



अप्रैल, २०१९ की मासिक मार्केट मॉनिटरिंग रिपोर्ट

Monthly Market Monitoring Report

April, 2019



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

आर. ए. प्रभाग/ Regulatory Affairs Division

मार्केट मॉनिटरिंग सेल /Market Monitoring Cell

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REPORT FOR MONTH: APRIL, 2019

OVERVIEW OF ELECTRICITY TRANSACTIONS ON POWER EXCHANGES IN INDIA

1. DAY AHEAD MARKET (DAM)

- 1.1** The total volume of electricity transacted on both the power exchanges, viz., IEX and PXIL in the day ahead market in the month of April 2019 was 4,036.84 MU. The total energy supplied in the country during the month of April, 2019 was 1,09,241 MU. The volume of electricity traded on the power exchanges in DAM represents 3.69% of the total energy supplied in the country.
- 1.2** The volume of electricity transacted on IEX and PXIL are 4,005.41 MU and 31.43 MU, respectively. This means that the total volume transacted on IEX is 99.22 % of the total volume on the power exchanges.
- 1.3** The total volume of electricity transacted in day ahead market on IEX was 4,005.41 MU at an Average Market Clearing Price (MCP) of Rs 3.22/ kWh during the month of April, 2019. Similarly, on PXIL, the total volume of electricity transacted was 31.43 MU at an Average MCP of Rs 3.75/kWh.

2. SUMMARY OF THE MARKET CLEARING PRICE, AREA CLEARING PRICE AND SCHEDULED VOLUME IN THE POWER EXCHANGES

- 2.1.** The Minimum, Maximum and Average of daily MCP during the month of April, 2019 are as given below:

MCP (Rs/kWh)	IEX	PXIL
Minimum	2.73	3.05
Maximum	3.78	4.24
Average	3.22	3.75

Table:1

- 2.2.** The Maximum Area Clearing Price (ACP) in IEX was observed in Southern Region at Rs 11.84/ kWh during the time block 19:30-19:45 [79th time-block] on 8th April, 2019 though the MCP for this time-block was Rs 4.56/ kWh only. This was due to congestion in transmission system in Southern Region. However, the Daily MCP on pan India basis on 8th April 2019 was Rs 3.25/ kWh.
- 2.3.** The Minimum ACP observed among all 13 bid areas was Rs 1.80/kWh during the time block 07:15-07:30 on 22nd April, 2019. As there was no congestion in transmission

system, the MCP for this time-block was also Rs 1.80/ kWh. However, the Daily MCP on pan India basis on 22nd April 2019 was Rs 2.83/ kWh.

- 2.4. The Minimum, Maximum and Average Scheduled Volume of a day during the month of April, 2019 in both the power exchanges are as given below:

Scheduled Volume (MU)	IEX	PXIL
Minimum	105.98	0.032
Maximum	167.21	4.800
Average	133.51	1.122

Table: 2

3.0 TERM AHEAD MARKET (TAM)

- 3.1 The total traded volume on both the power exchanges in Term Ahead Market was **627.60 MU**. The volume of TAM transacted on IEX and PXIL was 334.13 MU and 293.47 MU respectively.
- 3.2 With respect to the total energy supplied during the month of April, 2019 in the country, the volume of electricity traded on the power exchanges in TAM represents **0.57%** of the total energy supplied.

4.0 ANALYSIS OF MOVEMENT OF PRICES OBSERVED IN DAM DURING APRIL, 2019

A regression analysis has been carried out on the Day Ahead Market data taken from IEX website. Also, data was plotted in various graphs to observe patterns for each day of the April month. The observations made are as under:

- 4.1 In order to find out the determinants which are responsible for the Daily MCP, a regression analysis was carried out where the Daily MCP was the dependent variable and the independent variables were 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. Data pertaining to few months were utilized for this purpose.
- 4.2 A double log function was used so that elasticity of Daily MCP could be read off from the coefficients of independent variables. The regression analysis revealed that the significant variables were only the average purchase bid, average sell bid and generation from hydro projects. All the other variables were found to be insignificant. The regression analysis further revealed that the maximum elasticity of the Daily MCP was with respect to average purchase bid and elasticity figure was around 0.53. In effect, the

regression reveals that the most important variable which determines market clearing price is the average purchase bid.

4.3 The same relationship is visible from the analysis carried out from the plot in **Figure 1**.

4.4 The Final Scheduled Volume (MU) and the Daily MCP (Rs/kWh) showed decreasing trend on Sundays as the demand is less compared to other days of week. [**Figure - 1**]

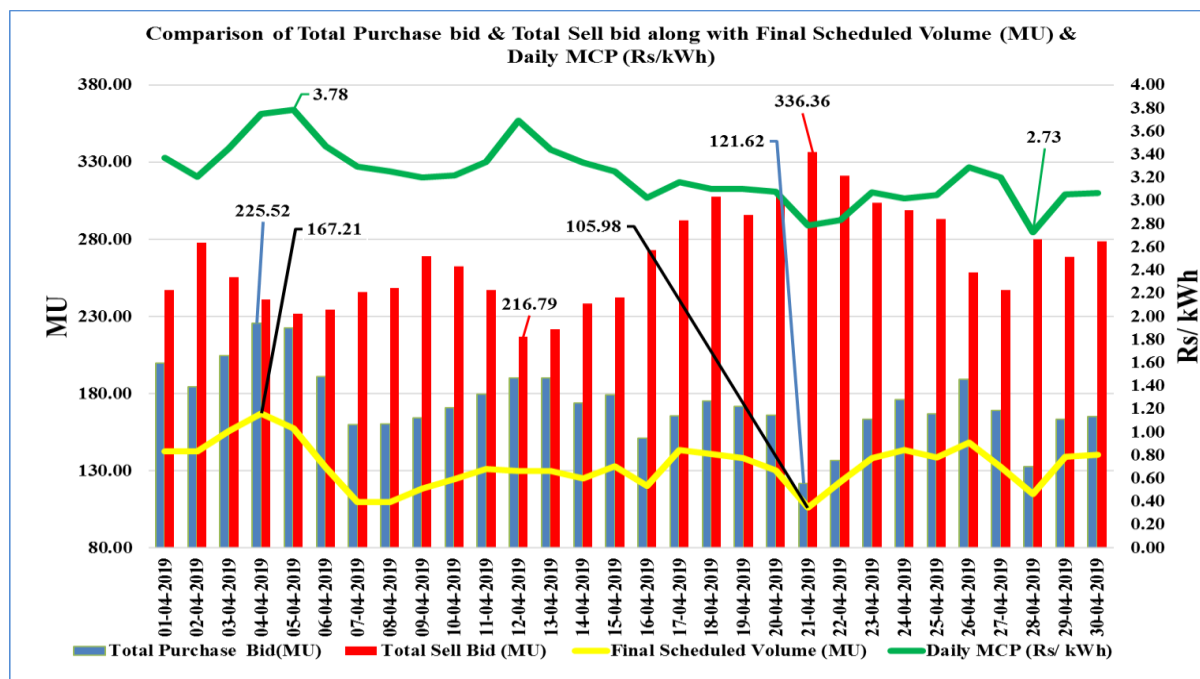


Figure - 1

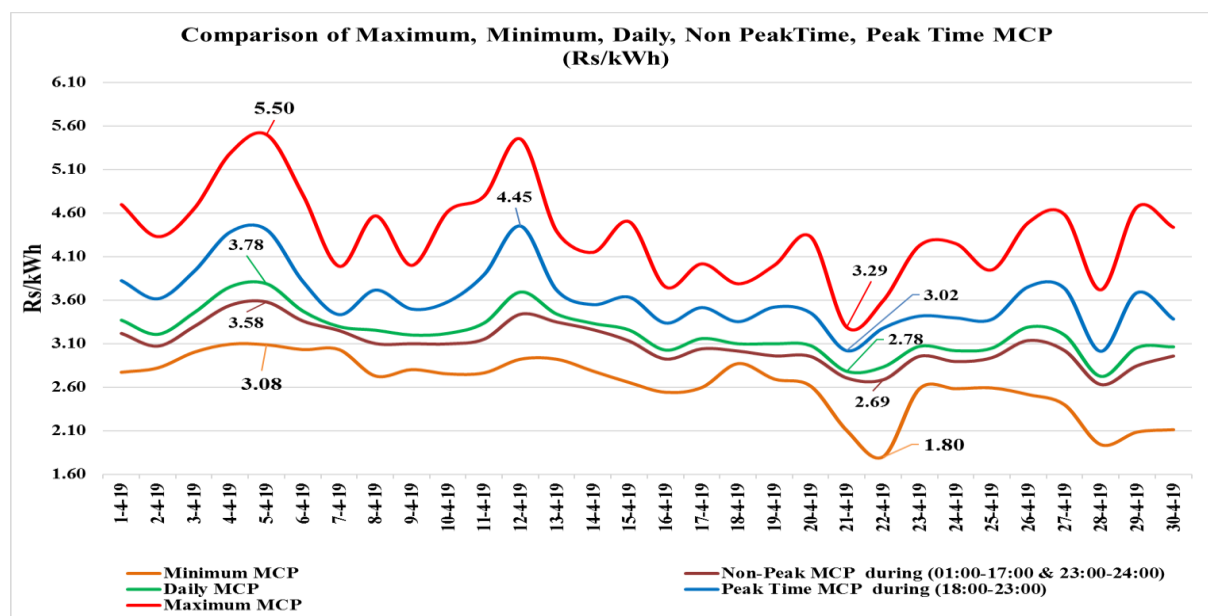


Figure -2

4.5 A comparison of maximum, minimum, daily, non-peak time, peak time MCP is shown in **Figure -2**. The same are also tabulated in **Annexure I**.

- 4.6 The Purchase Bids and the MCP discovered in each of the 15-minute time block during the month almost followed the same trend [**Annexure II**]. This is also corroborated with the outcome of regression analysis mentioned at para 4.1 and 4.2 above.
- 4.7 On **19 days** during the month, the maximum MCP occurred during **the time period 19:15 to 20:00 [Annexure III]**.
- 4.8 On 13 days during the month, the minimum Final Scheduled volume occurred during **the time period 04:15 to 05:00 [Annexure III]**.
- 4.9 The top **10 sellers** on the power exchanges during the month are: **Madhya Pradesh, Himachal Pradesh, Teesta -3, DVC, Rajasthan, Telangana, Uttar Pradesh, Uttarakhand, Haryana and Maharashtra**, which constituted 66.13% of the market share. [**Annexure IV**]
- 4.10 The top **10 purchaser** on the power exchanges during the month are: **Gujarat, Maharashtra, Tamil Nadu, Telangana, Orissa, Bihar, Delhi, West Bengal, Chhattisgarh and Kerala**, which constituted 80.76% of the market share. [**Annexure IV**]
- 4.11 The maximum demand met during the month of April, 2019 in the country occurred on **29th April, 2019 at 176.8 GW**.
- 4.12 One Nation One Price was observed for **16 days** (all time blocks) during the month including 2 days on which there were real time curtailment due to transmission constraints. Further, there was congestion on 14 days during the month. Hence, MCP was different from ACPs during these 14 days.
- 4.13 Due to real time transmission congestion, 3.09 MU could not be transacted on the IEX on 13th and 14th April 2019. The curtailment happened on **13th April, 2019 during 67th to 96th time-blocks** and on 14th April, 2019 during 1st to 8th time blocks. Further, there was no real time curtailment on PXIL.

Definitions/ terminologies used in the Report:

1. **Area Clearing Price (ACP)** is area clearing price in each time block in each of 13 bid areas. The country has been divided into 13 bid areas for the purpose of calculating prices in Power Exchanges

13 Bid area are as under:

N1: Jammu and Kashmir, Himachal Pradesh, Chandigarh, Haryana; **N2:** Uttar Pradesh, Uttaranchal, Rajasthan, Delhi; **N3:** Punjab; **E1:** West Bengal, Sikkim, Bihar, Jharkhand; **E2:** Orissa; **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.

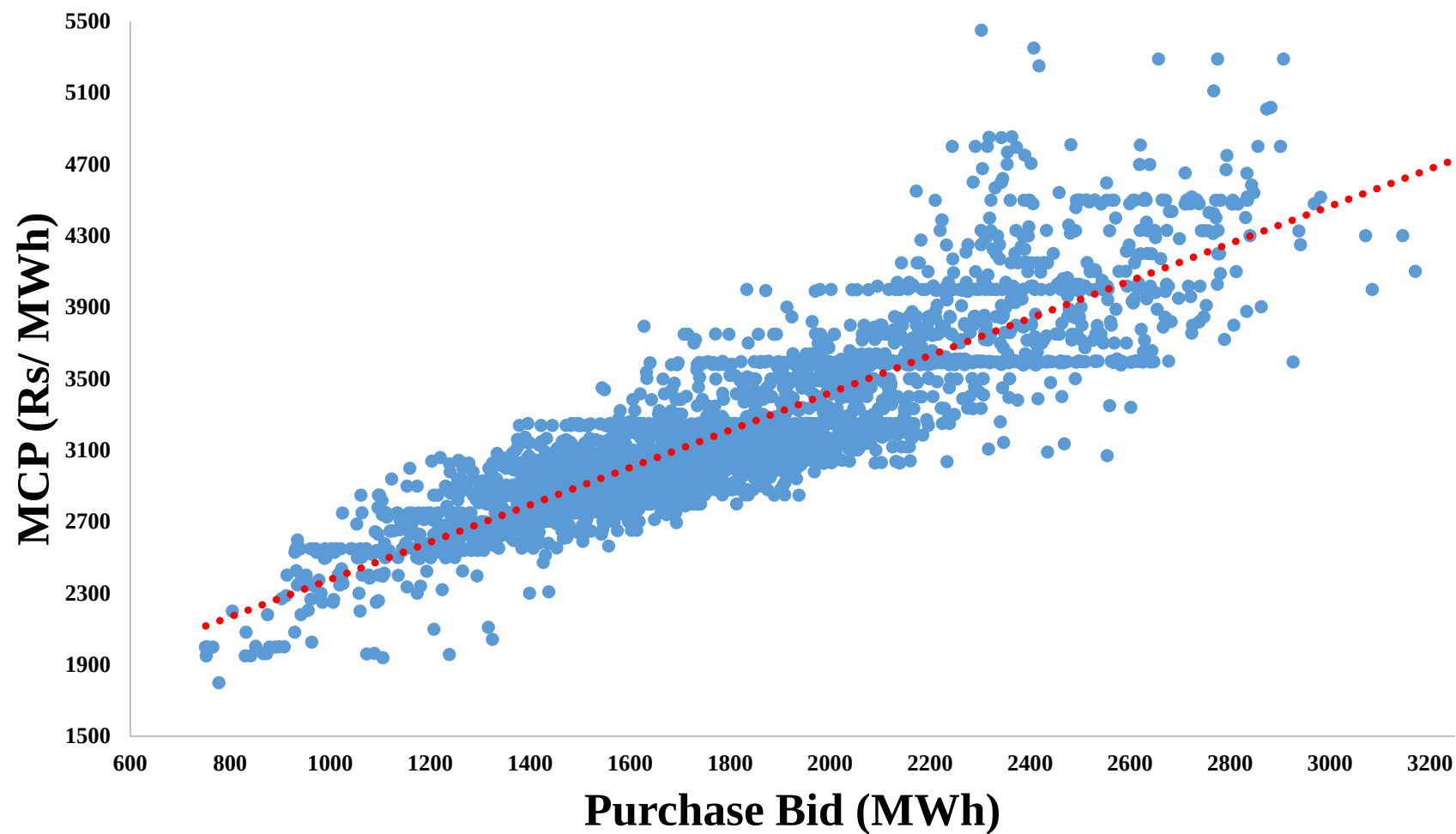
2. **Daily MCP** is the average of MCP of all 96 Time Blocks during the day.
3. **Day-Ahead Market (DAM)** on the power exchanges are market for electricity where market participants purchase and sell electricity at financially binding day-ahead prices for the following day.
4. **Elasticity** is percentage 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.
5. **Energy Supplied** is the total energy (MU) available at the States' periphery.
6. **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.
7. **Term Ahead Market (TAM)** on the power exchanges are 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, Intraday, Day Ahead Contingency, Daily and Weekly.

Annexure-I

Date	MCP during (01:00-06:00, 23:00-24:00)	MCP during (07:00-10:00)	MCP during (11:00-17:00)	Peak Time MCP during (18:00-23:00)	Non-Peak MCP during (01:00- 17:00 & 23:00- 24:00)	Maximum MCP	Minimum MCP	Daily MCP	Final Scheduled Volume (MU)
01-04-2019	3.25	3.25	3.17	3.82	3.22	4.70	2.77	3.37	142.68
02-04-2019	3.16	3.04	3.01	3.62	3.07	4.33	2.82	3.21	142.40
03-04-2019	3.44	3.39	3.10	3.93	3.30	4.65	3.00	3.46	155.64
04-04-2019	3.63	3.76	3.33	4.38	3.54	5.29	3.09	3.75	167.21
05-04-2019	3.83	3.58	3.32	4.41	3.58	5.50	3.08	3.78	157.39
06-04-2019	3.45	3.45	3.22	3.81	3.36	4.81	3.03	3.47	132.13
07-04-2019	3.38	3.35	3.06	3.43	3.25	3.99	3.03	3.30	109.64
08-04-2019	3.06	3.03	3.18	3.72	3.10	4.57	2.73	3.26	109.45
09-04-2019	3.17	3.01	3.09	3.50	3.10	4.00	2.80	3.20	118.37
10-04-2019	3.11	3.07	3.10	3.58	3.10	4.62	2.75	3.22	124.62
11-04-2019	3.29	3.05	3.07	3.89	3.15	4.80	2.76	3.34	131.20
12-04-2019	3.66	3.21	3.35	4.45	3.44	5.45	2.92	3.69	129.99
13-04-2019	3.50	3.25	3.25	3.71	3.35	4.39	2.92	3.44	129.93
14-04-2019	3.64	3.04	3.00	3.55	3.26	4.15	2.78	3.33	125.17
15-04-2019	3.32	2.88	3.09	3.63	3.13	4.50	2.65	3.26	133.08
16-04-2019	3.17	2.72	2.79	3.34	2.92	3.75	2.54	3.03	120.08
17-04-2019	3.30	2.81	2.91	3.52	3.04	4.02	2.60	3.16	143.64
18-04-2019	3.11	2.96	2.95	3.35	3.02	3.79	2.87	3.10	140.82
19-04-2019	3.14	2.83	2.85	3.52	2.96	4.00	2.69	3.10	138.20
20-04-2019	3.14	2.88	2.81	3.45	2.95	4.33	2.61	3.08	130.08
21-04-2019	2.97	2.62	2.50	3.02	2.71	3.29	2.10	2.78	105.98
22-04-2019	2.92	2.20	2.73	3.28	2.69	3.59	1.80	2.83	122.63
23-04-2019	3.24	2.83	2.74	3.42	2.95	4.23	2.58	3.07	138.23
24-04-2019	3.10	2.72	2.79	3.40	2.90	4.25	2.58	3.02	143.54
25-04-2019	3.14	2.74	2.85	3.38	2.94	3.95	2.59	3.05	138.69
26-04-2019	3.42	2.76	3.06	3.75	3.14	4.49	2.51	3.29	148.09
27-04-2019	3.31	2.73	2.91	3.74	3.02	4.58	2.40	3.20	132.39
28-04-2019	3.03	2.23	2.47	3.01	2.63	3.72	1.94	2.73	114.75
29-04-2019	3.15	2.45	2.77	3.69	2.85	4.67	2.08	3.06	139.15
30-04-2019	3.24	2.50	2.94	3.38	2.96	4.44	2.11	3.06	140.25
Maximum	3.83	3.76	3.35	4.45	3.58	5.50	3.09	3.78	167.21
Minimum	2.92	2.20	2.47	3.01	2.63	3.29	1.80	2.73	105.98
Average	3.28	2.94	2.98	3.62	3.09	4.36	2.64	3.22	133.51

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

**Comparison of MCP w.r.t. Purchase Bid for 2880 Time Blocks
during the month of April, 2019**



Annexure-III

	Max. FSV (MU)		Max. MCP (Rs./kWh)		Min FSV (MU)		Min. MCP (Rs./kWh)	
	Time Block	Value	Time Block	Value	Time Block	Value	Time Block	Value
01/4/2019	19:00 - 19:15	1.96	19:30 - 19:45	4.70	13:30 - 13:45	1.17	13:45 - 14:00	2.77
02/4/2019	19:00 - 19:15	1.90	19:30 - 19:45	4.33	13:30 - 13:45	1.19	13:30 - 13:45	2.82
03/4/2019	19:15 - 19:30	2.21	19:30 - 19:45	4.65	13:15 - 13:30	1.14	13:15 - 13:30	3.00
04/4/2019	20:30 - 20:45	2.27	19:30 - 19:45	5.29	08:30 - 08:45	1.43	13:15 - 13:30	3.09
05/4/2019	19:00 - 19:15	2.11	19:30 - 19:45	5.50	08:15 - 08:30	1.31	13:15 - 13:30	3.08
06/4/2019	19:00 - 19:15	1.76	19:15 - 19:30	4.81	13:30 - 13:45	1.08	13:30 - 13:45	3.03
07/4/2019	21:30 - 21:45	1.57	23:15 - 23:30	3.99	13:15 - 13:30	0.75	13:15 - 13:30	3.03
08/4/2019	19:00 - 19:15	1.62	19:30 - 19:45	4.57	03:45 - 04:00	0.62	04:15 - 04:30	2.73
09/4/2019	20:00 - 20:15	1.71	19:30 - 19:45	4.00	04:15 - 04:30	0.76	08:00 - 08:15	2.80
10/4/2019	19:45 - 20:00	1.74	19:30 - 19:45	4.62	04:15 - 04:30	0.90	03:45 - 04:00	2.75
11/4/2019	20:30 - 20:45	1.92	19:30 - 19:45	4.80	04:15 - 04:30	0.77	08:00 - 08:15	2.76
12/4/2019	19:00 - 19:15	1.67	19:15 - 19:30	5.45	04:15 - 04:30	0.91	08:15 - 08:30	2.92
13/4/2019	11:15 - 11:30	1.66	19:45 - 20:00	4.39	04:15 - 04:30	1.02	08:45 - 09:00	2.92
14/4/2019	21:45 - 22:00	1.77	21:45 - 22:00	4.15	04:15 - 04:30	0.96	08:30 - 08:45	2.78
15/4/2019	20:45 - 21:00	1.85	21:30 - 21:45	4.50	04:15 - 04:30	0.85	09:00 - 09:15	2.65
16/4/2019	19:30 - 19:45	1.64	21:30 - 21:45	3.75	04:15 - 04:30	0.88	10:00 - 10:15	2.54
17/4/2019	22:45 - 23:00	1.87	21:45 - 22:00	4.02	04:15 - 04:30	1.09	08:45 - 09:00	2.60
18/4/2019	22:45 - 23:00	1.93	23:45 - 24:00	3.79	04:45 - 05:00	1.08	04:45 - 05:00	2.87
19/4/2019	22:45 - 23:00	2.00	19:30 - 19:45	4.00	04:15 - 04:30	0.99	13:15 - 13:30	2.69
20/4/2019	19:45 - 20:00	1.83	19:30 - 19:45	4.33	04:45 - 05:00	1.00	13:15 - 13:30	2.61
21/4/2019	21:45 - 22:00	1.62	23:15 - 23:30	3.29	04:30 - 04:45	0.81	17:45 - 18:00	2.10
22/4/2019	21:45 - 22:00	1.93	19:30 - 19:45	3.59	06:15 - 06:30	0.71	07:15 - 07:30	1.80
23/4/2019	22:45 - 23:00	2.16	19:45 - 20:00	4.23	05:15 - 05:30	1.02	08:45 - 09:00	2.58
24/4/2019	21:15 - 21:30	1.96	19:45 - 20:00	4.25	05:45 - 06:00	0.95	09:00 - 09:15	2.58
25/4/2019	21:45 - 22:00	2.11	19:45 - 20:00	3.95	05:45 - 06:00	0.93	08:30 - 08:45	2.59
26/4/2019	22:30 - 22:45	2.15	19:45 - 20:00	4.49	05:45 - 06:00	1.00	05:45 - 06:00	2.51
27/4/2019	22:30 - 22:45	1.94	23:15 - 23:30	4.58	05:45 - 06:00	0.88	05:45 - 06:00	2.40
28/4/2019	20:45 - 21:00	1.75	23:15 - 23:30	3.72	09:00 - 09:15	0.82	17:45 - 18:00	1.94
29/4/2019	21:00 - 21:15	2.08	22:45 - 23:00	4.67	08:00 - 08:15	0.90	08:00 - 08:15	2.08
30/4/2019	22:45 - 23:00	2.06	23:15 - 23:30	4.44	08:00 - 08:15	1.01	05:45 - 06:00	2.11

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

Annexure-IV**Top Ten Entity (Sellers and Purchaser) during the month of April, 2019**

Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Madhya Pradesh	571.37	14.14%	Gujarat	772.34	19.12%
Himachal Pradesh	373.59	9.25%	Maharashtra	630.14	15.60%
Teesta -3	319.91	7.92%	Tamil Nadu	435.61	10.78%
DVC	276.75	6.85%	Telangana	316.86	7.84%
Rajasthan	232.85	5.76%	Orissa	254.80	6.31%
Telangana	204.80	5.07%	Bihar	213.50	5.28%
Uttar Pradesh	184.04	4.56%	Delhi	200.65	4.97%
Uttarakhand	179.57	4.44%	West Bengal	178.58	4.42%
Haryana	168.27	4.17%	Chhattisgarh	145.83	3.61%
Maharashtra	160.63	3.98%	Kerala	114.51	2.83%
Total Volume in PXs[§]	4039.93		Total Volume in PXs	4039.93	

§: Although, the total cleared volume on both the PXs was 4039.93 MU, due to real-time curtailment of 3.09 MU, the Final Scheduled Volume on PXs was 4036.84 MU.