



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

सेवा में /To

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विषय: मार्च, 2023 माह की मार्केट मॉनिटरिंग रिपोर्ट।

Subject: Monthly Market Monitoring Report for the month of March, 2023.

महोदय/ Sir,

मार्च, 2023 माह के लिए केंद्रीय विद्युत प्राधिकरण द्वारा तैयार की गई मासिक मार्केट मॉनिटरिंग रिपोर्ट (MMMR) की एक प्रति सूचना और अवलोकन के लिए संलग्न है। A copy of the monthly market monitoring report (MMMR) prepared by central Electricity Authority for the month of March, 2023 is enclosed herewith for kind information and perusal.

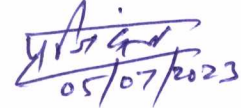
मार्च, 2023 माह के दौरान मार्केट के संचालन की मुख्य विशेषताएं इस प्रकार रही। Key highlights of the market operation during March, 2023 are as under:

- (i) मार्च, 2023 माह में देश में कुल 126,825 MU विद्युत का कारोबार किया गया, जिसमें से 61,279 MU का कारोबार अंतर्राज्यीय पारेषण प्रणाली (Inter State Transmission System) के माध्यम से किया गया था और शेष राज्य नियंत्रित उत्पादन स्टेशनों से अंतरराज्यीय पारेषण प्रणाली (Intra State Transmissions System) के माध्यम से किया गया। In the month of March, 2023 a total of 126,825 MU of electricity was transacted in the country out of which 61,279 MU was transacted through ISTS, and the remaining through state controlled generating stations through Intra State Transmissions System.
- (ii) अल्पावधि मार्केट के अंतर्गत कुल 21,496 MU का कारोबार किया गया था, जिसमें से 9,518 MU पावर एक्सचेंजों के माध्यम से कारोबार किया गया और शेष द्विपक्षीय कारोबार और विचलन (deviations) के रूप में हुआ। इस प्रकार अल्पावधि कारोबार, मार्च, 2023 माह में ट्रेड की गई विद्युत की कुल मात्रा का 16.95 % था और

7.50 % पावर एक्सचेंजों के माध्यम से रहा। A total of 21,496 MU was transacted under Short Term Market, out of which 9,518 MU was transacted through Power Exchanges and remaining happened as bilateral transactions & deviations. Thus, the total short term trade in March, 2023 was 16.95 % of total volume of electricity traded in March, 2023 and 7.50 % was through Power Exchanges.

- (iii) यदि हम अंतर्राज्यीय पारेषण प्रणाली (ISTS) के माध्यम से आपूर्ति की गई विद्युत के संबंध में इन कारोबारों की तुलना करते हैं, तो अल्पावधि कारोबार अंतर्राज्यीय पारेषण प्रणाली (ISTS) कारोबार का लगभग 35.08 % रहा, जिसमें से पावर एक्सचेंजों के माध्यम से कारोबार 15.53 % रहा। If we compare these transactions with respect to the electricity supplied through ISTS, the short term transactions constitutes about 35.08 % of ISTS transactions, out of which transaction through the power exchanges constitutes 15.53 %.

भवदीय/ Yours faithfully,



(प्रदीप जिंदल/ Pardeep Jindal)

मुख्य अभियंता (आर.ए.)/ Chief Engineer (RA)

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CEA website (<https://cea.nic.in/market-monitoring-report/?lang=en>)



सत्यमेव जयते

मासिक मार्केट मॉनिटरिंग रिपोर्ट - मार्च, 2023

Monthly Market Monitoring Report March, 2023



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

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**मार्च, 2023 की मासिक मार्केट
मॉनिटरिंग रिपोर्ट का सारांश**

**Summary of Market Monitoring Report
For the month of March, 2023**

मार्च, 2023 माह के लिए सारांश Summary for Month: March, 2023

भारत में विद्युत एक्सचेंजों पर विद्युत के व्यापार का सारांश

Summary of Electricity Transactions on Power Exchanges in India

- मार्च, 2023 के दौरान विद्युत एक्सचेंजों (यानी आईईएक्स, पीएक्सआईएल और एचपीएक्स) के माध्यम से कुल **9,518 MU** विद्युत का कारोबार किया गया। विद्युत की यह मात्रा डिलीवरी की तारीख के आधार पर है और इसमें DAM, GDAM, RTM, TAM और GTAM मार्केट खंडों के माध्यम से कारोबार शामिल हैं।

A total volume of **9,518 MU** electricity was transacted through power exchanges i.e. IEX, PXIL & HPX, during the month of March, 2023. This volume of electricity is on delivery date basis and includes transactions through DAM, GDAM, RTM, TAM and GTAM market segments.

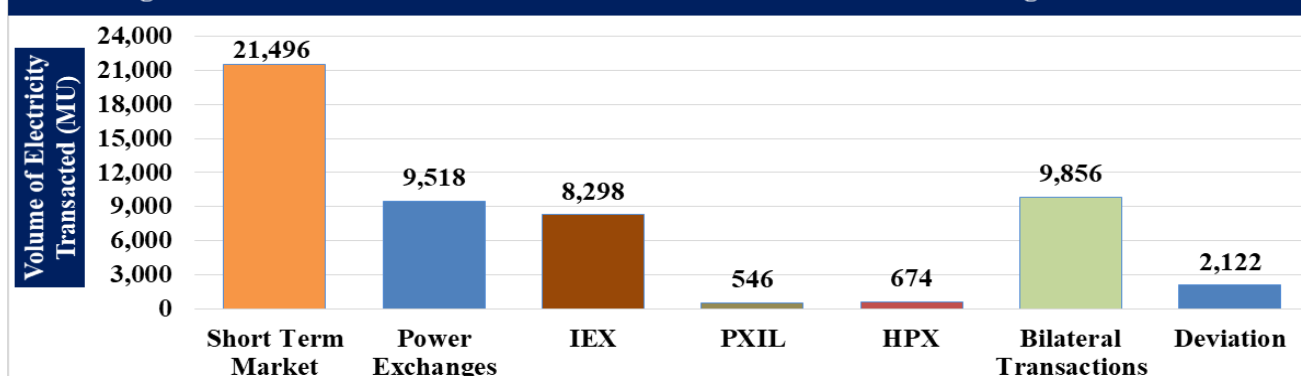
Segment	Transactions happened in the PXs (IEX, PXIL & HPX combined)			
	FSV (MU)	Average MCP (₹/kWh)	Congestion (MU)	Real Time Curtailment (MU)
DAM	4,718	5.40	0.00	0.00
GDAM	298	5.62	0.00	0.00
RTM	2,098	4.95	0.89	0.00
TAM	2,263	6.47	0.00	4.54
GTAM	140	5.98	0.00	0.00
Total in PXs	9,518	5.57*	0.89	4.54

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

- द्विपक्षीय व्यापार के तहत कुल **9,856 MU** विद्युत का कारोबार किया गया और **2,122 MU** को विचलन के रूप में स्थानांतरित किया गया। इस प्रकार कुल **21,496 MU** विद्युत का कारोबार अल्पावधि व्यापार के रूप में किया गया था। मार्च, 2023 के महीने में देश में कुल **126,825 MU** विद्युत की आपूर्ति की गई थी, इस प्रकार मार्च, 2023 माह में कारोबार की गई विद्युत की कुल मात्रा में अल्पावधि बाजार का हिस्सा **16.95 %** था।

Under the Bilateral trade a total of **9,856 MU** of electricity was transacted and **2,122 MU** was transferred as deviation. Thus a total of **21,496 MU** of electricity was transacted as short term trade. In the month of March, 2023 a total of **126,825 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in March, 2023 was **16.95 %**.

Comparison of total volume of electricity transacted in Short Term Market, through the PXs together, IEX, PXIL, HPX, Bilateral Transactions and Deviations during March, 2023



- मार्च, 2023 के दौरान संचरण जाम की कुल मात्रा **0.89 MU** थी, जो की विद्युत एक्सचेंजों में कारोबार की गई विद्युत की कुल मात्रा का केवल 0.009 % है और मार्च, 2023 के महीने के दौरान आपूर्ति की गई कुल ऊर्जा का 0.0007 % है।
The total volume of transmission congestion that happened during the month of March, 2023 was **0.89 MU** which is only 0.009 % of the total volume of electricity transacted in the power exchanges and 0.0007 % of total energy supplied during the month of March, 2023.

RTM में **10** दिन अर्थात् दिनांक 8, 20 से 22, 25, 26 और 28 से 31 मार्च, 2023 को संचरण जाम देखा गया। जबकि DAM, GDAM, TAM और GTAM में कोई संचरण जाम नहीं देखा गया। मार्च, 2023 माह के महीने में रिपोर्ट की गई वास्तविक समय में विद्युत कटौती की कुल मात्रा केवल **4.54 MU** थी।

Transmission congestion observed in RTM on 10 day i.e. 8th, 20th to 22nd, 25th, 26th & 28th to 31st March, 2023, whereas, there was no congestion happened in DAM, GDAM, RTM & GTAM. The total volume of real time curtailment reported in the month of March, 2023 was only **4.54 MU**.

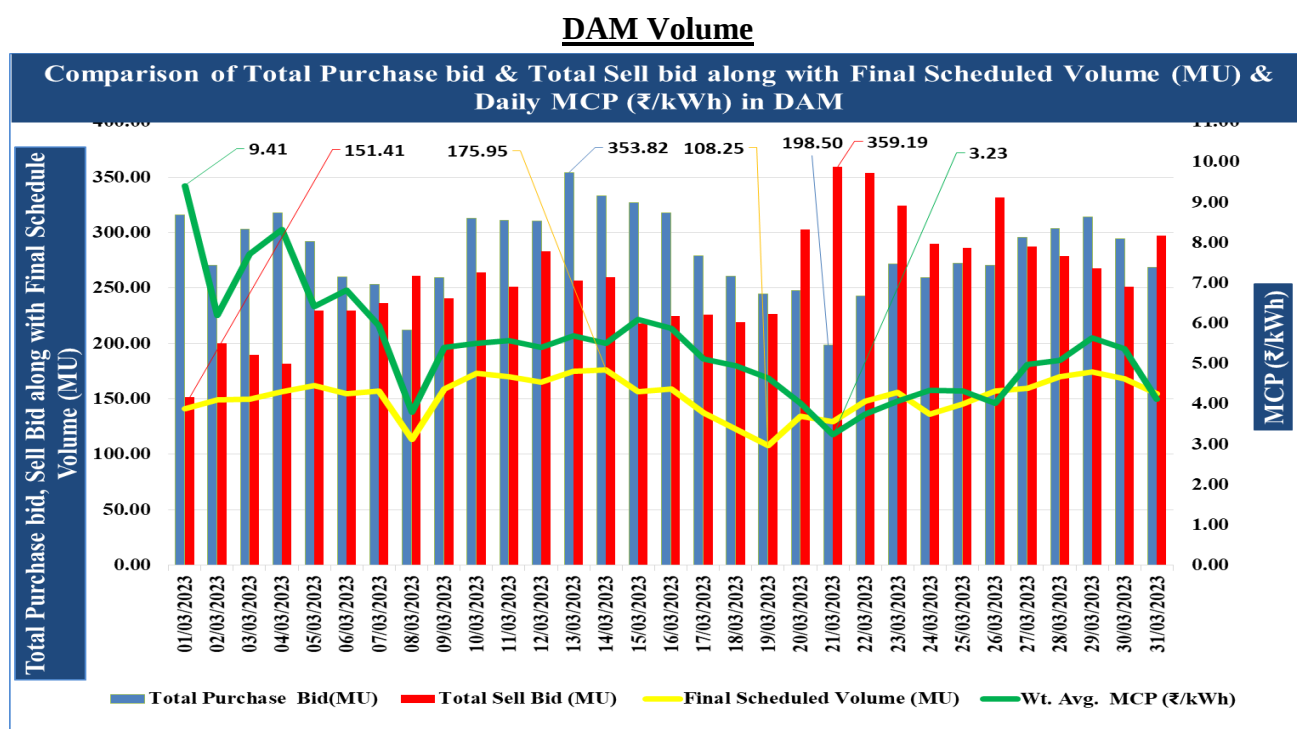
- मार्च, 2023 माह के दौरान अंतर्राज्यीय पारेषण प्रणाली (ISTS) में निर्धारित अनुसूचित विद्युत की कुल मात्रा **61,279 MU** थी। मार्च, 2023 के महीने में अल्पावधि बाजार में विद्युत का लेन-देन अंतर्राज्यीय पारेषण प्रणाली (ISTS) के माध्यम से अनुसूचित की गई कुल विद्युत की मात्रा का **35.08 %** रहा।

The total volume of electricity scheduled at ISTS during the month of March, 2023 was **61,279 MU**.

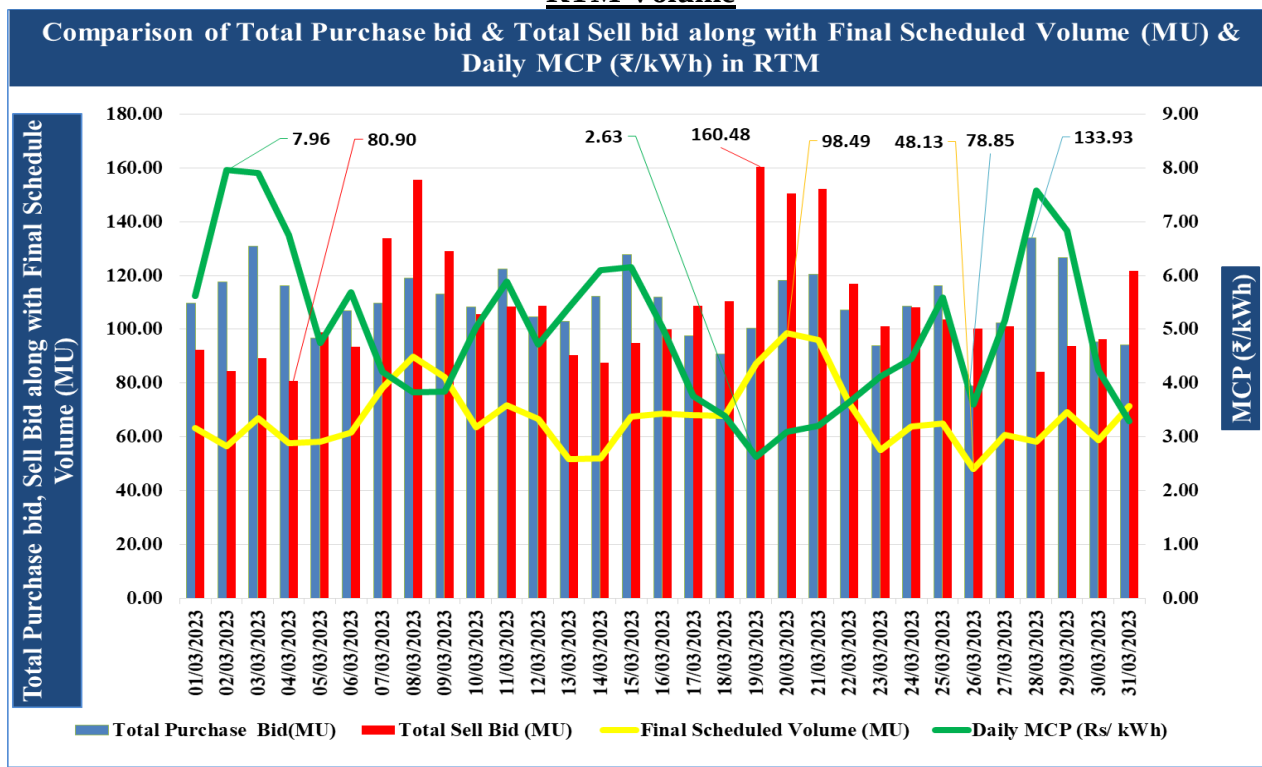
The total volume of electricity transacted in the short term market was **35.08 %** of total volume schedule at ISTS in the month of March, 2023.

- मार्च, 2023 माह के दौरान DAM और RTM में विद्युत की खरीद और बिक्री बोलियों, अंतिम अनुसूचित मात्रा और दैनिक औसत MCP की भिन्नता निम्नलिखित चित्रों में दर्शाई गई है:

The variation of Purchase and Sell bids, Final Scheduled Volume and Daily Avg. MCP in DAM and RTM during the month of March, 2023 are shown in following figures:



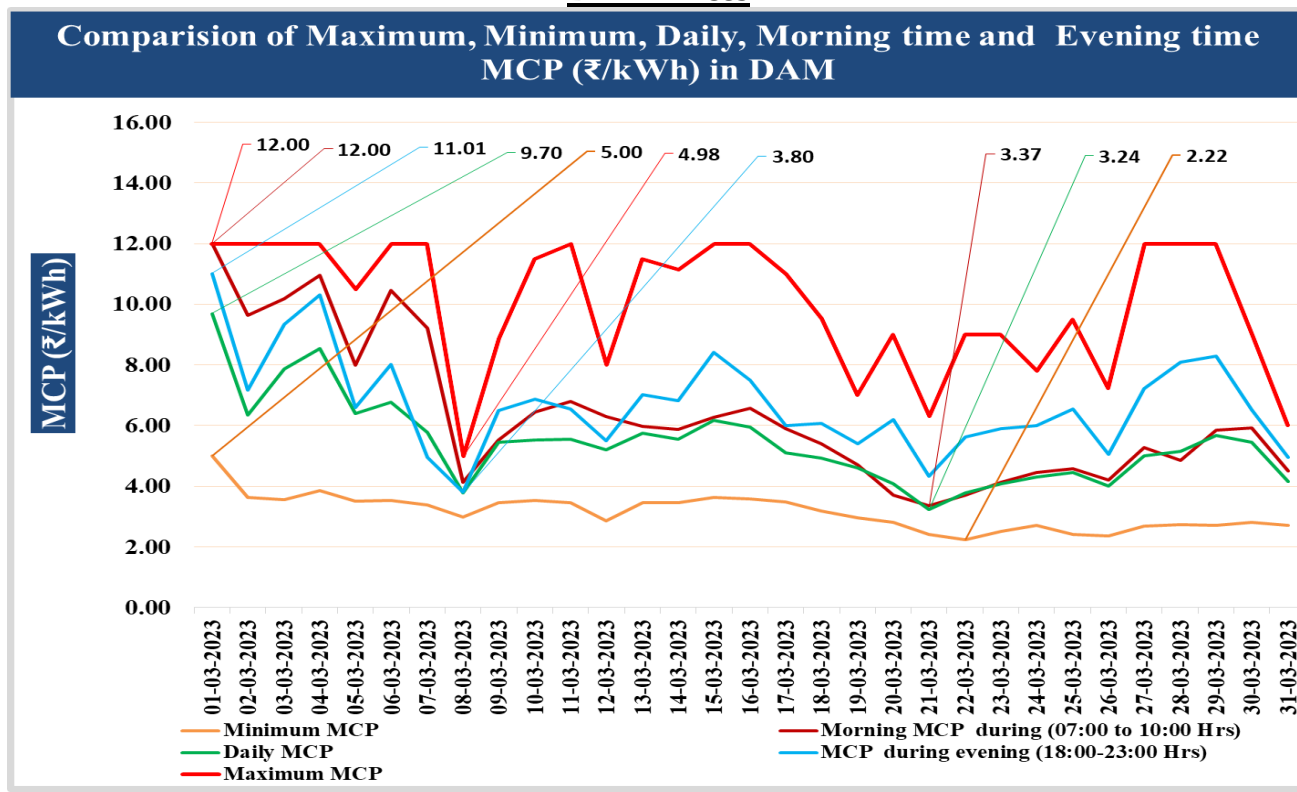
RTM Volume



➤ मार्च, 2023 माह के दौरान DAM और RTM में अधिकतम, न्यूनतम, दैनिक, सुबह और शाम के समय MCP की भिन्नता निम्नलिखित चित्रों में दिखाई गई है:

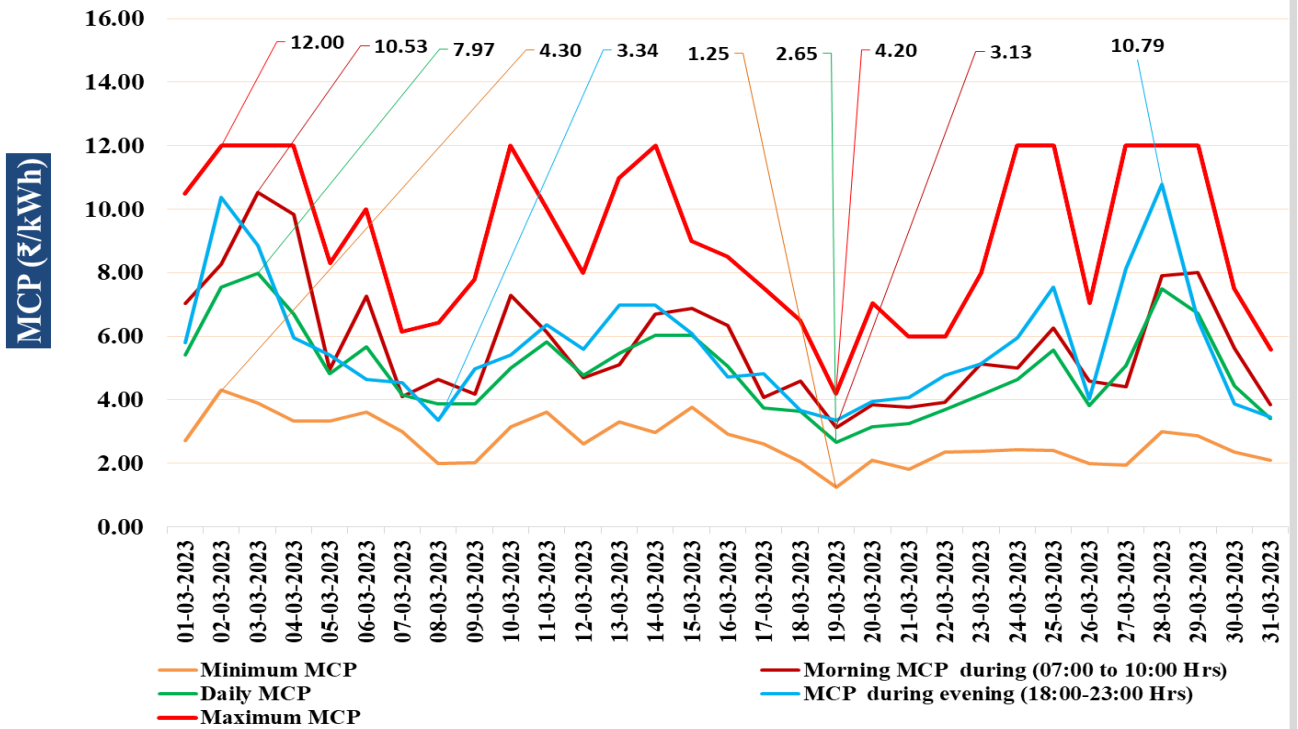
The variation of Maximum, Minimum, Daily, Morning and Evening time MCPs in DAM and RTM during the month of March, 2023 are shown in following figures:

DAM Prices



RTM Prices

Comparison of Maximum, Minimum, Daily, Morning time and Evening time MCP (₹/kWh) in RTM



MARKET MONITORING REPORT DETAILS

Electricity Transactions on Power Exchanges in India

1. Day Ahead Market (DAM)

1.1. The total volume of electricity transacted on the power exchanges, viz., IEX and PXIL in the Day Ahead Market (DAM) in the month of March, 2023 was **4,718.38 MU**. The total energy supplied in the country during the month of March, 2023 was 126,825 MU. Thus, the volume of electricity transacted on the power exchanges in DAM during March, 2023 was 3.72 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month i.e. February, 2023, it was **4,658.76 MU** which was 3.93 % of the total energy supplied (118,564 MU) in the country during February, 2023. Similarly, the total volume of electricity transacted in DAM during previous year i.e. March, 2022, was **5,858.59 MU** which was 4.56 % of the total energy supplied (128,478 MU) in the country during March, 2022.

1.2. The volume of electricity transacted on IEX during March, 2023 was **4,718.38 MU**. No transaction of electricity took place in PXIL & HPX. The volume of electricity transacted on IEX during February, 2023 was **4,658.76 MU**. No transaction of electricity took place in PXIL & HPX. The volume of electricity transacted on IEX and PXIL during March, 2022, were **5,858.39 MU and 0.20 MU** respectively.

1.3. The DAM volume for March, 2023 in IEX is inclusive of Cross Border Transactions of Electricity with Nepal and Bhutan (details given at **Annexure XII**), which was **370.58 MU** (i.e. 260.15 MU buy by Nepal and 110.43 MU buy by Bhutan).

1.4. The Average Market Clearing Price (MCP) on IEX during the month of March, 2023 was **₹ 5.40/kWh**, which shows a decrease of 18.31 % & 34.39 % when compared with average MCP's for the month of February, 2023 and March, 2022, which were **₹ 6.61/kWh** and **₹ 8.23/kWh**, respectively. On PXIL and HPX, no transaction of electricity took place during March, 2023.

1.5. DAM Market Clearing Price, Area Clearing Price and Final Scheduled Volume Of DAM in the Power Exchanges

Final Scheduled Volume (FSV), Daily Avg. Market Clearing Prices (MCP), Area Clearing Prices (ACP) in Day Ahead Market during the month of March, 2023 as compared with February, 2023 and March, 2022 is given in Table- 1A & 1B:

(a) Final Scheduled Volume:

Exchange	Period	Final Scheduled Volume (MU)			
		Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	March, 2023*	4718.38	108.25	175.95	152.21
	February, 2023*	4658.76	136.09	203.00	166.38
	%Change (Month over Month)	1.28	-20.46	-13.33	-8.52
	March, 2022*	5858.39	148.13	245.05	188.98
	%Change (Year over Year)	-19.46	-26.92	-28.20	-19.46
PXIL	March, 2023	-	-	-	-
	February, 2023	-	-	-	-
	%Change (Month over Month)	NA	NA	NA	NA
	March, 2022	0.20	0.04	0.16	0.10
	%Change (Year over Year)	NA	NA	NA	NA
HPX	March, 2023	-	-	-	-
	February, 2023	-	-	-	-
	%Change (Month over Month)	NA	NA	NA	NA

∴ No transaction took place

NA: Not Applicable

*** DAM Volume in IEX is inclusive of Cross Border Transactions of Electricity with Nepal and Bhutan**

Table: 1A

(b) Daily Avg. Market Clearing Price (MCP) and Area Clearing Price (ACP):

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)		ACP (₹/kWh)		Monthly Avg. MCP (₹/kWh)
		Minimum	Maximum	Minimum	Maximum	Average
IEX	March, 2023	3.23	9.41	2.22	12.00	5.40
	February, 2023	4.36	8.83	2.82	12.00	6.61
	Change% (Month over Month)	-25.92	6.57	-21.28	0.00	-18.31
	March, 2022	3.76	18.67	2.42	20.00	8.23
	%Change (Year over Year)	-14.10	-49.60	-8.26	-40.00	-34.39
PXIL	March, 2023	-	-	-	-	-
	February, 2023	-	-	-	-	-
	%Change Month over Month)	NA	NA	NA	NA	NA
	March, 2022	2.00	4.99	2.00	4.99	3.49
	%Change (Year over Year)	NA	NA	NA	NA	NA
HPX	March, 2023	-	-	-	-	-
	February, 2023	-	-	-	-	-

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)		ACP (₹/kWh)		Monthly Avg. MCP (₹/kWh)
		Minimum	Maximum	Minimum	Maximum	Average
	%Change Month over Month)	NA	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table: 1B

1.6. The maximum Area Clearing Price (ACP) of ₹ 12.00/kWh in IEX was observed in all 13 regions during 114 time blocks on 1st to 4th, 6th, 7th, 11th, 15th, 16th, 27th to 29th March, 2023. As there was no congestion in transmission system, the MCP for these time blocks was also ₹ 12.00/kWh. Whereas, in PXIL and HPX, no transaction of electricity took place in the month of March, 2023.

1.7. The minimum ACP of ₹ 2.22/kWh in IEX was observed in all 13 regions during the time block 13:45 - 14:00 Hrs on 22th March, 2023. As there was no congestion in transmission system, the MCP for this time-block was also ₹ 2.22/kWh. Whereas, in PXIL and HPX, no transaction of electricity took place in the month of March, 2023.

2. Real Time Market (RTM)

The total volume of electricity transacted on the power exchanges in Real Time Market in March, 2023 was **2,097.72 MU**, out of which **2,097.72 MU** (100 %) was transacted in IEX and no transaction took place in PXIL and HPX. The Final Scheduled Volume (FSV), Daily Avg. Market Clearing Prices (MCP) and Area Clearing Prices (ACP) in Real Time Market during the month of March, 2023 as compared with February, 2023 and March, 2022 are as given in table 2A & 2B:

(i) Final Scheduled Volume:

Exchange	Period	Final Scheduled Volume (MU)			
		Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	March, 2023	2,097.72	48.13	98.49	67.67
	February, 2023	1,714.05	47.19	76.13	61.22
	% Change (Month over Month)	22.38	1.99	29.37	10.54
	March, 2022	2,020.86	47.92	96.60	65.19
	% Change (Year over Year)	3.80	0.44	1.96	3.80
PXIL	March, 2023	-	-	-	-
	February, 2023	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA
	March, 2022	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA
HPX	March, 2023	-	-	-	-
	February, 2023	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-2A

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

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)		ACP (₹/kWh)		Monthly Avg. MCP (₹/kWh)
		Minimum	Maximum	Minimum	Maximum	Average
IEX	March, 2023	2.63	7.96	1.25	12.00	4.95
	February, 2023	4.31	9.91	1.00	12.00	7.15
	% Change (Month over Month)	-38.98	-19.68	25.00	0.00	-30.77
	March, 2022	3.43	17.49	1.00	20.00	8.17
	% Change (Year over Year)	-23.32	-54.49	25.00	-40.00	-39.41

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)		ACP (₹/kWh)		Monthly Avg. MCP (₹/kWh)
		Minimum	Maximum	Minimum	Maximum	Average
PXIL	March, 2023	-	-	-	-	-
	February, 2023	-	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA	NA
	March, 2022	-	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA	NA
HPX	March, 2023	-	-	-	-	-
	February, 2023	-	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-2B

3. Green Day Ahead Market (GDAM):

The volume of electricity transacted in GDAM **298 MU** (i.e. **298 MU** in IEX) at an average MCP of **Rs 5.62/kWh** and no transaction took place in PXIL & HPX in GDAM. The Final Scheduled Volume (FSV), Daily Avg. 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 March, 2023 and its comparison with February, 2023 and March, 2022 are as given in Table 3A and 3B:

i) Final Scheduled Volume :

Exchange	Segment	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	Solar	March, 2023	80.42	0.49	8.05	2.59
		February, 2023	22.55	0.51	1.91	0.81
		% Change (Month over Month)	256.63	-3.92	321.47	219.75
		March, 2022	67.87	0.47	6.10	2.19
		%Change (Year over Year)	18.49	4.26	31.97	18.26
	Non Solar	March, 2023	216.10	3.79	11.43	6.97
		February, 2023	230.45	5.73	12.81	8.23
		% Change (Month over Month)	-6.23	-33.86	-10.77	-15.31
		March, 2022	136.95	2.64	6.38	4.42
		%Change (Year over Year)	57.79	43.56	79.15	57.69
	Hydro	March, 2023	1.23	0.00	0.22	0.07
		February, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Solar + Non Solar	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
	Hydro	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
HPX	Solar, Non Solar and Hydro	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-3A

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

Exchange	Segment	Period	Prices (₹/kWh)				
			Daily Avg. MCP (₹/kWh)		ACP (₹/kWh)		Monthly Avg. MCP (₹/kWh)
			Minimum	Maximum	Minimum	Maximum	Average
IEX	Solar, Non Solar and Hydro	March, 2023	4.37	7.47	3.34	12.00	5.62
		February, 2023	4.65	8.81	2.99	12.00	6.69
		% Change (Month over Month)	-6.02	-15.21	11.71	0.00	-15.99
		March, 2022	4.01	17.34	3.25	20.00	8.09
		% Change (Year over Year)	8.98	-56.92	2.77	-40.00	-30.53
PXIL	Solar, Non Solar and Hydro	March, 2023	-	-	-	-	-
		February, 2023	-	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA	NA
PXIL	Solar, Non Solar and Hydro	March, 2023	-	-	-	-	-
		February, 2023	-	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-3B

- 3.1** There was no transmission congestion in the power exchanges in Green Day Ahead Market during the month of March, 2023, February, 2023 and March, 2022.
- 3.2** There was no real time curtailment in the power exchanges in Green Day Ahead Market during the month of March, 2023, February, 2023 and March, 2022.
- 3.3** The **top 10 sellers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of March, 2023 were **Andhra Pradesh, Karnataka, Madhya Pradesh, Ramagundam Floating Solar PV Station, Sikkim, J&K, SBSR Power Cleantech Eleven Private Limited, Himachal Pradesh, Simhadri FSP 15 MW Project and Ostro Kannada Power Private Limited**, which constituted **96.33 %** of the market volume.
- 3.4** The **top 10 buyers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of March, 2023 were **Maharashtra, Gujarat, Karnataka, ArcelorMittal Nippon steel (ESIL), DVC, Odisha, Delhi, Punjab, Madhya Pradesh and Daman & Diu - Dadra & Nagar Haveli**, which constituted **91.17 %** of the market volume.

4. Term Ahead Market (TAM)

- 4.1. The total volume of electricity transacted on the power exchanges in Term Ahead Market in March, 2023 on delivery date basis was **2,263.42 MU**, out of which **1,086.94 MU** (48.02 %) was transacted on IEX, **514.79 MU** (22.74 %) was transacted on PXIL and **661.69 MU** (29.23 %) was transacted on HPX.
- 4.2. The total volume of electricity transacted on the power exchanges in Term Ahead Market in February, 2023 on delivery date basis was **2,104.55 MU**, out of which **978.01 MU** (46.47 %) was transacted on IEX, **560.69 MU** (26.64 %) was transacted on PXIL and **565.85 MU** (26.89 %) was transacted on HPX.
- 4.3. Similarly, the total volume of electricity transacted on 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.
- 4.4. In the month of March, 2023, the transaction of electricity in IEX under anyday single sided reverse auction contract was **47.70 MU**, whereas in HPX, the same was **40.55 MU**, further, no transaction took place in PXIL under reverse auction contract. Similarly, under the long duration contracts (Daily, Weekly & Monthly) **297.60 MU** happened in Monthly contract in IEX, whereas in HPX, under the long duration contracts **148.80 MU** happened in Monthly contract. No transaction took place in PXIL under long duration contracts in the month of March, 2023.
- 4.5. With respect to the total energy supplied during the month of March, 2023 in the country, the volume of electricity traded on the power exchanges in TAM on delivery date basis represents **1.78 %** of the total energy supplied. The same was **1.78 %** in February, 2023 and **1.05 %** in March, 2022.
- 4.6. In the month of March, 2023, there was no transmission congestion in IEX, PXIL and HPX in TAM.
- 4.7. In the month March, 2023, there was real time curtailment of **4.54 MU** in TAM, Out of which **2.53 MU** happened under Day Ahead Contingency contract, **0.12 MU** happened under Daily-Anyday contract and **1.89 MU** happened under Weekly contract in IEX. Whereas, in PXIL & HPX there was no real time curtailment in TAM.
- 4.8. **The comparison of total volume of electricity transacted and Average MCP in the power exchanges in Term Ahead Market (TAM) on delivery date basis during March, 2023 with February, 2023 and March, 2022 is given in Table – 4A & 4B:**

(a) **Final Scheduled Volume (MU), March, 2023 vis- a- vis February, 2023 and March, 2022**

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
IEX	March, 2023	0.11	689.29	15.50	36.74	741.64
	February, 2023	0.52	679.65	108.00	-	978.01

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
	%Change (Month over Month)	-78.85	1.42	-85.65	NA	-24.17
	March, 2022	2.61	387.89	432.21	-	822.71
	%Change (Year over Year)	-95.79	77.70	-96.41	NA	-9.85
PXIL	March, 2023	0.42	514.37	-	-	514.79
	February, 2023	5.93	554.76	-	-	560.69
	%Change (Month over Month)	-92.92	-7.28	NA	NA	-8.19
	March, 2022	1.34	377.17	143.59	-	522.10
	%Change (Year over Year)	-68.66	36.38	NA	NA	-1.40
HPX	March, 2023	-	467.46	4.88	-	472.34
	February, 2023	-	545.98	-	-	565.85
	%Change (Month over Month)	NA	-14.38	NA	NA	-16.53

- : No transaction took place

NA: Not Applicable

Table: 4A

(b) Average MCP, March, 2023 vis- a- vis February, 2023 and March, 2022

Exchange	Period	Average MCP (₹/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	March, 2023	11.28	5.72	12.00	11.99
	February, 2023	10.35	7.51	7.20	-
	%Change (Month over Month)	8.99	-23.83	66.67	NA
	March, 2022	13.07	9.31	6.11	-
	%Change Year over Year)	-13.70	-38.56	96.40	NA
PXIL	March, 2023	6.72	5.53	-	-
	February, 2023	11.32	7.68	-	-
	%Change (Month over Month)	-40.64	-27.99	NA	NA
	March, 2022	12.47	8.7	6.85	-
	%Change (Year over Year)	-46.11	-36.44	NA	NA
HPX	March, 2023	-	5.57	12.00	-
	February, 2023	-	8.04	-	-
	%Change (Month over Month)	NA	-30.72	NA	NA

-: No transaction took place

NA: Not Applicable

Table: 4B

5. GREEN TERM AHEAD MARKET (GTAM):

The total volume of electricity transacted in the IEX, PXIL & HPX in GTAM on delivery date basis was **140.49* MU** (133.42 MU in Non-Solar and 7.07 MU in Hydro), respectively.

* In the month of March, 2023, the transaction of electricity in HPX under anyday single sided reverse auction contract was **11.64 MU** (7.44 MU in Non-Solar and 4.20 MU in Hydro), whereas no transaction took place in IEX & PXIL under reverse auction contract in GTAM. Similarly, under the long duration contracts (Daily, Weekly & Monthly) no transaction took place in IEX, PXIL & HPX under long duration contracts in GTAM in the month of March, 2023.

The total volume of electricity transacted in GTAM in Day Ahead Contingency, Intraday, Daily/Anyday and Weekly contracts during March, 2023 and its comparison with February, 2023 and March, 2022 on delivery date basis have been shown in Tables 5A to 5F.

5.1 Solar Energy Segment in GTAM

The Final Scheduled Volume and the Price of electricity transacted in GTAM in Power Exchanges during March, 2023 and its comparison with February, 2023 and March, 2022 have been shown in Table 5A & 5B below.

(i) **Final Scheduled Volume:**

Exchange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	Day Ahead Contingency	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change Month over Month)	NA	NA	NA	NA
		March, 2022	43.64	0.03	4.77	1.68
		%Change (Year over Year)	NA	NA	NA	NA
	Intraday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	3.69	0.12	0.26	0.20
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	March, 2023	-	-	-	-
		February, 2023	-	-	-	-

Exchange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	143.23	1.52	7.71	4.62
		%Change (Year over Year)	NA	NA	NA	NA
	Intraday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	1.03	0.06	0.06	0.06
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
HPX	Day Ahead Contingency	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Intra Day, Daily, weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

Table-5A

NA: Not Applicable

(ii) Daily Avg. Market Clearing Price (MCP):

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	3.50	17.54	5.79
		%Change (Year over Year)	NA	NA	NA
	Intraday	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change	NA	NA	NA

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
		(Year over Year)			
		March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	5.00	5.00	5.00
		%Change (Year over Year)	NA	NA	NA
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	3.93	14.01	6.35
		%Change (Year over Year)	NA	NA	NA
	Intraday	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	4.50	4.60	4.54
		%Change (Year over Year)	NA	NA	NA
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Intra Day, Daily, weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

Table-5B

NA: Not Applicable

- In March, 2023, there was no transaction took place in GTAM (Solar) in IEX, PXIL & HPX.

5.2 Non-Solar Energy Segment in GTAM

The Final Scheduled Volume and the Price of electricity transacted in GTAM (Non-Solar) in Power Exchanges during March, 2023 and its comparison with February, 2023 and March, 2022 have been shown in Tables 5C & 5D below.

(i) Final Scheduled Volume:

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	Day Ahead Contingency	March, 2023	92.56	0.64	4.55	2.99
		February, 2023	77.24	0.29	4.10	2.76
		%Change (Month over Month)	19.83	120.69	10.98	8.33
		March, 2022	138.79	3.04	6.93	4.48
		%Change (Year over Year)	-33.31	-78.95	-34.34	-33.26
	Intraday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	March, 2023	1.49	0.05	0.05	0.05
		February, 2023	4.20	0.07	0.19	0.17
		%Change (Month over Month)	-64.52	-28.57	-73.68	-70.59
		March, 2022	1.21	0.07	0.11	0.09
		%Change (Year over Year)	23.14	-28.57	-54.55	-44.44
	Weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	March, 2023	30.45	0.20	2.57	1.01
		February, 2023	39.29	0.05	3.20	1.40
		%Change (Month over Month)	-22.50	300.00	-19.69	-27.86
		March, 2022	171.80	1.69	10.75	5.54
		%Change (Year over Year)	-82.28	-88.17	-76.09	-81.77
	Intraday	March, 2023	0.35	0.35	0.35	0.35
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	2.83	1.27	1.56	1.41
		%Change (Year over Year)	-87.63	-72.44	-77.56	-75.18
	Daily/Anyday	March, 2023	-	-	-	-

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
		March, 2023	-	-	-	-
	Weekly	February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
		March, 2023	1.13	0.10	0.43	0.28
HPX	Day Ahead Contingency	February, 2023	22.89	0.32	1.38	0.82
		%Change (Month over Month)	-95.06	-68.75	-68.84	-65.85
		March, 2023	-	-	-	-
	Intra Day, Daily, weekly	February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		March, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table - 5C

(ii) Daily Avg. Market Clearing Price (MCP):

Exchange	Non- Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	March, 2023	4.32	9.44	5.64
		February, 2023	4.39	11.11	6.87
		%Change (Month over Month)	-1.59	-15.03	-17.90
		March, 2022	3.73	18.87	8.13
		%Change (Year over Year)	15.82	-49.97	-30.63
	Intraday	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	March, 2023	6.80	6.80	6.80
		February, 2023	6.30	6.30	6.30
		%Change (Month over Month)	7.94	7.94	7.94
		March, 2022	4.70	5.00	4.76
		%Change (Year over Year)	44.68	36.00	42.86
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

Exchange	Non- Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
PXIL		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Day Ahead Contingency	March, 2023	3.72	9.96	5.64
		February, 2023	4.10	8.88	6.53
		%Change (Month over Month)	-9.27	12.16	-13.63
		March, 2022	4.22	19.11	8.56
		%Change (Year over Year)	-11.85	-47.88	-34.11
	Intraday	March, 2023	4.83	4.83	4.83
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	7.00	12.02	9.51
		%Change (Year over Year)	-31.00	-59.82	-49.21
	Daily/Anyday	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		March, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency	March, 2023	5.94	8.45	7.01
		February, 2023	4.07	11.34	7.06
		%Change (Month over Month)	45.95	-25.49	-0.71
	Intra Day, Daily, weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table - 5D

- In March, 2023, there was no transmission congestion in GTAM (Non Solar) in IEX, PXIL & HPX.
- In March, 2023, there was no real time curtailment in GTAM (Non Solar) in IEX, PXIL & HPX.

5.3 Hydro Energy Segment in GTAM

The Final Scheduled Volume and the Price of electricity transacted in GTAM (Hydro) in Power Exchanges during March, 2023 and its comparison with February, 2023 and March, 2022 have been shown in Tables 5E & 5F below.

Hydro Energy Contract in GTAM

(i) Final Scheduled Volume:

Exchange	Hydro Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	Day Ahead Contingency	March, 2023	2.87	0.02	0.23	0.18
		February, 2023	9.53	0.29	0.40	0.34
		%Change (Month over Month)	-69.88	-93.10	-42.50	-47.06
	Intraday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Intraday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	March, 2023	-	-	-	-
		February, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table: 5E

(ii) Daily Avg. Market Clearing Price (MCP):

Exchange	Hydro Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	March, 2023	3.85	11.70	7.26
		February, 2023	5.57	11.89	9.93
		% Change (Month over Month)	-30.88	-1.60	-26.89
	Intraday	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
PXIL	Day Ahead Contingency	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Intraday	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Daily/Anyday	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
	Weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	March, 2023	-	-	-
		February, 2023	-	-	-
		% Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table – 5F

- In March, 2023, there was no transmission congestion in GTAM (Hydro) in IEX. No transaction took place in PXIL and HPX in GTAM (Hydro).
- In March, 2023, there was no real time curtailment in GTAM (Hydro) in IEX. No transaction took place in PXIL and HPX in GTAM (Hydro).

6. **Bilateral Transactions:**

The total volume of electricity transacted through **Bilateral transactions** in the month of March, 2023 was **9,856.49 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and trader in the month of March, 2023 were **3,180.64 MU** and **6,675.85 MU** respectively. The details of Bilateral transactions of Electricity during March, 2023 is shown in Table Below:

March, 2023	Direct	Traders	Total Bilateral Transaction (MU)
Total	3,180.64	6,675.85	9,856.49
Minimum	0.10	3.39	-
Maximum	531.70	1471.64	-

Table -6A

The region-wise maximum/ minimum volume of electricity transacted bilaterally during March, 2023 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	144.19	124.70	852.13	1641.80	711.21	1166.19	1473.10	3663.44	-	79.73
Minimum	0.10	3.39	18.06	5.98	2.44	84.59	22.33	37.96	-	3.60
Maximum	92.87	106.85	531.70	894.10	274.06	429.98	530.84	1471.64	-	61.51

Table-6B

6.1. The top 5 buyers on bilateral transaction through direct transactions in the month of March, 2023 were **Maharashtra, Karnataka, Telangana, Andhra Pradesh** and **Rajasthan**, which constituted **64.27 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of March, 2023 were **Tamil Nadu, Telangana, Maharashtra, Andhra Pradesh** and **Kerala**, which constituted **67.70 %** of the market volume. [Annexure III]

6.2. The top 5 sellers on bilateral transaction through direct transactions in the month of March, 2023 were **Uttar Pradesh, Punjab, SEMCORP, MP** and **AHEJ4LAHS**, which constituted **54.99 %** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of March, 2023 were **Punjab, JINDAL STAGE-II, RPREL, Delhi** and **RKM POWER**, which constituted **42.21 %** of the market volume. [Annexure III]

6.3. Deviation Volume -The volume of Deviation observed in the month of March, 2023 in import and export were **1,991.79 MU** and **2,251.29 MU** respectively. The total volume of Deviation observed in the month of March, 2023 can be taken as **2,121.54 MU**.

6.4. A comparison of volume of electricity transacted through the Power Exchanges together in DAM, TAM, RTM, GTAM and GDAM (on delivery date basis) with Bilateral transactions and Deviation in the month of March, 2023 is shown in **Figure 1:**

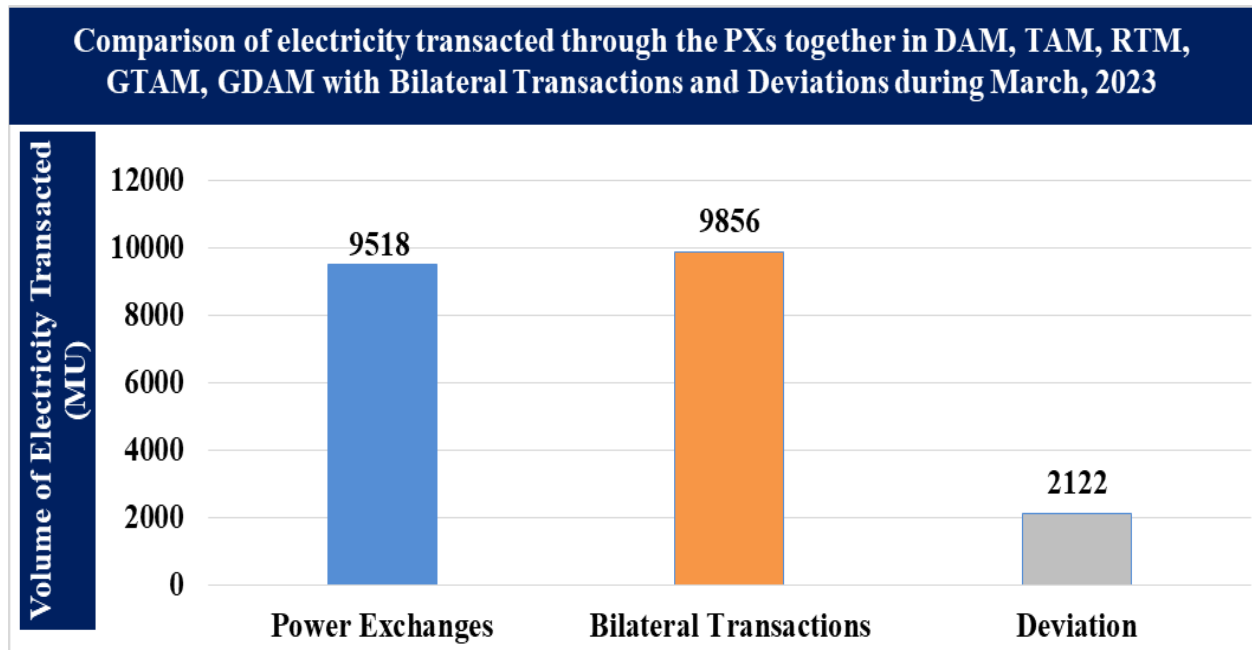
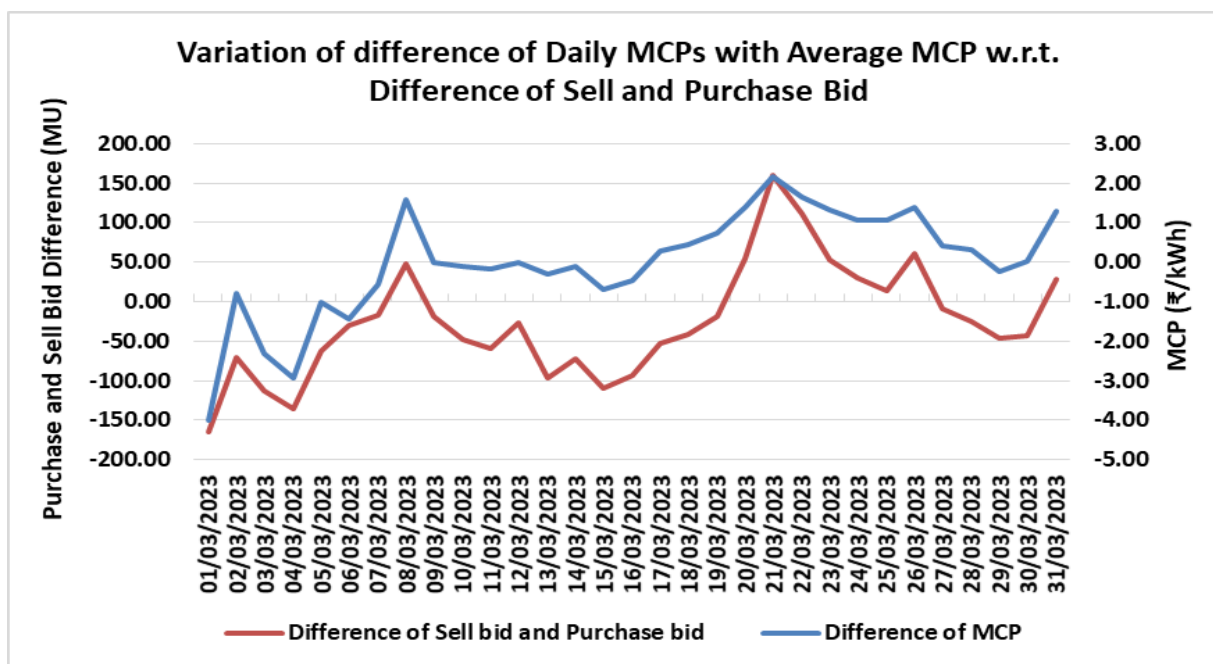


Figure -1

7. Analysis of movement of prices observed in DAM during March, 2023

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 March, 2023 month. The observations made are as under:

- 7.1. In order to find out the determinants which are responsible for the Daily Avg. MCP, a regression analysis has been carried out where the Daily Avg. MCP is the dependent variable and the independent variables are peak demand, total purchase bid, total sell bid, coal generation, hydro generation, wind generation and solar generation.
- 7.2. A double log function was used so that elasticity of Daily Avg. MCP could be read off from the coefficients of independent variables. The regression analysis revealed that the most significant variables was the Peak Demand. Further, the regression analysis revealed that the elasticity of the Daily Avg. MCP with respect to Peak Demand was **3.05** in the month of March, 2023.
- 7.3. The variation of difference of Daily Avg. MCPs with Average MCP w.r.t Difference of Sell and Purchase bid is Shown below:



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

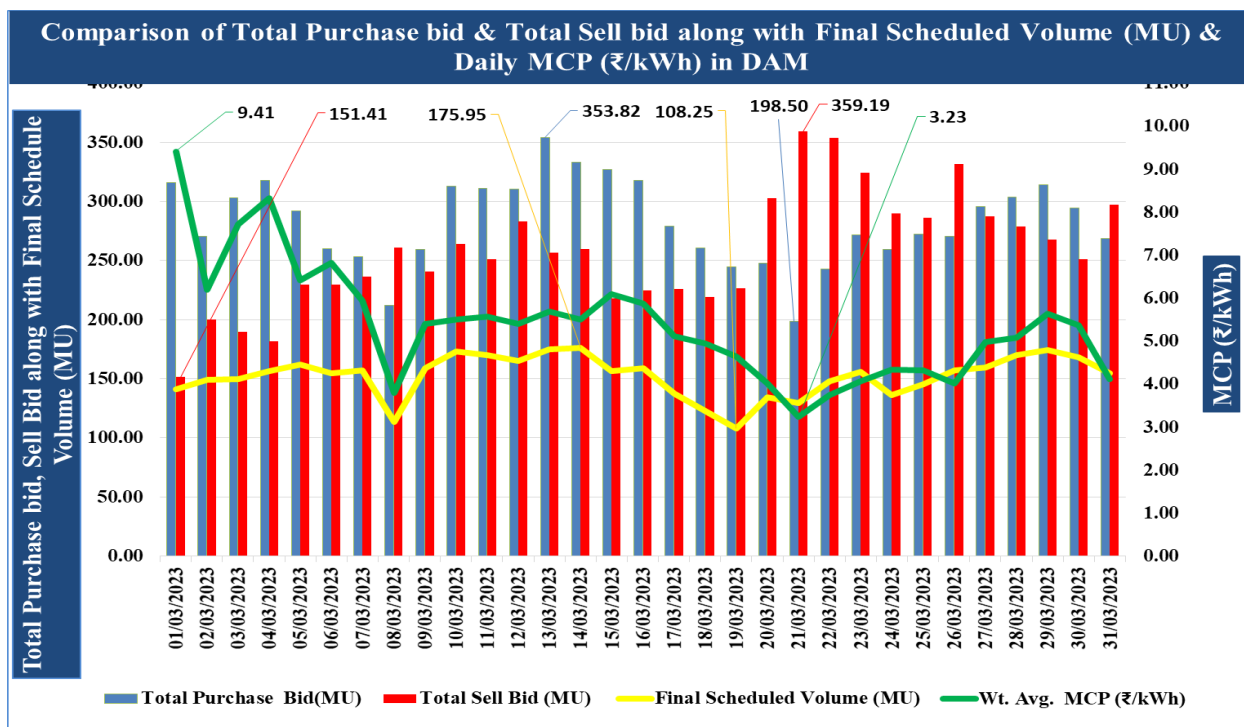


Figure - 2

7.5. Invariably, the Final Scheduled Volume (MU) and the Daily Avg. MCP (₹/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 March, 2023, it is observed that on fourth Sunday (26th March, 2023), FSV showed increasing trend in comparison to fourth Saturday (25th March, 2023). The detailed analysis on this is given at **Appendix-I**.

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

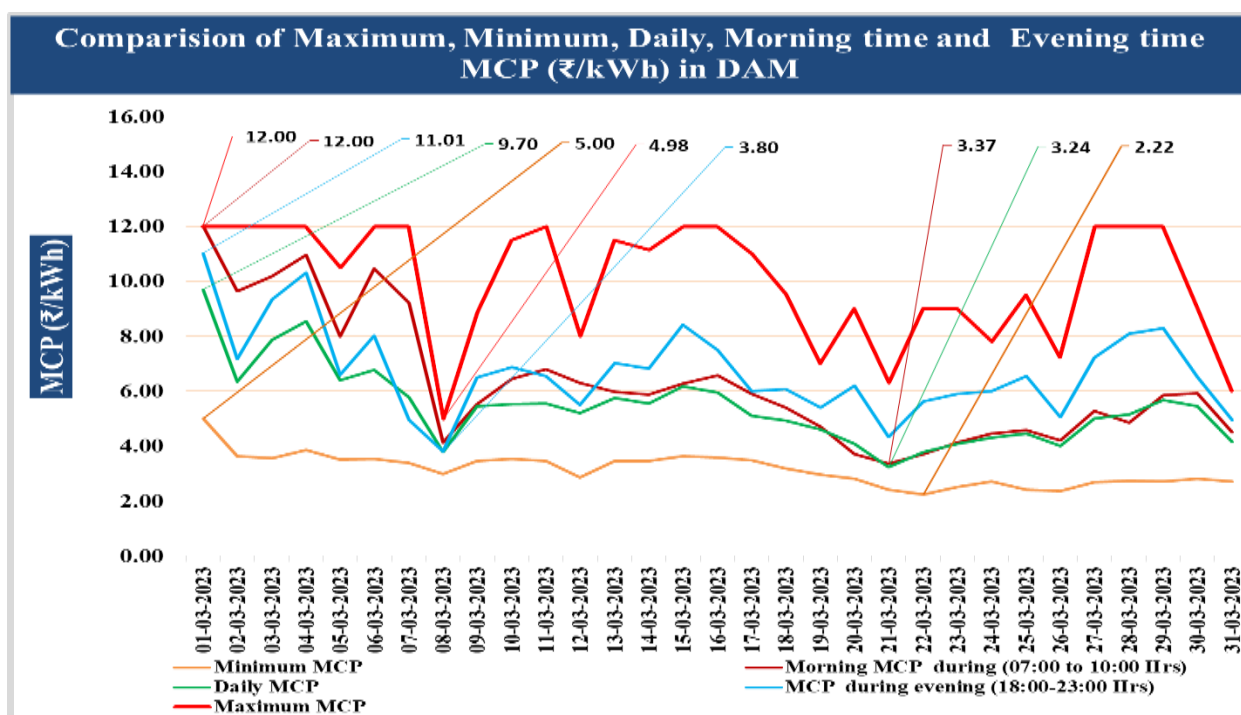


Figure-3

7.7. The Market Clearing Price duration curves for time block wise MCP for the month of March, 2023 is shown in **Figure 4**, whereas the time block wise MCP duration curve for the period 1st April, 2022 to 31st March, 2023 is shown in **Figure 5**.

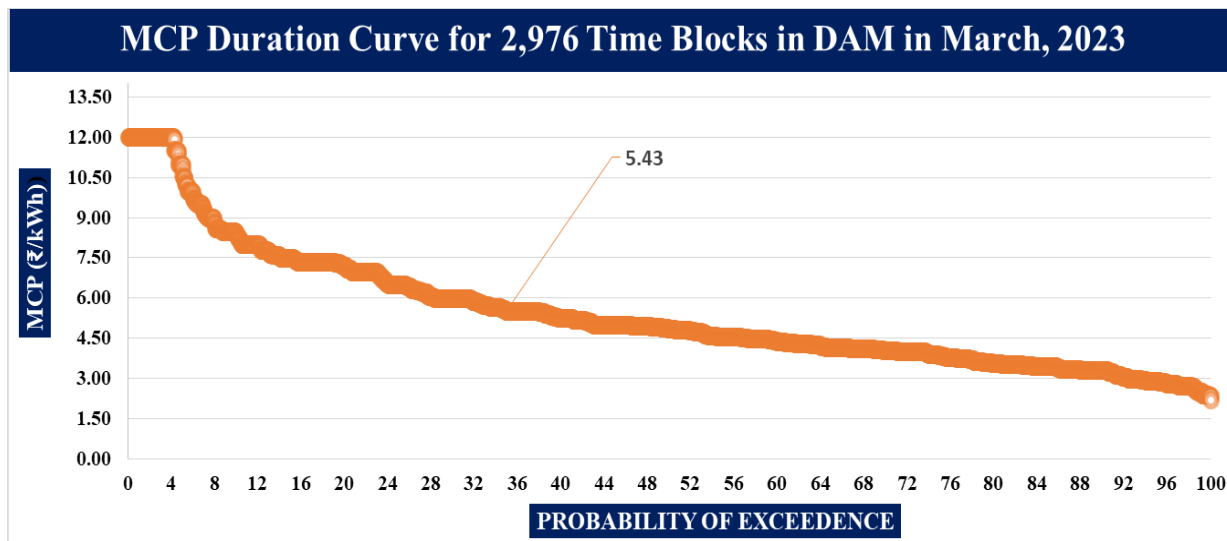


Figure – 4

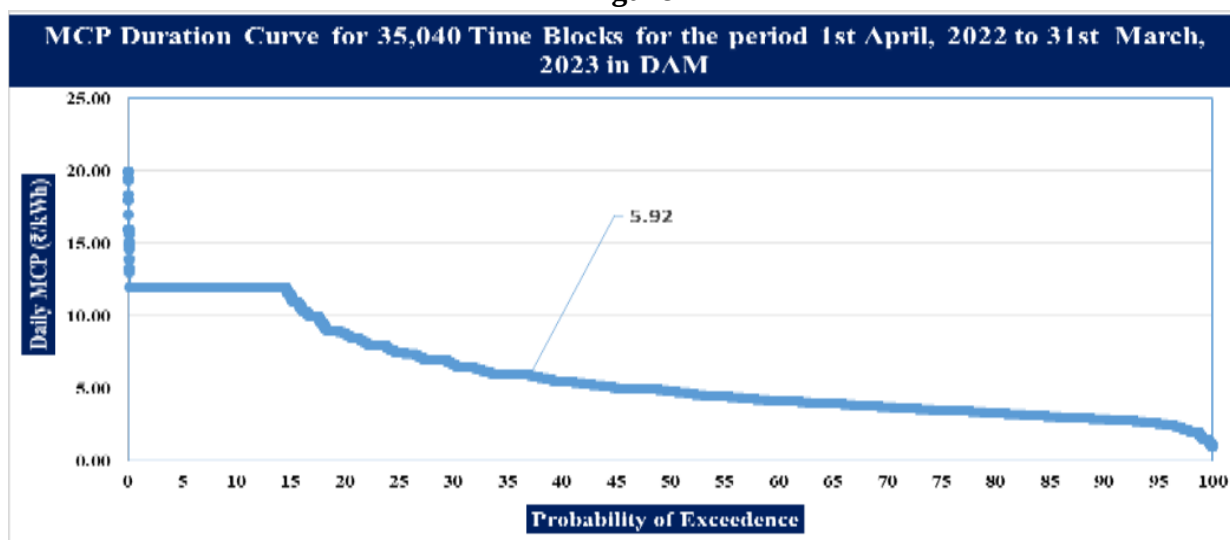


Figure-5

7.8. It can be seen in figure 4 above that in the MCP duration curve of March, 2023, for 35.00 % of the time MCP was above average MCP of the month (i.e. ₹ 5.43/kWh) and almost 65.00 % of the time MCP was below the average MCP of the month. Similarly, it can be seen in the MCP duration curve from 1st April, 2022 to 31st March, 2023 (figure-5), that for 37.00 % of the time the MCP was above the average MCP for the period (i.e. ₹ 5.92/kWh) and for 63.00 % of the time the Daily Avg. MCP was below the average MCP for the period.

7.9. 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 7.1 and 7.2 above.

- 7.10.** In March, 2023, the maximum FSV occurred mostly during the **time period 06-07 Hrs** (on 14 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 19-20 Hrs** (on 15 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 19-21 Hrs** (on 14 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 13-14 Hrs** (on 31 no. of days). **[Annexure VI]**
- 7.11.** In the month of March, 2023, there was **no** congestion in IEX and no transaction of electricity took place in PXIL & HPX during March, 2023. Further, in the month of February, 2023 and March, 2022, also there was no congestion in Power Exchanges.
- 7.12.** In the month of March, 2023, there was **no** real time curtailment in IEX and no transaction of electricity took place in PXIL & HPX during March, 2023. Further, in the month of February, 2023 and March, 2022 also, there was no real time curtailment in Power Exchanges.
- 7.13.** The **top 10 sellers** on the power exchanges in **Day Ahead Market (DAM)** in the month of March, 2023 were **Uttar Pradesh, Bihar, DB Power, Odisha, Raipur Energen, Chhattisgarh, Maharashtra, Madhya Pradesh, Delhi** and **Karnataka**, which constituted **67.97 %** of the market volume. **[Annexure VII]**.
- 7.14.** The **top 10 purchasers** on the power exchanges in **Day Ahead Market (DAM)** in the month of March, 2023 were **Gujarat, Telangana, J&K, Punjab, NVVN (SNA) – NEA, Uttarakhand, Andhra Pradesh, Maharashtra, Uttar Pradesh** and **Rajasthan**, which constituted **83.11 %** of the market volume. **[Annexure VII]**
- 7.15.** The total volume of electricity purchased by Discoms/Licensees in DAM in the month of March, 2023 was **4,268.74 MU**, which constituted **90.47 %** of total volume of electricity purchased on the power exchanges.
- 7.16.** Similarly, the total volume of electricity sold by Discoms/Licensees in DAM in the month of March, 2023 was **3,503.78 MU**, which constituted **74.26 %** of total volume of electricity sold on the power exchanges.

8. Analysis of movement of prices observed in Real Time Market (RTM) transactions in March, 2023

- 8.1. Similar to the regression analysis carried out for Day Ahead Market, the regression analysis for Real Time Market was also done. The regression analysis revealed that the significant variables was the Peak Demand. Further, the regression analysis revealed that the elasticity of the Daily Avg. MCP with respect to Coal Generation was **4.22** in the month of March, 2023.
- 8.2. The Purchase Bids and the MCP discovered in each of the 15-minute time block during the month almost followed the same trend [Annexure IX]. This is also corroborated with the outcome of regression analysis mentioned at **para 8.1 above**.
- 8.3. The Total Purchase Bid, Total Sell Bid, Daily Avg. MCP and FSV are shown in Figure-6 below:

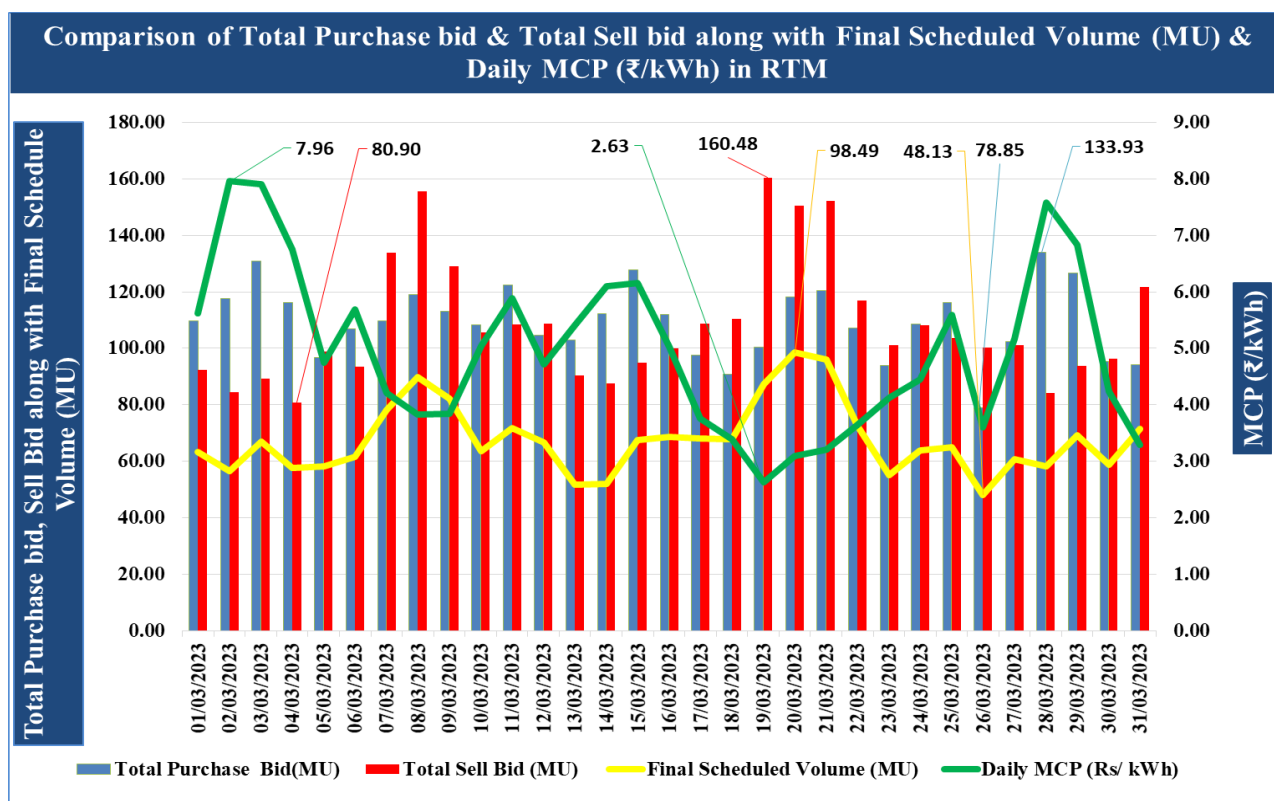


Figure-6

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

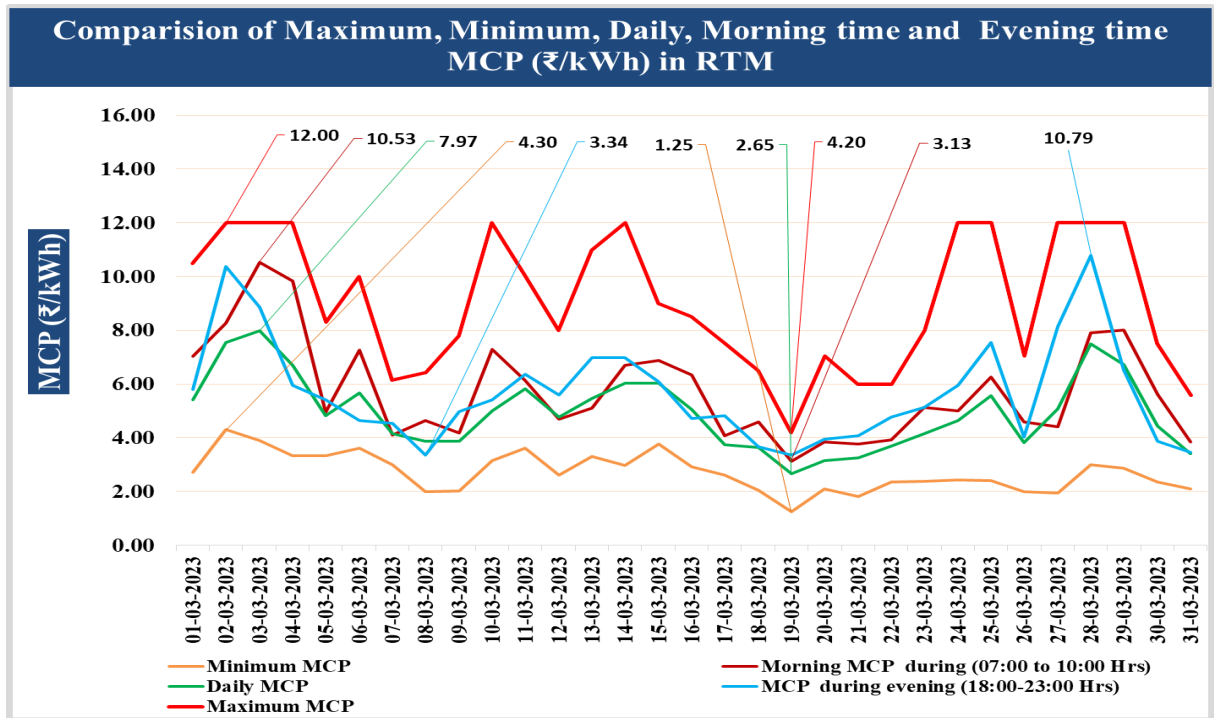


Figure-7

8.5. The Market Clearing Price duration curves for time block wise MCP for the month of March, 2023 is shown in **Figure 8**, whereas the day wise MCP duration curve for the period 1st April, 2022 to 31st March, 2023 is shown in **Figure 9**.

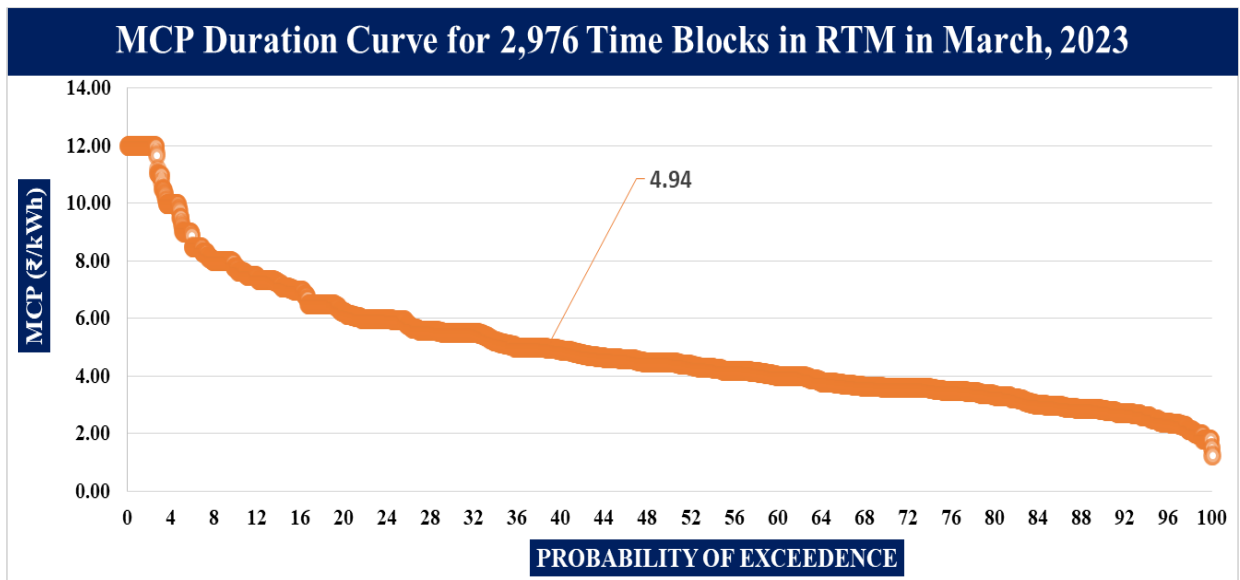


Figure-8

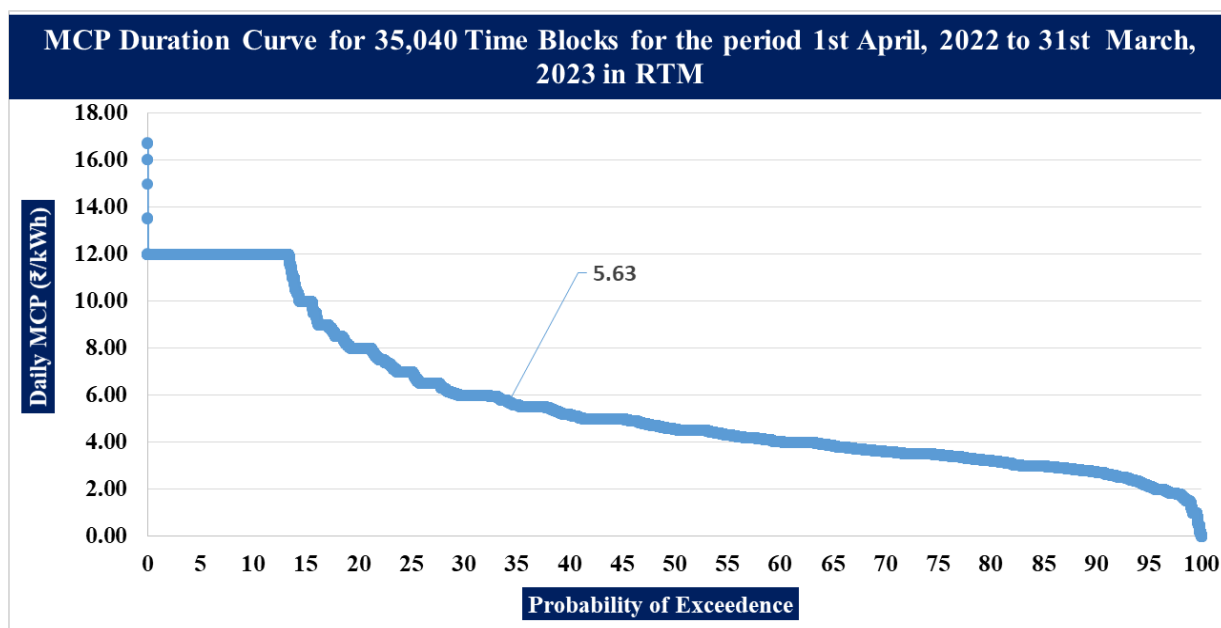


Figure-9

- 8.6.** It can be seen in figure 8 above that in the MCP duration curve of March, 2023, for 40.00 % of the time the MCP was above the average MCP of the month (i.e. ₹ 4.94/kWh) and for 60.00 % 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 28th March, 2023 (figure 9) that, for 35.00 % of the time the Daily Avg. MCP was above the average MCP for the period (i.e. ₹ 5.63/kWh) and for 65.00 % of the time the Daily Avg. MCP was below the average MCP for the period.
- 8.7.** In March, 2023, the maximum FSV occurred mostly during the **time period 10-12 Hrs** (on 10 no. of days). Whereas, the maximum MCP also occurred mostly during the **time period 08-10 Hrs** (on 12 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 00-02 Hrs** (on 08 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 00-02 Hrs** (on 10 no. of days).[Annexure X]
- 8.8.** There was **no** real time curtailment in IEX in Real Time Market (RTM) during March, 2023 and no transaction happened in PXIL and HPX. Further, in February, 2023 **no** real time curtailment occurred in IEX, whereas, no transaction happened in PXIL and HPX. Similarly, in March, 2022, there was no real time curtailment in IEX & no transaction happened in PXIL.
- 8.9.** In the month of March, 2023 there was congestion of **0.89 MU** in IEX and no transaction happened in PXIL & HPX. Further, in the month of February, 2023, there was **no** congestion in IEX and no transaction happened in PXIL & HPX. In the month of March, 2022, there was **3.13 MU** congestion in the transmission system in IEX and no transaction happened in PXIL.

8.10. The **top 10 sellers** on the power exchanges in **Real Time Market (RTM)** in the month of March, 2023 were **Madhya Pradesh, Bihar, Odisha, Uttar Pradesh, West Bengal, NPCIL KAKRAPAR ATOMIC POWER STATION UNITS 3 & 4, Rajasthan, Chhattisgarh, Andhra Pradesh** and **Telangana**, which constituted **74.56 %** of the market volume. **[Annexure XI]**

8.11. The **top 10 buyers** on the power exchanges in **Telangana, Gujarat, Punjab, J&K, Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh, West Bengal** and **Delhi**, which constituted **81.86 %** of the market volume. **[Annexure XI]**

8.12. The total volume of electricity purchased by Discoms/Licensees in RTM in the month of March, 2023 was **2,045.37 MU**, which constituted **97.50 %** of total volume of electricity purchased on the power exchanges.

8.13. Similarly, the total volume of electricity sold by Discoms/Licensees in RTM in the month of March, 2023 was **1,722.65 MU**, which constituted **82.12 %** of total volume of electricity sold on the power exchanges.

-
- **Source DAM, GDAM, TAM, GTAM and RTM data: IEX, PXIL and HPX**
 - **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 (₹/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	3,172.50	13.02	6.80	4.30	0	0
	June, 2022	4,084.99	116.20	6.49	6.61	0	0
Total Quarter -I	April - June, 2022	11,371.14	129.22	7.87	6.38	8.86	0
Quarter -II	July, 2022	3,516.65	31.78	5.50	5.01	0	0
	August, 2022	3,528.70	10.12	5.26	6.42	0	0
	September , 2022	4,049.65	12.89	5.73	6.19	0	0
Total Quarter -II	July - September , 2022	11,095.00	54.79	5.51	5.55	0.00	0.00
Quarter -III	October, 2022	4,325.01	3.01	3.96	4.64	0	0
	November, 2022	5,083.85	0	4.79	0	0	0
	December , 2022	4,977.44	0	5.57	0	0	0
Total Quarter -III	October - December , 2022	14,386.30	3.01	4.81	4.64	0.00	0.00
Quarter -IV	January, 2023	4,947.96	0.12	6.40	11.33	0	0
	February, 2023	4,658.76	0	6.61	0	0	0
	March, 2023	4,718.38	0	5.40	0	0	0
Total Quarter -IV	January - March, 2023	14,325.10	0.12	6.14	11.33	0	0
Total April, 2022 – March, 2023		65,732.22	187.38	6.12	6.11	8.86	0.00

Annexure-II

Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2022 to March, 2023 of IEX, PXIL and HPX (Delivery date basis)					
Quarter	Months	Final Scheduled Volume (MU)			
		IEX	PXIL	HPX	Total
Quarter -I	April, 2022	1,171.50	1,746.85	-	2,918.35
	May, 2022	1,188.60	1,157.77	-	2,346.37
	June, 2022	759.03	759.58	-	1,518.61
Total Quarter – I	April - June, 2022	3,119.13	3,664.20	-	6,783.33
Quarter-II	July, 2022	439.81	531.89	221.96	1,193.66
	August, 2022	722.89	486.80	253.48	1,463.17
	September , 2022	875.43	480.06	103.95	1,459.44
Total Quarter - II	July - September , 2022	2,038.13	1,498.75	579.39	4,116.27
Quarter -III	October, 2022	523.90	299.40	90.78	914.08
	November, 2022	547.33	492.13	155.43	1,194.89
	December, 2022	822.47	545.79	232.96	1,601.22
Total Quarter - III	October - December , 2022	1,893.70	1,337.32	479.17	3,710.19
Quarter -IV	January, 2023	918.74	661.11	410.30	1,990.15
	February, 2023	978.01	560.69	565.85	2,104.55
	March, 2023	1,086.94	514.79	661.69	2,263.42
Total Quarter - IV	January - March, 2023	2,983.69	1,736.59	1,637.84	6,358.12
Total April, 2022 - March, 2023		12,850.14	10,119.77	4,082.85	27,052.76

Top Five Entities (Buyers and Sellers) in Bilateral transactions in the month of March, 2023

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Maharashtra	531.70	16.72%	Tamil Nadu	1471.64	22.04%
Karnataka	530.84	16.69%	Telangana	946.62	14.18%
Telangana	356.36	11.20%	Maharashtra	894.10	13.39%
Andhra Pradesh	351.10	11.04%	Andhra Pradesh	724.93	10.86%
Rajasthan	274.06	8.62%	Kerala	482.28	7.22%
Total Volume	2,044.05	64.27%	Total Volume	4,519.59	67.70%
Total Volume in Bilateral	3,180.64		Total Volume in Bilateral	6,675.85	

(ii) Top five Sellers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Uttar Pradesh	484.37	15.23%	Punjab	802.82	11.14%
Punjab	430.11	13.52%	JINDAL STAGE-II	644.46	10.37%
SEMCORP	369.15	11.61%	RPREL	501.32	9.72%
Madhya Pradesh	306.29	9.63%	Delhi	467.50	8.56%
AHEJ4LAHS	159.07	5.00%	RKM POWER	401.45	7.21%
Total Volume	1,748.99	54.99%	Total Volume	2,817.56	42.21%
Total Volume in Bilateral	3,180.64		Total Volume in Bilateral	6,675.85	

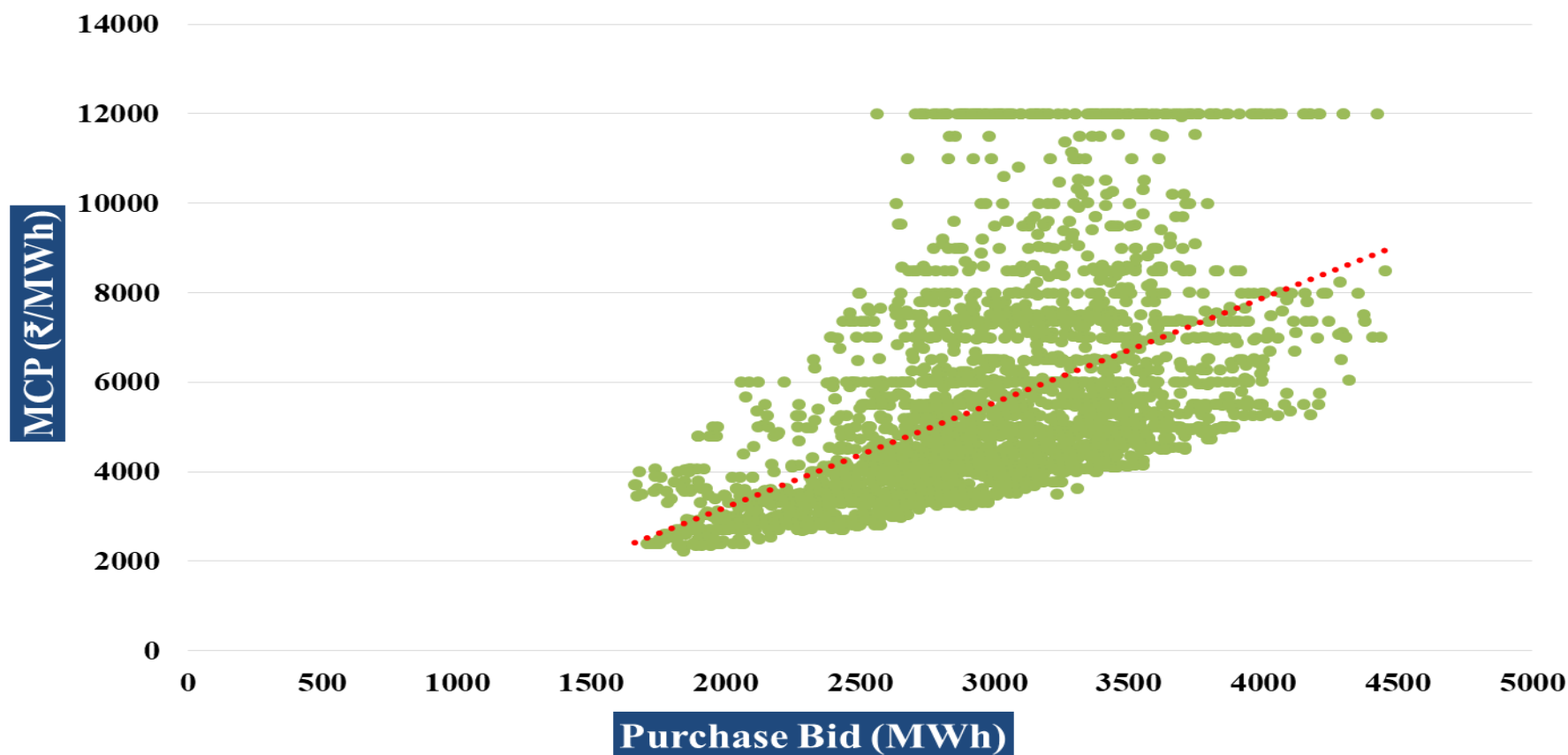
Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in DAM

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)
01-03-2023	12.00	8.13	11.01	8.82	12.00	5.00	9.70	140.96
02-03-2023	9.64	5.17	7.16	4.95	12.00	3.62	6.35	149.41
03-03-2023	10.19	5.99	9.34	7.12	12.00	3.56	7.86	149.75
04-03-2023	10.97	6.61	10.31	7.53	12.00	3.85	8.53	156.35
05-03-2023	8.00	4.67	6.59	7.01	10.50	3.50	6.39	161.97
06-03-2023	10.47	5.28	8.01	5.05	12.00	3.54	6.76	154.43
07-03-2023	9.21	4.24	4.95	6.05	12.00	3.39	5.77	156.99
08-03-2023	4.13	3.09	3.80	4.25	4.98	2.99	3.78	113.25
09-03-2023	5.53	4.19	6.50	5.76	8.89	3.47	5.45	159.02
10-03-2023	6.44	4.57	6.86	4.83	11.50	3.52	5.53	173.18
11-03-2023	6.81	4.24	6.56	5.26	12.00	3.46	5.54	169.99
12-03-2023	6.30	3.61	5.49	5.91	8.00	2.87	5.20	164.87
13-03-2023	5.98	4.51	7.03	5.72	11.50	3.46	5.74	174.86
14-03-2023	5.88	4.35	6.82	5.45	11.15	3.46	5.54	175.95
15-03-2023	6.28	4.82	8.41	5.54	12.00	3.62	6.17	156.51
16-03-2023	6.57	4.59	7.49	5.61	12.00	3.57	5.94	158.69
17-03-2023	5.90	4.34	5.99	4.63	11.00	3.48	5.09	137.58
18-03-2023	5.40	3.97	6.07	4.62	9.53	3.19	4.92	122.77
19-03-2023	4.71	3.58	5.40	4.87	7.00	2.95	4.60	108.25
20-03-2023	3.72	3.31	6.19	3.24	9.00	2.80	4.08	134.50
21-03-2023	3.37	2.69	4.34	2.79	6.32	2.40	3.24	129.67
22-03-2023	3.72	2.83	5.63	3.17	9.00	2.22	3.78	147.92
23-03-2023	4.12	3.16	5.90	3.45	9.00	2.50	4.09	156.11
24-03-2023	4.46	3.29	6.00	3.80	7.80	2.71	4.31	136.45
25-03-2023	4.58	3.12	6.55	3.92	9.50	2.40	4.45	145.67
26-03-2023	4.21	2.87	5.06	4.14	7.23	2.36	4.01	157.41
27-03-2023	5.28	3.29	7.23	4.61	12.00	2.69	4.99	159.37
28-03-2023	4.85	3.38	8.09	4.56	12.00	2.73	5.15	169.99
29-03-2023	5.85	3.39	8.30	5.57	12.00	2.71	5.66	174.08
30-03-2023	5.93	3.39	6.52	6.29	9.00	2.82	5.44	167.91
31-03-2023	4.50	3.07	4.95	4.32	6.00	2.71	4.14	154.53
Maximum	12.00	8.13	11.01	8.82	12.00	5.00	9.70	175.95
Minimum	3.37	2.69	3.80	2.79	4.98	2.22	3.24	108.25
Average	6.29	4.12	6.73	5.12	10.03	3.15	5.43	152.21

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,976 Time Blocks during the month of March, 2023 in DAM



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

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

Date	Max. FSV (MU)		Max. MCP (₹/kWh)		Min FSV (MU)		Min. MCP (₹/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-03-2023	01:45 - 02:00	2.01	05:30 - 05:45	12.00	18:45 - 19:00	0.89	13:00 - 13:15	5.00
02-03-2023	01:45 - 02:00	1.96	06:30 - 06:45	12.00	09:00 - 09:15	1.13	13:00 - 13:15	3.62
03-03-2023	02:15 - 02:30	2.08	06:30 - 06:45	12.00	20:00 - 20:15	1.17	13:15 - 13:30	3.56
04-03-2023	01:15 - 01:30	2.25	06:15 - 06:30	12.00	22:15 - 22:30	1.12	13:15 - 13:30	3.85
05-03-2023	06:45 - 07:00	2.07	00:00 - 00:15	10.50	21:45 - 22:00	1.22	13:45 - 14:00	3.50
06-03-2023	06:45 - 07:00	2.17	07:00 - 07:15	12.00	14:00 - 14:15	1.30	13:45 - 14:00	3.54
07-03-2023	06:45 - 07:00	2.16	06:15 - 06:30	12.00	22:45 - 23:00	1.11	13:15 - 13:30	3.39
08-03-2023	02:00 - 02:15	1.47	07:15 - 07:30	4.98	23:00 - 23:15	0.66	13:15 - 13:30	2.99
09-03-2023	17:30 - 17:45	2.04	19:00 - 19:15	8.89	05:45 - 06:00	1.20	13:45 - 14:00	3.47
10-03-2023	06:45 - 07:00	2.23	19:00 - 19:15	11.50	20:45 - 21:00	1.45	13:45 - 14:00	3.52
11-03-2023	06:45 - 07:00	2.16	19:00 - 19:15	12.00	13:30 - 13:45	1.34	13:30 - 13:45	3.46
12-03-2023	06:45 - 07:00	2.54	07:15 - 07:30	8.00	13:15 - 13:30	1.00	13:45 - 14:00	2.87
13-03-2023	16:30 - 16:45	2.27	19:00 - 19:15	11.50	20:00 - 20:15	1.17	13:00 - 13:15	3.46
14-03-2023	17:00 - 17:15	2.43	19:15 - 19:30	11.15	20:15 - 20:30	1.12	13:15 - 13:30	3.46
15-03-2023	16:45 - 17:00	2.19	19:00 - 19:15	12.00	19:00 - 19:15	1.09	13:15 - 13:30	3.62
16-03-2023	06:45 - 07:00	2.25	18:45 - 19:00	12.00	19:30 - 19:45	1.06	13:45 - 14:00	3.57
17-03-2023	07:30 - 07:45	2.15	18:45 - 19:00	11.00	19:30 - 19:45	0.96	13:45 - 14:00	3.48
18-03-2023	08:15 - 08:30	1.64	18:45 - 19:00	9.53	13:00 - 13:15	0.93	13:15 - 13:30	3.19
19-03-2023	08:15 - 08:30	1.47	19:00 - 19:15	7.00	03:15 - 03:30	0.88	13:15 - 13:30	2.95
20-03-2023	06:45 - 07:00	1.86	19:00 - 19:15	9.00	14:00 - 14:15	1.10	13:45 - 14:00	2.80
21-03-2023	07:30 - 07:45	2.06	19:15 - 19:30	6.32	19:00 - 19:15	0.97	13:45 - 14:00	2.40
22-03-2023	07:15 - 07:30	2.28	19:00 - 19:15	9.00	20:00 - 20:15	1.20	13:45 - 14:00	2.22
23-03-2023	06:45 - 07:00	2.20	19:00 - 19:15	9.00	13:00 - 13:15	1.13	13:45 - 14:00	2.50
24-03-2023	07:45 - 08:00	1.90	19:00 - 19:15	7.80	09:45 - 10:00	1.17	13:15 - 13:30	2.71
25-03-2023	06:45 - 07:00	2.15	19:00 - 19:15	9.50	19:00 - 19:15	0.98	13:15 - 13:30	2.40
26-03-2023	06:45 - 07:00	2.26	19:00 - 19:15	7.23	20:00 - 20:15	1.19	13:15 - 13:30	2.36
27-03-2023	07:45 - 08:00	2.28	19:00 - 19:15	12.00	03:00 - 03:15	1.32	13:30 - 13:45	2.69
28-03-2023	06:45 - 07:00	2.38	18:30 - 18:45	12.00	19:00 - 19:15	1.34	13:45 - 14:00	2.73
29-03-2023	06:45 - 07:00	2.65	18:45 - 19:00	12.00	22:45 - 23:00	1.40	13:15 - 13:30	2.71
30-03-2023	06:45 - 07:00	2.31	05:30 - 05:45	9.00	19:45 - 20:00	1.30	13:15 - 13:30	2.82
31-03-2023	07:15 - 07:30	2.29	18:45 - 19:00	6.00	19:45 - 20:00	1.10	13:15 - 13:30	2.71

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

Annexure-VII

Sellers and Buyers in Day Ahead Market (DAM) in the month of March, 2023						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Uttar Pradesh	1438.16	30.48%	Gujarat	1519.95	32.21%
2	Bihar	684.00	14.50%	Telangana	710.71	15.06%
3	DB Power	172.35	3.65%	J&K	340.40	7.21%
4	Odisha	168.72	3.58%	Punjab	336.48	7.13%
5	Raipur Energen	147.23	3.12%	NVVN (SNA) - NEA	221.88	4.70%
6	Chhattisgarh	147.00	3.12%	Uttarakhand	202.99	4.30%
7	Maharashtra	141.06	2.99%	Andhra Pradesh	155.61	3.30%
8	Madhya Pradesh	111.28	2.36%	Maharashtra	147.35	3.12%
9	Delhi	103.66	2.20%	Uttar Pradesh	143.26	3.04%
10	Karnataka	93.45	1.98%	Rajasthan	142.67	3.02%
11	MB Power	84.95	1.80%	Druk Green Power	110.43	2.34%
12	Jaypee Nigrie	77.88	1.65%	Daman & Diu - Dadra	101.45	2.15%
13	Haryana	77.79	1.65%	Madhya Pradesh	78.23	1.66%
14	Jindal Power Ltd.	76.49	1.62%	Assam	68.33	1.45%
15	Jindal Power	64.59	1.37%	ArcelorMittal Nippon	65.77	1.39%
16	Kerala	62.93	1.33%	West Bengal	59.58	1.26%
17	Mahan Energy	61.89	1.31%	Tamil Nadu	46.57	0.99%
18	Himachal Pradesh	57.97	1.23%	Haryana	45.99	0.97%
19	Jindal Steel	57.37	1.22%	Karnataka	39.47	0.84%
20	West Bengal	56.59	1.20%	NEA-NR	38.27	0.81%
21	RKM Power	56.34	1.19%	Odisha	32.93	0.70%
22	Tamil Nadu	55.91	1.18%	Himachal Pradesh	27.36	0.58%
23	Andhra Pradesh	55.75	1.18%	Jharkhand	21.16	0.45%
24	Rajasthan	53.28	1.13%	Delhi	19.40	0.41%
25	SKS Power	51.76	1.10%	Sikkim	9.78	0.21%
26	JITPL	47.13	1.00%	Goa SR	8.51	0.18%
27	Costal Energen	32.28	0.68%	Goa WR	6.67	0.14%
28	Assam	30.72	0.65%	Chhattisgarh	3.79	0.08%
29	Sembcorp Gayatri	28.48	0.60%	Nagaland	3.65	0.08%
30	Jharkhand	27.10	0.57%	Railways	3.02	0.06%
31	Maruti Clean Coal	26.25	0.56%	Kerala	2.99	0.06%
32	ACBIL	25.79	0.55%	Arunachal Pradesh	1.24	0.03%
33	Gujarat	23.12	0.49%	BHARAT	1.12	0.02%
34	Tripura	22.45	0.48%	Ratnagiri Gas &	0.64	0.01%
35	Goa WR	21.27	0.45%	Bihar	0.47	0.01%
36	NPCIL KAKRAPAR	21.00	0.45%	Meghalaya	0.25	0.01%
37	Chandigarh	19.86	0.42%	Chandigarh	0.01	0.00%
38	Jhabua Power	18.71	0.40%			
39	Kameng HEP	18.09	0.38%			
40	Teesta -3	14.54	0.31%			
41	Sembcorp Energy	14.06	0.30%			
42	DVC	13.88	0.29%			
43	Raigarh Energy Ltd.	12.29	0.26%			
44	Adani Green Energy	11.75	0.25%			

45	J&K	11.12	0.24%			
46	GMR Warora	9.03	0.19%			
47	Telangana	8.14	0.17%			
48	IL&FS	7.87	0.17%			
49	Sainj HEP	7.56	0.16%			
50	Ramagundam Stg-1	7.38	0.16%			
51	Karcham Wangtoo	6.98	0.15%			
52	Adhunik Power	6.36	0.13%			
53	Punjab	6.10	0.13%			
54	Talcher Stg-2	6.03	0.13%			
55	Shree Cement	5.30	0.11%			
56	Mizoram	5.11	0.11%			
57	Renew Surya Ravi	4.63	0.10%			
58	Bongaigaon	4.25	0.09%			
59	Simhapuri Energy	3.91	0.08%			
60	AD Hydro	3.68	0.08%			
61	NTPC Kudgi	3.65	0.08%			
62	Sorang HEP,	3.12	0.07%			
63	Nagaland	2.88	0.06%			
64	Dikchu	2.20	0.05%			
65	Simhadri Stg-2	1.98	0.04%			
66	Arunachal Pradesh	1.95	0.04%			
67	Ostro Kannada	1.78	0.04%			
68	Uttarakhand	1.68	0.04%			
69	Chuzachen	1.35	0.03%			
70	SBSR Power	1.08	0.02%			
71	Ramagundam Stg-3	1.07	0.02%			
72	Singoli Bhagwati	1.01	0.02%			
73	Lanco Budhil	0.82	0.02%			
74	Dhariwal	0.70	0.01%			
75	Sikkim	0.49	0.01%			
76	NTPL	0.38	0.01%			
77	Meghalaya	0.37	0.01%			
78	Adani Wind Energy	0.32	0.01%			
79	BALCO 2	0.30	0.01%			
80	GMR Kamalanga	0.26	0.01%			
81	JSW RENEW	0.22	0.00%			
82	PARBATI II HE	0.15	0.00%			
Total Volume of top 10		3,206.90	67.97%	Total Volume of top 10	3,921.31	83.11%
Total Volume in PXs		4,718.38		Total Volume in PXs	4,718.38	

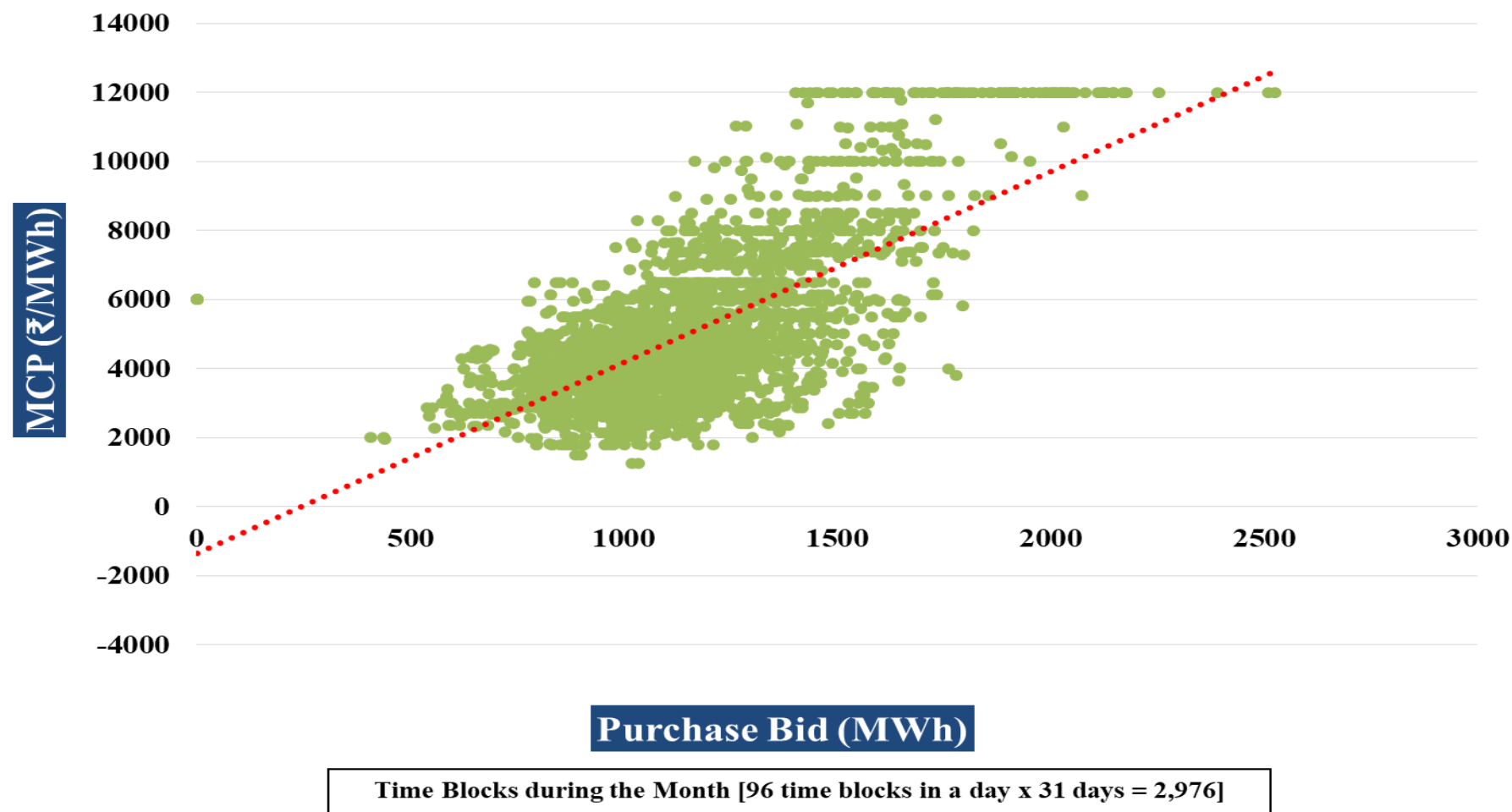
Annexure-VIII**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in RTM**

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)
01-03-2023	7.04	5.31	5.81	4.27	10.50	2.70	5.42	63.19
02-03-2023	8.27	6.65	10.37	5.61	12.00	4.30	7.54	56.42
03-03-2023	10.53	7.12	8.84	6.61	12.00	3.90	7.97	67.07
04-03-2023	9.84	5.61	5.96	6.59	12.00	3.32	6.69	57.68
05-03-2023	4.95	3.91	5.41	5.19	8.29	3.34	4.83	58.34
06-03-2023	7.27	5.25	4.64	6.04	10.00	3.62	5.67	61.73
07-03-2023	4.10	4.10	4.55	3.89	6.15	3.00	4.15	78.28
08-03-2023	4.63	3.25	3.34	4.46	6.42	2.00	3.86	89.71
09-03-2023	4.18	3.48	4.96	3.10	7.80	2.02	3.86	82.23
10-03-2023	7.28	4.08	5.41	4.30	12.00	3.14	5.01	63.68
11-03-2023	6.12	4.63	6.36	6.39	10.00	3.62	5.83	71.80
12-03-2023	4.68	3.67	5.60	5.21	8.01	2.60	4.77	66.76
13-03-2023	5.10	4.95	6.98	4.88	10.98	3.30	5.46	51.66
14-03-2023	6.70	4.85	6.97	5.99	12.00	2.98	6.02	52.11
15-03-2023	6.87	6.20	6.09	5.29	9.00	3.77	6.02	67.45
16-03-2023	6.34	5.56	4.71	4.07	8.50	2.92	5.04	68.74
17-03-2023	4.06	3.02	4.83	3.39	7.50	2.60	3.75	68.15
18-03-2023	4.58	3.30	3.67	3.01	6.50	2.05	3.63	67.78
19-03-2023	3.13	1.82	3.34	2.60	4.20	1.25	2.65	87.33
20-03-2023	3.83	2.36	3.95	2.87	7.05	2.10	3.15	98.49
21-03-2023	3.76	2.54	4.08	3.00	6.00	1.81	3.26	96.02
22-03-2023	3.92	3.00	4.78	3.32	6.00	2.36	3.69	72.62
23-03-2023	5.12	3.19	5.13	3.74	8.00	2.36	4.16	55.13
24-03-2023	4.99	3.26	5.95	4.71	12.00	2.42	4.64	63.77
25-03-2023	6.26	3.63	7.54	5.41	12.00	2.40	5.56	65.00
26-03-2023	4.58	2.75	4.03	4.27	7.05	1.98	3.82	48.13
27-03-2023	4.41	3.26	8.14	4.66	12.00	1.94	5.08	60.81
28-03-2023	7.92	4.09	10.79	7.87	12.00	3.00	7.50	58.29
29-03-2023	8.02	5.29	6.51	7.58	12.00	2.86	6.72	69.22
30-03-2023	5.63	3.80	3.86	4.86	7.50	2.36	4.43	58.88
31-03-2023	3.84	2.62	3.46	3.90	5.58	2.10	3.41	71.35
Maximum	10.53	7.12	10.79	7.87	12.00	4.30	7.97	98.49
Minimum	3.13	1.82	3.34	2.60	4.20	1.25	2.65	48.13
Average	5.74	4.08	5.68	4.74	9.07	2.71	4.95	67.67

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,976 Time Blocks during the month of March, 2023 in RTM



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

Date	Max. FSV (MU)		Max. MCP (₹/kWh)		Min FSV (MU)		Min. MCP (₹/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-03-2023	06:45 - 07:00	1.16	16:45 - 17:00	10.50	13:45 - 14:00	0.34	04:00 - 04:15	2.70
02-03-2023	15:45 - 16:00	0.97	07:15 - 07:30	12.00	03:45 - 04:00	0.23	04:30 - 04:45	4.30
03-03-2023	17:00 - 17:15	1.00	06:15 - 06:30	12.00	03:15 - 03:30	0.43	03:30 - 03:45	3.90
04-03-2023	06:45 - 07:00	0.90	07:00 - 07:15	12.00	22:15 - 22:30	0.40	13:45 - 14:00	3.32
05-03-2023	07:30 - 07:45	0.88	23:30 - 23:45	8.29	00:45 - 01:00	0.32	13:00 - 13:15	3.34
06-03-2023	17:30 - 17:45	0.88	07:15 - 07:30	10.00	20:15 - 20:30	0.43	22:45 - 23:00	3.62
07-03-2023	22:15 - 22:30	1.09	23:30 - 23:45	6.15	10:30 - 10:45	0.62	03:45 - 04:00	3.00
08-03-2023	17:45 - 18:00	1.30	06:15 - 06:30	6.42	09:30 - 09:45	0.57	17:30 - 17:45	2.00
09-03-2023	17:00 - 17:15	1.05	19:00 - 19:15	7.80	14:00 - 14:15	0.61	00:15 - 00:30	2.02
10-03-2023	22:45 - 23:00	0.94	07:30 - 07:45	12.00	01:15 - 01:30	0.54	13:15 - 13:30	3.14
11-03-2023	16:30 - 16:45	1.02	07:15 - 07:30	10.00	10:00 - 10:15	0.47	13:45 - 14:00	3.62
12-03-2023	13:15 - 13:30	0.96	22:30 - 22:45	8.01	03:45 - 04:00	0.44	13:00 - 13:15	2.60
13-03-2023	13:45 - 14:00	0.75	19:00 - 19:15	10.98	21:45 - 22:00	0.38	03:45 - 04:00	3.30
14-03-2023	22:00 - 22:15	0.77	19:00 - 19:15	12.00	02:30 - 02:45	0.21	13:15 - 13:30	2.98
15-03-2023	15:45 - 16:00	1.01	19:15 - 19:30	9.00	01:15 - 01:30	0.45	13:00 - 13:15	3.77
16-03-2023	03:30 - 03:45	0.93	10:45 - 11:00	8.50	07:45 - 08:00	0.41	23:45 - 24:00	2.92
17-03-2023	18:00 - 18:15	1.05	19:00 - 19:15	7.50	05:15 - 05:30	0.40	04:30 - 04:45	2.60
18-03-2023	15:15 - 15:30	1.11	06:45 - 07:00	6.50	07:45 - 08:00	0.51	14:15 - 14:30	2.05
19-03-2023	14:45 - 15:00	1.15	19:00 - 19:15	4.20	05:15 - 05:30	0.70	14:00 - 14:15	1.25
20-03-2023	16:30 - 16:45	1.21	06:15 - 06:30	7.05	20:45 - 21:00	0.82	13:15 - 13:30	2.10
21-03-2023	07:00 - 07:15	1.42	19:00 - 19:15	6.00	18:00 - 18:15	0.50	13:00 - 13:15	1.81
22-03-2023	14:45 - 15:00	1.05	19:00 - 19:15	6.00	18:15 - 18:30	0.54	13:30 - 13:45	2.36
23-03-2023	21:30 - 21:45	0.77	19:00 - 19:15	8.00	22:30 - 22:45	0.40	13:45 - 14:00	2.36
24-03-2023	13:45 - 14:00	1.04	19:00 - 19:15	12.00	01:00 - 01:15	0.35	13:15 - 13:30	2.42
25-03-2023	13:30 - 13:45	1.01	19:00 - 19:15	12.00	17:00 - 17:15	0.44	13:00 - 13:15	2.40
26-03-2023	12:30 - 12:45	0.87	06:15 - 06:30	7.05	05:15 - 05:30	0.22	13:15 - 13:30	1.98
27-03-2023	23:00 - 23:15	0.82	19:00 - 19:15	12.00	13:00 - 13:15	0.43	13:15 - 13:30	1.94
28-03-2023	12:00 - 12:15	0.83	00:00 - 00:15	12.00	04:00 - 04:15	0.36	13:15 - 13:30	3.00
29-03-2023	15:30 - 15:45	1.03	05:30 - 05:45	12.00	23:15 - 23:30	0.47	13:15 - 13:30	2.86
30-03-2023	18:45 - 19:00	1.21	06:15 - 06:30	7.50	01:30 - 01:45	0.33	13:15 - 13:30	2.36
31-03-2023	18:00 - 18:15	1.16	01:30 - 01:45	5.58	01:00 - 01:15	0.35	15:15 - 15:30	2.10

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Sellers and Buyers in Real Time Market (RTM) in the month of March, 2023						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Madhya Pradesh	391.41	18.66%	Telangana	425.38	20.28%
2	Bihar	371.88	17.73%	Gujarat	246.36	11.74%
3	Odisha	153.39	7.31%	Punjab	219.62	10.47%
4	Uttar Pradesh	134.33	6.40%	J&K	174.33	8.31%
5	West Bengal	121.47	5.79%	Maharashtra	169.61	8.09%
6	NPCIL	119.24	5.68%	Rajasthan	166.46	7.94%
7	Rajasthan	87.32	4.16%	Uttar Pradesh	121.08	5.77%
8	Chhattisgarh	86.80	4.14%	Andhra Pradesh	89.53	4.27%
9	Andhra Pradesh	57.78	2.75%	West Bengal	53.84	2.57%
10	Telangana	40.51	1.93%	Delhi	50.90	2.43%
11	Delhi	39.73	1.89%	Haryana	46.20	2.20%
12	Maharashtra	39.21	1.87%	Odisha	40.77	1.94%
13	Karnataka	36.16	1.72%	Tamil Nadu	35.75	1.70%
14	Haryana	35.64	1.70%	Karnataka	34.42	1.64%
15	RKM Power	28.46	1.36%	Assam	30.35	1.45%
16	Kameng HEP	27.33	1.30%	ArcelorMittal Nippon	27.60	1.32%
17	Himachal	25.30	1.21%	Uttarakhand	26.77	1.28%
18	Mahan Energy	23.58	1.12%	Daman & Diu - Dadra	23.32	1.11%
19	SKS Power	20.55	0.98%	Madhya Pradesh	20.09	0.96%
20	Kerala	20.00	0.95%	DVC	19.31	0.92%
21	TRN Energy	18.93	0.90%	Manipur	13.09	0.62%
22	Palatana	17.89	0.85%	Himachal Pradesh	7.96	0.38%
23	Jharkhand	14.89	0.71%	BHARAT	6.50	0.31%
24	NTPL	13.10	0.62%	Jharkhand	6.25	0.30%
25	Assam	12.15	0.58%	Jindal Power Ltd.	6.07	0.29%
26	Raipur Energen	12.06	0.58%	Chhattisgarh	5.23	0.25%
27	Jhabua Power	9.94	0.47%	Nagaland	4.81	0.23%
28	Sasan UMPP	9.62	0.46%	Kerala	4.52	0.22%
29	MB Power	9.49	0.45%	Tripura	4.11	0.20%
30	Gujarat	9.01	0.43%	Jindal Power	3.84	0.18%
31	Tripura	8.59	0.41%	Coastal Gujrat Power	3.76	0.18%
32	DVC	7.37	0.35%	Railways	2.20	0.10%
33	Tamil Nadu	6.86	0.33%	Goa WR	1.95	0.09%
34	Maruti Clean	6.31	0.30%	Sikkim	1.34	0.06%
35	BALCO 2	5.78	0.28%	Meghalaya	1.32	0.06%
36	Sembcorp	5.35	0.26%	Raipur Energen	0.86	0.04%
37	J&K	5.06	0.24%	Goa SR	0.71	0.03%
38	Teesta -3	4.95	0.24%	Mahan Energy	0.56	0.03%
39	ACBIL	4.71	0.22%	Bihar	0.40	0.02%
40	Punjab	4.56	0.22%	Arunachal Pradesh	0.33	0.02%
41	GMR Warora	4.51	0.22%	Ratnagiri Gas &	0.13	0.01%
42	Sembcorp Energy	4.20	0.20%	Raigarh Energy Ltd.	0.08	0.00%
43	Dikchu	3.13	0.15%	ACBIL	0.05	0.00%
44	Jindal Power Ltd.	2.95	0.14%			

45	Manipur	2.68	0.13%			
46	Jindal Power	2.47	0.12%			
47	Sikkim	2.44	0.12%			
48	Arunachal	2.31	0.11%			
49	Uttarakhand	2.22	0.11%			
50	IL&FS	2.13	0.10%			
51	Simhapuri	1.72	0.08%			
52	Adhunik Power	1.62	0.08%			
53	Singoli Bhagwati	1.58	0.08%			
54	Jindal Steel	1.49	0.07%			
55	Goa WR	1.41	0.07%			
56	Shree Cement	1.40	0.07%			
57	Sainj HEP	1.32	0.06%			
58	DB Power	1.26	0.06%			
59	Raigarh Energy	1.25	0.06%			
60	Daman & Diu -	1.12	0.05%			
61	Mouda Stg-2	0.90	0.04%			
62	NTPC BARH1	0.83	0.04%			
63	Mouda Stg-1	0.74	0.04%			
64	Jaypee Nigrie	0.71	0.03%			
65	Renew Surya	0.57	0.03%			
66	Meghalaya	0.56	0.03%			
67	Chandigarh	0.48	0.02%			
68	Talcher Stg-2	0.47	0.02%			
69	Ramagundam	0.33	0.02%			
70	NTPC Kudgi	0.33	0.02%			
71	Ostro Energy	0.31	0.01%			
72	Ostro Kannada	0.25	0.01%			
73	Sorang HEP,	0.24	0.01%			
74	Simhadri Stg-2	0.17	0.01%			
75	Costal Energen	0.14	0.01%			
76	Chuzachen	0.14	0.01%			
77	AGBPP	0.09	0.00%			
78	Ramagundam	0.08	0.00%			
79	GMR Kamalanga	0.08	0.00%			
80	JITPL	0.08	0.00%			
81	Ratnagiri Gas &	0.06	0.00%			
82	JSW RENEW	0.06	0.00%			
83	Karcham	0.06	0.00%			
84	AD Hydro	0.04	0.00%			
85	Lanco Budhil	0.02	0.00%			
86	Maithon Power	0.02	0.00%			
Total Volume of top 10		1,564.12	74.56%	Total Volume of top 10	1,408.26	82.16%
Total Volume in PXs		2,097.72		Total Volume in PXs	2,097.72	

Cross Border Electricity Transactions in Day Ahead Market (DAM) in IEX with Nepal and Bhutan during the month of March, 2023

S. No	Delivery Date	Buy Volume By Nepal (MU)	Buy Volume By Bhutan (MU)
1	01-03-2023	8.18	3.20
2	02-03-2023	9.04	5.14
3	03-03-2023	9.01	5.81
4	04-03-2023	8.59	5.87
5	05-03-2023	9.21	4.23
6	06-03-2023	5.78	3.10
7	07-03-2023	4.62	3.59
8	08-03-2023	6.41	2.99
9	09-03-2023	7.79	3.53
10	10-03-2023	7.82	3.45
11	11-03-2023	7.72	4.19
12	12-03-2023	9.02	3.46
13	13-03-2023	9.37	3.88
14	14-03-2023	9.44	4.12
15	15-03-2023	9.39	5.02
16	16-03-2023	9.35	4.21
17	17-03-2023	9.39	2.80
18	18-03-2023	9.06	4.39
19	19-03-2023	9.05	2.83
20	20-03-2023	7.77	1.02
21	21-03-2023	7.45	1.93
22	22-03-2023	7.43	1.24
23	23-03-2023	7.64	0.00
24	24-03-2023	7.99	2.34
25	25-03-2023	8.57	3.46
26	26-03-2023	8.71	3.79
27	27-03-2023	9.04	2.83
28	28-03-2023	9.00	3.16
29	29-03-2023	9.31	3.44
30	30-03-2023	9.57	5.42
31	31-03-2023	9.45	6.00
Total		260.15	110.43
Grand Total		370.58	

-: No transaction took place

Note: Cross Border Transactions of Electricity of 370.58 MU (i.e. 260.15 MU buy by Nepal and 110.43 MU buy by Bhutan) happened during March, 2023 in IEX, which is included in DAM Volume of March, 2023 in IEX.

Analysis for change in trend of Final Scheduled Volume in DAM on 4th Sunday of March, 2023 (i.e. 26th March, 2023)

Final Scheduled Volume (MU) and the Daily Avg. MCP (₹/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 March, 2023, it is observed that on fourth Sunday (26th March, 2023), FSV showed increasing trend in comparison to fourth Saturday (25th March, 2023).

- (i) On fourth Sunday (26th March, 2023), although there was decrease in purchase on power exchange by some of the States in comparison to fourth Saturday (25th March, 2023) by **11.25 MU** [i.e. Uttarakhand (2.45 MU), Rajasthan (1.91 MU), Himachal Pradesh (1.23 MU), West Bengal (1.04 MU) and Daman & Diu - Dadra & Nagar Haveli (0.97 MU), etc.], there was also increase in purchase on power exchange by some of the States by **22.98 MU** [i.e. Gujarat (8.12 MU), Telangana (4.50 MU), Punjab (3.92 MU), Andhra Pradesh (3.53 MU) and Tamil Nadu (1.38 MU), etc.]. This resulted in an overall increase in FSV by **11.73 MU** on Sunday (26th March, 2023) as compared to Saturday (25th March, 2023).

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.
The 13 Bid areas 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 Avg. 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 Average MCP** is the average of MCP of all 96 Time Blocks of the day during which transaction happened.
- 5. Day-Ahead Market (DAM)** means a market where Day Ahead Contracts are transacted on the Power Exchanges, wherein Collective Transactions occur on day (T) and delivery of electricity is on the next day (T+1).
- 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 for Solar, Non-Solar and Hydro Renewable Energy (RE) generation.

- 10. Green Day Ahead Market (GDAM)** is based on the principles of current Day Ahead Market (DAM), where market participants purchase and sell electricity generated from renewable sources.
- 11. Long Duration Contracts** on the power exchanges is a product segment under which the participants are allowed to trade for delivery of power upto 90 Days (Delivery Starting from T+2 to T+90 Days).
- 12. 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.
- 13. Real Time Market (RTM)** means a market where Real-Time Contracts are transacted on the Power Exchange(s), i.e. a contract other than Day Ahead Contract or Intraday Contract or Contingency Contract. In RTM collective transactions occur on day (T) or day (T-1) and delivery of electricity is on day (T) for a specified delivery period.
- 14. Term Ahead Market (TAM)** means a market where Term Ahead Contracts are transacted on the Power Exchange(s), i.e. a contract wherein transactions occur on day (T) and physical delivery of electricity is on a day more than one day ahead (T + 2 or more).