



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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2. Secretary, Ministry of New & Renewable Energy, Atal Akshay Urja Bhawan, CGO Complex, Lodhi Road, New Delhi- 110003.
3. Secretary, CERC, Chanderlok Building, Janpath, New Delhi- 110001.

विषय: फ़रवरी, 2023 माह की मार्केट मॉनिटरिंग रिपोर्ट।

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

महोदय/ Sir,

फ़रवरी, 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 February, 2023 is enclosed herewith for kind information and perusal.

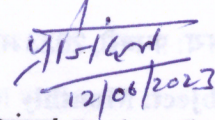
फ़रवरी, 2023 माह के दौरान मार्केट के संचालन की मुख्य विशेषताएं इस प्रकार रही। Key highlights of the market operation during February, 2023 are as under:

- (i) फ़रवरी, 2023 माह में देश में कुल 118,564 MU विद्युत का कारोबार किया गया, जिसमें से 53,871 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 February, 2023 a total of 118,564 MU of electricity was transacted in the country out of which 53,871 MU was transacted through ISTS, and the remaining through state controlled generating stations through Intra State Transmissions System.
- (ii) अल्पावधि मार्केट के अंतर्गत कुल 18,108 MU का कारोबार किया गया था, जिसमें से 8,884 MU पावर एक्सचेंजों के माध्यम से कारोबार किया गया और शेष द्विपक्षीय कारोबार और विचलन (deviations) के रूप में हुआ। इस प्रकार अल्पावधि कारोबार, फ़रवरी, 2023 माह में ट्रेड की गई विद्युत की कुल मात्रा का 15.27 % था

और 7.49 % पावर एक्सचेंजों के माध्यम से रहा। A total of 18,108 MU was transacted under Short Term Market, out of which 8,884 MU was transacted through Power Exchanges and remaining happened as bilateral transactions & deviations. Thus, the total short term trade in February, 2023 was 15.27 % of total volume of electricity traded in February, 2023 and 7.49 % 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 33.61 % रहा, जिसमें से पावर एक्सचेंजों के माध्यम से कारोबार 16.49 % रहा। If we compare these transactions with respect to the electricity supplied through ISTS, the short term transactions constitutes about 33.61 % of ISTS transactions, out of which transaction through the power exchanges constitutes 16.49 %.

भवदीय/ Yours faithfully,


12/06/2023

(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 - फ़रवरी, 2023

Monthly Market Monitoring Report February, 2023



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

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

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

फ़रवरी, 2023 माह के लिए सारांश Summary for Month: February, 2023

भारत में विद्युत एक्सचेंजों पर विद्युत के व्यापार का सारांश

Summary of Electricity Transactions on Power Exchanges in India

- फ़रवरी, 2023 के दौरान विद्युत एक्सचेंजों (यानी आईईएक्स, पीएक्सआईएल और एचपीएक्स) के माध्यम से कुल **8,884 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 **8,884 MU** electricity was transacted through power exchanges i.e. IEX, PXIL & HPX, during the month of February, 2023. This volume of electricity is on delivery date basis and includes transactions through DAM, GDAM, RTM, TAM and GTAM market segments.

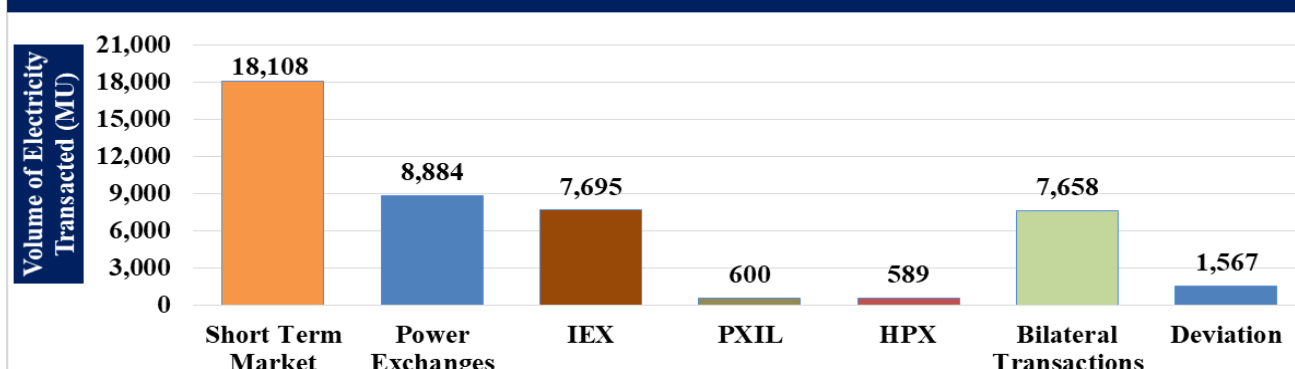
Segment	Transactions happened in the PXs (IEX, PXIL & HPX combined)			
	FSV (MU)	Average MCP (₹/kWh)	Congestion (MU)	Real Time Curtailment (MU)
DAM	4,659	6.61	0.00	0.00
GDAM	253	6.69	0.00	0.00
RTM	1,714	7.15	0.00	0.00
TAM	2,105	7.53	0.49	0.00
GTAM	153	6.99	0.00	4.69
Total in PXs	8,884	6.94*	0.49	4.69

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

- द्विपक्षीय व्यापार के तहत कुल **7,658 MU** विद्युत का कारोबार किया गया और **1,567 MU** को विचलन के रूप में स्थानांतरित किया गया। इस प्रकार कुल **18,108 MU** विद्युत का कारोबार अल्पावधि व्यापार के रूप में किया गया था। फ़रवरी, 2023 के महीने में देश में कुल **118,564 MU** विद्युत की आपूर्ति की गई थी, इस प्रकार फ़रवरी, 2023 माह में कारोबार की गई विद्युत की कुल मात्रा में अल्पावधि बाजार का हिस्सा **15.27 %** था।

Under the Bilateral trade a total of **7,658 MU** of electricity was transacted and **1,567 MU** was transferred as deviation. Thus a total of **18,108 MU** of electricity was transacted as short term trade. In the month of February, 2023 a total of **118,564 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in February, 2023 was **15.27 %**.

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



- फ़रवरी, 2023 के दौरान संचरण जाम की कुल मात्रा **0.49 MU** थी, जो की विद्युत एक्सचेंजों में कारोबार की गई विद्युत की कुल मात्रा का केवल 0.006 % है और फ़रवरी, 2023 के महीने के दौरान आपूर्ति की गई कुल ऊर्जा का 0.0004 % है।

The total volume of transmission congestion that happened during the month of February, 2023 was **0.49 MU** which is only 0.006 % of the total volume of electricity transacted in the power exchanges and 0.0004 % of total energy supplied during the month of February, 2023.

TAM में 1 दिन अर्थात् दिनांक 9 फ़रवरी, 2023 को संचरण जाम देखा गया। जबकि DAM, GDAM, RTM और GTAM में कोई संचरण जाम नहीं देखा गया। फ़रवरी, 2023 माह के महीने में रिपोर्ट की गई वास्तविक समय में विद्युत कटौती की कुल मात्रा केवल **4.69 MU** थी।

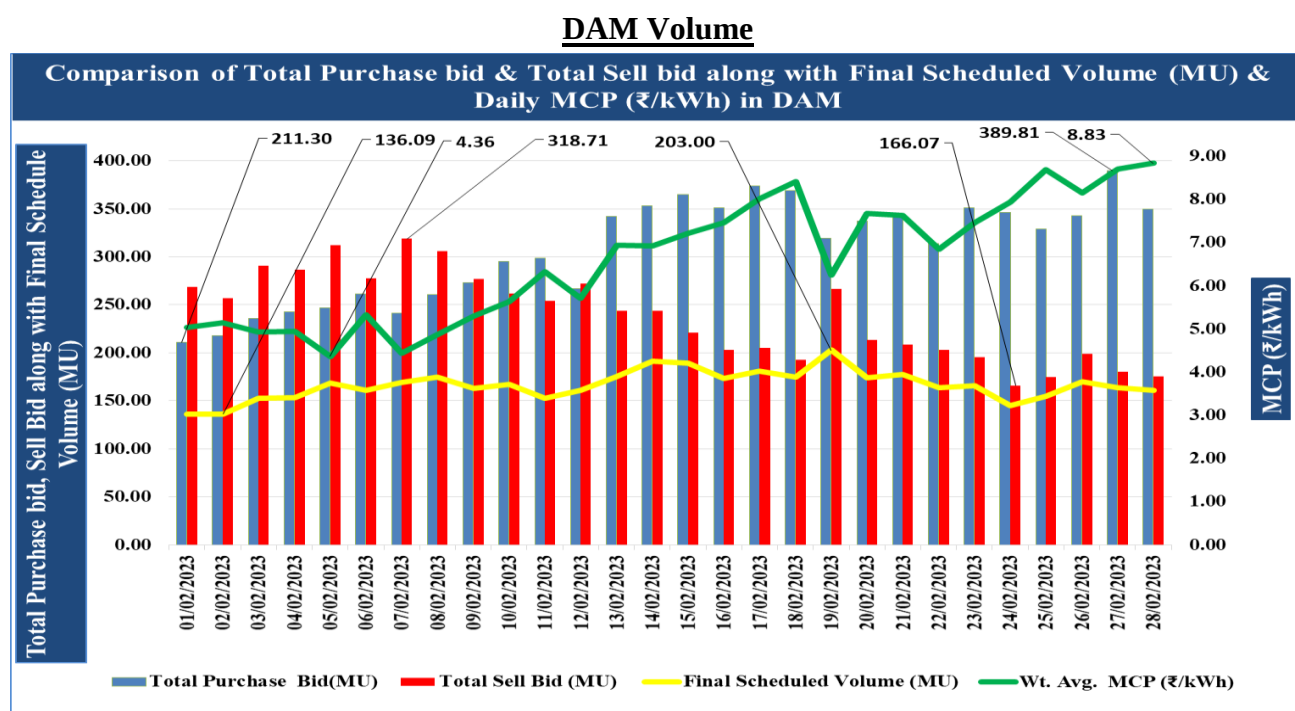
Transmission congestion observed in TAM on 1 day i.e. 9th February, 2023, whereas, there was no congestion happened in DAM, GDAM, RTM & GTAM. The total volume of real time curtailment reported in the month of February, 2023 was only **4.69 MU**.

- फ़रवरी, 2023 माह के दौरान अंतर्राज्यीय पारेषण प्रणाली (ISTS) में निर्धारित अनुसूचित विद्युत की कुल मात्रा **53,871 MU** थी। फ़रवरी, 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 33.61 % रहा।

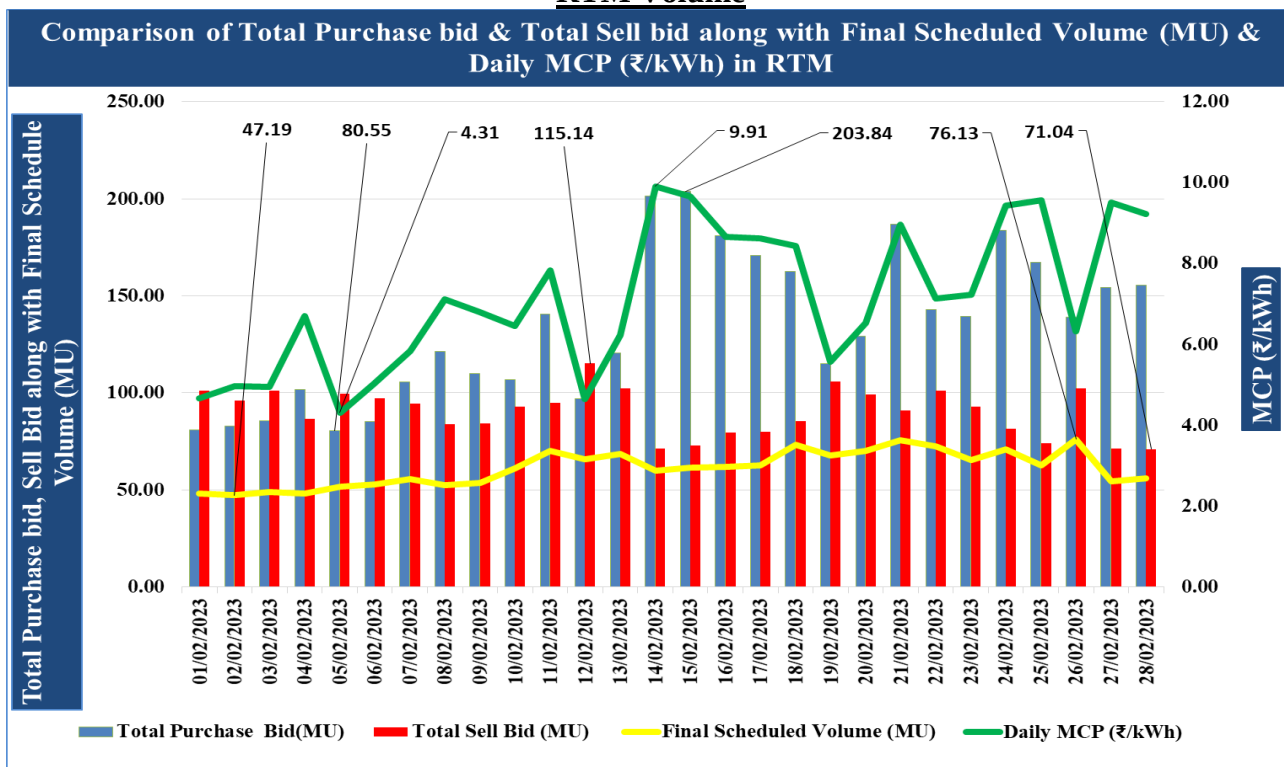
The total volume of electricity scheduled at ISTS during the month of February, 2023 was **53,871 MU**. The total volume of electricity transacted in the short term market was **33.61 %** of total volume schedule at ISTS in the month of February, 2023.

- फ़रवरी, 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 February, 2023 are shown in following figures:



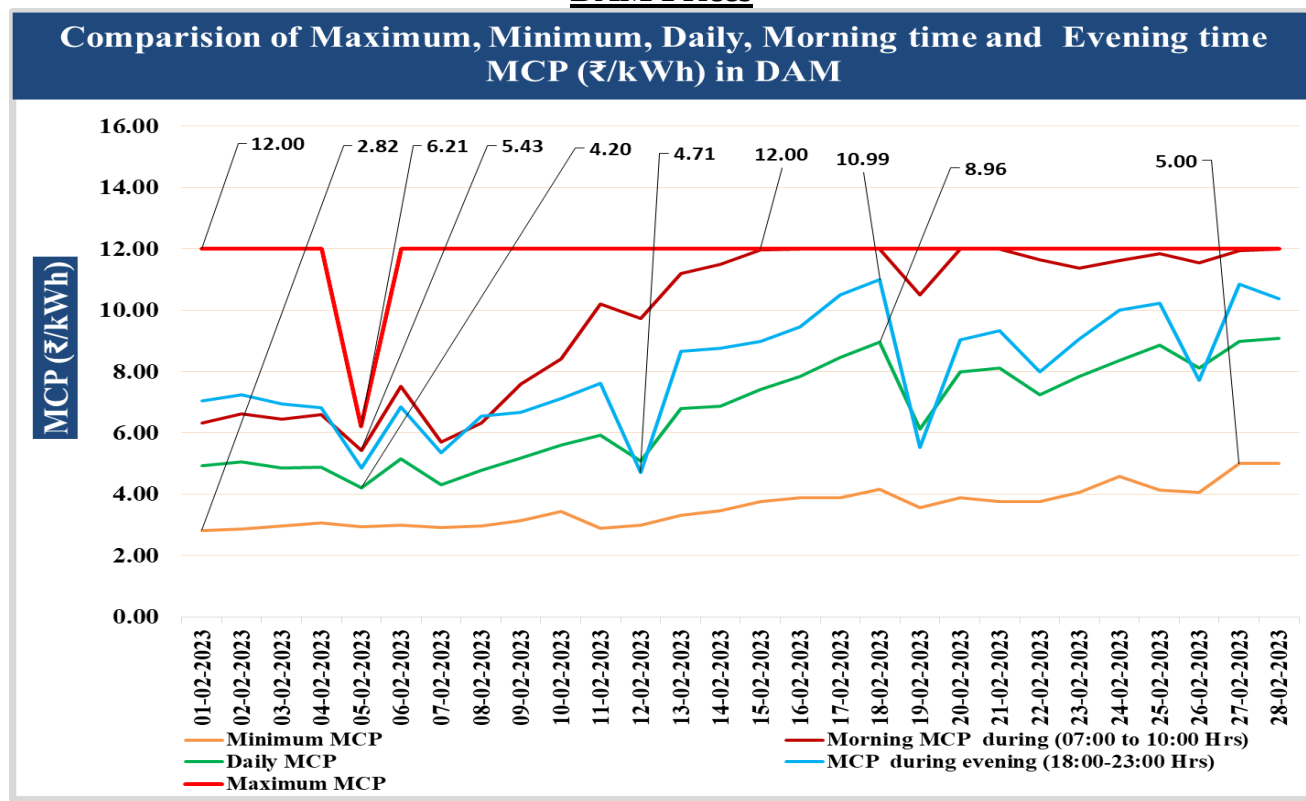
RTM Volume



➤ फरवरी, 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:

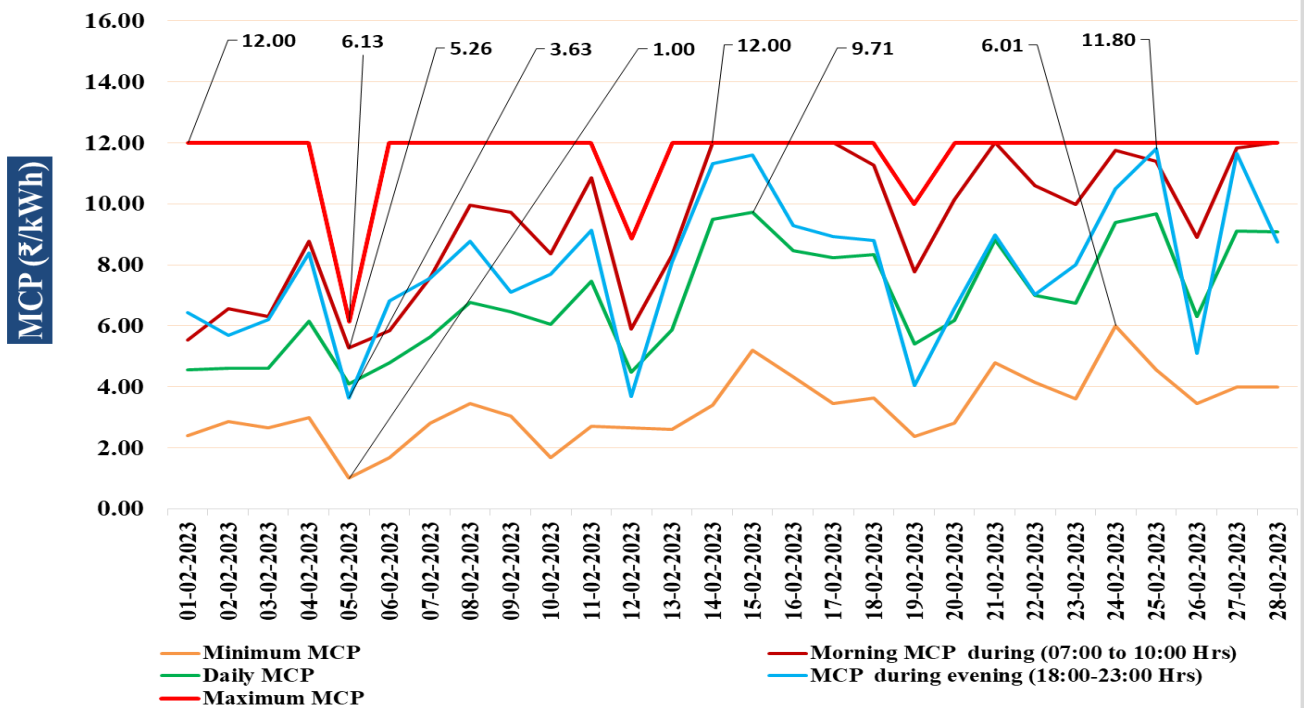
The variation of Maximum, Minimum, Daily, Morning and Evening time MCPs in DAM and RTM during the month of February, 2023 are shown in following figures:

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 February, 2023 was **4,658.76 MU**. The total energy supplied in the country during the month of February, 2023 was 118,564 MU. Thus, the volume of electricity transacted on the power exchanges in DAM during February, 2023 was 3.93 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month i.e. January, 2023, it was **4,948.08 MU** which was 3.90 % of the total energy supplied (126,759 MU) in the country during January, 2023. Similarly, the total volume of electricity transacted in DAM during previous year i.e. February, 2022, was **5,612.83 MU** which was 5.20 % of the total energy supplied (108,032 MU) in the country during February, 2022.

1.2. 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 January, 2023 were **4,947.96 MU** and **0.12 MU**. The volume of electricity transacted on IEX and PXIL during February, 2022, were **5,612.07 MU** and **0.76 MU** respectively.

1.3. The DAM volume for February, 2023 in IEX is inclusive of Cross Border Transactions of Electricity with Nepal and Bhutan (details given at **Annexure XII**), which was **341.22 MU** (i.e. 220.82 MU buy by Nepal and 120.40 MU buy by Bhutan).

1.4. The Average Market Clearing Price (MCP) on IEX during the month of February, 2023 was **₹ 6.61/kWh**, which shows an increase of 3.28 % & 48.87 % when compared with average MCP's for the month of January, 2023 and February, 2022, which were **₹ 6.40/kWh** and **₹ 4.44/kWh**, respectively. On PXIL and HPX, no transaction of electricity took place during February, 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 February, 2023 as compared with January, 2023 and February, 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	February, 2023*	4658.76	136.09	203.00	166.38
	January, 2023*	4947.96	129.04	198.30	159.61
	%Change (Month over Month)	-5.84	5.46	2.37	4.24
	February, 2022*	5612.07	172.17	226.72	200.43
	%Change (Year over Year)	-16.99	-20.96	-10.46	-16.99
PXIL	February, 2023	-	-	-	-
	January, 2023	0.12	0.12	0.12	0.12
	%Change (Month over Month)	NA	NA	NA	NA
	February, 2022	0.76	0.01	0.10	0.03
	%Change (Year over Year)	NA	NA	NA	NA
HPX	February, 2023	-	-	-	-
	January, 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				
		Daily MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
IEX	February, 2023	4.36	8.83	6.61	2.82	12.00
	January, 2023	4.05	8.39	6.40	2.00	12.00
	Change% (Month over Month)	7.65	5.24	3.28	41.00	0.00
	February, 2022	3.29	6.94	4.44	2.00	20.00
	%Change (Year over Year)	32.52	27.23	48.87	41.00	-40.00
PXIL	February, 2023	-	-	-	-	-
	January, 2023	11.33	11.33	11.33	9.99	12.00
	%Change Month over Month)	NA	NA	NA	NA	NA
	February, 2022	4.99	5.86	5.14	3.99	5.99
	%Change (Year over Year)	NA	NA	NA	NA	NA
HPX	February, 2023	-	-	-	-	-
	January, 2023	-	-	-	-	-
	%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 496 time blocks on 1st to 4th, 6th to 28th February, 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 February, 2023.
- 1.7.** The minimum ACP of ₹ 2.82/kWh in IEX was observed in all 13 regions during the time block 04:00 - 04:15 Hrs on 1st February, 2023. As there was no congestion in transmission system, the MCP for this time-block was also ₹ 2.82/kWh. Whereas, in PXIL and HPX, no transaction of electricity took place in the month of February, 2023.

2. Real Time Market (RTM)

The total volume of electricity transacted on the power exchanges in Real Time Market in February, 2023 was **1,714.05 MU**, out of which **1,714.05 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 February, 2023 as compared with January, 2023 and February, 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	February, 2023	1714.05	47.19	76.13	61.22
	January, 2023	2101.89	47.88	104.24	67.80
	% Change (Month over Month)	-18.45	-1.44	-26.97	-9.71
	February, 2022	1,555.78	38.02	88.64	55.56
	% Change (Year over Year)	10.17	24.12	-14.11	10.19
PXIL	February, 2023	-	-	-	-
	January, 2023	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA
	February, 2022	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA
HPX	February, 2023	-	-	-	-

-: 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 MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
IEX	February, 2023	4.31	9.91	7.15	1.00	12.00
	January, 2023	3.08	9.83	6.08	0.49	12.00
	% Change (Month over Month)	39.94	0.81	17.60	104.08	0.00
	February, 2022	3.13	7.08	4.35	1.64	20.00
	% Change (Year over Year)	37.70	39.97	64.37	-39.02	-40.00
PXIL	February, 2023	-	-	-	-	-
	January, 2023	-	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA	NA
	February, 2022	-	-	-	-	-

Exchange	Period	Prices (₹/kWh)				
		Daily MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
	% Change (Year over Year)	NA	NA	NA	NA	NA
HPX	February, 2023	-	-	-	-	-

-: No transaction took place

NA: Not Applicable

Table-2B

3. Green Day Ahead Market (GDAM):

The volume of electricity transacted in GDAM **253 MU** (i.e. **253 MU** in IEX) at an average MCP of **Rs 6.69/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 February, 2023 and its comparison with January, 2023 and February, 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	February, 2023	22.55	0.51	1.91	0.81
		January, 2023	26.06	0.18	1.40	0.84
		% Change (Month over Month)	-13.47	183.33	36.43	-3.57
		February, 2022	46.09	0.32	3.38	1.65
		%Change (Year over Year)	-51.07	59.38	-43.49	-50.91
	Non Solar	February, 2023	230.45	5.73	12.81	8.23
		January, 2023	259.10	4.11	11.58	8.36
		% Change (Month over Month)	-11.06	39.42	10.62	-1.56
		February, 2022	145.12	3.99	6.16	5.18
		%Change (Year over Year)	58.80	43.61	107.95	58.88
	Hydro	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Solar + Non Solar	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
	Hydro	February, 2023	-	-	-	-
		January, 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 MCP (₹/kWh)			ACP (₹/kWh)	
			Minimum	Maximum	Average	Minimum	Maximum
IEX	Solar and Non Solar	February, 2023	4.65	8.81	6.69	2.99	12.00
		January, 2023	4.13	9.25	6.44	2.86	12.00

Exchange	Segment	Period	Prices (₹/kWh)				
			Daily MCP (₹/kWh)			ACP (₹/kWh)	
			Minimum	Maximum	Average	Minimum	Maximum
		% Change (Month over Month)	12.59	-4.76	3.88	4.55	0.00
		February, 2022	3.55	6.68	4.91	2.50	18.00
		% Change (Year over Year)	30.99	31.89	36.25	19.60	-33.33
PXIL	Solar and Non Solar	February, 2023	-	-	-	-	-
		January, 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 February, 2023, January, 2023 and February, 2022.

3.2 There was no real time curtailment in the power exchanges in Green Day Ahead Market during the month of February, 2023, January, 2023 and February, 2022.

3.3 The **top 10 sellers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of February, 2023 were **Karnataka, Adani Wind Energy Kutchh Five Limited, Andhra Pradesh, Madhya Pradesh, Ramagundam Floating Solar PV Station, J&K, Ostro Energy Private Limited (OEPL), Ostro Kannada Power Private Limited, SBSR Power Cleantech Eleven Private Limited and Simhadri FSP 15 MW Project**, which constituted **95.47 %** of the market volume.

3.4 The **top 10 buyers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of February, 2023 were **Maharashtra, DVC, Punjab, Gujarat, Karnataka, Odisha, Delhi, Daman & Diu - Dadra & Nagar Haveli, Tamil Nadu and Madhya Pradesh**, which constituted **95.12 %** 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 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.
- 4.2. The total volume of electricity transacted on the power exchanges in Term Ahead Market in January, 2023 on delivery date basis was **1,990.15 MU**, out of which **918.74 MU** (46.16 %) was transacted on IEX, **661.11 MU** (33.22 %) was transacted on PXIL and **410.30 MU** (20.62 %) was transacted on HPX.
- 4.3. Similarly, the total volume of electricity transacted on the power exchanges in Term Ahead Market in February, 2022 on delivery date basis was **1261.73 MU**, out of which, **526.80 MU** (41.75 %) was transacted on IEX and **734.93 MU** (58.25 %) was transacted on PXIL.
- 4.4. In the month of February, 2023, the transaction of electricity in IEX under anyday single sided reverse auction contract was **189.84 MU**, whereas in HPX, the same was **19.87 MU**, further, no transaction took place in PXIL under reverse auction contract. Similarly, under the long duration contracts (Daily, Weekly & Monthly) no transaction took place in IEX, PXIL & HPX in the month of February, 2023.
- 4.5. With respect to the total energy supplied during the month of February, 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 **1.57 %** in January, 2023 and **1.17 %** in February, 2022.
- 4.6. In the month of February, 2023, there was no real time curtailment in IEX, PXIL and HPX in TAM.
- 4.7. In the month of February, 2023, there was transmission congestion of **0.49 MU** in TAM, which happened under Day Ahead Contingency contract in IEX. Whereas, in PXIL and HPX, there was no transmission congestion 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 February, 2023 with January, 2023 and February, 2022 is given in Table – 4A & 4B:**

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

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
IEX	February, 2023	0.52	679.65	108.00	-	788.17
	January, 2023	0.84	502.59	90.00	134.40	727.83
	%Change (Month over Month)	-38.10	35.23	20.00	NA	8.29
	February, 2022	-	163.00	363.80	-	526.80

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
	%Change (Year over Year)	NA	316.96	-70.31	NA	49.61
PXIL	February, 2023	5.93	554.76	-	-	560.69
	January, 2023	5.13	522.38	100.80	16.80	645.11
	%Change (Month over Month)	15.59	6.20	NA	NA	-13.09
	February, 2022	1.41	526.84	206.68	-	734.93
	%Change (Year over Year)	320.57	5.30	NA	NA	-23.71
HPX	February, 2023	-	545.98	-	-	545.98
	January, 2023	-	410.30	-	-	410.30
	%Change (Month over Month)	NA	33.07	NA	NA	33.07

- : No transaction took place

NA: Not Applicable

Table: 4A

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

Exchange	Period	Average MCP (₹/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	February, 2023	10.35	7.51	7.20	-
	January, 2023	12.00	7.14	4.85	6.25
	%Change (Month over Month)	-13.75	5.18	48.45	NA
	February, 2022	-	5.88	4.10	-
	%Change Year over Year)	NA	27.72	75.61	NA
PXIL	February, 2023	11.32	7.68	-	-
	January, 2023	11.32	7.57	5.30	7.53
	%Change (Month over Month)	0.00	1.45	NA	NA
	February, 2022	5.30	4.48	4.08	-
	%Change (Year over Year)	113.58	71.43	NA	NA
HPX	February, 2023	-	8.04	-	-
	January, 2023	-	8.17	-	-
	%Change (Month over Month)	NA	-1.59	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 **153.15 MU** (**143.62 MU** in Non-Solar and **9.53 MU** in Hydro), respectively.

The total volume of electricity transacted in GTAM in Day Ahead Contingency, Intraday, Daily/Anyday and Weekly contracts during February, 2023 and its comparison with January, 2023 and February, 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 February, 2023 and its comparison with January, 2023 and February, 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	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change Month over Month)	NA	NA	NA	NA
		February, 2022	22.43	0.15	2.06	0.83
		%Change (Year over Year)	NA	NA	NA	NA
	Intraday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	1.39	0.05	0.53	0.09
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	7.49	0.64	1.55	1.25
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	6.52	0.93	0.93	0.93
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	145.39	3.77	7.39	5.19
		%Change (Year over Year)	NA	NA	NA	NA

Exchange	Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
	Intraday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
HPX	Day Ahead Contingency	February, 2023	-	-	-	-
		January, 2023	0.20	0.20	0.20	0.20
		%Change (Month over Month)	NA	NA	NA	NA
	Intra Day, Daily, weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA

:- No transaction took place

NA: Not Applicable

Table-5A

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

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
IEX	Day Ahead Contingency	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	3.61	5.97	4.20
		%Change (Year over Year)	NA	NA	NA
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	3.60	3.60	3.60
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-
		January, 2023	-	-	-

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
		%Change (Month over Month)	NA	NA	NA
		February, 2022	3.96	3.96	3.96
		%Change (Year over Year)	NA	NA	NA
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	3.97	3.97	3.97
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	3.77	6.24	4.72
		%Change (Year over Year)	NA	NA	NA
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency	February, 2023	-	-	-
		January, 2023	7.28	7.28	7.28
		%Change (Month over Month)	NA	NA	NA
	Intra Day, Daily, weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-5B

- In February, 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 February, 2023 and its comparison with January, 2023 and February, 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	February, 2023	77.24	0.29	4.10	2.76
		January, 2023	41.41	0.08	3.19	1.53
		%Change (Month over Month)	86.52	262.50	28.53	80.39
		February, 2022	213.81	2.24	13.45	7.64
		%Change (Year over Year)	-63.87	-87.05	-69.52	-63.87
		February, 2023	-	-	-	-
	Intraday	January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	0.02	0.02	0.02	0.02
		%Change (Year over Year)	NA	NA	NA	NA
		February, 2023	4.20	0.07	0.19	0.17
	Daily/Anyday	January, 2023	5.57	0.10	0.26	0.18
		%Change (Month over Month)	-24.60	-30.00	-26.92	-5.56
		February, 2022	6.28	0.11	0.30	0.22
		%Change (Year over Year)	-33.12	-36.36	-36.67	-22.73
		February, 2023	-	-	-	-
	Weekly	January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	February, 2023	39.29	0.05	3.20	1.40
		January, 2023	44.84	0.11	2.24	1.45
		%Change (Month over Month)	-12.38	-54.55	42.86	-3.45
		February, 2022	244.01	1.10	15.26	8.71
		%Change (Year over Year)	-83.90	-95.45	-79.03	-83.93
		February, 2023	-	-	-	-
	Intraday	January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-	-

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		February, 2022	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
HPX	Day Ahead Contingency	February, 2023	22.89	0.32	1.38	0.82
		January, 2023	18.41	0.10	1.13	0.68
		%Change (Month over Month)	24.33	220.00	22.12	20.59
	Intra Day, Daily, weekly	February, 2023	-	-	-	-
		January, 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	February, 2023	4.39	11.11	6.87
		January, 2023	4.32	8.64	6.45
		%Change (Month over Month)	1.62	28.59	6.51
		February, 2022	3.96	6.10	4.50
		%Change (Year over Year)	10.86	82.13	52.67
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	5.00	5.00	5.00
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	February, 2023	6.30	6.30	6.30
		January, 2023	5.70	6.10	5.82
		%Change (Month over Month)	10.53	3.28	8.25
		February, 2022	4.65	4.70	4.66
		%Change (Year over Year)	35.48	34.04	35.19
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-

Exchange	Non- Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
PXIL		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Day Ahead Contingency	February, 2023	4.10	8.88	6.53
		January, 2023	3.79	8.60	6.00
		%Change (Month over Month)	8.18	3.26	8.83
		February, 2022	4.06	6.85	4.94
		%Change (Year over Year)	0.99	29.64	32.19
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
		February, 2022	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency	February, 2023	4.07	11.34	7.06
		January, 2023	4.48	10.06	7.25
		%Change (Month over Month)	-9.15	12.72	-2.62
	Intra Day, Daily, weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table - 5D

- In February, 2023, there was no transmission congestion in GTAM (Non Solar) in IEX, PXIL & HPX.
- In February, 2023, there was real time curtailment of **4.69 MU** in GTAM (Non Solar) in PXIL under Day Ahead Contingency contract. Whereas, in IEX and HPX, there was no real time curtailment in GTAM (Non Solar) during the month of February, 2023.

5.3 Hydro Energy Segment in GTAM

The Final Scheduled Volume and the Price of electricity transacted in GTAM (Hydro) in Power Exchanges during February, 2023 and its comparison with January, 2023 and February, 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	February, 2023	9.53	0.29	0.40	0.34
		January, 2023	14.37	0.28	0.71	0.46
		%Change (Month over Month)	-33.68	3.57	-43.66	-26.09
	Intraday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Intraday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	February, 2023	-	-	-	-
		January, 2023	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	February, 2023	-	-	-	-
		January, 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	February, 2023	5.57	11.89	9.93
		January, 2023	5.45	11.85	8.58
		%Change (Month over Month)	2.20	0.34	15.73
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
PXIL	Day Ahead Contingency	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Intraday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	February, 2023	-	-	-
		January, 2023	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table – 5F

- In February, 2023, there was no transmission congestion in GTAM (Hydro) in IEX. No transaction took place in PXIL and HPX in GTAM (Hydro).
- In February, 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 February, 2023 was **7,657.82 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and trader in the month of February, 2023 were **3,305.62 MU** and **4,352.20 MU** respectively. The details of Bilateral transactions of Electricity during February, 2023 is shown in Table Below:

February, 2023	Direct	Traders	Total Bilateral Transaction (MU)
Total	3,305.62	4,352.20	7,657.82
Minimum	1.30	12.28	-
Maximum	859.11	788.10	-

Table -6A

The region-wise maximum/ minimum volume of electricity transacted bilaterally during February, 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	167.39	113.74	1260.60	1097.44	915.24	856.43	962.39	2135.03	-	149.56
Minimum	7.22	12.28	1.30	26.54	47.98	25.32	21.10	76.60	-	20.16
Maximum	123.28	77.97	859.11	439.84	502.99	490.26	364.77	788.10	-	107.52

Table-6B

6.1. The top 5 buyers on bilateral transaction through direct transactions in the month of February, 2023 were **Madhya Pradesh, Rajasthan, Telangana, Maharashtra** and **Andhra Pradesh**, which constituted **70.21 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of February, 2023 were **Telangana, Tamil Nadu, Himachal Pradesh, Maharashtra** and **Andhra Pradesh**, which constituted **63.34 %** of the market volume. [Annexure III]

6.2. The top 5 sellers on bilateral transaction through direct transactions in the month of February, 2023 were **Uttar Pradesh, Punjab, Madhya Pradesh, SEMCORP** and **AHEJ4LAHS**, which constituted **57.12 %** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of February, 2023 were **JINDAL STAGE-II, Punjab, RPREL, Delhi** and **ESSAR POWER**, which constituted **47.01 %** of the market volume. [Annexure III]

6.3. Deviation Volume -The volume of Deviation observed in the month of February, 2023 in import and export were **1,624.77 MU** and **1,508.38 MU** respectively. The total volume of Deviation observed in the month of February, 2023 can be taken as **1,566.57 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 February, 2023 is shown in **Figure 1:**

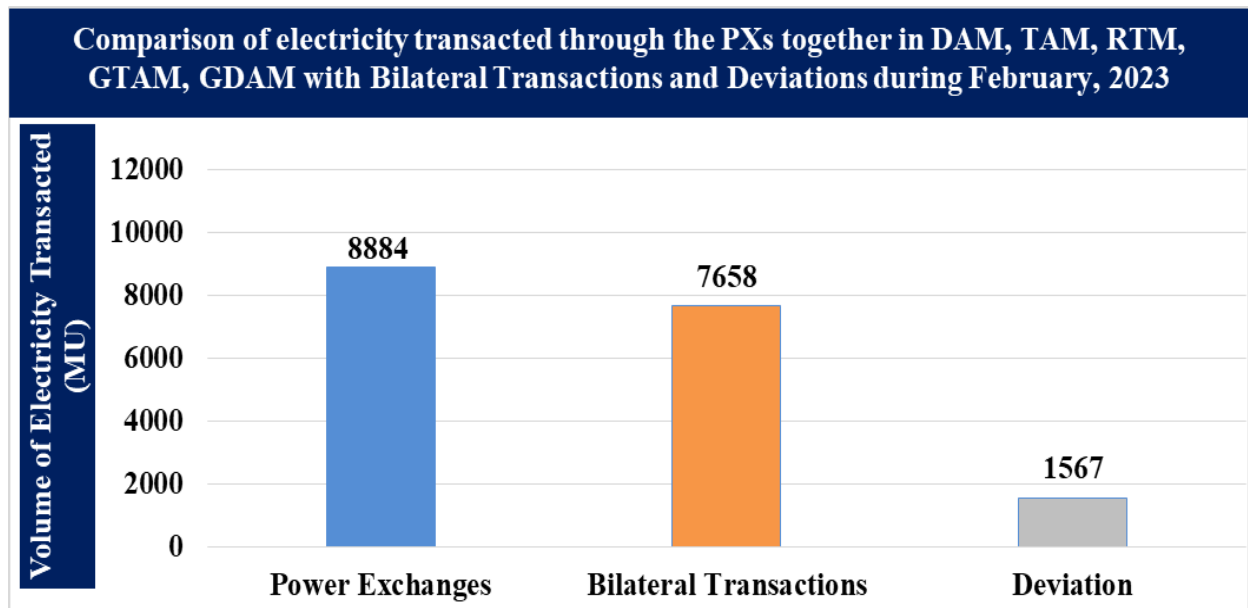
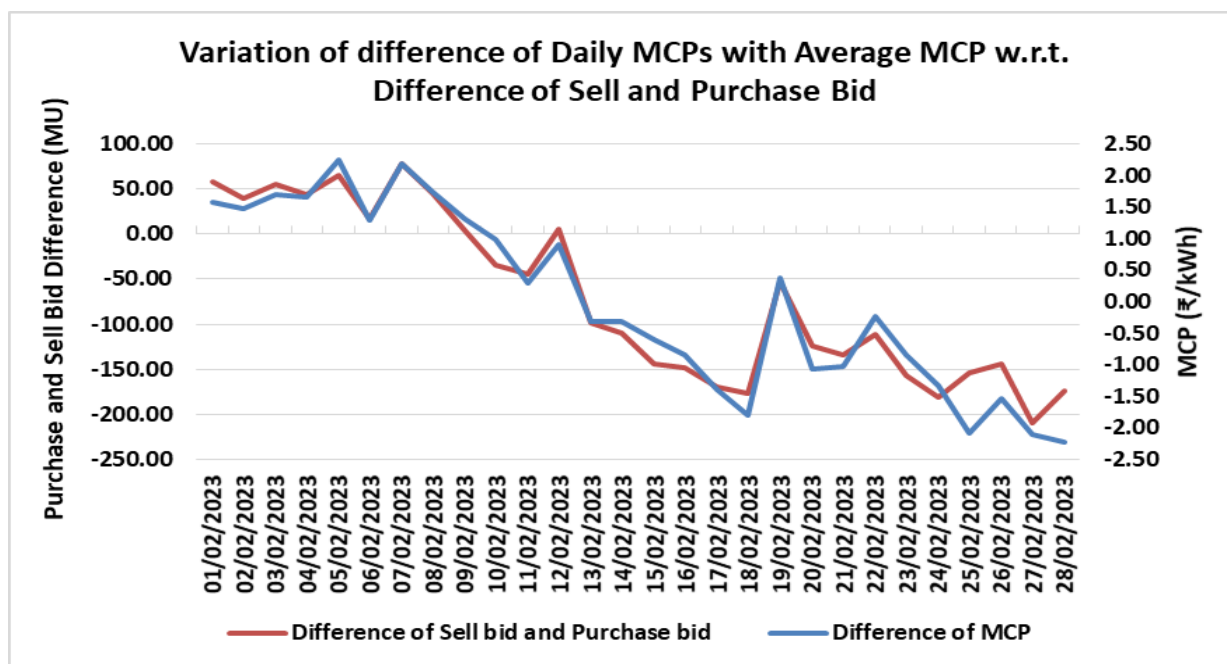


Figure -1

7. Analysis of movement of prices observed in DAM during February, 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 February, 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 **9.00** in the month of February, 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**

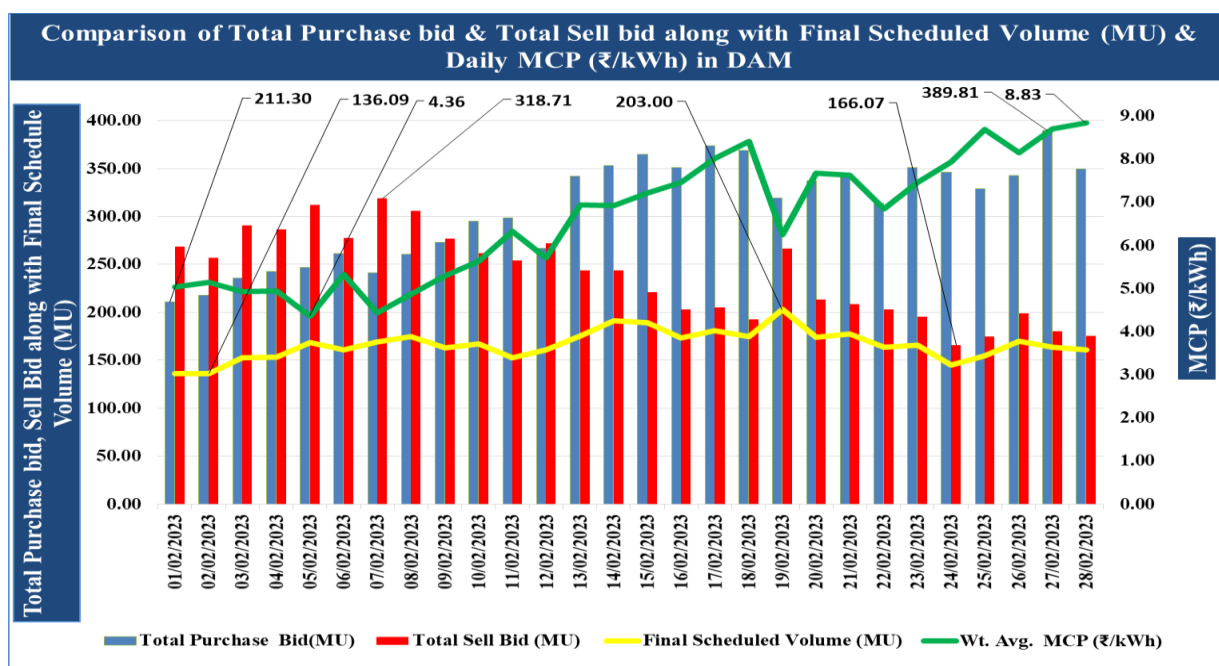


Figure - 2

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 February, 2023, it is observed that on second Sunday (12th February, 2023), FSV showed increasing trend in comparison to second Saturday (11th February, 2023), on third Monday (20th February, 2023), FSV showed decreasing trend in comparison to third Sunday (19th February, 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**

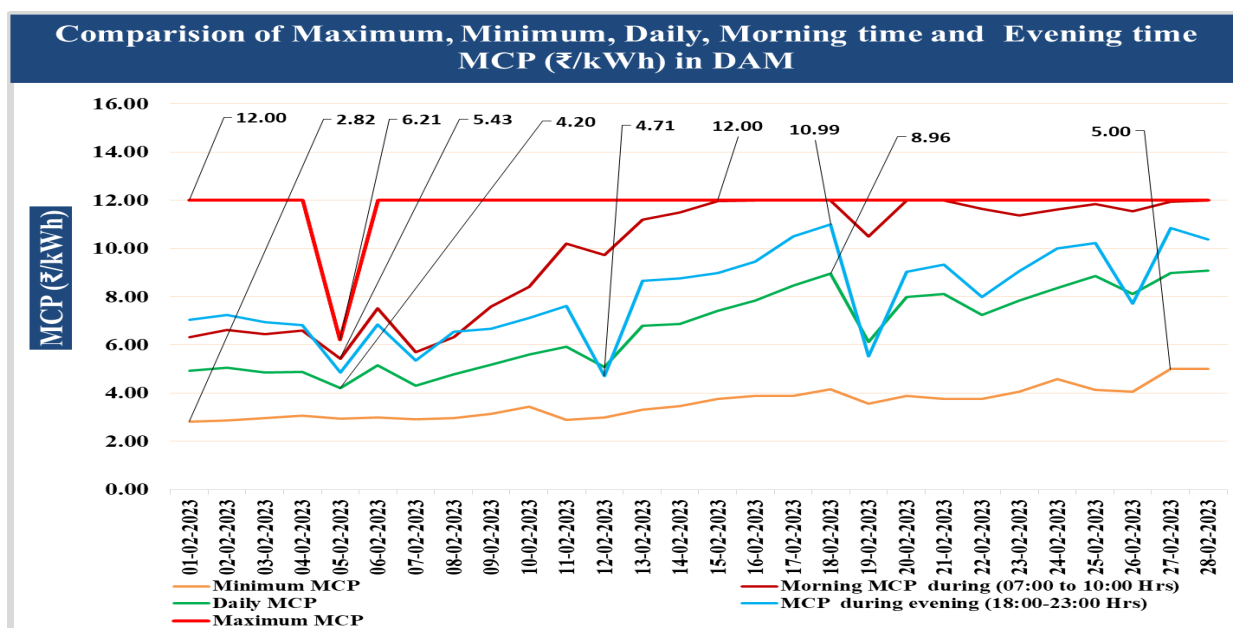


Figure-3

7.7. The Market Clearing Price duration curves for time block wise MCP for the month of February, 2023 is shown in **Figure 4**, whereas the time block wise MCP duration curve for the period 1st April, 2022 to 28th February, 2023 is shown in **Figure 5**.

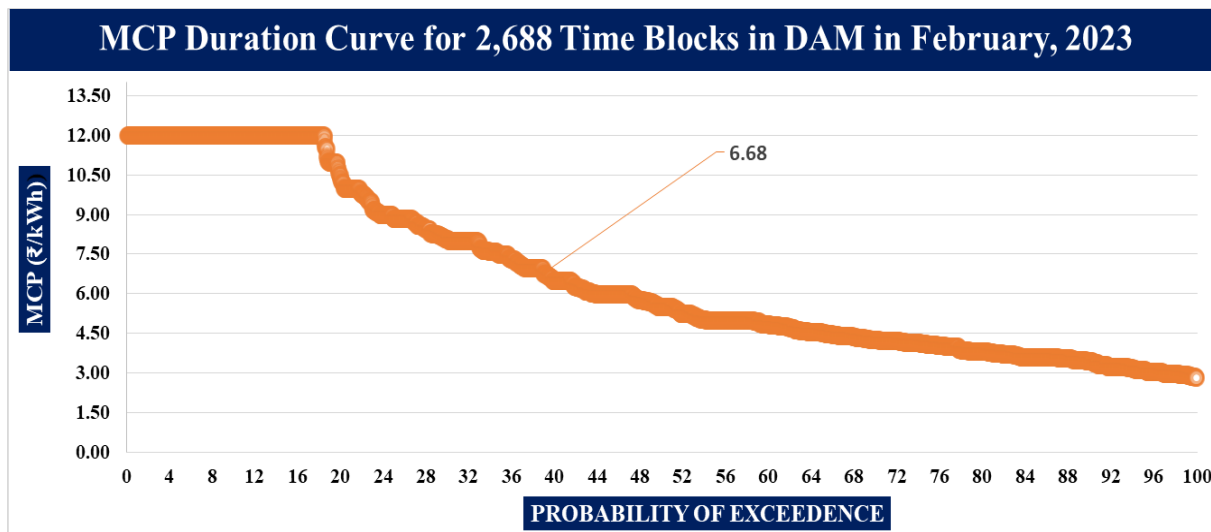


Figure – 4

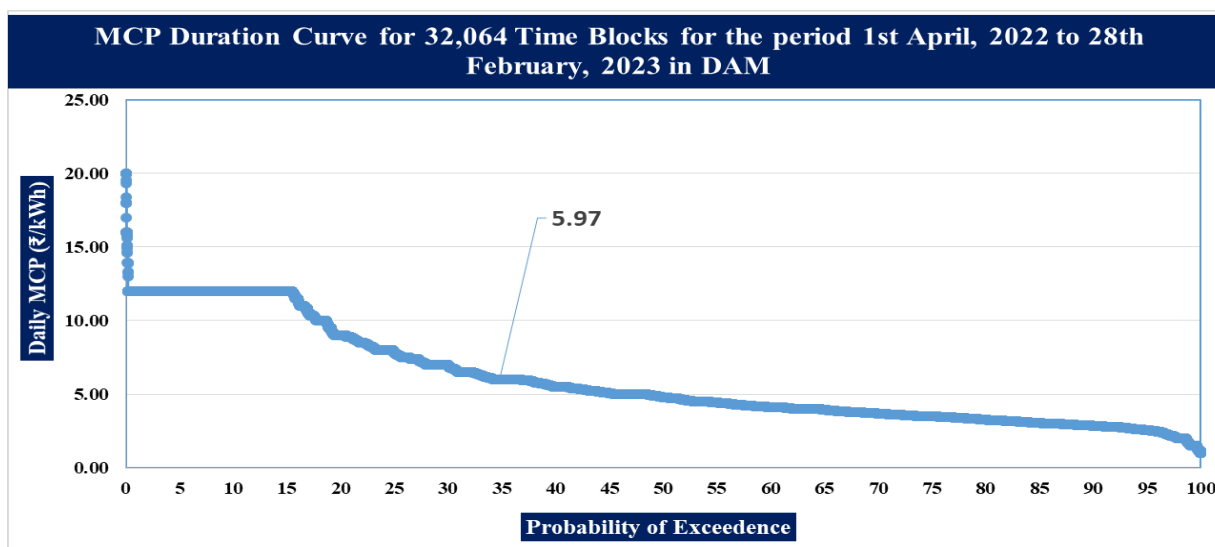


Figure-5

7.8. It can be seen in figure 4 above that in the MCP duration curve of February, 2023, for 40.00 % of the time MCP was above average MCP of the month (i.e. ₹ 6.68/kWh) and almost 60.00 % 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 28th February, 2023 (figure-5), that for 35.00 % of the time the MCP was above the average MCP for the period (i.e. ₹ 5.97kWh) and for 65.00 % 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 February, 2023, the maximum FSV occurred mostly during the **time period 05-07 Hrs** (on 7 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 05-07 Hrs** (on 18 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 18-20 Hrs** (on 08 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 3-5 Hrs** (on 19 no. of days). **[Annexure VI]**
- 7.11.** In the month of February, 2023, there was **no** congestion in IEX and no transaction of electricity took place in PXIL & HPX during February, 2023. Further, in the month of January, 2023 and February, 2022, also there was no congestion in Power Exchanges.
- 7.12.** In the month of February, 2023, there was **no** real time curtailment in IEX and no transaction of electricity took place in PXIL & HPX during February, 2023. Further, in the month of January, 2023 and February, 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 February, 2023 were **Uttar Pradesh, Bihar, DB Power, Raipur Energen, Odisha, West Bengal, Mahan Energy Limited, Jindal Power Ltd. Stg-II, Delhi and Maharashtra**, which constituted **68.89 %** 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 February, 2023 were **Gujarat, Telangana, Punjab, Rajasthan, Andhra Pradesh, J&K, Maharashtra, Haryana, NVVN (SNA) – NEA and Uttar Pradesh**, which constituted **85.22 %** of the market volume. **[Annexure VII]**
- 7.15.** The total volume of electricity purchased by Discoms/Licensees in DAM in the month of February, 2023 was **4,245.08 MU**, which constituted **91.12 %** 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 February, 2023 was **3,238.45 MU**, which constituted **69.51 %** of total volume of electricity sold on the power exchanges.

8. Analysis of movement of prices observed in Real Time Market (RTM) transactions in February, 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 Peak Demand was **13.54** in the month of February, 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:

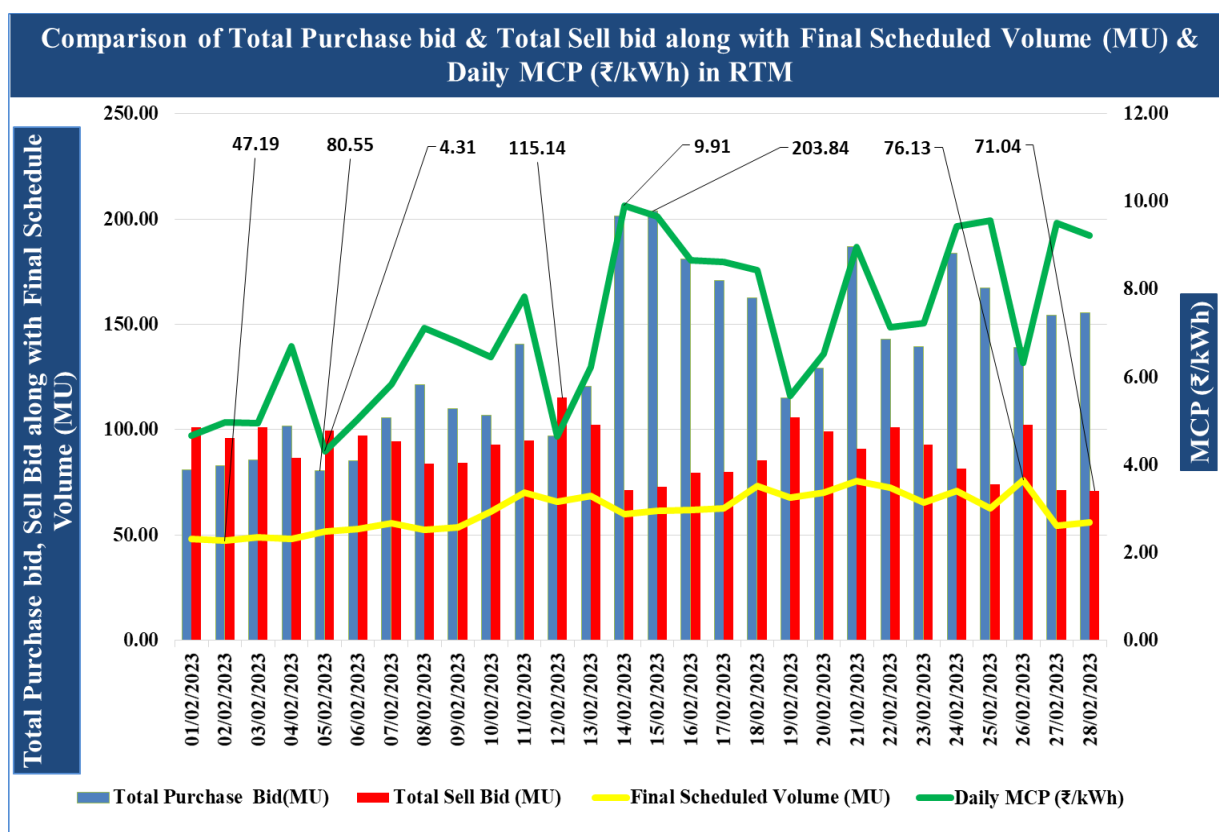


Figure-6

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

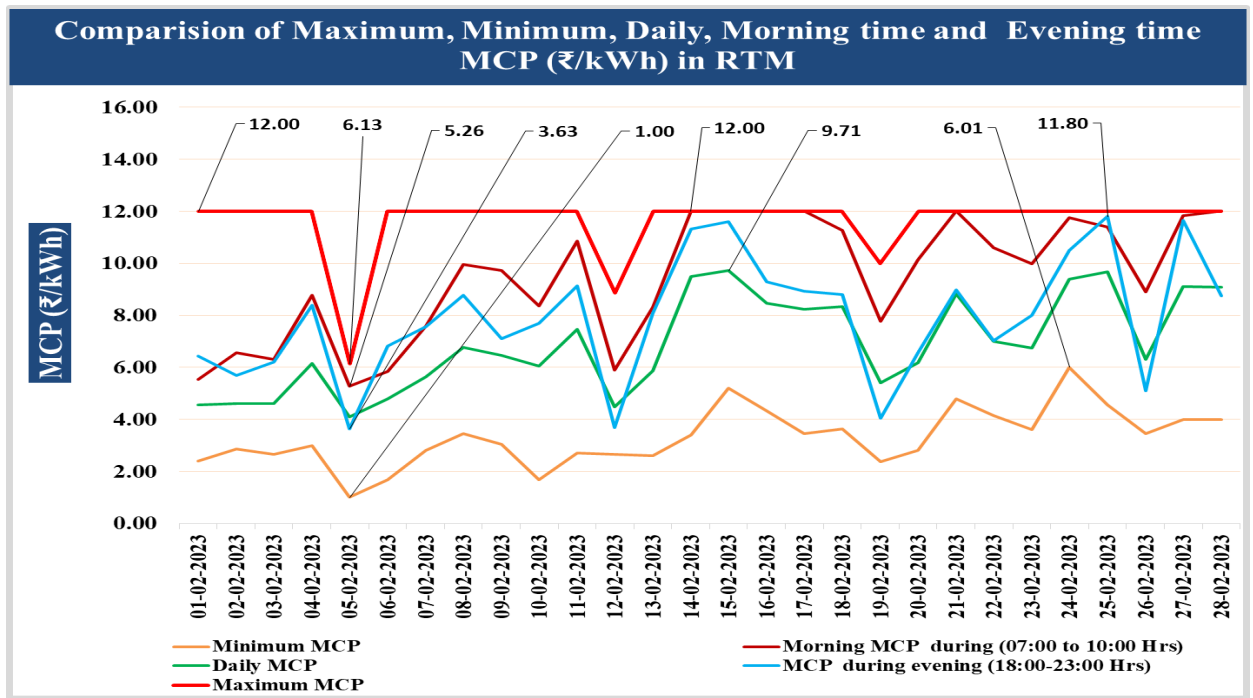


Figure-7

8.5. The Market Clearing Price duration curves for time block wise MCP for the month of February, 2023 is shown in **Figure 8**, whereas the day wise MCP duration curve for the period 1st April, 2022 to 28th February, 2023 is shown in **Figure 9**.

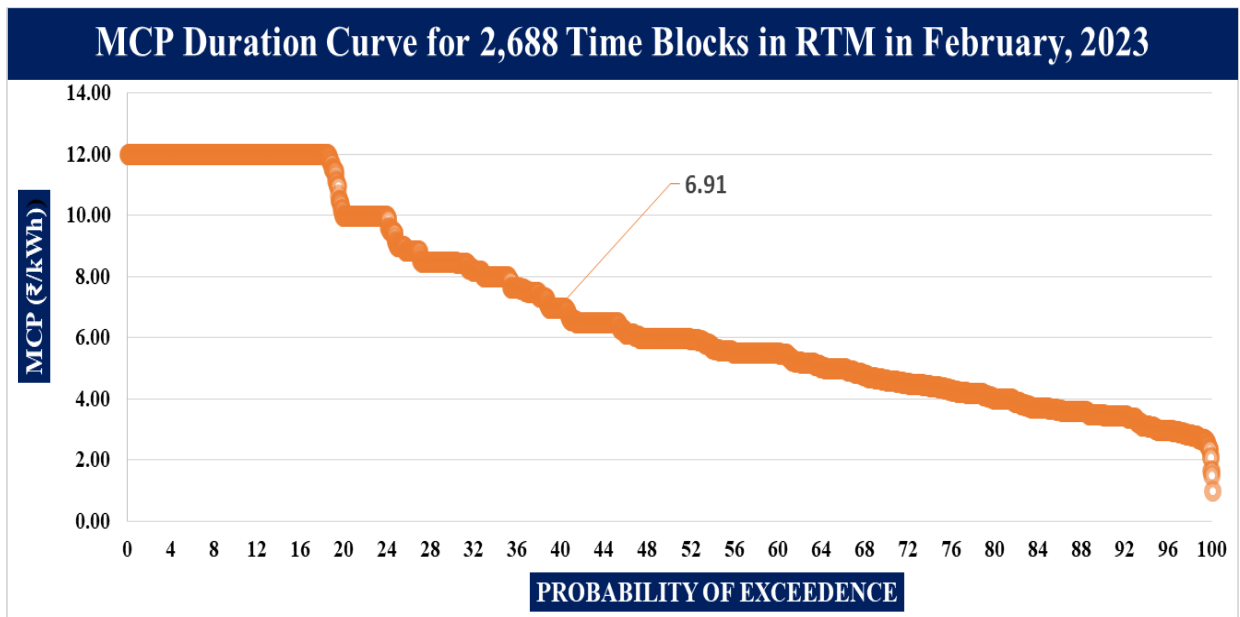


Figure-8

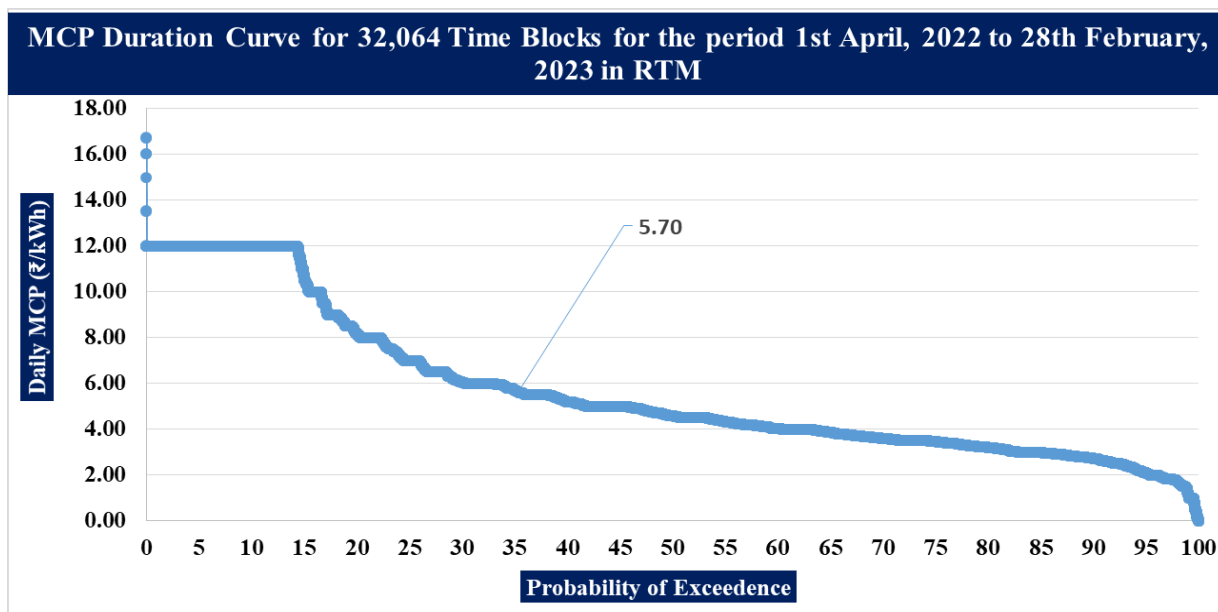


Figure-9

- 8.6.** It can be seen in figure 8 above that in the MCP duration curve of February, 2023, for 40.00 % of the time the MCP was above the average MCP of the month (i.e. ₹ 6.91/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 February, 2023 (figure 9) that, for 36.00 % of the time the Daily Avg. MCP was above the average MCP for the period (i.e. ₹ 5.70/kWh) and for 64.00 % of the time the Daily Avg. MCP was below the average MCP for the period.
- 8.7.** In February, 2023, the maximum FSV occurred mostly during the **time period 06-08 Hrs** (on 08 no. of days). Whereas, the maximum MCP also occurred mostly during the **time period 05-07 Hrs** (on 15 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 13-15 Hrs** (on 10 no. of days).[Annexure X]
- 8.8.** There was **no** real time curtailment in IEX in Real Time Market (RTM) during February, 2023 and no transaction happened in PXIL and HPX. Further, in January, 2023 **no** real time curtailment occurred in IEX, whereas, no transaction happened in PXIL and HPX. Similarly, in February, 2022, there was no real time curtailment in IEX & no transaction happened in PXIL.
- 8.9.** In the month of February, 2023 there was **no** congestion in IEX and no transaction happened in PXIL & HPX. Further, in the month of January, 2023, there was **no** congestion in IEX and no transaction happened in PXIL & HPX. In the month of February, 2022, there was **0.05 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 February, 2023 were **Bihar, Odisha, West Bengal, Uttar Pradesh, NTPC North Karanpura STPS, RKM Power, Delhi, J&K, Chhattisgarh** and **Maharashtra**, which constituted **67.19 %** of the market volume. **[Annexure XI]**

8.11. The **top 10 buyers** on the power exchanges in **Punjab, Rajasthan, Gujarat, Telangana, Maharashtra, Haryana, Andhra Pradesh, Uttar Pradesh, J&K** and **Odisha**, which constituted **82.16 %** of the market volume. **[Annexure XI]**

8.12. The total volume of electricity purchased by Discoms/Licensees in RTM in the month of February, 2023 was **1,682.70 MU**, which constituted **98.17% %** 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 February, 2023 was **1,349.58 MU**, which constituted **78.74% %** 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 February, 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
Total Quarter -IV	January - February, 2023	9,606.72	0.12	6.50	11.33	0	0
Total April, 2022 – February, 2023		51,407.12	187.26	6.11	6.11	8.86	0

Annexure-II

Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2022 to February, 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
Total Quarter - IV	January - February, 2023	1,896.75	1,221.8	976.15	4,094.70
Total April, 2022 - February, 2023		9,866.45	8,383.18	2,445.01	20,694.64

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

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Madhya Pradesh	859.11	25.99%	Telangana	788.10	18.11%
Rajasthan	502.99	15.22%	Tamil Nadu	639.21	14.69%
Telangana	364.77	11.03%	Himachal Pradesh	490.26	11.26%
Maharashtra	325.14	9.84%	Maharashtra	439.84	10.11%
Andhra Pradesh	268.88	8.13%	Andhra Pradesh	399.35	9.18%
Total Volume	2,320.89	70.21%	Total Volume	2,756.77	63.34%
Total Volume in Bilateral	3,305.62		Total Volume in Bilateral	4,352.20	

(ii) Top five Sellers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Uttar Pradesh	651.49	19.71%	JINDAL STAGE-II	484.99	11.14%
Punjab	558.19	16.89%	Punjab	451.27	10.37%
Madhya Pradesh	276.05	8.35%	RPREL	423.16	9.72%
SEMCORP	270.18	8.17%	Delhi	372.71	8.56%
AHEJ4LAHS	132.15	4.00%	ESSAR POWER	313.92	7.21%
Total Volume	1,888.05	57.12%	Total Volume	2,046.06	47.01%
Total Volume in Bilateral	3,305.62		Total Volume in Bilateral	4,352.20	

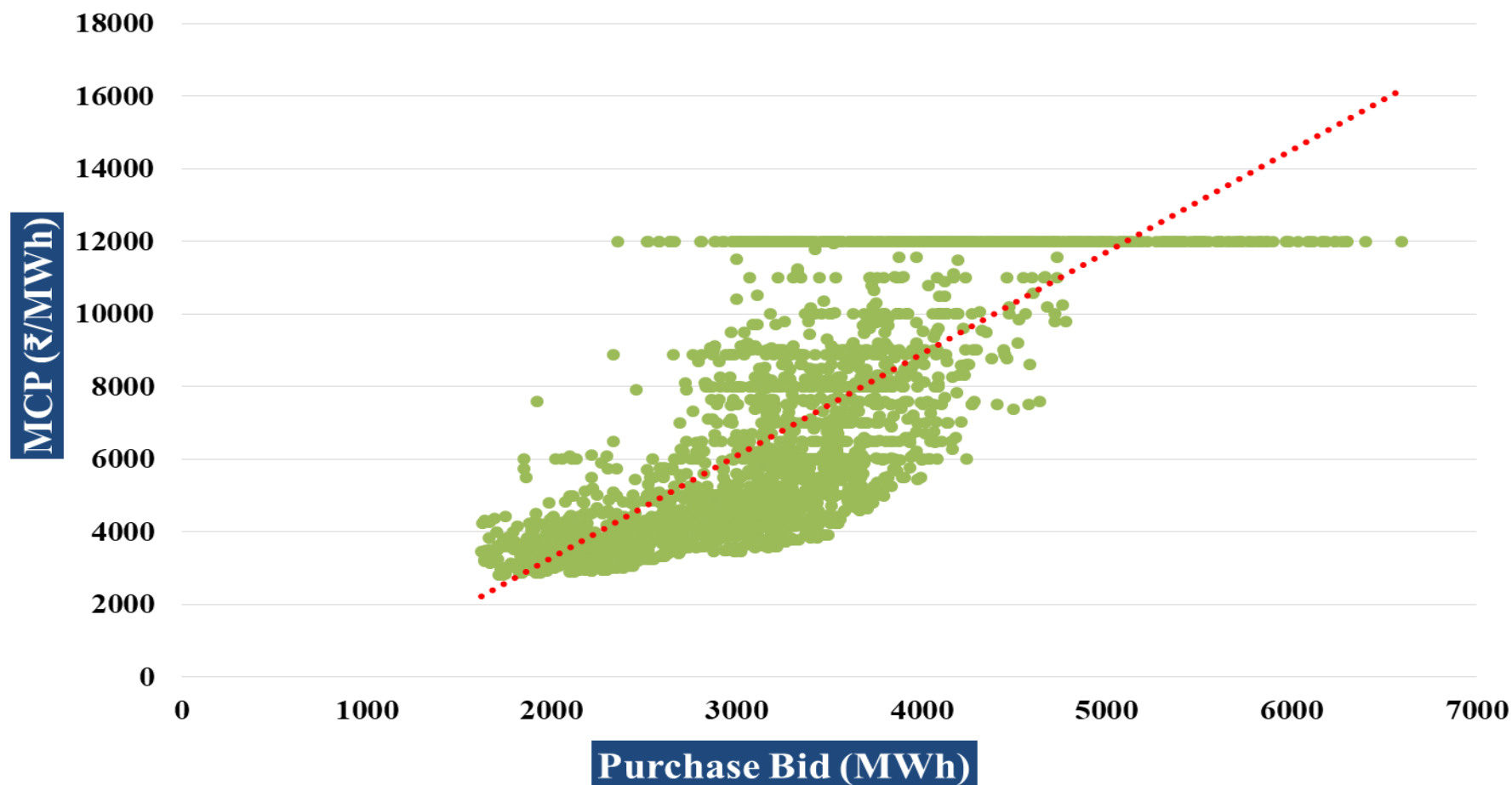
Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in DAM

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)
01-02-2023	6.33	4.14	7.05	3.07	12.00	2.82	4.92	136.16
02-02-2023	6.63	4.17	7.24	3.16	12.00	2.87	5.05	136.09
03-02-2023	6.45	3.81	6.95	3.19	12.00	2.96	4.86	152.40
04-02-2023	6.59	3.73	6.83	3.36	12.00	3.06	4.87	153.65
05-02-2023	5.43	3.55	4.86	3.59	6.21	2.95	4.20	168.20
06-02-2023	7.52	4.20	6.85	3.30	12.00	2.98	5.15	161.08
07-02-2023	5.69	3.72	5.36	3.18	12.00	2.91	4.30	169.11
08-02-2023	6.31	3.90	6.55	3.23	12.00	2.96	4.77	175.00
09-02-2023	7.59	4.20	6.67	3.53	12.00	3.14	5.19	162.70
10-02-2023	8.40	4.55	7.11	3.78	12.00	3.45	5.61	167.14
11-02-2023	10.20	4.54	7.62	3.42	12.00	2.88	5.93	152.62
12-02-2023	9.74	4.22	4.71	3.61	12.00	2.99	5.09	160.69
13-02-2023	11.20	5.55	8.66	3.92	12.00	3.32	6.80	175.57
14-02-2023	11.49	5.51	8.76	4.00	12.00	3.45	6.88	191.45
15-02-2023	11.97	6.16	8.97	4.71	12.00	3.77	7.41	189.24
16-02-2023	12.00	7.01	9.45	4.96	12.00	3.88	7.85	173.41
17-02-2023	12.00	7.85	10.50	5.35	12.00	3.88	8.47	180.78
18-02-2023	12.00	7.98	10.99	6.47	12.00	4.17	8.96	175.04
19-02-2023	10.50	4.63	5.53	5.63	12.00	3.56	6.13	203.00
20-02-2023	12.00	7.73	9.04	5.07	12.00	3.88	7.99	173.76
21-02-2023	12.00	7.73	9.34	5.23	12.00	3.77	8.11	177.55
22-02-2023	11.66	5.99	7.99	5.34	12.00	3.77	7.24	163.74
23-02-2023	11.38	6.85	9.07	5.75	12.00	4.07	7.84	165.82
24-02-2023	11.62	6.80	10.01	6.66	12.00	4.57	8.37	145.36
25-02-2023	11.85	6.47	10.24	8.37	12.00	4.13	8.86	154.60
26-02-2023	11.55	5.84	7.72	8.79	12.00	4.06	8.12	169.96
27-02-2023	11.94	7.52	10.86	7.16	12.00	5.00	8.99	163.89
28-02-2023	12.00	8.17	10.38	7.21	12.00	5.00	9.08	160.76
Maximum	12.00	8.17	10.99	8.79	12.00	5.00	9.08	203.00
Minimum	5.43	3.55	4.71	3.07	6.21	2.82	4.20	136.09
Average	9.79	5.59	8.05	4.82	11.79	3.58	6.68	166.38

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,688 Time Blocks during the month of February, 2023 in DAM



Time Blocks during the Month [96 time blocks in a day x 28 days = 2,688]

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
01-02-2023	07:30 - 07:45	2.13	18:15 - 18:30	12.00	20:30 - 20:45	0.93	04:00 - 04:15	2.82
02-02-2023	06:45 - 07:00	2.10	18:00 - 18:15	12.00	22:00 - 22:15	0.96	03:15 - 03:30	2.87
03-02-2023	08:00 - 08:15	2.44	18:15 - 18:30	12.00	19:15 - 19:30	1.13	03:15 - 03:30	2.96
04-02-2023	09:00 - 09:15	2.31	18:30 - 18:45	12.00	19:45 - 20:00	1.23	03:15 - 03:30	3.06
05-02-2023	07:45 - 08:00	2.78	19:00 - 19:15	6.21	13:00 - 13:15	1.18	13:15 - 13:30	2.95
06-02-2023	09:00 - 09:15	2.40	18:15 - 18:30	12.00	22:00 - 22:15	1.12	03:30 - 03:45	2.98
07-02-2023	08:00 - 08:15	2.71	19:15 - 19:30	12.00	22:00 - 22:15	1.16	03:45 - 04:00	2.91
08-02-2023	08:30 - 08:45	2.84	18:30 - 18:45	12.00	22:00 - 22:15	1.33	03:30 - 03:45	2.96
09-02-2023	08:30 - 08:45	2.64	18:15 - 18:30	12.00	14:00 - 14:15	1.26	04:00 - 04:15	3.14
10-02-2023	08:30 - 08:45	2.61	07:15 - 07:30	12.00	18:45 - 19:00	1.14	04:00 - 04:15	3.45
11-02-2023	08:15 - 08:30	2.36	06:30 - 06:45	12.00	04:00 - 04:15	1.11	03:45 - 04:00	2.88
12-02-2023	07:15 - 07:30	2.83	06:45 - 07:00	12.00	22:00 - 22:15	1.02	03:30 - 03:45	2.99
13-02-2023	08:15 - 08:30	2.52	06:15 - 06:30	12.00	14:00 - 14:15	1.40	03:30 - 03:45	3.32
14-02-2023	07:30 - 07:45	2.54	06:15 - 06:30	12.00	18:45 - 19:00	1.40	03:15 - 03:30	3.45
15-02-2023	05:00 - 05:15	2.45	06:15 - 06:30	12.00	18:45 - 19:00	1.19	03:15 - 03:30	3.77
16-02-2023	05:00 - 05:15	2.28	06:00 - 06:15	12.00	18:45 - 19:00	0.96	03:00 - 03:15	3.88
17-02-2023	05:00 - 05:15	2.48	05:45 - 06:00	12.00	19:15 - 19:30	0.96	03:00 - 03:15	3.88
18-02-2023	01:45 - 02:00	2.55	05:45 - 06:00	12.00	19:00 - 19:15	0.94	14:30 - 14:45	4.17
19-02-2023	05:00 - 05:15	2.79	06:30 - 06:45	12.00	14:15 - 14:30	1.55	14:15 - 14:30	3.56
20-02-2023	04:15 - 04:30	2.26	06:00 - 06:15	12.00	08:00 - 08:15	1.33	03:00 - 03:15	3.88
21-02-2023	01:15 - 01:30	2.38	06:00 - 06:15	12.00	07:45 - 08:00	1.22	03:45 - 04:00	3.77
22-02-2023	01:00 - 01:15	2.38	05:45 - 06:00	12.00	06:45 - 07:00	1.05	14:00 - 14:15	3.77
23-02-2023	05:00 - 05:15	2.25	05:45 - 06:00	12.00	20:00 - 20:15	1.08	13:15 - 13:30	4.07
24-02-2023	04:15 - 04:30	2.15	05:45 - 06:00	12.00	20:15 - 20:30	0.92	13:00 - 13:15	4.57
25-02-2023	01:00 - 01:15	2.04	05:45 - 06:00	12.00	07:30 - 07:45	1.01	13:30 - 13:45	4.13
26-02-2023	06:30 - 06:45	2.14	05:45 - 06:00	12.00	21:45 - 22:00	1.38	14:00 - 14:15	4.06
27-02-2023	12:30 - 12:45	2.16	05:30 - 05:45	12.00	07:45 - 08:00	1.02	03:45 - 04:00	5.00
28-02-2023	04:30 - 04:45	2.08	05:30 - 05:45	12.00	07:15 - 07:30	1.04	13:15 - 13:30	5.00

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

Annexure-VII

Sellers and Buyers in Day Ahead Market (DAM) in the month of February, 2023						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Uttar Pradesh	1099.80	23.61%	Gujarat	1152.33	24.73%
2	Bihar	907.62	19.48%	Telangana	590.94	12.68%
3	DB Power	214.05	4.59%	Punjab	447.04	9.60%
4	Raipur Energen	175.59	3.77%	Rajasthan	373.50	8.02%
5	Odisha	155.10	3.33%	Andhra Pradesh	368.17	7.90%
6	West Bengal	148.84	3.19%	J&K	259.00	5.56%
7	Mahan Energy	139.83	3.00%	Maharashtra	228.78	4.91%
8	Jindal Power Ltd.	132.08	2.83%	Haryana	216.02	4.64%
9	Delhi	119.16	2.56%	NVVN (SNA) - NEA	201.93	4.33%
10	Maharashtra	117.30	2.52%	Uttar Pradesh	132.61	2.85%
11	MB Power	90.62	1.95%	Druk Green Power	120.40	2.58%
12	JITPL	85.55	1.84%	Madhya Pradesh	80.46	1.73%
13	Jaypee Nigrie	83.93	1.80%	Daman & Diu - Dadra	71.19	1.53%
14	Karnataka	79.70	1.71%	ArcelorMittal Nippon	61.91	1.33%
15	Tamil Nadu	75.79	1.63%	Tamil Nadu	52.07	1.12%
16	Chhattisgarh	75.12	1.61%	Chhattisgarh	43.09	0.92%
17	Madhya Pradesh	72.44	1.55%	Karnataka	42.98	0.92%
18	Jindal Power	63.87	1.37%	Uttarakhand	42.82	0.92%
19	Sembcorp Gayatri	56.83	1.22%	Assam	29.81	0.64%
20	Himachal Pradesh	54.39	1.17%	Delhi	26.23	0.56%
21	Assam	53.21	1.14%	Odisha	25.65	0.55%
22	Kerala	46.69	1.00%	NEA-NR	18.89	0.41%
23	Raigarh Energy Ltd.	44.17	0.95%	West Bengal	18.48	0.40%
24	Tripura	40.83	0.88%	Jharkhand	14.78	0.32%
25	RKM Power	37.73	0.81%	Kerala	13.26	0.28%
26	Sembcorp Energy	36.90	0.79%	Goa WR	9.68	0.21%
27	Jindal Steel	36.03	0.77%	Goa SR	5.80	0.12%
28	Jhabua Power	34.28	0.74%	Railways	4.04	0.09%
29	Rajasthan	24.96	0.54%	Himachal Pradesh	3.83	0.08%
30	Jharkhand	24.23	0.52%	Sikkim	0.84	0.02%
31	Gujarat	23.12	0.50%	Nagaland	0.84	0.02%
32	Uttarakhand	22.85	0.49%	Chandigarh	0.53	0.01%
33	SKS Power	20.96	0.45%	IL&FS	0.42	0.01%
34	Andhra Pradesh	20.10	0.43%	Ratnagiri Gas &	0.30	0.01%
35	Chandigarh	18.65	0.40%	Meghalaya	0.10	0.00%
36	ACBIL	18.32	0.39%	Bihar	0.03	0.00%
37	Adhunik Power	17.14	0.37%			
38	Goa WR	13.79	0.30%			
39	Teesta -3	13.03	0.28%			
40	Talcher Stg-2	12.54	0.27%			
41	DVC	11.99	0.26%			
42	Maruti Clean Coal	11.90	0.26%			
43	Adani Green Energy	10.44	0.22%			
44	J&K	9.51	0.20%			

45	Renew Surya Ravi	9.12	0.20%			
46	Karcham Wangtoo	8.32	0.18%			
47	Sainj HEP	7.91	0.17%			
48	Ramagundam Stg-1	7.32	0.16%			
49	Costal Energen	6.05	0.13%			
50	NTPC Kudgi	5.33	0.11%			
51	Haryana	5.15	0.11%			
52	Shree Cement	5.13	0.11%			
53	Telangana	4.88	0.10%			
54	Sorang HEP,	4.82	0.10%			
55	Meghalaya	4.75	0.10%			
56	Bongaigaon	4.44	0.10%			
57	GMR Warora	3.65	0.08%			
58	Simhapuri Energy	3.61	0.08%			
59	AD Hydro	3.58	0.08%			
60	Arunachal Pradesh	3.32	0.07%			
61	Nagaland	2.64	0.06%			
62	BALCO 2	2.33	0.05%			
63	Adani Wind Energy	1.93	0.04%			
64	Simhadri Stg-2	1.47	0.03%			
65	IL&FS	1.47	0.03%			
66	Ostro Energy Private	1.46	0.03%			
67	SBSR Power	1.20	0.03%			
68	Dikchu	1.20	0.03%			
69	Ostro Kannada	1.05	0.02%			
70	Kameng HEP	1.03	0.02%			
71	Dhariwal	0.93	0.02%			
72	Punjab	0.90	0.02%			
73	Sikkim	0.86	0.02%			
74	Mizoram	0.75	0.02%			
75	Lanco Budhil	0.64	0.01%			
76	Chuzachen	0.38	0.01%			
77	GMR Kamalanga	0.14	0.00%			
78	PARBATI II HE	0.03	0.00%			
79	Singoli Bhagwati	0.02	0.00%			
Total Volume of top 10		3,209.36	68.89%	Total Volume of top 10	3,970.32	85.22%
Total Volume in PXs		4,658.76		Total Volume in PXs	4,658.76	

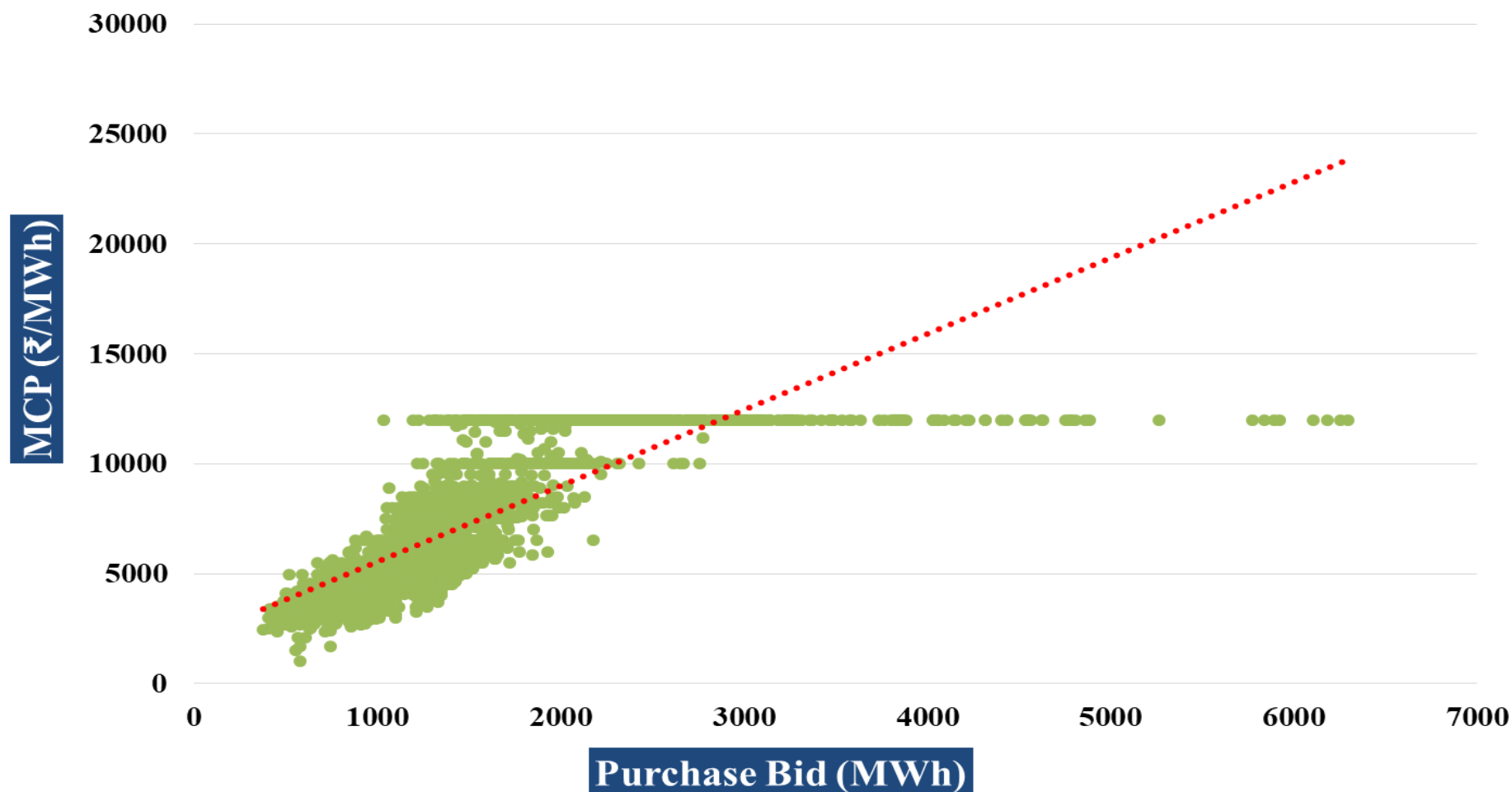
Annexure-VIII**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in RTM**

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)
01-02-2023	5.54	3.79	6.43	3.20	12.00	2.40	4.57	48.08
02-02-2023	6.56	3.85	5.68	3.34	12.00	2.85	4.61	47.19
03-02-2023	6.30	3.56	6.21	3.35	12.00	2.65	4.62	48.93
04-02-2023	8.77	4.94	8.39	3.94	12.00	3.00	6.15	48.08
05-02-2023	5.26	4.23	3.63	3.71	6.13	1.00	4.10	51.55
06-02-2023	5.84	4.24	6.82	2.99	12.00	1.67	4.79	52.88
07-02-2023	7.58	4.93	7.56	3.63	12.00	2.81	5.65	55.54
08-02-2023	9.95	5.54	8.78	4.44	12.00	3.46	6.76	52.40
09-02-2023	9.74	6.43	7.10	4.06	12.00	3.05	6.46	53.70
10-02-2023	8.36	5.94	7.70	3.44	12.00	1.67	6.06	60.97
11-02-2023	10.85	6.93	9.13	4.59	12.00	2.70	7.45	70.00
12-02-2023	5.89	3.60	3.69	5.22	8.87	2.66	4.48	65.84
13-02-2023	8.31	4.85	8.09	3.58	12.00	2.60	5.87	68.53
14-02-2023	12.00	10.19	11.32	5.82	12.00	3.41	9.50	60.11
15-02-2023	12.00	9.03	11.60	7.46	12.00	5.20	9.71	61.64
16-02-2023	12.00	7.70	9.28	6.48	12.00	4.32	8.46	61.70
17-02-2023	12.00	6.75	8.94	6.96	12.00	3.46	8.23	62.68
18-02-2023	11.26	6.69	8.80	7.91	12.00	3.64	8.34	73.20
19-02-2023	7.77	4.46	4.03	6.22	10.00	2.37	5.42	67.67
20-02-2023	10.14	5.51	6.55	4.28	12.00	2.80	6.18	70.21
21-02-2023	12.00	8.54	8.98	7.18	12.00	4.80	8.83	75.69
22-02-2023	10.60	5.73	7.03	6.16	12.00	4.15	6.99	72.39
23-02-2023	9.99	5.28	8.01	5.23	12.00	3.61	6.73	65.22
24-02-2023	11.75	8.77	10.50	7.73	12.00	6.01	9.39	70.84
25-02-2023	11.41	7.69	11.80	8.80	12.00	4.55	9.66	62.78
26-02-2023	8.89	4.78	5.09	7.36	12.00	3.46	6.30	76.13
27-02-2023	11.82	7.96	11.66	6.49	12.00	4.00	9.10	54.25
28-02-2023	12.00	8.53	8.75	8.29	12.00	4.00	9.09	55.90
Maximum	12.00	10.19	11.80	8.80	12.00	6.01	9.71	76.13
Minimum	5.26	3.56	3.63	2.99	6.13	1.00	4.10	47.19
Average	9.45	6.09	7.91	5.42	11.61	3.30	6.91	61.22

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Comparison of MCP w.r.t. Purchase Bid for 2,688 Time Blocks during the month of February, 2023 in RTM



Time Blocks during the Month [96 time blocks in a day x 28 days = 2,688]

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
01-02-2023	19:45 - 20:00	0.83	18:30 - 18:45	12.00	23:00 - 23:15	0.23	01:15 - 01:30	2.40
02-02-2023	09:15 - 09:30	0.79	18:30 - 18:45	12.00	05:00 - 05:15	0.16	03:15 - 03:30	2.85
03-02-2023	19:30 - 19:45	0.84	18:45 - 19:00	12.00	00:30 - 00:45	0.19	14:30 - 14:45	2.65
04-02-2023	11:00 - 11:15	0.86	07:15 - 07:30	12.00	23:30 - 23:45	0.16	13:15 - 13:30	3.00
05-02-2023	12:45 - 13:00	1.02	06:45 - 07:00	6.13	23:15 - 23:30	0.17	17:30 - 17:45	1.00
06-02-2023	08:45 - 09:00	0.88	18:30 - 18:45	12.00	21:45 - 22:00	0.25	04:00 - 04:15	1.67
07-02-2023	11:00 - 11:15	0.82	18:30 - 18:45	12.00	00:00 - 00:15	0.30	00:45 - 01:00	2.81
08-02-2023	11:30 - 11:45	0.91	06:15 - 06:30	12.00	04:30 - 04:45	0.26	01:45 - 02:00	3.46
09-02-2023	14:30 - 14:45	0.88	06:30 - 06:45	12.00	01:15 - 01:30	0.28	02:00 - 02:15	3.05
10-02-2023	16:00 - 16:15	1.09	07:00 - 07:15	12.00	23:45 - 24:00	0.30	05:00 - 05:15	1.67
11-02-2023	23:45 - 24:00	1.06	06:15 - 06:30	12.00	04:15 - 04:30	0.27	03:30 - 03:45	2.70
12-02-2023	01:30 - 01:45	1.17	00:00 - 00:15	8.87	20:45 - 21:00	0.30	14:30 - 14:45	2.66
13-02-2023	09:45 - 10:00	1.06	18:30 - 18:45	12.00	00:00 - 00:15	0.23	03:30 - 03:45	2.60
14-02-2023	14:15 - 14:30	1.02	05:30 - 05:45	12.00	01:45 - 02:00	0.25	03:00 - 03:15	3.41
15-02-2023	11:45 - 12:00	1.06	05:30 - 05:45	12.00	18:30 - 18:45	0.41	13:15 - 13:30	5.20
16-02-2023	18:00 - 18:15	0.95	05:45 - 06:00	12.00	01:00 - 01:15	0.39	15:00 - 15:15	4.32
17-02-2023	06:15 - 06:30	0.92	05:15 - 05:30	12.00	01:30 - 01:45	0.42	14:00 - 14:15	3.46
18-02-2023	09:15 - 09:30	1.11	05:00 - 05:15	12.00	13:15 - 13:30	0.57	13:15 - 13:30	3.64
19-02-2023	07:30 - 07:45	1.07	07:00 - 07:15	10.00	04:00 - 04:15	0.45	17:30 - 17:45	2.37
20-02-2023	08:00 - 08:15	1.16	06:45 - 07:00	12.00	12:15 - 12:30	0.48	04:00 - 04:15	2.80
21-02-2023	09:45 - 10:00	1.06	05:15 - 05:30	12.00	02:45 - 03:00	0.45	03:15 - 03:30	4.80
22-02-2023	06:30 - 06:45	1.32	06:30 - 06:45	12.00	00:15 - 00:30	0.34	12:45 - 13:00	4.15
23-02-2023	06:30 - 06:45	1.26	07:00 - 07:15	12.00	02:15 - 02:30	0.45	04:00 - 04:15	3.61
24-02-2023	06:30 - 06:45	1.25	06:30 - 06:45	12.00	04:00 - 04:15	0.44	13:15 - 13:30	6.01
25-02-2023	06:30 - 06:45	1.27	07:00 - 07:15	12.00	09:15 - 09:30	0.40	13:00 - 13:15	4.55
26-02-2023	16:15 - 16:30	1.14	00:00 - 00:15	12.00	03:45 - 04:00	0.54	13:30 - 13:45	3.46
27-02-2023	06:30 - 06:45	1.06	06:15 - 06:30	12.00	03:15 - 03:30	0.34	03:30 - 03:45	4.00
28-02-2023	06:15 - 06:30	0.91	05:15 - 05:30	12.00	13:15 - 13:30	0.37	13:00 - 13:15	4.00

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Sellers and Buyers in Real Time Market (RTM) in the month of February, 2023						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Bihar	315.57	18.41%	Punjab	328.15	19.14%
2	Odisha	184.66	10.77%	Rajasthan	310.74	18.13%
3	West Bengal	172.65	10.07%	Gujarat	159.87	9.33%
4	Uttar Pradesh	133.01	7.76%	Telangana	139.78	8.16%
5	NTPC North	80.75	4.71%	Maharashtra	138.51	8.08%
6	RKM Power	58.35	3.40%	Haryana	93.00	5.43%
7	Delhi	57.59	3.36%	Andhra Pradesh	91.96	5.37%
8	J&K	50.92	2.97%	Uttar Pradesh	54.25	3.17%
9	Chhattisgarh	50.09	2.92%	J&K	47.64	2.78%
10	Maharashtra	48.06	2.80%	Odisha	44.36	2.59%
11	Karnataka	41.43	2.42%	Karnataka	43.62	2.54%
12	Tamil Nadu	36.83	2.15%	Tamil Nadu	42.30	2.47%
13	Madhya Pradesh	36.44	2.13%	Delhi	31.20	1.82%
14	Kameng HEP	32.11	1.87%	DVC	28.27	1.65%
15	Rajasthan	31.75	1.85%	West Bengal	26.83	1.57%
16	Himachal	30.86	1.80%	Chhattisgarh	25.40	1.48%
17	Kerala	30.56	1.78%	Madhya Pradesh	18.19	1.06%
18	Andhra Pradesh	23.38	1.36%	ArcelorMittal Nippon	17.31	1.01%
19	Telangana	22.20	1.30%	Uttarakhand	15.17	0.89%
20	Mahan Energy	21.44	1.25%	Daman & Diu - Dadra	13.80	0.81%
21	Jindal Power Ltd.	20.97	1.22%	Assam	7.96	0.46%
22	DVC	18.33	1.07%	Kerala	5.20	0.30%
23	Palatana	17.50	1.02%	Jindal Power Ltd.	4.45	0.26%
24	TRN Energy	16.74	0.98%	Himachal Pradesh	4.40	0.26%
25	Gujarat	14.76	0.86%	Jharkhand	3.80	0.22%
26	Sembcorp	10.43	0.61%	Jaypee Nigrie	2.83	0.17%
27	SKS Power	10.19	0.59%	Manipur	2.44	0.14%
28	ACBIL	9.75	0.57%	Railways	1.96	0.11%
29	MB Power	9.57	0.56%	Goa WR	1.90	0.11%
30	Assam	9.20	0.54%	Tripura	1.62	0.09%
31	Jharkhand	8.49	0.50%	Jhabua Power	1.29	0.08%
32	Haryana	8.40	0.49%	Maruti Clean Coal	1.09	0.06%
33	Raipur Energen	8.28	0.48%	ACBIL	0.89	0.05%
34	Sembcorp Energy	8.10	0.47%	Sikkim	0.72	0.04%
35	Manipur	5.93	0.35%	Bihar	0.70	0.04%
36	Tripura	5.60	0.33%	Raigarh Energy Ltd.	0.43	0.02%
37	NTPL	5.28	0.31%	Meghalaya	0.41	0.02%
38	GMR Warora	4.94	0.29%	Goa SR	0.39	0.02%
39	Adhunik Power	4.88	0.28%	SKS Power	0.37	0.02%
40	Jindal Power	4.30	0.25%	Arunachal Pradesh	0.25	0.01%
41	Daman & Diu -	4.09	0.24%	BHARAT	0.19	0.01%
42	NTPC Kudgi	3.93	0.23%	Nagaland	0.13	0.01%
43	NTPC	3.71	0.22%	Chandigarh	0.12	0.01%
44	Simhapuri	3.13	0.18%	Mahan Energy	0.08	0.00%

45	NTPC Sholapur	3.04	0.18%	Ratnagiri Gas &	0.06	0.00%
46	Uttarakhand	2.98	0.17%	Coastal Gujrat Power	0.03	0.00%
47	Coastal Gujrat	2.82	0.16%			
48	Sikkim	2.69	0.16%			
49	Maruti Clean	2.46	0.14%			
50	Ostro Energy	2.25	0.13%			
51	Shree Cement	2.20	0.13%			
52	Ramagundam	2.10	0.12%			
53	JITPL	1.87	0.11%			
54	Khargone STPP	1.83	0.11%			
55	Singoli Bhagwati	1.16	0.07%			
56	Jindal Steel	1.13	0.07%			
57	Punjab	0.94	0.05%			
58	Teesta -3	0.92	0.05%			
59	Meghalaya	0.85	0.05%			
60	Ramagundam	0.83	0.05%			
61	Renew Surya	0.78	0.05%			
62	Chandigarh	0.67	0.04%			
63	Jhabua Power	0.65	0.04%			
64	Sasan UMPP	0.60	0.03%			
65	Raigarh Energy	0.59	0.03%			
66	Kahalgaon-II	0.55	0.03%			
67	Mouda Stg-2	0.53	0.03%			
68	Dikchu	0.52	0.03%			
69	BALCO 2	0.44	0.03%			
70	Sorang HEP,	0.43	0.02%			
71	AGBPP	0.35	0.02%			
72	Mouda Stg-1	0.31	0.02%			
73	Karcham	0.30	0.02%			
74	Arunachal	0.29	0.02%			
75	DB Power	0.23	0.01%			
76	Goa WR	0.21	0.01%			
77	Jaypee Nigrie	0.21	0.01%			
78	AD Hydro	0.20	0.01%			
79	Kahalgaon	0.19	0.01%			
80	Sainj HEP	0.19	0.01%			
81	Ostro Kannada	0.18	0.01%			
82	Ramagundam	0.17	0.01%			
83	Mizoram	0.15	0.01%			
84	Costal Energen	0.05	0.00%			
85	GMR Kamalanga	0.04	0.00%			
86	IL&FS	0.03	0.00%			
87	Lanco Budhil	0.02	0.00%			
Total Volume of top 10		1,151.67	67.19%	Total Volume of top 10	1,408.26	82.16%
Total Volume in PXs		1,714.05		Total Volume in PXs	1,714.05	

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

S. No	Delivery Date	Buy Volume By Nepal (MU)	Sell Volume by Nepal (MU)	Buy Volume By Bhutan(MU)
1	01-02-2023	7.91	0.00	3.20
2	02-02-2023	8.04	0.00	3.13
3	03-02-2023	8.48	0.00	2.97
4	04-02-2023	8.33	0.00	3.08
5	05-02-2023	8.78	0.00	3.74
6	06-02-2023	9.00	0.00	3.36
7	07-02-2023	9.08	0.00	4.02
8	08-02-2023	9.11	0.00	4.70
9	09-02-2023	9.00	0.00	3.98
10	10-02-2023	8.87	0.00	5.13
11	11-02-2023	8.77	0.00	4.91
12	12-02-2023	9.56	0.00	4.87
13	13-02-2023	8.72	0.00	4.40
14	14-02-2023	8.77	0.00	4.38
15	15-02-2023	8.42	0.00	5.08
16	16-02-2023	8.00	0.00	4.89
17	17-02-2023	7.03	0.00	5.51
18	18-02-2023	6.09	0.00	4.77
19	19-02-2023	8.16	0.00	4.70
20	20-02-2023	6.53	0.00	4.28
21	21-02-2023	6.32	0.00	4.04
22	22-02-2023	6.79	0.00	3.81
23	23-02-2023	6.86	0.00	4.02
24	24-02-2023	6.55	0.00	3.58
25	25-02-2023	6.71	0.00	5.46
26	26-02-2023	7.89	0.00	6.41
27	27-02-2023	6.40	0.00	4.59
28	28-02-2023	6.65	0.00	3.38
Total		220.82	0.00	120.40
Grand Total		341.22		

-: No transaction took place

Note: Cross Border Transactions of Electricity of 341.22 MU (i.e. 220.82 MU buy by Nepal and 120.40 MU buy by Bhutan) with Nepal happened during February, 2023 in IEX, which is included in DAM Volume of February, 2023 in IEX.

Analysis for change in trend of Final Scheduled Volume in DAM on 2nd Sunday & 3rd Monday of February, 2023 (i.e. 12th & 20th February, 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 February, 2023, it is observed that on second Sunday (12th February, 2023), FSV showed increasing trend in comparison to second Saturday (11th February, 2023), on third Monday (20th February, 2023), FSV showed decreasing trend in comparison to third Sunday (19th February, 2023).

- (i) On second Sunday (12th February, 2023), although there was decrease in purchase on power exchange by some of the States in comparison to second Saturday (11th February, 2023) by **24.29 MU** [i.e. Gujarat (15.89 MU), Haryana (5.66 MU), West Bengal (1.53 MU), Uttarakhand (0.40 MU) and Karnataka (0.31 MU), etc.], there was also increase in purchase on power exchange by some of the States by **32.37 MU** [i.e. ArcelorMittal Nippon steel (ESIL) (8.56 MU), Rajasthan (6.58 MU), Andhra Pradesh (5.42 MU), Punjab (3.18 MU) and Madhya Pradesh (1.89 MU), etc.]. This resulted in an overall increase in FSV by **8.08 MU** on Sunday (12th February, 2023) as compared to Saturday (11th February, 2023).
- (ii) On third Monday (20th February, 2023), although there was increase in purchase on power exchange by some of the States in comparison to third Sunday (19th February, 2023) by **14.88 MU** [i.e. Maharashtra (5.99 MU), Haryana (3.96 MU), J&K (2.28 MU), Odisha (1.94 MU) and Daman & Diu - Dadra & Nagar Haveli (0.25 MU), etc.], there was also decrease in purchase on power exchange by some of the States by **44.11 MU** [i.e. Telangana (17.63 MU), Rajasthan (4.93 MU), Punjab (4.10 MU), Gujarat (3.68 MU) and Madhya Pradesh (3.41 MU), etc.]. This resulted in an overall decrease in FSV by **29.23 MU** on Monday (20th February, 2023) as compared to Sunday (19th February, 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).