 04:00	1.99
30-11-2021	09:00 - 09:15	2.75	18:15 - 18:30	15.00	23:30 - 23:45	1.21	03:45 - 04:00	1.85

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 November, 2021**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	West Bengal	1175.36	24.91%	Gujarat	926.87	19.64%
2.	Bihar	515.08	10.91%	Maharashtra	630.89	13.37%
3.	Chhattisgarh	383.31	8.12%	Andhra Pradesh	627.01	13.29%
4.	Kerala	242.68	5.14%	Tamilnadu	521.58	11.05%
5.	Teesta -3	232.53	4.93%	Rajasthan	349.91	7.41%
6.	Orissa	205.42	4.35%	Punjab	250.00	5.30%
7.	Rajasthan	182.81	3.87%	ArcelorMittal Nippon	224.64	4.76%
8.	Assam	142.16	3.01%	Haryana	212.74	4.51%
9.	Himachal Pradesh	134.10	2.84%	Uttar Pradesh	212.20	4.50%
10.	JITPL	124.67	2.64%	Telangana	136.14	2.88%
11.	Karnataka	122.63	2.60%	J&K	124.06	2.63%
12.	MB Power	119.20	2.53%	Uttarakhand	98.16	2.08%
13.	Jindal Power	116.61	2.47%	Madhya Pradesh	90.32	1.91%
14.	Essar Power MP Ltd	81.16	1.72%	Orissa	71.99	1.53%
15.	Telangana	67.44	1.43%	Delhi	66.72	1.41%
16.	Madhya Pradesh	66.82	1.42%	Karnataka	46.47	0.98%
17.	DB Power	58.16	1.23%	Dadra & Nagar Haveli	26.15	0.55%
18.	Delhi	44.52	0.94%	Assam	24.02	0.51%
19.	ACBIL	39.46	0.84%	Kerala	21.59	0.46%
20.	Jindal Power Ltd. Stg-II	39.29	0.83%	Himachal Pradesh	17.40	0.37%
21.	Talcher Stg-2	38.86	0.82%	Meghalaya	13.96	0.30%
22.	Jaypee Nigrie	38.72	0.82%	Railways	11.01	0.23%
23.	Sembcorp Gayatri	36.02	0.76%	Daman & Diu	8.01	0.17%
24.	Maruti Clean Coal Power	26.81	0.57%	Goa WR	2.97	0.06%
25.	NVVN (SNA) - NEA	26.21	0.56%	Bihar	2.10	0.04%
26.	Maharashtra	25.88	0.55%	Jharkhand	1.68	0.04%
27.	Uttar Pradesh	25.37	0.54%	Goa SR	0.50	0.01%
28.	AD Hydro	24.14	0.51%			
29.	Sikkim	23.44	0.50%			
30.	Karcham Wangtoo	22.31	0.47%			
31.	RKM Power	21.18	0.45%			
32.	GMR Kamalanga	20.89	0.44%			
33.	Goa WR	19.47	0.41%			
34.	Jharkhand	19.25	0.41%			
35.	Haryana	17.33	0.37%			
36.	Andhra Pradesh	16.49	0.35%			
37.	Tripura	15.71	0.33%			

38.	Sainj HEP	15.24	0.32%			
39.	Jorethang	15.04	0.32%			
40.	Adhunik Power	15.04	0.32%			
41.	Tashiding HEP	14.97	0.32%			
42.	Jhabua Power	12.39	0.26%			
43.	Raigarh Energy Ltd.	11.50	0.24%			
44.	Arunachal Pradesh	11.03	0.23%			
45.	Raipur Energen	10.85	0.23%			
46.	DVC	10.81	0.23%			
47.	Palatana	10.35	0.22%			
48.	GMR Warora	8.72	0.18%			
49.	Gujarat	8.20	0.17%			
50.	Ramagundam Stg-1	6.92	0.15%			
51.	Dikchu	6.59	0.14%			
52.	Simhadri Stg-2	6.21	0.13%			
53.	Singoli Bhagwati	6.20	0.13%			
54.	RGPPL	4.68	0.10%			
55.	Tamilnadu	4.63	0.10%			
56.	Ramagundam Stg-3	4.37	0.09%			
57.	J&K	3.70	0.08%			
58.	Chuzachen	3.66	0.08%			
59.	Nagaland	3.64	0.08%			
60.	SKS Power	2.63	0.06%			
61.	Sorang HEP, (Himachal	2.62	0.06%			
62.	NLC TPS-II	2.11	0.04%			
63.	Bongaigaon	1.26	0.03%			
64.	NTPC Kudgi	1.05	0.02%			
65.	Sembcorp Energy India	0.94	0.02%			
66.	NLC TPS-II Stg-2	0.41	0.01%			
67.	Ayana Renewable Power	0.41	0.01%			
68.	Mizoram	0.36	0.01%			
69.	Punjab	0.33	0.01%			
70.	Talcher	0.18	0.00%			
71.	Renew Solar Energy	0.17	0.00%			
72.	Dhariwal	0.14	0.00%			
73.	Farakka	0.13	0.00%			
74.	Kahalgaon	0.06	0.00%			
75.	Dadra & Nagar Haveli	0.06	0.00%			
Total Volume of top 10		3,338.13	70.74%	Total Volume of top 10	4,091.99	86.71%
Total Volume in PXs		4,719.07		Total Volume in PXs	4,719.07	

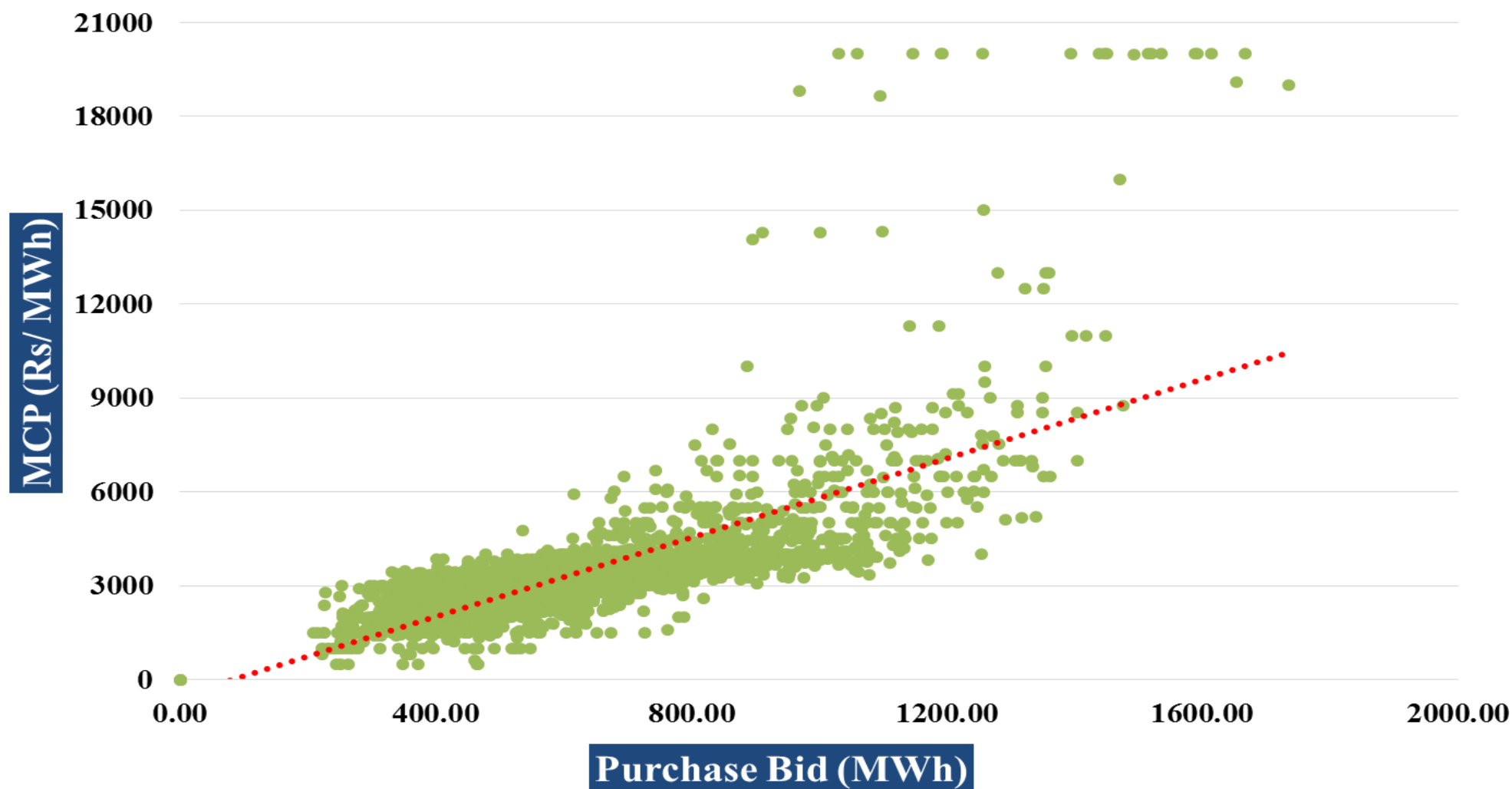
Annexure-VIII**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (Rs/kWh) and Final Scheduled Volume (MU) in RTM**

Date	Morning MCP (07:00-10:00)	Day MCP (11:00- 17:00)	Evening MCP (18:00- 23:00)	Night MCP (01:00- 06:00, 23:00-24:00)	Maximum MCP	Minimum MCP	Average MCP	Final Scheduled
01-11-2021	3.55	3.12	3.15	2.03	4.00	1.28	2.88	41.98
02-11-2021	4.19	3.34	3.15	2.17	5.01	1.50	3.09	43.60
03-11-2021	3.62	3.04	3.00	1.68	4.52	0.50	2.73	34.43
04-11-2021	3.55	1.64	1.70	2.21	4.44	0.50	2.14	39.65
05-11-2021	2.89	1.94	2.46	1.42	3.68	0.80	2.08	31.36
06-11-2021	3.48	2.39	3.43	2.25	5.85	1.00	2.79	38.14
07-11-2021	3.57	2.67	3.29	2.20	4.50	0.99	2.84	42.57
08-11-2021	5.20	4.13	9.47	2.37	20.00	1.50	5.13	49.41
09-11-2021	6.40	3.49	4.70	2.93	8.52	1.70	4.11	41.39
10-11-2021	4.61	3.52	4.26	2.24	8.00	1.50	3.51	47.49
11-11-2021	3.73	3.27	3.36	2.52	4.15	1.80	3.15	35.50
12-11-2021	3.39	3.56	4.07	1.97	7.50	0.50	3.20	40.42
13-11-2021	3.82	3.58	3.98	2.89	8.34	1.97	3.52	48.03
14-11-2021	3.69	3.32	3.28	2.56	4.10	1.60	3.15	49.12
15-11-2021	4.35	3.85	5.01	2.42	18.66	1.62	3.80	46.41
16-11-2021	3.95	3.30	4.00	2.42	7.00	1.50	3.33	39.35
17-11-2021	4.59	5.30	9.75	2.35	20.00	1.50	5.43	48.49
18-11-2021	6.42	4.49	3.49	2.86	9.12	1.78	4.09	56.17
19-11-2021	3.36	3.62	3.73	2.52	9.00	1.69	3.28	44.46
20-11-2021	3.60	3.02	3.65	2.50	5.80	1.40	3.12	45.18
21-11-2021	3.15	2.60	2.99	2.60	3.50	1.40	2.79	39.59
22-11-2021	3.70	3.15	4.89	2.53	11.00	1.50	3.50	52.39
23-11-2021	4.16	3.01	4.77	2.94	11.00	1.70	3.62	48.08
24-11-2021	4.10	3.30	4.89	3.02	9.01	2.16	3.62	49.82
25-11-2021	4.83	3.02	7.14	3.07	20.00	1.70	4.37	53.83
26-11-2021	5.18	3.37	7.36	3.14	20.00	2.36	4.60	50.10
27-11-2021	4.01	3.62	7.01	2.67	19.99	2.00	4.26	41.40
28-11-2021	3.33	2.72	2.77	2.60	3.50	1.49	2.80	32.94
29-11-2021	3.85	3.86	3.78	2.01	8.33	1.40	3.30	40.92
30-11-2021	4.56	3.77	5.84	2.62	20.00	1.61	4.08	39.14
Maximum	6.42	5.30	9.75	3.14	20.00	2.36	5.43	56.17
Minimum	2.89	1.64	1.70	1.42	3.50	0.50	2.08	31.36
Average	4.09	3.30	4.48	2.46	9.62	1.47	3.48	43.71

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,880 Time Blocks during the month of November, 2021 in RTM



Time Blocks during the Month [96 time blocks in a day x 30 days = 2,880]

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
01-11-2021	12:45-13:00	0.67	18:15-18:30	4.00	20:30-20:45	0.24	01:30-01:45	1.28
02-11-2021	16:30-16:45	0.75	07:30-07:45	5.01	05:15-05:30	0.22	01:30-01:45	1.50
03-11-2021	19:00-19:15	0.55	07:15-07:30	4.52	00:45-01:00	0.19	03:00-03:15	0.50
04-11-2021	08:15-08:30	0.72	06:45-07:00	4.44	18:15-18:30	0.18	12:45-13:00	0.50
05-11-2021	12:45-13:00	0.50	18:15-18:30	3.68	00:30-00:45	0.22	03:00-03:15	0.80
06-11-2021	11:45-12:00	0.59	18:30-18:45	5.85	05:15-05:30	0.24	13:45-14:00	1.00
07-11-2021	09:30-09:45	0.73	18:15-18:30	4.50	03:30-03:45	0.21	23:45-24:00	0.99
08-11-2021	10:45-11:00	0.87	18:00-18:15	20.00	04:30-04:45	0.21	03:00-03:15	1.50
09-11-2021	10:00-10:15	0.83	09:00-09:15	8.52	04:15-04:30	0.20	13:15-13:30	1.70
10-11-2021	08:45-09:00	0.78	18:15-18:30	8.00	04:45-05:00	0.24	02:00-02:15	1.50
11-11-2021	08:45-09:00	0.51	07:15-07:30	4.15	04:30-04:45	0.24	02:45-03:00	1.80
12-11-2021	21:00-21:15	0.70	18:30-18:45	7.50	04:45-05:00	0.27	04:15-04:30	0.50
13-11-2021	11:15-11:30	0.83	18:15-18:30	8.34	05:15-05:30	0.29	03:15-03:30	1.97
14-11-2021	15:00-15:15	0.71	18:15-18:30	4.10	05:00-05:15	0.31	04:30-04:45	1.60
15-11-2021	12:15-12:30	0.71	18:15-18:30	18.66	07:30-07:45	0.31	03:45-04:00	1.62
16-11-2021	21:45-22:00	0.62	18:15-18:30	7.00	06:45-07:00	0.24	13:30-13:45	1.50
17-11-2021	21:30-21:45	0.89	18:15-18:30	20.00	06:45-07:00	0.22	02:30-02:45	1.50
18-11-2021	18:45-19:00	0.91	08:45-09:00	9.12	06:45-07:00	0.26	22:30-22:45	1.78
19-11-2021	09:15-09:30	0.63	18:15-18:30	9.00	17:30-17:45	0.30	02:45-03:00	1.69
20-11-2021	21:30-21:45	0.72	18:00-18:15	5.80	03:45-04:00	0.32	13:00-13:15	1.40
21-11-2021	11:30-11:45	0.62	18:15-18:30	3.50	17:15-17:30	0.19	13:15-13:30	1.40
22-11-2021	21:00-21:15	0.92	18:00-18:15	11.00	05:45-06:00	0.27	13:15-13:30	1.50
23-11-2021	08:30-08:45	0.76	18:15-18:30	11.00	06:00-06:15	0.35	13:00-13:15	1.70
24-11-2021	22:00-22:15	0.85	18:15-18:30	9.01	05:15-05:30	0.35	13:15-13:30	2.16
25-11-2021	21:00-21:15	0.87	18:30-18:45	20.00	13:00-13:15	0.34	13:00-13:15	1.70
26-11-2021	09:45-10:00	0.78	18:15-18:30	20.00	00:15-00:30	0.26	13:00-13:15	2.36
27-11-2021	08:15-08:30	0.90	18:15-18:30	19.99	03:45-04:00	0.24	23:45-24:00	2.00
28-11-2021	08:30-08:45	0.56	08:00-08:15	3.50	13:15-13:30	0.20	13:30-13:45	1.49
29-11-2021	12:00-12:15	0.74	18:15-18:30	8.33	07:00-07:15	0.26	03:00-03:15	1.40
30-11-2021	07:45-08:00	0.57	18:30-18:45	20.00	16:45-17:00	0.26	01:30-01:45	1.61

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 November, 2021**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	Karnataka	121.73	9.28%	J&K	460.67	35.13%
2.	West Bengal	121.33	9.25%	Maharashtra	124.59	9.50%
3.	Orissa	113.52	8.66%	Rajasthan	116.78	8.91%
4.	Telangana	106.33	8.11%	Tamilnadu	91.73	6.99%
5.	Kameng HEP	86.78	6.62%	Gujarat	89.08	6.79%
6.	Madhya Pradesh	81.73	6.23%	Andhra Pradesh	78.65	6.00%
7.	Rajasthan	80.47	6.14%	Uttar Pradesh	78.13	5.96%
8.	Kerala	73.28	5.59%	Telangana	56.61	4.32%
9.	Tripura	50.55	3.85%	Punjab	37.59	2.87%
10.	Chhattisgarh	44.90	3.42%	Delhi	34.01	2.59%
11.	Delhi	40.34	3.08%	Haryana	33.25	2.54%
12.	MB Power	27.36	2.09%	Orissa	32.65	2.49%
13.	RKM Power	26.37	2.01%	West Bengal	16.60	1.27%
14.	Jindal Power Ltd. Stg-	23.06	1.76%	Himachal Pradesh	15.95	1.22%
15.	Assam	19.54	1.49%	Assam	13.82	1.05%
16.	Bihar	19.34	1.48%	Bihar	7.49	0.57%
17.	NLC	15.71	1.20%	Uttarakhand	5.83	0.44%
18.	NLC TPS-II	15.44	1.18%	Karnataka	4.47	0.34%
19.	Ramagundam Stg-1	15.23	1.16%	Kerala	3.65	0.28%
20.	Himachal Pradesh	15.13	1.15%	Manipur	3.56	0.27%
21.	Jhabua Power	11.84	0.90%	Madhya Pradesh	3.32	0.25%
22.	DB Power	11.41	0.87%	Dadra & Nagar Haveli	0.86	0.07%
23.	Andhra Pradesh	11.28	0.86%	ArcelorMittal Nippon	0.66	0.05%
24.	Uttar Pradesh	11.05	0.84%	Daman & Diu	0.57	0.04%
25.	Sembcorp Gayatri	10.97	0.84%	Railways	0.24	0.02%
26.	NLC TPS-II Stg-2	10.57	0.81%	Teesta -3	0.15	0.01%
27.	Bongaigaon	10.46	0.80%	Goa SR	0.15	0.01%
28.	Jindal Power	10.13	0.77%	Meghalaya	0.12	0.01%
29.	Raigarh Energy Ltd.	9.77	0.74%	Sikkim	0.08	0.01%
30.	Raipur Energen	9.31	0.71%	Goa WR	0.07	0.01%
31.	Sikkim	9.17	0.70%	Chhattisgarh	0.03	0.00%
32.	Khargone STPP	7.92	0.60%			
33.	GMR Warora	6.90	0.53%			
34.	Ramagundam Stg-3	6.86	0.52%			
35.	Sasan UMPP	6.69	0.51%			
36.	NTPC Sholapur	6.45	0.49%			
37.	GMR Kamalanga	6.09	0.46%			
38.	NTPC Gadarwara	6.07	0.46%			
39.	Maharashtra	4.26	0.32%			

40.	Manipur	4.07	0.31%			
41.	NPGC Nabinagar	3.63	0.28%			
42.	Gujarat	3.55	0.27%			
43.	Neyveli New Thermal	3.25	0.25%			
44.	ACBIL	2.98	0.23%			
45.	Jharkhand	2.88	0.22%			
46.	Palatana	2.79	0.21%			
47.	Haryana	2.73	0.21%			
48.	Barh STPS Stg - I	2.21	0.17%			
49.	NLC TPS-II Expn	2.15	0.16%			
50.	Talcher Stg-2	1.55	0.12%			
51.	Singoli Bhagwati	1.55	0.12%			
52.	Maruti Clean Coal	1.37	0.10%			
53.	Sembcorp Energy India	1.32	0.10%			
54.	BALCO 2	1.03	0.08%			
55.	Azure Power Forty	1.01	0.08%			
56.	Adhunik Power	0.88	0.07%			
57.	Tamilnadu	0.86	0.07%			
58.	Sorang HEP,	0.77	0.06%			
59.	Barh Stg-2	0.60	0.05%			
60.	SKS Power	0.57	0.04%			
61.	J&K	0.54	0.04%			
62.	NTPC Kudgi	0.53	0.04%			
63.	Jorethang	0.47	0.04%			
64.	AGBPP	0.41	0.03%			
65.	AGTPP	0.40	0.03%			
66.	Dikchu	0.34	0.03%			
67.	RGPPL_IR	0.28	0.02%			
68.	Karcham Wangtoo	0.23	0.02%			
69.	Punjab	0.21	0.02%			
70.	Sainj HEP	0.20	0.02%			
71.	Tashiding HEP	0.18	0.01%			
72.	Simhadri Stg-2	0.17	0.01%			
73.	RGPPL_Others	0.09	0.01%			
74.	Renew Solar Energy	0.07	0.01%			
75.	RGPPL	0.07	0.01%			
76.	Dhariwal	0.03	0.00%			
77.	Uttarakhand	0.02	0.00%			
78.	DVC	0.01	0.00%			
79.	Nagaland	0.01	0.00%			
Total Volume of top 10		880.63	67.15%	Total Volume of top 10	1,167.83	89.06%
Total Volume in PXs		1,311.35		Total Volume in PXs	1,311.35	

Annexure-XII**Cross Border Electricity Transactions in Day Ahead Market (DAM) in IEX with Nepal during the month of November, 2021**

S. No	Delivery Date	Traded Volume (MU)
1	01-11-2021	0.94
2	02-11-2021	0.94
3	03-11-2021	0.94
4	04-11-2021	0.94
5	05-11-2021	0.94
6	06-11-2021	0.94
7	07-11-2021	0.94
8	08-11-2021	0.94
9	09-11-2021	0.94
10	10-11-2021	0.94
11	11-11-2021	0.94
12	12-11-2021	0.94
13	13-11-2021	0.94
14	14-11-2021	0.94
15	15-11-2021	0.94
16	16-11-2021	0.94
17	17-11-2021	0.94
18	18-11-2021	0.94
19	19-11-2021	0.94
20	20-11-2021	0.94
21	21-11-2021	0.94
22	22-11-2021	0.94
23	23-11-2021	0.94
24	24-11-2021	0.94
25	25-11-2021	0.94
26	26-11-2021	0.94
27	27-11-2021	0.94
28	28-11-2021	0.94
29	29-11-2021	0.94
30	30-11-2021	0.94
Total		26.21

∴ No transaction happened.

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, Uttarakhand, 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. **Green Day Ahead Market (GDAM)** is based on the principles of current Term Ahead Market (TAM), where market participants purchase and sell electricity generated from renewable sources at financially binding day-ahead prices for the following day.
11. **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.

- 12. 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.
- 13. 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.