



**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: नवंबर, 2022 माह की मार्केट मॉनिटरिंग रिपोर्ट।**

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

महोदय/ Sir,

नवंबर, 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 November, 2022 is enclosed herewith for kind information and perusal.

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

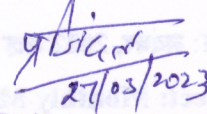
- (i) नवंबर, 2022 माह में देश में कुल 110,252 MU विद्युत का कारोबार किया गया, जिसमें से 52,574 MU का कारोबार अंतरराज्यीय पारेषण प्रणाली (Inter State Transmission System) के माध्यम से किया गया था और शेष राज्य नियंत्रित उत्पादन स्टेशनों से अंतरराज्यीय पारेषण प्रणाली (Intra State Transmissions System) के माध्यम से किया गया। In the month of November, 2022 a total of 110,252 MU of electricity was transacted in the country out of which 52,574 MU was transacted through ISTS, and the remaining through state controlled generating stations through Intra State Transmissions System.
- (ii) अल्पावधि मार्केट के अंतर्गत कुल 15,087 MU का कारोबार किया गया था, जिसमें से 8,137 MU पावर एक्सचेंजों के माध्यम से कारोबार किया गया और शेष द्विपक्षीय कारोबार और विचलन (deviations) के रूप में हुआ। इस प्रकार अल्पावधि कारोबार, नवंबर, 2022 माह में ट्रेड की गई विद्युत की कुल मात्रा का 13.68 % था और 7.38 %

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पावर एक्सचेंजों के माध्यम से रहा। A total of 15,087 MU was transacted under Short Term Market, out of which 8,137 MU was transacted through Power Exchanges and remaining happened as bilateral transactions & deviations. Thus, the total short term trade in November, 2022 was 13.68 % of total volume of electricity traded in November, 2022 and 7.38 % 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 28.70 % रहा, जिसमें से पावर एक्सचेंजों के माध्यम से कारोबार 15.48 % रहा। If we compare these transactions with respect to the electricity supplied through ISTS, the short term transactions constitutes about 28.70 % of ISTS transactions, out of which transaction through the power exchanges constitutes 15.48 %.

भवदीय/ Yours faithfully,

  
27/03/2023

( प्रदीप जिंदल/ Pardeep Jindal )

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

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6. MD & CEO, Power Exchange India Limited (PXIL), Sumer Plaza, 9th floor, Unit no - 901, Marol Maroshi Road, Andheri (East), Mumbai-400 059.
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CEA website (<https://cea.nic.in/market-monitoring-report/?lang=en>)



सत्यमेव जयते

मासिक मार्केट मॉनिटरिंग रिपोर्ट - नवंबर, 2022

# Monthly Market Monitoring Report November, 2022



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

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



## नवंबर, 2022 माह के लिए सारांश Summary for Month: November, 2022

### भारत में विद्युत एक्सचेंजों पर विद्युत के व्यापार का सारांश

#### Summary of Electricity Transactions on Power Exchanges In India

- नवंबर, 2022 के दौरान विद्युत एक्सचेंजों (यानी आईईएक्स, पीएक्सआईएल और एचपीएक्स) के माध्यम से कुल **8,137 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 **8,137 MU** electricity was transacted through power exchanges i.e. IEX, PXIL & HPX, during the month of November, 2022. This volume of electricity is on delivery date basis and includes transactions through DAM, GDAM, RTM, TAM and GTAM market segments.

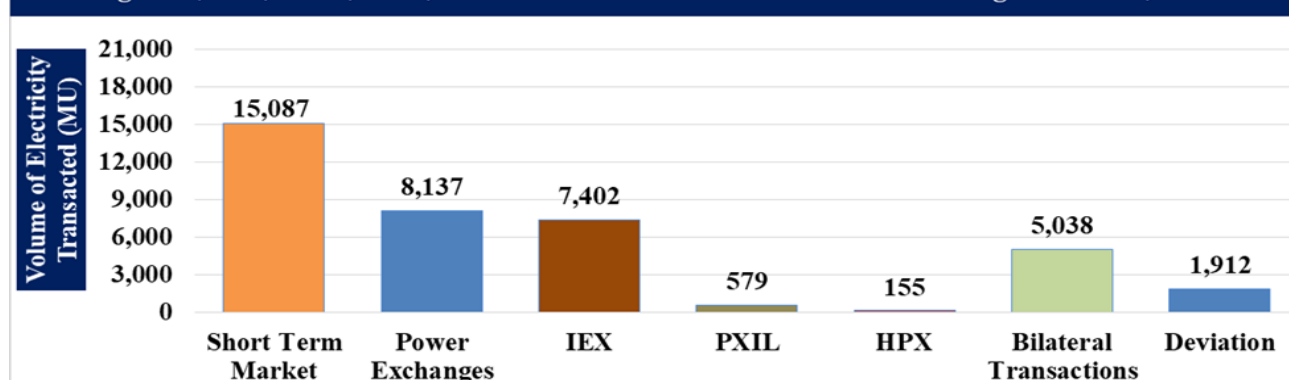
Segment	Transactions happened in the PXs (IEX, PXIL & HPX combined)			
	FSV (MU)	Average MCP (₹/kWh)	Congestion (MU)	Real Time Curtailment (MU)
DAM	5,083.85	4.79	0.00	0.00
GDAM	288.33	4.90	0.00	0.00
RTM	1,406.88	4.94	0.07	0.00
TAM	1,194.89	4.72	0.00	0.00
GTAM	162.81	4.96	0.00	0.00
<b>Total in PXs</b>	<b>8,136.76</b>	<b>4.82*</b>	<b>0.07</b>	<b>0.00</b>

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

- द्विपक्षीय व्यापार के तहत कुल **5,038 MU** विद्युत का कारोबार किया गया और **1,912 MU** को विचलन के रूप में स्थानांतरित किया गया। इस प्रकार कुल **15,087 MU** विद्युत का कारोबार अल्पावधि व्यापार के रूप में किया गया था। नवंबर, 2022 के महीने में देश में कुल **110,252 MU** विद्युत की आपूर्ति की गई थी, इस प्रकार नवंबर, 2022 माह में कारोबार की गई विद्युत की कुल मात्रा में अल्पावधि बाजार का हिस्सा **13.68 %** था।

Under the Bilateral trade a total of **5,038 MU** of electricity was transacted and **1,912 MU** was transferred as deviation. Thus a total of **15,087 MU** of electricity was transacted as short term trade. In the month of November, 2022 a total of **110,252 MU** of electricity was supplied in the country, thus the share of short term market in the total volume of electricity traded in November, 2022 was **13.68%**.

**Comparison of total volume of electricity transacted in Short Term Market, through the PXs together, IEX, PXIL, HPX, Bilateral Transactions and Deviations during November, 2022**



- नवंबर, 2022 के दौरान संचरण जाम की कुल मात्रा **0.07 MU** थी, जो की विद्युत एक्सचेंजों में कारोबार की गई विद्युत की कुल मात्रा का केवल 0.001 % है और नवंबर, 2022 के महीने के दौरान आपूर्ति की गई कुल ऊर्जा का 0.0001 % है। The total volume of transmission congestion that happened during the month of November, 2022 was **0.07 MU** which is only 0.001 % of the total volume of electricity transacted in the power exchanges and 0.0001 % of total energy supplied during the month of November, 2022.

RTM में 1 दिन अर्थात् दिनांक 30 नवंबर, 2022 को संचरण जाम देखा गया। जबकि DAM, GDAM, TAM और GTAM में कोई संचरण जाम नहीं देखा गया। नवंबर, 2022 माह के महीने में कोई वास्तविक समय में विद्युत कटौती रिपोर्ट नहीं की गई।

Transmission congestion observed in RTM on 1 day i.e. 30<sup>th</sup> November, 2022, whereas, there was no congestion happened in DAM, GDAM, TAM & GTAM. **No** real time curtailment reported in the month of November, 2022.

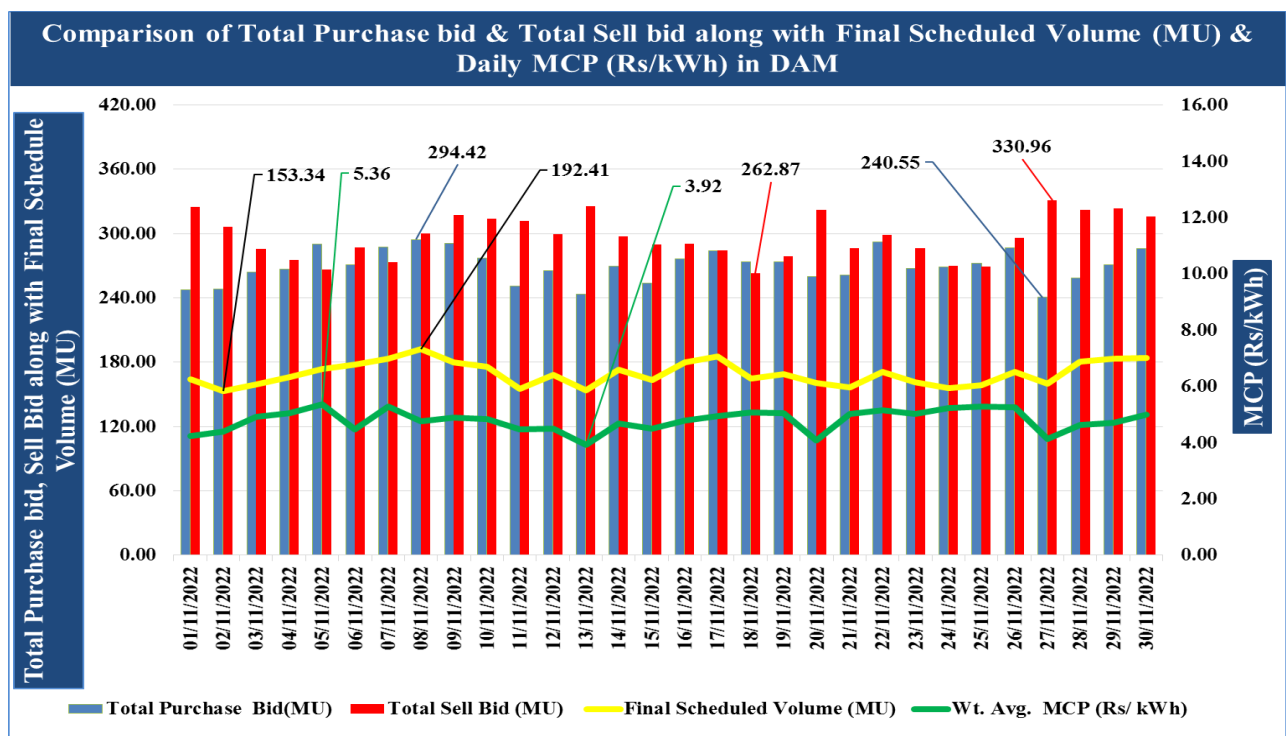
नवंबर, 2022 माह के दौरान अंतर्राज्यीय पारेषण प्रणाली (ISTS) में निर्धारित अनुसूचित विद्युत की कुल मात्रा **52,574 MU** थी। नवंबर, 2022 के महीने में अल्पावधि बाजार में विद्युत का लेन-देन अंतर्राज्यीय पारेषण प्रणाली (ISTS) के माध्यम से अनुसूचित की गई कुल विद्युत की मात्रा का 28.70% रहा।

The total volume of electricity scheduled at ISTS during the month of November, 2022 was **52,574 MU**. **The total volume of electricity transacted in the short term market was 28.70 % of total volume schedule at ISTS in the month of November, 2022.**

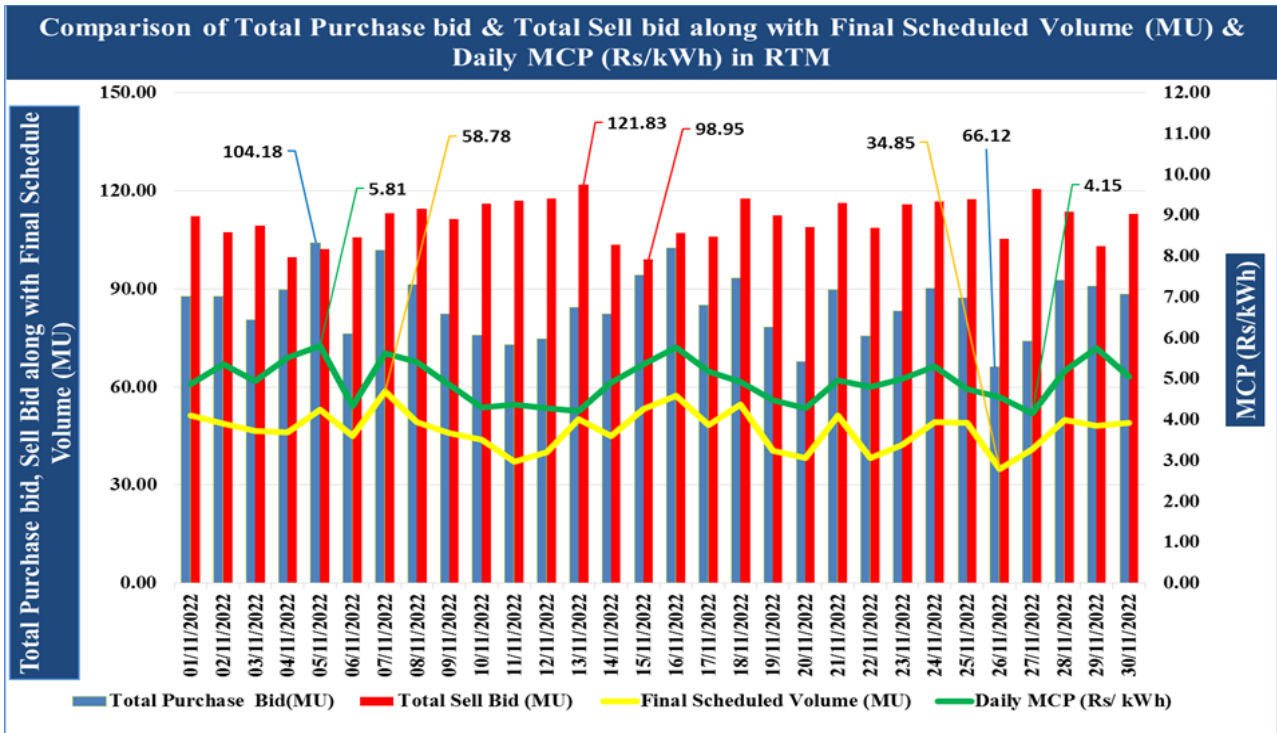
- नवंबर, 2022 माह के दौरान DAM और RTM में विद्युत की खरीद और बिक्री बोलियों, अंतिम अनुसूचित मात्रा और दैनिक औसत MCP की भिन्नता निम्नलिखित चित्रों में दर्शाई गई है:

The variation of Purchase and Sell bids, Final Scheduled Volume and Daily Avg. MCP in DAM and RTM during the month of November, 2022 are shown in following figures:

### DAM Volume



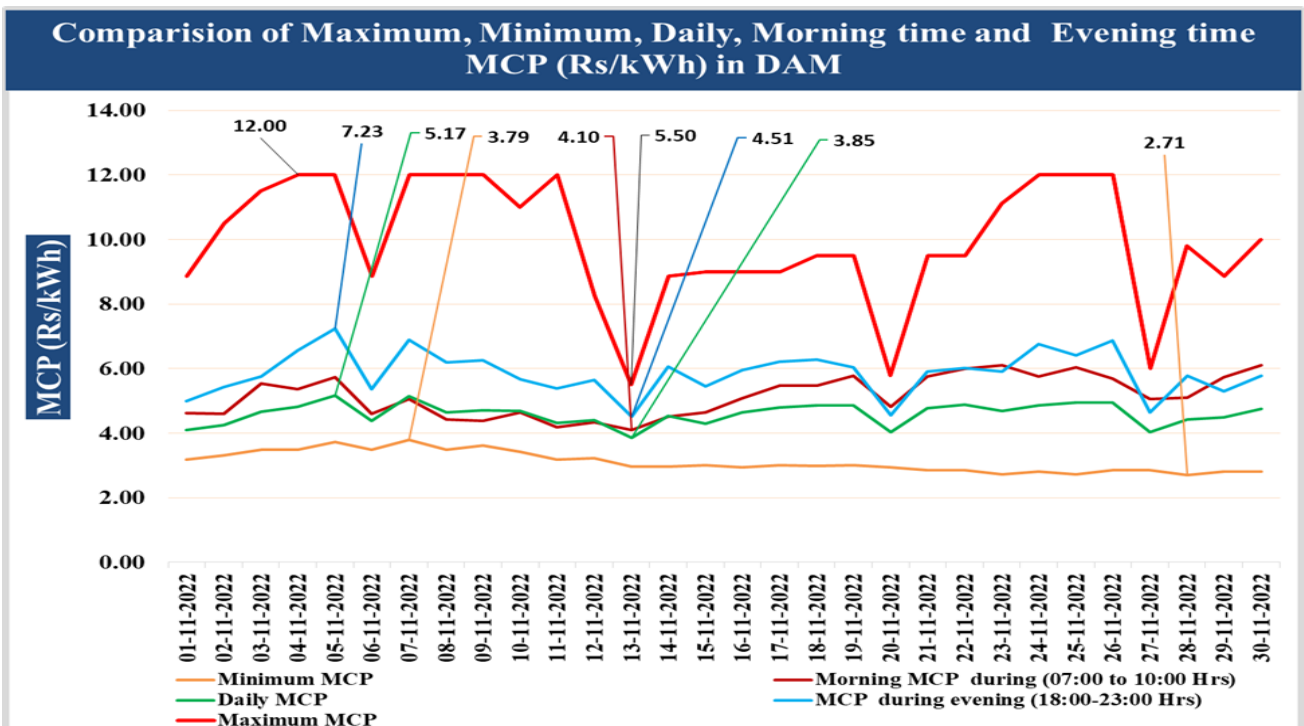
## RTM Volume



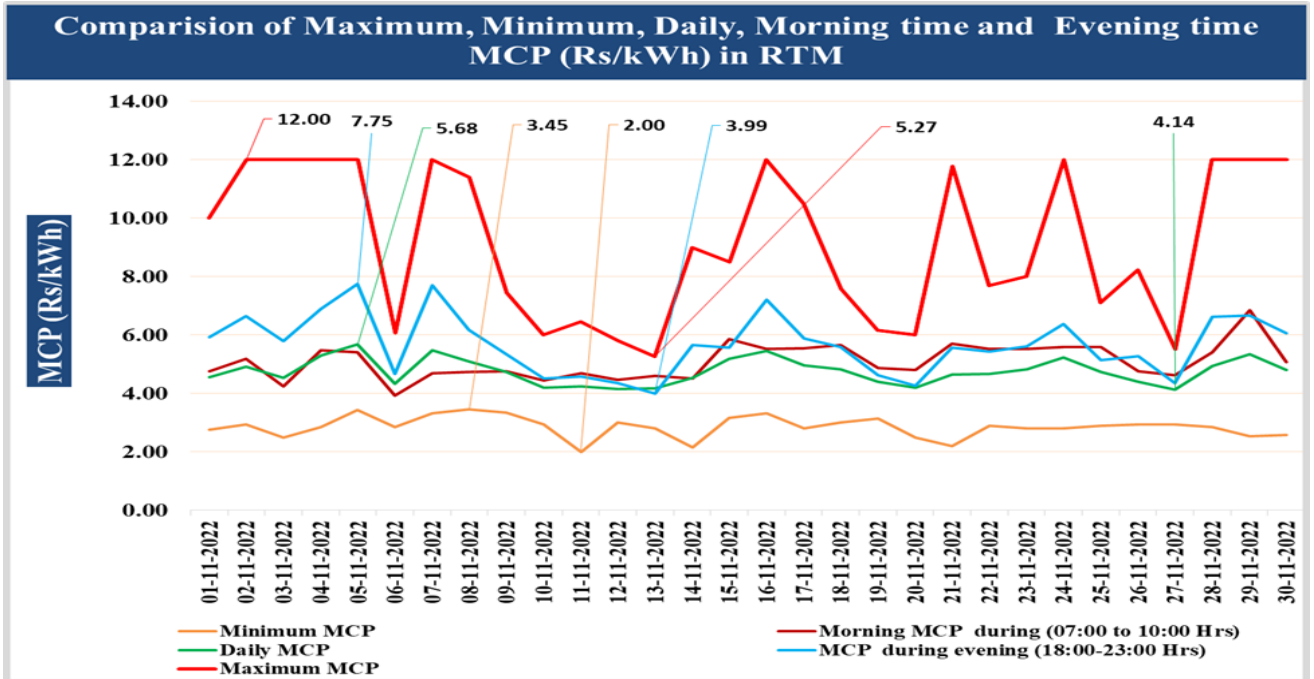
➤ नवंबर, 2022 माह के दौरान DAM और RTM में अधिकतम, न्यूनतम, दैनिक, सुबह और शाम के समय MCP की भिन्नता निम्नलिखित चित्रों में दिखाई गई है:

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

## DAM Prices



## RTM Prices



# **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 November, 2022 was **5,083.85 MU**. The total energy supplied in the country during the month of November, 2022 was 110,252 MU. Thus, the volume of electricity transacted on the power exchanges in DAM during November, 2022 was 4.61 % of the total energy supplied in the country. Comparing with the total volume of electricity transacted in DAM during the past month i.e. October, 2022, it was **4,328.02 MU** which was 3.80 % of the total energy supplied (113,944 MU) in the country during October, 2022. Similarly, the total volume of electricity transacted in DAM during previous year i.e. November, 2021, was **4,719.50 MU** which was 4.75 % of the total energy supplied (99,324 MU) in the country during November, 2021.

**1.2.** 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 October, 2022 were **4,325.01 MU** and **3.01 MU**, respectively and no transaction took place in HPX. The volume of electricity transacted on IEX and PXIL during November, 2021, were **4,718.76 MU** and **0.74 MU** respectively.

**1.3.** The DAM volume for November, 2022 in IEX is inclusive of Cross Border Transactions of Electricity with Nepal (details given at **Annexure XII**), which was **176.39 MU** (export by Nepal).

**1.4.** The Average Market Clearing Price (MCP) on IEX during the month of November, 2022 was ₹ **4.79/kWh**, which shows an increase of 20.96 % & 55.52 % when compared with average MCP's for the month of October, 2022 and November, 2021, which were ₹ **3.96/kWh** and ₹ **3.08/kWh**, respectively. On PXIL, no transaction of electricity took place in November, 2022, the average MCP's for the month October, 2022 and November, 2021 were ₹ **4.64/kWh** and ₹ **3.71/kWh** respectively.

### **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 November, 2022 as compared with October, 2022 and November, 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	November, 2022*	5083.85	153.34	192.41	169.46
	October, 2022*	4325.01	110.26	166.28	139.52
	% Change (Month over Month)	17.55	39.07	15.71	21.46
	November, 2021	4718.76	108.16	180.05	157.29
	% Change (Year over Year)	7.74	41.77	6.86	7.74
PXIL	November, 2022	-	-	-	-
	October, 2022	3.01	0.05	1.71	0.43
	% Change (Month over Month)	NA	NA	NA	NA
	November, 2021	0.74	0.02	0.2	0.07
	% Change (Year over Year)	NA	NA	NA	NA
HPX	November, 2022	-	-	-	-
	October, 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 (₹/kWh)				
		Daily Avg. MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
IEX	November, 2022	3.92	5.36	4.79	2.71	12.00
	October, 2022	3.02	4.88	3.96	1.12	12.00
	Change% (Month over Month)	29.80	9.84	20.96	141.96	0.00
	November, 2021	1.96	3.83	3.08	1.37	20.00
	%Change (Year over Year)	100.00	39.95	55.52	97.81	-40.00
PXIL	November, 2022	-	-	-	-	-
	October, 2022	3.95	5.94	4.64	0.53	12.00
	%Change Month over Month)	NA	NA	NA	NA	NA
	November, 2021	2.99	4.99	3.71	2.99	5.99
	%Change (Year over Year)	NA	NA	NA	NA	NA
HPX	November, 2022	-	-	-	-	-
	October, 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 24 time blocks on 4<sup>th</sup> to 9<sup>th</sup>, 11<sup>th</sup> & 24<sup>th</sup> to 26<sup>th</sup> November, 2022. As there was no congestion in transmission system, the MCP for these time blocks was also ₹ 12.00/kWh. Whereas, in PXIL, no transaction of electricity took place in the month of November, 2022.

**1.7.** The minimum ACP of ₹ 2.71/kWh in IEX was observed in all 13 regions during the time block 03:00 - 03:15 Hrs on 28<sup>th</sup> November, 2022. As there was no congestion in transmission system, the MCP for this time-block was also ₹ 2.71/kWh. Whereas, in PXIL, no transaction of electricity took place in the month of November, 2022.

## 2. Real Time Market (RTM)

The total volume of electricity transacted on the power exchanges in Real Time Market in November, 2022 was **1,406.88 MU**, out of which **1,406.88** (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 November, 2022 as compared with October, 2022 and November, 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	November, 2022	1,406.88	34.85	58.78	46.90
	October, 2022	2,264.59	45.12	124.36	73.05
	% Change (Month over Month)	-37.87	-22.76	-52.73	-35.80
	November, 2021	1,311.35	31.36	56.17	43.71
	% Change (Year over Year)	7.28	11.13	4.65	7.30
PXIL	November, 2022	-	-	-	-
	October, 2022	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA
	November, 2021	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA
HPX	November, 2022	-	-	-	-
	October, 2022	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

**Table-2A**

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

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
IEX	November, 2022	4.15	5.81	4.94	2.00	12.00
	October, 2022	2.20	5.46	3.78	0.05	12.00
	% Change (Month over Month)	88.64	6.41	30.69	3900.00	0.00
	November, 2021	2.08	5.43	3.48	0.50	20.00
	% Change (Year over Year)	99.52	7.00	41.95	300.00	-40.00
PXIL	November, 2022	-	-	-	-	-

Exchange	Period	Prices (₹/kWh)				
		Daily Avg. MCP (₹/kWh)			ACP (₹/kWh)	
		Minimum	Maximum	Average	Minimum	Maximum
	October, 2022	-	-	-	-	-
	% Change (Month over Month)	NA	NA	NA	NA	NA
	November, 2021	-	-	-	-	-
	% Change (Year over Year)	NA	NA	NA	NA	NA
HPX	November, 2022	-	-	-	-	-
	October, 2022	-	-	-	-	-
	%Change (Month over Month)	NA	NA	NA	NA	NA

-: No transaction took place

NA: Not Applicable

**Table-2B**

### 3. Green Day Ahead Market (GDAM):

The total volume of electricity transacted in GDAM in the month of November, 2022 was **288.33 MU** (i.e. **288.33 MU** in IEX) at an average MCP of **Rs 4.90/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 November, 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	November, 2022	72.59	0.52	5.16	2.42
		October, 2022	145.40	1.20	8.13	4.69
		% Change (Month over Month)	-50.08	-56.67	-36.53	-48.40
	Non Solar	November, 2022	215.74	5.62	9.12	7.19
		October, 2022	147.53	2.98	8.33	4.76
		% Change (Month over Month)	46.23	88.59	9.48	51.05
	Hydro	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
PXIL	Solar + Non Solar	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
	Hydro	November, 2022	-	-	-	-
		October, 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	November, 2022	4.08	6.08	4.90	2.71	12.00
		October, 2022	3.40	4.97	4.03	2.58	12.00
		% Change (Month over Month)	20.00	22.33	21.59	5.04	0.00
PXIL	Solar and	November, 2022	-	-	-	-	-

Exchange	Segment	Period	Prices (₹/kWh)				
			Daily Avg. MCP (₹/kWh)			ACP (₹/kWh)	
			Minimum	Maximum	Average	Minimum	Maximum
	Non Solar	October, 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 November, 2022 and October, 2022, respectively.
- 3.2** There was no real time curtailment in the power exchanges in Green Day Ahead Market during the month of November, 2022 and October, 2022, respectively.
- 3.3** The **top 10 sellers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of November, 2022 were **Karnataka, Adani Solar Energy Jaisalmer One Private Limited AHS, Telangana, Andhra Pradesh, J&K, Adani Solar Energy Jaisalmer One Private Limited AHW, Ostro Energy Private Limited (OEPL), Ramagundam Floating Solar PV Station, Adani Wind Energy Kutchh Five Limited and Madhya Pradesh**, which constituted **95.06 %** of the market volume.
- 3.4** The **top 10 buyers** on the power exchanges in **Green Day Ahead Market (GDAM)** in the month of November, 2022 were **Maharashtra, Uttar Pradesh, Madhya Pradesh, Delhi, Gujarat, DVC, Kerala, Karnataka Tamil Nadu and Railways**, which constituted **93.99 %** 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 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** (41.19 %) was transacted on PXIL and **155.43 MU** (13.01 %) was transacted on HPX.
- 4.2. The total volume of electricity transacted on the power exchanges in Term Ahead Market in October, 2022 on delivery date basis was **914.08 MU**, out of which **523.90 MU** (57.31 %) was transacted on IEX, **299.40 MU** (32.75 %) was transacted on PXIL and **90.78 MU** (9.93 %) was transacted on HPX.
- 4.3. Similarly, the total volume of electricity transacted on the power exchanges in Term Ahead Market in November, 2021 on delivery date basis was **579.13 MU**, out of which, **302.75 MU** (52.28 %) was transacted on IEX and **276.38 MU** (47.72 %) was transacted on PXIL.
- 4.4. In the month of November, 2022, the total volume of electricity transacted in Anyday Single Sided Reverse Auction contract was **199.20 MU** (i.e. 19.20 MU in IEX, 180.00 MU in PXIL and no transaction took place in HPX). Whereas, **140.40 MU** was transacted under Long Duration Contract (i.e. 140.40 MU in PXIL and no transaction took place in IEX & HPX).
- 4.5. With respect to the total energy supplied during the month of November, 2022 in the country, the volume of electricity traded on the power exchanges in TAM on delivery date basis represents **0.80 %** of the total energy supplied. The same was **1.15 %** in October, 2022 and **0.41 %** in November, 2021.
- 4.6. In the month of November, 2022, there was no real time curtailment in TAM on power exchanges.
- 4.7. In the month of November, 2022, there was no transmission congestion in TAM on power exchanges.
- 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 November, 2022 with October, 2022 and November, 2021 is given in Table – 4A & 4B:**

**(a) November, 2022 vis- a- vis October, 2022**

Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
IEX	November, 2022	-	328.93	144.00	55.20	528.13
	October, 2022	-	523.90	-	-	523.90
	%Change (Month over Month)	NA	-37.22	NA	NA	0.81
	November, 2021	0.15	107.24	195.36	-	302.75
	%Change (Year over Year)	NA	206.72	-26.29	NA	74.44
PXIL	November, 2022	1.51	170.22	-	-	171.73



Exchange	Period	Final Scheduled Volume (MU)				
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly	Total
	October, 2022	5.15	294.25	-	-	299.40
	%Change (Month over Month)	-70.68	-42.15	NA	NA	-42.64
	November, 2021	1.66	241.12	33.6	-	276.38
	%Change (Year over Year)	-9.04	-29.40	NA	NA	-99.38
HPX	November, 2022	-	155.43	-	-	155.43
	October, 2022	-	90.78	-	-	90.78
	%Change (Month over Month)	-	71.22	-	-	71.22

- : No transaction took place

NA: Not Applicable

**Table: 4A**

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

Exchange	Period	Average MCP (₹/kWh)			
		Intra Day	Day Ahead Contingency	Daily or Any Day	Weekly
IEX	November, 2022	-	4.83	4.50	4.56
	October, 2022	-	4.08	-	-
	%Change (Month over Month)	NA	18.38	NA	NA
	November, 2021	11.15	3.37	3.19	-
	%Change Year over Year)	NA	43.32	41.07	NA
PXIL	November, 2022	5.13	5.29	4.00	-
	October, 2022	7.67	4.30	-	-
	%Change (Month over Month)	-33.12	23.02	NA	NA
	November, 2021	4.58	3.22	3.40	-
	%Change (Year over Year)	12.01	64.29	17.65	NA
HPX	November, 2022	-	4.98	-	-
	October, 2022	-	3.85	-	-
	%Change (Month over Month)	-	29.35	-	-

-: 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 in GTAM on delivery date basis was **162.81 MU** (**24.41 MU** in Solar, **102.13 MU** in Non-Solar and **36.26 MU** in Hydro), respectively. No transaction of electricity took place in GTAM in HPX.

The total volume of electricity transacted in GTAM in Day Ahead Contingency, Intraday, Daily/ Anyday and Weekly contracts during November, 2022 on delivery date basis has 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 November, 2022 and its comparison with October, 2022 and November, 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	November, 2022	1.35	0.23	1.12	0.67
		October, 2022	6.14	0.14	2.01	0.77
		%Change Month over Month)	-78.01	64.29	-44.28	-12.99
		November, 2021	177.20	0.50	13.00	5.91
		%Change (Year over Year)	-99.24	-54.00	-91.38	-88.66
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	1.52	0.04	0.06	0.05
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	November, 2022	10.50	0.35	0.35	0.35
		October, 2022	3.90	0.30	0.30	0.30
		%Change (Month over Month)	169.23	16.67	16.67	16.67
		November, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
	Weekly	November, 2022	-	-	-	-
		October, 2022	4.20	0.30	0.30	0.30
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	-	-	-	-
%Change (Year over Year)		NA	NA	NA	NA	
PXIL	Day Ahead Contingency	November, 2022	12.57	0.22	1.92	0.66
		October, 2022	3.33	0.09	1.00	0.67

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)	277.48	144.44	92.00	-1.49
		November, 2021	48.61	1.16	4.84	2.03
		%Change (Year over Year)	-74.14	-81.03	-60.33	-67.49
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
		November, 2022	-	-	-	-
	Daily/ Anyday	October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	65.26	1.40	11.22	2.84
		%Change (Year over Year)	NA	NA	NA	NA
		November, 2022	-	-	-	-
	Weekly	October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	-	-	-	-
		%Change (Year over Year)	NA	NA	NA	NA
		November, 2022	-	-	-	-
	HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-
October, 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
	Day Ahead Contingency	November, 2022	4.85	5.09	4.97
		October, 2022	2.30	4.50	3.56
		%Change (Month over Month)	110.87	13.11	39.61
		November, 2021	3.24	4.40	3.72
		%Change	49.69	15.68	33.60
	Intraday	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	3.50	3.50	3.50
		%Change (Year over Year)	NA	NA	NA

Exchange	Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
	Daily/Anyday	November, 2022	4.50	4.50	4.50
		October, 2022	4.50	4.50	4.50
		%Change (Month over Month)	0.00	0.00	0.00
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Weekly	November, 2022	-	-	-
		October, 2022	4.50	4.50	4.50
		%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2022	4.47	5.95	5.11
		October, 2022	2.90	4.34	3.67
		%Change (Month over Month)	54.14	37.10	39.24
		November, 2021	3.30	4.00	3.67
		%Change (Year over Year)	35.45	48.75	39.24
	Intraday	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
	Daily/Anyday	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	3.50	3.60	3.53
		%Change (Year over Year)	NA	NA	NA
	Weekly	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA

∴ No transaction took place

NA: Not Applicable

**Table-5B**

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

- In November, 2022, there was no real time curtailment in GTAM (Solar) in IEX & PXIL and no transaction happened 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 November, 2022 and its comparison with October, 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	November, 2022	25.52	0.43	1.71	0.85
		October, 2022	4.60	0.07	0.54	0.24
		%Change (Month over Month)	454.78	514.29	216.67	254.17
		November, 2021	127.57	0.22	12.01	4.25
		%Change (Year over Year)	-80.00	95.45	-85.76	-80.00
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	0.43	0.43	0.43	0.43
		%Change (Year over Year)	NA	NA	NA	NA
	Daily/Anyday	November, 2022	2.16	0.07	0.07	0.07
		October, 2022	1.80	0.07	0.10	0.09
		%Change (Month over Month)	20.00	0.00	-30.00	-22.22
		November, 2021	0.43	0.05	0.05	0.05
		%Change (Year over Year)	402.33	40.00	40.00	40.00
	Weekly	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	0.34	0.05	0.05	0.05
		%Change (Year over Year)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2022	74.45	0.82	4.28	2.48
		October, 2022	29.53	0.60	1.25	0.95
		%Change (Month over Month)	152.12	36.67	242.40	161.05
		November, 2021	18.04	0.31	0.89	0.60
		%Change (Year over Year)	312.69	164.52	380.90	313.33
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
		November, 2021	-	-	-	-

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		
		Daily/Anyday	November, 2022	-	-	-	-	
			October, 2022	-	-	-	-	
			%Change (Month over Month)	NA	NA	NA	NA	
			November, 2021	3.66	0.18	0.24	0.22	
			%Change (Year over Year)	NA	NA	NA	NA	
			Weekly	November, 2022	-	-	-	-
		October, 2022		-	-	-	-	
		%Change (Month over Month)		NA	NA	NA	NA	
		November, 2021		-	-	-	-	
		%Change (Year over Year)		NA	NA	NA	NA	
		HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-	-
				October, 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	November, 2022	5.22	5.70	5.65
		October, 2022	3.50	5.80	5.00
		%Change (Month over Month)	49.14	-1.72	13.00
		November, 2021	3.56	4.84	4.00
		%Change (Year over Year)	46.63	17.77	41.25
		Intraday	November, 2022	-	-
	October, 2022		-	-	-
	%Change (Month over Month)		NA	NA	NA
	November, 2021		3.65	3.65	3.65
	%Change (Year over Year)		NA	NA	NA
	Daily/Anyday	November, 2022	5.73	5.73	5.73
		October, 2022	5.70	5.70	5.70
		%Change (Month over Month)	0.53	0.53	0.53
		November, 2021	4.65	4.65	4.65
		%Change (Year over Year)	23.23	23.23	23.23
	Weekly	November, 2022	-	-	-
		October, 2022	-	-	-

Exchange	Non- Solar Energy Contract	Period	Prices(₹/kWh)		
			Minimum	Maximum	Average
		%Change (Month over Month)	NA	NA	NA
		November, 2021	4.65	4.65	4.65
		%Change (Year over Year)	NA	NA	NA
		November, 2022	4.08	5.29	4.74
		October, 2022	3.19	5.12	4.40
		%Change (Month over Month)	27.90	3.32	7.73
		November, 2021	4.02	4.26	4.12
		%Change (Year over Year)	1.49	24.18	15.05
PXIL	Day Ahead Contingency	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		November, 2022	-	-	-
	Intraday	October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		November, 2022	-	-	-
		October, 2022	-	-	-
	Daily/Anyday	%Change (Month over Month)	NA	NA	NA
		November, 2021	-	-	-
		%Change (Year over Year)	NA	NA	NA
		November, 2022	-	-	-
October, 2022		-	-	-	
%Change (Month over Month)		NA	NA	NA	
Weekly	November, 2021	-	-	-	
	%Change (Year over Year)	NA	NA	NA	
	November, 2022	-	-	-	
	October, 2022	-	-	-	
	%Change (Month over Month)	NA	NA	NA	
	November, 2021	-	-	-	
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

**Table - 5D**

- In November, 2022, there was no transmission congestion in GTAM (Non Solar) in IEX and PXIL. No transaction happened in HPX.
- In November, 2022, there was no real time curtailment in GTAM (Non Solar) in IEX & PXIL. No transaction happened in 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 November, 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	November, 2022	36.26	0.81	1.57	1.21
		October, 2022	77.71	1.17	3.57	2.51
		%Change (Month over Month)	-53.34	-30.77	-56.02	-51.79
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
PXIL	Day Ahead Contingency	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Intraday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Daily/Anyday	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		%Change (Month over Month)	NA	NA	NA	NA
	Weekly	November, 2022	-	-	-	-
		October, 2022	-	-	-	-
		% Change (Month over Month)	NA	NA	NA	NA
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-	-
		October, 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	November, 2022	3.98	5.64	4.98
		October, 2022	2.96	4.83	3.95
		%Change (Month over Month)	34.46	16.77	26.08
	Intraday	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Daily/Anyday	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
	Weekly	November, 2022	-	-	-
		October, 2022	-	-	-
		%Change (Month over Month)	NA	NA	NA
		October, 2022	-	-	-
		%Change (Month over Month)	-	-	-
	PXIL	Intraday	November, 2022	NA	NA
October, 2022			-	-	-
%Change (Month over Month)			-	-	-
Daily/Anyday		November, 2022	NA	NA	NA
		October, 2022	-	-	-
		%Change (Month over Month)	-	-	-
Weekly		November, 2022	NA	NA	NA
		October, 2022	-	-	-
		%Change (Month over Month)	-	-	-
HPX	Day Ahead Contingency, Intra Day, Daily, weekly	November, 2022	-	-	-
		October, 2022	-	-	-
		% Change (Month over Month)	NA	NA	NA

-: No transaction took place

NA: Not Applicable

**Table – 5F**

- In November, 2022, there was no transmission congestion in GTAM (Hydro) in IEX. No transaction happened in PXIL and HPX in GTAM (Hydro).
- In November, 2022, there was no real time curtailment in GTAM (Hydro) in IEX. No transaction happened in PXIL and HPX in GTAM (Hydro).

## 6. Bilateral Transactions:

The total volume of electricity transacted through **Bilateral transactions** in the month of November, 2022 was **5,038.09 MU**. The total buy volume of electricity transacted in bilateral market through direct transactions and trader in the month of November, 2022 were **2,133.41 MU** and **2,904.68 MU** respectively. The details of Bilateral transactions of Electricity during November, 2022 is shown in Table Below:

November, 2022	Direct	Traders	Total Bilateral Transaction (MU)
<b>Total</b>	2,133.41	2,904.68	5,038.09
<b>Minimum</b>	0.63	0.65	-
<b>Maximum</b>	826.90	509.88	-

**Table -6A**

The region-wise maximum/ minimum volume of electricity transacted bilaterally during November, 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
<b>Total</b>	46.21	344.50	1244.85	1317.84	726.81	827.58	115.54	340.88	-	73.88
<b>Minimum</b>	7.15	10.50	45.72	41.92	9.69	48.55	0.63	0.73	-	0.65
<b>Maximum</b>	39.06	140.01	826.90	509.88	381.81	353.96	95.67	274.89	-	51.84

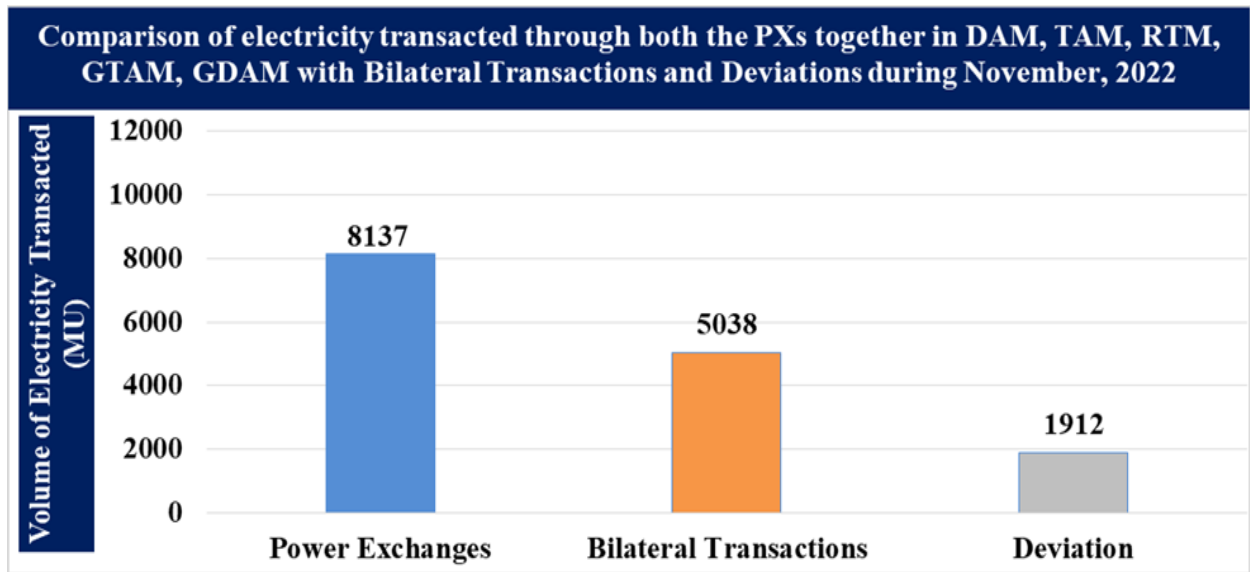
**Table-6B**

**6.1. The top 5 buyers** on bilateral transaction through direct transactions in the month of November, 2022 were **Madhya Pradesh, Rajasthan, Maharashtra, Haryana and Telangana**, which constituted **85.23 %** of the market volume. Whereas **top 5 buyers** on bilateral transaction through traders in the month of November, 2022 were **Maharashtra, Gujarat, Himachal Pradesh, Andhra Pradesh and Rajasthan**, which constituted **61.62 %** of the market volume. [Annexure III]

**6.2. The top 5 sellers** on bilateral transaction through direct transactions in the month of November, 2022 were **Punjab, Uttar Pradesh, Telangana, ADANI HYBRID ENERGY, JAISALMER FOUR LIMITED AHS and Damodar Valley Corporation**, which constituted **56.41 %** of the market volume. Whereas **top 5 sellers** on bilateral transaction through traders in the month of November, 2022 were **Raipur Energen Limited, Delhi, Gujarat, Bihar and Jindal Power Limited Stage-2**, which constituted **42.55 %** of the market volume. [Annexure III]

**6.3. Deviation Volume** -The volume of Deviation observed in the month of November, 2022 in import and export were **21,952.22 MU** and **1,872.11 MU** respectively. The total volume of Deviation observed in the month of November, 2022 can be taken as **1,912.17 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 November, 2022 is shown in **Figure 1**:

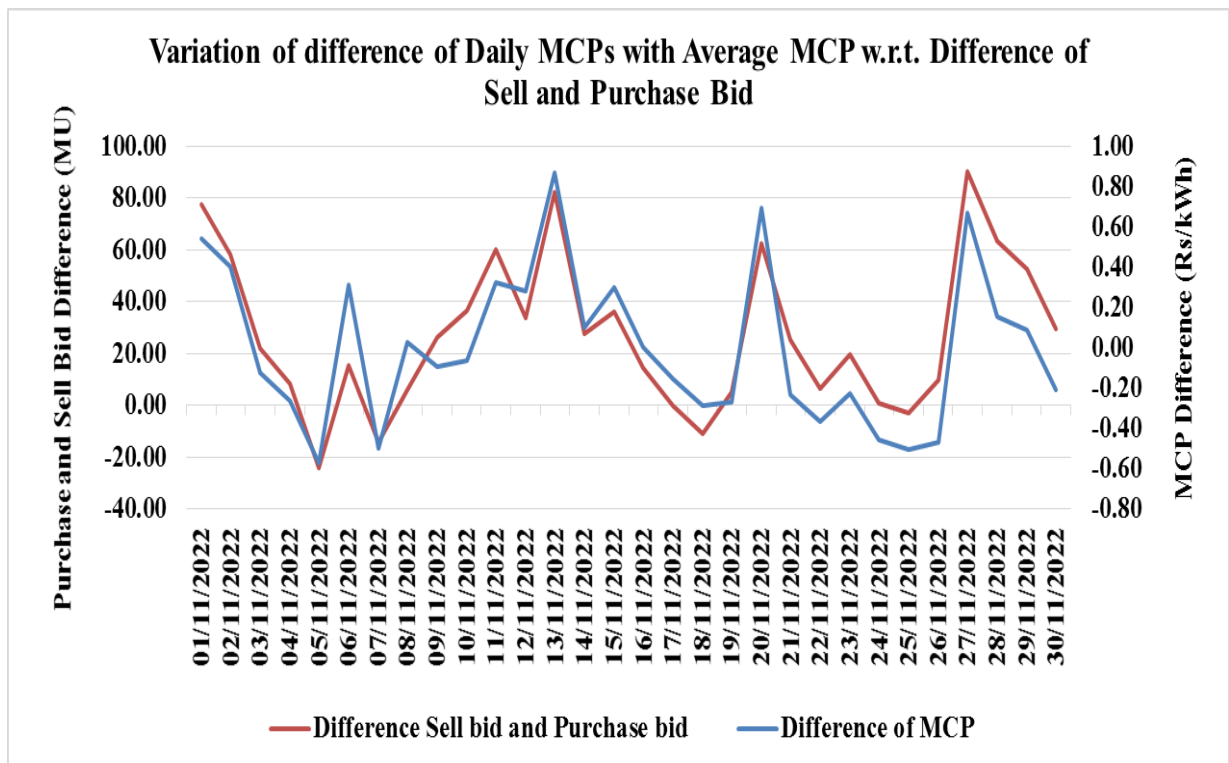


**Figure -1**

## 7. Analysis of movement of prices observed in DAM during November, 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 November, 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 Sell Bid and Total Purchase bid, 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 **0.65** which signifies that there is high multi-collinearity among the predictor variables/ independent variables used in regression analysis.
- 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**

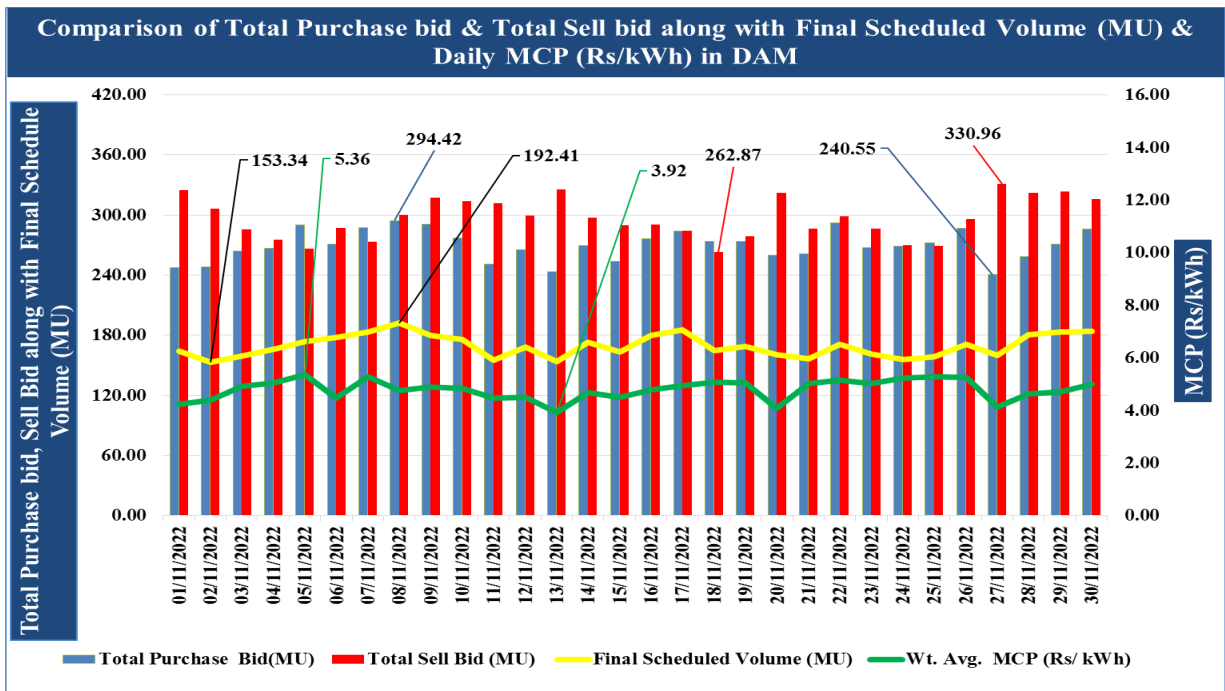


Figure - 2

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 November, 2022, it is observed that on first Sunday (06<sup>th</sup> November, 2022), FSV showed increasing trend in comparison to first Saturday (05<sup>th</sup> November, 2022), on third Monday (21<sup>st</sup> November, 2022), FSV showed decreasing trend in comparison to third Sunday (20<sup>th</sup> November, 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**

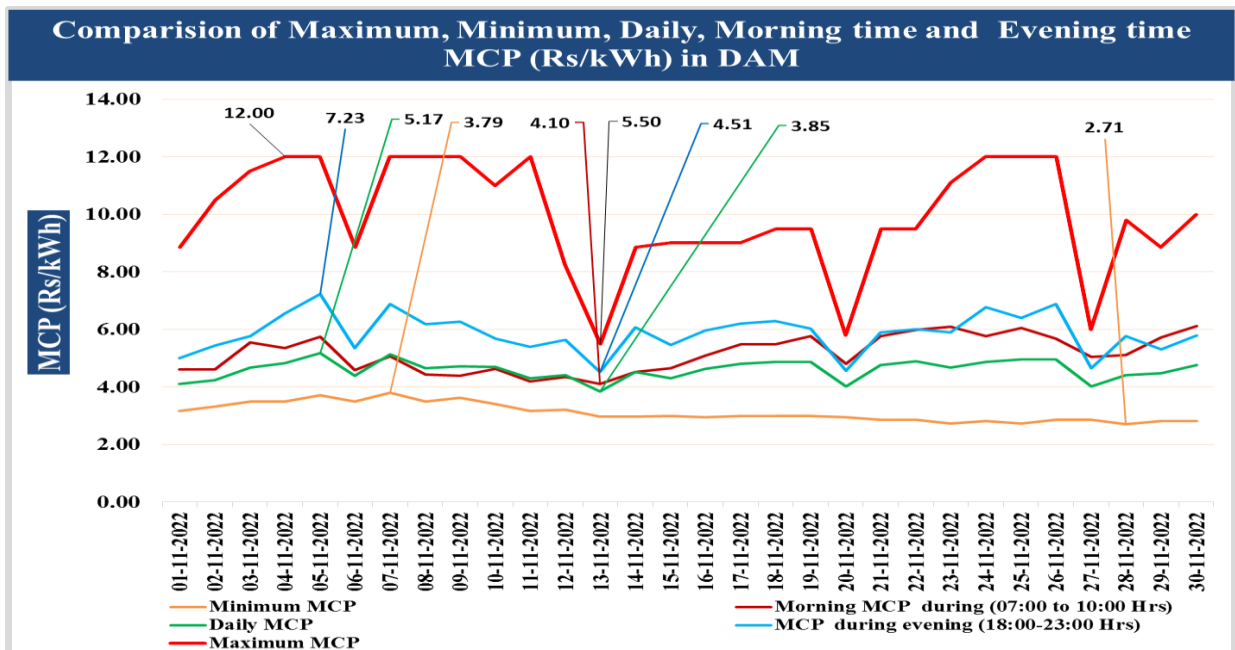
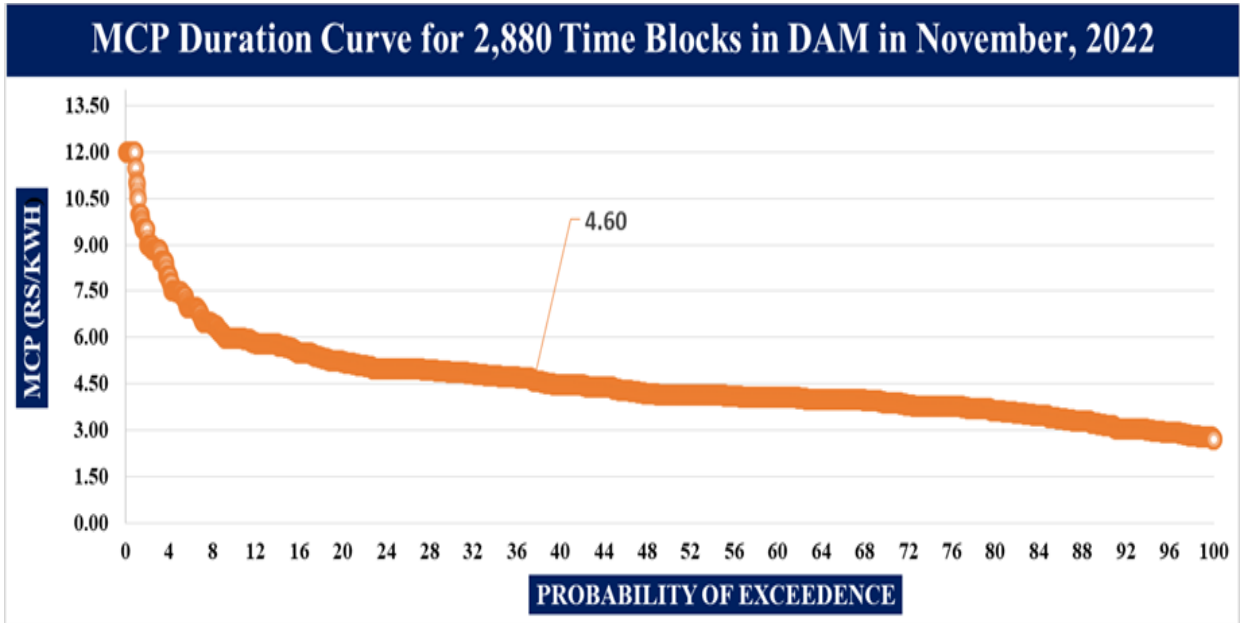
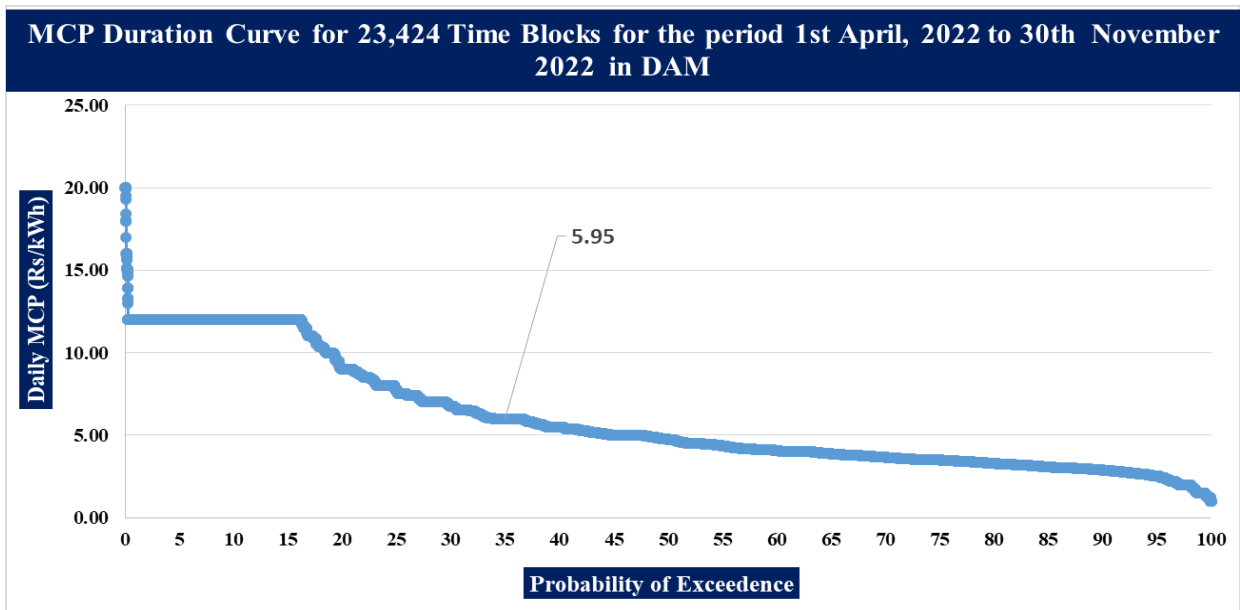


Figure-3

7.7. The Market Clearing Price duration curves for time block wise MCP for the month of November, 2022 is shown in **Figure 4**, whereas the time block wise MCP duration curve for the period 1<sup>st</sup> April, 2022 to 30<sup>th</sup> November, 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 November, 2022, for 38.00 % of the time MCP was above average MCP of the month (i.e. **Rs. 4.60/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 1<sup>st</sup> April, 2022 to 30<sup>th</sup> November, 2022 (figure-5), that for 35.00 % of the time the MCP was above the average MCP for the period (i.e. **Rs. 5.95/kWh**) 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 November, 2022, the maximum FSV occurred mostly during the **time period 07-08 Hrs** (on 12 no. of days). Whereas, the maximum MCP occurred mostly during the **time period 18-19 Hrs** (on 17 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 4-5 Hrs** (on 11 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 3-4 Hrs** (on 23 no. of days). [**Annexure VI**]
- 7.11.** In the month of November, 2022, there was **no** congestion in IEX and no transaction of electricity took place in PXIL & HPX during November, 2022. Further, in the month of October, 2022 and November, 2021, also there was no congestion in Power Exchanges.
- 7.12.** In the month of November, 2022, there was **no** real time curtailment in IEX and no transaction of electricity took place in PXIL & HPX during November, 2022. Further, in the month of October, 2022 and November, 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 **November, 2022** were **Uttar Pradesh, West Bengal, Chhattisgarh, Bihar, Sembcorp Gayatri, NVVN (SNA) – NEA, Telangana, Jindal Power Ltd. Stg-II, Odisha and DB Power**, which constituted **76.28 %** 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 November, 2022 were **Gujarat, Rajasthan, Andhra Pradesh, J&K, Uttarakhand, Maharashtra, Tamil Nadu, Uttar Pradesh, Arcelor Mittal Nippon steel (ESIL) and Daman & Diu - Dadra & Nagar Haveli**, which constituted **87.84 %** of the market volume. [**Annexure VII**]
- 7.15.** The total volume of electricity purchased by Discoms/Licensees in DAM in the month of November, 2022 was **4,861.26 MU**, which constituted **95.62 %** 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 November, 2022 was **3,788.16 MU**, which constituted **74.51 %** of total volume of electricity sold on the power exchanges.

## 8. Analysis of movement of prices observed in Real Time Market (RTM) transactions in November, 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 was the Total Purchase Bid and Total Sell Bid, 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 Purchase Bid was **0.63** which signifies that there is high multi-collinearity among the predictor variables/ independent variables used in regression analysis.

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:

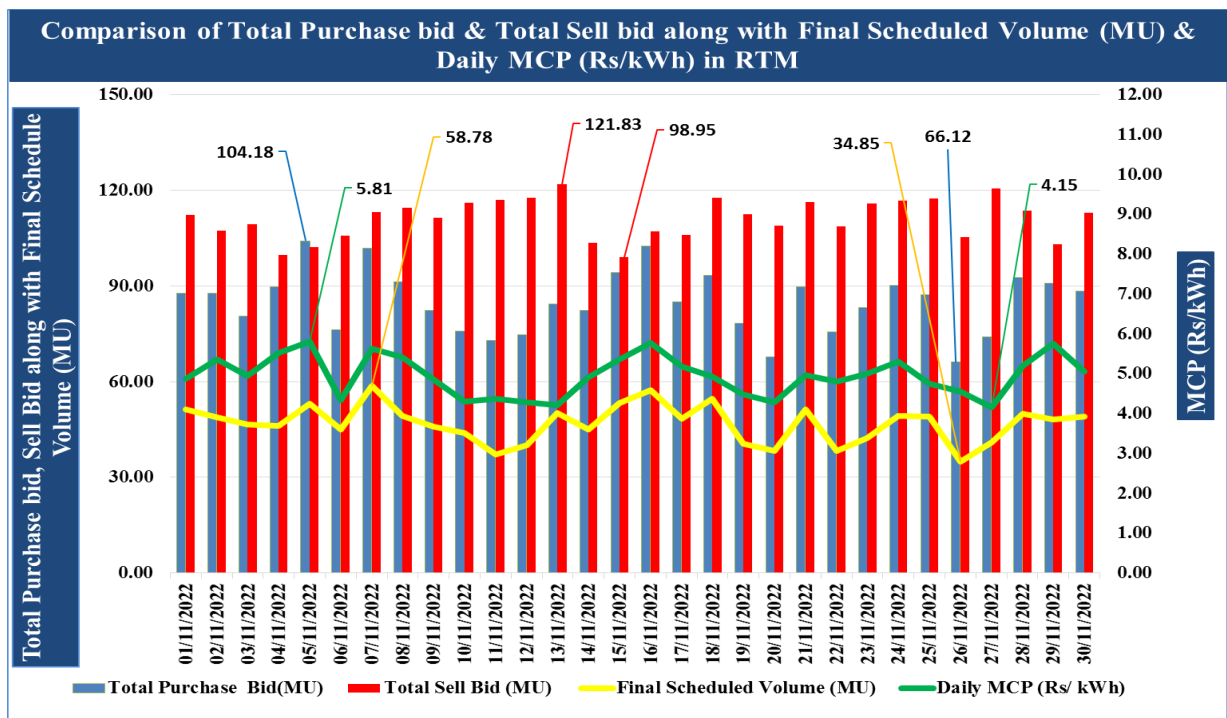


Figure-6

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



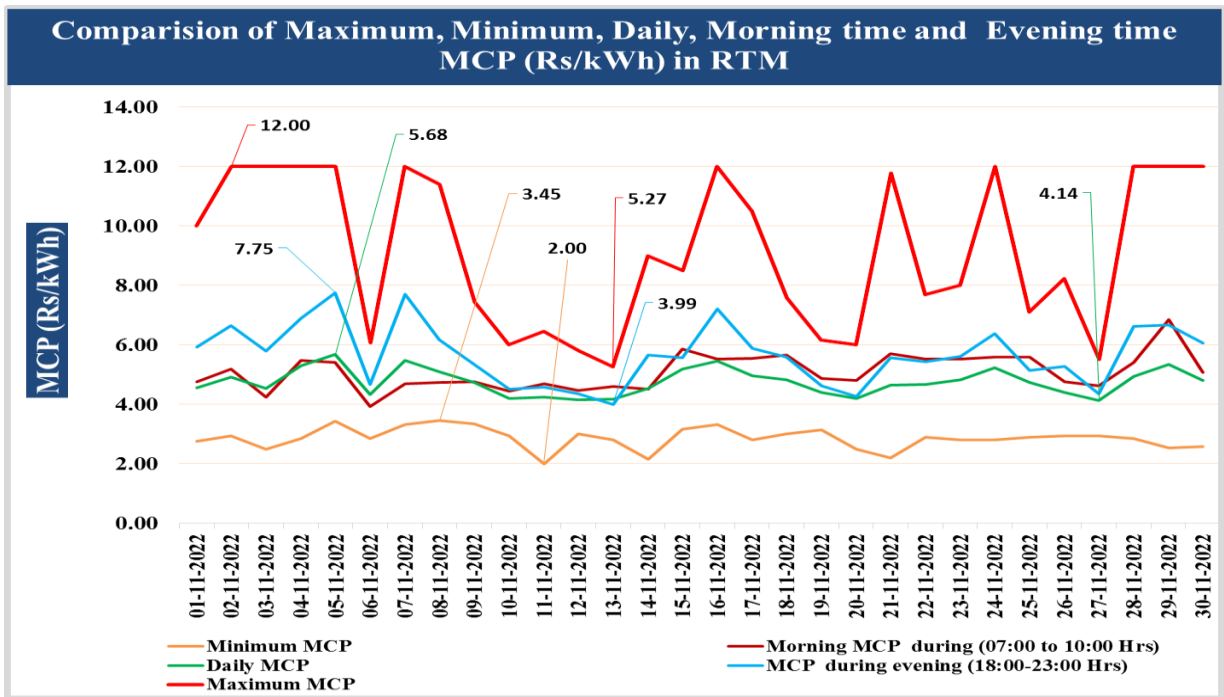


Figure-7

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

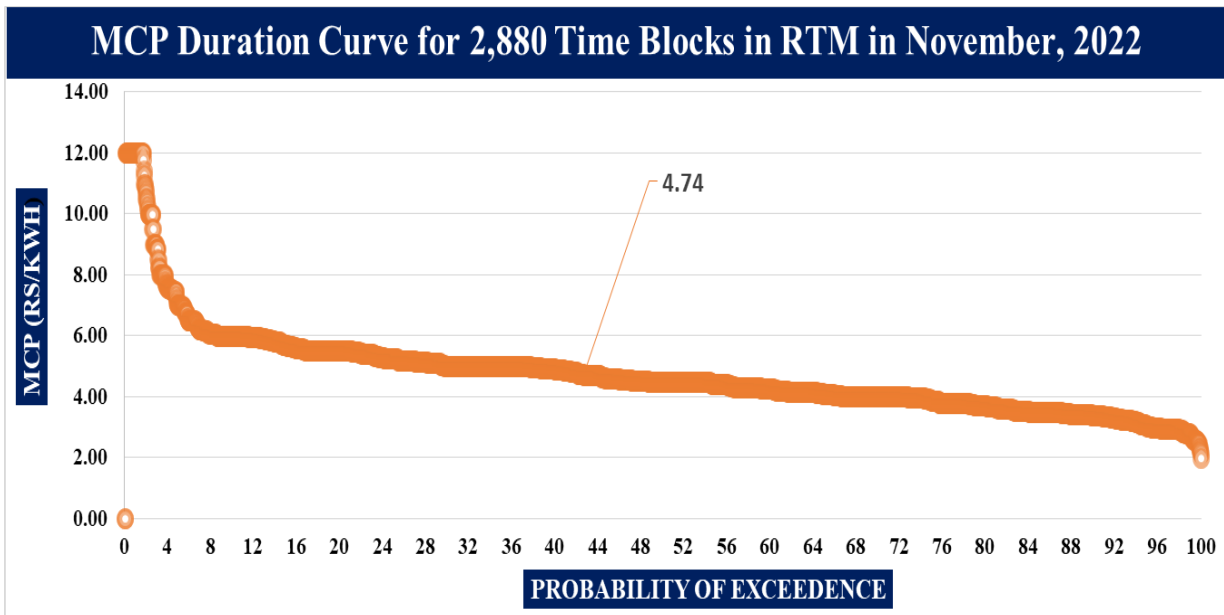
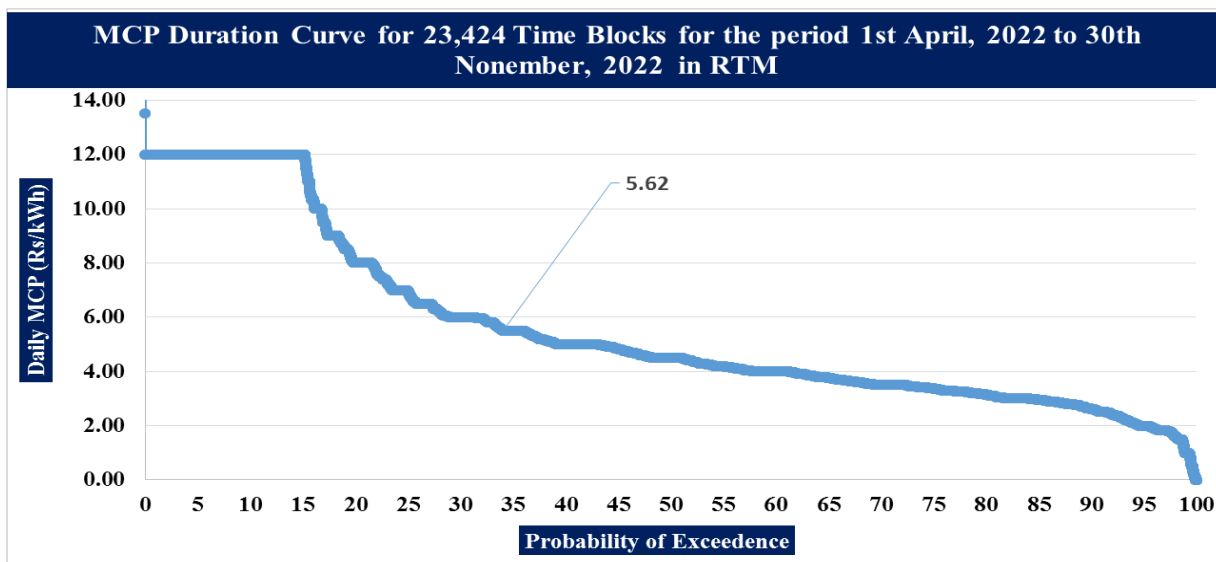


Figure-8



**Figure-9**

- 8.6.** It can be seen in figure 8 above that in the MCP duration curve of November, 2022, for 43.00 % of the time the MCP was above the average MCP of the month (i.e. ₹ 4.74/kWh) and for 57.00 % 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 1<sup>st</sup> April, 2022 to 30<sup>th</sup> November, 2022 (figure 9) that, for 35.00 % of the time the Daily Avg. MCP was above the average MCP for the period (i.e. ₹ 5.62/kWh) and for 65.00 % of the time the Daily Avg. MCP was below the average MCP for the period.
- 8.7.** In November, 2022, the maximum FSV occurred mostly during the **time period 16-18 Hrs** (on 9 no. of days). Whereas, the maximum MCP also occurred mostly during the **time period 18-19 Hrs** (on 13 no. of days). Similarly, the minimum FSV occurred mostly during the **time period 4-6 Hrs** (on 6 no. of days). Whereas, the minimum MCP occurred mostly during the **time period 13-14 Hrs** (on 20 no. of days).[Annexure X]
- 8.8.** There was **no** real time curtailment in IEX in Real Time Market (RTM) during November, 2022 and no transaction happened in PXIL and HPX. Further, in October, 2022 **no** real time curtailment occurred in IEX, whereas, no transaction happened in PXIL and HPX. Similarly, in November, 2021, there was no real time curtailment in IEX and no transaction of electricity happened in PXIL.
- 8.9.** In the month of November, 2022 there was **no** congestion in IEX and no transaction happened in PXIL & HPX. Further, in the month of October, 2022, there was no congestion in the transmission system in IEX & PXIL and no transaction happened in HPX. In the month of November, 2021, there was transmission congestion of **1.14 MU** in IEX, whereas, in PXIL, no transaction of electricity happened in November, 2021.
- 8.10.** The **top 10 sellers** on the power exchanges in **Real Time Market (RTM)** in the month of November, 2022 were **Bihar, West Bengal, Uttar Pradesh, Odisha, Madhya Pradesh,**

**Chhattisgarh, Kameng HEP, Telangana, Himachal Pradesh and Delhi**, which constituted **73.56 %** of the market volume. [Annexure XI]

**8.11.** The **top 10 buyers** on the power exchanges in **Real Time Market (RTM)** in the month of November, 2022 were **Rajasthan, J&K, Gujarat, Maharashtra Telangana, Tamil Nadu, Andhra Pradesh Delhi, Uttar Pradesh and Punjab**, which constituted **82.84 %** of the market volume. [Annexure XI]

**8.12.** The total volume of electricity purchased by Discoms/Licensees in RTM in the month of November, 2022 was **1,319.55 MU**, which constituted **97.18 %** 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 November, 2022 was **1,123.44 MU**, which constituted **82.74 %** 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**

<b>Final Scheduled Volume, Average MCP and Real-Time Curtailment in Day Ahead Market (DAM) for the months of April, 2022 to November, 2022 of IEX and PXIL</b>							
<b>Quarter</b>	<b>Months</b>	<b>Final Scheduled Volume (MU)</b>		<b>Market Clearing Price (₹/kWh)</b>		<b>Real Time Curtailment (MU)</b>	
		<b>IEX</b>	<b>PXIL</b>	<b>IEX</b>	<b>PXIL</b>	<b>IEX</b>	<b>PXIL</b>
<b>Quarter -I</b>	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
<b>Total Quarter -I</b>	<b>April - June, 2022</b>	<b>11,371.14</b>	<b>129.22</b>	<b>7.87</b>	<b>6.38</b>	<b>8.86</b>	<b>0</b>
<b>Quarter -II</b>	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
<b>Total Quarter -II</b>	<b>July - September , 2022</b>	<b>11,095.00</b>	<b>54.79</b>	<b>5.51</b>	<b>5.55</b>	<b>0.00</b>	<b>0.00</b>
<b>Quarter -III</b>	October, 2022	4,325.01	3.01	3.96	4.64	0	0
	November, 2022	5,083.85	0	4.79	0	0	0
<b>Total April, 2022 – November, 2022</b>		<b>31,875.00</b>	<b>187.02</b>	<b>6.03</b>	<b>6.11</b>	<b>8.86</b>	<b>0.00</b>

<b>Final Scheduled Volume in Term Ahead Market (TAM) for the months of April, 2022 to November, 2022 of IEX, PXIL and HPX (Delivery date basis)</b>					
<b>Quarter</b>	<b>Months</b>	<b>Final Scheduled Volume (MU)</b>			
		<b>IEX</b>	<b>PXIL</b>	<b>HPX</b>	<b>Total</b>
<b>Quarter -I</b>	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
<b>Total Quarter – I</b>	<b>April - June, 2022</b>	<b>3,119.13</b>	<b>3,664.20</b>	<b>-</b>	<b>6,783.33</b>
<b>Quarter-II</b>	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
<b>Total Quarter - II</b>	<b>July - September , 2022</b>	<b>2,038.13</b>	<b>1,498.75</b>	<b>579.39</b>	<b>4,116.27</b>
<b>Quarter -III</b>	October , 2022	523.90	299.40	90.78	914.08
	November, 2022	547.33	492.13	155.43	1,194.89
<b>Total April, 2022 - November, 2022</b>		<b>6,228.49</b>	<b>5,954.48</b>	<b>825.60</b>	<b>13,008.57</b>

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

### (i) Top five Buyers in Bilateral transactions

Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Madhya Pradesh	826.96	38.76%	Maharashtra	509.88	17.55%
Rajasthan	381.81	17.90%	Gujarat	470.42	16.20%
Maharashtra	295.37	13.84%	Himachal Pradesh	353.96	12.19%
Haryana	218.64	10.25%	Andhra Pradesh	274.89	9.46%
Telangana	95.67	4.48%	Rajasthan	180.58	6.22%
<b>Total Volume</b>	<b>1,818.40</b>	<b>85.23%</b>	<b>Total Volume</b>	<b>1,789.74</b>	<b>61.62%</b>
<b>Total Volume in Bilateral</b>	<b>2,133.41</b>		<b>Total Volume in Bilateral</b>	<b>2,904.68</b>	

### (ii) Top five Sellers in Bilateral transactions

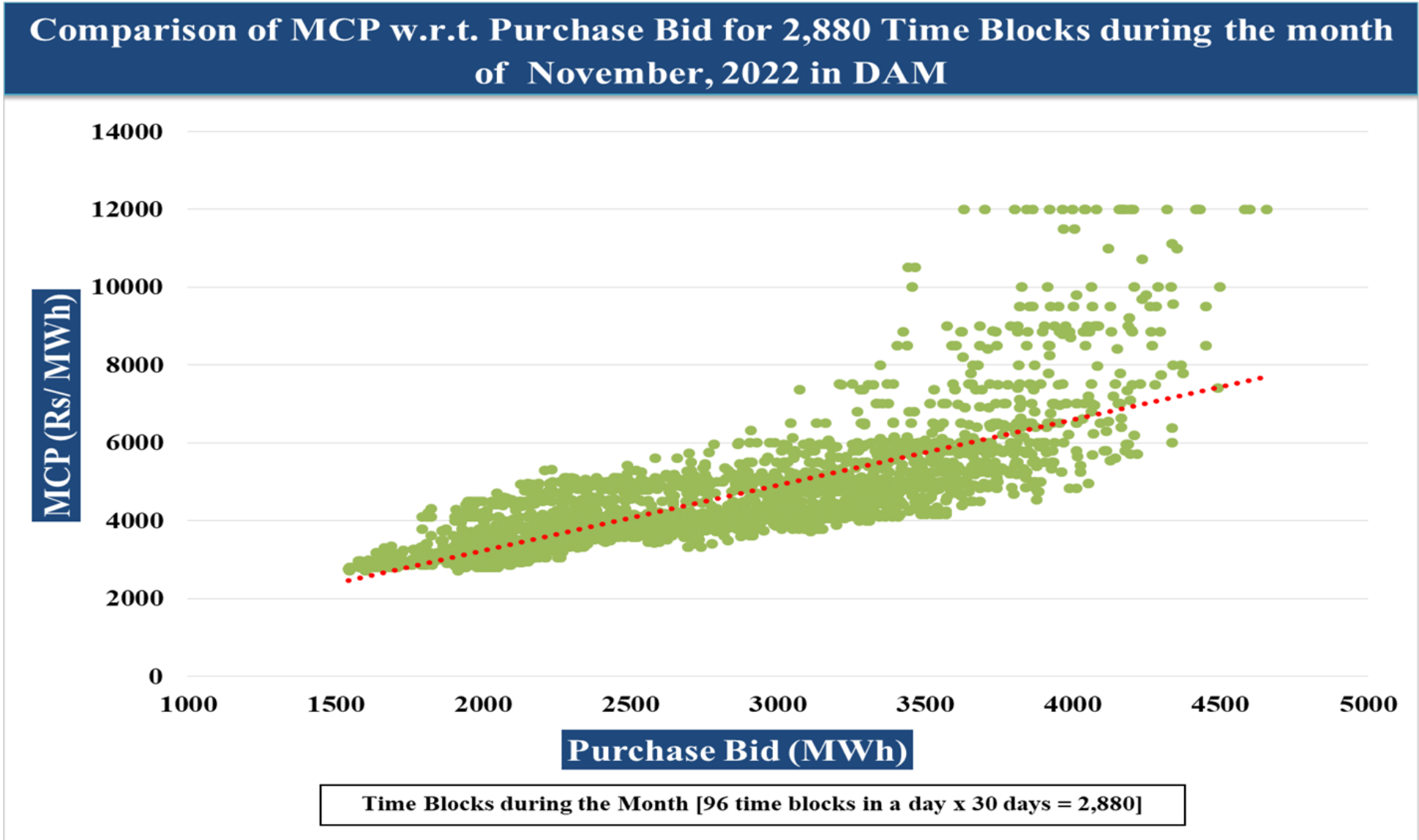
Entity Name	Direct		Entity Name	Through Traders	
	(MU)	Percent		(MU)	Percent
Punjab	450.21	21.10%	RAIPUR ENERGEN	372.09	12.81%
Uttar Pradesh	306.00	14.34%	Delhi	316.16	10.88%
Telangana	209.53	9.82%	Gujarat	188.54	6.49%
ADANI HYBRID ENERGY JAISALMER	119.88	5.62%	Bihar	180.00	6.20%
Damodar Valley Corporation	117.88	5.53%	Jindal Power Limited, Stage-2	179.09	6.17%
<b>Total Volume</b>	<b>1203.50</b>	<b>56.41%</b>	<b>Total Volume</b>	<b>1,222.10</b>	<b>10.88%</b>
<b>Total Volume in Bilateral</b>	<b>2133.41</b>		<b>Total Volume in Bilateral</b>	<b>2,888.17</b>	

**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)
01-11-2022	4.61	3.62	4.99	3.51	8.86	3.17	4.10	164.09
02-11-2022	4.60	3.62	5.43	3.64	10.50	3.32	4.24	153.34
03-11-2022	5.54	4.06	5.77	3.82	11.50	3.50	4.66	159.02
04-11-2022	5.36	4.05	6.56	3.78	12.00	3.50	4.82	166.30
05-11-2022	5.74	4.23	7.23	4.03	12.00	3.72	5.17	173.71
06-11-2022	4.59	3.92	5.35	3.89	8.86	3.50	4.38	178.18
07-11-2022	5.06	4.64	6.89	4.19	12.00	3.79	5.14	183.75
08-11-2022	4.43	4.19	6.19	3.93	12.00	3.50	4.65	192.41
09-11-2022	4.39	4.35	6.26	3.94	12.00	3.62	4.72	180.18
10-11-2022	4.64	4.71	5.67	3.84	11.00	3.41	4.69	176.07
11-11-2022	4.19	4.17	5.39	3.59	12.00	3.17	4.31	155.30
12-11-2022	4.35	4.04	5.64	3.75	8.25	3.22	4.41	168.32
13-11-2022	4.10	3.75	4.51	3.24	5.50	2.96	3.85	153.77
14-11-2022	4.51	4.35	6.07	3.38	8.86	2.96	4.52	173.37
15-11-2022	4.65	4.14	5.46	3.28	9.00	3.00	4.30	163.29
16-11-2022	5.08	4.51	5.96	3.36	9.00	2.94	4.63	180.14
17-11-2022	5.48	4.50	6.21	3.49	9.00	3.00	4.80	185.49
18-11-2022	5.47	4.63	6.29	3.52	9.50	2.98	4.86	164.86
19-11-2022	5.77	4.61	6.04	3.58	9.50	3.00	4.86	168.73
20-11-2022	4.81	3.84	4.56	3.30	5.80	2.94	4.02	160.84
21-11-2022	5.76	4.74	5.91	3.25	9.50	2.86	4.77	156.76
22-11-2022	5.99	4.99	6.01	3.20	9.50	2.85	4.89	170.74
23-11-2022	6.10	4.47	5.90	3.04	11.11	2.72	4.68	161.14
24-11-2022	5.76	4.44	6.76	3.17	12.00	2.81	4.87	155.74
25-11-2022	6.05	4.81	6.41	3.21	12.00	2.72	4.95	158.64
26-11-2022	5.68	4.52	6.88	3.32	12.00	2.85	4.95	171.36
27-11-2022	5.05	3.68	4.64	3.26	6.00	2.85	4.03	159.76
28-11-2022	5.10	4.23	5.77	3.06	9.80	2.71	4.42	180.72
29-11-2022	5.73	4.51	5.31	3.04	8.87	2.81	4.48	183.51
30-11-2022	6.11	4.72	5.78	3.13	10.00	2.81	4.75	184.32
<b>Maximum</b>	<b>6.11</b>	<b>4.99</b>	<b>7.23</b>	<b>4.19</b>	<b>12.00</b>	<b>3.79</b>	<b>5.17</b>	<b>192.41</b>
<b>Minimum</b>	<b>4.10</b>	<b>3.62</b>	<b>4.51</b>	<b>3.04</b>	<b>5.50</b>	<b>2.71</b>	<b>3.85</b>	<b>153.34</b>
<b>Average</b>	<b>5.16</b>	<b>4.30</b>	<b>5.86</b>	<b>3.49</b>	<b>9.93</b>	<b>3.11</b>	<b>4.60</b>	<b>169.46</b>

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)





**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
01-11-2022	07:00 - 07:15	2.68	18:45 - 19:00	8.86	03:45 - 04:00	1.20	03:45 - 04:00	3.17
02-11-2022	07:00 - 07:15	2.67	18:30 - 18:45	10.50	04:15 - 04:30	1.08	13:15 - 13:30	3.32
03-11-2022	07:00 - 07:15	2.63	18:30 - 18:45	11.50	04:15 - 04:30	1.07	13:15 - 13:30	3.50
04-11-2022	07:00 - 07:15	2.62	18:30 - 18:45	12.00	03:45 - 04:00	1.15	03:30 - 03:45	3.50
05-11-2022	07:00 - 07:15	2.65	17:45 - 18:00	12.00	03:45 - 04:00	1.30	13:15 - 13:30	3.72
06-11-2022	07:00 - 07:15	2.62	18:45 - 19:00	8.86	03:45 - 04:00	1.33	13:15 - 13:30	3.50
07-11-2022	07:00 - 07:15	2.67	17:45 - 18:00	12.00	04:15 - 04:30	1.19	03:45 - 04:00	3.79
08-11-2022	07:00 - 07:15	2.74	18:15 - 18:30	12.00	04:15 - 04:30	1.30	04:00 - 04:15	3.50
09-11-2022	18:15 - 18:30	2.73	18:15 - 18:30	12.00	04:30 - 04:45	1.06	04:00 - 04:15	3.62
10-11-2022	18:45 - 19:00	2.52	18:30 - 18:45	11.00	04:15 - 04:30	0.98	04:00 - 04:15	3.41
11-11-2022	07:00 - 07:15	2.31	18:30 - 18:45	12.00	04:45 - 05:00	0.91	03:45 - 04:00	3.17
12-11-2022	16:45 - 17:00	2.52	17:45 - 18:00	8.25	04:45 - 05:00	1.09	03:30 - 03:45	3.22
13-11-2022	09:45 - 10:00	2.26	18:45 - 19:00	5.50	22:00 - 22:15	1.04	03:30 - 03:45	2.96
14-11-2022	07:00 - 07:15	2.54	18:30 - 18:45	8.86	00:15 - 00:30	1.15	03:45 - 04:00	2.96
15-11-2022	18:00 - 18:15	2.41	18:30 - 18:45	9.00	00:00 - 00:15	1.15	03:15 - 03:30	3.00
16-11-2022	16:30 - 16:45	2.48	18:45 - 19:00	9.00	21:30 - 21:45	1.25	03:15 - 03:30	2.94
17-11-2022	16:45 - 17:00	2.67	18:45 - 19:00	9.00	22:00 - 22:15	1.26	03:15 - 03:30	3.00
18-11-2022	16:45 - 17:00	2.50	18:15 - 18:30	9.50	22:00 - 22:15	1.05	03:15 - 03:30	2.98
19-11-2022	18:15 - 18:30	2.51	18:00 - 18:15	9.50	22:00 - 22:15	1.21	03:30 - 03:45	3.00
20-11-2022	07:15 - 07:30	2.35	17:45 - 18:00	5.80	21:30 - 21:45	1.14	03:30 - 03:45	2.94
21-11-2022	18:00 - 18:15	2.35	17:45 - 18:00	9.50	00:00 - 00:15	1.20	03:00 - 03:15	2.86
22-11-2022	18:00 - 18:15	2.59	17:45 - 18:00	9.50	22:00 - 22:15	1.25	03:45 - 04:00	2.85
23-11-2022	16:00 - 16:15	2.50	17:45 - 18:00	11.11	23:45 - 24:00	1.14	03:15 - 03:30	2.72
24-11-2022	18:15 - 18:30	2.48	17:45 - 18:00	12.00	04:45 - 05:00	1.04	03:15 - 03:30	2.81
25-11-2022	18:00 - 18:15	2.50	17:45 - 18:00	12.00	04:45 - 05:00	1.03	03:15 - 03:30	2.72
26-11-2022	18:00 - 18:15	2.73	17:45 - 18:00	12.00	03:45 - 04:00	1.23	03:00 - 03:15	2.85
27-11-2022	07:15 - 07:30	2.32	08:15 - 08:30	6.00	03:15 - 03:30	1.28	03:15 - 03:30	2.85
28-11-2022	18:00 - 18:15	2.86	18:00 - 18:15	9.80	04:15 - 04:30	1.40	03:00 - 03:15	2.71
29-11-2022	18:00 - 18:15	2.92	17:45 - 18:00	8.87	03:00 - 03:15	1.47	03:00 - 03:15	2.81
30-11-2022	18:15 - 18:30	2.78	17:45 - 18:00	10.00	23:30 - 23:45	1.41	03:00 - 03:15	2.81

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

**Annexure-VII**

Sellers and Buyers in Day Ahead Market (DAM) in the month of November, 2022						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Uttar Pradesh	1127.05	22.17	Gujarat	1460.86	28.74%
2	West Bengal	977.42	19.23	Rajasthan	717.98	14.12%
3	Chhattisgarh	481.41	9.47%	Andhra Pradesh	526.56	10.36%
4	Bihar	463.21	9.11%	J&K	481.32	9.47%
5	Sembcorp Gayatri	210.14	4.13%	Uttarakhand	285.44	5.61%
6	NVVN (SNA) - NEA	176.39	3.47%	Maharashtra	257.39	5.06%
7	Telangana	146.68	2.89%	Tamil Nadu	218.90	4.31%
8	Jindal Power Ltd.	112.18	2.21%	Uttar Pradesh	208.64	4.10%
9	Orissa	94.77	1.86%	ArcelorMittal Nippon	186.41	3.67%
10	DB Power	88.49	1.74%	Daman & Diu - Dadra	122.28	2.41%
11	Raipur Energen	88.48	1.74%	Punjab	114.10	2.24%
12	JITPL	87.52	1.72%	West Bengal	73.74	1.45%
13	Teesta -3	78.47	1.54%	Delhi	63.83	1.26%
14	Himachal Pradesh	77.28	1.52%	Telangana	62.10	1.22%
15	ACBIL	75.63	1.49%	Madhya Pradesh	55.36	1.09%
16	Mahan Energy	69.08	1.36%	Karnataka	50.36	0.99%
17	Madhya Pradesh	60.25	1.19%	Assam	47.14	0.93%
18	Jindal Power	59.54	1.17%	Orissa	45.24	0.89%
19	Karnataka	58.00	1.14%	Haryana	31.05	0.61%
20	Haryana	50.49	0.99%	Railways	25.51	0.50%
21	Maharashtra	48.68	0.96%	Kerala	19.43	0.38%
22	Jaypee Nigrie	43.86	0.86%	Goa SR	9.88	0.19%
23	RKM Power	40.33	0.79%	Jharkhand	4.43	0.09%
24	Sembcorp Energy	39.32	0.77%	Goa WR	3.86	0.08%
25	Assam	34.58	0.68%	Himachal Pradesh	3.83	0.08%
26	Goa WR	30.87	0.61%	Chandigarh	3.10	0.06%
27	Maruti Clean Coal	21.22	0.42%	Meghalaya	2.33	0.05%
28	DVC	17.45	0.34%	Bihar	1.34	0.03%
29	Delhi	17.34	0.34%	BALCO 2	0.78	0.02%
30	Rajasthan	14.52	0.29%	Chhattisgarh	0.46	0.01%
31	Chandigarh	13.71	0.27%	Tripura	0.18	0.00%
32	Tamil Nadu	13.63	0.27%			
33	Talcher Stg-2	13.50	0.27%			
34	Andhra Pradesh	12.81	0.25%			
35	Palatana	12.55	0.25%			
36	Sainj HEP	10.54	0.21%			
37	Adani Green Energy	9.73	0.19%			
38	Gujarat	8.96	0.18%			
39	J&K	8.53	0.17%			
40	Karcham Wangtoo	8.00	0.16%			
41	MB Power	7.58	0.15%			
42	Kerala	6.76	0.13%			
43	AD Hydro	6.58	0.13%			
44	Nagaland	6.09	0.12%			
4	Mizoram	5.65	0.11%			
46	SKS Power	5.46	0.11%			

47	GMR Kamalanga	5.28	0.10%			
48	Kameng HEP	5.10	0.10%			
49	Sikkim	4.39	0.09%			
50	Coastal Gujrat Power	4.03	0.08%			
51	GMR Warora	3.29	0.06%			
52	Dikchu	3.09	0.06%			
53	Punjab	2.75	0.05%			
54	Chuzachen	2.47	0.05%			
55	Arunachal Pradesh	2.43	0.05%			
56	Meghalaya	2.16	0.04%			
57	Lanco Budhil	1.14	0.02%			
58	Ramagundam Stg-1	0.70	0.01%			
59	Bongaigaon	0.62	0.01%			
60	Talcher	0.58	0.01%			
61	Raigarh Energy Ltd.	0.57	0.01%			
62	Jorethang	0.56	0.01%			
63	Ramagundam Stg-3	0.54	0.01%			
64	Simhadri Stg-2	0.53	0.01%			
65	Ostro Energy Private	0.52	0.01%			
66	Sorang HEP,	0.44	0.01%			
67	Singoli Bhagwati	0.42	0.01%			
68	Tashiding HEP	0.35	0.01%			
69	Adhunik Power	0.26	0.01%			
70	IL&FS	0.17	0.00%			
71	Kahalgaon	0.16	0.00%			
72	Manipur	0.15	0.00%			
73	Uttarakhand	0.14	0.00%			
74	Dhariwal	0.10	0.00%			
75	Farakka	0.10	0.00%			
76	Renew Surya Ravi	0.07	0.00%			
<b>Total Volume of top 10</b>		<b>3,877.74</b>	<b>76.28</b>	<b>Total Volume of top 10</b>	<b>4,465.7</b>	<b>87.84%</b>
<b>Total Volume in PXs</b>		<b>5,083.85</b>		<b>Total Volume in PXs</b>	<b>5,083.8</b>	

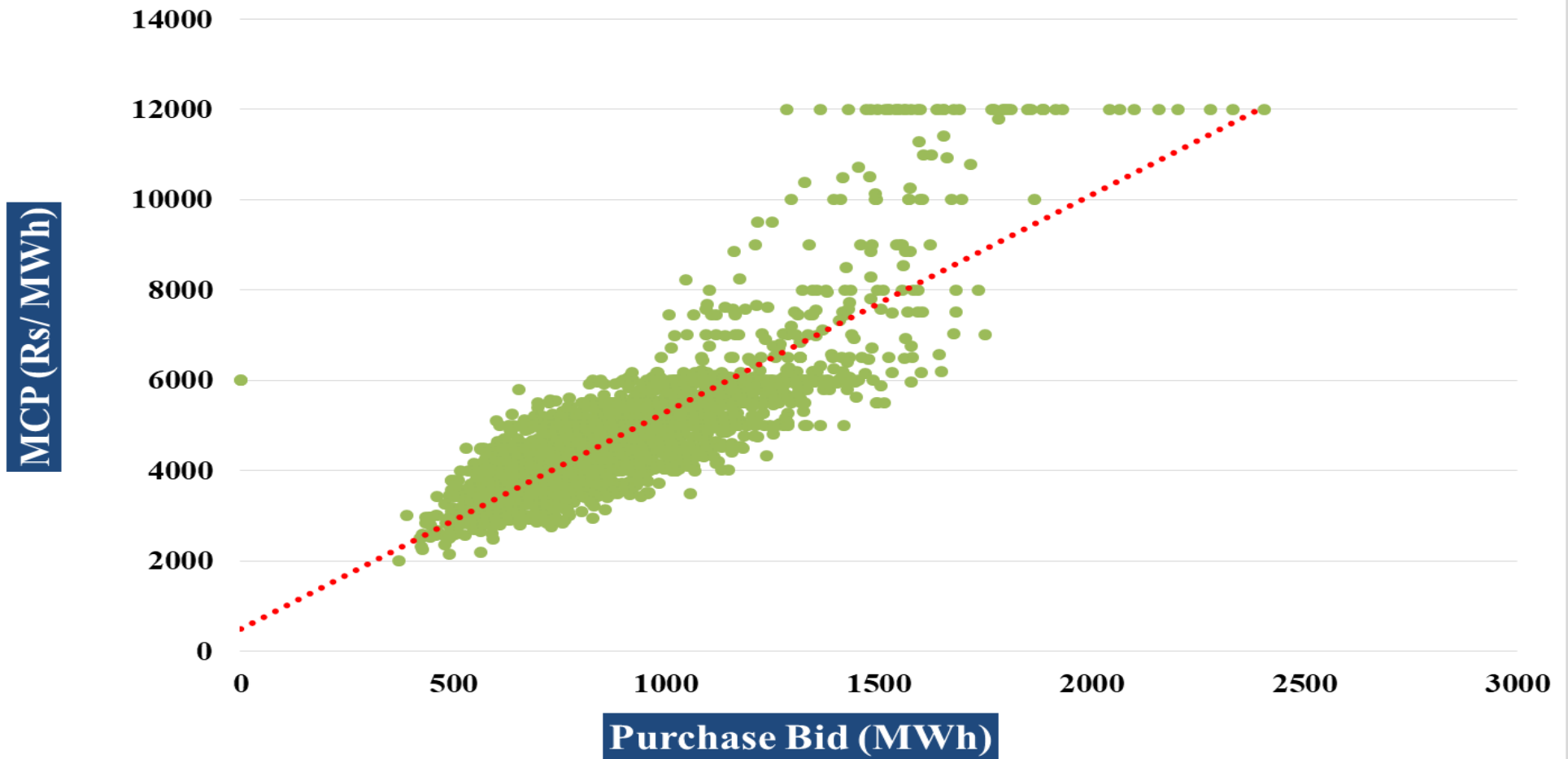
**Evening, Day, Night, Morning, Maximum, Minimum, Average MCP (₹/kWh) and Final Scheduled Volume (MU) in RTM**

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)
01-11-2022	4.75	4.12	5.92	3.74	10.00	2.75	4.57	51.31
02-11-2022	5.19	4.40	6.65	3.81	12.00	2.94	4.92	48.91
03-11-2022	4.25	4.49	5.80	3.70	12.00	2.48	4.54	46.62
04-11-2022	5.49	4.92	6.89	4.22	12.00	2.85	5.30	46.00
05-11-2022	5.41	4.75	7.75	5.00	12.00	3.43	5.68	53.11
06-11-2022	3.93	4.42	4.67	4.20	6.07	2.84	4.34	45.00
07-11-2022	4.69	5.23	7.70	4.24	12.00	3.32	5.47	58.78
08-11-2022	4.74	4.86	6.19	4.63	11.41	3.45	5.10	49.22
09-11-2022	4.77	4.87	5.35	4.05	7.45	3.35	4.73	45.94
10-11-2022	4.45	4.26	4.50	3.74	6.00	2.93	4.20	43.93
11-11-2022	4.69	4.30	4.58	3.67	6.45	2.00	4.25	37.22
12-11-2022	4.47	4.13	4.37	3.79	5.80	3.00	4.15	40.03
13-11-2022	4.60	4.26	3.99	4.03	5.27	2.80	4.18	50.18
14-11-2022	4.50	4.89	5.67	3.25	9.01	2.15	4.54	45.05
15-11-2022	5.87	5.31	5.57	4.35	8.50	3.17	5.19	53.38
16-11-2022	5.52	5.17	7.22	4.20	12.00	3.33	5.46	57.34
17-11-2022	5.55	4.87	5.89	3.92	10.49	2.81	4.96	48.32
18-11-2022	5.67	4.65	5.60	3.84	7.57	3.00	4.82	54.74
19-11-2022	4.87	4.40	4.62	3.93	6.17	3.15	4.40	40.61
20-11-2022	4.82	4.42	4.27	3.53	6.00	2.50	4.19	38.37
21-11-2022	5.70	5.00	5.57	2.88	11.79	2.20	4.64	51.16
22-11-2022	5.53	4.72	5.42	3.47	7.69	2.90	4.67	38.33
23-11-2022	5.53	5.17	5.62	3.42	8.00	2.81	4.83	42.40
24-11-2022	5.60	5.53	6.37	3.73	12.00	2.81	5.23	49.18
25-11-2022	5.59	4.88	5.14	3.76	7.10	2.90	4.74	48.94
26-11-2022	4.75	4.41	5.28	3.47	8.22	2.93	4.41	34.85
27-11-2022	4.62	4.22	4.36	3.58	5.51	2.94	4.14	40.87
28-11-2022	5.42	4.84	6.64	3.29	12.00	2.85	4.93	50.02
29-11-2022	6.85	5.14	6.67	3.35	12.00	2.53	5.34	48.08
30-11-2022	5.08	5.31	6.07	3.09	12.00	2.57	4.81	48.99
<b>Maximum</b>	<b>6.85</b>	<b>5.53</b>	<b>7.75</b>	<b>5.00</b>	<b>12.00</b>	<b>3.45</b>	<b>5.68</b>	<b>58.78</b>
<b>Minimum</b>	<b>3.93</b>	<b>4.12</b>	<b>3.99</b>	<b>2.88</b>	<b>5.27</b>	<b>2.00</b>	<b>4.14</b>	<b>34.85</b>
<b>Average</b>	<b>5.10</b>	<b>4.73</b>	<b>5.68</b>	<b>3.80</b>	<b>9.15</b>	<b>2.86</b>	<b>4.76</b>	<b>46.90</b>

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

# Comparison of MCP w.r.t. Purchase Bid for 2,880 Time Blocks during the month of November, 2022 in RTM



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

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

Date	Max. FSV (MU)		Max. MCP (₹/kWh)		Min FSV (MU)		Min. MCP (₹/kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01-11-2022	18:15 - 18:30	0.95	17:45 - 18:00	10.00	04:45 - 05:00	0.19	13:15 - 13:30	2.75
02-11-2022	17:00 - 17:15	0.95	17:30 - 17:45	12.00	04:00 - 04:15	0.16	23:30 - 23:45	2.94
03-11-2022	17:30 - 17:45	0.90	17:45 - 18:00	12.00	03:30 - 03:45	0.17	09:15 - 09:30	2.48
04-11-2022	16:30 - 16:45	0.71	17:30 - 17:45	12.00	02:15 - 02:30	0.24	23:45 - 24:00	2.85
05-11-2022	17:00 - 17:15	0.82	17:15 - 17:30	12.00	03:45 - 04:00	0.30	13:00 - 13:15	3.43
06-11-2022	11:45 - 12:00	0.75	17:45 - 18:00	6.07	01:30 - 01:45	0.17	15:00 - 15:15	2.84
07-11-2022	20:45 - 21:00	0.98	17:30 - 17:45	12.00	05:30 - 05:45	0.30	03:45 - 04:00	3.32
08-11-2022	19:15 - 19:30	1.09	18:45 - 19:00	11.41	03:00 - 03:15	0.19	03:15 - 03:30	3.45
09-11-2022	16:30 - 16:45	0.73	17:30 - 17:45	7.45	05:15 - 05:30	0.22	20:00 - 20:15	3.35
10-11-2022	17:45 - 18:00	0.76	17:45 - 18:00	6.00	04:45 - 05:00	0.27	03:45 - 04:00	2.93
11-11-2022	15:45 - 16:00	0.58	18:00 - 18:15	6.45	03:15 - 03:30	0.22	20:45 - 21:00	2.00
12-11-2022	18:45 - 19:00	0.77	18:00 - 18:15	5.80	02:15 - 02:30	0.18	19:45 - 20:00	3.00
13-11-2022	07:30 - 07:45	0.88	06:45 - 07:00	5.27	04:15 - 04:30	0.34	04:00 - 04:15	2.80
14-11-2022	18:30 - 18:45	0.85	18:00 - 18:15	9.01	05:30 - 05:45	0.24	04:00 - 04:15	2.15
15-11-2022	16:30 - 16:45	0.93	17:30 - 17:45	8.50	05:15 - 05:30	0.31	03:45 - 04:00	3.17
16-11-2022	21:00 - 21:15	0.93	18:00 - 18:15	12.00	04:45 - 05:00	0.31	03:45 - 04:00	3.33
17-11-2022	18:15 - 18:30	0.90	17:45 - 18:00	10.49	23:30 - 23:45	0.24	04:00 - 04:15	2.81
18-11-2022	15:45 - 16:00	0.89	18:00 - 18:15	7.57	05:15 - 05:30	0.36	23:45 - 24:00	3.00
19-11-2022	08:15 - 08:30	0.72	17:15 - 17:30	6.17	04:45 - 05:00	0.16	13:00 - 13:15	3.15
20-11-2022	09:00 - 09:15	0.63	18:00 - 18:15	6.00	04:30 - 04:45	0.26	19:30 - 19:45	2.50
21-11-2022	16:30 - 16:45	0.88	17:30 - 17:45	11.79	00:00 - 00:15	0.24	04:00 - 04:15	2.20
22-11-2022	08:45 - 09:00	0.77	18:00 - 18:15	7.69	15:15 - 15:30	0.21	01:00 - 01:15	2.90
23-11-2022	15:30 - 15:45	0.69	18:00 - 18:15	8.00	04:45 - 05:00	0.26	01:00 - 01:15	2.81
24-11-2022	16:45 - 17:00	0.74	17:45 - 18:00	12.00	04:45 - 05:00	0.30	03:15 - 03:30	2.81
25-11-2022	20:45 - 21:00	0.82	18:00 - 18:15	7.10	04:45 - 05:00	0.31	03:00 - 03:15	2.90
26-11-2022	17:45 - 18:00	0.68	18:15 - 18:30	8.22	14:45 - 15:00	0.16	01:15 - 01:30	2.93
27-11-2022	14:00 - 14:15	0.60	18:00 - 18:15	5.51	06:00 - 06:15	0.26	03:30 - 03:45	2.94
28-11-2022	07:45 - 08:00	0.87	17:30 - 17:45	12.00	22:15 - 22:30	0.32	01:15 - 01:30	2.85
29-11-2022	16:45 - 17:00	0.87	08:00 - 08:15	12.00	03:15 - 03:30	0.25	04:00 - 04:15	2.53
30-11-2022	18:30 - 18:45	0.80	18:00 - 18:15	12.00	05:30 - 05:45	0.24	03:00 - 03:15	2.57

MCP: Market Clearing Price (₹/kWh)

FSV: Final Scheduled Volume (MU)

Sellers and Buyers in Real Time Market (RTM) in the month of November, 2022						
S. No.	Entity Name	Sell		Entity Name	Purchase	
		(MU)	Percent (%)		(MU)	Percent (%)
1	Bihar	297.37	21.90	Rajasthan	228.42	16.82%
2	West Bengal	137.16	10.10	J&K	224.17	16.51%
3	Uttar Pradesh	117.61	8.66%	Gujarat	142.27	10.48%
4	Orissa	91.25	6.72%	Maharashtra	136.39	10.04%
5	Madhya Pradesh	74.33	5.47%	Telangana	132.18	9.73%
6	Chhattisgarh	68.33	5.03%	Tamil Nadu	77.05	5.67%
7	Kameng HEP	67.38	4.96%	Andhra Pradesh	50.29	3.70%
8	Telangana	64.58	4.76%	Delhi	49.80	3.67%
9	Himachal	45.07	3.32%	Uttar Pradesh	43.51	3.20%
10	Delhi	35.69	2.63%	Punjab	40.82	3.01%
11	Tripura	34.42	2.54%	ArcelorMittal Nippon	31.99	2.36%
12	Sembcorp	26.14	1.93%	West Bengal	28.11	2.07%
13	Karnataka	23.14	1.70%	Assam	26.56	1.96%
14	Andhra Pradesh	18.71	1.38%	Haryana	26.39	1.94%
15	Assam	17.44	1.28%	Daman & Diu - Dadra	19.84	1.46%
16	MB Power	16.61	1.22%	Karnataka	16.32	1.20%
17	Maharashtra	14.91	1.10%	Uttarakhand	14.47	1.07%
18	Rajasthan	12.31	0.91%	Orissa	13.88	1.02%
19	RKM Power	11.75	0.87%	Kerala	12.46	0.92%
20	Haryana	11.19	0.82%	Meghalaya	12.39	0.91%
21	J&K	9.65	0.71%	Madhya Pradesh	9.50	0.70%
22	Raipur Energen	9.34	0.69%	Jharkhand	3.44	0.25%
23	Mahan Energy	9.05	0.67%	Railways	2.70	0.20%
24	Kahalgaon-II	8.72	0.64%	Tripura	2.34	0.17%
25	Sembcorp Energy	8.68	0.64%	Himachal Pradesh	2.15	0.16%
26	Tamil Nadu	7.99	0.59%	BALCO 2	2.08	0.15%
27	Gujarat	7.81	0.58%	Manipur	1.58	0.12%
28	Manipur	7.12	0.52%	DVC	1.36	0.10%
29	Jindal Power Ltd.	6.93	0.51%	Goa WR	1.36	0.10%
30	Meghalaya	5.51	0.41%	Sikkim	1.17	0.09%
31	NTPL	5.49	0.40%	Goa SR	0.80	0.06%
32	Teesta -3	5.32	0.39%	Chhattisgarh	0.63	0.05%
33	TRN Energy	5.11	0.38%	Sainj HEP	0.47	0.03%
34	DVC	4.91	0.36%	Chandigarh	0.31	0.02%
35	Palatana	4.67	0.34%	Bihar	0.29	0.02%
36	GMR Kamalanga	4.52	0.33%	Jindal Power	0.26	0.02%
37	Sikkim	4.31	0.32%	Nagaland	0.09	0.01%
38	Kahalgaon	3.98	0.29%	Arunachal Pradesh	0.01	0.00%
39	NTPC	3.83	0.28%			
40	Punjab	3.73	0.27%			
41	Kerala	3.39	0.25%			

42	JITPL	3.21	0.24%			
43	NTPC Sholapur	2.78	0.20%			
44	Jindal Power	2.70	0.20%			
45	Maruti Clean	2.68	0.20%			
46	Coastal Gujrat	2.66	0.20%			
47	ACBIL	2.43	0.18%			
48	GMR Warora	2.30	0.17%			
49	Daman & Diu -	2.28	0.17%			
50	Mouda Stg-2	2.23	0.16%			
51	Chandigarh	2.21	0.16%			
52	Bongaigaon	1.90	0.14%			
53	NTPC Kudgi	1.72	0.13%			
54	Sainj HEP	1.51	0.11%			
55	DB Power	1.50	0.11%			
56	Khargone STPP	1.39	0.10%			
57	SKS Power	1.28	0.09%			
58	Singoli Bhagwati	1.20	0.09%			
59	Mouda Stg-1	1.13	0.08%			
60	Renew Surya	1.04	0.08%			
61	Ramagundam	0.95	0.07%			
62	Ostro Energy	0.58	0.04%			
63	Ramagundam	0.46	0.03%			
64	Nagaland	0.35	0.03%			
65	Uttarakhand	0.34	0.02%			
66	Arunachal	0.33	0.02%			
67	Dikchu	0.27	0.02%			
68	Raigarh Energy	0.21	0.02%			
69	Jorethang	0.19	0.01%			
70	AGTPP	0.15	0.01%			
71	Jhabua Power	0.15	0.01%			
72	IL&FS	0.09	0.01%			
73	Lanco Budhil	0.06	0.00%			
74	Karcham	0.04	0.00%			
75	Tashiding HEP	0.03	0.00%			
76	AGBPP	0.02	0.00%			
77	Sorang HEP	0.02	0.00%			
<b>Total Volume of top 10</b>		<b>998.77</b>	<b>73.56</b>	<b>Total Volume of top 10</b>	<b>1,124.8</b>	<b>82.84%</b>
<b>Total Volume in PXs</b>		<b>1,357.85</b>		<b>Total Volume in PXs</b>	<b>1,357.8</b>	



<b>Cross Border Electricity Transactions in Day Ahead Market (DAM) in IEX with Nepal and Bhutan during the month of November, 2022</b>			
<b>S. No</b>	<b>Delivery Date</b>	<b>Buy Volume By Nepal (MU)</b>	<b>Sell Volume by Nepal (MU)</b>
1	01-11-2022	-	5.15
2	02-11-2022	-	5.29
3	03-11-2022	-	3.87
4	04-11-2022	-	4.35
5	05-11-2022	-	8.62
6	06-11-2022	-	8.49
7	07-11-2022	-	7.81
8	08-11-2022	-	7.57
9	09-11-2022	-	6.27
10	10-11-2022	-	6.54
11	11-11-2022	-	6.70
12	12-11-2022	-	7.83
13	13-11-2022	-	7.08
14	14-11-2022	-	6.82
15	15-11-2022	-	6.07
16	16-11-2022	-	5.94
17	17-11-2022	-	5.45
18	18-11-2022	-	5.45
19	19-11-2022	-	8.33
20	20-11-2022	-	9.78
21	21-11-2022	-	8.12
22	22-11-2022	-	5.42
23	23-11-2022	-	5.09
24	24-11-2022	-	4.64
25	25-11-2022	-	4.73
26	26-11-2022	-	4.82
27	27-11-2022	-	2.20
28	28-11-2022	-	2.46
29	29-11-2022	-	2.73
30	30-11-2022	-	2.76
<b>Total</b>		0.00	176.39
<b>Grand Total</b>		<b>176.39</b>	

-: No transaction happened

**Note: Cross Border Transactions of Electricity of 176.39 MU with Nepal happened during November, 2022 in IEX, which is included in DAM Volume of November, 2022 in IEX.**

**Analysis for change in trend of Final Scheduled Volume in DAM on 1<sup>st</sup> Sunday & 3<sup>rd</sup> Monday of November, 2022 (i.e. 6<sup>th</sup> & 21<sup>st</sup> November, 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 November, 2022, it is observed that on first Sunday (06<sup>th</sup> November, 2022), FSV showed increasing trend in comparison to first Saturday (05<sup>th</sup> November, 2022), on third Monday (21<sup>st</sup> November, 2022), FSV showed decreasing trend in comparison to third Sunday (20<sup>th</sup> November, 2022).

- (i) On first Sunday (06<sup>th</sup> November, 2022), although there was decrease in purchase on power exchange by some of the States in comparison to first Saturday (05<sup>th</sup> November, 2022) by **21.23 MU** [i.e. Andhra Pradesh (8.54 MU), Rajasthan (5.67 MU), West Bengal (1.66 MU), Daman & Diu - Dadra & Nagar Haveli (1.47 MU) and Telangana (1.33 MU), etc.], there was also increase in purchase on power exchange by some of the States by **25.69 MU** [i.e. Gujarat (18.45 MU), Maharashtra (4.14 MU), J&K (1.97 MU), ArcelorMittal Nippon steel (ESIL) (0.42 MU) and Orissa (0.26 MU), etc.]. This resulted in an overall increase in FSV by **4.46 MU** on Sunday (06<sup>th</sup> November, 2022) as compared to Saturday (05<sup>th</sup> November, 2022).
- (ii) On third Monday (21<sup>st</sup> November, 2022), although there was increase in purchase on power exchange by some of the States in comparison to third Sunday (20<sup>th</sup> November, 2022) by **15.26 MU** [i.e. Tamil Nadu (2.99 MU), Delhi (2.57 MU), Punjab (2.48 MU), West Bengal (2.16 MU) and Andhra Pradesh (1.71 MU), etc.], there was also decrease in purchase on power exchange by some of the States by **19.35 MU** [i.e. Rajasthan (3.60 MU), Uttarakhand (3.42 MU), Gujarat (2.74 MU), J&K(2.73 MU) and Uttar Pradesh (2.15 MU), etc.]. This resulted in an overall decrease in FSV by **4.09 MU** on Monday (21<sup>st</sup> November, 2022) as compared to Sunday (20<sup>th</sup> November, 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)** on the power exchanges are market for electricity where market participants purchase and sell electricity at financially binding day-ahead prices for the following day.
- 6. Elasticity** is percentage of change in MCP with respect to change in independent variable viz. peak demand, average purchase bid, average sell bid, generation from coal based plants, generation from hydro based plants, generation from wind based plants and generation from solar plants.
- 7. Energy Supplied** is the total energy (MU) available at the States' periphery.
- 8. Final Scheduled Volume** is the total of scheduled volume of all 96 time blocks in a day during the month in which transaction happened.
- 9. Green Term Ahead Market (GTAM)** is based on the principles of current Term Ahead Market (TAM) and will offer trade through Intra-Day Contracts, Day ahead contingency Contracts, Daily Contracts and Weekly Contracts for solar, non-Solar and hydro Renewable Energy (RE) generation. GTAM is a market-based mechanism; where RE surplus and RE deficit States can trade RE Power and balance their RPO targets.

- 10. Green Day Ahead Market (GDAM)** is based on the principles of current Day Ahead Market (DAM), where market participants purchase and sell electricity generated from renewable sources at financially binding day-ahead prices for the following day.
- 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)** on the power exchanges is the market for electricity where market participants buy/ sell electricity on a half-hourly market and would commence with the end of the right to revision of schedule or declared capability and would end with gate closure. The auction sessions would be conducted every half an hour for the delivery of power for the duration of 30 minutes in two time blocks of 15 minutes each to commence from one hour after the closure of the RTM trading session.
- 14. Term Ahead Market (TAM)** on the power exchanges is the market for electricity where market participants buy/sell electricity on a term basis ranging from 3 hours before actual despatch (i.e. intra-day) and up to 11 days in advance. There are 4 types of contracts in TAM, namely; Intra-day, Day Ahead Contingency, Daily and Weekly.