



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

आर. ए. प्रभाग/ Regulatory Affairs Division

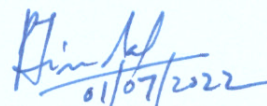
Subject: Monthly Market Monitoring Report for the month of April, 2022-reg.

In the month of April, 2022 a total of 132,028 MU of electricity was transacted in the country out of which 60,398 MU was transacted through ISTS, and the remaining through state controlled generating stations.

A total of 18,982 MU was transacted under Short Term Market, out of which 9,281 MU was transacted through Power Exchanges and remaining happened as bilateral transactions & deviations. Thus, the total short term trade in April, 2022 was 14.38 % of total volume of electricity traded in April, 2022 and 7.03 % was through Power Exchanges.

If we compare these transactions with respect to the electricity supplied through ISTS, the short term transactions constitutes about 31.43 % of ISTS transactions, out of which transaction through the power exchanges constitutes 15.37 %.

The monthly market monitoring report for the month of April, 2022 giving details of electricity transaction happened in the power exchanges and other short term markets is annexed below for reference.


01/07/2022

Pardeep Jindal

Chief Engineer (RA)

To

All Stake holders



सत्यमेव जयते

अप्रैल, 2022 मासिक मार्केट मॉनिटरिंग रिपोर्ट

Monthly Market Monitoring Report

April, 2022



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

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MARKET MONITORING REPORT
FOR THE MONTH OF APRIL, 2022

SUMMARY

SUMMARY FOR MONTH: APRIL, 2022

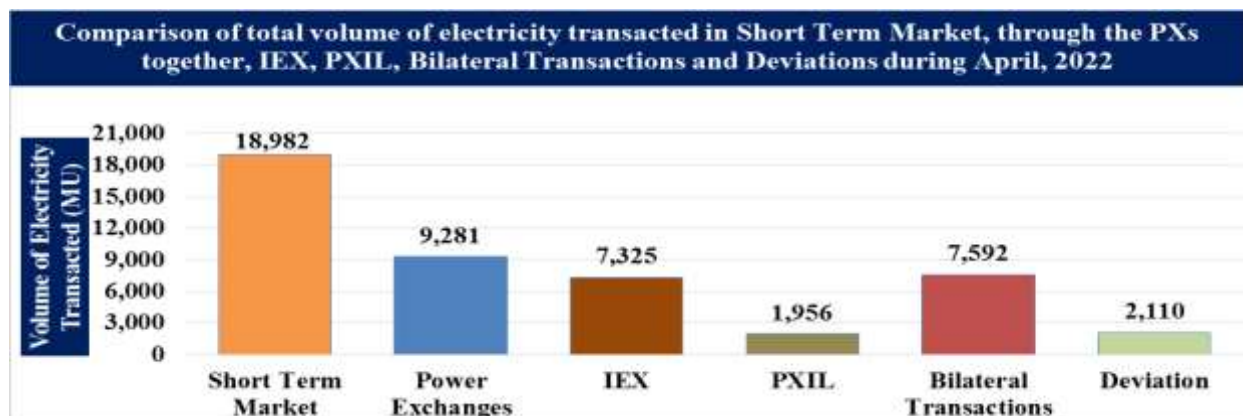
SUMMARY OF ELECTRICITY TRANSACTIONS ON POWER EXCHANGES IN INDIA

- A total volume of **9,281 MU** electricity was transacted in both the power exchanges i.e. IEX & PXIL, during the month of April, 2022. 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 (MU)	Real Time Curtailment (MU)
DAM	4113.65	10.06	0.69	8.86
GDAM	214.73	10.21	0.00	0.00
RTM	1704.38	4.78	0.56	0.00
TAM	2918.36	10.51	307.98	28.20
GTAM	329.44	8.81	0.00	0.00
Total in PXs	9280.56	9.19*	309.23	37.06

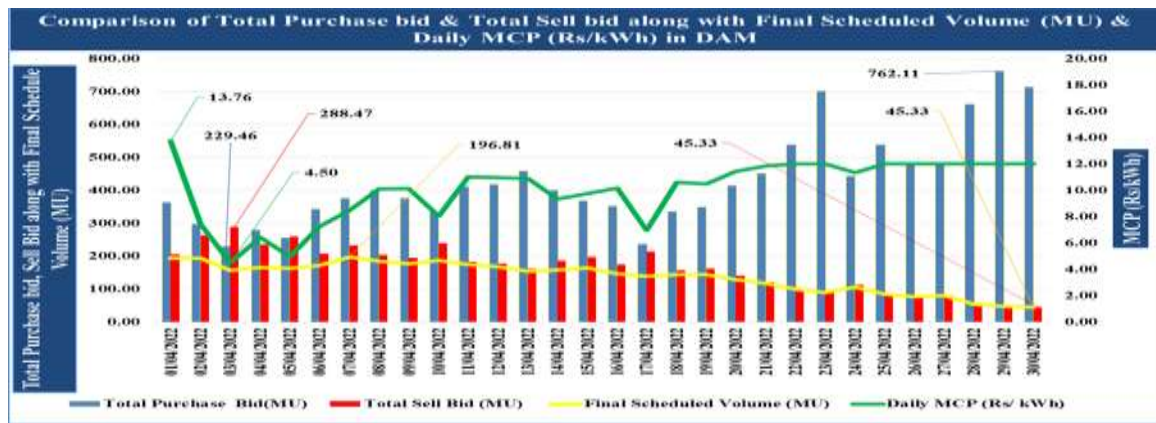
* The total average is weighted average of all market segments.

- Under the Bilateral trade a total of **7,592 MU** of electricity was transacted and **2,110 MU** was transferred as deviation. Thus a total of **18,982 MU** of electricity was transacted as short term trade. In the month of April, 2022 a total of **132,028 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in April, 2022 was **14.38%**.



- The total volume of congestion that happened during the month of April, 2022 was **309.23 MU** which is only 3.33 % of the total volume of electricity transacted in the power exchanges and 0.23 % of total energy supplied during the month of April, 2022. There was no congestion observed in GDAM and GTAM in April, 2022, whereas there was congestion in DAM on 3days (08.04.2022, 10.04.2022 & 13.04.2022), in RTM on 7 days (03.04.2022 to 04.04.2022, 06.04.2022 to 08.04.2022 & 11.04.2022 to 12.04.2022) and in TAM on 14 days (06.04.2022, 11.04.2022, 14.04.2022 to 16.04.2022, 19.04.2022 to 24.04.2022, 26.04.2022 to 28.04.2022). The total volume of real time curtailment reported in the month of April, 2022 was only **37.06 MU**. The total volume of electricity scheduled at ISTS during the month of April, 2022 was **60,398 MU**. **The total volume of electricity transacted in the short term market was 31.43 % of total volume schedule at ISTS in the month of April, 2022.**
- The variation of Purchase and Sell bids, Final Scheduled Volume and Daily MCP in DAM and RTM during the month of April, 2022 are shown in following figures:

DAM Volume

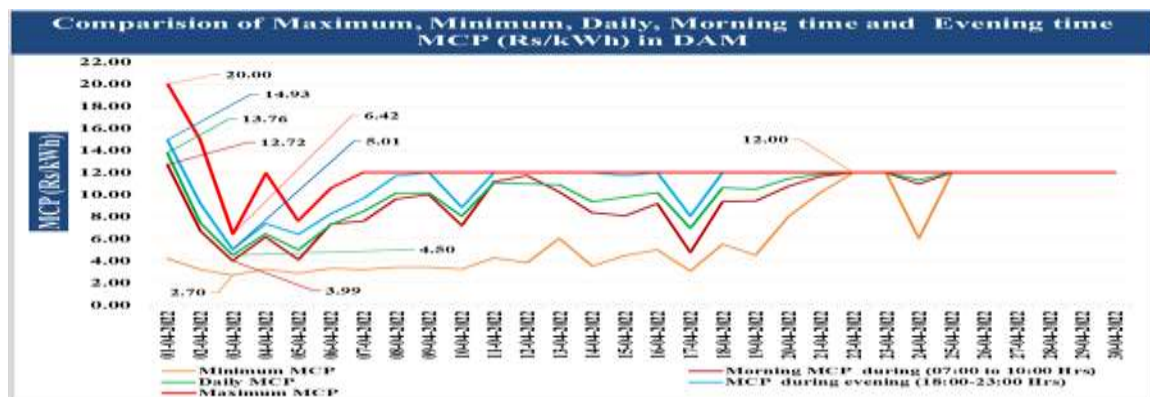


RTM Volume

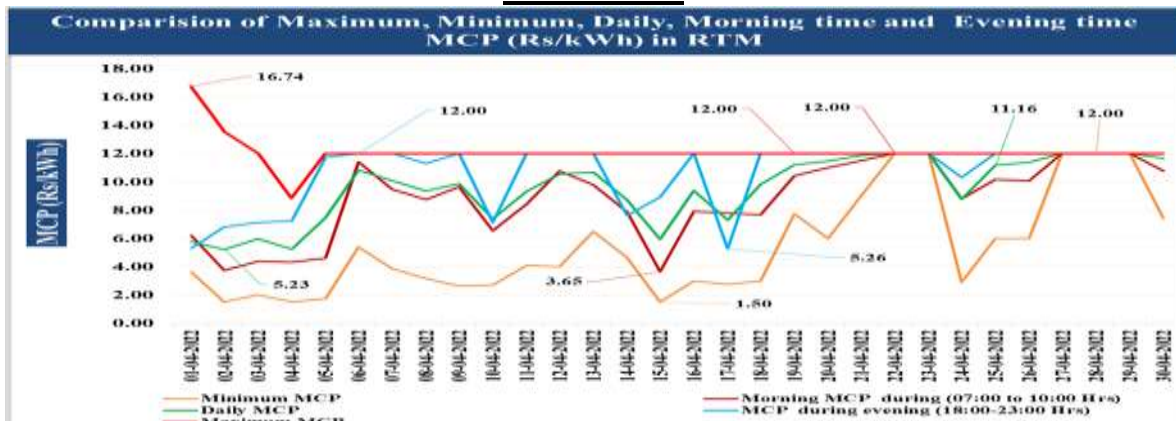


- The variation of Maximum, Minimum, Daily, Morning and Evening time MCPs in DAM and RTM during the month of April, 2022 are shown in following figures:

DAM Prices



RTM Prices



THE MARKET MONITORING REPORT FOR APRIL, 2022

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 April, 2022 was **4113.65 MU**. The total energy supplied in the country during the month of April, 2022 was 132,028 MU. Thus, the volume of electricity transacted on both the power exchanges in DAM during April, 2022 was 3.12 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month .i.e. March, 2022, it was **5858.59 MU** which was 4.56 % of the total energy supplied [128,478 MU] in the country during March, 2022. Similarly, the total volume of electricity transacted in DAM during previous year .i.e. April, 2021, it was **5703.95 MU** which was 4.87 % of the total energy supplied [117,080 MU] in the country during April, 2021.
- 1.2.** The volume of electricity transacted on IEX during April, 2022 was **4113.65 MU**, whereas no transaction of electricity happened in PXIL during April, 2022. Which means that the total volume transacted on IEX was **100 %** of the total volume on power exchanges. The volume of electricity transacted on IEX and PXIL during March, 2022 were **5858.39 MU and 0.20 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 April, 2021, were **5699.22 MU and 4.73 MU** respectively.
- 1.3.** There was Cross Border Transactions of Electricity of **99.88 MU** (i.e. 99.88 MU buy by Nepal) happened in DAM in IEX during April, 2022. Whereas, there was Cross Border Transactions of Electricity of **181.49 MU** (147.36 MU buy by Nepal and 34.13 MU buy by Bhutan) happened in DAM in IEX during March, 2022.
- 1.4.** The Average Market Clearing Price (MCP) on IEX during the month of April, 2022 was **Rs 10.06/kWh**, which shows an increase of **22.29 % & 172.00 %** when compared with average MCP's for the month of March, 2022 and April, 2021, which were **Rs 8.23/kWh and Rs 3.70/kWh**, respectively. No transaction happened in PXIL

2. DAM 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 April, 2022 with that of March, 2022 and April, 2021 is given in Table- 1A & 1B:**

(a) April, 2022 vis- a -vis March, 2022

Daily MCP (Rs/kWh)	IEX			PXIL		
	April, 2022	March, 2022	% Change	April, 2022	March, 2022	% Change
Minimum	4.50	3.76	19.68	-	1.99	NA
Maximum	13.76	18.67	-26.30	-	4.99	NA
Average	10.06	8.23	22.24	-	3.49	NA

Table: 1A

(b) April, 2022 vis- a –vis April, 2021

Daily MCP (Rs/kWh)	IEX			PXIL		
	April, 2022	April, 2021	% Change	April, 2022	April, 2021	% Change
Minimum	4.50	2.96	52.03	-	3.28	NA
Maximum	13.76	4.94	178.54	-	4.57	NA
Average	10.06	3.70	171.89	-	3.69	NA

Table: 1B

2.2. The maximum Area Clearing Price (ACP) of **Rs 20.00/kWh** in IEX was observed in all 13 regions on 1st April, 2022 during multiple time blocks (00:00-00:15 to 01:15-01:30, 06:00-06:15 to 06:30-06:45, 16:30-16:45 to 16:45-17:00 & 23:30-23:45 to 23:45 to 24:00. As there was no congestion in transmission system, the MCP for these time-blocks was also **Rs 20.00/kWh**. However, the Daily MCP in IEX on 1st April, 2022 was **Rs. 13.76/kWh**. Whereas, in PXIL No transaction happened.

2.3. The minimum Area Clearing Price (ACP) of **Rs 2.70/kWh** in IEX was observed in all 13 regions on 3rd April, 2022 during the time block 14:30-14:45. As there was no congestion in transmission system, the MCP for these time-blocks was also **Rs 2.70/kWh**. However, the Daily MCP in IEX on 3rd April, 2022 was **Rs. 4.50/kWh**. Whereas, in PXIL No transaction happened.

2.4. A comparison of the Minimum and Maximum Area Clearing Price (ACP) during the months of April, 2022 with that of March, 2022 and April, 2021 is given in Table-2A&2B:

(a) April, 2022 vis- a -vis March, 2022

ACP (Rs/kWh)	IEX			PXIL		
	April, 2022	March, 2022	% Change	April, 2022	March, 2022	% Change
Minimum	2.70	2.42	11.57	-	1.99	NA
Maximum	20.00	20.00	0.00	-	4.99	NA

Table: 2A**(b) April, 2022 vis- a- vis April, 2021**

ACP (Rs/kWh)	IEX			PXIL		
	April, 2022	April, 2021	% Change	April, 2022	April, 2021	% Change
Minimum	2.70	2.30	17.39	-	3.09	NA
Maximum	20.00	7.55	164.90	-	7.10	NA

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 April, 2022 with that of March, 2022 and April, 2021 is given in Table-2C & 2D:

(a) April, 2022 vis- a- vis March, 2022

Final Scheduled Volume (MU)	IEX			PXIL		
	April, 2022	March, 2022	% Change	April, 2022	March, 2022	% Change
Minimum	45.33	148.13	-69.40	-	0.04	NA
Maximum	196.81	245.05	-19.69	-	0.16	NA
Average	137.12	188.98	-27.44	-	0.10	NA

Table: 2C**(b) April, 2022 vis- a- vis April, 2021**

Final Scheduled Volume (MU)	IEX			PXIL		
	April, 2022	April, 2021	% Change	April, 2022	April, 2021	% Change
Minimum	45.33	143.55	-68.42	-	0.14	NA
Maximum	196.81	238.26	-17.40	-	0.84	NA
Average	137.12	189.97	-27.82	-	0.43	NA

Table: 2D**3. 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 April, 2022 was **1704.38 MU**, out of which, **1704.28 MU** (99.99 %) was transacted in IEX and **0.10 MU** (0.01 %) was transacted in 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 April, 2022 as compared with March, 2022 and April, 2021 are as given in table 3A, 3B & 3C:

(i) Final Scheduled Volume:

Exchange	Period	Final Scheduled Volume (MU)			
		Total	Minimum	Maximum	Average
IEX	April, 2022	1704.28	23.92	98.97	56.81
	March, 2022	2020.86	47.91	96.60	65.19
	Change % (Month over Month)	-15.67	-50.07	2.45	-12.85
	April, 2021	1473.36	35.56	68.36	49.11
	Change % (Year over Year)	15.67	-32.73	44.78	15.68
PXIL	April, 2022	0.10	0.001	0.08	0.03
	March, 2022	-	-	-	-
	Change % (Month over Month)	NA	NA	NA	NA
	April, 2021	-	-	-	-
	Change % (Year over Year)	NA	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table-3A

(ii) Daily Market Clearing Price (MCP):

Exchange	Period	Daily MCP (Rs/kWh)		
		Minimum	Maximum	Average
IEX	April, 2022	5.23	12.00	9.55
	March, 2022	3.43	17.48	8.17
	Change % (Month over Month)	52.48	-31.35	16.89
	April, 2021	2.77	5.60	3.50
	Change % (Year over Year)	88.81	114.29	172.86
PXIL	April, 2022	7.00	12.00	10.33
	March, 2022	-	-	-
	Change % (Month over Month)	NA	NA	NA
	April, 2021	-	-	-
	Change % (Year over Year)	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table-3B**(iii) Area Clearing Price (ACP):**

Exchange	Period	ACP (Rs/kWh)	
		Minimum	Maximum
IEX	April, 2022	0.60	16.74
	March, 2022	1.00	20.00
	Change % (Month over Month)	-40.00	-16.30
	April, 2021	1.00	10.50
	Change % (Year over Year)	-40.00	59.43
PXIL	April, 2022	7.00	12.00
	March, 2022	-	-
	Change % (Month over Month)	NA	NA
	April, 2021	-	-
	Change % (Year over Year)	NA	NA

-: No transaction happened

NA: Not Applicable

Table -3C**4. GREEN DAY AHEAD MARKET (GDAM):**

The transaction of electricity in Green Day Ahead Market (GDAM) has been started in IEX from 27th October, 2021 with the approval of the CERC. The total volume of electricity transacted in GDAM in the month of April, 2022 was **214.74 MU** at an average price MCP of **Rs 10.21/kWh**. 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 April, 2022 are given below:

i) Final Scheduled Volume in IEX:

Segment	Period	Final Scheduled Volume (MU)			
		Total	Minimum	Maximum	Average
Solar	April, 2022	89.13	0.40	4.79	2.97
	March, 2022	67.87	0.47	6.10	2.19
	% Change (Month over Month)	31.32	-14.89	-21.48	35.62
Non Solar	April, 2022	125.60	2.45	6.05	4.19
	March, 2022	136.95	2.64	6.38	8.09
	% Change (Month over Month)	-8.29	-7.20	-5.17	-48.21

Hydro	April, 2022	-	-	-	-
	March, 2022	-	-	-	-

-: No transaction happened

NA: Not Applicable

Table-4A**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	April, 2022	4.59	16.26	10.21	3.65	20.00
	March, 2022	4.01	17.34	8.09	3.25	20.00
	% Change (Month over Month)	14.46	-6.23	26.21	12.31	0.00

-: No transaction happened

NA: Not Applicable

Table-4B

- 4.1.** In the month of April, 2022, 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 March, 2022, there was no transmission congestion in IEX in GDAM, hence one nation one price was observed for all **31 days** during the month.
- 4.2.** There was **no** real time curtailment in IEX in Green Day Ahead Market during the month of April, 2022 and March, 2022, respectively.
- 4.3.** The **top 10 sellers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of April, 2022 were **Karnataka, Adani Hybrid Energy Jaisalmer Four Limited (Solar), J&K, Adani Green Solar Jaisalmer, Azure Power Maple Pvt Ltd, Adani Hybrid Energy Jaisalmer Three Limited (Solar), Renew Solar Energy (Jharkhand Three) Pvt Ltd (RSEJTPL), Madhya Pradesh, Renew Solar Urja Private Limited and Adani Hybrid Energy Jaisalmer Two Limited (Solar)**, which constituted **86.86%** of the market volume.
- 4.4.** The **top 10 purchasers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of April, 2022 were **Punjab, Maharashtra, Gujarat, Jharkhand, West Bengal, Railways, Uttar Pradesh, Karnataka Dadra & Nagar Haveli and Delhi**, which constituted **93.84 %** of the market volume.

5. TERM AHEAD MARKET (TAM)**Term Ahead Market (TAM) (on Trade Date Basis)**

- 5.1.** The total volume of electricity transacted on both the power exchanges in Term Ahead Market in April, 2022 on trade date basis was **3,234.74 MU**, out of which, **1,166.80 MU** (36.07 %) was transacted on IEX and **2,067.94 MU** (63.93 %) was transacted on PXIL.
- 5.2.** The total volume of electricity transacted on both the power exchanges in Term Ahead Market in March, 2022 on trade date basis was **1,316.99 MU**, out of which, **716.62 MU** (54.41%) was transacted on IEX and **600.37 MU** (45.59%) was transacted on PXIL.

- 5.3. Similarly, total volume of electricity transacted on both the power exchanges in Term Ahead Market in April, 2021 on trade date basis was **977.13 MU**, out of which, **325.78 MU** (33.34 %) was transacted on IEX and **651.35 MU** (66.66 %) was transacted on PXIL
- 5.4. With respect to the total energy supplied during month of April, 2022 in the country, the volume of electricity traded on power exchanges in TAM on trade date basis represents **2.45 %** of the total energy supplied. The same was **1.03 %** in March, 2022 and **0.83 %** in April, 2021.
- 5.5. In the month of April, 2022, there was transmission congestion of **307.98 MU** in TAM, Out of which **2.66 MU** happened under Day Ahead Contingency contract, **0.66 MU** under Intra Day contract, **298.42 MU** under Daily/Anyday contract & **6.24 MU** under Weekly contract in IEX. Whereas, In PXIL there was no transmission congestion in TAM during the month of April, 2022.
- 5.6. **The comparison of total volume of electricity transacted and Average MCP on both the power exchanges in Term Ahead Market (TAM) during April, 2022 with March, 2022 and April, 2021 is given in Table- 5A, 5B & 5C:**

(a) April, 2022 vis- a- vis March, 2022 (on trade Date Basis)

Contract Type	IEX			PXIL		
	April, 2022	March, 2022	% Change	April, 2022	March, 2022	% Change
Intra Day (MU)	18.23	2.61	598.47	16.89	1.34	1160.45
Day Ahead Contingency(MU)	515.33	408.44	26.17	762.74	366.64	108.04
Daily/ AnyDay (MU)	597.72	305.57	95.61	1288.3	232.39	454.37
Weekly (MU)	35.52	-	NA	0.00	-	NA

- : No Transaction happened

NA: Not Applicable

Table: 5A

(b) April, 2022 vis- a- vis April, 2021 (on trade Date Basis)

Contract Type	IEX			PXIL		
	April, 2022	April, 2021	% Change	April, 2022	April, 2021	% Change
Intra Day (MU)	18.23	7.50	143.07	16.89	95.87	-82.38
Day Ahead Contingency(MU)	515.33	64.77	695.64	762.74	-	NA
Daily/ AnyDay (MU)	597.72	253.51	135.78	1288.31	555.48	131.93
Weekly (MU)	35.52	-	NA	-	-	NA

- : No Transaction happened

NA: Not Applicable

Table: 5B

(c) Average MCP, April, 2022 vis- a- vis March, 2022 and April, 2021 (on trade Date Basis)

Exchange	Period	Average MCP (Rs/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	April, 2022	13.19	11.02	11.03	13.50
	March, 2022	1.26	9.63	2.26	-
	%Change (Month over Month)	946.83	14.43	388.05	NA

PXIL	April, 2021	4.72	3.91	3.48	-
	%Change (Year over Year)	179.45	181.84	216.95	NA
	April, 2022	13.57	11.07	11.62	-
	March, 2022	12.47	9.05	8.58	-
	%Change (Month over Month)	8.82	22.32	35.43	NA
	April, 2021	4.07	-	3.72	-
	%Change (Year over Year)	233.42	NA	212.37	NA

-: No transaction happened

NA: Not Applicable

Table: 5C

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

- 5.7. The total volume of electricity transacted on both the power exchanges in Term Ahead Market in April, 2022 on delivery date basis was **2918.36 MU**, out of which, **1171.50 MU** (40.14 %) was transacted on IEX and **1746.86 MU** (59.86%) was transacted on PXIL.
- 5.8. The total volume of electricity transacted on both the power exchanges in Term Ahead Market in March, 2022 on delivery date basis was **1,344.81 MU**, out of which, **822.71 MU** (61.18 %) was transacted on IEX and **522.10 MU** (38.82%) was transacted on PXIL.
- 5.9. Similarly, The total volume of electricity transacted on both the power exchanges in Term Ahead Market in April, 2021 on delivery date basis was **925.30 MU**, out of which, **348.58 MU** (37.67%) was transacted on IEX and **576.72 MU** (62.33%) was transacted on PXIL.
- 5.10. With respect to the total energy supplied during the month of April, 2022 in the country, the volume of electricity traded on the power exchanges in TAM on delivery date basis represents **2.21 %** of the total energy supplied. The same was **0.98 %** in March, 2022 and **0.53 %** in April, 2021.
- 5.11. In the month of April, 2022, there was real time curtailment of **5.91 MU** in IEX in TAM, Out of which **0.76 MU** happened under Day Ahead Contingency contract and **5.15 MU** happened under Daily/Anyday contract in IEX. Whereas, in PXIL there was real time curtailment of **22.29 MU** in TAM, Out of which **15.41 MU** happened under Day Ahead Contingency contract and **6.88 MU** happened under Daily/Anyday contract.
- 5.12. **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 April, 2022 with March, 2022 and April, 2021 is given in Table – 5D, 5E & 5F:**

(a) April, 2022 vis- a- vis March, 2022 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	April, 2022	March, 2022	% Change	April, 2022	March, 2022	% Change
Intra Day (MU)	18.23	2.61	598.47	16.92	1.34	1162.69
Day Ahead Contingency(MU)	533.50	387.89	37.54	772.30	377.17	104.76
Daily/Any Day (MU)	601.05	432.21	39.06	957.64	143.59	566.93
Weekly (MU)	18.72	-	NA	-	-	NA

- : No transaction happened

NA: Not Applicable

Table: 5D

(b) April, 2022 vis- a- vis April, 2021 (on Delivery Date Basis)

Contract Type	IEX			PXIL		
	April, 2022	April, 2021	% Change	April, 2022	April, 2021	% Change
Intra Day (MU)	18.23	7.50	143.07	16.92	94.17	-82.03
Day Ahead Contingency MU)	533.50	63.07	745.89	772.30	-	NA
Daily/ Any Day (MU)	601.05	278.01	116.20	957.64	482.55	98.45
Weekly (MU)	18.72	-	NA	-	-	NA

-: No transaction happened

NA: Not Applicable

Table: 5E**(c) Average MCP, April, 2022 vis- a- vis March, 2022 and April, 2021 (on Delivery Date Basis)**

Exchange	Period	Average MCP (Rs/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	April, 2022	13.21	11.03	9.57	12.00
	March, 2022	1.26	9.31	6.11	-
	%Change (Month over Month)	948.41	18.47	56.63	NA
	April, 2021	4.72	3.92	3.67	-
	%Change (Year over Year)	179.87	181.38	160.76	NA
PXIL	April, 2022	13.57	11.09	10.20	-
	March, 2022	12.47	8.70	6.85	-
	%Change (Month over Month)	8.82	27.47	48.91	NA
	April, 2021	4.23	-	3.75	-
	%Change (Year over Year)	220.80	NA	172.00	NA

-: No transaction happened

NA: Not Applicable

Table: 5F**6. 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 was **335.90 MU (205.00 MU in Solar and 130.90 MU in non-Solar)**, whereas, the same on delivery date basis was **329.44 MU (202.05 MU in Solar and 127.39 MU in Non-Solar)**, respectively. The total volume of electricity transacted in Solar Energy Segment in GTAM in Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during March, 2022 on trade date basis and delivery date basis has been shown in Tables 6A to 6H.

6.1. 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 April, 2022 and its comparison with March, 2022 and April, 2021 has been shown in Table 6A & 6B below.

(i) Final Scheduled Volume:

Exchange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	April, 2022	19.08	0.17	2.65	1.12
		March, 2022	43.37	0.03	4.77	1.67
		%Change (Month over Month)	-56.01	466.67	-44.44	-32.93
		April, 2021	72.73	0.44	6.10	2.42
		%Change (Year over Year)	-73.77	-61.36	-56.56	-53.72
	Intraday	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	0.42	0.42	0.42	0.42
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/ Anyday	April, 2022	15.99	0.54	5.75	2.66
		March, 2022	5.18	1.49	2.13	1.73
		%Change (Month over Month)	208.69	-63.76	169.95	53.76
		April, 2021	3.50	1.40	2.10	1.75
		%Change (Year over Year)	356.86	-61.43	173.81	52.00
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	1.68	1.68	1.68	1.68
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	168.50	3.92	7.70	5.62
		March, 2022	140.31	1.52	7.71	4.53
		%Change (Month over Month)	20.09	157.89	-0.13	24.06
	Intraday	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/ Anyday	April, 2022	1.43	0.50	0.93	0.72
		March, 2022	0.44	0.44	0.44	0.44
		%Change (Month over Month)	225.00	13.64	111.36	63.64
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%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	April, 2022	3.50	12.04	8.01
		March, 2022	3.50	17.54	6.08
		%Change (Month over Month)	0.00	-31.36	31.74
		April, 2021	3.45	4.47	3.90
		%Change (Year over Year)	1.45	169.35	105.38
	Intraday	April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	4.00	4.00	4.00
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	April, 2022	4.95	11.86	7.65
		March, 2022	5.00	5.20	5.07
		%Change (Month over Month)	-1.00	128.08	50.89
		April, 2021	4.35	4.40	4.38
		%Change (Year over Year)	13.79	169.55	74.66
	Weekly	April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	4.00	4.00	4.00
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	3.24	11.99	8.11
		March, 2022	3.93	14.01	6.58
		%Change (Month over Month)	-17.56	-14.42	23.25
	Intraday	April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/ Anyday	April, 2022	12.85	14.00	13.43
		March, 2022	4.60	4.60	4.60
		%Change (Month over Month)	179.35	204.35	191.96
	Weekly	April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction happened

NA: Not Applicable

Table-6B

6.2. 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 April, 2022 and its comparison with March, 2022 and April, 2021 has been shown in Table 6C & 6D below.

(i) Final Scheduled Volume:

Exchange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	April, 2022	20.12	0.17	2.65	1.18
		March, 2022	43.64	0.03	4.77	1.68
		%Change (Month over Month)	-53.90	466.67	-44.44	-29.76
		April, 2021	72.07	0.44	6.10	2.40
		%Change (Year over Year)	-72.08	-61.36	-56.56	-50.83
	Intraday	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	0.42	0.42	0.42	0.42
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	April, 2022	17.48	0.10	1.63	0.58
		March, 2022	3.69	0.12	0.26	0.20
		%Change (Month over Month)	373.71	-16.67	526.92	190.00
		April, 2021	2.90	0.20	0.30	0.24
		%Change (Year over Year)	502.76	-50.00	443.33	141.67
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	163.52	2.61	7.70	5.45
		March, 2022	143.23	1.52	7.71	4.62
		%Change (Month over Month)	14.17	71.71	-0.13	17.97
	Intraday	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	April, 2022	0.93	0.93	0.93	0.93
		March, 2022	1.03	0.06	0.06	0.06
		%Change (Month over Month)	-9.71	1450.00	1450.00	1450.00
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-

:- No transaction happened

NA: Not Applicable

Table-6C

(ii) Daily Market Clearing Price (MCP):

Exchange	Solar Energy Contract	Period	Prices(Rs/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	April, 2022	3.50	12.04	7.98
		March, 2022	3.50	17.54	5.79
		%Change (Month over Month)	0.00	-31.36	37.82
		April, 2021	3.45	4.47	3.91
		%Change (Year over Year)	1.45	169.35	104.09
		April, 2022	-	-	-
	Intraday	March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	4.00	4.00	4.00
		%Change (Year over Year)	NA	NA	NA
		April, 2022	4.95	9.81	5.93
	Daily/Anyday	March, 2022	5.00	5.00	5.00
		%Change (Month over Month)	-1.00	96.20	18.60
		April, 2021	4.35	4.40	4.38
		%Change (Year over Year)	13.79	122.95	35.39
		April, 2022	-	-	-
	Weekly	March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		April, 2022	3.24	11.77	8.09
PXIL	Day Ahead Contingency	March, 2022	3.93	14.01	6.35
		%Change (Month over Month)	-17.56	-15.99	27.40
		April, 2022	-	-	-
	Intraday	March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2022	14.00	14.00	14.00
	Daily/Anyday	March, 2022	4.50	4.60	4.54
		%Change (Month over Month)	211.11	204.35	208.37
		April, 2022	-	-	-
	Weekly	March, 2022	-	-	-

-: No transaction happened

NA: Not Applicable

Table-6D

- In April, 2022, there was no transmission congestion in GTAM (Solar) in both IEX and PXIL.
- In April, 2022, there was no real time curtailment in GTAM (Solar) in both IEX & PXIL.

6.3. 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 April, 2022 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 April, 2022 on trade date basis and its comparison with March, 2022 and April, 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	April, 2022	68.32	0.42	3.21	2.36
		March, 2022	137.03	3.04	6.93	4.42
		%Change (Month over Month)	-50.14	-86.18	-53.68	-46.61
		April, 2021	104.61	0.24	13.31	3.49
		%Change (Year over Year)	-34.69	75.00	-75.88	-32.38
	Intraday	April, 2022	0.20	0.20	0.20	0.20
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	3.01	0.18	2.40	1.00
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/ Anyday	April, 2022	16.54	0.60	9.07	2.76
		March, 2022	1.43	0.22	0.67	0.48
		%Change (Month over Month)	1056.64	172.73	1253.73	475.00
		April, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		April, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	45.52	0.60	3.38	1.52
		March, 2022	166.87	0.59	10.75	5.38
		%Change (Month over Month)	-72.72	1.69	-68.56	-71.75
	Intraday	April, 2022	-	-	-	-
		March, 2022	2.83	1.27	1.56	1.41
		%Change (Month over Month)	NA	NA	NA	NA

	Daily/ Anyday	April, 2022	0.32	0.32	0.32	0.32
		March, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-

-: 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	April, 2022	4.75	14.84	10.53
		March, 2022	3.73	18.87	8.43
		%Change (Month over Month)	27.35	-21.36	24.91
		April, 2021	4.12	5.03	4.39
		%Change (Year over Year)	15.29	195.03	139.86
		April, 2022	12.00	12.00	12.00
	Intraday	March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	4.90	5.60	5.25
		%Change (Year over Year)	144.90	114.29	128.57
		April, 2022	6.00	13.10	11.21
		March, 2022	4.70	6.00	5.23
	Daily/Anyday	%Change (Month over Month)	27.66	118.33	114.34
		April, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	April, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	4.67	13.66	10.40
		March, 2022	4.22	19.11	8.88
		% Change (Month over Month)	10.66	-28.52	17.12
	Intraday	April, 2022	-	-	-
		March, 2022	7.00	12.02	9.51
		% Change (Month over Month)	NA	NA	NA
	Daily/ Anyday	April, 2022	13.40	13.40	13.40
		March, 2022	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Weekly	April, 2022	-	-	-
		March, 2022	-	-	-

-: No transaction happened

NA: Not Applicable

Table-6F

6.4. 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 April, 2022 and its comparison with March, 2022 has been shown in Table 6G & 6H below.

(i) Final Scheduled Volume:

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum	Maximum	Average
IEX	Day Ahead Contingency	April, 2022	68.55	0.42	3.45	2.36
		March, 2022	138.78	3.04	6.93	4.48
		% Change (Month over Month)	-50.61	-86.18	-50.22	-47.32
		April, 2021	99.94	0.24	13.31	3.33
		% Change (Year over Year)	-31.41	75.00	-74.08	-29.13
	Intraday	April, 2022	0.20	0.20	0.20	0.20
		March, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
		April, 2021	3.01	0.18	2.40	1.00
		% Change (Year over Year)	-93.36	11.11	-91.67	-80.00
	Daily/Anyday	April, 2022	14.42	0.10	1.75	0.60
		March, 2022	1.21	0.07	0.11	0.09
		% Change (Month over Month)	1091.74	42.86	1490.91	566.67
		April, 2021	-	-	-	-
		% Change (Year over Year)	NA	NA	NA	NA
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
		April, 2021	-	-	-	-
		% Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	43.90	0.59	3.38	1.46
		March, 2022	171.80	1.69	10.75	5.54
		% Change (Month over Month)	-74.45	-65.09	-68.56	-73.65
	Intraday	April, 2022	-	-	-	-
		March, 2022	2.83	1.27	1.56	1.41
		% Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	April, 2022	0.32	0.32	0.32	0.32
		March, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
	Weekly	April, 2022	-	-	-	-
		March, 2022	-	-	-	-

-: 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	April, 2022	4.75	14.01	10.50
		March, 2022	3.73	18.87	8.13
		%Change (Month over Month)	27.35	-25.76	29.15
		April, 2021	4.12	5.03	4.38
		%Change (Year over Year)	15.29	178.53	139.73
	Intraday	April, 2022	12.00	12.00	12.00
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	4.90	5.60	5.25
		%Change (Year over Year)	144.90	114.29	128.57
	Daily/Anyday	April, 2022	6.00	12.15	8.24
		March, 2022	4.70	5.00	4.76
		%Change (Month over Month)	27.66	143.00	73.11
		April, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	April, 2022	-	-	-
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		April, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	April, 2022	4.67	13.92	10.41
		March, 2022	4.22	19.11	8.56
		%Change (Month over Month)	10.66	-27.16	21.61
	Intraday	April, 2022	-	-	-
		March, 2022	7.00	12.02	9.51
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	April, 2022	13.40	13.40	13.40
		March, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	April, 2022	-	-	-
		March, 2022	-	-	-

-: No transaction happened

NA: Not Applicable

Table-6H

- In April, 2022, there was no transmission congestion in GTAM (Non Solar) in both IEX and PXIL.
- In April, 2022, there was no real time curtailment in GTAM (Non Solar) in both IEX & PXIL.

7. BILATRAL TRANSACTIONS:

The total volume of electricity transacted through **Bilateral transactions** in the month of April, 2022 was **7,592.35 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and traders in the month of April, 2022 were **1,548.30 MU** and **6,044.05 MU** respectively. The details of Bilateral transactions of Electricity happened during April, 2022 have been shown in Table Below:

April, 2022	Direct	Traders	Total Bilateral Transaction (MU)
Total	1548.30	6044.05	7592.35
Minimum	0.50	0.02	-
Maximum	329.34	1370.06	-

Table -7A

The region-wise maximum/ minimum volume of electricity transaction happened bilaterally during April, 2022 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	296.09	957.72	822.33	1810.20	219.57	597.88	210.31	2655.83	-	22.43
Minimum	81.80	0.84	63.36	1.52	0.50	0.02	2.29	2.38	-	1.48
Maximum	130.17	334.43	329.34	1007.84	154.46	259.51	130.78	1370.06	-	20.94

Table-7B

7.1. The **top 5 buyers** on bilateral transaction through direct transactions in the month of April, 2022 were **CHATTISGARH, MAHARASHTRA, Haryana, AMNSIL_WR and TELANGANA**, which constituted **59.73 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of April, 2022 were **TAMILNADU, Gujarat, ANDHRA_PRADESH, MAHARASHTRA and TELANGANA**, which constituted **65.55 %** of the market volume. [Annexure III]

7.2. The **top 5 sellers** on bilateral transaction through direct transactions in the month of April, 2022 were **MP, DBPL, DVC, J & K and Punjab**, which constituted **63.13 %** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of April, 2022 were **RPREL, KARNATAKA, Punjab, ESSARMPL and RKM_POWER**, which constituted **35.53 %** of the market volume. [Annexure III]

7.3. Deviation Volume - The volume of Deviation observed in the month of April, 2022 in import and export were **2,009.04 MU** and **2,210.10 MU** respectively. The total volume of Deviation observed in the month of April, 2022 can be taken as **2,109.57 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 April, 2022 is shown in **Figure 1:**

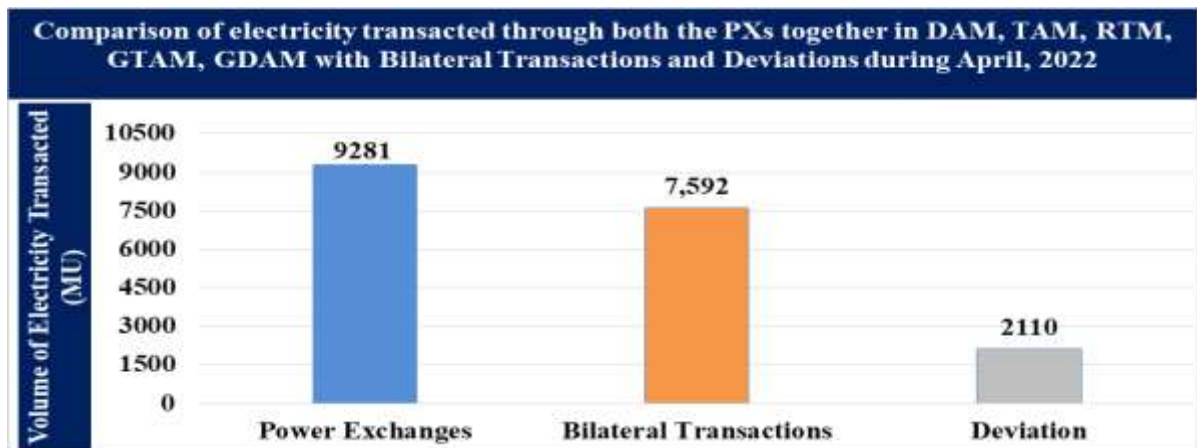


Figure -1

8. ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN DAM DURING APRIL, 2022

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 April, 2022 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 only significant variable were the total purchase bid, Coal Generation and Wind 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 **0.98**, which signifies that there is high multicollinearity 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**.

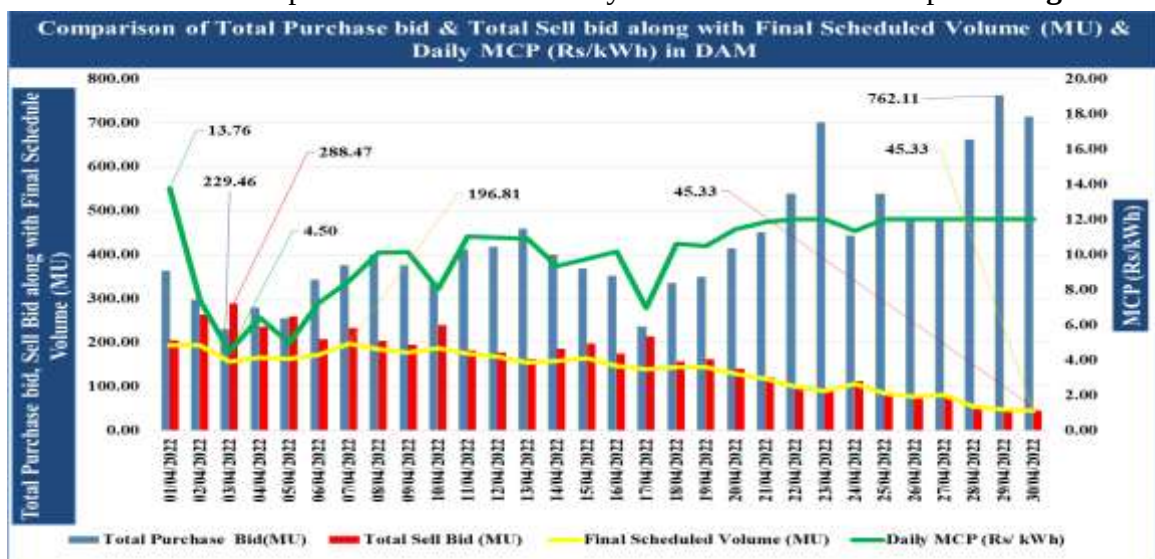


Figure -2

- 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. However, during the month of April, 2022, it is observed that on second Sunday (10th April, 2022), FSV showed increasing trend in comparison to second Saturday (9th April, 2022). Similarly, on fourth Monday (25th April, 2022), the FSV showed decreasing trend in comparison to fourth Sunday (24th April, 2022). The detailed analysis on this is given at **Appendix-I**.
- 8.5. A comparison of maximum, minimum, daily, evening time MCP is shown in **Figure -3**. The same are also tabulated in **Annexure-IV**.

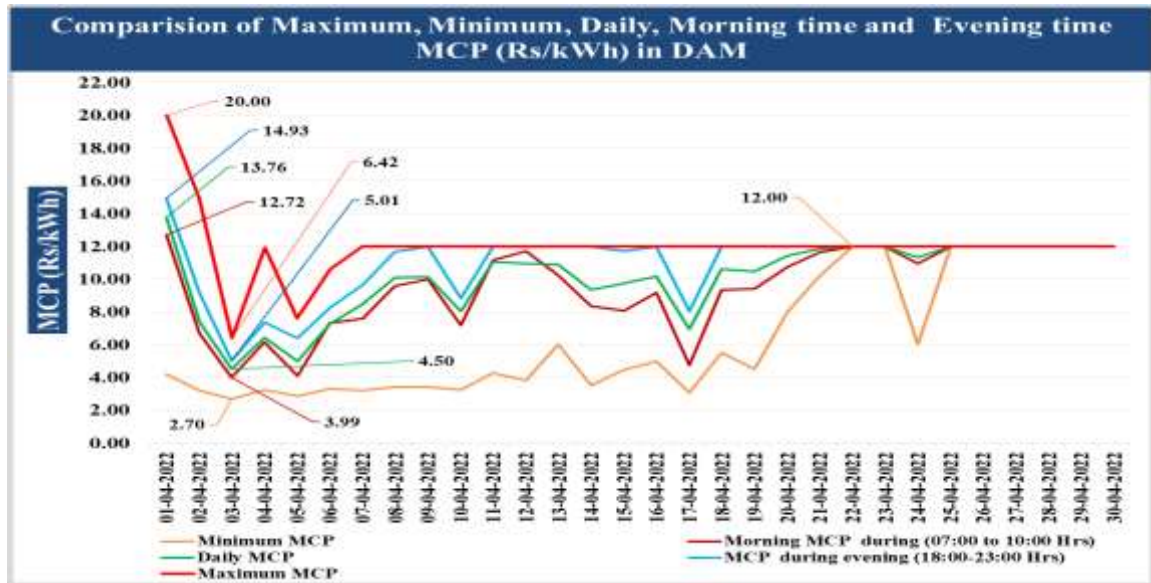


Figure -3

- 8.6. The Market Clearing Price duration curves for time block wise MCP for the month of April, 2022 is shown in **Figure 4**, whereas the day wise MCP duration curve for the period 1st April, 2022 to 30th April, 2022 is shown in **Figure 5**.

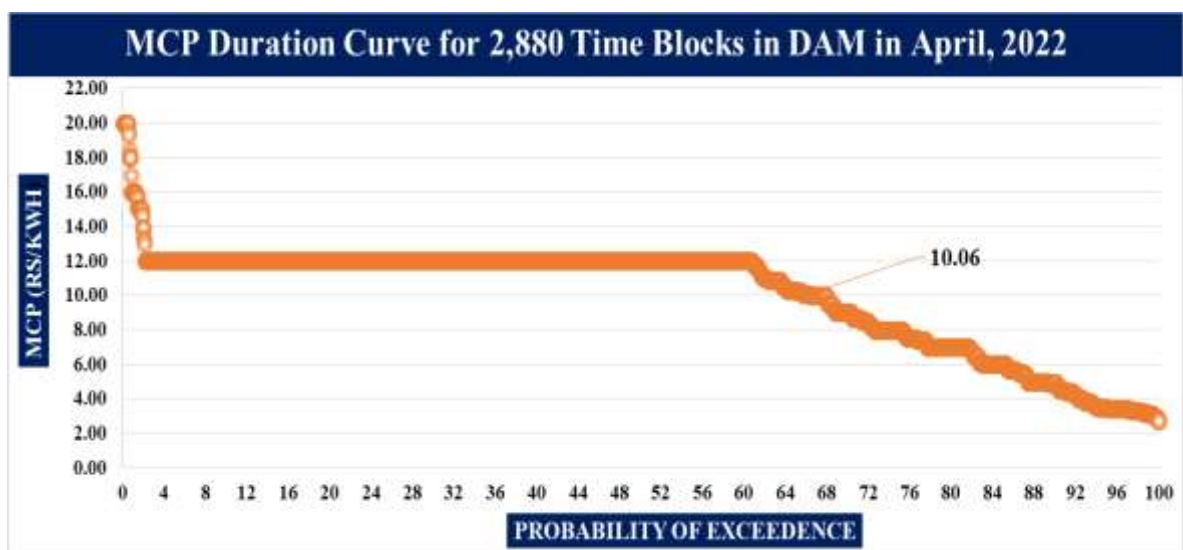


Figure-4

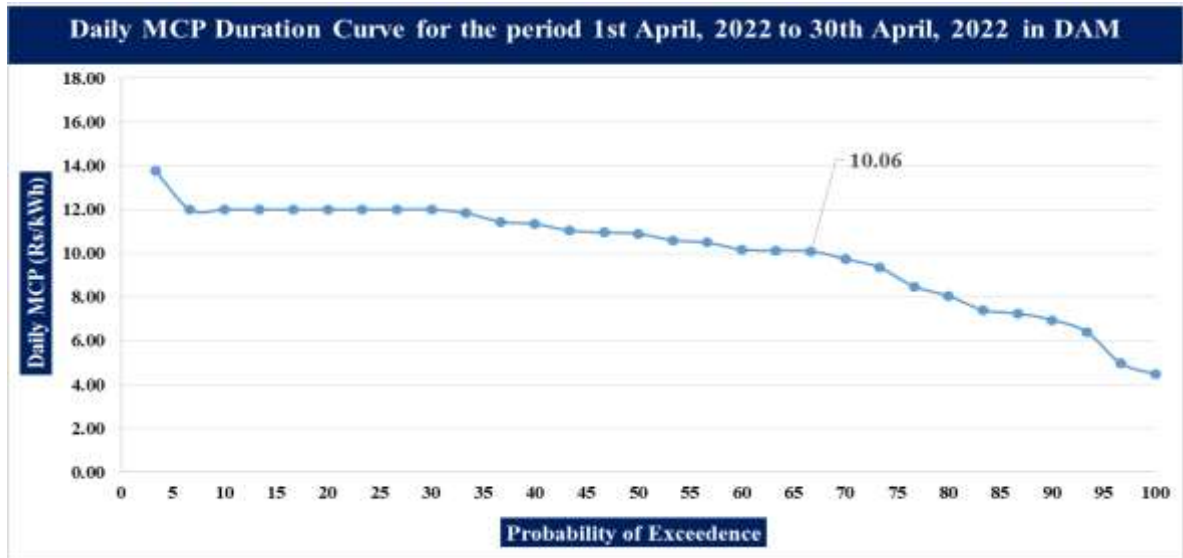


Figure-5

- 8.7. It can be seen in figure 4 above that in the MCP duration curve of April, 2022, for 65.69 % of the time MCP was above average MCP of the month (i.e. **Rs. 10.06/kWh**) and almost 34.31 % 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, 2022 to 30th April, 2022 (figure-5), that for 66.67 % of the time the daily MCP was above the average MCP for the period (i.e. **Rs. 10.06/kWh**) and for 33.33 % 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 April, 2022, the maximum FSV occurred mostly during the **time period 7-8 AM** (on 10 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 12-1 AM** (on 27 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 12-1 AM** (on 8 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 1-2 PM** (on 17 no. of days). [Annexure VI]
- 8.10. The maximum demand met during the month of April, 2022 in the country occurred on **29th April, 2022 at 207.11 GW**, which is 3.92 % more than the maximum demand occurred during **March, 2022 [i.e. 199.30 GW on 31st March, 2022]** and is 13.45 % more than the maximum demand occurred during **April, 2021 i.e. [182.56 GW on 10th April, 2021]**.
- 8.11. In the month of April, 2022, there was congestion of **0.69 MU** in the transmission system in IEX on 3 days (8th to 10th & 13th April, 2022), hence one nation one price was observed for **27 days** in IEX during April, 2022, whereas, in PXIL, no transaction of electricity happened in April, 2022. Further, in the month of March, 2022, there was no congestion in IEX, hence one nation one price was observed for **31 days** in IEX, whereas, in PXIL, no transaction of electricity happened in March, 2022. In the month of April, 2021, One nation One Price was observed in IEX for **27 days** during the month, as there was transmission congestion of **11.26 MU** on account of congestion on **3 days** (i.e., 02nd to 04th April, 2021). Whereas, in PXIL,

there was no congestion in transmission system during April, 2021, so one nation one price was observed on all **11 days** during which transaction of electricity happened (i.e. 06th to 10th, 12th, 14th, 16th, 19th to 21th April, 2021).

- 8.12.** In the month of April, 2022, there was real time curtailment of **8.86 MU** in IEX and in PXIL no transaction happened in April, 2022. Further, in the month of March, 2022 also, there was no real time curtailment both IEX and PXIL. In the month of April, 2021, there was no real time curtailment in IEX and PXIL, respectively.
- 8.13.** The **top 10 sellers** on the power exchanges in **Day Ahead Market (DAM)** in the month of April, 2022 were, **Uttar Pradesh, Jindal Power Ltd. Stg-II, JITPL, Sembcorp Gayatri, Jindal Power, Jaypee Nigrie, Himachal Pradesh, Delhi, Telangana and Karnataka**, which constituted **56.19 %** 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 April, 2022 were **Telangana, Tamil Nadu, West Bengal, Andhra Pradesh, Haryana, Maharashtra, Punjab, Uttarakhand, Gujarat and NVVN (SNA) – NEA** , which constituted **82.20 %** of the market volume. [Annexure VII]
- 8.15.** The total volume of electricity purchased by Discoms/Licensees in DAM in the month of April, 2022 was **3911.80 MU**, which constituted **95.04 %** 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 April, 2022 was **1934.57 MU**, which constituted **47.00%** 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 APRIL, 2022

- 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 total purchase bid, Wind Generation and Solar 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 **0.35**, which signifies that there is high multicollinearity among the predictor variables/ independent variables used in regression analysis.
- 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:

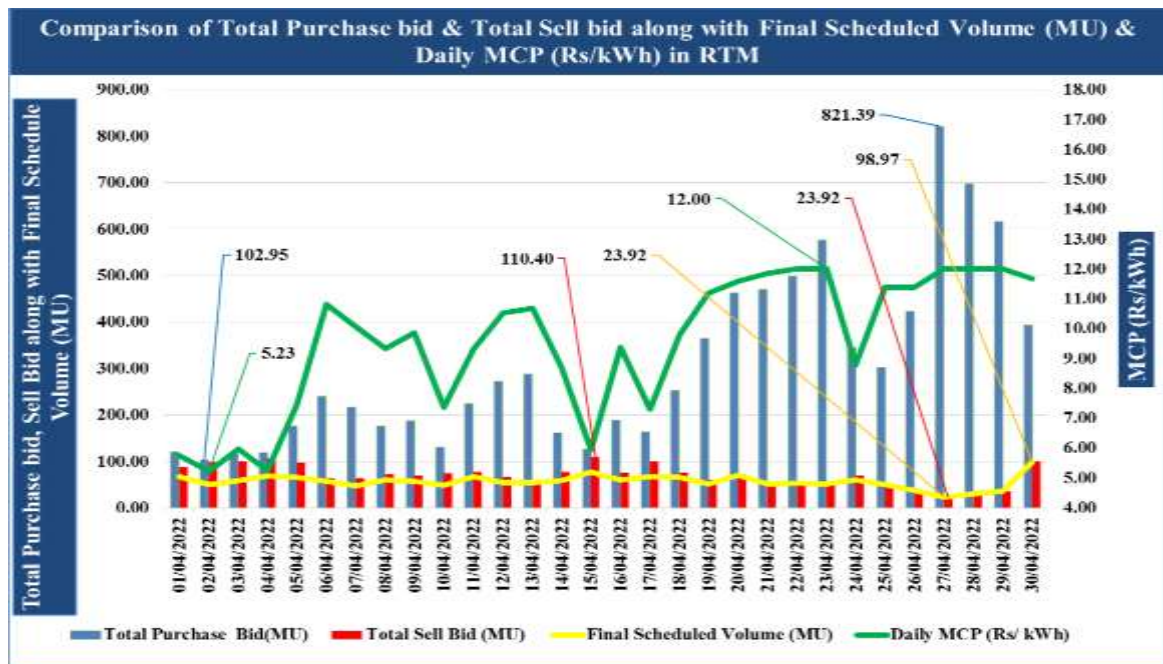


Figure-6

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

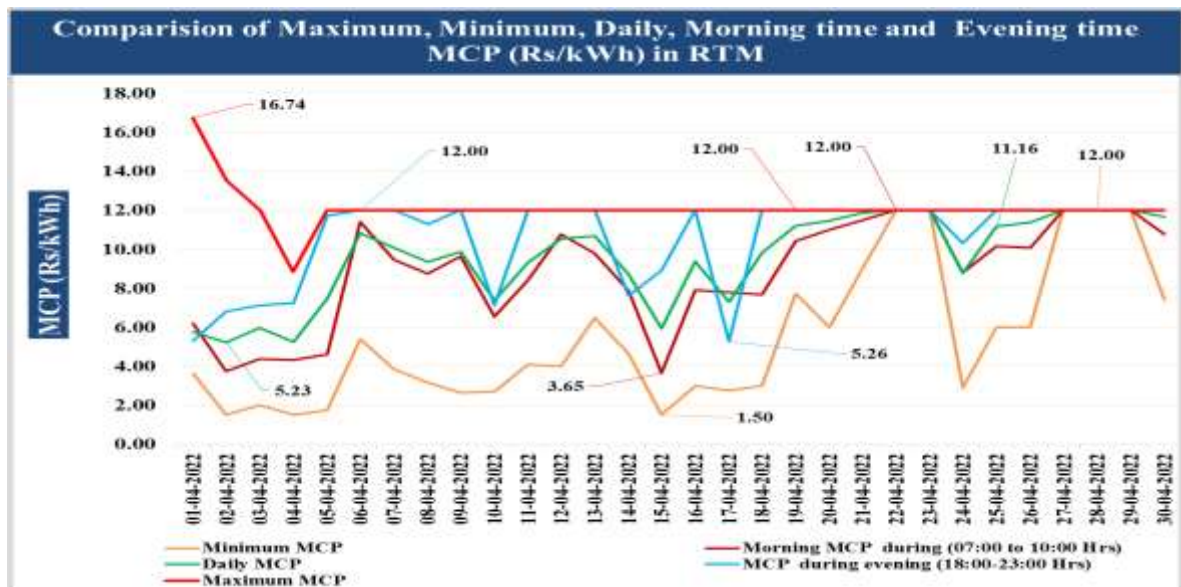


Figure-7

9.5. The Market Clearing Price duration curves for time block wise MCP for the month of April, 2022 is shown in Figure 8, whereas the day wise MCP duration curve for the period 1st April, 2022 to 30th April, 2022 is shown in Figure 9.

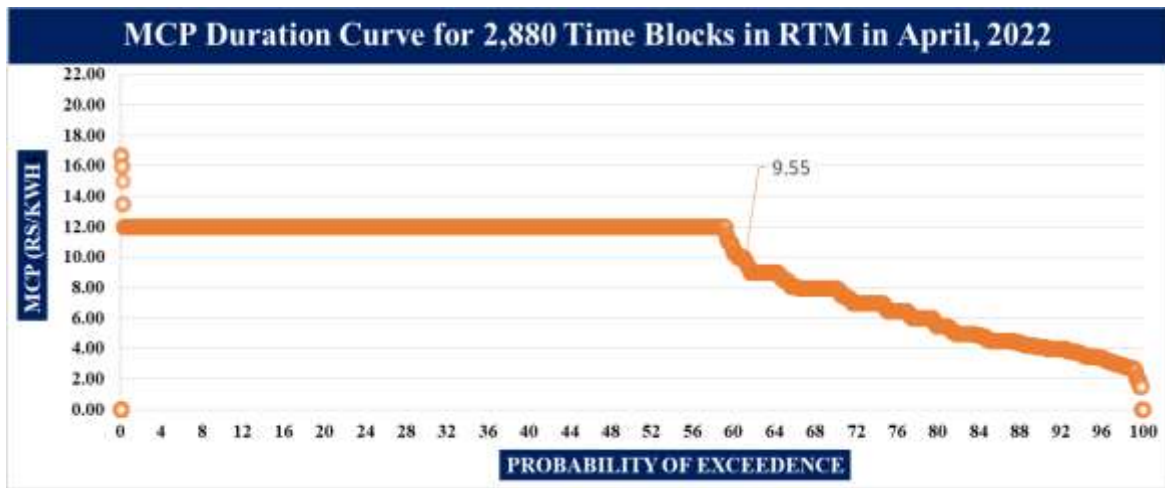


Figure-8

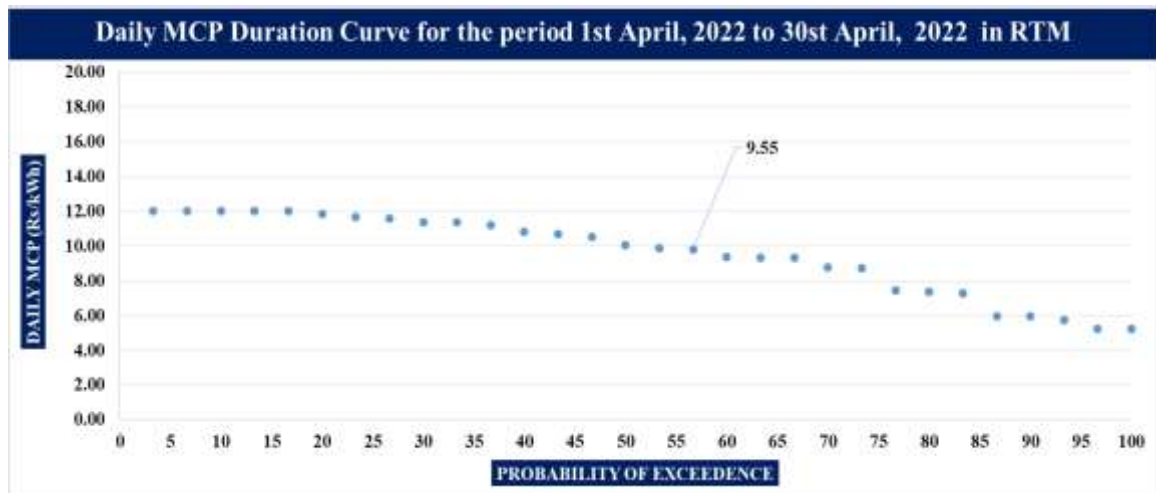


Figure-9

- 9.6. It can be seen in figure 8 above that in the MCP duration curve of April, 2022, for 61.56 % of the time the MCP was above the average MCP of the month (i.e. **Rs. 9.55/kWh**) and for 38.44 % 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, 2022 to 30th April, 2022 (figure 9) that, for 56.67 % of the time the daily MCP was above the average MCP for the period (i.e. **Rs. 9.55/kWh**) and for 43.33 % of the time the daily MCP was below the average MCP for the period.
- 9.7. In April, 2022, the maximum FSV occurred mostly during the **time period 7-9 AM** (on 7 no. of days). Whereas, the maximum MCP also occurred mostly during the **time period 12-1 AM** (on 26 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 12-1 AM** (on 8 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 1-2 PM** (on 12 no. of days). [Annexure X]
- 9.8. There was **no** real time curtailment in IEX in Real Time Market (RTM) during April, 2022 and March, 2022, whereas, **no** real time curtailment in PXIL during April, 2022 and no transaction of electricity happened during March, 2022. Similarly, in April, 2021, there was no real time curtailment in IEX, whereas, no transaction of electricity happened in PXIL during April, 2021 in Real Time Market (RTM).

- 9.9.** In the month of April, 2022, there was congestion of **0.56 MU** in the transmission system in IEX on 7 days (03.04.2022 to 04.04.2022, 06.04.2022 to 08.04.2022 & 11.04.2022 to 12.04.2022), hence one nation one price was observed for **23 days** in IEX during April, 2022, whereas, in PXIL, there was no congestion in April, 2022, hence one nation one price was observed for **30 days** in PXIL during April, 2022. Further, In the month of March, 2022, there was congestion of **3.13 MU** in the transmission system in IEX on 9 days (9th to 12th & 14th to 18th March, 2022), hence one nation one price was observed for **22 days** in IEX during March, 2022, whereas, in PXIL, no transaction of electricity happened in March, 2022. In the month of April, 2021, there was congestion of **0.64 MU** in transmission system in IEX in Real Time Market on account of congestion on **6 days** (i.e. 3rd, 13th, 17th, 18th, 22nd, 23rd April, 2021), hence, one nation one price was observed for **24 days** in IEX. Whereas, in PXIL, no transaction of electricity happened in April, 2021 in Real Time Market.
- 9.10.** The **top 10 sellers** on the power exchanges in **Real Time Market (RTM)** in the month of April, 2022 were **Bihar, Delhi, West Bengal, Karnataka, Rajasthan, Assam, Kerala, Telangana, Himachal Pradesh, Chhattisgarh**, which constituted **66.41%** of the market volume. [Annexure XI]
- 9.11.** The **top 10 buyers** on the power exchanges in **Real Time Market (RTM)** in the month of April, 2022 were **Telangana, Maharashtra, Tamil Nadu, Haryana, West Bengal, Punjab, Andhra Pradesh, Rajasthan, Gujarat, Uttar Pradesh**, which constituted **79.94%** of the market volume. [Annexure XI]
- 9.12.** The total volume of electricity purchased by Discoms/Licensees in RTM in the month of April, 2022 was **1676.82 MU**, which constituted **98.38 %** 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 April, 2022 was **1451.31 MU**, which constituted **85.15 %** 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, 2022 to March, 2023 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, 2022	4,113.65	0	10.06	0	8.86	0
	May, 2022						
	June, 2022						
Total Quarter -I	April - June, 2022	4,113.65	0			8.86	0
Total April, 2022 - March, 2023		4,113.65	0			8.86	0

Annexure-II

Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2022 to March, 2023 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, 2022	1,166.81	2,067.94	3,234.75
	May, 2022			
	June, 2022			
Total Quarter -I	April - June, 2022	1,166.81	2,067.94	3,234.75
Total April, 2022 - March, 2023		1,166.81	2,067.94	3,234.75

Quarter	Months	Final Scheduled Volume (MU) on Delivery Date Basis		
		IEX	PXIL	Total
Quarter -I	April, 2022	1,171.50	1,746.85	2,918.35
	May, 2022			
	June, 2022			
Total Quarter -I	April - June, 2022	1,171.50	1,746.85	2,918.35
Total April, 2022 - March, 2023		1,171.50	1,746.85	2,918.35

Top Five Entities (Buyers and Sellers) in Bilateral transactions in the month of April, 2022

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
CHATTISGARH	329.34	21.27%	TAMILNADU	1370.06	22.67%
MAHARASHTR	191.43	12.36%	Gujarat	1007.84	16.67%
Haryana	154.46	9.98%	ANDHRA_PRADESH	567.68	9.39%
AMNSIL_WR	132.45	8.55%	MAHARASHTRA	516.51	8.55%
TELANGANA	130.78	8.45%	TELANGANA	499.73	8.27%
Total Volume	938.45	60.61%	Total Volume	3,961.82	65.55%
Total Volume in Bilateral	1,548.29		Total Volume in Bilateral	6,044.05	

(ii) Top five Sellers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
MP	350.77	24.69%	RPREL	512.47	8.30%
DBPL	145.54	10.25%	KARNATAKA	490.32	7.94%
DVC	140.934	9.92%	Punjab	428.27	6.94%
J & K	108.00	7.60%	ESSARMPL	394.32	6.39%
Punjab	103.20	7.26%	RKM_POWER	367.84	5.96%
Total Volume	848.44	59.73%	Total Volume	2,193.22	35.53%
Total Volume in Bilateral	1,420.56		Total Volume in Bilateral	6,172.19	

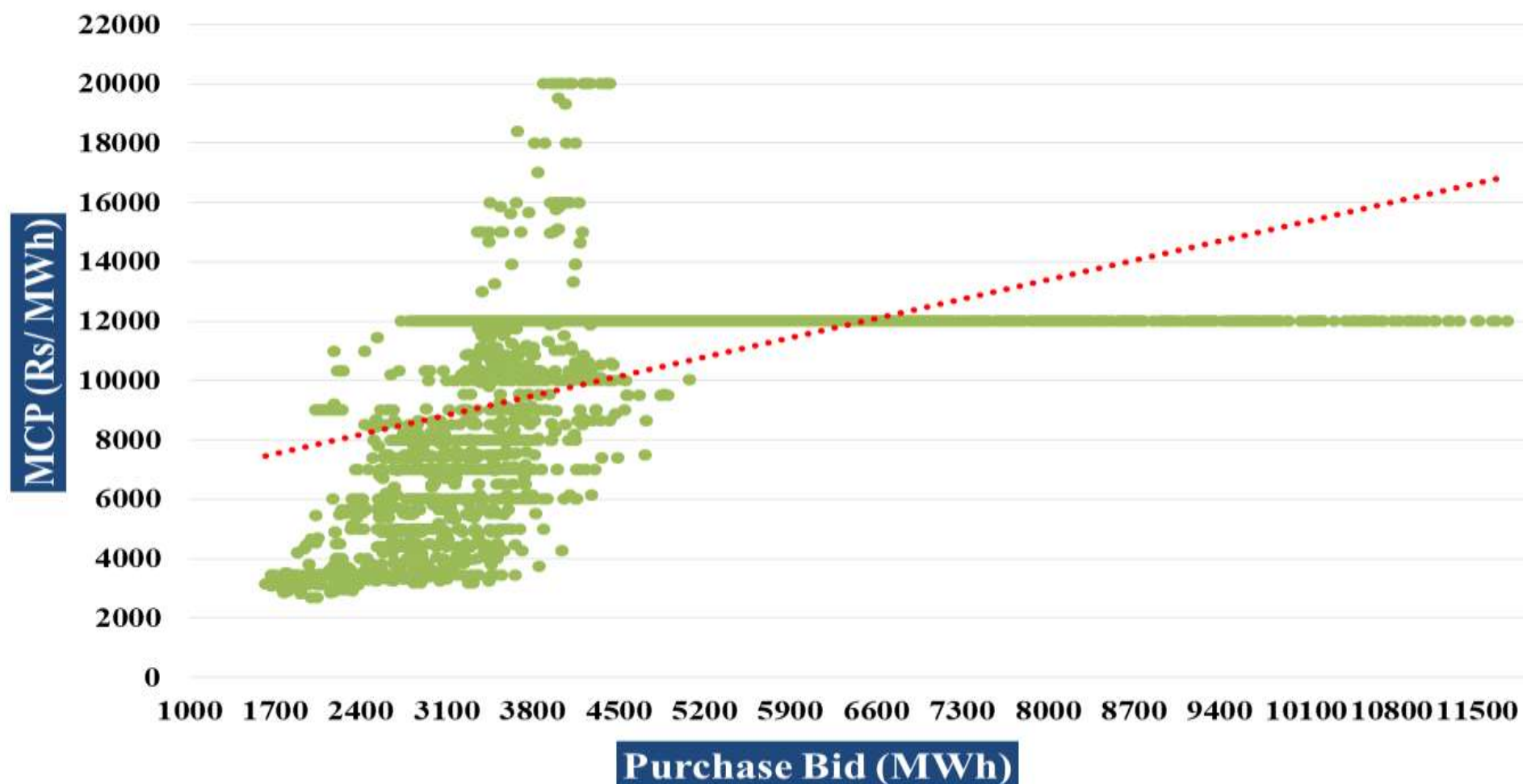
Annexure-IV**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (Rs/kWh) and Final Scheduled Volume (MU) in DAM**

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)
01-04-2022	12.72	11.55	14.93	15.58	20.00	4.20	13.76	194.08
02-04-2022	6.70	3.79	9.19	9.91	15.00	3.19	7.41	194.05
03-04-2022	3.99	3.18	5.01	5.66	6.42	2.70	4.50	156.78
04-04-2022	6.14	4.85	7.34	7.34	11.92	3.23	6.41	165.69
05-04-2022	4.10	3.49	6.40	5.73	7.62	2.86	4.97	162.89
06-04-2022	7.31	5.05	8.24	8.60	10.60	3.30	7.26	171.91
07-04-2022	7.59	5.21	9.64	11.28	12.00	3.19	8.48	196.81
08-04-2022	9.59	7.15	11.67	12.00	12.00	3.43	10.10	184.80
09-04-2022	10.00	6.72	12.00	12.00	12.00	3.43	10.13	177.06
10-04-2022	7.18	3.94	8.84	12.00	12.00	3.23	8.06	186.60
11-04-2022	11.17	9.19	12.00	12.00	12.00	4.26	11.04	174.18
12-04-2022	11.71	8.58	12.00	12.00	12.00	3.83	10.95	167.93
13-04-2022	10.25	9.22	12.00	12.00	12.00	6.00	10.90	154.46
14-04-2022	8.35	4.99	12.00	12.00	12.00	3.52	9.35	158.58
15-04-2022	8.08	6.76	11.71	12.00	12.00	4.46	9.74	164.66
16-04-2022	9.17	7.37	12.00	12.00	12.00	5.00	10.18	147.04
17-04-2022	4.74	3.32	8.03	10.94	12.00	3.07	6.95	138.47
18-04-2022	9.36	8.71	12.00	12.00	12.00	5.50	10.60	144.36
19-04-2022	9.41	8.30	12.00	12.00	12.00	4.50	10.49	144.50
20-04-2022	10.76	10.80	12.00	12.00	12.00	8.00	11.44	128.89
21-04-2022	11.64	11.67	12.00	12.00	12.00	10.19	11.84	117.29
22-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	99.19
23-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	89.19
24-04-2022	10.97	10.34	12.00	12.00	12.00	6.00	11.34	106.04
25-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	84.31
26-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	76.35
27-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	80.44
28-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	54.35
29-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	47.42
30-04-2022	12.00	12.00	12.00	12.00	12.00	12.00	12.00	45.33
Maximum	12.72	12.00	14.93	15.58	20.00	12.00	13.76	196.81
Minimum	3.99	3.18	5.01	5.66	6.42	2.70	4.50	45.33
Average	9.56	8.34	10.97	11.30	11.99	6.44	10.06	137.12

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 April, 2022 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
01-04-2022	13:00 - 13:15	2.44	00:00 - 00:15	20.00	17:45 - 18:00	1.73	13:00 - 13:15	4.20
02-04-2022	15:45 - 16:00	2.69	00:30 - 00:45	15.00	17:45 - 18:00	1.56	14:30 - 14:45	3.19
03-04-2022	07:30 - 07:45	2.14	02:15 - 02:30	6.42	17:45 - 18:00	1.20	14:30 - 14:45	2.70
04-04-2022	07:15 - 07:30	2.30	23:45 - 24:00	11.92	00:00 - 00:15	1.44	13:00 - 13:15	3.23
05-04-2022	07:15 - 07:30	2.32	06:00 - 06:15	7.62	03:00 - 03:15	1.41	08:45 - 09:00	2.86
06-04-2022	12:30 - 12:45	2.30	00:30 - 00:45	10.60	03:00 - 03:15	1.41	13:00 - 13:15	3.30
07-04-2022	07:15 - 07:30	2.73	00:00 - 00:15	12.00	01:00 - 01:15	1.60	13:00 - 13:15	3.19
08-04-2022	15:00 - 15:15	2.70	00:00 - 00:15	12.00	01:00 - 01:15	1.49	13:00 - 13:15	3.43
09-04-2022	15:30 - 15:45	2.66	00:00 - 00:15	12.00	00:00 - 00:15	1.26	13:15 - 13:30	3.43
10-04-2022	07:00 - 07:15	2.79	00:00 - 00:15	12.00	18:30 - 18:45	1.46	13:30 - 13:45	3.23
11-04-2022	07:30 - 07:45	2.53	00:00 - 00:15	12.00	18:45 - 19:00	1.17	13:00 - 13:15	4.26
12-04-2022	15:00 - 15:15	2.39	00:00 - 00:15	12.00	00:15 - 00:30	1.30	13:00 - 13:15	3.83
13-04-2022	15:00 - 15:15	2.59	00:00 - 00:15	12.00	02:15 - 02:30	1.03	14:00 - 14:15	6.00
14-04-2022	08:00 - 08:15	2.38	00:00 - 00:15	12.00	18:45 - 19:00	1.20	13:00 - 13:15	3.52
15-04-2022	14:45 - 15:00	2.25	00:00 - 00:15	12.00	22:00 - 22:15	1.26	14:15 - 14:30	4.46
16-04-2022	07:30 - 07:45	2.23	00:00 - 00:15	12.00	23:15 - 23:30	1.07	13:00 - 13:15	5.00
17-04-2022	07:30 - 07:45	1.91	00:00 - 00:15	12.00	10:45 - 11:00	1.04	13:15 - 13:30	3.07
18-04-2022	07:15 - 07:30	2.23	00:00 - 00:15	12.00	18:45 - 19:00	1.00	13:00 - 13:15	5.50
19-04-2022	15:30 - 15:45	2.34	00:00 - 00:15	12.00	23:45 - 24:00	1.11	13:45 - 14:00	4.50
20-04-2022	15:15 - 15:30	1.98	00:00 - 00:15	12.00	23:30 - 23:45	0.92	13:15 - 13:30	8.00
21-04-2022	07:45 - 08:00	1.58	00:00 - 00:15	12.00	23:30 - 23:45	0.97	13:00 - 13:15	10.19
22-04-2022	13:15 - 13:30	1.37	00:00 - 00:15	12.00	21:15 - 21:30	0.84	00:00 - 00:15	12.00
23-04-2022	14:30 - 14:45	1.24	00:00 - 00:15	12.00	02:15 - 02:30	0.74	00:00 - 00:15	12.00
24-04-2022	14:30 - 14:45	1.61	00:00 - 00:15	12.00	01:00 - 01:15	0.84	13:15 - 13:30	6.00
25-04-2022	05:30 - 05:45	1.20	00:00 - 00:15	12.00	21:00 - 21:15	0.71	00:00 - 00:15	12.00
26-04-2022	08:45 - 09:00	1.15	00:00 - 00:15	12.00	00:30 - 00:45	0.61	00:00 - 00:15	12.00
27-04-2022	08:45 - 09:00	1.34	00:00 - 00:15	12.00	00:30 - 00:45	0.55	00:00 - 00:15	12.00
28-04-2022	08:45 - 09:00	0.91	00:00 - 00:15	12.00	00:30 - 00:45	0.44	00:00 - 00:15	12.00
29-04-2022	09:00 - 09:15	0.62	00:00 - 00:15	12.00	00:30 - 00:45	0.41	00:00 - 00:15	12.00
30-04-2022	09:15 - 09:30	0.81	00:00 - 00:15	12.00	00:15 - 00:30	0.31	00:00 - 00:15	12.00

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Annexure-VII**Sellers and Buyers in Day Ahead Market (DAM) in the month of April, 2022**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	Uttar Pradesh	713.52	17.34%	Telangana	702.35	17.06%
2.	Jindal Power Ltd. Stg-II	292.98	7.12%	Tamilnadu	625.99	15.21%
3.	JITPL	277.80	6.75%	West Bengal	499.39	12.13%
4.	Sembcorp Gayatri	194.26	4.72%	Andhra Pradesh	409.05	9.94%
5.	Jindal Power	171.40	4.16%	Haryana	334.03	8.12%
6.	Jaypee Nigrie	158.93	3.86%	Maharashtra	282.24	6.86%
7.	Himachal Pradesh	135.25	3.29%	Punjab	159.71	3.88%
8.	Delhi	125.36	3.05%	Uttarakhand	141.20	3.43%
9.	Telangana	121.75	2.96%	Gujarat	130.35	3.17%
10.	Karnataka	121.52	2.95%	NVVN (SNA) - NEA	99.01	2.41%
11.	Rajasthan	105.40	2.56%	Chhattisgarh	98.71	2.40%
12.	MB Power	100.68	2.45%	ArcelorMittal Nippon steel	85.13	2.07%
13.	RKM Power	94.99	2.31%	Uttar Pradesh	83.77	2.04%
14.	Teesta -3	94.48	2.30%	Karnataka	70.42	1.71%
15.	ACBIL	94.45	2.29%	Rajasthan	65.58	1.59%
16.	Madhya Pradesh	82.67	2.01%	Jharkhand	46.90	1.14%
17.	Maharashtra	72.86	1.77%	Bihar	39.44	0.96%
18.	Raigarh Energy Ltd.	71.25	1.73%	Assam	33.82	0.82%
19.	Assam	65.99	1.60%	Himachal Pradesh	31.73	0.77%
20.	Sembcorp Energy India Ltd.	64.00	1.56%	Delhi	31.38	0.76%
21.	Tamilnadu	63.13	1.53%	Madhya Pradesh	27.21	0.66%
22.	Raipur Energen	60.46	1.47%	Dadra & Nagar Haveli	23.19	0.56%
23.	Kerala	55.40	1.35%	Orissa	21.22	0.52%
24.	Essar Power MP Ltd	45.56	1.11%	J&K	15.98	0.39%
25.	AD Hydro	44.03	1.07%	Daman & Diu	14.37	0.35%
26.	Orissa	43.99	1.07%	Railways	8.66	0.21%
27.	DB Power	43.78	1.06%	Kerala	8.50	0.21%
28.	Maruti Clean Coal Power	43.55	1.06%	Goa SR	8.26	0.20%
29.	Andhra Pradesh	37.70	0.92%	Goa WR	7.08	0.17%
30.	Adani Hybrid Energy Jaisalmer	31.57	0.77%	Tripura	6.64	0.16%
31.	Adhunik Power	30.68	0.75%	BALCO 2	2.04	0.05%
32.	Chhattisgarh	30.55	0.74%	Manipur	1.02	0.02%
33.	Renew Surya Ravi Private Limited	28.42	0.69%	NEA-NR	0.87	0.02%
34.	Bihar	26.49	0.64%	Meghalaya	0.25	0.01%
35.	Gujarat	24.53	0.60%	Chandigarh	0.17	0.00%
36.	Sainj HEP	23.33	0.57%	Arunachal Pradesh	0.12	0.00%
37.	Karcham Wangtoo	22.15	0.54%			
38.	GMR Kamalanga	21.11	0.51%			
39.	J&K	18.94	0.46%			
40.	Chandigarh	18.66	0.45%			

41.	Shree Cement	17.17	0.42%			
42.	Adani Green Solar Jaisalmer	16.02	0.39%			
43.	Adani Hybrid Energy Jaisalmer	15.49	0.38%			
44.	Palatana	14.84	0.36%			
45.	Mizoram	12.79	0.31%			
46.	DVC	11.73	0.28%			
47.	Arunachal Pradesh	11.64	0.28%			
48.	Singoli Bhagwati	11.27	0.27%			
49.	Sikkim	10.84	0.26%			
50.	Tashiding HEP	9.79	0.24%			
51.	GMR Warora	9.10	0.22%			
52.	Jorethang	8.76	0.21%			
53.	RGPPL	7.51	0.18%			
54.	West Bengal	7.38	0.18%			
55.	Kameng HEP	6.89	0.17%			
56.	Sorang HEP, (Himachal Sorang	6.70	0.16%			
57.	Goa WR	6.34	0.15%			
58.	Adani Hybrid Energy Jaisalmer	6.07	0.15%			
59.	Dikchu	5.38	0.13%			
60.	Nagaland	4.70	0.11%			
61.	Adani Green Energy Nineteen	4.28	0.10%			
62.	Chuzachen	3.99	0.10%			
63.	IL&FS	3.58	0.09%			
64.	Jhabua Power	3.37	0.08%			
65.	NLC TPS-II Stg-2	3.31	0.08%			
66.	Bongaigaon	3.26	0.08%			
67.	NLC TPS-II	3.16	0.08%			
68.	Haryana	2.98	0.07%			
69.	Jindal Steel	2.40	0.06%			
70.	Renew Solar Energy (Jharkhand	2.08	0.05%			
71.	Dhariwal	1.97	0.05%			
72.	Lanco Budhil	1.89	0.05%			
73.	Renew Solar Urja Private Limited	1.67	0.04%			
74.	Tripura	0.95	0.02%			
75.	Jharkhand	0.92	0.02%			
76.	Meghalaya	0.61	0.01%			
77.	Farakka	0.40	0.01%			
78.	Kahalgaon	0.30	0.01%			
79.	Adani Wind Energy Kutchh Five Limited	0.30	0.01%			
80.	Talcher	0.25	0.01%			
81.	Ostro Energy Private Limited (OEPL)	0.14	0.00%			
Total Volume of top 10		2,312.75	56.19%	Total Volume of top 10	3,383.33	82.20%
Total Volume in PXs		4,113.65		Total Volume in PXs	4,113.65	

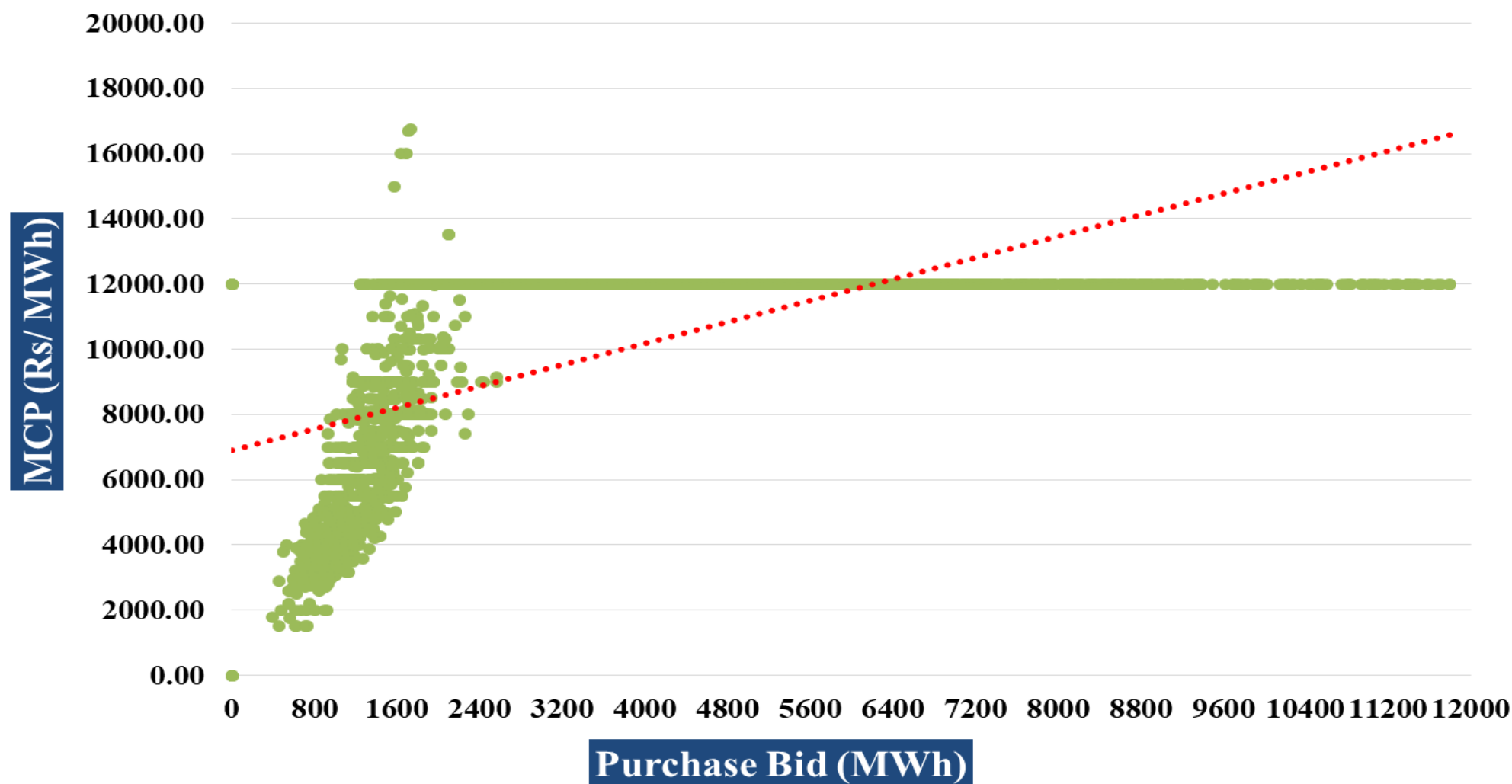
Annexure-VIII**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (Rs/kWh) and Final Scheduled Volume (MU) in RTM**

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 Volume (MU)
01-04-2022	6.20	4.22	5.30	7.46	16.00	2.50	4.30	55.29
02-04-2022	3.73	3.91	6.81	6.04	6.50	2.29	3.77	53.33
03-04-2022	4.38	3.29	7.12	8.59	5.64	2.02	4.00	47.92
04-04-2022	4.30	3.53	7.24	5.79	12.00	2.90	4.85	54.46
05-04-2022	4.60	5.41	11.73	7.50	15.00	2.68	4.69	65.05
06-04-2022	11.39	8.29	12.00	12.00	8.00	2.57	4.08	48.59
07-04-2022	9.46	6.80	12.00	12.00	12.00	2.51	5.14	68.98
08-04-2022	8.75	5.35	11.29	12.00	12.00	2.87	5.14	71.10
09-04-2022	9.63	6.04	12.00	12.00	20.00	2.70	6.30	76.54
10-04-2022	6.55	3.43	7.12	12.00	20.00	2.70	6.18	68.75
11-04-2022	8.42	6.54	12.00	10.31	20.00	3.75	7.89	57.47
12-04-2022	10.76	7.65	12.00	12.00	20.00	3.12	6.65	56.15
13-04-2022	9.79	8.75	12.00	12.00	14.00	2.02	4.92	59.20
14-04-2022	7.88	7.53	7.62	11.35	20.00	2.60	6.98	58.89
15-04-2022	3.65	4.44	8.93	6.20	20.00	3.07	9.57	64.04
16-04-2022	7.90	5.48	12.00	11.89	20.00	5.00	11.77	63.08
17-04-2022	7.79	4.05	5.26	12.00	20.00	4.70	11.02	66.42
18-04-2022	7.66	6.96	12.00	12.00	20.00	1.00	4.98	67.68
19-04-2022	10.42	10.13	12.00	12.00	5.39	1.61	3.43	53.24
20-04-2022	11.01	11.18	12.00	12.00	14.03	2.36	5.00	54.37
21-04-2022	11.48	11.79	12.00	12.00	20.00	4.50	11.25	69.47
22-04-2022	12.00	12.00	12.00	12.00	20.00	5.00	14.06	65.63
23-04-2022	12.00	12.00	12.00	12.00	20.00	8.00	17.04	62.68
24-04-2022	8.79	4.22	10.32	12.00	20.00	8.00	16.06	87.69
25-04-2022	10.17	11.01	12.00	12.00	20.00	8.94	17.49	96.60
26-04-2022	10.06	10.99	12.00	12.00	20.00	4.18	11.96	91.44
27-04-2022	12.00	12.00	12.00	12.00	14.23	2.00	4.77	60.89
28-04-2022	12.00	12.00	12.00	12.00	12.00	2.99	5.89	72.30
29-04-2022	12.00	12.00	12.00	12.00	20.00	3.48	11.63	66.45
30-04-2022	10.78	11.58	12.00	12.00	20.00	3.62	11.22	66.69
Maximum	12.00	12.00	12.00	12.00	20.00	8.94	17.49	96.60
Minimum	3.65	3.29	5.26	5.79	5.39	1.00	3.43	47.92
Average	8.85	7.75	10.56	10.90	16.23	3.52	8.07	65.01

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 April, 2022 in RTM



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

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

Date	Max. FSV (MU)		Max. MCP (Rs/kWh)		Min FSV (MU)		Min. MCP (Rs/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-04-2022	12:00 - 12:15	0.93	00:00 - 00:15	16.74	01:45 - 02:00	0.44	13:00 - 13:15	3.61
02-04-2022	12:30 - 12:45	0.73	23:30 - 23:45	13.52	07:30 - 07:45	0.31	09:15 - 09:30	1.50
03-04-2022	23:45 - 24:00	0.84	00:00 - 00:15	12.00	04:00 - 04:15	0.45	09:45 - 10:00	2.00
04-04-2022	06:15 - 06:30	0.96	22:45 - 23:00	8.85	18:45 - 19:00	0.44	13:00 - 13:15	1.50
05-04-2022	14:30 - 14:45	1.05	18:00 - 18:15	12.00	09:30 - 09:45	0.41	08:45 - 09:00	1.75
06-04-2022	14:45 - 15:00	1.06	00:00 - 00:15	12.00	00:00 - 00:15	0.32	13:00 - 13:15	5.39
07-04-2022	16:00 - 16:15	0.81	00:00 - 00:15	12.00	19:15 - 19:30	0.17	13:00 - 13:15	3.85
08-04-2022	15:00 - 15:15	1.13	00:00 - 00:15	12.00	00:00 - 00:15	0.09	13:00 - 13:15	3.16
09-04-2022	06:00 - 06:15	0.84	00:00 - 00:15	12.00	22:00 - 22:15	0.29	13:15 - 13:30	2.65
10-04-2022	14:15 - 14:30	0.81	00:00 - 00:15	12.00	01:00 - 01:15	0.12	12:00 - 12:15	2.70
11-04-2022	08:30 - 08:45	1.01	00:00 - 00:15	12.00	18:30 - 18:45	0.26	13:15 - 13:30	4.09
12-04-2022	03:45 - 04:00	1.03	00:00 - 00:15	12.00	20:45 - 21:00	0.23	13:00 - 13:15	4.00
13-04-2022	15:00 - 15:15	0.78	00:00 - 00:15	12.00	00:00 - 00:15	0.34	13:30 - 13:45	6.50
14-04-2022	14:45 - 15:00	0.92	00:00 - 00:15	12.00	00:00 - 00:15	0.28	08:15 - 08:30	4.65
15-04-2022	16:00 - 16:15	1.17	19:30 - 19:45	12.00	23:00 - 23:15	0.55	13:00 - 13:15	1.50
16-04-2022	22:30 - 22:45	1.14	00:00 - 00:15	12.00	00:00 - 00:15	0.38	13:30 - 13:45	3.00
17-04-2022	07:15 - 07:30	1.13	00:00 - 00:15	12.00	17:45 - 18:00	0.36	10:00 - 10:15	2.75
18-04-2022	01:30 - 01:45	1.04	00:00 - 00:15	12.00	17:15 - 17:30	0.38	12:00 - 12:15	3.00
19-04-2022	07:45 - 08:00	0.92	00:00 - 00:15	12.00	17:30 - 17:45	0.21	09:45 - 10:00	7.73
20-04-2022	13:45 - 14:00	1.34	00:00 - 00:15	12.00	23:45 - 24:00	0.24	13:00 - 13:15	8.49
21-04-2022	13:15 - 13:30	1.13	00:00 - 00:15	12.00	18:15 - 18:30	0.23	09:45 - 10:00	9.00
22-04-2022	08:30 - 08:45	0.89	00:00 - 00:15	12.00	19:15 - 19:30	0.23	00:00 - 00:15	12.00
23-04-2022	09:30 - 09:45	0.90	00:00 - 00:15	12.00	20:15 - 20:30	0.20	00:00 - 00:15	12.00
24-04-2022	07:45 - 08:00	1.10	00:00 - 00:15	12.00	00:15 - 00:30	0.29	15:00 - 15:15	2.90
25-04-2022	09:45 - 10:00	0.94	00:30 - 00:45	12.00	18:45 - 19:00	0.23	09:00 - 09:15	7.00
26-04-2022	08:00 - 08:15	0.86	00:00 - 00:15	12.00	23:30 - 23:45	0.05	08:30 - 08:45	6.00
27-04-2022	07:45 - 08:00	0.52	00:00 - 00:15	12.00	00:00 - 00:15	0.05	00:00 - 00:15	12.00
28-04-2022	17:30 - 17:45	0.67	00:00 - 00:15	12.00	15:15 - 15:30	0.06	00:00 - 00:15	12.00
29-04-2022	10:45 - 11:00	0.80	00:00 - 00:15	12.00	16:45 - 17:00	0.06	00:00 - 00:15	12.00
30-04-2022	10:30 - 10:45	1.97	00:00 - 00:15	12.00	00:00 - 00:15	0.45	09:45 - 10:00	7.40

MCP: Market Clearing Price (Rs/kWh)

FSV: Final Scheduled Volume (MU)

Annexure-XI**Sellers and Buyers in Real Time Market (RTM) in the month of April, 2022**

S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1.	Bihar	306.12	17.96%	Telangana	242.78	14.24%
2.	Delhi	164.74	9.67%	Maharashtra	210.52	12.35%
3.	West Bengal	109.06	6.40%	Tamilnadu	197.95	11.61%
4.	Karnataka	107.29	6.30%	Haryana	186.30	10.93%
5.	Rajasthan	92.08	5.40%	West Bengal	119.46	7.01%
6.	Assam	86.77	5.09%	Punjab	112.16	6.58%
7.	Kerala	84.92	4.98%	Andhra Pradesh	110.54	6.49%
8.	Telangana	65.67	3.85%	Rajasthan	72.56	4.26%
9.	Himachal Pradesh	64.51	3.78%	Gujarat	64.37	3.78%
10.	Chhattisgarh	50.69	2.97%	Uttar Pradesh	45.76	2.68%
11.	Andhra Pradesh	50.42	2.96%	Himachal Pradesh	41.29	2.42%
12.	Uttar Pradesh	50.10	2.94%	Chhattisgarh	36.18	2.12%
13.	Jindal Power Ltd. Stg-	43.67	2.56%	Uttarakhand	32.31	1.90%
14.	Madhya Pradesh	42.06	2.47%	Orissa	32.16	1.89%
15.	Orissa	39.69	2.33%	Madhya Pradesh	28.43	1.67%
16.	DVC	24.77	1.45%	Jharkhand	25.48	1.49%
17.	MB Power	24.23	1.42%	Assam	19.71	1.16%
18.	Dikchu	22.63	1.33%	Delhi	19.48	1.14%
19.	Tripura	18.56	1.09%	Bihar	18.62	1.09%
20.	RKM Power	16.50	0.97%	Karnataka	17.54	1.03%
21.	Teesta -3	15.29	0.90%	J&K	12.24	0.72%
22.	Maharashtra	13.49	0.79%	ArcelorMittal Nippon	12.20	0.72%
23.	GMR Warora	13.25	0.78%	Dadra & Nagar Haveli	7.67	0.45%
24.	Meghalaya	13.24	0.78%	Kerala	7.09	0.42%
25.	Kameng HEP	12.11	0.71%	Railways	5.44	0.32%
26.	Manipur	12.07	0.71%	Raigarh Energy Ltd.	4.39	0.26%
27.	Jindal Power	11.99	0.70%	BALCO 2	3.66	0.21%
28.	Sembcorp Gayatri	11.95	0.70%	Daman & Diu	3.23	0.19%
29.	Bongaigaon	11.02	0.65%	Tripura	3.22	0.19%
30.	Sikkim	8.98	0.53%	DVC	2.45	0.14%
31.	Essar Power MP Ltd	8.73	0.51%	Manipur	1.62	0.09%
32.	Tamilnadu	7.57	0.44%	Sikkim	1.51	0.09%
33.	Gujarat	7.29	0.43%	Arunachal Pradesh	1.50	0.09%
34.	Sembcorp Energy India	6.88	0.40%	Goa WR	1.39	0.08%
35.	Nagaland	5.84	0.34%	Meghalaya	1.13	0.07%
36.	Raipur Energen	5.72	0.34%	Jindal Power Ltd. Stg-II	0.84	0.05%
37.	Haryana	5.50	0.32%	Goa SR	0.84	0.05%
38.	Arunachal Pradesh	5.26	0.31%	Maruti Clean Coal	0.18	0.01%
39.	JITPL	5.20	0.31%	Chandigarh	0.16	0.01%
40.	DB Power	5.01	0.29%	Nagaland	0.01	0.00%
41.	Jorethang	4.73	0.28%			

42.	Jharkhand	4.29	0.25%			
43.	Punjab	3.25	0.19%			
44.	Sorang HEP,	2.91	0.17%			
45.	J&K	2.74	0.16%			
46.	Sainj HEP	2.61	0.15%			
47.	ACBIL	2.27	0.13%			
48.	Ostro Energy Private	2.14	0.13%			
49.	Singoli Bhagwati	1.99	0.12%			
50.	Tashiding HEP	1.91	0.11%			
51.	Adhunik Power	1.65	0.10%			
52.	Goa WR	1.62	0.09%			
53.	Karcham Wangtoo	1.58	0.09%			
54.	Maruti Clean Coal	1.58	0.09%			
55.	Shree Cement	1.58	0.09%			
56.	NLC TPS-II Stg-2	1.57	0.09%			
57.	Renew Solar Energy	1.43	0.08%			
58.	Uttarakhand	1.33	0.08%			
59.	Jhabua Power	1.28	0.08%			
60.	Chuzachen	1.26	0.07%			
61.	Raigarh Energy Ltd.	0.89	0.05%			
62.	Palatana	0.86	0.05%			
63.	Renew Solar Urja	0.85	0.05%			
64.	NLC	0.78	0.05%			
65.	NLC TPS-II	0.70	0.04%			
66.	AD Hydro	0.62	0.04%			
67.	Chandigarh	0.57	0.03%			
68.	Dadra & Nagar Haveli	0.51	0.03%			
69.	Neyveli New Thermal	0.46	0.03%			
70.	IL&FS	0.45	0.03%			
71.	Adani Green Solar	0.39	0.02%			
72.	RGPPL	0.33	0.02%			
73.	Daman & Diu	0.32	0.02%			
74.	Renew Surya Ravi	0.30	0.02%			
75.	Ramagundam Floating	0.26	0.02%			
76.	Lanco Budhil	0.23	0.01%			
77.	Adani Wind Energy	0.23	0.01%			
78.	RGPPL_Others	0.20	0.01%			
79.	Adani Hybrid Energy	0.20	0.01%			
80.	Adani Hybrid Energy	0.19	0.01%			
81.	Sasan UMPP	0.15	0.01%			
82.	Jindal Steel	0.07	0.00%			
83.	NLC TPS-II Expn	0.05	0.00%			
84.	Continuum Power	0.05	0.00%			
Total Volume of top 10		1,131.85	66.41%		1,362.40	79.94%
Total Volume in PXs		1,704.38		Total Volume in PXs	1,704.38	

Annexure-XII**Cross Border Electricity Transactions in Day Ahead Market (DAM) in IEX with Nepal and Bhutan during the month of April, 2022**

S. No	Delivery Date	Buy Volume By Nepal (MU)	Buy Volume by Bhutan (MU)
1	01-04-2022	1474.03	-
2	02-04-2022	3187.50	-
3	03-04-2022	5035.45	-
4	04-04-2022	2515.92	-
5	05-04-2022	5553.98	-
6	06-04-2022	4318.34	-
7	07-04-2022	3920.26	-
8	08-04-2022	4209.73	-
9	09-04-2022	3673.29	-
10	10-04-2022	5085.31	-
11	11-04-2022	3341.21	-
12	12-04-2022	3347.00	-
13	13-04-2022	3001.49	-
14	14-04-2022	4211.02	-
15	15-04-2022	4651.06	-
16	16-04-2022	2703.29	-
17	17-04-2022	5397.98	-
18	18-04-2022	3712.46	-
19	19-04-2022	4195.65	-
20	20-04-2022	3819.06	-
21	21-04-2022	4174.06	-
22	22-04-2022	2299.46	-
23	23-04-2022	1265.27	-
24	24-04-2022	2626.10	-
25	25-04-2022	2400.95	-
26	26-04-2022	2394.52	-
27	27-04-2022	3715.64	-
28	28-04-2022	1532.26	-
29	29-04-2022	1015.90	-
30	30-04-2022	1105.98	-
Total		99.88	-
		99.88	

-: No transaction happened.

Note: Cross Border Transactions of Electricity of 99.88 MU (99.88 MU purchase by Nepal) happened during April, 2022 in IEX, which is included in DAM Volume of April, 2022 in IEX

Appendix-I**Analysis for change in trend of Final Scheduled Volume in DAM on 2nd Sunday & 4th Monday of April, 2022 (i.e. 10th April, 2022 & 25th April, 2022)**

Final Scheduled Volume (MU) and the Daily MCP (Rs/kWh) invariably shows decreasing trend on Sundays and increasing trend on Mondays as the demand of electricity in the country is less on Sundays as compared to other days of week. However, during the month of April, 2022, it is observed that on second Sunday (10th April, 2022), FSV showed increasing trend in comparison to second Saturday (09th April, 2022) and FSV on fourth Monday (25th April, 2022) showed decreasing trend in comparison to fourth Sunday (24th April, 2022). On analysis, it has been found as under:

- (i) On second Sunday (10th April, 2022), although there was decrease in purchase on power exchange by some of the States in comparison to second Saturday (09th April, 2022) by **45.41 MU** [i.e. Tamil Nadu (38.06 MU), Uttarakhand (2.30 MU), Maharashtra (1.68 MU), Punjab (1.29 MU), ArcelorMittal Nippon steel (ESIL) (0.83 MU) and Himachal Pradesh (0.55 MU), etc.], there was also increase in purchase on power exchange by some of the States by **54.96 MU** [i.e. Telangana (20.01 MU), Chhattisgarh (9.26), Haryana (5.86 MU), Rajasthan (4.40 MU), West Bengal (4.05 MU), Odisha (2.36 MU) and Andhra Pradesh (1.93 MU), etc.]. This resulted in an overall increase in FSV by **9.55 MU** on Sunday (10th April, 2022) as compared to Saturday (09th April, 2022).
- (ii) On fourth Monday (25th April, 2022), although there was increase in purchase on power exchange by some of the States in comparison to Sunday (24th April, 2022) by **5.08 MU** [i.e. Andhra Pradesh (1.95 MU), Jharkhand (0.71 MU), Bihar (0.55 MU), Kerala (0.48 MU) and Odisha (0.47 MU), etc.], there was also decrease in purchase on power exchange by some of the States by **26.80 MU** [i.e. Telangana (10.34 MU), Tamil Nadu (3.47 MU), Haryana (2.10 MU), Rajasthan (1.81 MU) and Assam (1.66 MU), etc.]. This resulted in an overall decrease in FSV by **21.72 MU** on Monday (25th April, 2022).

Appendix-II**Definitions/ Terminologies used in the Report**

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