



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: दिसंबर, 2022 माह की मार्केट मॉनिटरिंग रिपोर्ट।

Subject: Monthly Market Monitoring Report for the month of December, 2022.

महोदय/ Sir,

दिसंबर, 2022 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 December, 2022 is enclosed herewith for kind information and perusal.

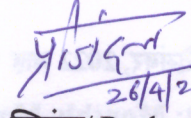
दिसंबर, 2022 माह के दौरान मार्केट के संचालन की मुख्य विशेषताएं इस प्रकार रही। Key highlights of the market operation during December, 2022 are as under:

- (i) दिसंबर, 2022 माह में देश में कुल 121,913 MU विद्युत का कारोबार किया गया, जिसमें से 57,397 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 December, 2022 a total of 121,913 MU of electricity was transacted in the country out of which 57,397 MU was transacted through ISTS, and the remaining through state controlled generating stations through Intra State Transmissions System.
- (ii) अल्पावधि मार्केट के अंतर्गत कुल 17,338 MU का कारोबार किया गया था, जिसमें से 8,800 MU पावर एक्सचेंजों के माध्यम से कारोबार किया गया और शेष द्विपक्षीय कारोबार और विचलन (deviations) के रूप में हुआ। इस प्रकार अल्पावधि कारोबार, दिसंबर, 2022 माह में ट्रेड की गई विद्युत की कुल मात्रा का 14.22 % था और 7.22 %

पावर एक्सचेंजों के माध्यम से रहा। A total of 17,338 MU was transacted under Short Term Market, out of which 8,800 MU was transacted through Power Exchanges and remaining happened as bilateral transactions & deviations. Thus, the total short term trade in December, 2022 was 14.22 % of total volume of electricity traded in December, 2022 and 7.22% 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 30.21 % रहा, जिसमें से पावर एक्सचेंजों के माध्यम से कारोबार 15.33 % रहा। If we compare these transactions with respect to the electricity supplied through ISTS, the short term transactions constitutes about 30.21 % of ISTS transactions, out of which transaction through the power exchanges constitutes 15.33 %.

भवदीय/ Yours faithfully,


26/4/2023

(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 - दिसंबर, 2022

Monthly Market Monitoring Report December, 2022



भारत सरकार/ Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority
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**दिसंबर, 2022 की मासिक मार्केट
मॉनिटरिंग रिपोर्ट का सारांश**

**Summary of Market Monitoring Report
For the month of December, 2022**

दिसंबर, 2022 माह के लिए सारांश Summary for Month: December, 2022

भारत में विद्युत एक्सचेंजों पर विद्युत के व्यापार का सारांश

Summary of Electricity Transactions on Power Exchanges in India

- दिसंबर, 2022 के दौरान विद्युत एक्सचेंजों (यानी आईईएक्स, पीएक्सआईएल और एचपीएक्स) के माध्यम से कुल **8,800 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।

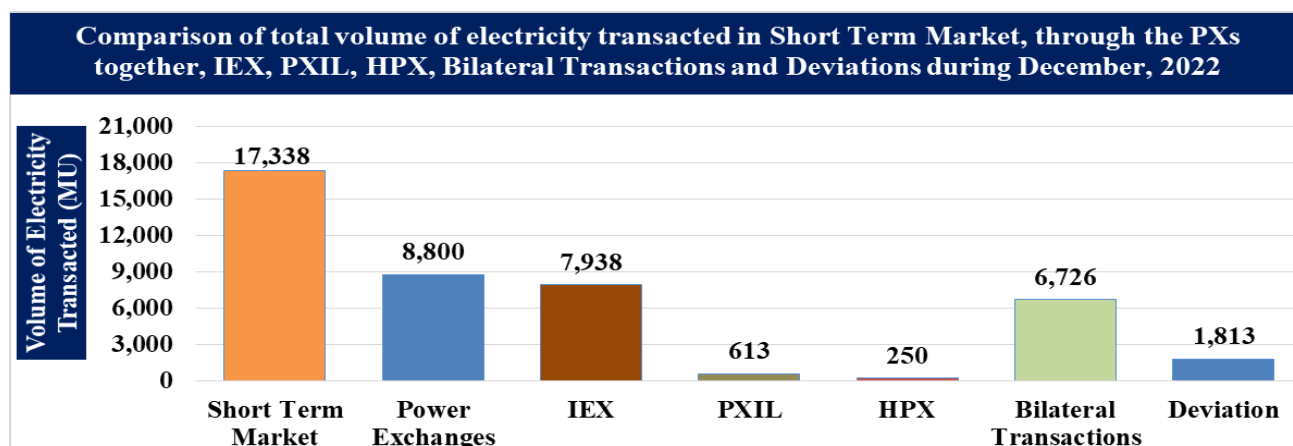
A total volume of **8,800 MU** electricity was transacted through power exchanges i.e. IEX, PXIL & HPX, during the month of December, 2022. This volume of electricity is on delivery date basis and includes transactions through DAM, GDAM, RTM, TAM and GTAM market segments.

Segment	Transactions happened in the PXs (IEX, PXIL & HPX combined)			
	FSV (MU)	Average MCP (₹/kWh)	Congestion (MU)	Real Time Curtailment (MU)
DAM	4,977	5.57	0.00	0.00
GDAM	238	5.32	0.00	0.00
RTM	1,763	5.41	0.01	0.00
TAM	1,601	5.79	0.19	13.68
GTAM	220	5.57	0.00	0.00
Total in PXs	8,800	5.57*	0.20	13.68

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

- द्विपक्षीय व्यापार के तहत कुल **6,726 MU** विद्युत का कारोबार किया गया और **1,813 MU** को विचलन के रूप में स्थानांतरित किया गया। इस प्रकार कुल **17,338 MU** विद्युत का कारोबार अल्पावधि व्यापार के रूप में किया गया था। दिसंबर, 2022 के महीने में देश में कुल **121,913 MU** विद्युत की आपूर्ति की गई थी, इस प्रकार दिसंबर, 2022 माह में कारोबार की गई विद्युत की कुल मात्रा में अल्पावधि बाजार का हिस्सा **14.22 %** था।

Under the Bilateral trade a total of **6,726 MU** of electricity was transacted and **1,813 MU** was transferred as deviation. Thus a total of **17,338 MU** of electricity was transacted as short term trade. In the month of December, 2022 a total of **121,913 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in December, 2022 was **14.22%.**



- दिसंबर, 2022 के दौरान संचरण जाम की कुल मात्रा **0.20 MU** थी, जो की विद्युत एक्सचेंजों में कारोबार की गई विद्युत की कुल मात्रा का केवल 0.002 % है और दिसंबर, 2022 के महीने के दौरान आपूर्ति की गई कुल ऊर्जा का 0.0002 % है।

The total volume of transmission congestion that happened during the month of December, 2022 was **0.20 MU** which is only 0.002 % of the total volume of electricity transacted in the power exchanges and 0.0002 % of total energy supplied during the month of December, 2022.

RTM में 1 दिन अर्थात् दिनांक 11 दिसंबर, 2022 और TAM में 1 दिन अर्थात् दिनांक 21 दिसंबर, 2022 को संचरण जाम देखा गया। जबकि DAM, GDAM और GTAM में कोई संचरण जाम नहीं देखा गया। दिसंबर, 2022 माह के महीने में रिपोर्ट की गई वास्तविक समय में विद्युत कटौती की कुल मात्रा केवल **13.68 MU** थी।

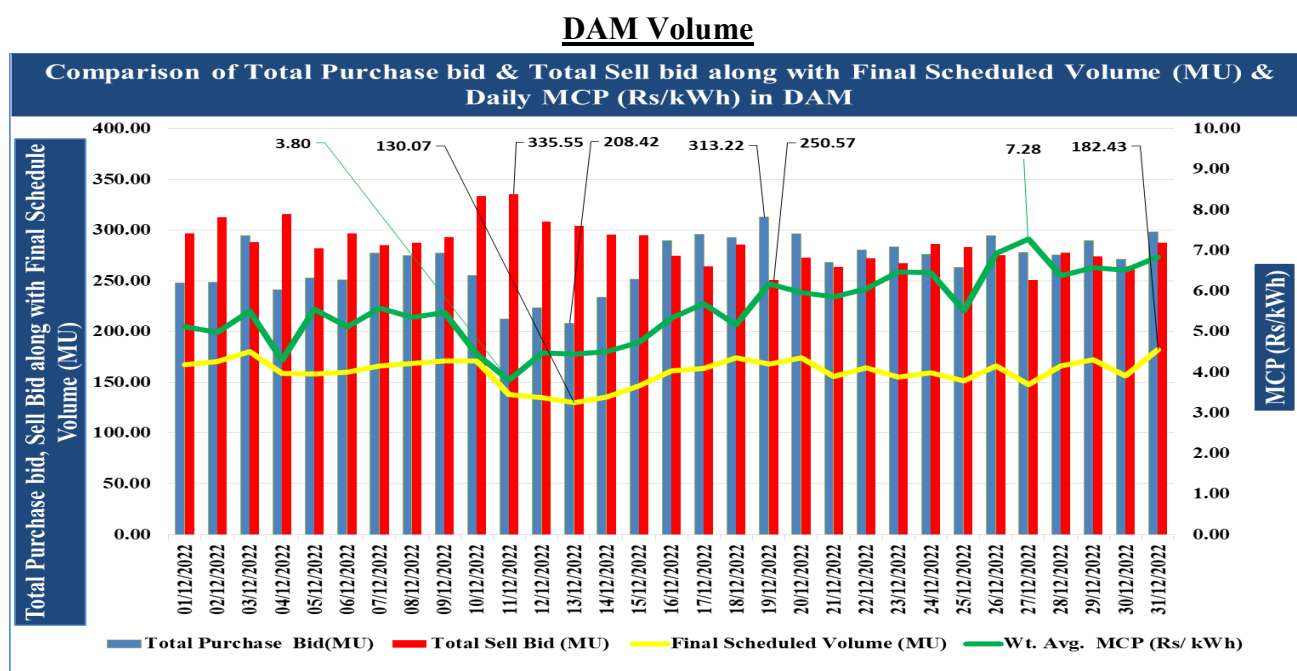
Transmission congestion observed in RTM on 1 day i.e. 11th December, 2022 and in TAM on 1 day i.e. 21th December, 2022, whereas, there was no congestion happened in DAM, GDAM & GTAM. The total volume of real time curtailment reported in the month of December, 2022 was only **13.68 MU**.

दिसंबर, 2022 माह के दौरान अंतर्राज्यीय पारेषण प्रणाली (ISTS) में निर्धारित अनुसूचित विद्युत की कुल मात्रा **57,397 MU** थी। दिसंबर, 2022 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 30.21% रहा।

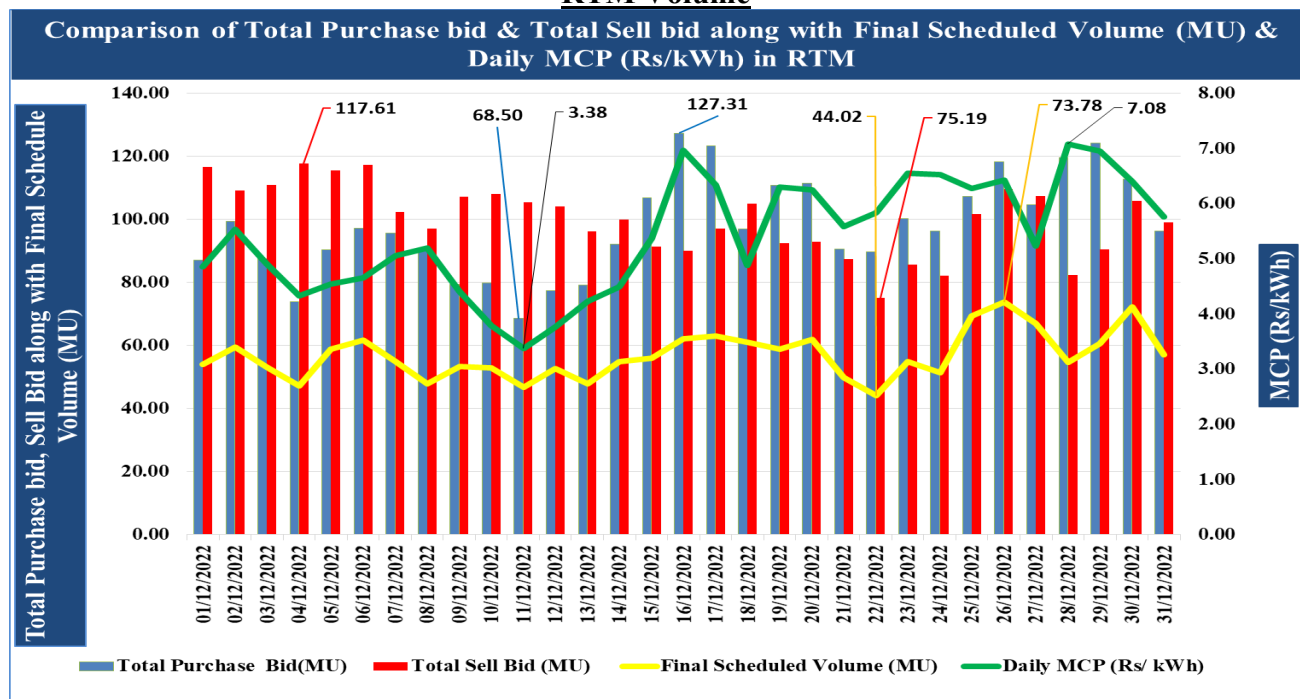
The total volume of electricity scheduled at ISTS during the month of December, 2022 was **57,397 MU**. The total volume of electricity transacted in the short term market was **30.21 %** of total volume schedule at ISTS in the month of December, 2022.

- दिसंबर, 2022 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 December, 2022 are shown in following figures:



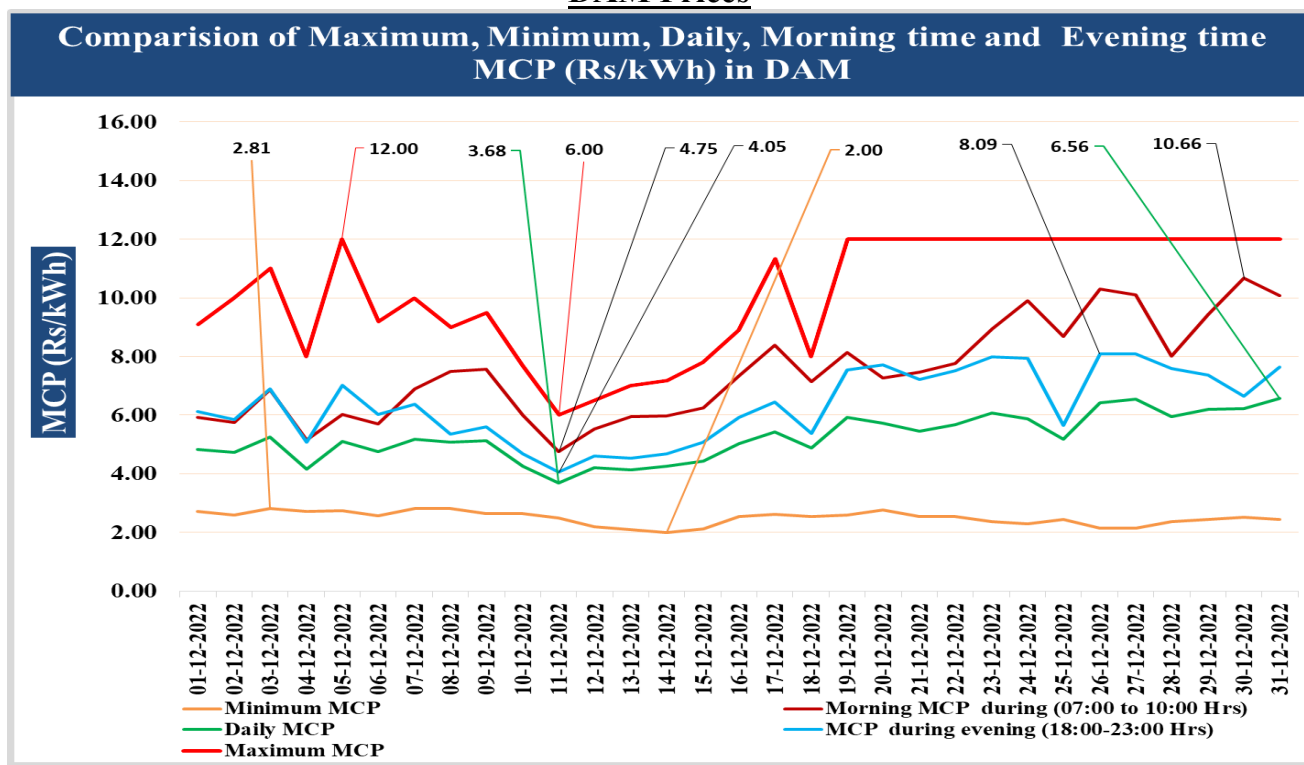
RTM Volume



- दिसंबर, 2022 माह के दौरान DAM और RTM में अधिकतम, न्यूनतम, दैनिक, सुबह और शाम के समय MCP की भिन्नता निम्नलिखित चित्रों में दिखाई गई है:

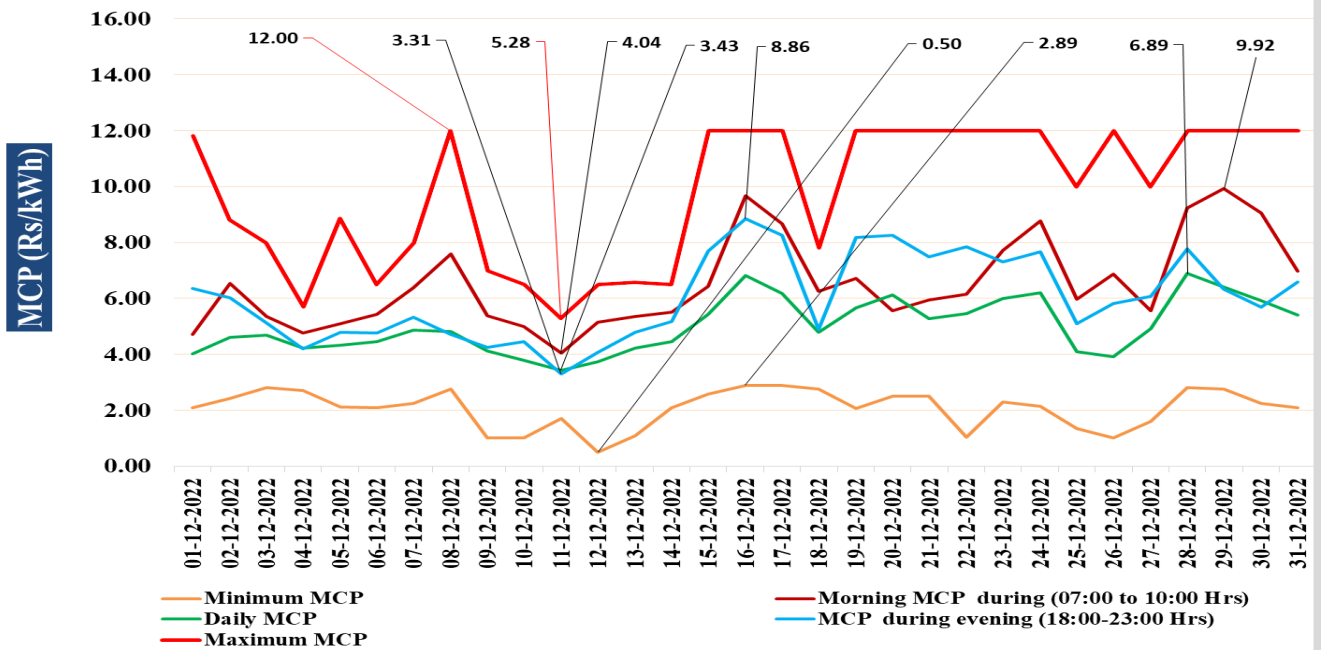
The variation of Maximum, Minimum, Daily, Morning and Evening time MCPs in DAM and RTM during the month of December, 2022 are shown in following figures:

DAM Prices



RTM Prices

Comparison of Maximum, Minimum, Daily, Morning time and Evening time MCP (Rs/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 December, 2022 was **4,977.44 MU**. The total energy supplied in the country during the month of December, 2022 was 121,913 MU. Thus, the volume of electricity transacted on the power exchanges in DAM during December, 2022 was 4.08 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month i.e. November, 2022, it was **5,083.85 MU** which was 4.61 % of the total energy supplied (110,252 MU) in the country during November, 2022. Similarly, the total volume of electricity transacted in DAM during previous year i.e. December, 2021, was **5,424.15 MU** which was 4.97 % of the total energy supplied (109,177 MU) in the country during December, 2021.
- 1.2.** The volume of electricity transacted during December, 2022 on IEX was **4,977.44 MU**. No transaction of electricity took place in PXIL and HPX, respectively. The volume of electricity transacted during November, 2022 on IEX was **5,083.85 MU**. No transaction of electricity took place in PXIL and HPX, respectively. The volume of electricity transacted on IEX and PXIL during December, 2021, were **5,423.27 MU and 0.88 MU** respectively.
- 1.3.** The DAM volume for December, 2022 in IEX is inclusive of Cross Border Transactions of Electricity with Nepal (details given at **Annexure XII**), which was **101.68 MU** (export by Nepal).
- 1.4.** The Average Market Clearing Price (MCP) on IEX during the month of December, 2022 was **₹ 5.57/kWh**, which shows an increase of 16.28 % & 57.34 % when compared with average MCP's for the month of November, 2022 and December, 2021, which were **₹ 4.79/kWh** and **₹ 3.54/kWh**, respectively. On PXIL, no transaction of electricity took place in December, 2022 and November, 2022, the average MCP's for the month December, 2021 was **₹ 4.23/kWh** respectively. No transaction of electricity took place in HPX during December, 2022 and November, 2022.
- 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 December, 2022 as compared with November, 2022 and December, 2021 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	December, 2022*	4,977.44	130.07	182.43	160.56
	November, 2022*	5,083.85	153.34	192.41	169.46
	%Change (Month over Month)	-2.09	-15.18	-5.19	-5.25
	December, 2021	5,423.27	155.6	209.33	174.94
	%Change (Year over Year)	-8.22	-16.41	-12.85	-8.22
PXIL	December, 2022	-	-	-	-
	November, 2022	-	-	-	-
	%Change (Month over Month)	NA	NA	NA	NA
	December, 2021	0.88	0.01	0.28	0.05
	%Change (Year over Year)	NA	NA	NA	NA
HPX	December, 2022	-	-	-	-
	November, 2022	-	-	-	-
	%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

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	December, 2022	3.80	7.28	5.57	2.00	12.00
	November, 2022	3.92	5.36	4.79	2.71	12.00
	%Change (Month over Month)	-3.06	35.82	16.28	-26.20	0.00
	December, 2021	2.69	4.41	3.54	1.47	20.00
	%Change (Year over Year)	41.26	65.08	57.34	36.05	-40.00
PXIL	December, 2022	-	-	-	-	-
	November, 2022	-	-	-	-	-
	%Change Month over Month)	NA	NA	NA	NA	NA
	December, 2021	2.16	5.50	4.23	1.85	5.50
	%Change (Year over Year)	NA	NA	NA	NA	NA
HPX	December, 2022	-	-	-	-	-
	November, 2022	-	-	-	-	-
	%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 152 time blocks on 5th & 19th to 31st December, 2022. 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 December, 2022.
- 1.7.** The minimum ACP of ₹ 2.00/kWh in IEX was observed in all 13 regions during the time block 01:45 - 02:00 Hrs on 14th December, 2022. As there was no congestion in transmission system, the MCP for this time-block was also ₹ 2.00/kWh. Whereas, in PXIL and HPX, no transaction of electricity took place in the month of December, 2022.

2. Real Time Market (RTM)

The total volume of electricity transacted on the power exchanges in Real Time Market in December, 2022 was **1,763.05 MU**, out of which **1,763.05 (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 December, 2022 as compared with November, 2022 and December, 2021 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	December, 2022	1763.05	44.02	73.78	56.87
	November, 2022	1406.88	34.85	58.78	46.90
	% Change (Month over Month)	25.32	26.31	25.52	21.26
	December, 2021	1,512.39	33.95	67.45	48.79
	% Change (Year over Year)	16.57	29.66	9.38	16.56
PXIL	December, 2022	-	-	-	-
	November, 2022	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA
	December, 2021	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA
HPX	December, 2022	-	-	-	-

-: 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	December, 2022	3.38	7.08	5.41	0.50	12.00
	November, 2022	4.15	5.81	4.94	2.00	12.00
	% Change (Month over Month)	-18.55	21.86	9.51	-75.00	0.00
	December, 2021	2.51	5.12	3.61	0.95	20.00
	% Change (Year over Year)	34.66	38.28	49.86	-47.37	-40.00
PXIL	December, 2022	-	-	-	-	-
	November, 2022	-	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA	NA
	December, 2021	-	-	-	-	-

Exchange	Period	Prices (₹/kWh)				
		Daily MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
	% Change (Year over Year)	NA	NA	NA	NA	NA
HPX	December, 2022	-	-	-	-	-

-: No transaction took place

NA: Not Applicable

Table-2B

3. Green Day Ahead Market (GDAM):

The total volume of electricity transacted in GDAM in the month of December, 2022 was **237.98 MU** (i.e. **237.98 MU** in IEX) at an average MCP of **₹ 5.32/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 December, 2022 are as given in Table 3A and 3B:

i) Final Scheduled Volume in IEX:

Exchange	Segment	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
IEX	Solar	December, 2022	28.92	0.43	3.45	0.93
		November, 2022	72.59	0.52	5.16	2.42
		% Change (Month over Month)	-60.16	-17.31	-33.14	-61.57
	Non Solar	December, 2022	209.06	5.21	10.27	6.74
		November, 2022	215.74	5.62	9.12	7.19
		% Change (Month over Month)	-3.10	-7.30	12.61	-6.26
	Hydro	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
PXIL	Solar + Non Solar	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
	Hydro	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		% 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)	
			Minimum	Maximum	Average	Minimum	Maximum
IEX	Solar and Non Solar	December, 2022	4.08	6.94	5.32	2.90	12.00
		November, 2022	4.08	6.08	4.90	2.71	12.00
		% Change (Month over Month)	0.00	14.14	8.57	7.01	0.00
PXIL	Solar and Non Solar	December, 2022	-	-	-	-	-
		November, 2022	-	-	-	-	-
		% 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 December, 2022 and November, 2022, respectively.
- 3.2** There was no real time curtailment in the power exchanges in Green Day Ahead Market during the month of December, 2022 and November, 2022, respectively.
- 3.3** The **top 10 sellers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of December, 2022 were **Karnataka, Andhra Pradesh, J&K, Adani Wind Energy Kutchh Five Limited, Ostro Energy Private Limited (OEPL), Madhya Pradesh, Ramagundam Floating Solar PV Station, Telangana, Simhadri FSP 15 MW and SBSR Power Cleantech Eleven Private Limited**, which constituted **97.19 %** of the market volume.
- 3.4** The **top 10 buyers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of December, 2022 were **Maharashtra, DVC, Daman & Diu - Dadra & Nagar Haveli, Delhi, Gujarat, Karnataka, Tamil Nadu, Madhya Pradesh, Kerala and Uttar Pradesh**, which constituted **86.40 %** 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 December, 2022 on delivery date basis was **1,601.22 MU**, out of which **822.47 MU** (51.37 %) was transacted on IEX, **545.79 MU** (34.09 %) was transacted on PXIL and **232.96 MU** (14.54 %) was transacted on HPX.
- 4.2. The total volume of electricity transacted on the power exchanges in Term Ahead Market in November, 2022 on delivery date basis was **1,194.89 MU**, out of which **547.33 MU** (45.81 %) was transacted on IEX, **492.13 MU** (41.18 %) was transacted on PXIL and **155.43 MU** (13.01 %) was transacted on HPX.
- 4.3. Similarly, the total volume of electricity transacted on the power exchanges in Term Ahead Market in December, 2021 on delivery date basis was **643.00 MU**, out of which, **379.77 MU** (59.06 %) was transacted on IEX and **263.23 MU** (40.94 %) was transacted on PXIL.
- 4.4. In the month of December, 2022, the total volume of electricity transacted in Anyday Single Sided Reverse Auction contract was **268.04 MU** (i.e. 94.30 MU in IEX, 173.74 MU in PXIL and no transaction took place in HPX). Whereas, **112.09 MU** was transacted under Long Duration Contract (i.e. 4.09 MU in IEX, 108.00 MU in PXIL and no transaction took place in HPX).
- 4.5. With respect to the total energy supplied during the month of December, 2022 in the country, the volume of electricity traded on the power exchanges in TAM on delivery date basis represents **1.31 %** of the total energy supplied. The same was **1.08 %** in November, 2022 and **0.59 %** in December, 2021.
- 4.6. In the month of December, 2022, there was real time curtailment of **13.68 MU** in TAM, Out of which **0.19 MU** happened under Day Ahead Contingency contract and **1.22 MU** happened under Daily-Anyday contract in IEX. Whereas, in PXIL, there was real time curtailment of **12.27 MU** under Anyday Single Sided Reverse Auction contract & in HPX, there was no real time curtailment in TAM.
- 4.7. In the month of December, 2022, there was transmission congestion of **0.19 MU** in TAM, Out of which **0.19 MU** happened under Day Ahead Contingency contract in IEX. Whereas, in PXIL and HPX, there was no transmission congestion in TAM during the month of December, 2022.
- 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 December, 2022 with November, 2022 and December, 2021 is given in Table – 4A & 4B:

(a) **Final Scheduled Volume (MU), December, 2022 vis- a- vis November, 2022 and December, 2021**

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
IEX	December, 2022	0.10	530.80	92.38	100.80	724.08
	November, 2022	-	328.93	144.00	55.20	528.13
	%Change (Month over Month)	NA	61.37	-35.85	82.61	37.10

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
	December, 2021	0.87	72.90	276.00	-	379.77
	%Change (Year over Year)	-88.51	628.12	-66.53	NA	90.66
PXIL	December, 2022	0.73	263.32	-	-	264.05
	November, 2022	1.51	170.22	-	-	171.73
	%Change (Month over Month)	-51.66	54.69	NA	NA	53.76
	December, 2021	6.05	253.58	3.60	-	263.23
	%Change (Year over Year)	-87.93	3.84	NA	NA	0.31
HPX	December, 2022	-	232.96	-	-	232.96
	November, 2022	-	155.43	-	-	155.43
	%Change (Month over Month)	NA	49.88	NA	NA	49.88

- : No transaction took place

NA: Not Applicable

Table: 4A

(b) Average MCP, December, 2022 vis- a- vis November, 2022 and December, 2021

Exchange	Period	Average MCP (₹/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	December, 2022	5.51	6.06	4.65	4.61
	November, 2022	-	4.83	4.50	4.56
	%Change (Month over Month)	NA	25.47	3.33	1.10
	December, 2021	3.36	4.66	3.36	-
	%Change Year over Year)	63.99	30.04	38.39	NA
PXIL	December, 2022	7.93	6.27	-	-
	November, 2022	5.13	5.29	4.00	-
	%Change (Month over Month)	54.58	18.53	NA	NA
	December, 2021	5.42	3.85	3.50	-
	%Change (Year over Year)	46.31	62.86	NA	NA
HPX	December, 2022	-	5.60	-	-
	November, 2022	-	4.98	-	-
	%Change (Month over Month)	NA	12.45	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 **220.41 MU** (**6.87 MU** in Solar, **187.94 MU** in Non-Solar and **25.60 MU** in Hydro), respectively.

The total volume of electricity transacted in GTAM in Day Ahead Contingency, Intraday, Daily/Anyday and Weekly contracts during December, 2022 on delivery date basis has basis 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 December, 2022 and its comparison with November, 2022 and December, 2021 has 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	December, 2022	6.67	2.09	2.30	2.22
		November, 2022	1.35	0.23	1.12	0.67
		%Change Month over Month)	394.07	808.70	105.36	231.34
		December, 2021	66.45	0.15	6.53	2.14
		%Change (Year over Year)	-89.96	1293.33	-64.78	3.74
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	4.33	0.02	1.51	0.14
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-	-
		November, 2022	10.50	0.35	0.35	0.35
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	December, 2022	0.20	0.20	0.20	0.20
		November, 2022	12.57	0.22	1.92	0.66

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)	-98.41	-9.09	-89.58	-69.70
		December, 2021	103.96	0.96	9.32	3.47
		%Change (Year over Year)	-99.81	-79.17	-97.85	-94.24
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	0.15	0.15	0.15	0.15
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/ Anyday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	7.00	1.40	1.40	1.40
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%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	December, 2022	5.02	5.33	5.14
		November, 2022	4.85	5.09	4.97
		%Change (Month over Month)	3.51	4.72	3.42
		December, 2021	3.41	4.11	3.73
		%Change (Year over Year)	47.21	29.68	37.80
	Intraday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	3.30	3.63	3.43
		%Change (Year over Year)	NA	NA	NA

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	4.50	4.50	4.50
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	December, 2022	5.87	5.87	5.87
		November, 2022	4.47	5.95	5.11
		%Change (Month over Month)	31.32	-1.34	14.87
		December, 2021	3.51	4.16	3.79
		%Change (Year over Year)	67.24	41.11	54.88
	Intraday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	3.41	3.41	3.41
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	3.50	3.50	3.50
		%Change (Year over Year)	NA	NA	NA
	Weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table-5B

- In December, 2022, there was no transmission congestion in GTAM (Solar) in IEX & PXIL and no transaction took place in HPX in GTAM (Solar).

- In December, 2022, there was no real time curtailment in GTAM (Solar) in IEX & PXIL and no transaction took place in HPX.

5.2 Non-Solar Energy Segment in GTAM

The Final Scheduled Volume and the Price of electricity transacted in GTAM in Power Exchanges during December, 2022 and its comparison with November, 2022 has 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	December, 2022	104.30	1.68	4.23	3.36
		November, 2022	25.52	0.43	1.71	0.85
		%Change (Month over Month)	308.70	290.70	147.37	295.29
		December, 2021	141.83	0.28	9.86	4.58
		%Change (Year over Year)	-26.46	500.00	-57.10	-26.64
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-	-
		November, 2022	2.16	0.07	0.07	0.07
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	0.31	0.03	0.03	0.03
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	0.65	0.03	0.03	0.03
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	December, 2022	66.94	0.43	3.25	2.16
		November, 2022	74.45	0.82	4.28	2.48
		%Change (Month over Month)	-10.09	-47.56	-24.07	-12.90
		December, 2021	125.83	0.30	9.35	4.06
		%Change (Year over Year)	-46.80	43.33	-65.24	-46.80
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	1.40	1.40	1.40	1.40

Exchange	Non- Solar Energy Contract	Period	Final Scheduled Volume (MU)			
			Total	Minimum (on a day)	Maximum (on a day)	Average (per day)
		%Change (Year over Year)	NA	NA	NA	NA
		December, 2022	-	-	-	-
		November, 2022	-	-	-	-
	Daily/Anyday	%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		December, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
HPX	Day Ahead Contingency	December, 2022	16.69	0.18	1.46	1.19
		November, 2022	-	-	-	-
		%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	December, 2022	4.61	7.30	5.72
		November, 2022	5.22	5.70	5.65
		%Change (Month over Month)	-11.69	28.07	1.24
		December, 2021	3.60	4.40	4.02
		%Change (Year over Year)	28.06	65.91	42.29
	Intraday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	5.73	5.73	5.73
		%Change (Month over Month)	NA	NA	NA
		December, 2021	4.65	4.65	4.65
		%Change (Year over Year)	NA	NA	NA
	Weekly	December, 2022	-	-	-
		November, 2022	-	-	-

Exchange	Non- Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
PXIL		%Change (Month over Month)	NA	NA	NA
		December, 2021	4.65	4.65	4.65
		%Change (Year over Year)	NA	NA	NA
		December, 2022	3.86	6.64	5.22
		November, 2022	4.08	5.29	4.74
		%Change (Month over Month)	-5.39	25.52	10.13
	Day Ahead Contingency	December, 2021	3.61	4.31	3.85
		%Change (Year over Year)	6.93	54.06	35.58
		December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	7.00	7.00	7.00
	Intraday	%Change (Year over Year)	NA	NA	NA
		December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		December, 2022	-	-	-
	Weekly	November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		December, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		December, 2022	3.85	5.43	4.83
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
HPX	Day Ahead Contingency	December, 2022	3.85	5.43	4.83
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table - 5D

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

5.3 Hydro Energy Segment in GTAM

For the Hydro Energy Segment in GTAM, Final Scheduled Volume and Daily Average MCP in the Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during December, 2022 on delivery date basis are shown in Tables 5E & 5F.

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	December, 2022	25.60	0.70	0.98	0.83
		November, 2022	36.26	0.81	1.57	1.21
		%Change (Month over Month)	-29.40	-13.58	-37.58	-31.40
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Intraday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	December, 2022	-	-	-	-
		November, 2022	-	-	-	-
		% 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	December, 2022	3.93	7.72	5.97
		November, 2022	3.98	5.64	4.98
		%Change (Month over Month)	-1.26	36.88	19.88
	Intraday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
PXIL	Intraday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	December, 2022	-	-	-
		November, 2022	-	-	-
		% Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

Table – 5F

- In December, 2022, there was no transmission congestion in GTAM (Hydro) in IEX. No transaction took place in PXIL and HPX in GTAM (Hydro).
- In December, 2022, 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 December, 2022 was **6,725.84 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and trader in the month of December, 2022 were **3,102.21 MU** and **3,623.63 MU** respectively. The details of Bilateral transactions of Electricity during December, 2022 is shown in Table Below:

December, 2022	Direct	Traders	Total Bilateral Transaction (MU)
Total	3,102.21	3,623.63	6,725.84
Minimum	0.22	0.10	-
Maximum	1,246.81	606.36	-

Table -6A

The region-wise maximum/ minimum volume of electricity transacted bilaterally during December, 2022 are given in table below:

(i) **Region-wise Volume:**

Region-wise Volume (MU)	ER		WR		NR		SR		NER	
	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader	Direct	Trader
Total	119.68	243.81	1708.1	1398.66	1141.2	1057.14	133.11	752.06	-	171.97
Minimum	9.42	0.10	45.30	36.85	0.22	38.18	20.67	46.46	-	1.45
Maximum	66.65	148.80	1246.8	606.36	626.60	536.54	112.44	332.05	-	116.79

Table-6B

6.1. The top 5 buyers on bilateral transaction through direct transactions in the month of December, 2022 were **Madhya Pradesh, Rajasthan, Maharashtra, Haryana and Uttarakhand**, which constituted **80.67 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of December, 2022 were **Gujarat, Himachal Pradesh, Maharashtra, Telangana and Andhra Pradesh** which constituted **59.64 %** of the market volume. [Annexure III]

6.2. The top 5 sellers on bilateral transaction through direct transactions in the month of December, 2022 were **Uttar Pradesh, Punjab, Telangana, AHEJ4LAHS and MB Power**, which constituted **57.11 %** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of December, 2022 were **RPREL, Punjab, JINDAL STAGE-II, Delhi and JINDAL POWER**, which constituted **49.02 %** of the market volume. [Annexure III]

6.3. Deviation Volume -The volume of Deviation observed in the month of December, 2022 in import and export were **1,770.34 MU** and **1,854.69 MU** respectively. The total volume of Deviation observed in the month of December, 2022 can be taken as **1,812.51 MU**.

6.4. A comparison of volume of electricity transacted through the Power Exchanges together in DAM, TAM, RTM, GTAM, GDAM (on delivery date basis) with Bilateral transactions and Deviation in the month of December, 2022 is shown in **Figure 1:**

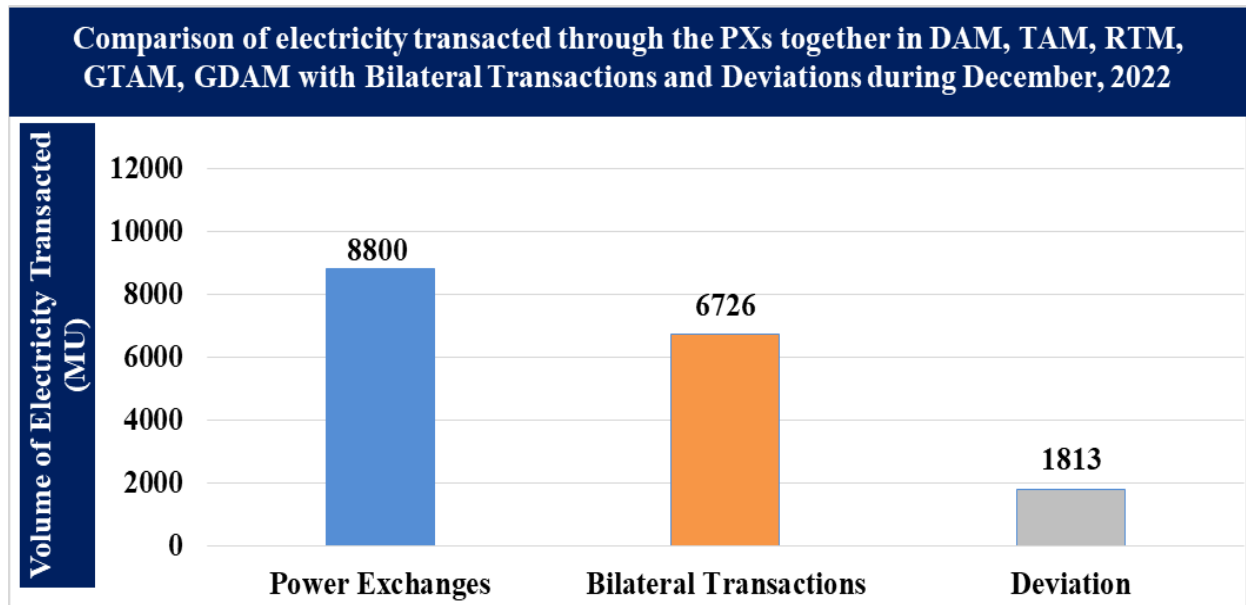
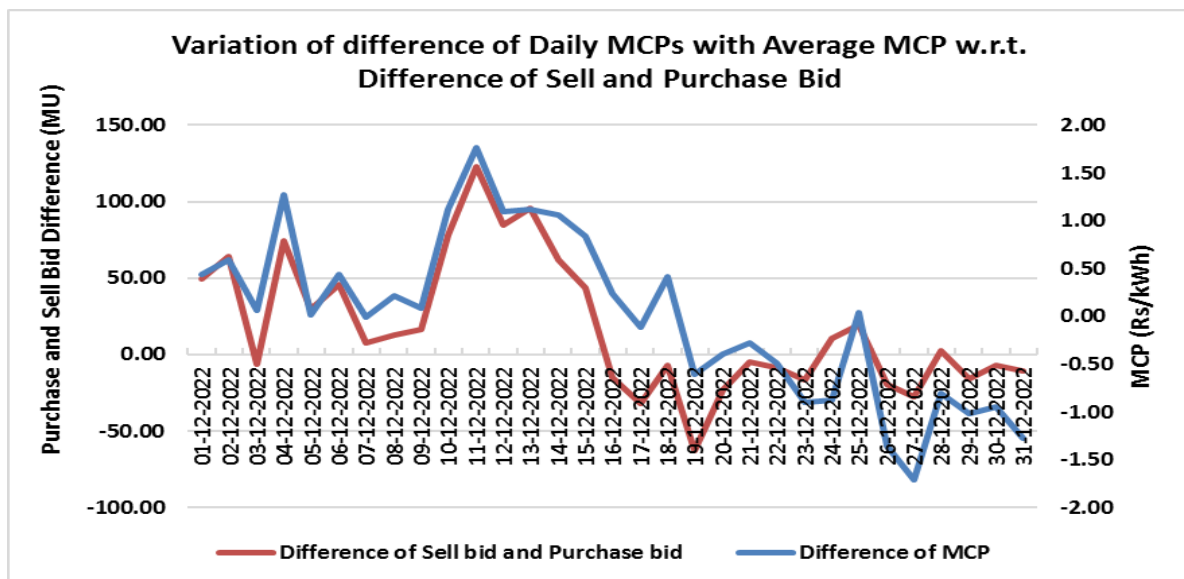


Figure -1

7. Analysis of movement of prices observed in DAM during December, 2022

A regression analysis has been carried out on the Day Ahead Market data taken from IEX website. Also, data was plotted in various graphs to observe patterns for each day of the December, 2022 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 significant variables were the Peak Demand, Total Purchase Bid, Total Sell Bid, Hydro Generation, Wind Generation and Solar Generation whereas all the other variables were found to be insignificant. Further, the regression analysis revealed that the elasticity of the Daily Avg. MCP with respect to Solar Generation was **0.92** which signifies that the most important variable which determines Daily Avg. MCP market clearing price is the Solar Generation in the month of December, 2022.
- 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**

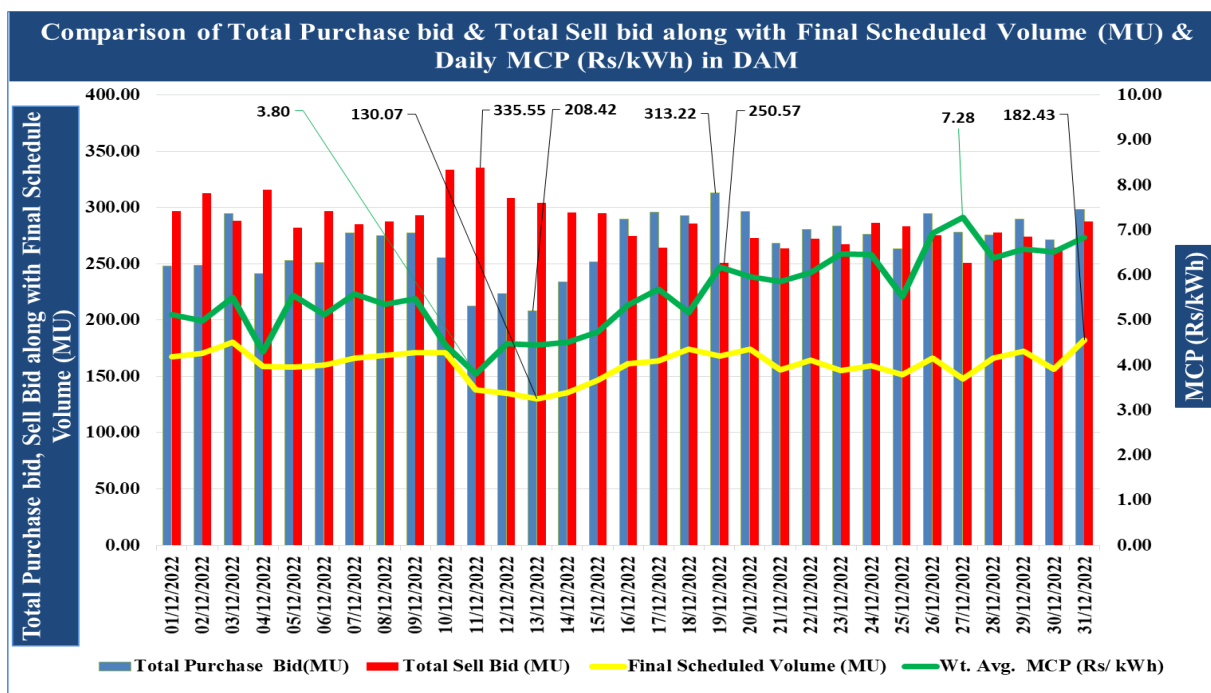


Figure - 2

- 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 December, 2022, it is observed that on third Sunday (18th December, 2022), FSV showed increasing trend in comparison to third Saturday (17th December, 2022). 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**

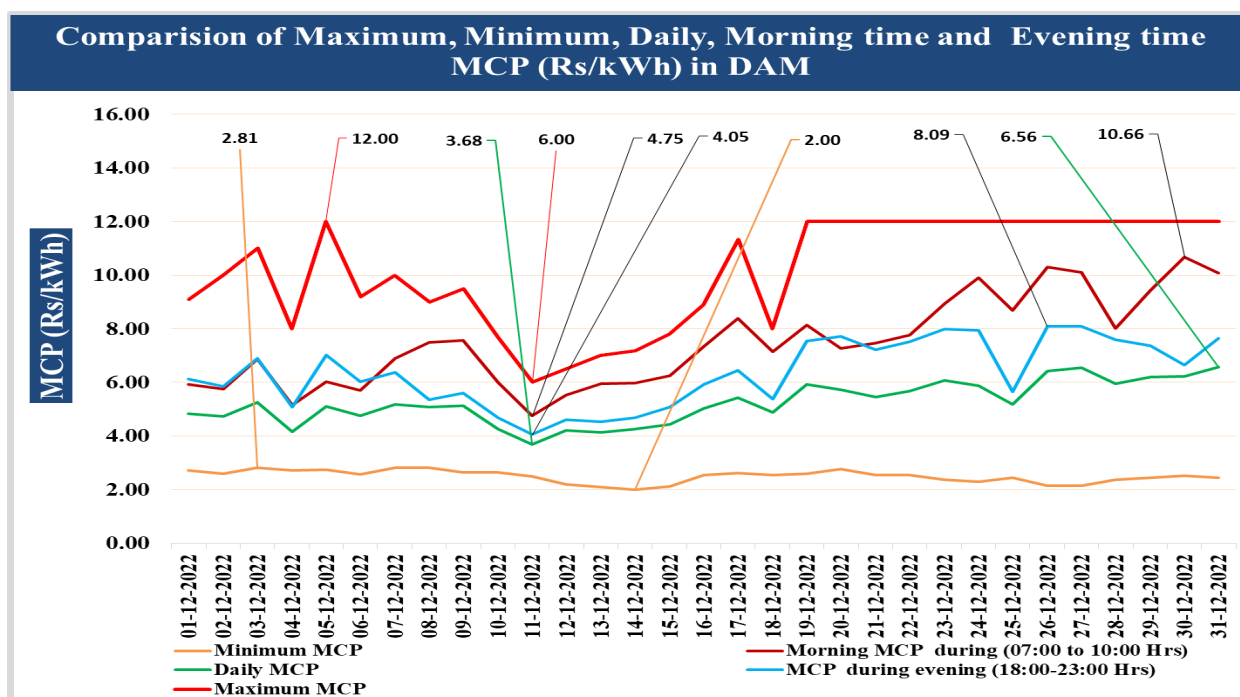


Figure-3

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

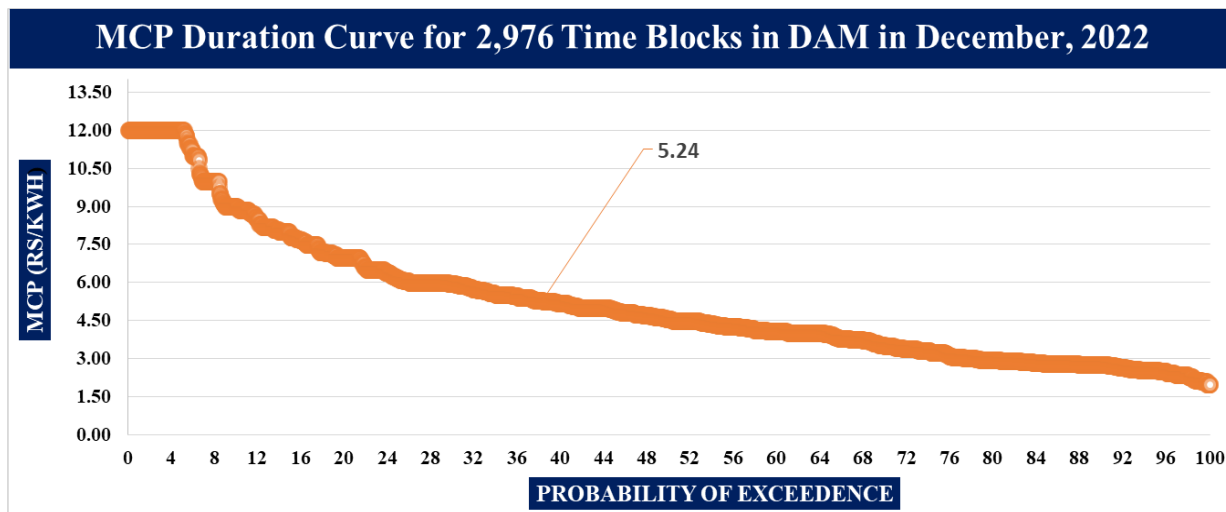


Figure – 4

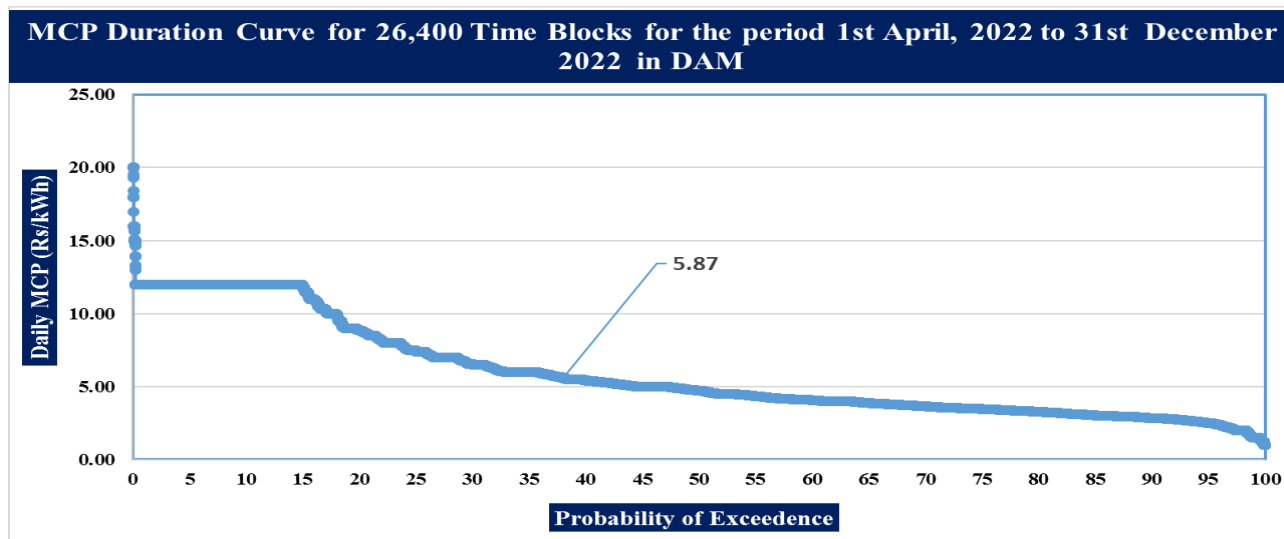


Figure-5

7.8. It can be seen in figure 4 above that in the MCP duration curve of December, 2022, for 38.00 % of the time MCP was above average MCP of the month (i.e. **Rs. 5.24/kWh**) and almost 62.00 % 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 December, 2022 (figure-5), that for 38.00 % of the time the MCP was above the average MCP for the period (i.e. **Rs. 5.87/kWh**) and for 62.00 % 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 December, 2022, the maximum FSV occurred mostly during the **time period 15-16 Hrs** (on 15 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 07-08 Hrs** (on 16 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 2-4 Hrs** (on 8 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 2-4 Hrs** (on 26 no. of days). [Annexure VI]
- 7.11.** In the month of December, 2022, there was **no** congestion in IEX and no transaction of electricity took place in PXIL & HPX during December, 2022. Further, in the month of November, 2022 and December, 2021, also there was no congestion in Power Exchanges.
- 7.12.** In the month of December, 2022, there was **no** real time curtailment in IEX and no transaction of electricity took place in PXIL & HPX during December, 2022. Further, in the month of November, 2022 and December, 2021 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 December, 2022 were **Uttar Pradesh, Bihar, West Bengal, Chhattisgarh, Jaypee Nigrie, Raipur Energen, JITPL, Jindal Power Ltd. Stg-II, Delhi and Madhya Pradesh**, which constituted **71.58 %** 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 December, 2022 were **Gujarat, Andhra Pradesh, Rajasthan, Maharashtra, J&K, Punjab, Telangana, Tamil Nadu, Uttar Pradesh and ArcelorMittal Nippon steel (ESIL)**, which constituted **84.08 %** of the market volume. [Annexure VII]
- 7.15.** The total volume of electricity purchased by Discoms/Licensees in DAM in the month of December, 2022 was **4,744.41 MU**, which constituted **95.32 %** 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 December, 2022 was **3,516.05 MU**, which constituted **70.64 %** of total volume of electricity sold on the power exchanges.

8. Analysis of movement of prices observed in Real Time Market (RTM) transactions in December, 2022

- 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 were the Peak Demand, Total Purchase Bid, Total Sell Bid, Coal Generation, Hydro Generation, Wind Generation and Solar Generation, whereas all the other variables were found to be insignificant. Further, the regression analysis revealed that the elasticity of the Daily Avg. MCP with respect to Total Sell Bid was **0.99** which signifies that the most important variable which determines Daily Avg. MCP is the total sell bid in the month of December, 2022.
- 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:

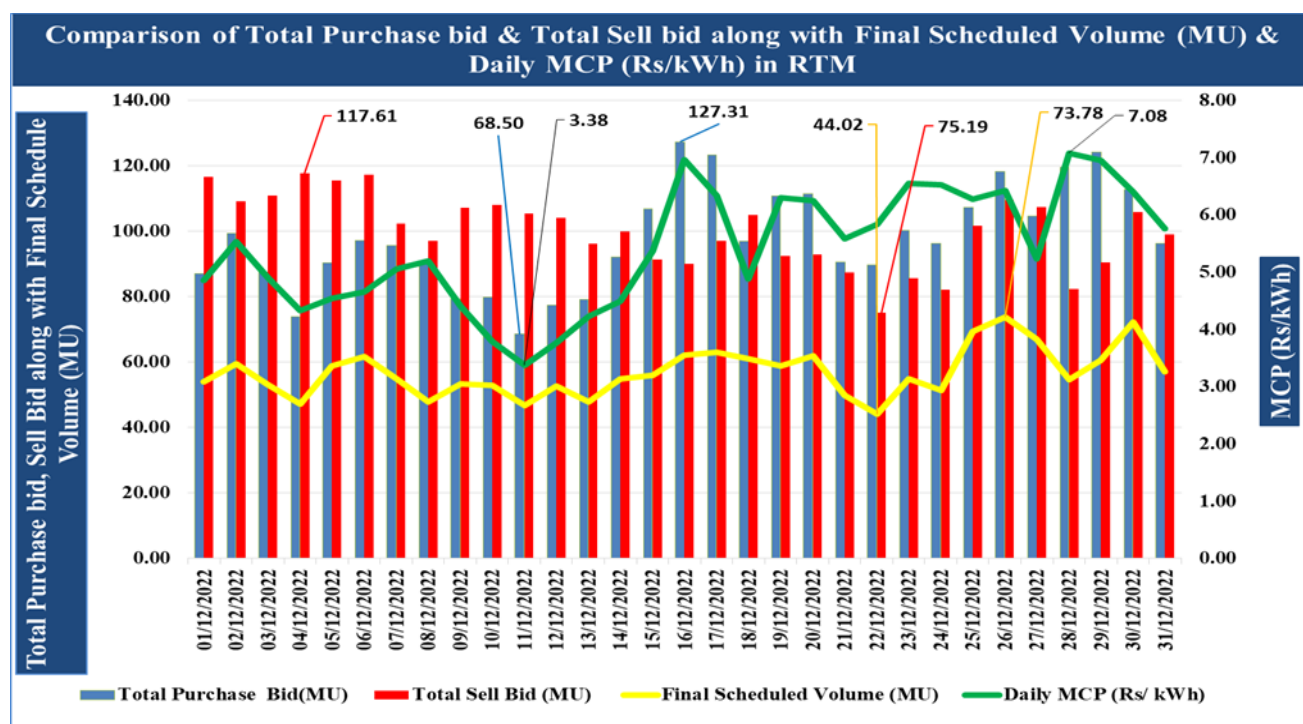


Figure-6

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

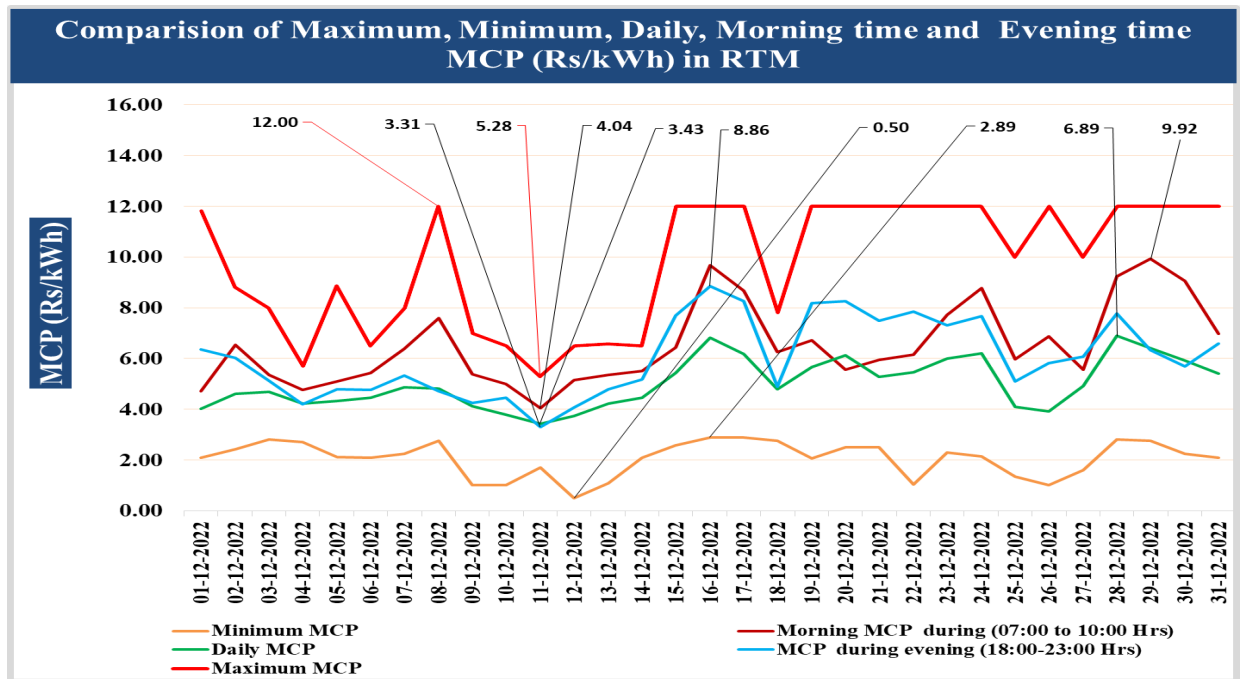


Figure-7

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

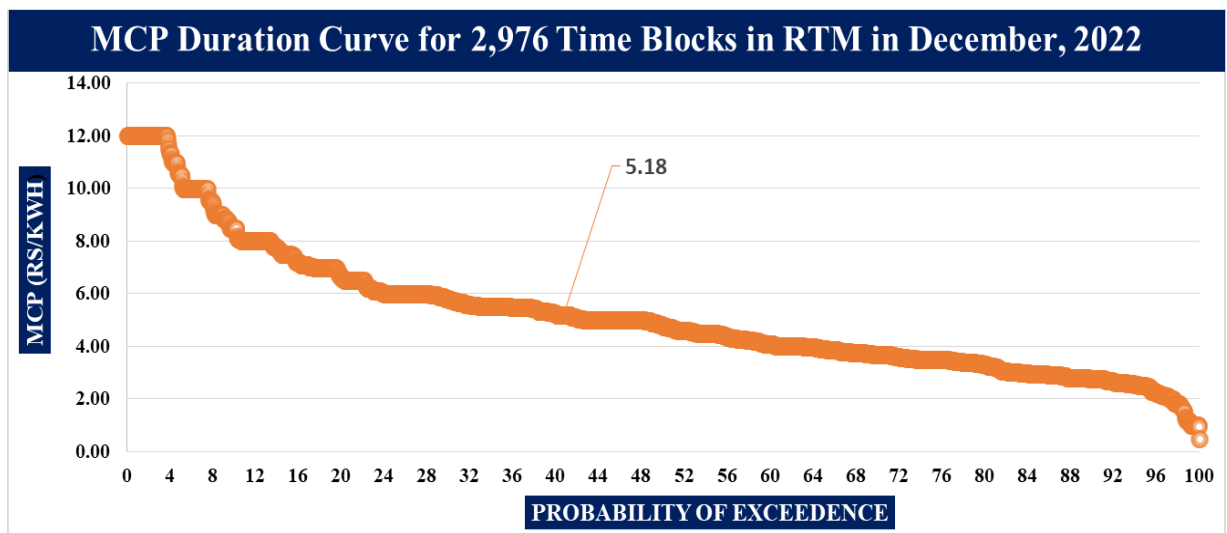


Figure-8

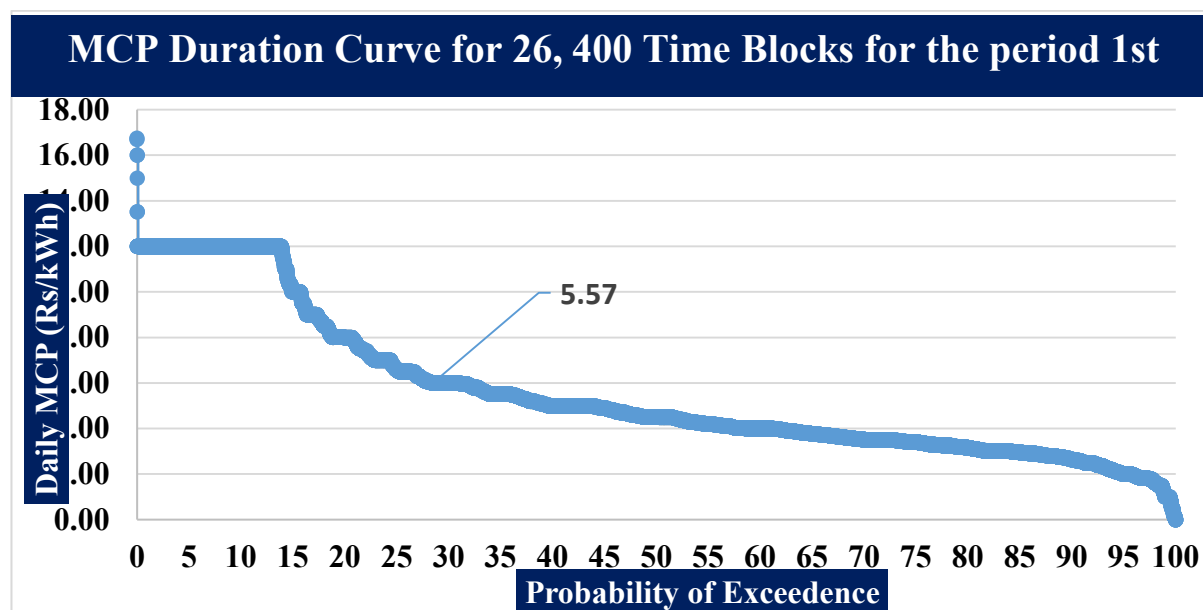


Figure-9

- 8.6.** It can be seen in figure 8 above that in the MCP duration curve of December, 2022, for 41.00 % of the time the MCP was above the average MCP of the month (i.e. ₹ 5.18/kWh) and for 59.00 % 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 31st December, 2022 (figure 9) that, for 36.00 % of the time the Daily Avg. MCP was above the average MCP for the period (i.e. ₹ 5.57/kWh) and for 64.00 % of the time the Daily Avg. MCP was below the average MCP for the period.
- 8.7.** In December, 2022, the maximum FSV occurred mostly during the **time period 07-08 Hrs** (on 10 no. of days). Whereas, the maximum MCP also occurred mostly during the **time period 16-18 Hrs** (on 11 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 4-6 Hrs** (on 8 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 03-04 Hrs** (on 13 no. of days).[Annexure X]
- 8.8.** There was **no** real time curtailment in IEX in Real Time Market (RTM) during December, 2022 and no transaction happened in PXIL and HPX. Further, in November, 2022 **no** real time curtailment occurred in IEX, whereas, no transaction happened in PXIL and HPX. Similarly, in December, 2021, there was no real time curtailment in IEX & PXIL.
- 8.9.** In the month of December, 2022 there was **0.01 MU** congestion in IEX and no transaction happened in PXIL & HPX. Further, in the month of November, 2022, there was **0.07 MU** congestion in the transmission system in IEX and no transaction happened in PXIL & HPX. In the month of December, 2021, there was **0.06 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 December, 2022 were **Bihar, West Bengal, Uttar Pradesh, Madhya Pradesh, Odisha, MB Power, Chhattisgarh, Delhi, Himachal Pradesh and Tamil Nadu**, which constituted **70.79 %** of the market volume. [Annexure XI]

8.11. The **top 10 buyers** on the power exchanges in **Rajasthan, Telangana, Maharashtra, J&K, Gujarat, Andhra Pradesh, Punjab Tamil Nadu, Haryana and Uttar Pradesh**, which constituted **81.09 %** of the market volume. [Annexure XI]

8.12. The total volume of electricity purchased by Discoms/Licensees in RTM in the month of December, 2022 was **1,723.81 MU**, which constituted **97.77 %** 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 December, 2022 was **1,445.94 MU**, which constituted **82.01 %** 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 December, 2022 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
Total April, 2022 – December, 2022		46,261.30	190.03	5.65	6.09	8.86	0.00

Annexure-II

Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2022 to December, 2022 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
Total April, 2022 - December, 2022		7,050.96	6,500.27	1,058.56	14,609.79

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

(i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Madhya Pradesh	1,246.81	40.19%	Gujarat	606.36	16.73%
Rajasthan	626.60	20.20%	Himachal Pradesh	536.54	14.81%
Maharashtra	324.43	10.46%	Maharashtra	460.28	12.70%
Haryana	190.45	6.14%	Telangana	332.05	9.16%
Uttarakhand	114.24	3.68%	Andhra Pradesh	225.76	6.23%
Total Volume	2,502.53	80.67%	Total Volume	2,160.99	59.64%
Total Volume in Bilateral	3,102.21		Total Volume in Bilateral	3,623.63	

(ii) Top five Sellers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Uttar Pradesh	707.46	22.81%	RPREL	491.92	13.58%
Punjab	608.14	19.60 %	Punjab	384.40	10.61%
Telangana	215.86	6.96%	JINDAL STAGE-II	359.87	9.93%
AHEJ4LAHS	124.85	4.02%	Delhi	307.11	8.48%
MB Power	115.32	3.72%	JINDAL POWER	233.02	6.43%
Total Volume	1,771.63	57.11%	Total Volume	1,776.32	49.02%
Total Volume in Bilateral	3,102.21		Total Volume in Bilateral	3,623.47	

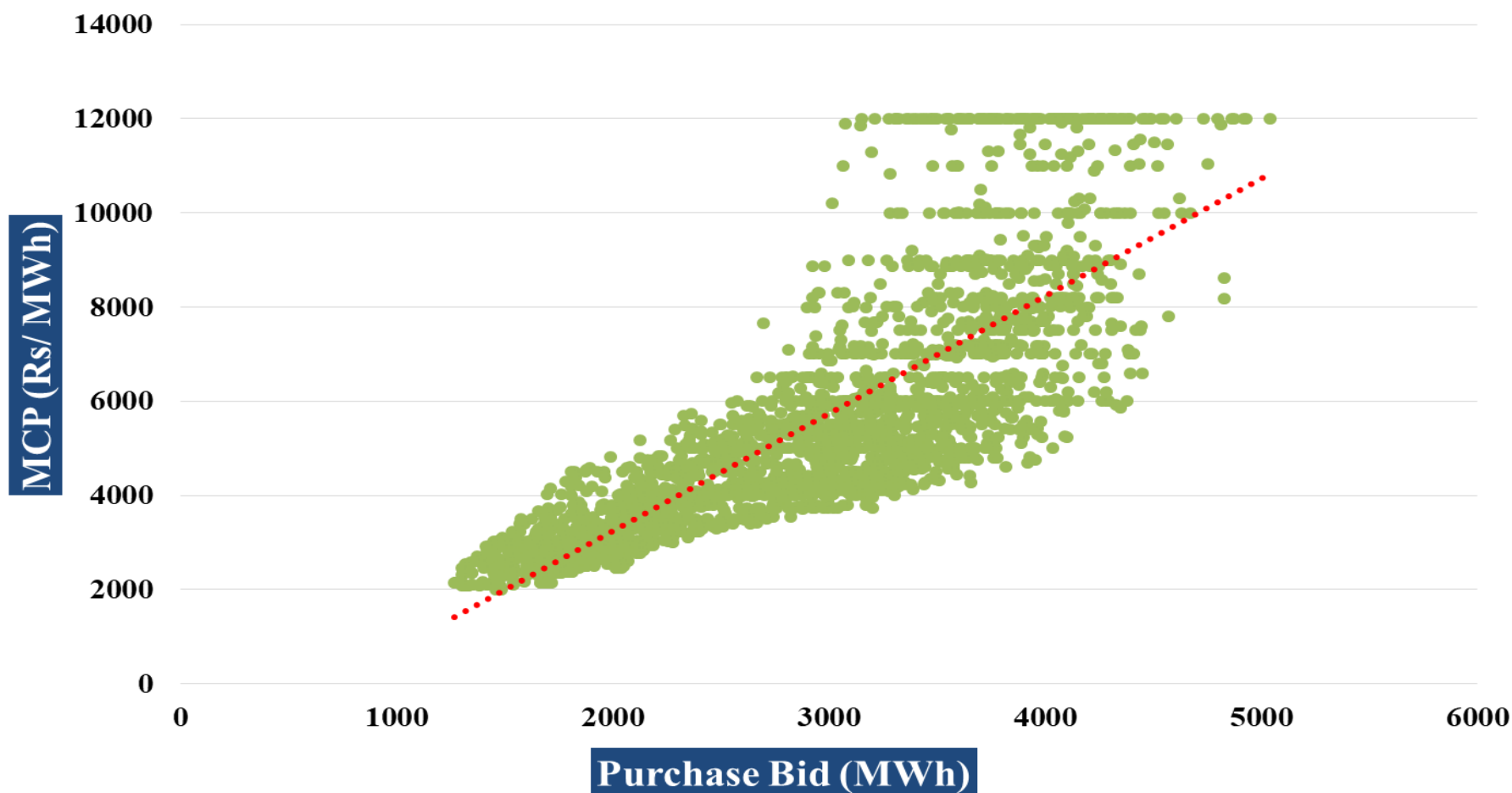
Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in DAM

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)
01-12-2022	5.91	4.91	6.13	3.00	9.10	2.71	4.83	167.14
02-12-2022	5.74	4.90	5.84	3.02	10.00	2.59	4.73	170.35
03-12-2022	6.87	4.93	6.90	3.21	11.00	2.81	5.25	180.47
04-12-2022	5.15	4.03	5.08	2.93	8.00	2.71	4.16	159.13
05-12-2022	6.03	5.03	7.02	3.00	12.00	2.75	5.10	158.10
06-12-2022	5.70	4.97	6.02	2.95	9.20	2.57	4.77	160.21
07-12-2022	6.90	5.24	6.38	3.09	10.00	2.81	5.18	165.92
08-12-2022	7.49	5.38	5.36	3.12	9.00	2.81	5.07	168.51
09-12-2022	7.56	5.40	5.61	3.03	9.50	2.65	5.12	171.32
10-12-2022	6.01	4.33	4.67	2.86	7.70	2.65	4.27	170.95
11-12-2022	4.75	3.75	4.05	2.70	6.00	2.50	3.68	137.73
12-12-2022	5.52	4.79	4.60	2.54	6.52	2.18	4.21	134.93
13-12-2022	5.94	4.49	4.54	2.43	7.00	2.09	4.14	130.07
14-12-2022	5.96	4.72	4.69	2.43	7.18	2.00	4.25	135.55
15-12-2022	6.24	4.58	5.09	2.64	7.81	2.11	4.42	146.79
16-12-2022	7.34	5.08	5.92	2.92	8.90	2.54	5.04	161.47
17-12-2022	8.38	5.23	6.44	3.10	11.33	2.62	5.43	164.00
18-12-2022	7.14	4.97	5.37	3.10	8.00	2.54	4.89	174.48
19-12-2022	8.14	6.07	7.54	3.13	12.00	2.60	5.93	168.16
20-12-2022	7.27	5.74	7.72	3.15	12.00	2.77	5.73	174.14
21-12-2022	7.47	5.26	7.22	2.97	12.00	2.54	5.45	155.90
22-12-2022	7.77	5.65	7.53	2.95	12.00	2.54	5.68	164.18
23-12-2022	8.92	6.08	7.98	2.79	12.00	2.36	6.07	155.04
24-12-2022	9.91	4.98	7.93	2.74	12.00	2.30	5.89	159.52
25-12-2022	8.68	5.12	5.64	2.80	12.00	2.45	5.17	151.78
26-12-2022	10.31	6.60	8.09	2.63	12.00	2.15	6.43	166.47
27-12-2022	10.11	7.16	8.08	2.59	12.00	2.14	6.55	147.85
28-12-2022	8.02	6.67	7.60	2.66	12.00	2.36	5.96	166.13
29-12-2022	9.44	6.67	7.36	2.85	12.00	2.45	6.19	172.30
30-12-2022	10.66	6.65	6.64	2.89	12.00	2.51	6.22	156.44
31-12-2022	10.08	7.36	7.64	2.84	12.00	2.45	6.56	182.43
Maximum	10.66	7.36	8.09	3.21	12.00	2.81	6.56	182.43
Minimum	4.75	3.75	4.05	2.43	6.00	2.00	3.68	130.07
Average	7.47	5.38	6.34	2.87	10.14	2.49	5.24	160.56

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 December, 2022 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
01-12-2022	17:00 - 17:15	2.59	17:45 - 18:00	9.10	23:15 - 23:30	1.22	02:45 - 03:00	2.71
02-12-2022	17:30 - 17:45	2.59	18:30 - 18:45	10.00	03:45 - 04:00	1.26	03:30 - 03:45	2.59
03-12-2022	17:00 - 17:15	2.46	18:30 - 18:45	11.00	03:45 - 04:00	1.40	03:45 - 04:00	2.81
04-12-2022	17:00 - 17:15	2.41	19:30 - 19:45	8.00	03:45 - 04:00	1.25	03:00 - 03:15	2.71
05-12-2022	17:00 - 17:15	2.67	18:30 - 18:45	12.00	02:00 - 02:15	1.06	02:00 - 02:15	2.75
06-12-2022	17:00 - 17:15	2.66	18:15 - 18:30	9.20	02:00 - 02:15	1.11	03:00 - 03:15	2.57
07-12-2022	16:15 - 16:30	2.54	18:30 - 18:45	10.00	23:30 - 23:45	1.09	02:30 - 02:45	2.81
08-12-2022	15:15 - 15:30	2.45	07:30 - 07:45	9.00	00:00 - 00:15	1.21	03:00 - 03:15	2.81
09-12-2022	15:45 - 16:00	2.66	07:30 - 07:45	9.50	02:15 - 02:30	1.13	03:00 - 03:15	2.65
10-12-2022	15:30 - 15:45	2.42	07:45 - 08:00	7.70	22:00 - 22:15	1.21	03:00 - 03:15	2.65
11-12-2022	17:00 - 17:15	2.15	08:15 - 08:30	6.00	22:00 - 22:15	1.06	03:00 - 03:15	2.50
12-12-2022	15:15 - 15:30	2.06	18:15 - 18:30	6.52	00:00 - 00:15	0.97	03:00 - 03:15	2.18
13-12-2022	18:00 - 18:15	1.98	07:30 - 07:45	7.00	22:00 - 22:15	0.84	02:15 - 02:30	2.09
14-12-2022	15:45 - 16:00	2.05	07:45 - 08:00	7.18	22:00 - 22:15	0.87	03:45 - 04:00	2.00
15-12-2022	17:15 - 17:30	2.29	07:30 - 07:45	7.81	00:00 - 00:15	0.93	02:30 - 02:45	2.11
16-12-2022	15:45 - 16:00	2.41	07:30 - 07:45	8.90	01:30 - 01:45	1.16	03:15 - 03:30	2.54
17-12-2022	15:30 - 15:45	2.30	18:15 - 18:30	11.33	23:30 - 23:45	1.13	02:45 - 03:00	2.62
18-12-2022	15:45 - 16:00	2.58	07:45 - 08:00	8.00	03:45 - 04:00	1.23	03:00 - 03:15	2.54
19-12-2022	15:30 - 15:45	2.61	16:45 - 17:00	12.00	04:15 - 04:30	1.28	03:30 - 03:45	2.60
20-12-2022	15:45 - 16:00	2.60	17:30 - 17:45	12.00	23:00 - 23:15	1.30	03:30 - 03:45	2.77
21-12-2022	06:45 - 07:00	2.36	17:45 - 18:00	12.00	23:30 - 23:45	1.08	03:00 - 03:15	2.54
22-12-2022	06:45 - 07:00	2.48	17:45 - 18:00	12.00	02:15 - 02:30	1.18	03:45 - 04:00	2.54
23-12-2022	06:30 - 06:45	2.40	16:30 - 16:45	12.00	23:30 - 23:45	1.10	02:45 - 03:00	2.36
24-12-2022	07:00 - 07:15	2.49	07:00 - 07:15	12.00	22:45 - 23:00	0.99	01:45 - 02:00	2.30
25-12-2022	15:45 - 16:00	2.32	07:45 - 08:00	12.00	22:30 - 22:45	0.95	03:45 - 04:00	2.45
26-12-2022	07:00 - 07:15	2.44	07:00 - 07:15	12.00	23:00 - 23:15	1.10	02:45 - 03:00	2.15
27-12-2022	15:30 - 15:45	2.30	07:15 - 07:30	12.00	22:45 - 23:00	0.84	03:15 - 03:30	2.14
28-12-2022	15:15 - 15:30	2.50	07:45 - 08:00	12.00	23:30 - 23:45	1.10	02:45 - 03:00	2.36
29-12-2022	15:30 - 15:45	2.46	07:45 - 08:00	12.00	23:00 - 23:15	1.12	02:45 - 03:00	2.45
30-12-2022	06:30 - 06:45	2.24	07:00 - 07:15	12.00	23:15 - 23:30	1.19	03:30 - 03:45	2.51
31-12-2022	15:30 - 15:45	2.72	07:30 - 07:45	12.00	22:00 - 22:15	1.35	02:45 - 03:00	2.45

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

Annexure-VII

Sellers and Buyers in Day Ahead Market (DAM) in the month of December, 2022						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Uttar Pradesh	904.97	18.18%	Gujarat	978.08	19.65%
2	Bihar	744.19	14.95%	Andhra Pradesh	612.47	12.30%
3	West Bengal	685.88	13.78%	Rajasthan	515.88	10.36%
4	Chhattisgarh	275.80	5.54%	Maharashtra	440.83	8.86%
5	Jaypee Nigrie	200.99	4.04%	J&K	425.92	8.56%
6	Raipur Energen	183.44	3.69%	Punjab	301.46	6.06%
7	JITPL	164.72	3.31%	Telangana	280.85	5.64%
8	Jindal Power Ltd.	152.26	3.06%	Tamil Nadu	264.42	5.31%
9	Delhi	128.11	2.57%	Uttar Pradesh	220.36	4.43%
10	Madhya Pradesh	122.47	2.46%	ArcelorMittal Nippon	144.52	2.90%
11	Odisha	116.98	2.35%	Uttarakhand	130.72	2.63%
12	Sembcorp Gayatri	116.80	2.35%	Daman & Diu - Dadra	122.67	2.46%
13	Maharashtra	81.42	1.64%	Haryana	106.22	2.13%
14	DB Power	77.60	1.56%	Karnataka	83.67	1.68%
15	ACBIL	74.93	1.51%	West Bengal	57.24	1.15%
16	Jindal Power	65.61	1.32%	NVVN (SNA) - NEA	54.59	1.10%
17	Assam	62.40	1.25%	Odisha	47.15	0.95%
18	Mahan Energy	61.49	1.24%	Assam	43.27	0.87%
19	Karnataka	57.61	1.16%	Kerala	34.25	0.69%
20	Telangana	47.09	0.95%	NEA-NR	23.83	0.48%
21	MB Power	45.74	0.92%	Delhi	20.13	0.40%
22	Tamil Nadu	40.73	0.82%	Chhattisgarh	17.91	0.36%
23	Sembcorp Energy	38.58	0.78%	Madhya Pradesh	16.86	0.34%
24	RKM Power	38.12	0.77%	Jharkhand	7.32	0.15%
25	Gujarat	31.25	0.63%	Goa SR	7.20	0.14%
26	Andhra Pradesh	30.51	0.61%	Sikkim	5.09	0.10%
27	Maruti Clean Coal	29.02	0.58%	Goa WR	3.55	0.07%
28	Tripura	25.69	0.52%	Himachal Pradesh	2.60	0.05%
29	Jindal Steel	24.11	0.48%	Meghalaya	2.56	0.05%
30	NVVN (SNA) - NEA	23.25	0.47%	Chandigarh	2.09	0.04%
31	DVC	20.51	0.41%	Railways	1.67	0.03%
32	Chandigarh	20.01	0.40%	Bihar	0.77	0.02%
33	Goa WR	19.05	0.38%	BHARAT	0.75	0.02%
34	Himachal Pradesh	18.51	0.37%	BALCO 2	0.46	0.01%
35	Kerala	17.83	0.36%	DVC	0.06	0.00%
36	Haryana	17.66	0.35%			
37	SKS Power	16.40	0.33%			
38	Teesta -3	15.76	0.32%			
39	Kameng HEP	14.49	0.29%			
40	Adhunik Power	14.37	0.29%			
41	NPCIL KAKRAPAR	13.82	0.28%			
42	Meghalaya	12.52	0.25%			
43	GMR Warora	9.96	0.20%			
44	Adani Green Energy	9.47	0.19%			
45	J&K	9.30	0.19%			
46	Talcher Stg-2	8.40	0.17%			

47	Sainj HEP	8.40	0.17%			
48	Jhabua Power	7.55	0.15%			
49	Rajasthan	6.74	0.14%			
50	Karcham Wangtoo	5.82	0.12%			
51	Raigarh Energy Ltd.	5.77	0.12%			
52	Jharkhand	4.82	0.10%			
53	Nagaland	4.52	0.09%			
54	Arunachal Pradesh	3.83	0.08%			
55	Shree Cement	3.51	0.07%			
56	AD Hydro	3.42	0.07%			
57	Ramagundam Stg-1	3.05	0.06%			
58	Coastal Gujrat	2.91	0.06%			
59	PARBATI II HE	2.70	0.05%			
60	Ramagundam Stg-3	2.62	0.05%			
61	Mizoram	2.32	0.05%			
62	Bongaigaon	2.11	0.04%			
63	Simhadri Stg-2	2.04	0.04%			
64	Ostro Energy Private	1.94	0.04%			
65	Chuzachen	1.53	0.03%			
66	Uttarakhand	1.42	0.03%			
67	BALCO 2	1.38	0.03%			
68	Punjab	1.23	0.02%			
69	IL&FS	1.11	0.02%			
70	Lanco Budhil	0.89	0.02%			
71	Dikchu	0.85	0.02%			
72	Sikkim	0.67	0.01%			
73	Adani Wind Energy	0.63	0.01%			
74	Talcher	0.63	0.01%			
75	Jorethang	0.55	0.01%			
76	Tashiding HEP	0.53	0.01%			
77	Dhariwal	0.52	0.01%			
78	Palatana	0.48	0.01%			
79	Farakka	0.37	0.01%			
80	Kahalgaon	0.22	0.00%			
81	NTPC Kudgi	0.20	0.00%			
82	Renew Surya Ravi	0.11	0.00%			
83	Singoli Bhagwati	0.06	0.00%			
84	GMR Kamalanga	0.03	0.00%			
Total Volume of top 10		3,562.84	71.58%	Total Volume of top 10	4,184.7	84.08%
Total Volume in PXs		4,977.44		Total Volume in PXs	4,977.4	

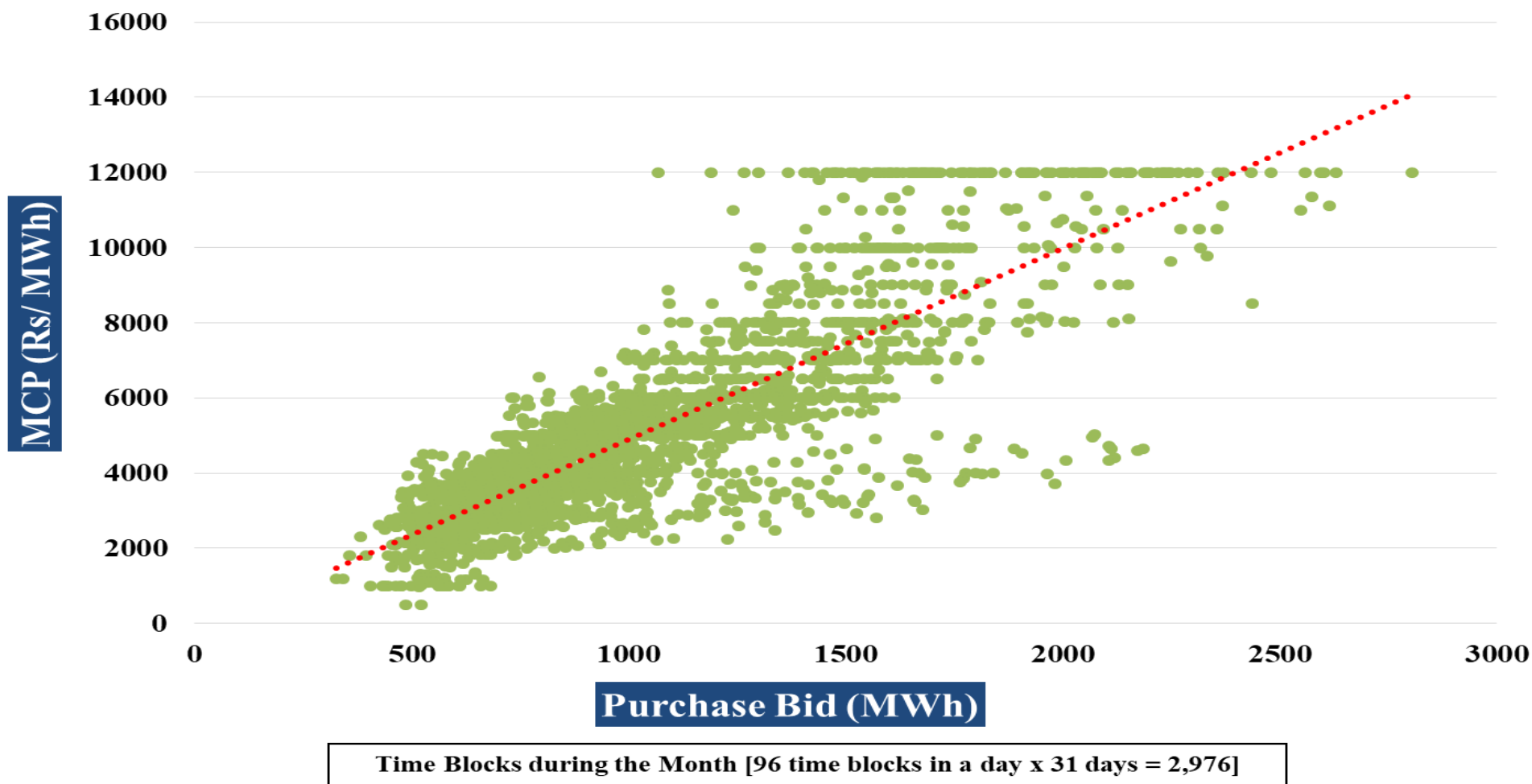
Annexure-VIII**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in RTM**

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)
01-12-2022	4.72	4.82	6.36	3.03	11.81	2.09	4.01	53.94
02-12-2022	6.53	5.78	6.03	3.64	8.80	2.42	4.61	59.43
03-12-2022	5.35	5.21	5.11	3.40	7.98	2.81	4.68	53.18
04-12-2022	4.77	4.95	4.20	3.22	5.69	2.70	4.23	47.25
05-12-2022	5.11	4.92	4.79	2.91	8.87	2.11	4.33	58.77
06-12-2022	5.44	4.92	4.76	3.12	6.50	2.10	4.44	61.63
07-12-2022	6.39	5.34	5.32	3.11	8.00	2.25	4.86	54.76
08-12-2022	7.59	4.88	4.72	3.28	12.00	2.75	4.83	47.83
09-12-2022	5.37	4.77	4.24	2.64	6.99	1.00	4.12	53.40
10-12-2022	4.99	4.51	4.46	1.84	6.50	1.00	3.80	52.97
11-12-2022	4.04	4.27	3.31	2.34	5.28	1.70	3.43	46.81
12-12-2022	5.14	4.81	4.07	1.58	6.50	0.50	3.74	52.70
13-12-2022	5.34	5.07	4.78	2.29	6.57	1.10	4.23	47.94
14-12-2022	5.52	4.66	5.18	3.00	6.50	2.09	4.45	54.90
15-12-2022	6.43	4.89	7.68	3.44	12.00	2.57	5.42	56.07
16-12-2022	9.67	6.28	8.86	4.01	12.00	2.89	6.83	62.11
17-12-2022	8.68	5.44	8.27	3.68	12.00	2.89	6.17	62.93
18-12-2022	6.25	5.01	4.90	3.63	7.81	2.77	4.79	61.08
19-12-2022	6.73	6.44	8.18	3.51	12.00	2.07	5.66	58.91
20-12-2022	5.55	6.91	8.26	3.82	12.00	2.50	6.12	61.84
21-12-2022	5.93	5.36	7.48	2.96	12.00	2.50	5.28	49.81
22-12-2022	6.14	5.95	7.86	3.10	12.00	1.03	5.46	44.02
23-12-2022	7.72	6.91	7.32	2.99	12.00	2.30	6.00	54.85
24-12-2022	8.78	6.71	7.66	2.94	12.00	2.14	6.19	51.36
25-12-2022	5.98	8.54	5.09	2.84	10.00	1.35	4.09	69.33
26-12-2022	6.87	7.95	5.82	2.57	12.00	1.00	3.91	73.78
27-12-2022	5.55	5.79	6.09	2.71	10.00	1.59	4.92	67.02
28-12-2022	9.23	7.98	7.76	3.71	12.00	2.81	6.89	54.61
29-12-2022	9.92	7.21	6.34	3.70	12.00	2.77	6.42	60.59
30-12-2022	9.06	7.36	5.68	2.88	12.00	2.25	5.92	72.17
31-12-2022	6.96	6.01	6.58	2.93	12.00	2.09	5.41	57.08
Maximum	9.92	8.54	8.86	4.01	12.00	2.89	6.89	73.78
Minimum	4.04	4.27	3.31	1.58	5.28	0.50	3.43	44.02
Average	6.51	5.79	6.04	3.06	9.80	2.07	5.01	56.87

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 December, 2022 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
01-12-2022	20:45 - 21:00	0.83	17:30 - 17:45	11.81	13:00 - 13:15	0.31	03:30 - 03:45	2.09
02-12-2022	16:45 - 17:00	1.01	07:30 - 07:45	8.80	10:15 - 10:30	0.30	23:45 - 24:00	2.42
03-12-2022	17:30 - 17:45	0.87	17:15 - 17:30	7.98	05:15 - 05:30	0.31	03:45 - 04:00	2.81
04-12-2022	11:45 - 12:00	0.69	09:30 - 09:45	5.69	00:15 - 00:30	0.32	00:30 - 00:45	2.70
05-12-2022	17:45 - 18:00	0.91	17:30 - 17:45	8.87	23:45 - 24:00	0.36	04:00 - 04:15	2.11
06-12-2022	11:00 - 11:15	0.94	18:30 - 18:45	6.50	00:30 - 00:45	0.31	03:30 - 03:45	2.10
07-12-2022	11:30 - 11:45	0.84	18:15 - 18:30	8.00	04:45 - 05:00	0.34	03:45 - 04:00	2.25
08-12-2022	07:15 - 07:30	0.83	08:30 - 08:45	12.00	04:45 - 05:00	0.24	03:45 - 04:00	2.75
09-12-2022	17:45 - 18:00	0.89	10:30 - 10:45	6.99	01:15 - 01:30	0.28	03:00 - 03:15	1.00
10-12-2022	12:45 - 13:00	0.86	16:45 - 17:00	6.50	19:30 - 19:45	0.28	01:00 - 01:15	1.00
11-12-2022	13:00 - 13:15	0.73	10:30 - 10:45	5.28	06:30 - 06:45	0.19	23:45 - 24:00	1.70
12-12-2022	17:00 - 17:15	0.85	09:45 - 10:00	6.50	07:45 - 08:00	0.40	02:00 - 02:15	0.50
13-12-2022	13:45 - 14:00	0.64	19:00 - 19:15	6.57	18:45 - 19:00	0.27	03:30 - 03:45	1.10
14-12-2022	16:15 - 16:30	0.83	18:15 - 18:30	6.50	04:45 - 05:00	0.42	02:45 - 03:00	2.09
15-12-2022	05:00 - 05:15	0.87	18:00 - 18:15	12.00	00:00 - 00:15	0.38	01:45 - 02:00	2.57
16-12-2022	14:30 - 14:45	0.96	17:45 - 18:00	12.00	04:00 - 04:15	0.39	01:00 - 01:15	2.89
17-12-2022	07:00 - 07:15	1.01	18:15 - 18:30	12.00	04:00 - 04:15	0.43	03:45 - 04:00	2.89
18-12-2022	07:30 - 07:45	1.03	16:45 - 17:00	7.81	04:00 - 04:15	0.40	01:15 - 01:30	2.77
19-12-2022	19:45 - 20:00	0.83	16:45 - 17:00	12.00	12:45 - 13:00	0.45	22:30 - 22:45	2.07
20-12-2022	10:15 - 10:30	0.92	17:00 - 17:15	12.00	23:30 - 23:45	0.29	06:00 - 06:15	2.50
21-12-2022	07:00 - 07:15	0.81	17:00 - 17:15	12.00	23:00 - 23:15	0.23	01:15 - 01:30	2.50
22-12-2022	07:00 - 07:15	0.76	16:45 - 17:00	12.00	23:30 - 23:45	0.26	23:30 - 23:45	1.03
23-12-2022	19:45 - 20:00	0.96	17:30 - 17:45	12.00	01:15 - 01:30	0.30	03:45 - 04:00	2.30
24-12-2022	07:30 - 07:45	0.80	16:45 - 17:00	12.00	00:00 - 00:15	0.29	03:00 - 03:15	2.14
25-12-2022	12:45 - 13:00	1.26	10:45 - 11:00	10.00	21:30 - 21:45	0.34	21:30 - 21:45	1.35
26-12-2022	11:15 - 11:30	1.18	09:30 - 09:45	12.00	04:15 - 04:30	0.37	02:30 - 02:45	1.00
27-12-2022	12:00 - 12:15	1.15	18:30 - 18:45	10.00	00:15 - 00:30	0.38	03:30 - 03:45	1.59
28-12-2022	07:00 - 07:15	0.96	09:00 - 09:15	12.00	00:30 - 00:45	0.29	03:45 - 04:00	2.81
29-12-2022	07:15 - 07:30	1.05	07:30 - 07:45	12.00	13:45 - 14:00	0.31	01:45 - 02:00	2.77
30-12-2022	07:00 - 07:15	1.23	07:30 - 07:45	12.00	23:15 - 23:30	0.43	00:00 - 00:15	2.25
31-12-2022	07:15 - 07:30	0.94	18:30 - 18:45	12.00	22:15 - 22:30	0.35	02:45 - 03:00	2.09

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Sellers and Buyers in Real Time Market (RTM) in the month of December, 2022						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Bihar	381.76	21.65%	Rajasthan	366.03	20.76%
2	West Bengal	170.45	9.67%	Telangana	210.03	11.91%
3	Uttar Pradesh	161.99	9.19%	Maharashtra	178.49	10.12%
4	Madhya Pradesh	120.37	6.83%	J&K	158.80	9.01%
5	Odisha	90.47	5.13%	Gujarat	112.02	6.35%
6	MB Power	74.77	4.24%	Andhra Pradesh	94.05	5.33%
7	Chhattisgarh	71.12	4.03%	Punjab	87.44	4.96%
8	Delhi	62.31	3.53%	Tamil Nadu	82.16	4.66%
9	Himachal	59.24	3.36%	Haryana	76.56	4.34%
10	Tamil Nadu	55.68	3.16%	Uttar Pradesh	64.14	3.64%
11	Karnataka	43.49	2.47%	Delhi	51.27	2.91%
12	Kameng HEP	35.37	2.01%	West Bengal	43.47	2.47%
13	Telangana	32.12	1.82%	Karnataka	35.88	2.03%
14	RKM Power	28.30	1.60%	Assam	31.71	1.80%
15	Maharashtra	26.61	1.51%	ArcelorMittal Nippon	30.67	1.74%
16	J&K	24.60	1.40%	Kerala	24.02	1.36%
17	Kerala	23.78	1.35%	Uttarakhand	23.17	1.31%
18	Rajasthan	19.76	1.12%	Daman & Diu - Dadra	14.68	0.83%
19	Andhra Pradesh	19.20	1.09%	Chhattisgarh	11.86	0.67%
20	Tripura	19.01	1.08%	Odisha	11.76	0.67%
21	Sembcorp	15.03	0.85%	Himachal Pradesh	8.24	0.47%
22	Jindal Power Ltd.	14.86	0.84%	Madhya Pradesh	6.80	0.39%
23	NTPL	13.31	0.76%	Jharkhand	6.59	0.37%
24	Haryana	11.67	0.66%	Sikkim	5.34	0.30%
25	Jhabua Power	11.56	0.66%	Manipur	4.72	0.27%
26	Palatana	10.85	0.62%	DVC	4.63	0.26%
27	Raipur Energen	10.67	0.61%	Mahan Energy	3.50	0.20%
28	Mahan Energy	10.48	0.59%	Tripura	3.24	0.18%
29	DVC	8.81	0.50%	Meghalaya	3.17	0.18%
30	Assam	8.04	0.46%	Goa WR	1.93	0.11%
31	Sikkim	8.00	0.45%	Railways	1.62	0.09%
32	Gujarat	7.94	0.45%	Jaypee Nigrie	1.33	0.08%
33	Teesta -3	7.03	0.40%	BALCO 2	0.91	0.05%
34	Sasan UMPP	6.28	0.36%	Arunachal Pradesh	0.78	0.04%
35	NTPC	6.28	0.36%	Goa SR	0.73	0.04%
36	BALCO 2	5.77	0.33%	Chandigarh	0.52	0.03%
37	DB Power	5.26	0.30%	Bihar	0.30	0.02%
38	Jharkhand	5.10	0.29%	Jindal Steel	0.22	0.01%
39	Coastal Gujrat	5.05	0.29%	Jindal Power Ltd.	0.18	0.01%
40	Sembcorp Energy	4.65	0.26%	Raigarh Energy Ltd.	0.08	0.00%
41	NTPC North	4.30	0.24%			
42	Daman & Diu -	4.08	0.23%			
43	TRN Energy	4.03	0.23%			
44	JITPL	3.87	0.22%			

45	Manipur	3.56	0.20%			
46	GMR Warora	2.98	0.17%			
47	Uttarakhand	2.72	0.15%			
48	Maruti Clean	2.60	0.15%			
49	Kahalgaon-II	2.56	0.15%			
50	Ostro Energy	2.51	0.14%			
51	NTPC Sholapur	2.46	0.14%			
52	SKS Power	2.42	0.14%			
53	Adhunik Power	2.41	0.14%			
54	Mouda Stg-2	2.39	0.14%			
55	Goa WR	2.34	0.13%			
56	Jindal Power	2.27	0.13%			
57	ACBIL	2.08	0.12%			
58	Kahalgaon	2.05	0.12%			
59	Bongaigaon	1.87	0.11%			
60	Mouda Stg-1	1.45	0.08%			
61	Shree Cement	1.38	0.08%			
62	Jindal Steel	1.36	0.08%			
63	Punjab	1.10	0.06%			
64	Jaypee Nigrie	1.02	0.06%			
65	Renew Surya	1.01	0.06%			
66	Khargone STPP	0.72	0.04%			
67	GMR Kamalanga	0.71	0.04%			
68	Singoli Bhagwati	0.65	0.04%			
69	Raigarh Energy	0.52	0.03%			
70	Sainj HEP	0.43	0.02%			
71	NTPC Kudgi	0.35	0.02%			
72	Karcham	0.31	0.02%			
73	IL&FS	0.31	0.02%			
74	Meghalaya	0.23	0.01%			
75	Jorethang	0.19	0.01%			
76	Chandigarh	0.18	0.01%			
77	Nagaland	0.15	0.01%			
78	Ramagundam	0.12	0.01%			
79	Arunachal	0.10	0.01%			
80	SBSR Power	0.08	0.00%			
81	Ramagundam	0.07	0.00%			
82	Adani Green	0.03	0.00%			
83	Sorang HEP,	0.03	0.00%			
84	AGBPP	0.02	0.00%			
85	AGTPP	0.01	0.00%			
86	Lanco Budhil	0.01	0.00%			
Total Volume of top 10		1,248.15	70.79%	Total Volume of top 10	1,429.73	81.09%
Total Volume in PXs		1,763.05		Total Volume in PXs	1,763.05	

Cross Border Electricity Transactions in Day Ahead Market (DAM) in IEX with Nepal and Bhutan during the month of December, 2022

S. No	Delivery Date	Buy Volume By Nepal (MU)	Sell Volume by Nepal (MU)
1	01-12-2022	0.00	2.82
2	02-12-2022	0.00	2.67
3	03-12-2022	0.00	3.26
4	04-12-2022	0.00	2.24
5	05-12-2022	0.00	1.98
6	06-12-2022	0.20	1.20
7	07-12-2022	1.39	0.97
8	08-12-2022	1.38	0.98
9	09-12-2022	1.64	1.04
10	10-12-2022	0.20	1.34
11	11-12-2022	1.09	1.09
12	12-12-2022	1.37	1.04
13	13-12-2022	1.45	0.93
14	14-12-2022	2.58	0.72
15	15-12-2022	2.71	0.58
16	16-12-2022	2.68	0.37
17	17-12-2022	1.63	0.00
18	18-12-2022	3.08	0.00
19	19-12-2022	3.83	0.00
20	20-12-2022	4.21	0.00
21	21-12-2022	4.02	0.00
22	22-12-2022	3.83	0.00
23	23-12-2022	3.86	0.00
24	24-12-2022	3.56	0.00
25	25-12-2022	4.89	0.00
26	26-12-2022	4.19	0.00
27	27-12-2022	4.61	0.00
28	28-12-2022	4.97	0.00
29	29-12-2022	4.89	0.00
30	30-12-2022	5.23	0.00
31	31-12-2022	4.94	0.00
Total		78.43	23.25
Grand Total		101.68	

-: No transaction happened

Note: Cross Border Transactions of Electricity of 101.68 MU with Nepal happened during December, 2022 in IEX, which is included in DAM Volume of December, 2022 in IEX.

Analysis for change in trend of Final Scheduled Volume in DAM on 3rd Sunday of December, 2022 (i.e. 18th December, 2022)

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 December, 2022, it is observed that on third Sunday (18th December, 2022), FSV showed increasing trend in comparison to third Saturday (17th December, 2022).

- (i) On third Sunday (18th December, 2022), although there was decrease in purchase on power exchange by some of the States in comparison to third Saturday (17th December, 2022) by **16.48 MU** [i.e. Tamil Nadu (5.33 MU), Maharashtra (2.45 MU), Andhra Pradesh (1.93 MU), Uttarakhand (1.41 MU) and Chhattisgarh (1.35 MU), etc.], there was also increase in purchase on power exchange by some of the States by **26.96 MU** [i.e. Gujarat (14.72 MU), Rajasthan (4.96 MU), Telangana (3.78 MU), NVVN (SNA) – NEA (1.21 MU) and Uttar Pradesh (0.67 MU), etc.]. This resulted in an overall increase in FSV by **10.48 MU** on Sunday (18th December, 2022) as compared to Saturday (17th December, 2022).

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).