

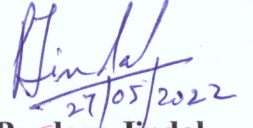


भारत सरकार/ **Government of India**
विद्युत मंत्रालय/ **Ministry of Power**
केन्द्रीय विद्युत प्राधिकरण/ **Central Electricity Authority**
आर. ए. प्रभाग/ **Regulatory Affairs Division**

Subject: Annual Market Monitoring Report for the FY 2020-21-reg.

In the FY 2020-21 a total of **1,271 BU** of electricity was transacted in the country out of which a total of **155.62 BU** was transacted under Short Term Market. The total volume of electricity transacted in both the power exchanges (IEX & PXIL) during FY 2020-21 was **79.70 BU**, which includes transactions through DAM, RTM, TAM and GTAM contracts. The total transactions through bilateral trading and through deviations were **53.01 MU** and **22.91 BU**, respectively. Thus, the total short term trade in FY 2020-21 was 12.24 % of total volume of electricity traded in FY 2020-21 and 6.27 % was transacted through Power Exchanges.

The Annual market monitoring report for the FY 2020-21 giving details of electricity transaction happened in the power exchanges is annexed below for reference.


27/05/2022
Pardeep Jindal

Chief Engineer (RA)

To
All Stake holders



सत्यमेव जयते

वार्षिक रिपोर्ट 2020-21

ANNUAL REPORT 2020-21



भारत सरकार/ Government of India

विद्युत मंत्रालय/ Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority

आर. ए. प्रभाग/ Regulatory Affairs Division



TABLE OF CONTENT

S. No.	Title	Page
	Preface	10
	Definitions & Terminologies	11
	Abbreviations	13
	Executive Summary	14
Chapter I – Introduction		
1.	Overview of Electricity Sector in India	16
2.	Development of Electricity Market	16
3.	Growth of Electricity transacted in Power Exchanges since its evolution	17
4.	Contracts executed in Power Exchanges in India during FY 2020-21	17
5.	Bid Areas in Power Exchanges	18
Chapter II – Overview of Power Market in India		
1.	Total Short Term Trade (Bilateral + Exchanges + Deviation)	20
2.	Volume of Electricity transacted during FY 2020-21	20
3.	Transactions in Power Exchanges w.r.t Total Energy Supplied in the country during FY 2020-21.	21
4.	Volume of power exchanges transactions of electricity as % of total electrical energy supplied in the country during FY 2020-21	23
Chapter III – Day Ahead Market (DAM)		
1.	Volume and Price of Electricity transacted in IEX	25
2.	Volume and Price of Electricity transacted in PXIL	25
3.	Monthly Volume and Price of Electricity transacted in IEX and PXIL	25
4.	Maximum/ Minimum Final scheduled Volume (FSV) for a Day in DAM during FY 2020-21	26
5.	Maximum, Minimum & Average of Daily Average MCP In DAM during FY 2020-21	27
6.	Maximum/ Minimum Area Clearing Price (ACP) in DAM during FY 2020-21	28
7.	Congestion in Day Ahead Market in IEX and PXIL	29
8.	Real Time Curtailment in Day Ahead Market	29
Chapter IV – Real Time Market (RTM)		
1.	Volume and Price of Electricity transacted in IEX	31
2.	Volume and Price of Electricity transacted in PXIL	31
3.	Monthly Volume and Price of Electricity transacted in IEX and PXIL	31
4.	Maximum/ Minimum Final scheduled Volume (FSV) for a Day in RTM during FY 2020-21	32
5.	Maximum, Minimum & Average of Daily Average MCP In RTM during FY 2020-21	33

6.	Maximum/ Minimum Area Clearing Price (ACP) in RTM during FY 2020-21	34
7.	Comparison of Final Scheduled volume & Monthly average MCP of Day Ahead Market and Real Time Market during FY 2020-21	35
8.	Congestion in Real Time Market in IEX and PXIL	35
9.	Real Time Curtailment in Real Time Market	36

Chapter V – Term Ahead Market

1.	Volume of Electricity transacted in TAM on Delivery date basis	37
2.	Contract-wise Final Scheduled Volume and Weighted Average MCP in TAM in both the Power Exchanges on Delivery date basis	38
3.	Contract-wise Final Scheduled Volume in TAM in both the Power Exchanges on Delivery date basis	39
4.	Real Time Curtailment in Term Ahead Market	43
5.	Volume of Electricity transacted in IEX & PXIL on Trade date basis	44
6.	Contract-wise Final Scheduled Volume and Weighted Average MCP in TAM in both the Power Exchanges on Trade date basis	45
7.	Contract-wise Traded Volume in TAM in both the Power Exchanges on Trade date basis	47
8.	Congestion in Term Ahead Market in IEX	50
9.	Congestion in Term Ahead Market in PXIL	50
10.	Contract-wise Price (Rs. /kWh) on Delivery date basis in TAM during FY 2020-21	51
11.	Contract-wise Price (Rs. /kWh) on Trade date basis in TAM during FY 2020-21	52
12.	Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Term Ahead Market (TAM) during FY 2020-21 (on delivery date basis)	53
13.	Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Term Ahead Market (TAM) during FY 2020-21 (on Trade date basis)	53

Chapter VI – Green Term Ahead Market

1.	Volume of Electricity transacted in GTAM on Delivery date basis	55
2.	Volume (MU) and Prices (Rs. /kWh) for Solar and Non Solar transactions in GTAM on Delivery date basis during FY 2020-21	56
3.	Contract-wise Final Scheduled Volume in GTAM in both the Power Exchanges on Delivery date basis	57
4.	Real Time Curtailment in Green Term Ahead Market	61
5.	Volume of Electricity transacted in GTAM on Trade date basis	61
6.	Volume (MU) and Prices (Rs. /kWh) for Solar and Non Solar transactions in GTAM on Trade date basis during FY 2020-21	62
7.	Contract-wise Traded Volume in GTAM in both the Power Exchanges on Trade date basis	63
8.	Congestion in IEX & PXIL in Green Term Ahead Market	67
9.	Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Green Term Ahead Market (GTAM) during FY 2020-21 (on delivery date basis)	68
10.	Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Green Term Ahead Market (GTAM) during FY 2020-21 (on Trade date basis)	68

Chapter VII – Analysis of variations in FSV & Average MCP in the PXs during FY 2020-21

1. General Observations	69
2. Specific Observations	69
3. Regression Analysis for Day Ahead Market (DAM) transaction	70
4. Regression Analysis for Real Time Market (RTM) transaction	71

Chapter VIII – Top Ten Sellers and Purchasers on the PXs during FY 2020-21 in DAM

1. Top Ten Sellers on the Power Exchanges during FY 2020-21 in DAM	73
2. Top Ten Buyers on the Power Exchanges during FY 2020-21 in DAM	73
3. Top Ten Sellers on the Power Exchanges during FY 2020-21 in RTM	74
4. Top Ten Buyers on the Power Exchanges during FY 2020-21 in RTM	74

ANNEXURES

Annexure: I	Month wise top ten sellers and buyers in DAM	79
Annexure: II	Month wise top ten sellers and buyers in RTM	81
Annexure: III	Month wise Comparison of Maximum, Minimum, Daily, Non Peak Time and Peak Time MCP in DAM	83
Annexure: IV	Month wise Comparison of Maximum, Minimum, Daily, Non Peak Time and Peak Time MCP in RTM	86

TABLES

Table No.	Title	Page
Table: 1	Bid Areas in Power Exchanges	19
Table: 2	Month-wise transactions in PXs (on delivery date basis) & total energy supplied in the country during FY 2020-21	21
Table: 3	Month-wise transactions in PXs (on trade date basis) & total energy supplied in the country during FY 2020-21	22
Table: 4	Volume of power exchanges transactions of electricity as % of total electrical energy supplied in the country during FY 2020-21	24
Table: 5	Month-wise values of Final Scheduled Volume and Average MCP of electricity transacted in both the Power Exchanges in DAM	25
Table: 6	Maximum/Minimum FSV in DAM for a day during various months of FY 2020-21	26
Table: 7	Maximum/Minimum and Average MCP in DAM during FY 2020-21	27
Table: 8	Maximum/Minimum ACP in DAM during FY 2020-21	28
Table: 9	Month wise details of Transmission Congestion in DAM	29
Table: 10	Month wise details of Real Time Curtailment in DAM	30
Table: 11	Month wise values of Final scheduled volume and Average MCP of electricity transacted in both the power exchanges in RTM	31
Table: 12	Maximum/Minimum FSV for a day in RTM during FY 2020-21	32
Table: 13	Maximum Minimum and Average MCP in RTM during FY 2020-21	33
Table: 14	Maximum/Minimum ACP in RTM during FY 2020-21	34
Table: 15	Month wise details of Transmission Congestion in RTM	36
Table: 16	Month wise Final Scheduled Volume in TAM on both the PXs on Delivery Date basis during FY 2020-21	37
Table: 17	Contract-wise FSV in TAM in all 4 contracts on Delivery Date basis	38
Table: 18	Contract-wise weighted average MCP for transaction in all 4 contracts in TAM on PXs (on Delivery date basis)	38
Table: 19	Month-wise FSV in both the PXs in Intra Day Contract in TAM on Delivery date basis	39
Table: 20	Month-wise FSV in both the PXs in Day Ahead Contingency Contract in TAM on Delivery Date basis	40
Table: 21	Month-wise FSV in both the PXs in Daily/ Anyday Contract in TAM on Delivery Date basis	41
Table: 22	Month-wise FSV in both the PXs in Weekly Contract in TAM on Delivery Date basis	42
Table: 23	Month wise details of Real Time Curtailment in TAM	43
Table: 24	Month-wise Final Scheduled Volume in TAM on both PXs on Trade Date basis during FY 2020-21	44
Table: 25	Contract-wise FSV in TAM in all 4 contracts on Trade Date basis	45
Table: 26	Contract-wise weighted average MCP for transaction in all 4 contracts in TAM on PXs (on Trade Date basis)	45

Table: 27	Month-wise FSV in both the PXs in Intra Day Contract in TAM on Trade Date basis	46
Table: 28	Month-wise FSV in both the PXs in Day Ahead Contingency in TAM Contract on Trade Date basis	47
Table: 29	Month-wise FSV in both the PXs in Daily/ Anyday Contract in TAM on Trade Date basis	48
Table: 30	Month-wise FSV in both the PXs in Weekly Contract in TAM on Trade Date basis	49
Table: 31	Month wise details of Transmission Congestion in IEX in TAM	50
Table: 32	Month wise details of Transmission Congestion in PXIL in TAM	51
Table: 33	Contract-wise Price (Rs. /kWh) of Electricity transacted on Trade Date basis in IEX & PXIL in TAM during FY 2020-21	51
Table: 34	Contract-wise Price (Rs. /kWh) of Electricity transacted on Trade date basis in IEX & PXIL in TAM during FY 2020-21	53
Table: 35	Average MCP of Electricity transacted in IEX & PXIL in TAM during FY 2020-21 on Delivery date basis	54
Table: 36	Average MCP of Electricity transacted in IEX & PXIL in TAM during FY 2020-21 on Trade date basis	54
Table: 37	Month wise FSV in GTAM under solar and non-solar segments on Delivery Date basis	55
Table: 38	Month wise FSV in IEX and PXIL in GTAM under solar and non-solar segments on Delivery Date basis	56
Table: 39	Contract-wise prices of solar and non-solar transactions of electricity in GTAM in IEX during FY 2020-21 on Delivery Date basis	57
Table: 40	Month-wise FSV in both the PXs in Intra Day Contract in GTAM on Delivery Date basis	58
Table: 41	Month-wise FSV in both the PXs in Day Ahead Contingency in GTAM Contract on Delivery Date basis	59
Table: 42	Month-wise FSV in both the PXs in Daily/ Anyday Contract in GTAM on Delivery Date basis	60
Table: 43	Month-wise FSV in both the PXs in Weekly Contract in GTAM on Delivery Date basis	60
Table: 44	Month wise FSV in GTAM under solar and non-solar segments on Trade Date basis	61
Table: 45	Month wise FSV in IEX and PXIL in GTAM under solar and non-solar segments on Trade Date basis	62
Table: 46	Contract-wise prices of solar and non-solar transactions of electricity in GTAM in IEX during FY 2020-21 on Trade Date basis	63
Table: 47	Month-wise FSV in both the PXs in Intra Day Contract in GTAM on Trade Date basis	64
Table: 48	Month-wise FSV in both the PXs in Day Ahead Contingency in GTAM Contract on Trade Date basis	65
Table: 49	Month-wise FSV in both the PXs in Daily/ Anyday Contract in GTAM on Trade Date basis	65
Table: 50	Month-wise FSV in both the PXs in Weekly Contract in GTAM on Trade Date basis	66
Table: 51	Transmission Congestion details in IEX in GTAM under solar segment	67

Table: 52	Transmission Congestion details in IEX in GTAM under Non Solar segment	67
Table: 53	Average Market Clearing Price (MCP) of electricity transacted in IEX & PXIL in GTAM during FY20 20-21 (on delivery date basis)	68
Table: 54	Average Market Clearing Price (MCP) of electricity transacted in IEX & PXIL in GTAM during FY20 20-21 (on delivery date basis)	68
Table: 55	Regression Analysis for Day Ahead Market (DAM)	70
Table: 56	Regression Analysis for Real Time Market (RTM)	71
Table: 57	Top Ten Sellers on the Power Exchanges (IEX and PXIL) during FY 2020-21 in DAM	73
Table: 58	Top Ten Buyers on the Power Exchanges (IEX and PXIL) during FY 2020-21 in DAM	73
Table: 59	Top Ten Sellers on the Power Exchanges (IEX and PXIL) during FY 2020-21 in RTM	74
Table: 60	Top Ten Buyers on the Power Exchanges (IEX and PXIL) during FY 2020-21 in RTM	74
Table: 61	Sellers in DAM on PXs during FY 2020-21	75
Table: 62	Buyers in DAM on PXs during FY 2020-21	76
Table: 63	Sellers in RTM on PXs during FY 2020-21	77
Table: 64	Buyers in RTM on PXs during FY 2020-21	78

FIGURES

S. No.	Title	Page
Figure: 1	Demarcation of Bid Areas in the country for Power Exchange transactions	19
Figure: 2	DAM, RTM, TAM, GTAM and Energy Supplied during FY 2020-21	20
Figure: 3	Total Volume of Electricity Transacted in PXs (DAM+RTM+TAM+GTAM) on Delivery Date Basis	22
Figure: 4	Total Volume of Electricity Transacted in PXs (DAM+RTM+TAM+GTAM) on Trade Date Basis	23
Figure: 5	% of Volume transacted in IEX and PXIL w.r.t Total Energy Supplied during FY 2020-21	24
Figure: 6	Month-wise FSV in DAM	26
Figure: 7	Maximum & Minimum FSV for a Day in IEX in DAM	27
Figure: 8	Maximum & Minimum FSV for a Day in PXIL in DAM	27
Figure: 9	Maximum, Minimum & Average MCP in IEX in DAM	28
Figure: 10	Maximum, Minimum & Average MCP in PXIL in DAM	28
Figure: 11	Month-wise FSV in RTM	32
Figure: 12	Month-wise Maximum & Minimum FSV in IEX in RTM	33
Figure: 13	Month wise Maximum and Minimum & Average MCP in IEX in RTM	34
Figure: 14	Month wise FSV in DAM and RTM	35
Figure: 15	Month wise weighted Average MCP of DAM and RTM	35
Figure: 16	Final Scheduled Volume in TAM of IEX and PXIL on Delivery date basis	37
Figure: 17	FSV in Intraday Contract in TAM on Delivery date basis	39
Figure: 18	FSV in Day Ahead Contingency Contract in TAM on Delivery date basis	40
Figure: 19	FSV in Daily/ Anyday Contract in TAM on Delivery date basis	41
Figure: 20	FSV in Weekly Contract in TAM on Delivery date basis	42
Figure: 21	Real Time Curtailment in Daily/ Anyday contract in TAM	43
Figure: 22	Final Scheduled Volume in TAM of IEX and PXIL on Trade date basis	44
Figure: 23	FSV in Intraday Contract in TAM on Trade date basis	46
Figure: 24	FSV in Day Ahead Contingency Contract in TAM on Trade date basis	47
Figure: 25	FSV in Daily/ Anyday Contract in TAM on Trade date basis	48
Figure: 26	FSV in Weekly Contract in TAM on Trade date basis	49
Figure: 27	Congestion in IEX in TAM	50
Figure: 28	Congestion in PXIL in TAM	51
Figure: 29	Intraday contract prices in TAM on Delivery date basis	52
Figure: 30	Day Ahead Contingency contract prices in TAM on Delivery date basis	52
Figure: 31	Daily/ Anyday contract prices in TAM on Delivery date basis	52
Figure: 32	Weekly contract prices in TAM on Delivery date basis	52
Figure: 33	Intraday contract prices in TAM on Trade date basis	53

Figure: 34	Day Ahead Contingency contract prices in TAM on Trade date basis	53
Figure: 35	Daily/ Anyday contract prices in TAM on Trade date basis	53
Figure: 36	Weekly contract prices in TAM on Trade date basis	53
Figure: 37	FSV in GTAM on Delivery Date basis	56
Figure: 38	FSV in Day Ahead Contract in GTAM on Delivery Date basis	59
Figure: 39	FSV in GTAM on Trade Date basis	62
Figure: 40	FSV in Day Ahead Contract in GTAM on Trade Date basis	65

PREFACE

As per the provisions contained in Section 73 (i) and (j) of Electricity Act, 2003, CEA shall collect and record the data concerning the generation, transmission, trading, distribution and utilization of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters and make public from time to time the information secured under this Act, and provide for the publication of reports and investigations.

In furtherance of this, Ministry of Power vide letter dated 25.03.2019 requested CEA to establish and operationalize a Dedicated Market Cell in CEA for development and deepening of Electricity Market in India. Accordingly, a Market Monitoring was assigned to Regulatory Affairs Division, CEA. The functions include analysis of the spot market, monitoring of the volume and daily price movements and facilitates introduction of new products into the Power Exchanges, etc.

Accordingly, the Monthly Market Monitoring Reports and Annual Reports in respect of electricity transacted under various types of contracts executed through both the Power Exchanges (PXs) are being prepared by Regulatory Affairs (RA) Division, CEA since April, 2019. These reports are available on CEA's website on regular basis.

The Annual Report of Market Monitoring Cell of CEA for FY 2020-21 provides a snapshot of the short-term transactions of electricity through both the power exchanges in India viz. Indian Energy Exchange (IEX) and Power Exchange of India Ltd. (PXIL) in Day Ahead Market (DAM), Real Time Market (RTM), Term Ahead Market (TAM) and Green Term Ahead Market (GTAM). The dissemination of information for different stakeholders and consumers is the main aim of this Annual Report of CEA so as to ensure efficiency and competition in the Power Sector of India and Power Market in particular.

Definitions/ Terminologies

- 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.
- 2. Average MCP** is the average of daily MCP of the days during the month on which transaction happened.
- 3. Congestion** in transmission system means a situation in a particular area where the demand for transmission capacity exceeds the Available Transfer Capability for that area.
- 4. Daily MCP** is the average of MCPs of all 96 Time Blocks of the day during which transactions 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. Delivery Date** in power exchanges is the date on which the actual scheduled volume of electricity is delivered and real time curtailments occurs, if any.
- 7. Elasticity** is percentage of change in MCP with respect to change in independent variables 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.
- 8. Energy Supplied** is the total energy (MU) available at the State's periphery.
- 9. Final Scheduled Volume (FSV)** is the total of scheduled volume (MU) of all 96 time blocks in a day during the month in which transaction happened.
- 10. Green Term Ahead Market (GTAM)** on the power exchanges is the market for electricity similar to Term Ahead Market, where market participants buy/sell electricity generated from renewable sources on a term basis ranging from three (3) hours before actual dispatch (i.e. intra-day) and up to 11 days in advance. There are four (4) types of contracts in GTAM, namely; Intra-day, Day Ahead Contingency, Daily and Weekly.
- 11. Market Clearing Price (MCP)** is the price of electricity (Rs/kWh) discovered in each of the 15 Minute Time Block. The day is divided in 96-time blocks of 15 minutes each.
- 12. Market Clearing Volume (MCV)** is the volume of electricity (MU) discovered in each of the 15 Minute Time Block. The day is divided in 96-time blocks of 15 minutes each.
- 13. 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 three (3) hours before actual despatch (i.e. intra-day) and up to 11 days in advance. There are four (4) types of contracts in TAM, namely; Intra-day, Day Ahead Contingency, Daily and Weekly.
- 14. Trade Date** in power exchanges is the date on which trading of electricity takes place and transmission congestion occurs, if any.
- 15. Real Time Curtailment (RTC)** in Power Exchanges refers to volume loss (MU) between Cleared volume after accounting for transmission congestion and Final Scheduled volume allowed by the System Operator.

16. Real Time Market (RTM) on the power exchanges are market for electricity, where market participants purchase and sell electricity in the 48 market sessions of 15-minute duration each. The auction sessions are conducted during even time blocks of the hour with delivery to be commenced 1-hour after closure of trade session.

ABBREVIATIONS

ACBIL	ACB (India) Limited
ACP	Area Clearing Price
AGBPP	Assam Gas Based Power Plant
AGTPP	Agartala Gas Turbine Power Plant
BALCO	Bharat Aluminum Company Limited
BRBCL	Bhartiya Rail Bijlee Company Limited
BU	Billion Unit
CEA	Central Electricity
CERC	Central Electricity Regulatory Commission
DAM	Day Ahead Market
DAC	Day Ahead Contingency
DB POWER	Diligent Power Pvt. Ltd.
DGEN MEGA POWER	DGEN Mega Power Project
DVC	Damodar Valley Corporation
FSV	Final Scheduled Volume
FY	Financial Year
GTAM	Green Term Ahead Market
HEP	Hydro Electric Plant
JITPL	Jindal India Thermal Power Ltd.
IEX	Indian Energy Exchange
IL&FS	Infrastructure Leasing & Financial Services Limited
kWh	kiloWatt hour
MCP	Market Clearing Price
MCV	Market Clearing Volume
MSW	Municipal Solid Waste
MW	Mega Watt
MU	Million Unit
NLC Ltd.	Neyveli Lignite Corporation Limited
NLDC	National Load Dispatch Centre
NTPC Ltd.	National Thermal Power Corporation Limited
NTPL	NLC Tamil Nadu Power Limited
RGPPL	Ratnagiri Gas and Power Private Limited
TAM	Term Ahead Market
TPS	Thermal Power Station
PXIL	Power Exchange of India Limited
PXs	Power Exchanges
RTC	Real Time Curtailment
RTM	Real Time Market
UT	Union Territory

EXECUTIVE SUMMARY

The Annual Report of Market Monitoring Cell of CEA for FY 2020-21 comprises an overview of development of Electricity market in India, evolution of Power Exchanges, types of Contracts being executed in the Power Exchanges, Month-wise Final Scheduled Volume and Price of Electricity transacted in the Power Exchanges in Day Ahead Market (DAM), Real Time Market (RTM), Term Ahead Market (TAM) and Green Term Ahead Market (GTAM) during FY 2020-21.

The report also provides details of month-wise Minimum, Maximum daily volumes and Final scheduled volume in the month for electricity transacted in both the Power exchanges viz. IEX and PXIL in Day Ahead Market (DAM) and Real Time Market (RTM) during FY 2020-21. Similarly, the report provides details of the month-wise and also contract-wise Final Scheduled Volume and Price for electricity transacted in both the Power exchanges viz. IEX and PXIL in Term Ahead Market (TAM) and Green Term Ahead Market (GTAM) during FY 2020-21.

The report further provides details of the minimum, maximum and average of daily Market Clearing Price (MCP) of every month during FY 2020-21 for the electricity transacted in DAM, RTM, TAM and GTAM in the exchanges. The report also contains details of the minimum and maximum Area Clearing Prices of a day discovered during each months of FY 2020-21 in Day Ahead Market and Real Time Market.

The other salient features of Annual Report of Market Monitoring Cell of CEA for FY 2020-21 are as under:

The total volume of electricity transacted on both the power exchanges in the DAM, RTM, TAM and GTAM on delivery date basis during the FY 2020-21 were **60,633 MU**, **9,470 MU**, **8,733 MU** and **862 MU** respectively, whereas the total volume in TAM and GTAM on trade date basis were **8,444 MU** and **1,061 MU**, respectively. The total energy supplied in the country during the FY 2020-21 was **1,271 BU**. The volume of electricity transacted on the power exchanges on delivery date basis was **79.70 BU**, which is **6.27%** of the total energy supplied in the country. Out of this DAM, RTM, TAM and GTAM represents **4.77%**, **0.7 %**, **0.69%** and **0.07%** of the total energy supplied in the country respectively.

In DAM, the total volume of electricity transacted in IEX during FY 2020-21 was **60,392 MU** with an average MCP of **Rs 2.82/kWh**. Similarly, in PXIL, the total volume of electricity transacted in DAM during FY 2020-21 was **241 MU** with Average MCP of **Rs 3.13/kWh**. Whereas in the RTM, the total volume of electricity transacted in IEX during FY 2020-21 was **9,467.95 MU** with an average MCP of **Rs 2.79/kWh**. Similarly, in PXIL, the total volume of

electricity transacted in RTM during FY 2020-21 was **2.29 MU** with Average MCP of **Rs 2.60/kWh**.

Similarly in the TAM, the total volume of electricity transacted in IEX and PXIL during FY 2020-21 on delivery date basis were **3,272 MU** and **5,461 MU**, respectively. These were **2,895 MU** and **5,549 MU**, respectively on trade date basis. Whereas in the GTAM, the total volume of electricity transacted in IEX and PXIL during FY 2020-21 on delivery date basis were **861 MU** and **0.39 MU**, respectively. These were **1,060 MU** and **0.39 MU**, respectively on trade date basis.

During the FY 2020-21, the average price of electricity transacted in TAM in IEX and PXIL on the delivery date basis were **Rs. 3.03/kWh** and **Rs. 2.88/kWh**. The same were **Rs. 3.04/kWh** and **Rs. 3.05/kWh** on trade date basis, respectively. Whereas in GTAM, the average price of electricity transacted in GTAM in IEX and PXIL on the delivery date basis were **Rs. 4.08/kWh** and **Rs. 4.86/kWh**, respectively. For trade date basis also, the price were same at **Rs. 4.08/kWh** and **Rs. 4.86/kWh** on trade date basis, respectively.

During FY 2020-21, congestion in DAM on IEX was observed on **29 days** and in PXIL was observed only on **2 days**.

The report also highlights the detailed analysis volume of real time curtailment, loss of final scheduled volume due to congestion in transmission system in the power exchanges and name of top 10 sellers and top 10 purchasers of electricity in both the power exchanges taken together. The report further depicts the regression analysis carried out using a double log function on monthly basis with average MCP as dependent variable and with peak demand, total sell bid, total purchase bid, thermal generation, hydro generation, wind generation and solar generation as independent variables to find the significant variables affecting the average Market Clearing Price. The regression analysis has been done for transactions happening in IEX only, as the transaction happened in IEX in Day Ahead Market and Real Time Market were **99.60 %** and **99.98 %** of total transactions happened in DAM and RTM in both the power exchanges. The regression analysis's results of each month of FY 2020-21 revealed that the most important variable, which determined the Daily Market Clearing Price was the **Total Purchase Bid**.

The Report also depicts the variations in Final Scheduled Volume and Average Market Clearing Price (MCP) in the Power Exchanges during FY 2020-21.

Note: The data /information used for Annual Report of Market Monitoring Cell of CEA for the FY 2020-21 have been obtained from both the Power Exchanges (IEX & PXIL), National Load Dispatch Centre (NLDC).

CHAPTER-I

INTRODUCTION

1. Overview of Electricity Sector in India

Electricity is an essential component of infrastructure development of the country as it affects a country's economic growth and welfare. India's Electricity sector is one of the most diversified in the world. The sources of power generation in India range from conventional sources such as coal, lignite, hydro, nuclear, natural gas and oil, as well as, to renewable sources such as wind, solar, and bio-mass.

The Power Sector in India is undergoing a significant change that has redefined the industry outlook. It is also a key sector to promote sustained industrial growth. The total installed capacity as on 31st March, 2021 was **3,82,151 MW** out of which Thermal Capacity was **2,34,728 MW (61.42 %)**, Hydro Capacity was **46,209 MW (12.09 %)**, Nuclear capacity was **6,780 MW (1.77 %)** and RES Capacity was **94,434 MW (24.71 %)**. The total electrical energy supplied in the country during the FY 2020-21 was **1,271 BU**.

2. Development of Electricity Market

2.1 Legal and Regulatory framework

Section 66 of Electricity Act, 2003 and Power Market Regulations, 2010 formulated by the Central Electricity Regulatory Commission (CERC) provide key legal and regulatory framework for development of a market for electricity in India. Section 66 of the Electricity Act, 2003 provide that the development of a market for electricity is responsibility of the appropriate Electricity Regulatory Commission. Accordingly, CERC took an initiative to develop a common platform for electricity trading with its staff paper on 20th July, 2006 in exercise of its powers conferred by aforementioned Section 66 and clause (y) of sub-section (2) of Section 178 of the Electricity Act, 2003.

2.2. Evolution of Power Exchanges in India

In the Electricity market, power can be traded either bilaterally or through Power Exchanges. Bilateral contracts are negotiated between two parties, one being buyer and the other being seller, with or without a trader. The contract price information is, therefore, limited only to the parties involved. In this type of contract, traders also have credit risk in case of default by counter party. On the other hand, the trading through Power Exchange is a collective trade and is more sophisticated way to explore and make deals in the market. The traders compete with each other to have more market share in both bilateral as well as collective trade markets.

The Power Exchanges in India were established with the intent of creating a comprehensive market structure and enabling the execution and contracting of different types of possible

transactions in electricity markets. In the Power Exchanges, the market participants can quote their buy and sell bids ahead of physical delivery. The Power Exchange aggregates the buy and sell bids separately and clears the market on the basis of supply-demand equilibrium. The intersection point of buy and sell curve determines the Market Clearing Price (MCP) and Market Clearing Volume (MCV). Such transactions are also known as collective transactions as buyers and sellers are anonymous to each other.

In India, two power exchanges viz., Indian Energy Exchange (IEX) and Power Exchange of India Ltd. (PXIL) are functioning with the approval of CERC. CERC vide its order dated 31st August, 2007 and 27th May, 2008 accorded approval to IEX and PXIL, respectively for setting up and operating Power Exchanges. Further, through its order dated 9th June, 2008 and 30th September, 2008, CERC accorded approval to rules, bye-laws and business rules of IEX and PXIL to start transactions in the DAM. Subsequently, CERC vide its order dated 31st August, 2009 accorded approval to IEX and PXIL to start trading TAM contracts and directed that both the PXs should commence their operation in the TAM. From, 1st June, 2020, the transaction of electricity have been started in the Real Time Market in both the power exchanges (i.e. IEX and PXIL) with the approval of the CERC. Later, CERC vide its order dated 17th August, 2020 accorded its approval for introduction of Green Term Ahead Market (GTAM) contracts on Indian Energy Exchange (IEX) and the transaction of electricity in Green Term Ahead Market was started in IEX w.e.f. 21st August, 2020 onwards, whereas with approval from CERC, the transaction of electricity in Green Term Ahead Market was also started in PXIL w.e.f. 24th March, 2021 onwards.

3. Growth of Electricity transacted in Power Exchanges since its evolution

The transactions of electricity was initially started in DAM, and TAM only and now transactions of electricity in RTM and GTAM has also started. Based on an overview of volume of Electricity transacted in both the PXs from FY 2008-09 to FY 2020-21, it is noted that the volume of electricity transacted through the power exchanges in India increased steadily across the years from **2.77 BU** in FY 2008-09 to **79.70 BU** in FY 2020-21.

4. Contracts executed in Power Exchanges in India during FY 2020-21

4.1. Day Ahead Market (DAM)

In the DAM, the electricity is traded in every 15-minute block interval through a closed double sided anonymous auction for physical delivery for the next day starting from 00:00 hrs. The market price for each block of the following day is determined based on purchase bids and sale bids submitted by the market participants. The bids may be simple price-quantity pairs, or come in standard blocks for several hours of the same day. In the latter case, they consist of

duration, quantity and a minimum price, and are either accepted in full for all hours or denied in its whole. The price is discovered at the intersection of the aggregated demand and supply curves, and the market participants are charged or get paid this uniform price (marginal pricing principle). The DAM enables the distribution utilities to meet unplanned power requirements and facilitate sale of the surplus power.

4.2. Real Time Market (RTM)

The transaction of electricity in Real Time Market was started in both IEX and PXIL from 1st June, 2020 with the approval of the CERC. In the RTM, the electricity is traded in 48 market sessions of 15 minutes duration. The trading takes place during even time blocks of the hour with delivery to be commenced one hour after the closure of trade session. The price discovery mechanism is similar to that of Day Ahead Market. The RTM enables the trading entities to buy and sell power for delivery one hour after the closure of trade session, This helps in meeting unplanned/ unforeseen power requirement or sale of surplus of power.

4.3. Term ahead Market (TAM)

The 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 four types of contracts in TAM, namely; Intra-day, Day Ahead Contingency, Daily/ Any Day and Weekly, which helps the participants to manage their electricity portfolio for different durations. Thus, the TAM provides a range of products allowing participants to buy/sell electricity.

4.4. Green Term Ahead Market (GTAM)

The transaction of electricity in GTAM (Solar and Non-solar) was started in IEX from 21st August, 2020 onwards, whereas, in PXIL, GTAM (Non-Solar) was started from 24th March, 2021 and GTAM (Solar) from June, 2021. Similar to TAM, the GTAM on the power exchanges is the market for trading renewable energy (Solar and Non Solar) under the four contracts Intra-day, Day Ahead Contingency, Daily/ Any Day and Weekly. Trading in GTAM is continuous for Intraday, DAC and Daily, whereas double sided open auction bidding process for Weekly.

5. Bid areas in power exchanges

For the purpose of smooth transactions of Electricity through Power Exchanges in India, the five regions of India namely Northern Region, Western Region, Eastern Region, Southern Region and North Eastern Region have been further divided into another 13 mutually exclusive bid areas taking into account inter-regional and intra-regional corridor constraints.

The States covered under bid areas for different regions of Power Exchange have been shown in **Table-1**.

S. No.	Bid Area	Region	States Covered Under Bid Area
1.	N1	North Region	UT of J& K and Ladakh, Himachal Pradesh, Chandigarh,
2.	N2	North Region	Uttar Pradesh , Uttaranchal, Rajasthan, Delhi
3.	N3	North Region	Punjab
4.	E1	East Region	West Bengal, Sikkim, Bihar, Jharkhand
5.	E2	East Region	Odisha
6.	W1	West Region	Madhya Pradesh
7.	W2	West Region	Maharashtra, Gujarat, Daman and Diu, Dadar and
8.	W3	West Region	Chhattisgarh
9.	S1	South Region	Andhra Pradesh, Telangana, Karnataka, Pondicherry
10.	S2	South Region	Tamil Nadu, Puducherry, Puducherry (Karaikal),
11.	S3	South Region	Kerala
12.	A1	North East Region	Tripura, Manipur, Mizoram, Nagaland
13.	A2	North East Region	Assam, Arunachal Pradesh, Meghalaya

Table- 1

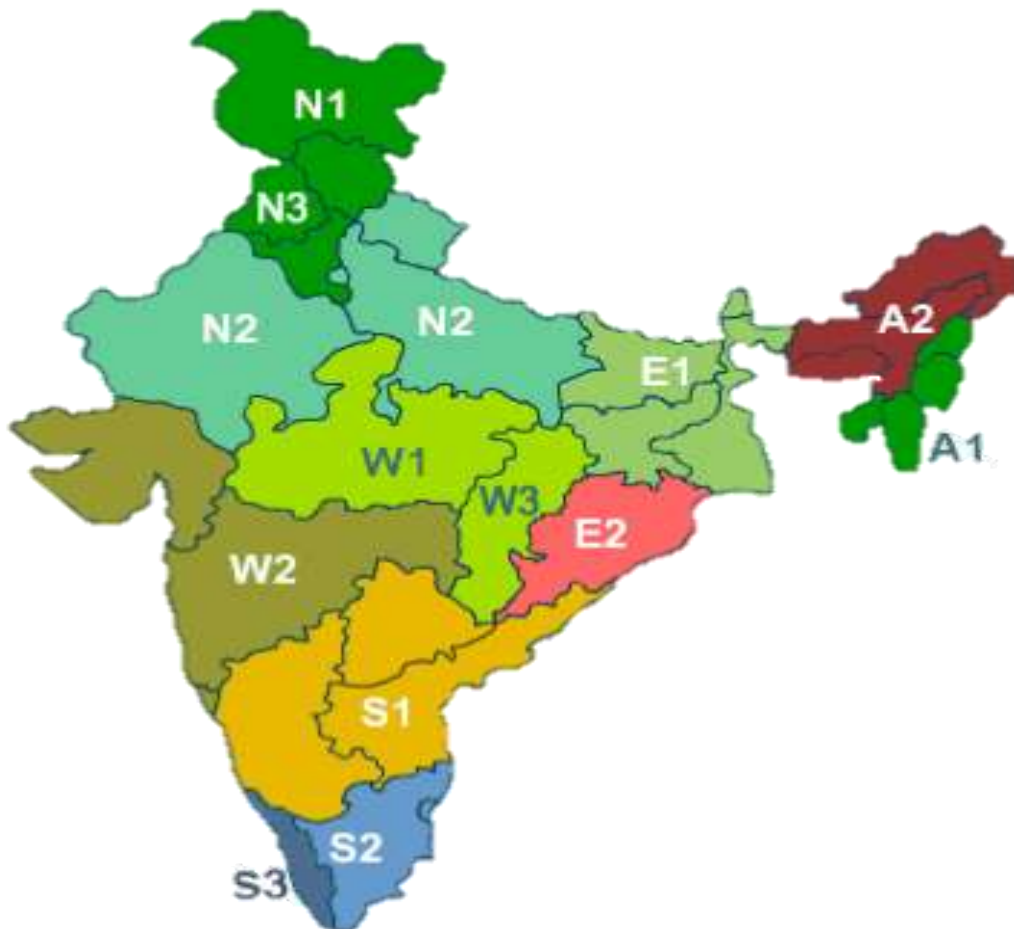


Figure: 1 Demarcation of Bid Areas in the country for Power Exchanges

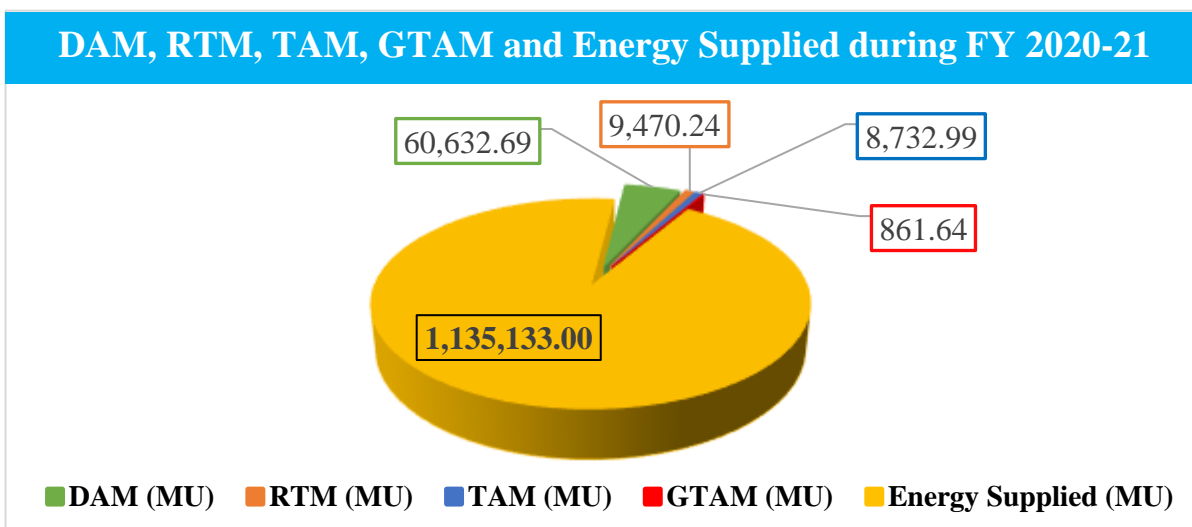
CHAPTER-II**OVERVIEW OF POWER MARKET IN INDIA****1. Total Short Term Trade (Bilateral + Exchanges + Deviation)**

During, 2020-21, a total of **1,271 BU** of electricity was supplied out of which **53.01 BU** was transacted through Bilateral trade*, **79.70 BU** through Power Exchanges and **22.91 BU** through Deviations*. Thus the short term trade (**155.62 BU**) constitutes 12.24 % of total energy supplied in the country during FY 2020-21, out of which bilateral trade constituted 4.17 %, trade through exchange constituted 6.27 % and remaining i.e. 1.80 % is by way of deviation. In the subsequent part of the report details of trade through power exchanges have been highlighted.

** In the above data for bilateral transactions and Deviation Settlement Mechanism (DSM), for the period April, 2020 to November, 2020, the Regulatory Affairs Division (CEA) was not receiving monthly bilateral and DSM transaction data from NLDC, so for this period transaction data is taken from NLDC's website for this report. Whereas from December, 2020 onwards, the bilateral transaction and DSM transaction data were provided by NLDC and the same were represented in the monthly market monitoring reports of CEA.*

2. Volume of Electricity transacted during FY 2020-21

The total volume of electricity transacted on both the power exchanges, viz., IEX and PXIL on delivery date basis during the FY 2020-21 was **79,698 MU**, out of which in the Day Ahead Market (DAM), Real Time Market (RTM), Term Ahead Market (TAM) and Green Term Ahead Market (GTAM) constituted **60,633 MU**, **9,470 MU**, **8,732 MU** and **862 MU** respectively. The total energy supplied in the country during the FY 2020-21 was **1,270,664 MU**. The volume of electricity transacted on the power exchanges represents 6.27 % of the total energy supplied in the country, out of which DAM, RTM, TAM and GTAM represents 4.77 %, 0.75 %, 0.69 % and 0.07 % respectively.

**Figure: 2**

3. Transactions in Power Exchanges w.r.t. total Energy Supplied in the country during FY 2020-21

The total volume of electricity transacted through both the power exchanges in DAM, RTM, TAM and GTAM together on delivery date basis during FY 2020-21 was **79,698 MU (73,993 MU in IEX and 5,705 MU in PXIL)**. The total energy supplied during the FY 2020-21 was **1,271 BU**. The total volume transacted in power exchanges was **6.27 %** of total electrical energy supplied during FY 2020-21 respectively. The maximum volume of transaction of electricity (DAM+RTM+TAM+GTAM) in both the Power Exchanges happened in the month of March, 2021, whereas the minimum transaction happened in April, 2020.

The maximum transaction of electricity (DAM+RTM+TAM+GTAM) in IEX happened in the month of March, 2021, whereas the minimum transaction happened in April, 2020. The maximum transaction of electricity (DAM+RTM+TAM+GTAM) in PXIL happened in the month of December, 2020, whereas the minimum transaction happened in July, 2020.

The month-wise transactions in PXs (on delivery date basis) and total energy supplied in the country during FY 2020-21 are shown in Table 2:

Month	IEX	PXIL	Total (MU)	Total Energy Supplied (MU)
	DAM+RTM+ TAM+GTAM (MU)	DAM+RTM+ TAM+GTAM (MU)		
Apr, 2020	4,051.98	191.30	4,243.28	84,550
May, 2020	6,005.11	306.48	6,311.59	102,089
Jun, 2020	4,790.15	91.77	4,881.92	105,086
Jul, 2020	5,334.12	28.72	5,362.84	112,147
Aug, 2020	5,468.12	335.32	5,803.44	109,217
Sept, 2020	5,669.09	532.78	6,201.87	112,241
Oct, 2020	6,777.74	840.63	7,618.37	109,174
Nov, 2020	6,180.66	921.22	7,101.88	96,883
Dec, 2020	7,289.22	935.15	8,224.37	105,623
Jan, 2021	7,431.57	633.73	8,065.30	109,767
Feb, 2021	6,743.73	487.82	7,231.55	103,252
Mar, 2021	8,251.29	399.87	8,651.16	120,635
Total	73,992.77	5,704.80	79,697.56	1,270,664

Table: 2

The graphical representation of total volume of electricity transacted in DAM, RTM, TAM and GTAM in PXs on delivery date basis is given in **figure: 3**

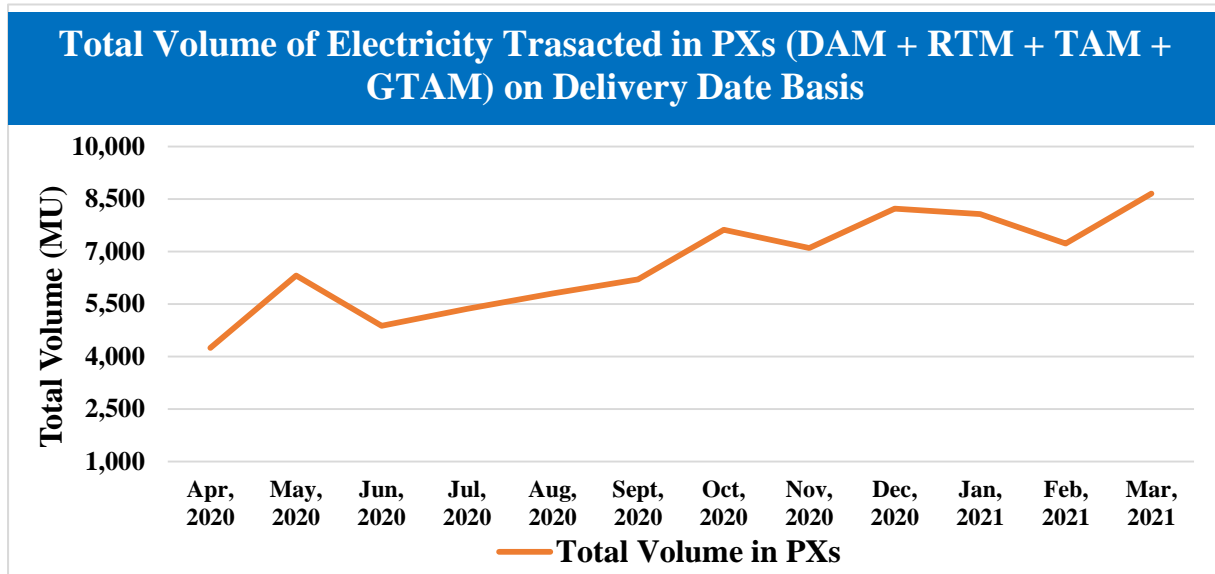


Figure: 3

The total volume of electricity transacted through both the power exchanges in DAM, RTM, TAM and GTAM together on trade date basis during FY 2020-21 was **79,608 MU (73,815 MU in IEX and 5,793 MU in PXIL)**. The total energy supplied during the FY 2020-21 was **1,271 BU**. The total volume transacted in power exchanges was **6.27%** of the total electrical energy supplied during FY 2020-21 respectively. The maximum volume of transaction of electricity (DAM+RTM+TAM+GTAM) in both the Power Exchanges happened in the month of March, 2021, whereas the minimum transaction happened in April, 2020.

The maximum transaction of electricity (DAM+RTM+TAM+GTAM) in IEX happened in the month of March, 2021, whereas the minimum transaction happened in April, 2020. The maximum transaction of electricity (DAM+RTM+TAM+GTAM) in PXIL happened in the month of October, 2020, whereas the minimum transaction happened in June, 2020.

The month-wise transactions in PXs (on trade date basis) and total energy supplied in the country during FY 2020-21 are shown in Table 3:

Month	IEX	PXIL	Total (MU)	Total Energy Supplied (MU)
	DAM+RTM+TAM+GTAM (MU)	DAM+RTM+TAM+GTAM (MU)		
Apr, 2020	4,032.56	282.72	4,315.28	84,550
May, 2020	5,951.39	240.59	6,191.98	102,089
Jun, 2020	4,762.08	68.25	4,830.33	105,086
Jul, 2020	5,331.94	117.56	5,449.50	112,147
Aug, 2020	5,494.78	284.82	5,779.60	109,217

Month	IEX	PXIL	Total (MU)	Total Energy Supplied (MU)
	DAM+RTM+ TAM+GTAM (MU)	DAM+RTM+ TAM+GTAM (MU)		
Sept, 2020	5,671.96	570.62	6,242.58	112,241
Oct, 2020	6,830.08	1,023.02	7,853.10	109,174
Nov, 2020	6,126.49	792.97	6,919.46	96,883
Dec, 2020	7,415.54	929.50	8,345.04	105,623
Jan, 2021	7,234.09	666.76	7,900.85	109,767
Feb, 2021	6,617.43	451.50	7,068.93	103,252
Mar, 2021	8,346.54	364.53	8,711.07	120,635
Total	73,814.88	5,792.85	79,607.73	1,270,664

Table: 3

The graphical representation of total volume of electricity transacted in DAM, RTM, TAM and GTAM in PXs on trade date basis is given in **figure: 4**

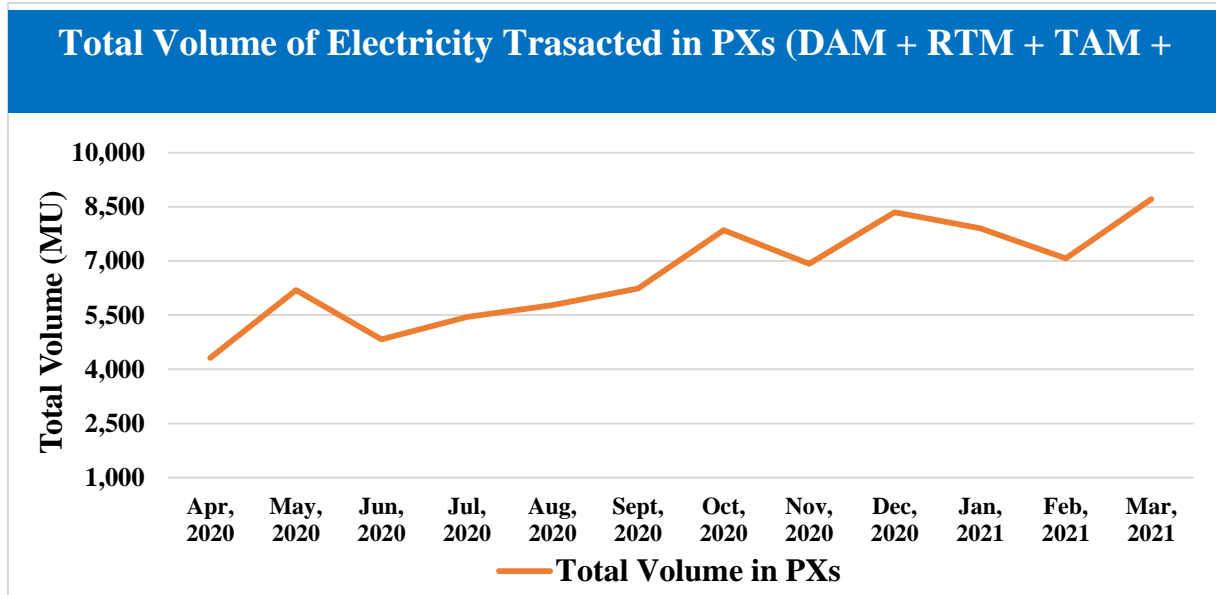


Figure: 4

4. Volume of electricity transaction in power exchanges on delivery date basis as percentage (%) of total electrical energy supplied in the country during FY 2020-21

The total volume of electricity transacted in power exchanges on delivery date basis as percentage (%) of total electricity generated and the total electrical energy supplied in the country during FY 2020-21 are given in **Table: 4**.

Month	% of IEX w.r.t. Total Energy Supplied	% of PXIL w.r.t. Total Energy Supplied	% of Total Volume in PXs w.r.t. Total Energy Supplied
Apr, 2020	4.79%	0.23%	5.10%
May, 2020	5.88%	0.30%	6.07%
Jun, 2020	4.56%	0.09%	4.60%
Jul, 2020	4.76%	0.03%	4.86%
Aug, 2020	5.01%	0.31%	5.29%
Sept, 2020	5.05%	0.47%	5.56%
Oct, 2020	6.21%	0.77%	7.19%
Nov, 2020	6.38%	0.95%	7.14%
Dec, 2020	6.90%	0.89%	7.90%
Jan, 2021	6.77%	0.58%	7.20%
Feb, 2021	6.53%	0.47%	6.85%
Mar, 2021	6.84%	0.33%	7.22%
FY 2020-21	5.82%	0.45%	6.27%

Table: 4

The graphical representation of the total volume of electricity transacted on delivery date basis in power exchanges as percentage of the total electrical energy supplied in the country during FY 2020-21 is displayed in **Figure: 5**.

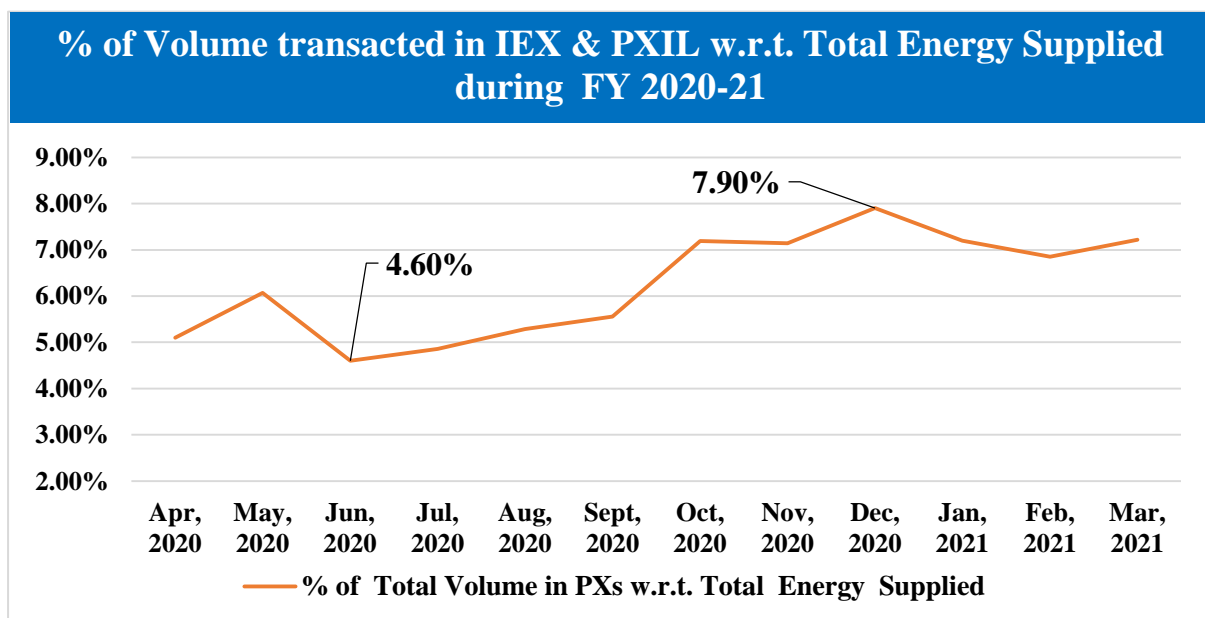


Figure: 5

CHAPTER-III**DAY AHEAD MARKET (DAM)****1. Volume and Price of Electricity transacted in IEX**

The total volume of electricity transacted in IEX in DAM on delivery date basis during FY 2020-21 was **60,392 MU** with an average MCP of **Rs 2.82 /kWh**. In IEX, the maximum transaction of electricity happened in the month of March, 2021 which was **6,549 MU** with an average MCP of **Rs 4.07 /kWh**. The minimum volume of electricity happened in the month of April, 2020, which was **3,692 MU** with average MCP of **Rs 2.42 /kWh**.

The total volume of electricity transacted on IEX in DAM was **99.60 %** of the total volume on the power exchanges.

2. Volume and Price of Electricity transacted in PXIL

The total volume of electricity transacted in PXIL in DAM on delivery date basis during FY 2020-21 was **241 MU** with Average MCP of **Rs 3.13/kWh**. In PXIL, the maximum volume of transaction of electricity happened in the month of October, 2020, which was **50 MU** with average MCP of **Rs 2.80 /kWh** and the minimum volume of transaction of electricity happened in the month of December, 2020, which was **5.42 MU** with average MCP of **Rs 3.25 /kWh**. It is to be mentioned that no transaction of electricity happened in PXIL in April, 2020 and July, 2020.

3. Monthly Volume and Price of Electricity transacted in IEX and PXIL

The month-wise total of Final Scheduled Volume and Average MCP of electricity transacted in both the Power Exchanges in DAM are shown in **Table 5**:

Month	Final Scheduled Volume MU)			Average MCP (Rs/kWh)		
	IEX	PXIL	Total	IEX	PXIL	Wt. Avg.
Apr, 2020	3,692.04	-	3,692.04	2.42	NA	2.42
May, 2020	5,573.73	22.24	5,595.97	2.57	2.58	2.57
Jun, 2020	4,174.34	15.03	4,189.37	2.35	2.56	2.35
Jul, 2020	4,486.71	-	4,486.71	2.47	NA	2.47
Aug, 2020	4,484.36	14.10	4,498.46	2.43	2.64	2.43
Sept, 2020	4,780.99	60.2	4,841.19	2.69	2.70	2.69
Oct, 2020	5,500.53	49.57	5,550.10	2.74	2.80	2.74
Nov, 2020	4,860.46	48.62	4,909.08	2.73	2.87	2.73
Dec, 2020	5,605.58	5.42	5,611.00	2.83	3.25	2.83
Jan, 2021	5,584.07	7.63	5,591.70	3.18	3.85	3.18
Feb, 2021	5,099.75	7.44	5,107.19	3.39	3.69	3.39
Mar, 2021	6,548.94	10.94	6,559.88	4.07	4.32	4.07

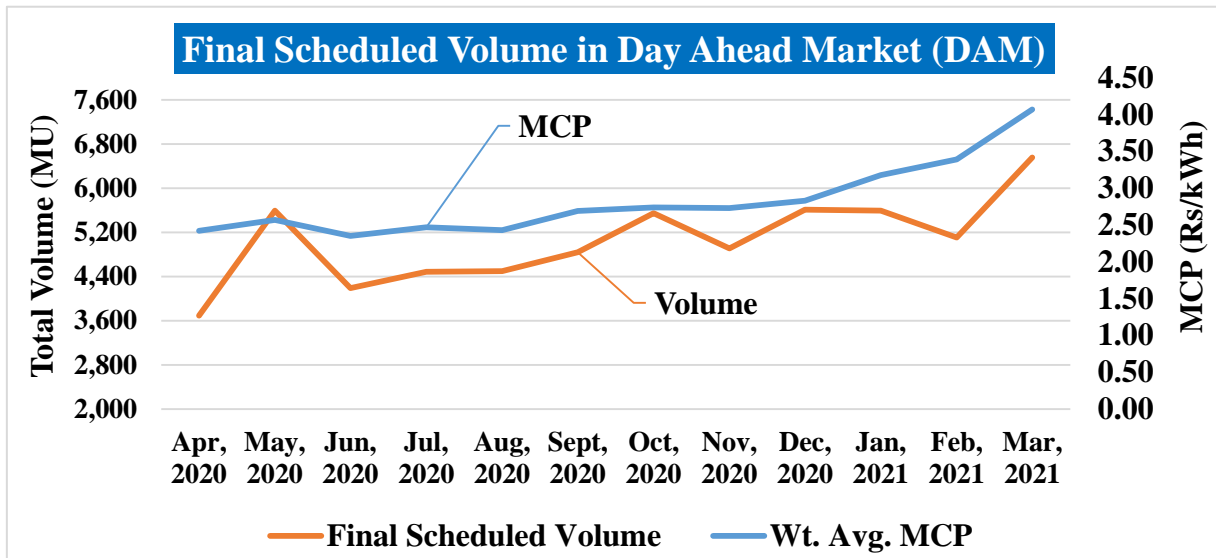
Month	Final Scheduled Volume MU)			Average MCP (Rs/kWh)		
	IEX	PXIL	Total	IEX	PXIL	Wt. Avg.
Total	60,391.50	241.19	60,632.69			
Average FY 2020-21	5,032.63	24.12	5,052.72	2.82	3.12	2.82

No transaction happened

NA- Not applicable

Table: 5

The graphical representation of month wise total FSV in DAM is displayed in **Figure: 6**.

**Figure: 6**

4. Maximum/ Minimum Final scheduled Volume (FSV) for a Day in DAM during FY 2020-21

The maximum Final Scheduled Volume (FSV) for transaction of electricity for a day in IEX in Day Ahead Market was observed in the month of March, 2021 during the FY 2020-21, whereas, in PXIL the maximum FSV was observed in the month of September, 2020. Similarly, the minimum FSV in any particular day in IEX was observed in November, 2020, while in PXIL, the minimum FSV was observed in May, 2020 and March, 2021. No transaction of electricity happened in PXIL during July, 2020. The month- wise Maximum/Minimum FSV for a day during various months of FY 2020-21 are shown in **Table 6**:

Months	Minimum FSV (MU)		Maximum FSV (MU)	
	IEX	PXIL	IEX	PXIL
Apr, 2020	92.47	-	151.23	-
May, 2020	140.41	2.61	220.37	6.21
Jun, 2020	86.28	0.05	173.52	3.08
Jul, 2020	114.05	-	181.17	-
Aug, 2020	103.09	0.87	187.85	3.83
Sept, 2020	125.62	0.84	182.6	3.94
Oct, 2020	123.04	0.58	208.48	2.69
Nov, 2020	95.12	0.03	204.76	3.62
Dec, 2020	143.02	0.02	207.05	0.38

Months	Minimum FSV (MU)		Maximum FSV (MU)	
	IEX	PXIL	IEX	PXIL
Jan, 2021	156.75	0.02	199.03	1.22
Feb, 2021	152.98	0.09	203.71	0.47
Mar, 2021	181.14	0.01	251.01	1.22

- No transaction happened

Table: 6

The graphical representation of month wise maximum & minimum FSV in DAM is displayed in **Figure: 7 & 8**

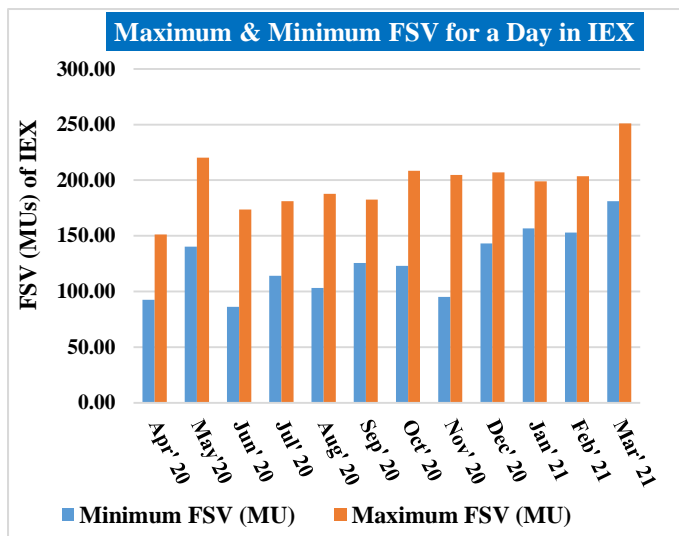


Figure: 7

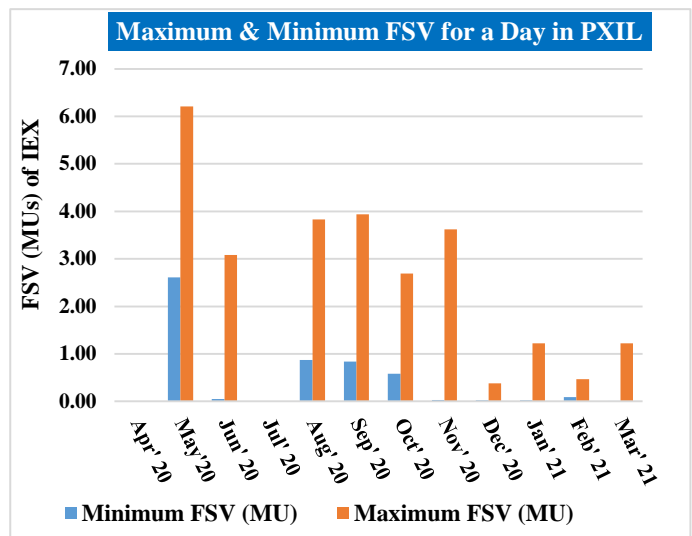


Figure: 8

5. Maximum, Minimum & Average of Daily Average MCP in DAM during FY 2020-21

The maximum daily average MCP for transaction of electricity in IEX was observed in the month of March, 2021 (**Rs. 5.42 /kWh**) during the FY 2020-21, whereas, in PXIL it was **Rs. 5.99 /kWh, which** was observed in the month of December, 2021. Similarly, the minimum daily average MCP of **Rs. 1.65 /kWh** in IEX was observed in June, 2020, while in PXIL, the minimum MCP of **Rs. 2.15 /kWh** was also observed in June, 2020. The month-wise Maximum, Minimum and Average MCP are shown in **Table 7**:

Months	Maximum Daily Average MCP (Rs/kWh)		Minimum Daily Average MCP (Rs/kWh)		Monthly Average MCP (Rs/kWh)	
	IEX	PXIL	IEX	PXIL	IEX	PXIL
Apr, 2020	2.67	-	2.11	-	2.42	-
May, 2020	2.79	2.86	2.24	2.45	2.57	2.58
Jun, 2020	2.74	2.93	1.65	2.15	2.35	2.56
Jul, 2020	2.90	-	1.91	-	2.47	-
Aug, 2020	2.99	2.81	1.64	2.47	2.43	2.64
Sept, 2020	3.15	3.09	2.46	2.43	2.69	2.70
Oct, 2020	3.12	3.34	2.40	2.52	2.74	2.80
Nov, 2020	3.23	3.35	2.13	2.42	2.73	2.87

Months	Maximum Daily Average MCP (Rs/kWh)		Minimum Daily Average MCP (Rs/kWh)		Monthly Average MCP (Rs/kWh)	
	IEX	PXIL	IEX	PXIL	IEX	PXIL
Dec, 2020	3.25	4.55	2.54	2.4	2.83	3.25
Jan, 2021	3.85	4.71	2.66	3.19	3.18	3.85
Feb, 2021	4.54	4.73	2.85	2.62	3.39	3.69
Mar, 2021	5.42	5.99	2.99	3.13	4.07	4.32

- No transaction happened

Table: 7

The graphical representation of month wise maximum, minimum & average of daily average MCP is displayed in **Figure: 9 & 10**

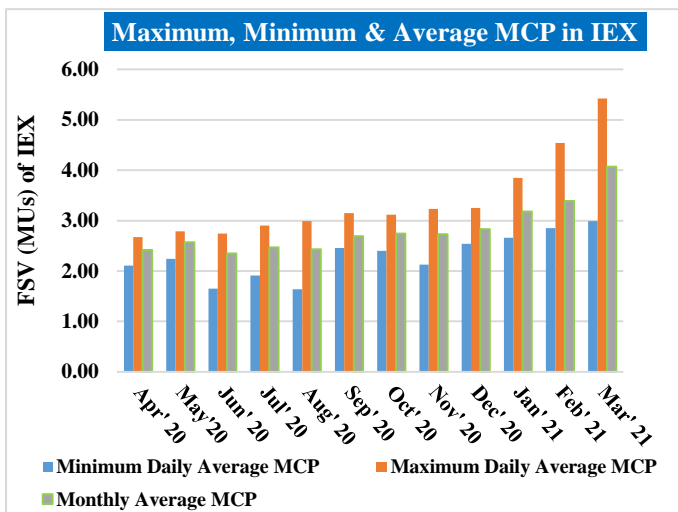


Figure: 9

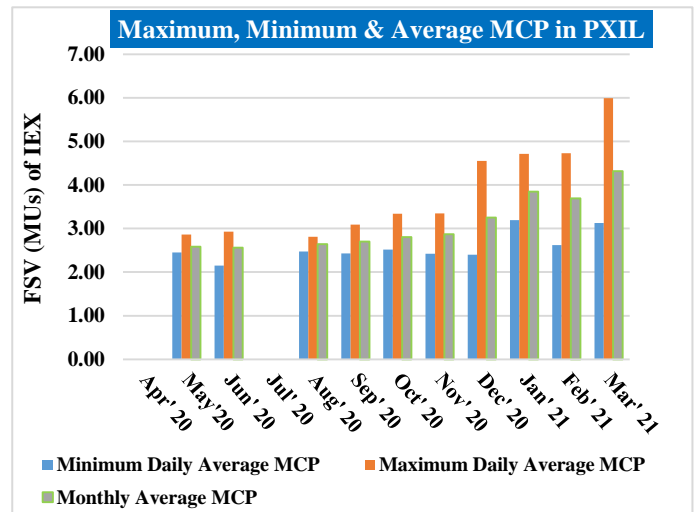


Figure: 10

6. Maximum/ Minimum Area Clearing Price (ACP) in DAM during FY 2020-21

The maximum ACP of **Rs. 9.88 /kWh** in IEX during the FY 2020-21 was observed on 27th March, 2021 during the 68th time block, whereas, the minimum ACP of **Rs. 0.68 /kWh** in IEX was observed on 15th August, 2020 during 70th time block. Similarly, the maximum ACP of **Rs. 13.95 /kWh** in PXIL during the FY 2020-21 was observed on 19th February, 2021 during 72nd time block, whereas, the minimum ACP of **Rs. 1.04 /kWh** in PXIL was observed 11th September, 2020 consecutively during 33rd to 44th time blocks. The month wise Maximum/Minimum ACP are shown in **Table 8**:

Months	IEX		PXIL	
	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)
Apr, 2020	3.87	0.70	-	-
May, 2020	5.00	1.10	5.50	1.30
Jun, 2020	4.11	1.00	3.50	1.80
Jul, 2020	5.17	0.88	-	-
Aug, 2020	4.93	0.68	4.18	2.00
Sept, 2020	5.44	1.77	6.00	1.04

Months	IEX		PXIL	
	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)
Oct, 2020	6.00	1.60	5.47	2.00
Nov, 2020	6.00	1.00	6.00	1.23
Dec, 2020	6.05	1.57	5.99	2.00
Jan, 2021	8.00	1.55	6.71	1.51
Feb, 2021	8.75	1.58	13.95	2.58
Mar, 2021	9.88	2.34	7.80	2.62

- No Transaction happened

Table: 8

7. Congestion in Day Ahead Market in IEX and PXIL

From the table, it may be seen that in DAM, the total transmission congestion of **26.53 MU** happened in IEX, whereas, the volume of transmission congestion happened in PXIL during FY 2020-21 was 0.045 MU. The congestion was only 0.40 % of the total volume of electricity transacted in DAM.

The month wise details of transmission congestion in DAM are tabulated in **Table: 9**

Months	IEX		PXIL		Total	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	0.00	NA	-	NA	0.00	NA
May, 2020	0.00	NA	-	NA	0.00	NA
Jun, 2020	0.00	NA	0.00	NA	0.00	NA
Jul, 2020	0.00	NA	-	NA	0.00	NA
Aug, 2020	0.00	NA	0.00	NA	0.00	NA
Sept, 2020	0.00	NA	0.045	1 day	0.045	1 day
Oct, 2020	2.01	2 days	0.00	NA	2.01	2 days
Nov, 2020	0.00	NA	0.00	NA	0.00	NA
Dec, 2020	0.18	1 day	0.00	NA	0.18	1 day
Jan, 2021	0.00	NA	0.00	NA	0.00	NA
Feb, 2021	0.00	NA	0.00	NA	0.00	NA
Mar, 2021	24.34	22 days	0.00	NA	24.34	22 days
Total	26.53	25 days	0.045	1 days	26.58	26 days

- No transaction happened

NA: Not Applicable

Table: 9

8. Real Time Curtailment in Day Ahead Market

The total volume of real time curtailment of **0.16 MU** happened in DAM in IEX during FY 2020-21, whereas no real time curtailment happened in PXIL during same period. As a result, 0.16 MU could not be transacted due to real time curtailment in the power exchanges. This is only 0.0024 % of the total volume of electricity transacted in DAM.

The month wise details of real time curtailment in DAM are tabulated in **Table: 10**

Months	IEX Curtailment (MU)	PXIL Curtailment (MU)	Total (MU)
Apr, 2020	0.00	0.00	0.00
May, 2020	0.00	0.00	0.00
Jun, 2020	0.00	0.00	0.00
Jul, 2020	0.00	0.00	0.00
Aug, 2020	0.00	0.00	0.00
Sept, 2020	0.00	0.00	0.00
Oct, 2020	0.16	0.00	0.16
Nov, 2020	0.00	0.00	0.00
Dec, 2020	0.00	0.00	0.00
Jan, 2021	0.00	0.00	0.00
Feb, 2021	0.00	0.00	0.00
Mar, 2021	0.00	0.00	0.00
Total	0.16	0.00	0.16

Table: 10

CHAPTER-IV**Real Time MARKET (RTM)****1. Volume and Price of Electricity transacted in IEX**

The total volume of electricity transacted in IEX in RTM on delivery date basis during FY 2020-21 was **9,468 MU** with an average MCP of **Rs 2.79 /kWh**. In IEX, the maximum transaction of electricity happened in the month of March, 2021 which was **1,414 MU** with an average MCP of **Rs 3.73 /kWh**. The minimum volume of electricity happened in the month of June, 2020, which was **515 MU** with average MCP of **Rs 2.22 /kWh**.

The total volume of electricity transacted on IEX in RTM was **99.98 %** of the total volume on the power exchanges.

2. Volume and Price of Electricity transacted in PXIL

The total volume of electricity transacted in PXIL in RTM on delivery date basis during FY 2020-21 was **2.29 MU** with Average MCP of **Rs 2.60/kWh**. In PXIL, the transaction of electricity happened only in the months of June, 2020 (**1.86 MU** at average MCP of **2.59 Rs/kWh**) and July, 2020 (**0.43 MU** at average MCP of **2.61 Rs/kWh**) only. And, **no** transaction of electricity happened in PXIL in during August, 2020 to March, 2021.

3. Monthly Volume and Price of Electricity transacted in IEX and PXIL

The month-wise values of Final Scheduled Volume and Average MCP of electricity transacted in both the Power Exchanges in RTM are shown in **Table 11**

Month	Final Scheduled Volume (MU)			Average MCP (Rs/kWh)		
	IEX	PXIL	Total	IEX	PXIL	Wt. Avg.
Apr, 2020	Transaction of electricity in RTM started from 1 st June, 2020					
May, 2020						
Jun, 2020	515.47	1.86	517.33	2.22	2.59	2.22
Jul, 2020	784.96	0.43	785.39	2.49	2.61	2.49
Aug, 2020	860.57	-	860.57	2.27	NA	2.27
Sept, 2020	704.04	-	704.04	2.52	NA	2.52
Oct, 2020	814.48	-	814.48	2.69	NA	2.69
Nov, 2020	893.62	-	893.62	2.75	NA	2.75
Dec, 2020	1,129.09	-	1,129.09	2.94	NA	2.94
Jan, 2021	1,233.31	-	1,233.31	3.02	NA	3.02
Feb, 2021	1,118.45	-	1,118.45	3.31	NA	3.31
Mar, 2021	1,413.96	-	1,413.96	3.73	NA	3.73
Total	9,467.95	2.29	9,470.24			
Average FY 2020-21	946.79	1.15	947.02	2.79	2.60	2.79

- No transaction happened

NA- Not applicable

Table: 11

The graphical representation of month wise total FSV in RTM is displayed in **Figure: 9**.

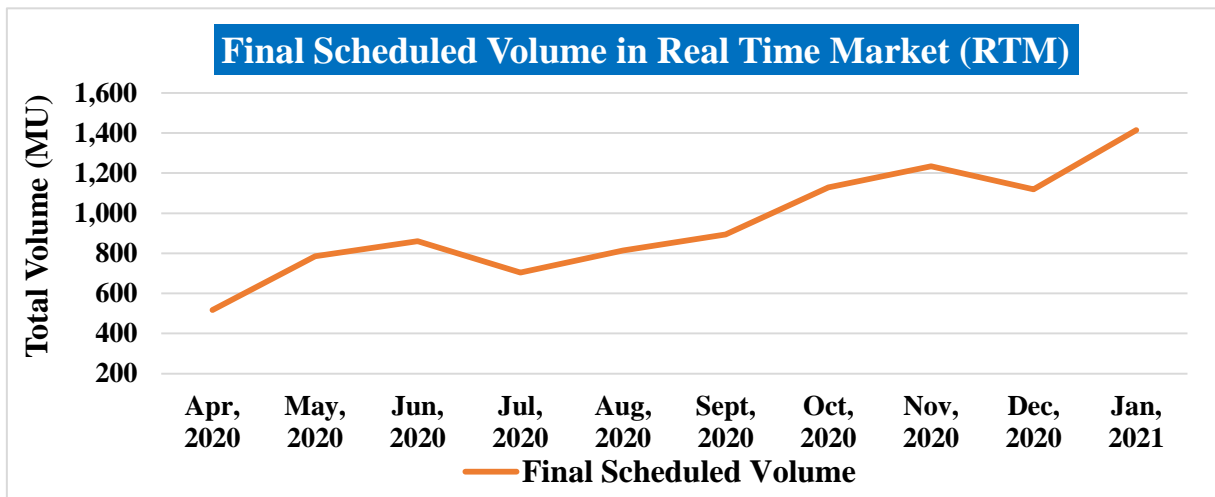


Figure: 11

4. Maximum / Minimum Final Scheduled Volume (FSV) for a Day in RTM during FY 2020-21

The maximum Final Scheduled Volume (FSV) for transaction of electricity in any particular day in IEX in Real Time Market was observed in the month of March, 2021, whereas, the minimum FSV in any particular day was observed in the month of June, 2020 during the FY 2020-21. In PXIL the maximum FSV in any particular day was observed in the month of July, 2020 and the minimum FSV was observed in June, 2020. No transaction of electricity happened in PXIL during August, 2020 to March, 2021. The month-wise Maximum/Minimum FSV for a day during various months of FY 2020-21 are shown in **Table 12**:

Months	Minimum FSV (MU)		Maximum FSV (MU)	
	IEX	PXIL	IEX	PXIL
Apr, 2020	Transaction of electricity in RTM started from 1 st June, 2020			
May, 2020				
Jun, 2020	3.42	0.01	36.09	0.90
Jul, 2020	14.37	0.43	42.69	0.43
Aug, 2020	15.47	-	53.09	-
Sept, 2020	12.57	-	41.76	-
Oct, 2020	16.71	-	44.54	-
Nov, 2020	19.01	-	40.60	-
Dec, 2020	24.09	-	51.34	-
Jan, 2021	21.41	-	55.75	-
Feb, 2021	28.28	-	52.73	-
Mar, 2021	34.64	-	62.77	-

- No transaction happened

Table: 12

The graphical representation of month wise maximum & minimum FSV in IEX in RTM is displayed in **Figure: 12**

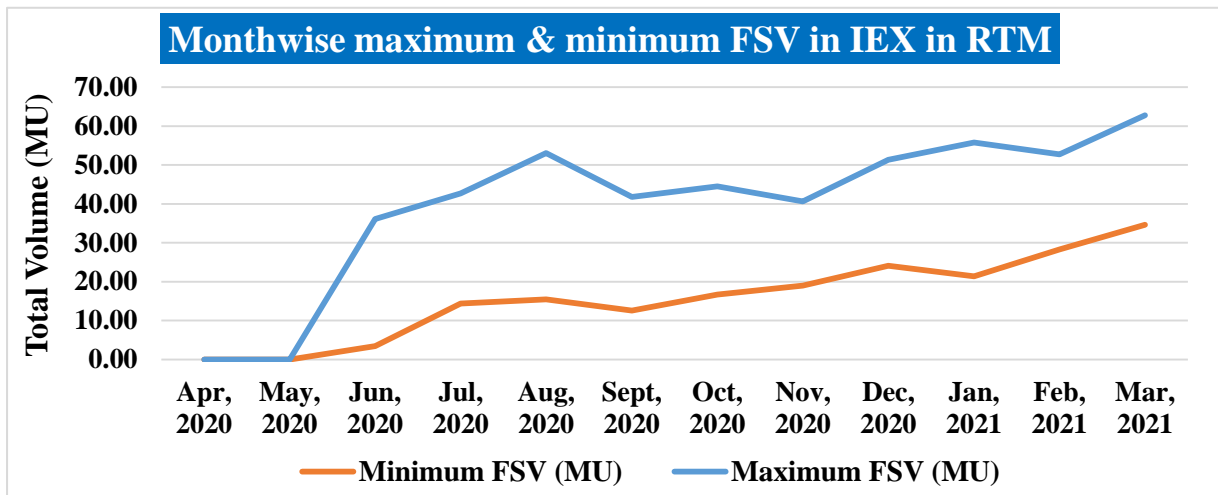


Figure: 12

5. Maximum, Minimum & Average of Daily Average MCP in RTM during FY 2020-21

The maximum MCP for transaction of electricity in IEX was observed in the month of March, 2021 (**Rs. 6.20 /kWh**) during the FY 2020-21. Whereas, in PXIL the maximum MCP of **Rs. 2.91 /kWh** was observed in the month of June, 2020. Similarly, the minimum MCP of **Rs. 1.55 /kWh** in IEX was observed in July, 2020, while in PXIL, the minimum MCP of **Rs. 2.25 /kWh** was observed in June, 2020. The month-wise Maximum, Minimum and Average MCP are shown in **Table 13**:

Months	Maximum MCP (Rs/kWh)		Min. MCP (Rs/kWh)		Average MCP (Rs/kWh)	
	IEX	PXIL	IEX	PXIL	IEX	PXIL
Apr, 2020	Transaction of electricity in RTM started from 1 st June, 2020					
May, 2020	Transaction of electricity in RTM started from 1 st June, 2020					
Jun, 2020	3.03	2.91	1.56	2.25	2.22	2.59
Jul, 2020	3.39	2.61	1.55	2.61	2.49	2.61
Aug, 2020	2.98	NA	1.66	NA	2.27	NA
Sept, 2020	3.38	NA	1.80	NA	2.52	NA
Oct, 2020	3.39	NA	1.96	NA	2.69	NA
Nov, 2020	3.38	NA	1.87	NA	2.75	NA
Dec, 2020	3.76	NA	2.40	NA	2.94	NA
Jan, 2021	3.99	NA	2.32	NA	3.02	NA
Feb, 2021	4.72	NA	2.66	NA	3.31	NA
Mar, 2021	6.20	NA	2.60	NA	3.73	NA

NA: Not Applicable as no transaction happened

Table: 13

The graphical representation of month wise maximum, minimum & average of daily average MCP in IEX in RTM is displayed in **Figure: 13**

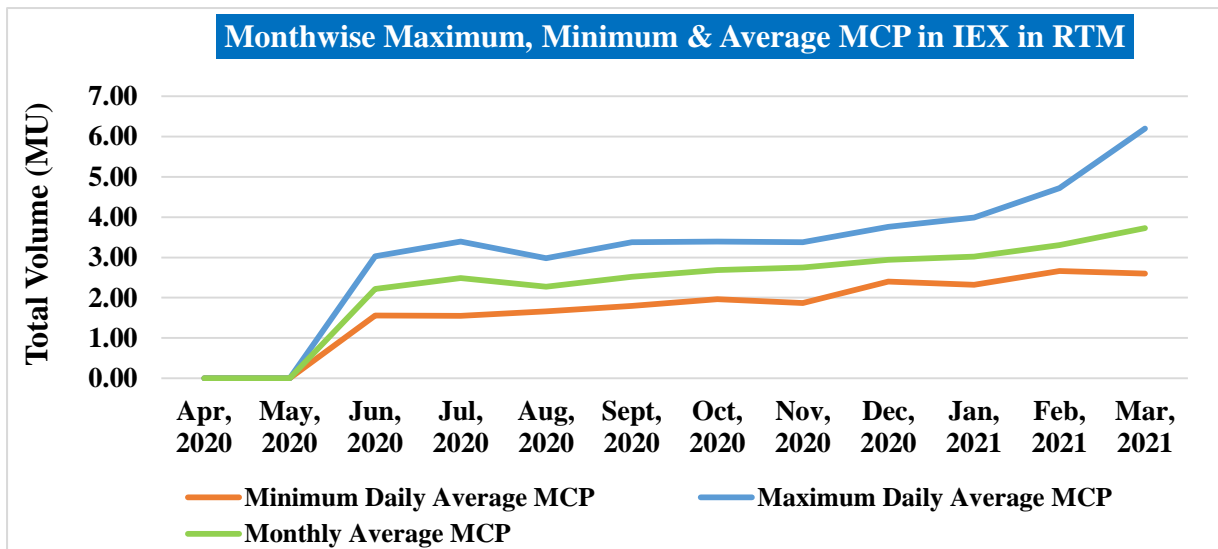


Figure: 13

6. Maximum / Minimum Area Clearing Price (ACP) in RTM during FY 2020-21

The maximum ACP of **Rs. 19.99 /kWh** in IEX during the FY 2020-21 was observed on 8th March, 2021 during 82nd time block, whereas, the minimum ACP of **Rs. 0.015 /kWh** in IEX was observed 2nd June, 2020 during 32nd & 33rd time blocks. Similarly, the maximum ACP of **Rs. 4.00 /kWh** in PXIL was observed in the month of June, 2020, whereas, the minimum ACP of **Rs. 1.88 /kWh** in PXIL was also observed in the month of June, 2020. The month wise Maximum/Minimum ACP are shown in **Table 14**:

Months	IEX		PXIL	
	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)	Max. ACP (Rs/kWh)	Min. ACP (Rs/kWh)
Apr, 2020	Transaction of electricity in RTM started from 1 st June, 2020			
May, 2020	Transaction of electricity in RTM started from 1 st June, 2020			
Jun, 2020	10.00	0.015	4.00	1.88
Jul, 2020	5.65	0.19	2.61	2.60
Aug, 2020	5.21	0.10	NA	NA
Sept, 2020	6.00	0.10	NA	NA
Oct, 2020	11.56	0.60	NA	NA
Nov, 2020	6.80	0.05	NA	NA
Dec, 2020	15.00	0.90	NA	NA
Jan, 2021	9.00	0.40	NA	NA
Feb, 2021	9.00	1.58	NA	NA
Mar, 2021	19.99	1.43	NA	NA

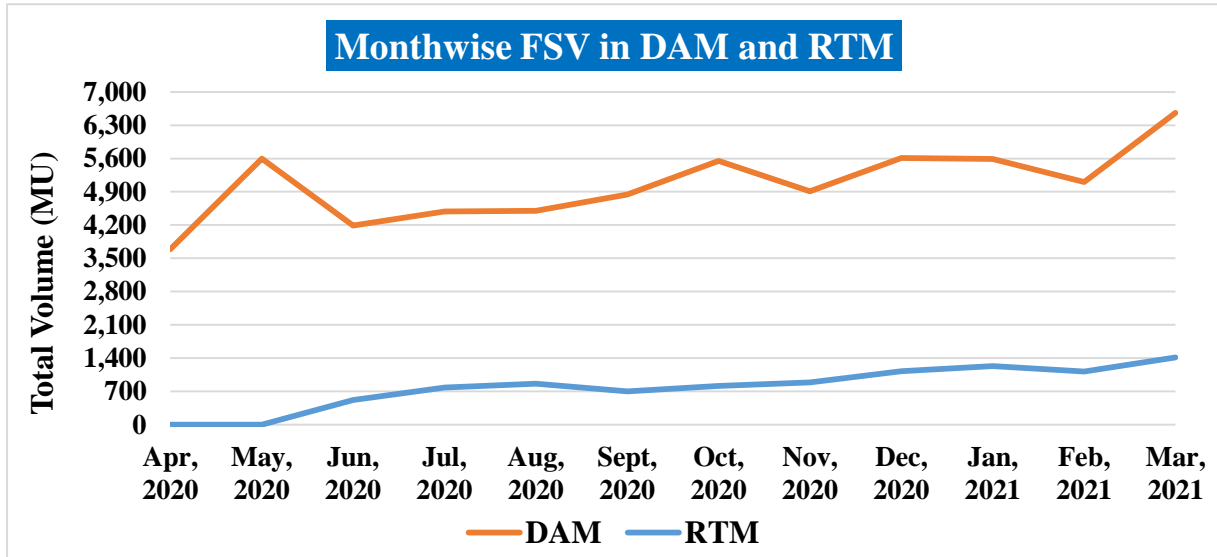
NA: Not Applicable as no transaction happened

Table: 14

7. Comparison of Final Scheduled volume & Monthly average MCP of Day Ahead Market and Real Time Market during FY 2020-21

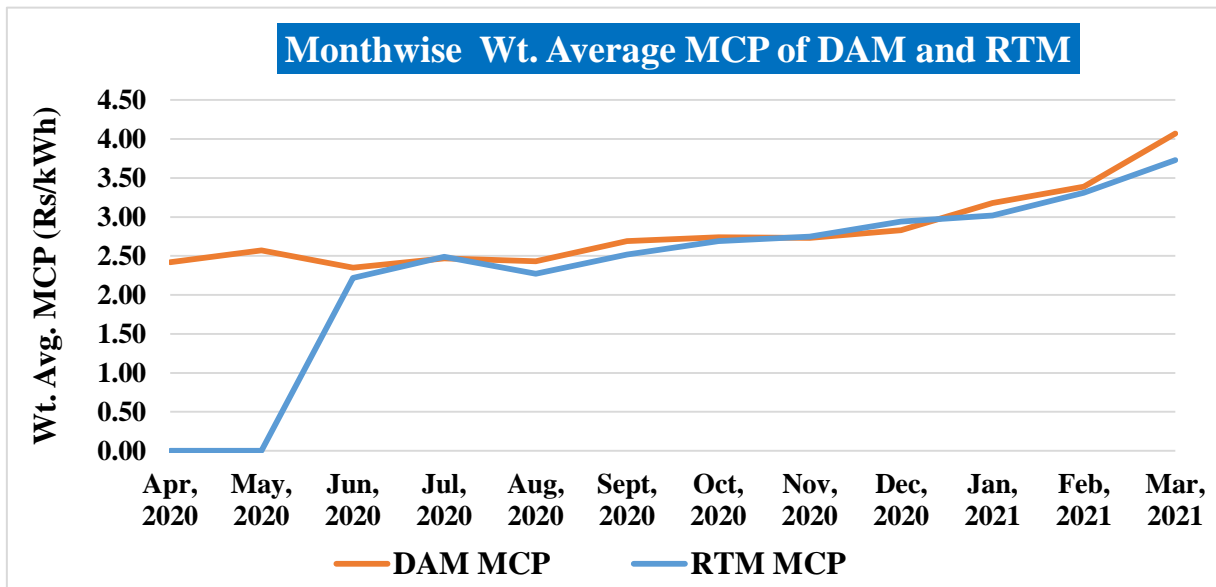
During the FY 2020-21, the volume of electricity transacted in Day Ahead Market and Real Time Market were **60,633 MU** & **9,470 MU**, respectively. Whereas, the average MCP's for DAM & RTM during FY 2020-21 were **Rs. 2.82/kWh** & **Rs. 2.79/kWh**, respectively.

The month-wise comparison FSV & MCP for DAM and RTM is shown in **Figures 14 & 15**:



*Transaction of electricity in RTM started from 1st June, 2020 onwards.

Figure: 14



*Transaction of electricity in RTM started from 1st June, 2020 onwards.

Figure: 15

8. Congestion in Real Time Market in IEX and PXIL

From the table, it may be seen that in RTM, the total transmission congestion of **14.60 MU** happened in IEX, whereas, **no** transmission congestion happened in PXIL during FY 2020-21.

The month wise details of transmission congestion in RTM are tabulated in **Table: 15**

Months	IEX		PXIL		Total	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	Transaction of electricity in RTM started from 1 st June, 2020					
May, 2020						
Jun, 2020	3.70	1 day	0.00	0	3.70	1 day
Jul, 2020	0.08	1 day	0.00	0	0.08	1 day
Aug, 2020	0.00	0	-	NA	0.00	0
Sept, 2020	0.54	2 days	-	NA	0.54	2 days
Oct, 2020	0.05	2 days	-	NA	0.05	2 days
Nov, 2020	0.01	2 days	-	NA	0.01	2 days
Dec, 2020	0.02	4 days	-	NA	0.02	4 days
Jan, 2021	2.29	7 days	-	NA	2.29	7 days
Feb, 2021	0.61	11 days	-	NA	0.61	11 days
Mar, 2021	7.30	14 days	-	NA	7.30	14 days
Total	14.60	44 days	0.00	0	14.60	44 days

- No transaction happened

NA: Not Applicable

Table: 15

9. Real Time Curtailment in Real Time Market

There was **no** real time curtailment happened in Real Time Market in both the power exchanges during FY 2020-21.

CHAPTER- V**TERM AHEAD MARKET (TAM)****1. Volume of Electricity transacted in TAM on Delivery date basis**

The total volume of electricity transacted in Power Exchanges in TAM was **8,733 MU** (**3,272 MU** in IEX and **5,461 MU** in PXIL). In IEX, the maximum volume of **524 MU** was transacted in the month of January, 2021, whereas, the minimum volume of **62 MU** was transacted in the month of July, 2020.

Similarly, in PXIL the maximum volume of **930 MU** was transacted in the month of December, 2020, and the minimum volume of **28 MU** was transacted in the month of July, 2020.

The month wise TAM transaction details are given in **Table 16** below:

Months	Final Scheduled Volume (MU)		
	IEX	PXIL	Total
Apr, 2020	359.94	191.30	551.24
May, 2020	431.38	284.38	715.76
Jun, 2020	100.34	74.88	175.22
Jul, 2020	62.45	28.29	90.74
Aug, 2020	120.53	321.22	441.75
Sept, 2020	106.64	472.44	579.08
Oct, 2020	219.16	791.06	1,010.22
Nov, 2020	245.41	872.60	1,118.01
Dec, 2020	435.72	929.73	1,365.45
Jan, 2021	524.08	626.10	1,150.18
Feb, 2021	432.24	480.38	912.62
Mar, 2021	234.18	388.54	622.72
Total	3,272.07	5,460.92	8,732.99

Table: 16

The graphical representation of month wise total FSV on delivery date basis in TAM is displayed in **Figure: 16**.

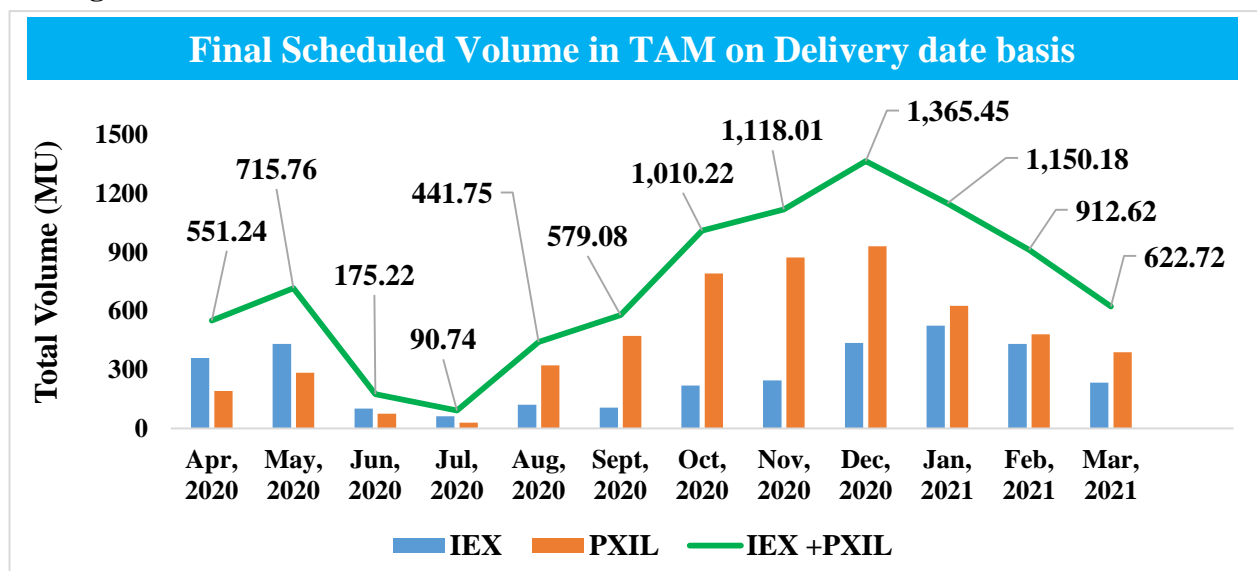


Figure: 16

2. Contract-wise Final Scheduled Volume and Weighted Average MCP in TAM in both the Power Exchanges on Delivery date basis

The month wise transaction of electricity (FSV) on PXs in all 4 contracts under term ahead market on delivery date basis is shown below in **Table 17**:

Months	Final Scheduled Volume (MU)				
	Intraday	Day Ahead Contingency	Daily/ Anyday	Weekly	Total
Apr, 2020	30.84	2.77	355.63	162.00	551.24
May, 2020	92.39	27.46	453.14	142.77	715.76
Jun, 2020	23.63	5.51	120.88	25.20	175.22
Jul, 2020	25.87	17.75	47.12	-	90.74
Aug, 2020	20.64	1.62	419.49	-	441.75
Sept, 2020	37.69	42.39	484.60	14.40	579.08
Oct, 2020	21.49	16.87	839.86	132.00	1,010.22
Nov, 2020	26.81	13.67	1,022.33	55.20	1,118.01
Dec, 2020	23.74	14.47	1,327.24	-	1,365.45
Jan, 2021	35.11	48.3	1,066.77	-	1,150.18
Feb, 2021	15.86	58.26	838.50	-	912.62
Mar, 2021	15.69	46.66	560.37	-	622.72
Total	369.76	295.73	7,535.93	531.57	8,732.99

Table: 17

The month wise weighted average MCP for transactions in all 4 contracts under term ahead market on PXs (delivery date basis) are shown below in **Table : 18**

Months	Weighted Average MCP (Rs/kWh) for TAM in PXs				
	Intraday	Day Ahead Contingency	Daily/ Anyday	Weekly	Wt. Average
Apr, 2020	2.92	2.45	3.17	2.64	3.00
May, 2020	3.03	2.80	3.13	2.55	2.99
Jun, 2020	3.12	2.69	3.16	2.53	3.05
Jul, 2020	3.44	2.77	3.60	NA	3.39
Aug, 2020	3.17	2.99	2.69	NA	2.71
Sept, 2020	3.45	2.72	2.58	2.53	2.65
Oct, 2020	3.33	2.74	2.71	2.55	2.70
Nov, 2020	3.40	2.64	2.66	2.58	2.67
Dec, 2020	3.15	3.07	2.62	NA	2.63
Jan, 2021	2.95	3.11	2.83	NA	2.85
Feb, 2021	3.46	3.67	2.91	NA	2.97
Mar, 2021	3.16	3.94	2.74	NA	2.84

NA: Not Applicable

Table: 18

3. Contract-wise Final Scheduled Volume in TAM in both the Power Exchanges on Delivery date basis

(i) Intraday contract

The total volume of electricity transacted in Power Exchanges in Intraday Contract under TAM was **369.76 MU** (**123.27 MU** in IEX and **246.49 MU** in PXIL). In IEX, the maximum volume of electricity of **56.65 MU** was transacted in the month of May, 2020, and the minimum volume of **0.89 MU** was transacted in the month of October, 2020. Similarly, in PXIL the maximum volume of **35.74 MU** was transacted in the month of May, 2020, and the minimum volume of **8.95 MU** was transacted in the month of April, 2020.

The month wise details of electricity transacted in Intraday Contract under TAM are tabulated in **Table: 19**.

Months	Final Scheduled Volume in Intraday Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	21.89	8.95	30.84
May, 2020	56.65	35.74	92.39
Jun, 2020	6.39	17.24	23.63
Jul, 2020	6.06	19.81	25.87
Aug, 2020	1.87	18.77	20.64
Sept, 2020	11.33	26.36	37.69
Oct, 2020	0.89	20.60	21.49
Nov, 2020	6.46	20.35	26.81
Dec, 2020	5.04	18.70	23.74
Jan, 2021	1.76	33.35	35.11
Feb, 2021	1.31	14.55	15.86
Mar, 2021	3.62	12.07	15.69
Total	123.27	246.49	369.76

Table: 19

The month wise plot of FSV (MU) in intraday contract under TAM is displayed in **Figure: 17**

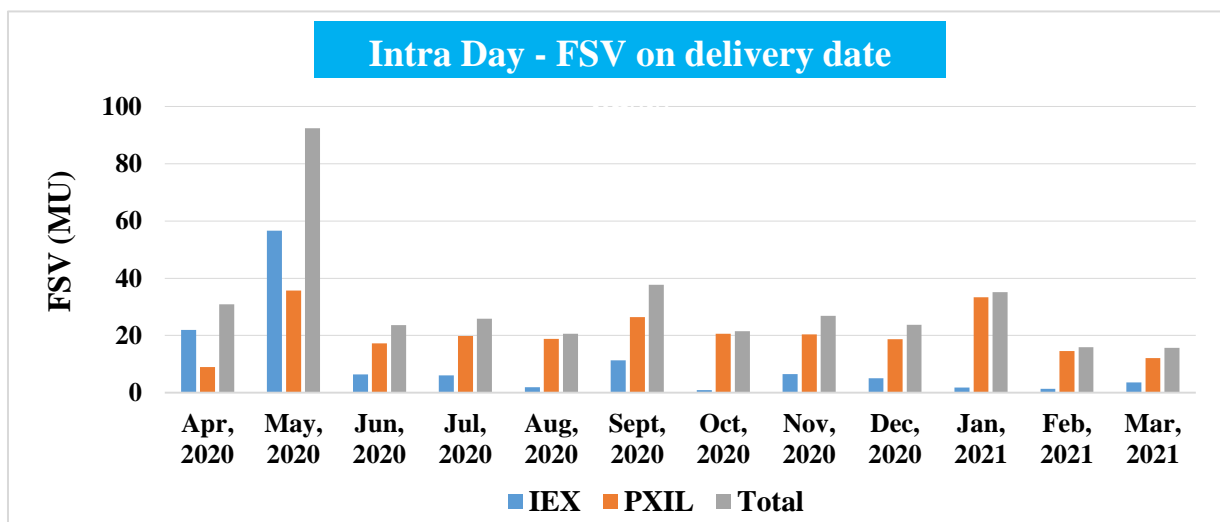


Figure: 17

(ii) Day Ahead Contingency (DAC) Contract

The total volume of electricity transacted in Power Exchanges in **Day Ahead Contingency Contract** was **295.73 MU** (**295.59 MU** in IEX and **0.14 MU** in PXIL). In IEX, the maximum volume of **58.26 MU** was transacted in the month of February, 2020 and the minimum volume of **1.62 MU** was transacted in the month of August, 2020. Whereas, in PXIL, the transaction of electricity happened only in the month of September, 2020 (**i.e. 0.14 MU**) and no transaction of electricity happened during the period April, 2020 to August, 2020 and October, 2020 to March, 2021, respectively.

The month wise details of electricity transacted in Day Ahead Contingency Contract under TAM are tabulated in **Table: 20**.

Months	Final Scheduled Volume in Day Ahead Contingency Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	2.77	-	2.77
May, 2020	27.32	0.14	27.46
Jun, 2020	5.51	-	5.51
Jul, 2020	17.75	-	17.75
Aug, 2020	1.62	-	1.62
Sept, 2020	42.39	-	42.39
Oct, 2020	16.87	-	16.87
Nov, 2020	13.67	-	13.67
Dec, 2020	14.47	-	14.47
Jan, 2021	48.3	-	48.3
Feb, 2021	58.26	-	58.26
Mar, 2021	46.66	-	46.66
Total	295.59	0.14	295.73

- No transaction happened

Table: 20

The month wise plot of FSV (MU) in Day Ahead Contingency contract under TAM is displayed in **Figure: 18**

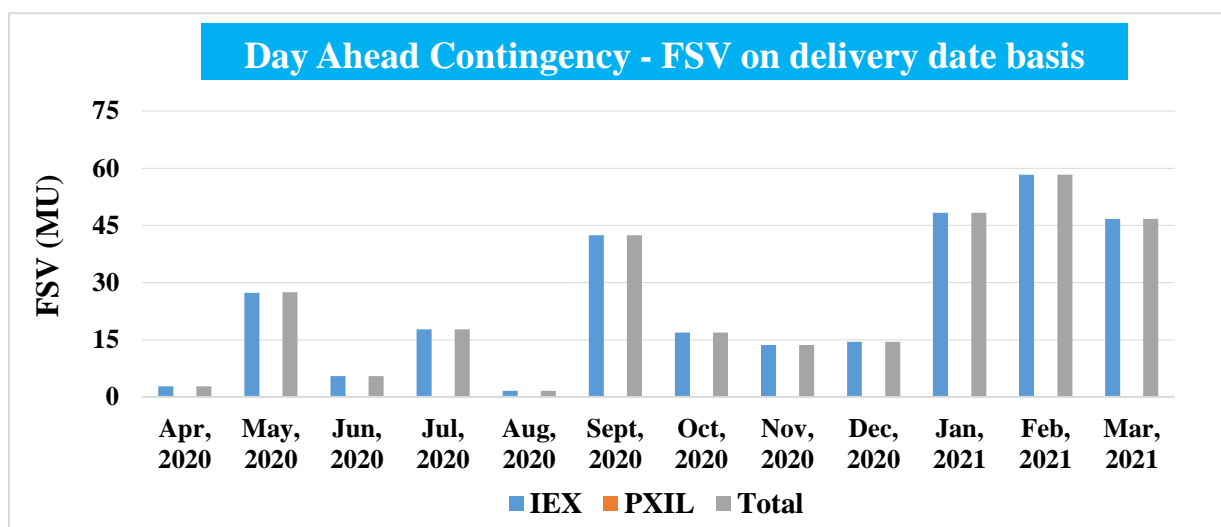


Figure: 18

(iii) Daily/Anyday Contract

The total volume of electricity transacted in Power Exchanges in **Any day/Daily Contract** was **7,353.93 MU** (**2,321.64 MU** in IEX and **5,214.29 MU** in PXIL). In IEX, the maximum volume of **474.02 MU** was transacted in the month of January, 2021, and the minimum volume of **38.52 MU** was transacted in the month of September, 2020. Similarly, in PXIL the maximum volume of **911.03 MU** was transacted in the month of December, 2020, and the minimum volume of **8.48 MU** was transacted in the month of July, 2020.

The month wise details of electricity transacted in Daily/Anyday Contract under TAM are tabulated in **Table: 21**

Months	Transactions in Daily/ Anyday Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	173.28	182.35	355.63
May, 2020	204.64	248.50	453.14
Jun, 2020	63.24	57.64	120.88
Jul, 2020	38.64	8.48	47.12
Aug, 2020	117.04	302.45	419.49
Sept, 2020	38.52	446.08	484.60
Oct, 2020	69.40	770.46	839.86
Nov, 2020	170.08	852.25	1,022.33
Dec, 2020	416.21	911.03	1,327.24
Jan, 2021	474.02	592.75	1,066.77
Feb, 2021	372.67	465.83	838.50
Mar, 2021	183.9	376.47	560.37
Total	2,321.64	5,214.29	7,535.93

- No transaction happened

Table: 21

The month wise plot of FSV (MU) in Daily/Anyday Contract under TAM is displayed in **Figure: 19**

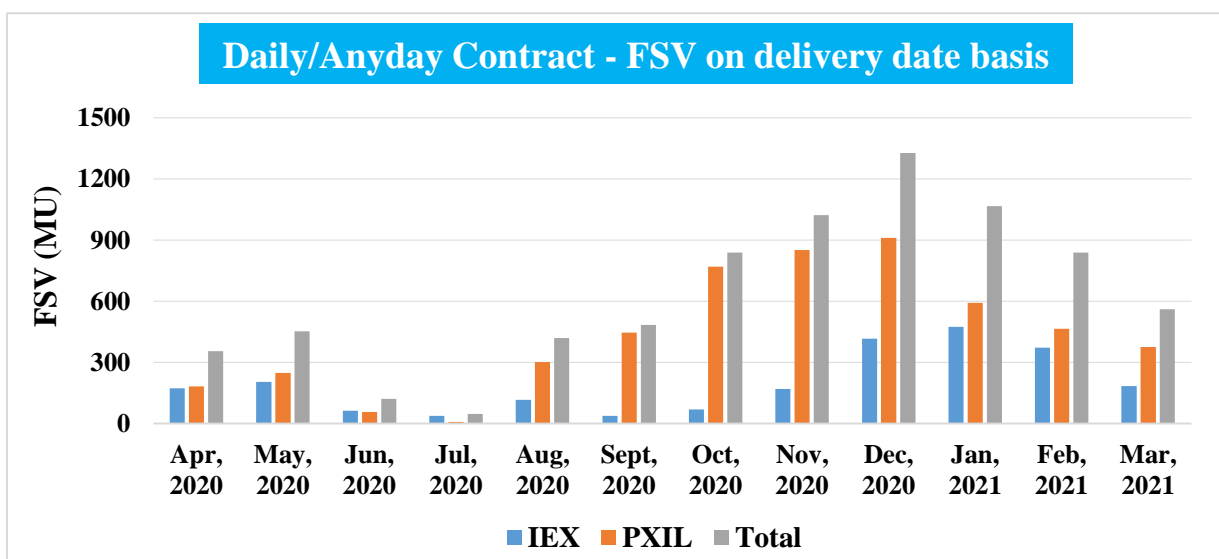


Figure: 19

(iv) Weekly Contract

The total volume of electricity transacted in Power Exchanges in **Weekly Contract** was **531.57 MU** (**531.57 MU** in IEX and no transaction happened in PXIL). In IEX, the maximum volume of **162.00 MU** was transacted in the month of April, 2020, and the minimum volume of **14.40 MU** was transacted in the month of September, 2020. In IEX, no transaction in weekly Contract happened during the period July to August, 2020 and January, 2021 to March, 2021. Whereas, in PXIL, no transaction of electricity happened during the FY 2020-21.

The month wise details of electricity transacted in Weekly Contract under TAM are tabulated in **Table: 22**

Months	Transactions in Weekly Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	162.00	-	162.00
May, 2020	142.77	-	142.77
Jun, 2020	25.20	-	25.20
Jul, 2020	-	-	-
Aug, 2020	-	-	-
Sept, 2020	14.40	-	14.40
Oct, 2020	132.00	-	132.00
Nov, 2020	55.20	-	55.20
Dec, 2020	-	-	0.00
Jan, 2021	-	-	-
Feb, 2021	-	-	-
Mar, 2021	-	-	-
Total	531.57	-	531.57

- No transaction happened

Table: 22

The month wise plot of FSV (MU) in Weekly Contract under TAM is displayed in **Figure: 20**

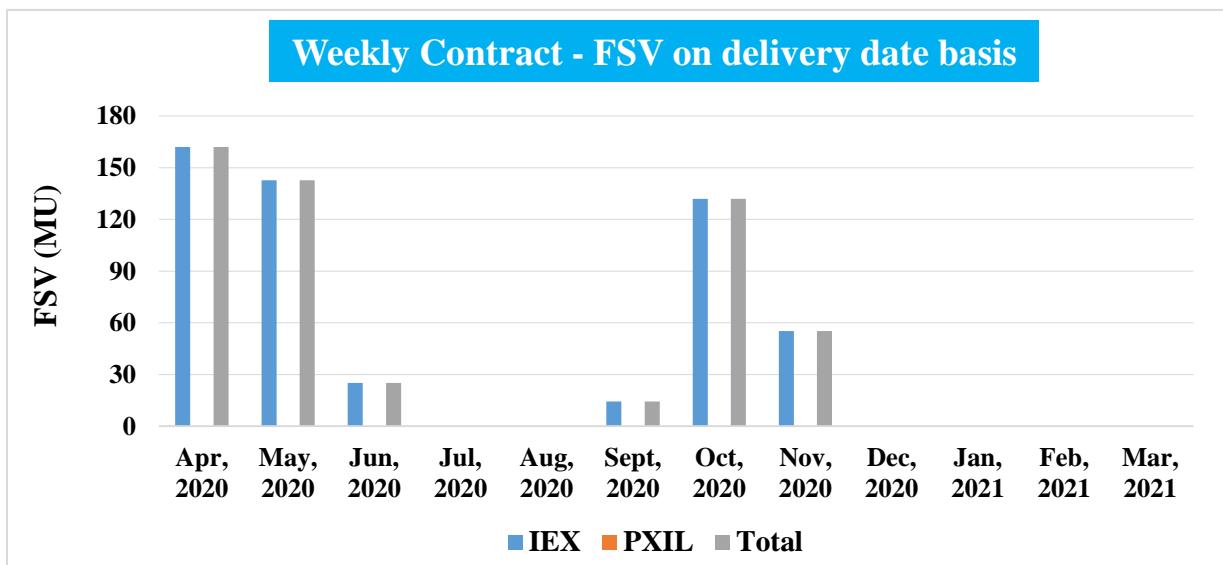


Figure: 20

4. Real Time Curtailment in Term Ahead Market

The total real time curtailment of **68.33 MU** happened in IEX and PXIL during FY 2020-21 (on delivery date basis transaction data). The total real time curtailment of **33.89 MU** (Intraday-0.00 MU, Daily/Any day- 33.01 MU, DAC-0.00 MU and Weekly-0.88 MU) happened in IEX during FY 2020-21. The same was **34.44 MU** in PXIL (Intraday- 0.00 MU, Daily/ Any day – 34.44 MU, DAC-0.00 MU and Weekly- 0.00 MU).

The month wise and contract wise details of real time curtailment in TAM are tabulated in

Table: 23

Months	IEX Curtailment (MU)				PXIL Curtailment (MU)				Total Curtailment (MU)
	Intraday	Daily	DAC	Weekly	Intraday	Daily	DAC	Weekly	Total
Apr, 2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
May, 2020	0.00	4.88	0.00	0.88	0.00	2.63	0.00	0.00	8.39
Jun, 2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul, 2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug, 2020	0.00	4.16	0.00	0.00	0.00	0.00	0.00	0.00	4.16
Sept, 2020	0.00	-	0.00	0.00	0.00	1.25	0.00	0.00	1.25
Oct, 2020	0.00	0.2	0.00	0.00	0.00	1.04	0.00	0.00	1.24
Nov, 2020	0.00	14.72	0.00	0.00	0.00	0.56	0.00	0.00	15.28
Dec, 2020	0.00	2.35	0.00	0.00	0.00	28.5	0.00	0.00	30.88
Jan, 2021	0.00	1.84	0.00	0.00	0.00	0.43	0.00	0.00	2.27
Feb, 2021	0.00	4.85	0.00	0.00	0.00	0.00	0.00	0.00	4.85
Mar, 2021	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	0.00	33.01	0.00	0.88	0.00	34.4	0.00	0.00	68.33

Table: 23

The month wise details of real time curtailment in Daily/Anyday Contract is displayed in

Figure: 21

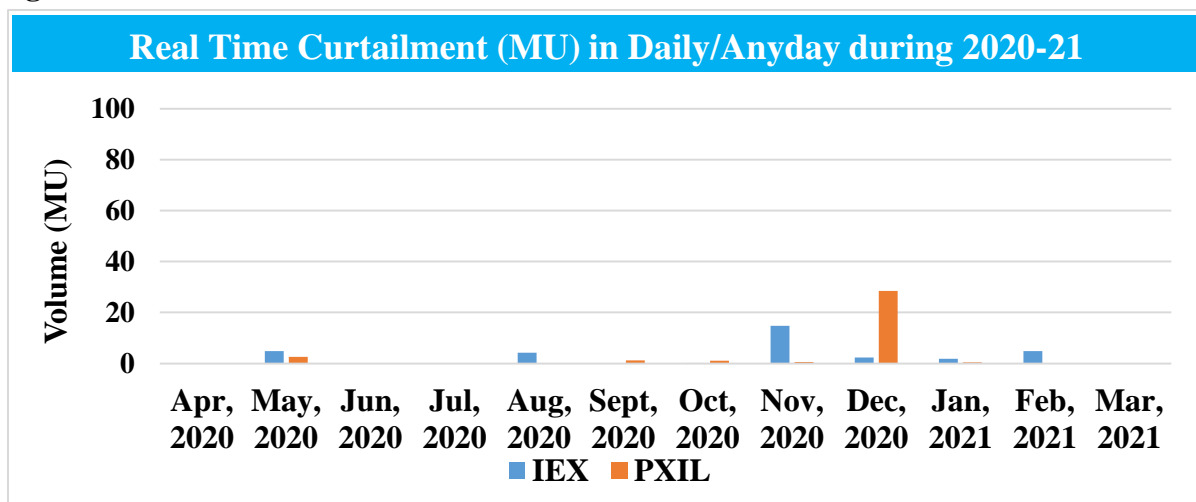


Figure: 21

5. Volume of Electricity transacted in IEX & PXIL on Trade date basis

The total volume of electricity transacted in Power Exchanges in Term Ahead Market was **8,444 MU** (2,895 MU in IEX and 5,549 MU in PXIL). In IEX, the maximum volume of **378 MU** was transacted in the month of May, 2020 and the minimum volume of **60 MU** was transacted in the month of July, 2020.

Similarly, in PXIL the maximum volume of **973 MU** was transacted in the month of October, 2020, and the minimum volume of **51 MU** was transacted in the month of June, 2020. The month wise transaction details are given in **Table: 24**

Months	Traded Volume (MU)		
	IEX	PXIL	Total
Apr, 2020	340.52	282.72	623.24
May, 2020	377.67	218.35	596.02
Jun, 2020	72.28	51.36	123.64
Jul, 2020	60.27	117.13	177.40
Aug, 2020	146.93	270.72	417.65
Sept, 2020	98.30	510.42	608.72
Oct, 2020	276.80	973.45	1,250.25
Nov, 2020	189.00	744.35	933.35
Dec, 2020	371.59	924.08	1,295.67
Jan, 2021	324.31	659.13	983.44
Feb, 2021	305.50	444.06	749.56
Mar, 2021	332.18	353.20	685.38
Total	2,895.35	5,548.97	8,444.32

Table: 24

The month wise plot of total traded volume during FY 2020-21 in TAM is displayed in **Figure: 22**.

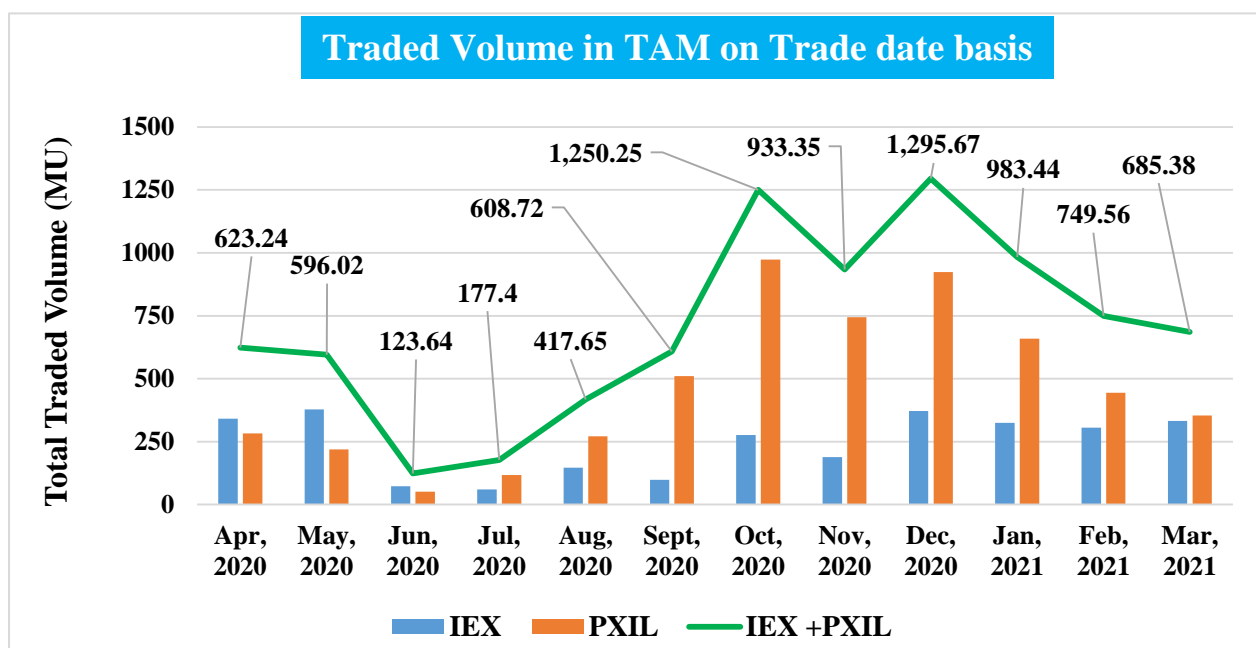


Figure: 22

6. Contract-wise Final Scheduled Volume and Weighted Average MCP in TAM in both the Power Exchanges on Trade date basis

Out of the total volume of **8,444 MU** transacted in TAM on trade date basis, the majority of transaction i.e. 86.91 % happened under Day Ahead Contingency contract. The month wise transaction of electricity on PXs in all 4 contracts under term ahead market on trade date basis is shown below in **Table: 25**

Months	Final Scheduled Volume (MU)				
	Intraday	Day Ahead Contingency	Daily/ Anyday	Weekly	Total
Apr, 2020	30.84	2.43	447.77	142.20	623.24
May, 2020	92.58	26.67	380.20	96.57	596.02
Jun, 2020	23.44	7.69	92.51	-	123.64
Jul, 2020	25.87	15.57	135.96	-	177.40
Aug, 2020	20.74	2.46	394.45	-	417.65
Sept, 2020	38.38	42.09	494.65	33.60	608.72
Oct, 2020	20.71	16.71	1,044.83	168.00	1,250.25
Nov, 2020	26.81	13.66	892.88	-	933.35
Dec, 2020	23.74	14.69	1,257.24	-	1,295.67
Jan, 2021	35.11	50.53	897.8	-	983.44
Feb, 2021	15.86	56.71	676.99	-	749.56
Mar, 2021	15.69	46.08	623.61	-	685.38
Total	369.77	295.29	7,338.89	440.37	8,444.32

Table: 25

The month wise weighted average MCP for transactions in all 4 contracts under term ahead market on PXs (trade date basis) are shown below in **Table: 26**

Months	Weighted Average MCP (Rs/kWh) for TAM in PXs				
	Intraday	Day Ahead Contingency	Daily/ Anyday	Weekly	Wt. Average
Apr, 2020	2.92	2.45	3.04	2.64	2.94
May, 2020	3.03	2.80	3.22	2.55	3.06
Jun, 2020	3.12	2.69	3.31	NA	3.24
Jul, 2020	3.44	2.77	2.86	NA	2.94
Aug, 2020	3.17	2.99	2.76	NA	2.78
Sept, 2020	3.44	2.72	2.59	2.53	2.65
Oct, 2020	3.33	2.74	2.71	2.55	2.70
Nov, 2020	3.40	2.64	2.65	NA	2.67
Dec, 2020	3.15	3.07	2.62	NA	2.63
Jan, 2021	2.95	3.11	2.88	NA	2.89
Feb, 2021	3.46	3.67	2.91	NA	2.98
Mar, 2021	3.16	3.94	2.88	NA	2.96

NA: Not Applicable

Table: 26

7. Contract-wise Traded Volume in TAM in both the Power Exchanges on Trade Date Basis

7.1. Intraday contract

The total volume of electricity transacted in Power Exchanges in Intraday Contract was **369.77 MU** (**123.27 MU** in IEX and **246.50 MU** in PXIL). In IEX, the maximum volume of **56.65 MU** was transacted in the month of May, 2020, and the minimum volume of **0.89 MU** was transacted in the month of October, 2020. Similarly, in PXIL the maximum volume of **35.93 MU** was transacted in the month of May, 2020 and the minimum volume of **8.95 MU** was transacted in the month of April, 2020.

The month wise details of electricity transacted in Intraday Contract under TAM are tabulated in **Table: 27**

Months	Traded Volume in Intraday Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	21.89	8.95	30.84
May, 2020	56.65	35.93	92.58
Jun, 2020	6.39	17.05	23.44
Jul, 2020	6.06	19.81	25.87
Aug, 2020	1.87	18.87	20.74
Sept, 2020	11.33	27.05	38.38
Oct, 2020	0.89	19.82	20.71
Nov, 2020	6.46	20.35	26.81
Dec, 2020	5.04	18.70	23.74
Jan, 2021	1.76	33.35	35.11
Feb, 2021	1.31	14.55	15.86
Mar, 2021	3.62	12.07	15.69
Total	123.27	246.50	369.77

Table: 27

The month wise plot of Traded Volume (MU) in Intraday Contract in TAM is displayed in **Figure: 23**

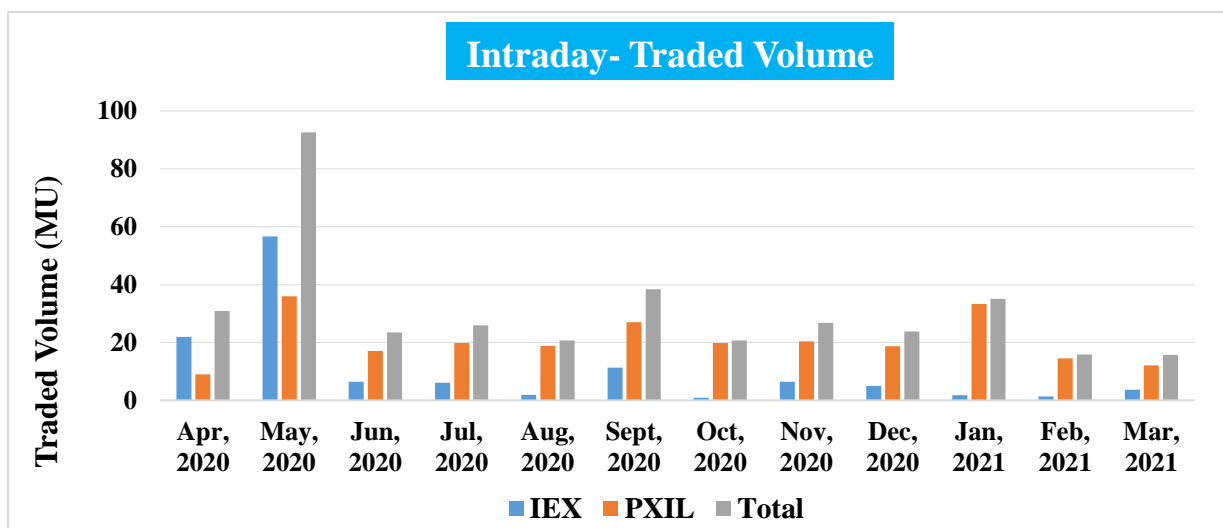


Figure: 23

7.2. Day Ahead Contingency (DAC) Contract

The total volume of electricity transacted in Power Exchanges in **Day Ahead Contingency Contract** was **295.29 MU** (**295.15 MU** in IEX and **0.14 MU** in PXIL). In IEX, the maximum volume of electricity was transacted in the month of February, 2021 at **56.71 MU** and the minimum volume of electricity was transacted in the month of April, 2020 at **2.43 MU**. Whereas, in PXIL, the transaction of electricity happened only in the month of May, 2020 and no transaction happened during the period April, 2020 and June, 2020 to March, 2021.

The month wise details of electricity transacted in Day Ahead Contingency Contract under TAM are tabulated in **Table: 28**

Months	Traded Volume in Day Ahead Contingency Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	2.43	-	2.43
May, 2020	26.53	0.14	26.67
Jun, 2020	7.69	-	7.69
Jul, 2020	15.57	-	15.57
Aug, 2020	2.46	-	2.46
Sept, 2020	42.09	-	42.09
Oct, 2020	16.71	-	16.71
Nov, 2020	13.66	-	13.66
Dec, 2020	14.69	-	14.69
Jan, 2021	50.53	-	50.53
Feb, 2021	56.71	-	56.71
Mar, 2021	46.08	-	46.08
Total	295.15	0.14	295.29

- No transaction happened

Table: 28

The month wise plot of Traded Volume (MU) in Day Ahead Contingency on Contract in TAM is displayed in **Figure: 24**

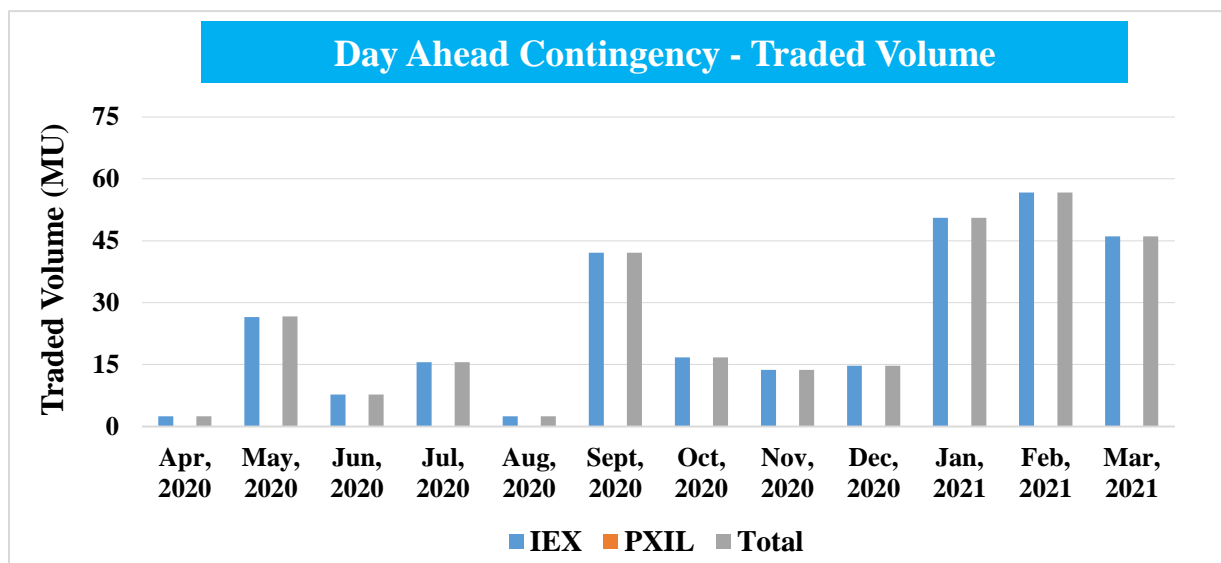


Figure: 24

7.3. Daily/ Anyday Contract

The total volume of electricity transacted in Power Exchanges in Any day/Daily Contract was **7,338.89 MU** (**2,036.56 MU** in IEX and **5,302.33 MU** in PXIL). In IEX, the maximum volume of **351.86 MU** was transacted in the month of December, 2020 and the minimum volume of **38.64 MU** was transacted in the month of July, 2020. Similarly, in PXIL the maximum volume of **953.63 MU** was transacted in the month of October, 2020, and the minimum volume of **34.31 MU** was transacted in the month of June, 2020.

The month wise details of electricity transacted in Daily/Anyday on Contract under TAM is tabulated in **Table: 29**

Months	Traded Volume in Daily/ Anyday Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	174.00	273.77	447.77
May, 2020	197.92	182.28	380.20
Jun, 2020	58.20	34.31	92.51
Jul, 2020	38.64	97.32	135.96
Aug, 2020	142.60	251.85	394.45
Sept, 2020	11.280	483.37	494.65
Oct, 2020	91.20	953.63	1,044.83
Nov, 2020	168.88	724.00	892.88
Dec, 2020	351.86	905.38	1,257.24
Jan, 2021	272.02	625.78	897.8
Feb, 2021	247.48	429.51	676.99
Mar, 2021	282.48	341.13	623.61
Total	2,036.56	5,302.33	7,338.89

- No transaction happened

Table: 29

The month wise plot of Traded Volume (MU) in Daily/Anyday on Contract in TAM is displayed in **Figure: 25**

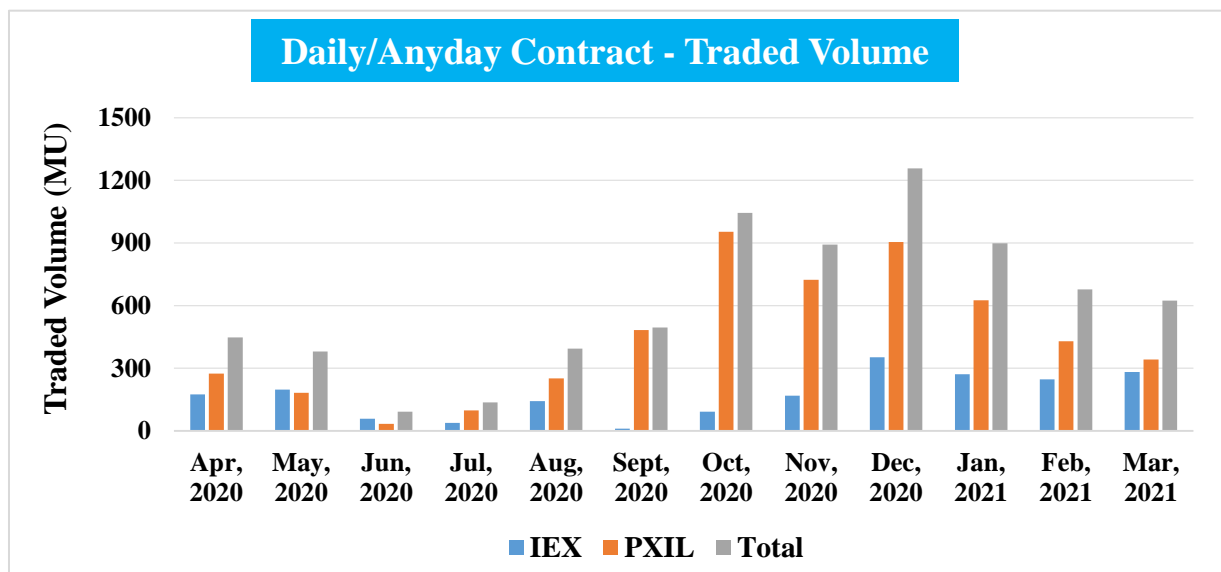


Figure: 25

7.4. Weekly Contract

The total volume of electricity transacted in Power Exchanges in **Weekly Contract** was **440.37 MU** (440.37 MU in IEX and no transaction happened in PXIL). In IEX, the maximum volume of **168.00 MU** was transacted in the month of October, 2020, and the minimum volume of **33.60 MU** was transacted in the month of September, 2020. Whereas, in PXIL no transaction of electricity happened during FY 2020-21. In IEX, no transaction in weekly Contract happened during the period June to August, 2020 and November, 2020 to March, 2021.

The month wise details of electricity transacted in Weekly Contract under TAM are tabulated in **Table: 30**

Months	Traded Volume in Weekly Contract (MU)		
	IEX	PXIL	Total
Apr, 2020	142.20	-	142.20
May, 2020	96.57	-	96.57
Jun, 2020	-	-	-
Jul, 2020	-	-	-
Aug, 2020	-	-	-
Sept, 2020	33.60	-	33.60
Oct, 2020	168.00	-	168.00
Nov, 2020	-	-	-
Dec, 2020	-	-	-
Jan, 2021	-	-	-
Feb, 2021	-	-	-
Mar, 2021	-	-	-
Total	440.37	-	440.37

- No transaction happened

Table: 30

The month wise plot of Traded Volume (MU) in Weekly on Contract in TAM is displayed in **Figure: 26**



Figure: 26

8. Congestion in Term Ahead Market in IEX

From the table, it may be seen that in IEX, the total transmission congestion of **397.67 MU** happened in TAM.

The month wise details of transmission congestion in IEX in TAM are tabulated in **Table: 31**

Months	IEX							
	Intraday		DAC		Any Day/ Daily		Weekly	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	0.16	2 days	0.00	0	0.00	0	55.20	3 days
May, 2020	0.60	6 days	0.03	1 day	4.88	2 days	0.88	1 day
Jun, 2020	0.16	2 days	0.00	0	0.00	0	NA	NA
Jul, 2020	0.48	4 days	0.00	0	0.00	0	NA	NA
Aug, 2020	0.00	0	0.00	0	4.16	1 day	NA	NA
Sept, 2020	0.13	1 day	1.16	2 days	0.00	0	0.00	0
Oct, 2020	0.01	1 day	0.00	0	0.00	0	0.00	0
Nov, 2020	0.43	1 day	0.00	0	0.00	0	NA	NA
Dec, 2020	0.02	1 day	0.00	0	109.66	6 days	NA	NA
Jan, 2021	0.00	0	0.00	0	215.60	11 days	NA	NA
Feb, 2021	0.08	1 day	0.00	0	4.04	2 days	NA	NA
Mar, 2021	0.00	0	0.00	0	0.00	0	NA	NA
Total	2.06	19 days	1.18	3 days	338.35	22 days	56.08	4 days

NA: Not Applicable as no transaction happened

Table: 31

The month wise plot of Congestion in IEX in TAM is displayed in **Figure: 27**

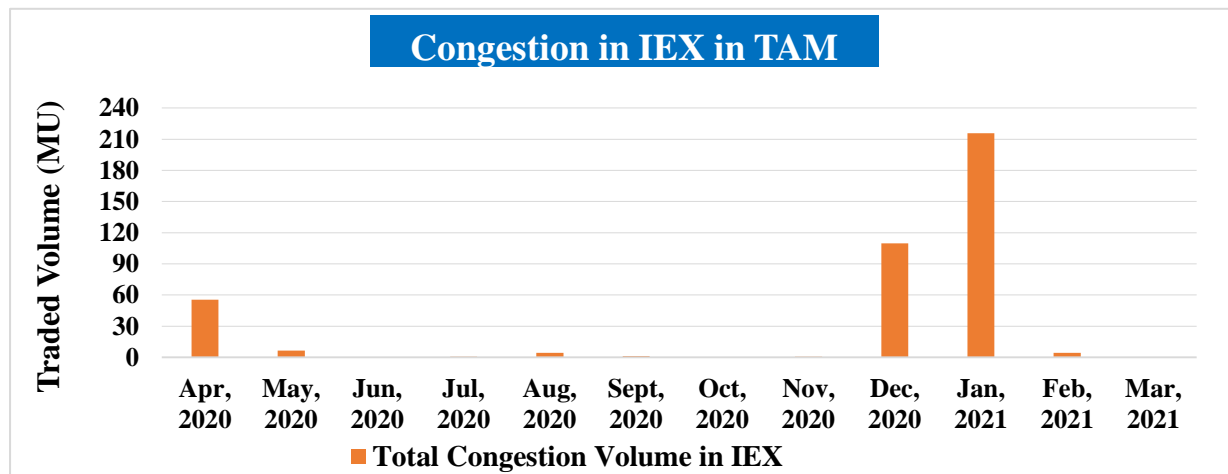


Figure: 27

9. Congestion in Term Ahead Market in PXIL

From the table, it may be seen that in PXIL, the total transmission congestion of **119.37 MU** happened in TAM.

The month wise details of transmission congestion in PXIL in TAM are tabulated in **Table: 32**

Months	PXIL							
	Intraday		DAC		Any Day/ Daily		Weekly	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	0.00	0	NA	NA	0.00	0	NA	NA
May, 2020	0.00	0	NA	NA	2.63	1 day	NA	NA
Jun, 2020	0.00	0	NA	NA	0.00	0	NA	NA
Jul, 2020	0.00	0	NA	NA	0.00	0	NA	NA
Aug, 2020	0.00	0	NA	NA	0.00	0	NA	NA
Sept, 2020	0.00	0	NA	NA	1.25	1 day	NA	NA
Oct, 2020	0.00	0	NA	NA	1.04	1 day	NA	NA
Nov, 2020	0.00	0	NA	NA	0.56	1 day	NA	NA
Dec, 2020	0.00	0	NA	NA	28.53	1 day	NA	NA
Jan, 2021	0.00	0	NA	NA	0.00	0	NA	NA
Feb, 2021	0.00	0	NA	NA	2.96	2 days	NA	NA
Mar, 2021	0.00	0	0.00	0	82.40	2 days	NA	NA
Total	0	0	0.00	0	119.37	9 days	NA	NA

NA: Not Applicable as no transaction happened

Table: 32

The month wise plot of Congestion in PXIL in TAM is displayed in **Figure: 28**

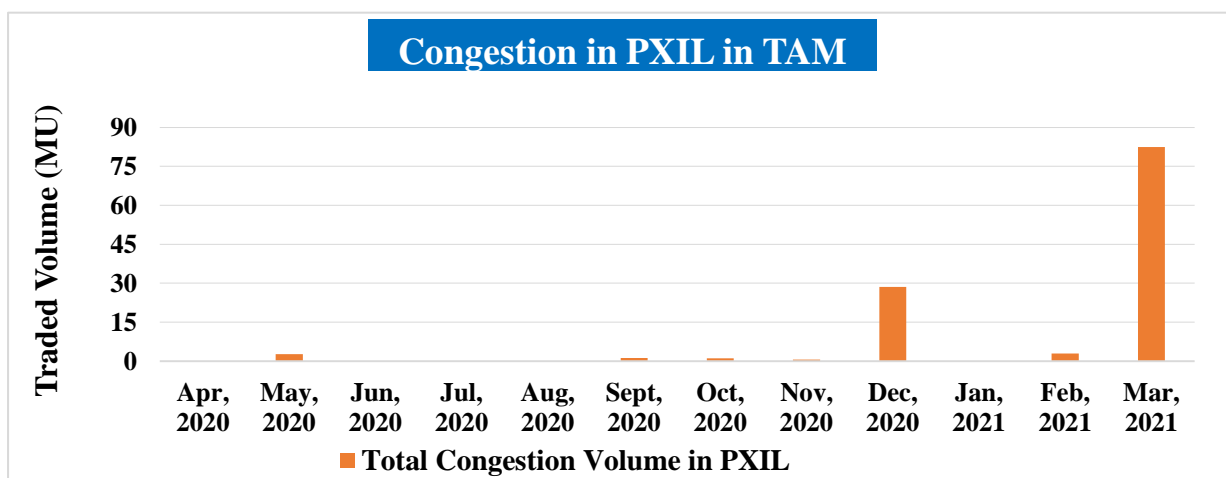


Figure: 28

10. Contract-wise Prices (Rs. /kWh) on Delivery date basis in TAM during FY 2020-21

The month wise and contract wise prices of electricity transacted in TAM during FY 2020-21 on delivery date basis are tabulated in **Table: 33**.

Months	Intraday		Day Ahead Contingency		Weekly Contract		Daily/Anyday Contract	
	IEX	PXIL	IEX	PXIL	IEX	PXIL	IEX	PXIL
Apr, 2020	2.95	2.85	2.45	-	2.64	-	3.85	2.52
May, 2020	3.09	2.93	2.80	2.66	2.55	-	3.85	2.54
Jun, 2020	3.13	3.11	2.69	-	2.53	-	3.85	2.40

Jul, 2020	3.38	3.46	2.77	-	-	-	3.85	2.46
Aug, 2020	3.10	3.18	2.99	-	-	-	3.33	2.44
Sept, 2020	3.74	3.32	2.72	-	2.53	-	2.48	2.59
Oct, 2020	3.66	3.32	2.74	-	2.55	-	2.58	2.72
Nov, 2020	3.28	3.44	2.64	-	2.58	-	2.58	2.67
Dec, 2020	3.76	2.98	3.07	-	-	-	2.74	2.57
Jan, 2021	3.38	2.93	3.11	-	-	-	2.66	2.97
Feb, 2021	3.37	3.47	3.67	-	-	-	2.94	2.89
Mar, 2021	4.04	2.90	3.94	-	-	-	3.49	2.37
Average (2020-21)	3.41	3.16	2.97	2.66	2.56	-	3.18	2.59

Table: 33

The month wise movement of prices in Intraday, Day Ahead Contingency, Daily/Anyday and Weekly Contracts on delivery date basis is displayed in Figures: 29, 30, 31 & 32

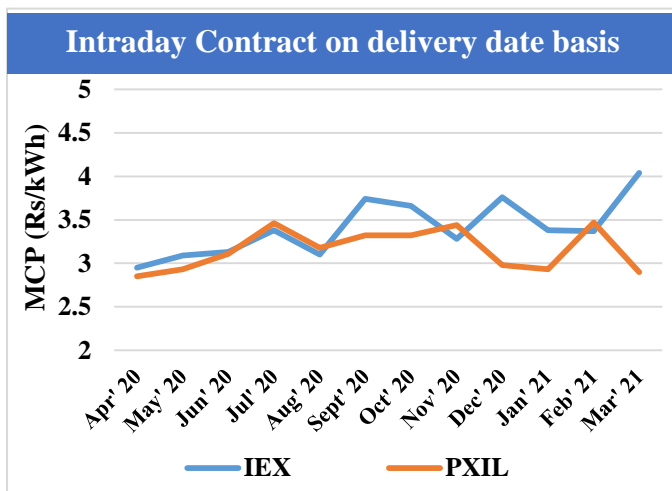


Figure 29

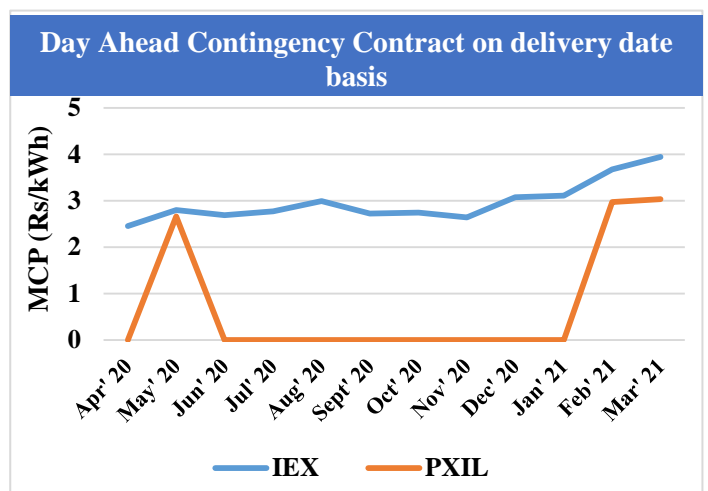


Figure 30

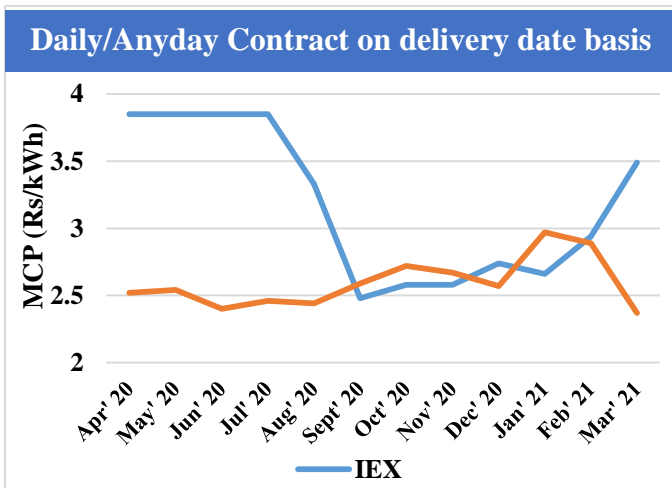


Figure: 31

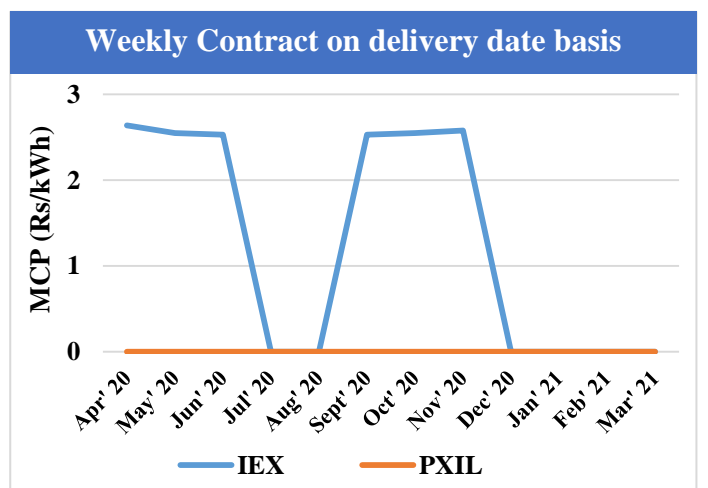


Figure: 32

11. Contract-wise Price (Rs. /kWh) of Electricity transacted on Trade date basis in IEX & PXIL in TAM during FY 2020-21

The month wise and contract wise prices of electricity transacted in TAM during FY 2020-21 on Trade date basis are tabulated in Table: 34

Months	Intraday		Day Ahead Contingency		Weekly Contract		Daily/Anyday Contract	
	IEX	PXIL	IEX	PXIL	IEX	PXIL	IEX	PXIL
Apr, 2020	2.95	2.86	2.44	-	2.57	-	3.85	2.42
May, 2020	3.09	2.92	2.81	-	2.54	-	3.74	2.53
Jun, 2020	3.13	3.16	2.70	-	-	-	3.85	2.35
Jul, 2020	3.38	3.46	2.76	-	-	-	3.85	2.46
Aug, 2020	3.10	3.09	2.88	-	-	-	3.64	2.44
Sept, 2020	3.74	3.35	3.02	-	2.53	-	2.54	2.59
Oct, 2020	3.64	3.38	2.48	-	2.56	-	2.58	2.81
Nov, 2020	3.21	3.45	2.90	-	-	-	2.73	2.73
Dec, 2020	3.76	2.99	3.12	-	-	-	2.57	2.72
Jan, 2021	3.38	3.72	3.69	-	-	-	2.78	3.12
Feb, 2021	3.36	5.52	3.11	-	-	-	2.94	3.88
Mar, 2021	4.04	2.86	3.97	3.03	-	-	3.74	2.66
Average (2020-21)	3.40	3.40	2.99	3.03	2.55	-	3.23	2.73

- No transaction happened

NA- Not applicable

Table: 34

The month wise movement of prices in Intraday, Day Ahead Contingency, Daily/Anyday and Weekly Contracts on trade date basis is displayed in **Figures: 33, 34, 35 & 36**

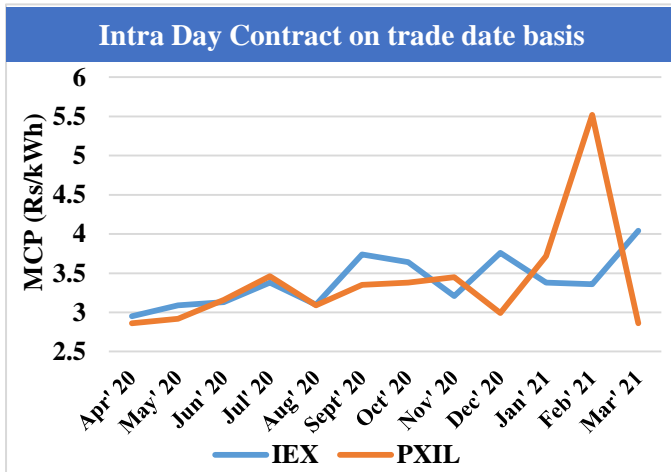


Figure: 33

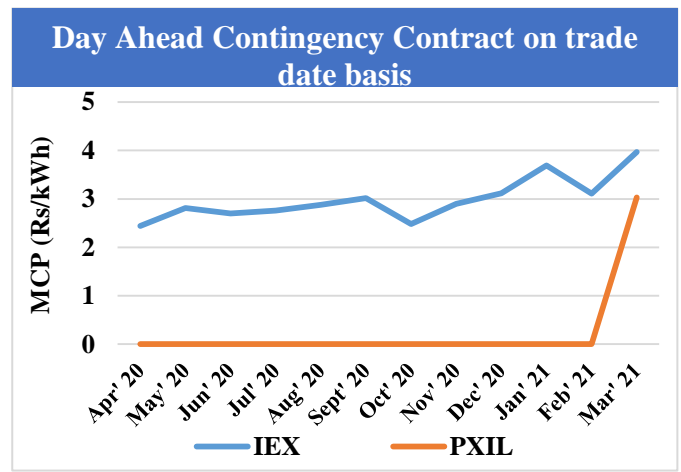


Figure: 34

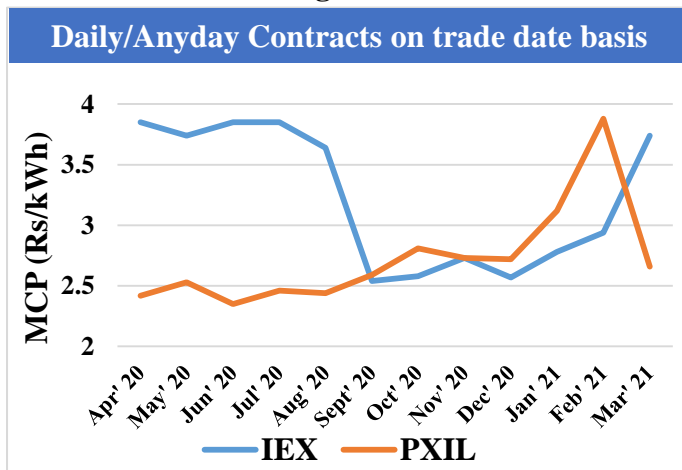


Figure: 35

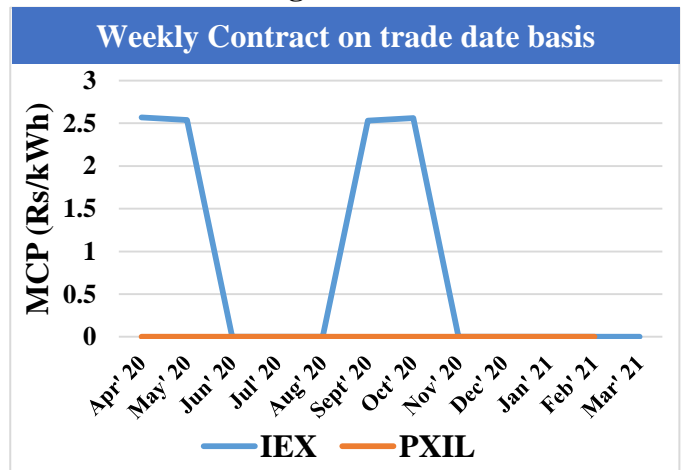


Figure: 36

12. Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Term Ahead Market (TAM) during FY 2020-21 (on Delivery date basis)

The Average Market Clearing Price of electricity on delivery date basis transacted in TAM during FY 2020-21 is tabulated in **Table: 35**.

TAM MCP (Rs./kWh)	IEX	PXIL
FY 2020-21	3.03	2.88

Table: 35

13. Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Term Ahead Market (TAM) during FY 2020-21 (on Trade date basis)

The Average Market Clearing Price of electricity on trade date basis transacted in TAM during FY 2020-21 is tabulated in **Table: 36**.

TAM MCP (Rs./kWh)	IEX	PXIL
FY 2020-21	3.04	3.05

Table: 36

CHAPTER- VI
GREEN TERM AHEAD MARKET (GTAM)

1. Volume of Electricity transacted in GTAM on Delivery date basis

The GTAM market was started from 1st August, 2020 in IEX and on 24th March, 2021 in PXIL. The total volume of electricity transacted in both the Power Exchanges in GTAM under Solar and Non Solar segments was **862 MU** (**630 MU** in Solar and **232 MU** in Non Solar). Under the solar segment the maximum volume of **213.44 MU** was transacted in the month of October, 2020, whereas, the minimum volume of **2.66 MU** was transacted in the month of August, 2020. Similarly, under the non-solar segment the maximum volume of **67.65 MU** was transacted in the month of January, 2021 in IEX, whereas, the minimum volume of electricity of **5.08 MU** was transacted in the month of September, 2020. The majority of transactions in GTAM happened under Day Ahead Contingency Contract (95.52 %) on delivery date basis.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards. The month wise GTAM transaction details under solar and non-solar segments on delivery date basis are given in **Table: 37**

Months	Final Scheduled Volume (MU)		
	GTAM (Solar)	GTAM (Non Solar)	Total
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX and from 24 th March, 2021 in PXIL		
May, 2020			
Jun, 2020			
Jul, 2020			
Aug, 2020	2.66	-	2.66
Sept, 2020	72.34	5.08	77.42
Oct, 2020	213.44	30.13	243.57
Nov, 2020	162.26	18.91	181.17
Dec, 2020	96.82	22.01	118.83
Jan, 2021	22.46	67.65	90.11
Feb, 2021	38.01	55.28	93.29
Mar, 2021	22.18	32.42	54.60
Total	630.17	231.48	861.65

Table: 37

The graphical representation of GTAM transaction details under solar and non-solar segments on delivery date basis is displayed below in **Figure: 37**

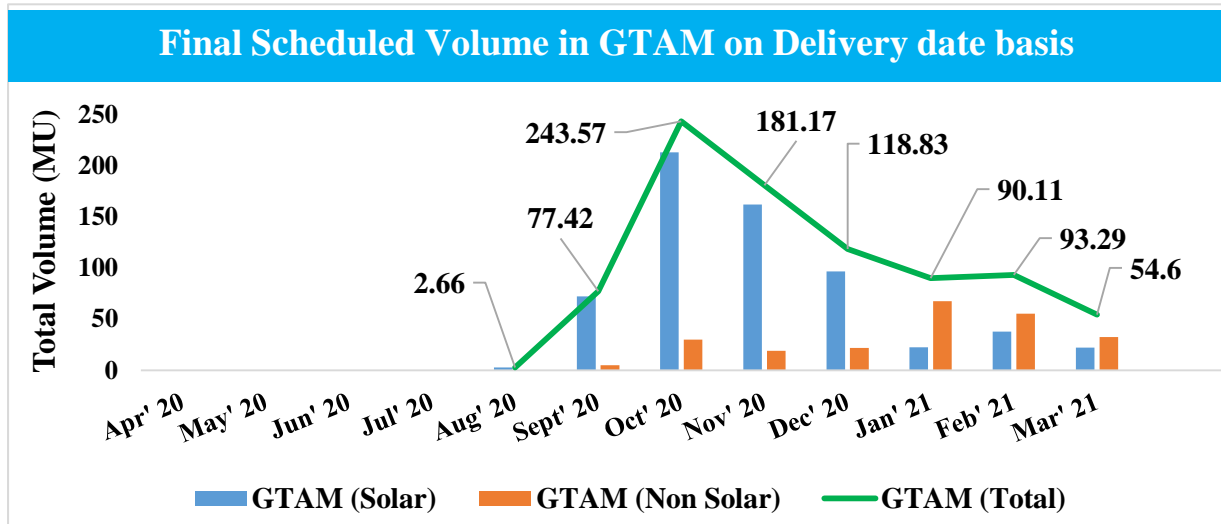


Figure: 37

2. Volume (MU) and Prices (Rs. /kWh) for Solar and Non Solar transactions in GTAM on Delivery date basis during FY 2020-21

The month wise GTAM transaction details for IEX and PXIL under solar and non-solar segments on delivery date basis are given in **Table - 38** below:

Months	Final Scheduled Volume (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX and				
May, 2020	from 24 th March, 2021 in PXIL				
Jun, 2020					
Jul, 2020					
Aug, 2020	2.66	-			2.66
Sept, 2020	72.34	5.08			77.42
Oct, 2020	213.44	30.13			243.57
Nov, 2020	162.26	18.91			181.17
Dec, 2020	96.82	22.01			118.83
Jan, 2021	22.46	67.65			90.11
Feb, 2021	38.01	55.28			93.29
Mar, 2021	22.18	32.03	-	0.39	54.60
Total	630.17	231.09	-	0.39	861.65
	861.26		0.39		

- No transaction happened

Table: 38

The month wise and contract wise prices of solar and non-solar transaction of electricity in GTAM in IEX during FY 2020-21 on delivery date basis are tabulated in **Table: 39**.

Months	Intraday		Day Ahead Contingency		Weekly Contract		Daily/Anyday Contract	
	Solar	Non Solar	Solar	Non Solar	Solar	Non Solar	Solar	Non Solar
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX							
May, 2020								
Jun, 2020								
Jul, 2020								
Aug, 2020	3.00	NA	3.05	NA	NA	NA	NA	NA
Sept, 2020	3.37	NA	3.55	3.67	NA	NA	NA	NA
Oct, 2020	3.58	NA	3.45	3.59	NA	NA	NA	NA
Nov, 2020	3.89	NA	3.55	3.89	NA	NA	NA	NA
Dec, 2020	3.93	3.52	3.94	3.97	3.70	NA	NA	NA
Jan, 2021	NA	4.35	4.24	4.30	NA	4.00	4.50	4.01
Feb, 2021	4.17	NA	4.04	4.44	NA	4.30	4.50	4.01
Mar, 2021	NA	5.10	4.18	4.40	NA	NA	NA	NA
Average (2020-21)	3.66	4.32	3.75	4.04	3.70	4.15	4.50	4.01

NA: Not applicable as no transaction happened

Table: 39

*In PXIL, the transaction in GTAM started from 24th March, 2021. A volume of **0.39 MU** at **Rs 4.83/kWh** in intraday contract in Non-Solar segments was transacted on delivery date basis in PXIL, and no transaction in any other contract happened.*

3. Contract-wise Final Scheduled Volume in GTAM in both the Power Exchanges on Delivery date basis

(i) Intraday contract

The total volume of electricity transacted in both the Power Exchanges in Intraday Contract under GTAM for solar and non-solar segments was **12.58 MU** (**12.19 MU** in IEX and **0.39 MU** in PXIL). In IEX, under the solar segment the maximum volume of **5.09 MU** was transacted in the month of October, 2020, whereas, the minimum volume of **0.0021 MU** was transacted in the month of August, 2020. Similarly, under the non-solar segment the maximum volume of **0.38 MU** was transacted in the month of January, 2021 in IEX, whereas, the minimum volume of electricity of **0.20 MU** was transacted in the month of December, 2020.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards.

The month wise details of electricity transacted in Intraday Contract under solar and non-solar segments in GTAM are tabulated in **Table: 40**.

Months	Final Scheduled Volume in Intraday Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020					0.0021
Sept, 2020	0.8	-			0.8
Oct, 2020	5.09	-			5.09
Nov, 2020	3.13	-			3.13
Dec, 2020	0.52	0.20			0.72
Jan, 2021	-	0.38			0.38
Feb, 2021	1.72	-			1.72
Mar, 2021	-	0.35	-	0.39	0.74
Total	11.26	0.93	-	0.39	12.58
	12.19		0.39		

- No transaction happened

Table: 40

(ii) Day Ahead Contingency (DAC) Contract

The total volume of electricity transacted in both the Power Exchanges in Intraday Contract under GTAM for solar and non-solar segments was **823.01 MU** (**823.01 MU** in IEX and no transaction happened in PXIL). In IEX, under the solar segment the maximum volume of **208.35 MU** was transacted in the month of October, 2020, whereas, the minimum volume of **2.66 MU** was transacted in the month of August, 2020. Similarly, under the non-solar segment the maximum volume of **55.13 MU** was transacted in the month of February, 2021 in IEX, whereas, the minimum volume of electricity of **5.08 MU** was transacted in the month of September, 2020.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards and no transaction happened in the month of March, 2021.

The month wise details of electricity transacted in Day Ahead Contingency Contract under solar and non-solar segments in GTAM are tabulated in **Table: 41**.

Months	Final Scheduled Volume in Day Ahead Contingency Contract (MU)				
	IEX		PXIL		Total
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	2.66	-			2.66
Sept, 2020	71.54	5.08			76.62
Oct, 2020	208.35	30.13			238.48
Nov, 2020	159.13	18.91			178.04
Dec, 2020	89.65	21.11			110.76
Jan, 2021	21.06	50.12			71.18
Feb, 2021	35.89	55.13			91.02
Mar, 2021	22.18	31.68	-	-	54.25
Total	610.46	212.15	-	-	823.01
	823.01		-		

- No transaction happened

Table: 41

The month wise plot of FSV (MU) in Day Ahead Contingency contract on delivery date basis under GTAM is displayed in **Figure: 38**

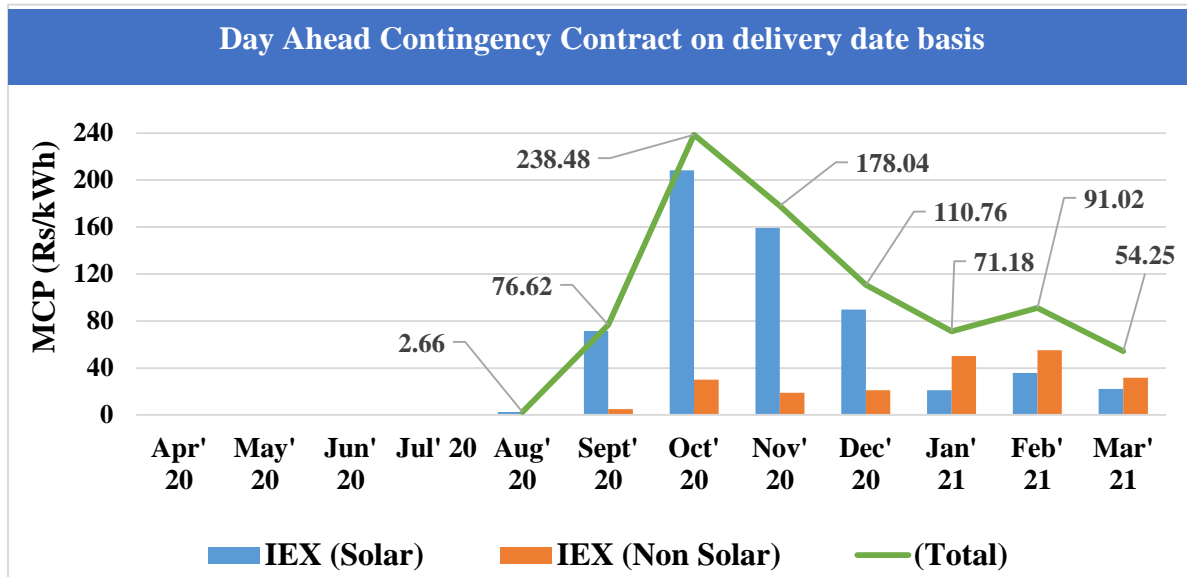


Figure: 38

(iii) Daily/Anyday Contract

The total volume of electricity transacted in both the Power Exchanges in Daily/Anyday Contract under GTAM for solar and non-solar segments was **2.30 MU** (**2.30 MU** in IEX and no transaction happened in PXIL). In IEX, the transaction happened in January, 2021 and February, 2021, only. Whereas, no transaction happened during August, 2020 to December, 2020 and March, 2021 in both solar and non-solar segments in IEX.

The month wise details of electricity transacted in Daily/Anyday Contract under solar and non-solar segments in GTAM are tabulated in **Table: 42**

Months	Final Scheduled Volume in Daily/ Anyday Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020					-
Sept, 2020	-	-			
Oct, 2020	-	-			
Nov, 2020	-	-			
Dec, 2020	-	-			
Jan, 2021	1.40	0.36			1.76
Feb, 2021	0.40	0.14			0.54
Mar, 2021	-	-	-	-	-
Total	1.80	0.50	-	-	2.30
	2.30		-		

- No transaction happened

Table: 42

(iv) Weekly Contract

The total volume of electricity transacted in both the Power Exchanges in Weekly Contract under GTAM for solar and non-solar segments was **24.15 MU** (**24.15 MU** in IEX and no transaction happened in PXIL). In IEX, the transaction under the solar segment happened in the month of December, 2020, only. Whereas, under non solar segment the transaction happened in the month of December, 2020 and January, 2021 in IEX. Whereas, no transaction happened during August, 2020 to November, 2020 and February, 2021 to March, 2021 in IEX.

The month wise details of electricity transacted in Weekly Contract under solar and non-solar segments in GTAM are tabulated in **Table: 43**

Months	Final Scheduled Volume in Weekly Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020					-
Sept, 2020	-	-			
Oct, 2020	-	-			
Nov, 2020	-	-			
Dec, 2020	6.65	0.70			7.35

Jan, 2021	-	16.80			16.80
Feb, 2021	-	-			-
Mar, 2021	-	-	-	-	-
Total	6.65	17.50	-	-	24.15
	24.15		-		

- No transaction happened

Table: 43

4. Real Time Curtailment in Green Term Ahead Market

There was **no** real time curtailment in any contracts (Intraday, Day Ahead Contingency, Daily-Anyday and weekly) under Solar and Non-Solar segments in both the power exchanges (IEX and PXIL) during FY 2020-21.

5. Volume of Electricity transacted in GTAM on Trade date basis

The total volume of electricity transacted in Power Exchanges in Green Term Ahead Market was **862 MU** (**861.91 MU** in IEX and **0.39 MU** in PXIL). In IEX, under the solar contracts the maximum volume of **208.40 MU** was transacted in the month of October, 2020, whereas, the minimum volume of **2.93 MU** was transacted in the month of August, 2020. Similarly, under the non-solar contracts the maximum volume of **68.37 MU** was transacted in the month of January, 2021 in IEX, whereas, the minimum volume of electricity of **5.78 MU** was transacted in the month of September, 2020. The majority of transactions in GTAM happened under Day Ahead Contingency Contract (95.54 %) on trade date basis.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards.

The month wise GTAM transaction details under solar and non-solar segments on trade date basis are given in **Table-44** below:

Months	Final Scheduled Volume (MU)		
	GTAM (Solar)	GTAM (Non Solar)	Total
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX. and from 24 th March, 2021 in PXIL		
May, 2020			
Jun, 2020			
Jul, 2020			
Aug, 2020	2.93	-	2.93
Sept, 2020	82.85	5.78	88.63
Oct, 2020	208.4	29.87	238.27
Nov, 2020	164.28	19.13	183.41
Dec, 2020	89.18	21.90	111.08
Jan, 2021	24.03	68.37	92.4
Feb, 2021	37.48	56.25	93.73
Mar, 2021	21.44	30.41	51.85
Total	630.59	231.71	862.30

Table: 44

The graphical representation of GTAM transaction details under solar and non-solar segments on trade date basis is displayed below in **Figure: 39**

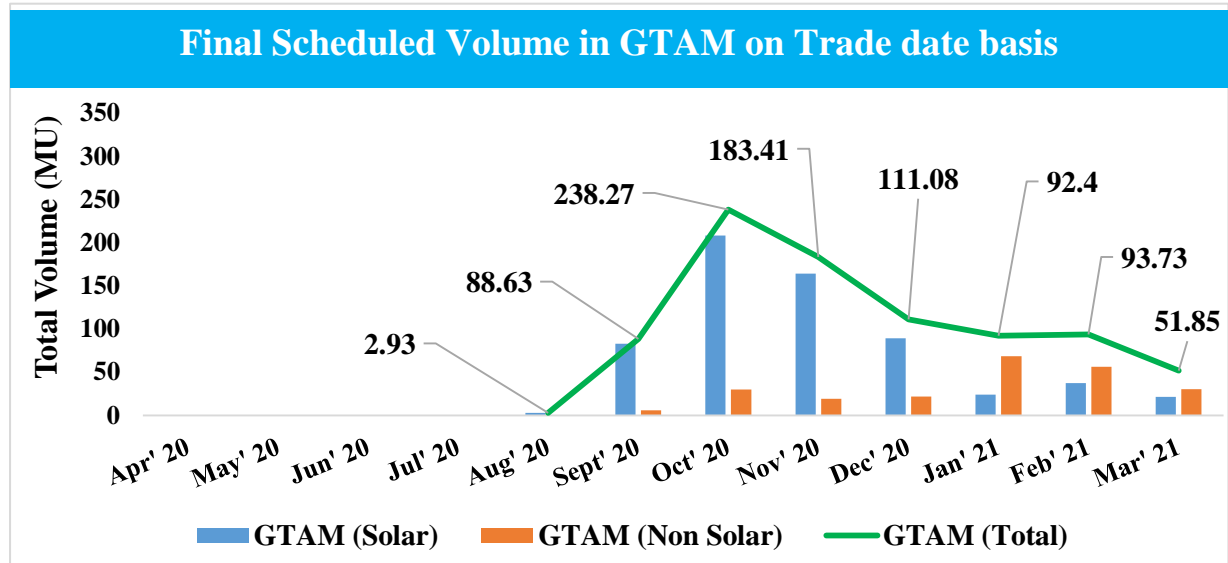


Figure: 39

6. Volume (MU) and Prices (Rs. /kWh) for Solar and Non Solar transactions in GTAM on Trade date basis during FY 2020-21

The month wise GTAM transaction details for IEX and PXIL under solar and non-solar segments on trade date are given in **Table-45** below:

Months	Final Scheduled Volume (MU)				
	IEX		PXIL		Total
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX. and from 24 th March, 2021 in PXIL				
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	2.93	-			2.93
Sept, 2020	82.85	5.78			88.63
Oct, 2020	208.40	29.87			238.27
Nov, 2020	164.28	19.13			183.41
Dec, 2020	89.18	21.90			111.08
Jan, 2021	24.03	68.37			92.4
Feb, 2021	37.48	56.25			93.73
Mar, 2021	21.44	30.02	-	0.39	51.85
Total	630.59	231.32	-	0.39	862.30
	861.91		0.39		

Table: 45

The month wise and contract wise prices of solar and non-solar transaction of electricity in GTAM in IEX during FY 2020-21 on trade date basis are tabulated in **Table: 46**

	Intraday		Day Ahead Contingency		Weekly Contract		Daily/Anyday Contract	
	Solar	Non Solar	Solar	Non Solar	Solar	Non Solar	Solar	Non Solar
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX							
May, 2020								
Jun, 2020								
Jul, 2020								
Aug, 2020	3.00	NA	3.07	NA	NA	NA	NA	NA
Sept, 2020	3.37	NA	3.56	3.64	NA	NA	NA	NA
Oct, 2020	3.58	NA	3.45	3.60	NA	NA	NA	NA
Nov, 2020	3.89	NA	3.56	3.91	NA	NA	NA	NA
Dec, 2020	3.93	3.52	4.00	3.97	3.70	4.00	NA	NA
Jan, 2021	NA	4.35	4.21	4.32	NA	4.30	4.50	4.01
Feb, 2021	4.17	NA	4.03	4.42	NA	NA	NA	NA
Mar, 2021	NA	5.10	4.17	4.40	NA	NA	NA	NA
Average (2020-21)	3.66	4.32	3.75	4.04	3.70	4.15	4.50	4.01

NA: Not applicable as no transaction happened

Table: 46

In PXIL, the transaction in GTAM started from 24th March, 2021. A volume of 0.39 MU at Rs 4.83/kWh in intraday contract under Non-Solar segments was traded in PXIL, and no transaction in any other contract happened.

7. Contract-wise Traded Volume in GTAM in both the Power Exchanges on Trade Date Basis

7.1. Intraday contract

The total volume of electricity transacted in both the Power Exchanges in Intraday Contract under GTAM for solar and non-solar segments was **210.78 MU** (**210.39 MU** in IEX and **0.39 MU** in PXIL). In IEX, under the solar segment the maximum volume of **5.09 MU** was transacted in the month of October, 2021, whereas, the minimum volume of **0.0021 MU** was transacted in the month of August, 2020. Similarly, under the non-solar segment the maximum volume of **198.40 MU** was transacted in the month of December, 2020 in IEX, whereas, the minimum volume of electricity of **0.35 MU** was transacted in the month of March, 2021.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards.

The month wise details of electricity transacted in Intraday Contract under Solar and Non Solar segments in GTAM are tabulated in **Table: 47**

Months	Final Scheduled Volume in Intraday Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	0.0021	-			0.0021
Sept, 2020	0.80	-			0.80
Oct, 2020	5.09	-			5.09
Nov, 2020	3.13	-			3.13
Dec, 2020	0.52	0.20			0.72
Jan, 2021	-	0.38			0.38
Feb, 2021	1.72	-			1.72
Mar, 2021	-	0.35	-	0.39	0.74
Total	11.26	0.93	-	-	12.58
	12.19		0.39		

- : No transaction happened

Table: 47

7.2. Day Ahead Contingency (DAC) Contract

The total volume of electricity transacted in both the Power Exchanges in Intraday Contract under GTAM for solar and non-solar segments was **823.87 MU** (**823.87 MU** in IEX and no transaction happened in PXIL). In IEX, under the solar segment the maximum volume of **203.31 MU** was transacted in the month of October, 2020, whereas, the minimum volume of **2.93 MU** was transacted in the month of August, 2020. Similarly, under the non-solar segment the maximum volume of **56.25MU** was transacted in the month of February, 2021 in IEX, whereas, the minimum volume of electricity of **5.78 MU** was transacted in the month of September, 2020. In PXIL, the transaction of electricity started from 24th March, 2021, onwards and no transaction happened in the month of March, 2021.

The month wise details of electricity transacted in Day Ahead Contingency Contract under Solar and Non Solar segments in GTAM are tabulated in **Table: 48**

Months	Final Scheduled Volume in Day Ahead Contingency Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	2.93	-			2.93
Sept, 2020	82.05	5.78			87.83
Oct, 2020	203.31	29.87			233.18

Nov, 2020	161.15	19.13			180.28
Dec, 2020	82.61	21.00			103.61
Jan, 2021	22.23	50.70			72.93
Feb, 2021	35.76	56.25			92.01
Mar, 2021	21.44	29.67	-	-	51.11
Total	611.48	212.39	-	-	823.87
	823.87				

- No transaction happened

Table: 48

The month wise plot of FSV (MU) in Day Ahead Contingency contract on trade date basis under GTAM is displayed in **Figure: 39**

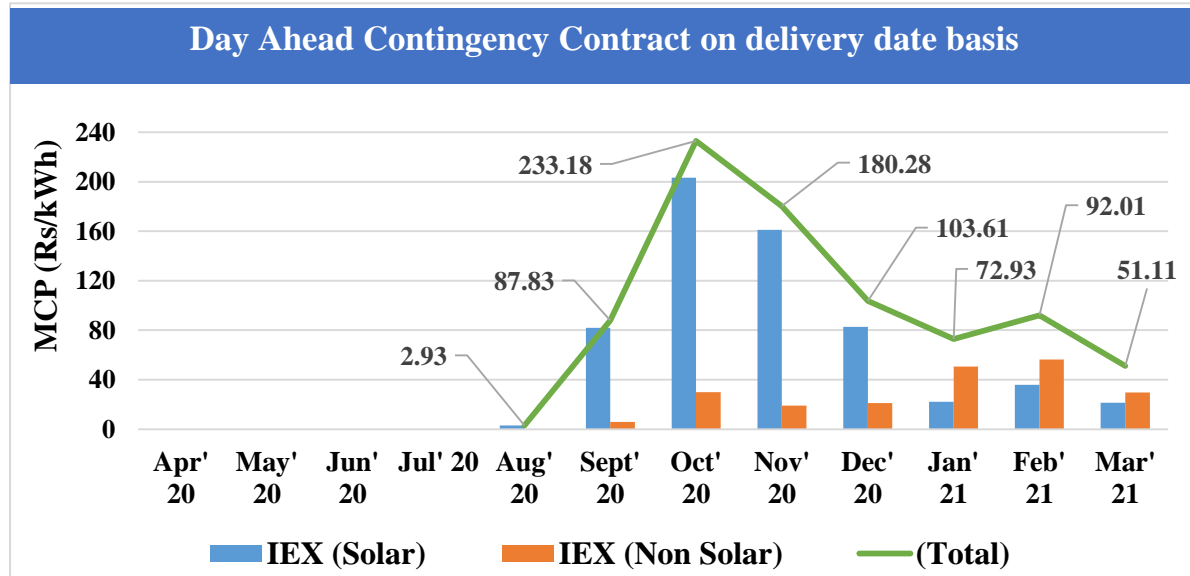


Figure: 40

7.3. Daily/ Anyday Contract

The total volume of electricity transacted in Power Exchanges in Any day/Daily Contract was **2.30 MU** (2.30 MU in IEX and no transaction happened in PXIL). In IEX, the transaction of electricity under the solar (1.80 MU) and non-solar (0.50 MU) segment happened in the month of January, 2021 only. In PXIL, the transaction of electricity started from 24th March, 2021, onwards and no transaction happened in the month of March, 2021.

The month wise details of electricity transacted in Daily/Anyday under Solar and Non Solar segments in GTAM is tabulated in **Table: 49**

Months	Final Scheduled Volume in Dail/Anyday Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	-	-			-
Sept, 2020	-	-			-

Months	Final Scheduled Volume in Dail/Anyday Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Oct, 2020	-	-			-
Nov, 2020	-	-			-
Dec, 2020	-	-			-
Jan, 2021	1.8	0.50			2.30
Feb, 2021	-	-			-
Mar, 2021	-	-	-	-	-
Total	1.8	0.50	-	-	2.30
	2.30		-		

- No transaction happened

Table: 49

7.4. Weekly Contract

The total volume of electricity transacted in Power Exchanges in **Weekly Contract** was **23.55 MU** (**23.55 MU** in IEX and no transaction happened in PXIL). In IEX, under the solar segment the transaction of electricity happened in the month of December, 2020 (**6.05 MU**). Similarly, under the non-solar segment the transaction of electricity happened in the months of December, 2020 (**0.70 MU**) and January, 2021 (**16.80 MU**) only.

In PXIL, the transaction of electricity started from 24th March, 2021, onwards and no transaction happened in the month of March, 2021.

The month wise details of electricity transacted in Weekly Contract under Solar and Non Solar segments in GTAM are tabulated in **Table: 50**

Months	Final Scheduled Volume in Weekly Contract (MU)				Total
	IEX		PXIL		
	Solar	Non Solar	Solar	Non Solar	
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX		Whereas, in PXIL the transaction of electricity in GTAM started from March, 2021.		
May, 2020					
Jun, 2020					
Jul, 2020					
Aug, 2020	-	-			-
Sept, 2020	-	-			-
Oct, 2020	-	-			-
Nov, 2020	-	-			-
Dec, 2020	6.05	0.70			6.75
Jan, 2021	-	16.80			16.80
Feb, 2021	-	-			-
Mar, 2021	-	-	-	-	-
Total	6.05	17.50	-	-	23.55
	23.55		-		

- No transaction happened

Table: 50

8. Congestion in IEX & PXIL in Green Term Ahead Market

In IEX, the total transmission congestion of **0.093 MU** happened in Day Ahead Contingency contract under Solar segment in GTAM during FY 2020-21. No transmission congestion happened in Intraday, Daily/Anyday and weekly contracts under solar segment, respectively.

The month wise details of transmission congestion in IEX in Solar segment in GTAM are tabulated in **Table: 51**:

Months	IEX (Solar)							
	Intraday		DAC		Any Day/ Daily		Weekly	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX							
May, 2020								
Jun, 2020								
Jul, 2020								
Aug, 2020	0.00	0	0.068	1 day	-	NA	-	NA
Sept, 2020	0.00	0	0.000	NA	-	NA	-	NA
Oct, 2020	0.00	0	0.017	2 days	-	NA	-	NA
Nov, 2020	0.00	0	0.000	NA	-	NA	-	NA
Dec, 2020	0.00	0	0.000	NA	-	NA	0.00	0
Jan, 2021	-	NA	0.008	2 days	0.00	0	-	NA
Feb, 2021	0.00	0	0.000	NA	-	NA	-	NA
Mar, 2021	-	0	0.000	NA	-	NA	-	NA
Total	0.00	0	0.093	5 days	0.00	0	0.00	0

NA: Not Applicable as no transaction happened

Table 51

Similarly, in IEX the total transmission congestion of **0.194 MU** happened in Day Ahead Contingency contract under Non Solar segment in GTAM during FY 2020-21. No transmission congestion happened in Intraday, Daily/Anyday and weekly contracts under solar non solar segment, respectively.

The month wise details of transmission congestion in IEX in Non-Solar segment in GTAM are tabulated in **Table: 52**.

Months	IEX (Non Solar)							
	Intraday		DAC		Any Day/ Daily		Weekly	
	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days	Volume (MU)	No. of days
Apr, 2020	Transaction of electricity in GTAM started from 1 st August, 2020 in IEX							
May, 2020								
Jun, 2020								
Jul, 2020								

Aug, 2020	-	NA	-	NA	-	NA	-	NA
Sept, 2020	-	NA	0.000	0	-	NA	-	NA
Oct, 2020	-	NA	0.001	1 day	-	NA	-	NA
Nov, 2020	-	NA	0.000	0	-	NA	-	NA
Dec, 2020	0.00	0	0.193	2 days	-	NA	0.00	0
Jan, 2021	0.00	0	0.000	0	0.00	0	0.00	0
Feb, 2021	-	NA	0.000	0	-	NA	-	NA
Mar, 2021	0.00	0	0.000	0	-	NA	-	NA
Total	0.00	0	0.194	3 days	0.00	0	0.00	0

Table 52

In PXIL, the transactions in GTAM started from 24th March, 2021. No transaction happened in any contract under solar segment in the month of March, 2021, whereas, the **0.39 MU** was transacted in intraday contract under non solar segment and no transmission happened

9. Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Green Term Ahead Market (GTAM) during FY 2020-21 (on Delivery date basis)

The Average Market Clearing Price of electricity on delivery date basis transacted in GTAM under Solar and Non Solar segments during FY 2020-21 is tabulated in **Table: 53**

GTAM MCP (Rs./kWh)	IEX		PXIL	
	Solar	Non Solar	Solar	Non Solar
FY 2020-21	3.90	4.25	-	4.83

NA: Not Applicable as no transaction happened

Table: 53

10. Average Market Clearing Price (MCP) of Electricity transacted in IEX & PXIL in Green Term Ahead Market (GTAM) during FY 2020-21 (on Trade date basis)

The Average Market Clearing Price of electricity on trade date basis transacted in GTAM under Solar and Non Solar segments during FY 2020-21 is tabulated in **Table: 54**.

GTAM MCP (Rs./kWh)	IEX		PXIL	
	Solar	Non Solar	Solar	Non Solar
FY 2020-21	3.90	4.25	NA	4.83

NA: Not Applicable as no transaction happened

Table: 54

CHAPTER-VII**ANALYSIS OF VARIATIONS IN FSV & AVERAGE MCP DURING FY 2020-21****1. General Observations**

(i) The demand and supply scenario in the market is the main determinant, which determines the prices discovered in the Power exchange. The fundamental drivers of price in the Exchange can be identified as:

- i. Demand scenario for major entities in India
- ii. Changes in Short/ Medium/ Long term contracts of buying/ selling entities and variable cost of generation.
- iii. Availability/ Outages of State Sector/ Central Sector / Private Sector Plants
- iv. Capacity available for exchange from all Independent Power Producers
- v. Expected transmission corridor availability
- vi. Peak Demand in the country
- vii. Coal, Wind, Solar and Hydro power generation in the country
- viii. Purchase and Sell Bid on power exchanges

(ii) Most of the DISCOMs have some sort of capping on the quantum and price for procuring power from the power exchange or open market, which is based on directive from the respective State Electricity Regulatory Commission (SERCs). Therefore, they are not at liberty to procure 100% power requirement from the power exchange/open market, when there is a shortage scenario in the state or when electricity demand of the state has gone up. Hence, the demand of electricity in any particular time block on the power exchange also depends upon the strategic decision of the utilities to meet the entire load or to shed some load.

2. Specific Observations

(i) During most of the months of FY 2020-21, the difference in volume of total sale bid (MU) and total purchase bid (MU) during any day of the month has been found as one of the important factor, which determined the increase/decrease in daily MCP of that day during the month. It implies that when the difference between the sale bid (MU) and purchase bid (MU) is minimum, then on that day, the daily MCP is maximum and when the difference between the two is maximum, then on that day, the daily MCP is minimum. It was also further observed that congestion also plays a role in the relationship.

(ii) From the day-wise variation in most of the months of FY 2020-21, it is seen that the total purchase bid (MU) and the total final scheduled volume (MU) almost followed the same trend i.e. when total purchase bid (MU) increases, the total final scheduled volume (MU) increases and vice-versa.

(iii) The purchase bids and the MCP discovered in each of the 15-minute time block during all the days of almost every months of FY 2020-21 followed the same trend i.e when the volume of purchase bids is more in any time block, MCP discovered in that time block is also more and vice-versa. **This is also corroborated with the outcome of the Regression Analysis carried out for each months of FY 2020-21 using a double log function, whereby the elasticity of Daily MCP can be read off from the coefficients of independent variables.**

3. Regression Analysis for DAM transaction

(i) The regression analysis was carried out for every month of FY 2020-21 with average MCP as dependent variable and with peak demand, total sell bid, total purchase bid, thermal generation, hydro generation, wind generation and solar generation as independent variables to find the significant variables affecting the average Market Clearing Price. The analysis have been done for transactions happening in IEX only, as the 99.99 % of transaction happening in power exchanges in Day Ahead Market occurred in IEX only. The regression analysis revealed that the most important variable, which determines daily market clearing price is the total purchase bid for almost every months of FY 2020-21.

The month wise details of significant variables, most significant variables and its regression coefficient in IEX are tabulated in **Table: 55**

Month	Significant Variables	Most Significant Variables and its Regression Coefficient	2 nd Most Significant Variable and its Regression Coefficient
April, 2020	Total Purchase bid and Total Sell bid	Total Purchase bid (0.33)	Total Sell bid (- 0.37)
May, 2020	Total Purchase bid, Total Sell bid and Wind generation	Total Purchase bid (0.30)	Total Sell bid (- 0.25)
June, 2020	Total Purchase bid and Hydro generation	Total Purchase bid (0.56)	Hydro Generation (-0.56)
July, 2020	Total Purchase bid and Total Sell bid	Total Purchase bid (0.47)	Total Sell bid (- 0.53)
Aug, 2020	Total Purchase bid, Total Sell bid and Solar generation	Total Purchase Bid (0.56)	Total Sell bid (- 0.36)
Sept, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.29)	Total Sell bid (- 0.39)
Oct, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.29)	Total Sell bid (- 0.46)
Nov, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.41)	Total Sell bid (- 0.29)
Dec, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.38)	Total Sell bid (- 0.28)

Jan, 2021	Total Purchase bid, Total Sell bid, Hydro and Solar generation	Total Purchase bid (0.63)	Total Sell bid (- 0.34)
Feb, 2021	Total Purchase bid, Total Sell bid, Hydro and Solar generation	Total Purchase bid (0.63)	Total Sell bid (- 0.33)
March, 2021	Total Purchase bid, Total Sell bid, Wind and Solar generation	Total Purchase bid (0.72)	Total Sell bid (- 0.34)

Table: 55

ii) On annual regression analysis of Daily Market Clearing Prices w.r.t Total Purchase bid, Total Sell bid, Peak Demand, Hydro generation, Solar generation and Thermal generation, it is observed that the significant variables were Total Purchase, Coal Generation and Solar Generation only. Further, among these three variables, the most significant variable was **Total Purchase bid** with regression coefficient as **0.31**.

4. Regression Analysis for RTM transaction

(i) Similar to Day Ahead Market, the regression analysis for Real time Market was carried out for every month of FY 2020-21 with average MCP as dependent variable and with peak demand, total sell bid, total purchase bid, thermal generation, hydro generation, wind generation and solar generation as independent variables to find the significant variables affecting the average Market Clearing Price. The analysis have been done for transactions happening in IEX only, as the 99.99 % of transaction happening in power exchanges in Real Time Market occurred in IEX only. The regression analysis revealed that the most important variable, which determines daily market clearing price is the total purchase bid for almost every months of FY 2020-21.

The month wise details of significant variables, most significant variables and its regression coefficient in IEX are tabulated in **Table: 56**

Month	Significant Variables	Most Significant Variables and its Regression Coefficient	2 nd Most Significant Variable and its Regression Coefficient
April, 2020	The transaction of electricity in Real Time Market started from 1 st June, 2020 onwards.		
May, 2020			
June, 2020	Total Purchase bid, Total Sell bid, Peak Demand and Coal generation	Total Purchase bid (0.26)	Total Sell bid (- 0.39)
July, 2020	Total Purchase bid, Total Sell bid and Hydro generation	Total Purchase bid (0.40)	Total Sell bid (- 0.66)
Aug, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.29)	Total Sell bid (- 0.49)
Sept, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.28)	Total Sell bid (-0.42)
Oct, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.28)	Total Sell bid (- 0.51)

Nov, 2020	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.30)	Total Sell bid (- 0.48)
Dec, 2020	Total Purchase bid	Total Purchase Bid (0.30)	Total Sell bid (- 0.61)
Jan, 2021	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.47)	Total Sell bid (- 0.62)
Feb, 2021	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.45)	Total Sell bid (- 0.41)
March, 2021	Total Purchase bid and Total Sell bid	Total Purchase Bid (0.57)	Total Sell bid (- 0.33)

Table: 56

ii) On annual regression analysis of Daily Market Clearing Prices w.r.t Total Purchase bid, Total Sell bid, Peak Demand, Hydro generation, Solar generation and Thermal generation, it is observed that the significant variables were Total Purchase, Coal Generation and Solar Generation only. Further, among these three variables, the most significant variable was **Total Purchase bid** with regression coefficient as **0.22**.

CHAPTER-VIII**1. TOP TEN SELLERS ON THE POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21 IN DAM**

The percentage share of top 10 sellers during FY 2020-21 in the power exchanges is **50.12%** of total volume of electricity transacted in DAM. The volume of electricity transacted by top ten sellers along with their share in total volume are provided in the **Table: 57**.

Entity Name	Sell (MU)	Percent
Odisha	4,878.28	8.05%
Uttar Pradesh	4,827.79	7.96%
Teesta -3	4,675.61	7.71%
Himachal Pradesh	2,720.12	4.49%
Jaypee Nigrie	2,697.80	4.45%
West Bengal	2,442.94	4.03%
Sembcorp Gayatri	2,416.30	3.99%
Madhya Pradesh	2,050.84	3.38%
Raipur Energen	1,844.66	3.04%
Jindal Power	1,834.47	3.03%
Total	30,388.82	50.12%
Total Volume in PXs during FY 2020-21	60,633	

TABLE: 57**2. TOP TEN BUYERS ON THE POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21 IN DAM**

The percentage share of top 10 purchasers during FY 2020-21 in the power exchanges is **81.04%** of total volume of electricity transacted in DAM. The volume of electricity transacted by top ten buyers along with their share in total volume are provided in the **Table: 58**.

Entity Name	Purchase (MU)	Percent
Gujarat	8,483.95	13.99%
Andhra Pradesh	8,334.34	13.75%
Maharashtra	7,990.23	13.18%
Telangana	7,038.44	11.61%
Tamil Nadu	4,265.95	7.04%
Punjab	3,342.59	5.51%
Haryana	2,803.62	4.62%
Rajasthan	2,664.91	4.40%
Uttar Pradesh	2,557.86	4.22%
Uttarakhand	1,955.03	3.22%
Total	49,136.92	81.04%
Total Volume in PXs during FY 2020-21	60,633	

TABLE: 58

3. TOP TEN SELLERS ON THE POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21 IN RTM

The percentage share of top 10 sellers during FY 2020-21 in the power exchanges is **53.22** % of total volume of electricity transacted in RTM. The volume of electricity transacted by top ten sellers along with their share in total volume are provided in the **Table: 59**.

Entity Name	Sell (MU)	Percent
Orissa	723.47	7.64%
Madhya Pradesh	702.77	7.42%
West Bengal	672.45	7.10%
Telangana	583.88	6.17%
Uttar Pradesh	572.84	6.05%
Rajasthan	517.88	5.47%
Karnataka	457.77	4.83%
Delhi	299.29	3.16%
J&K	258.84	2.73%
Sembcorp Gayatri	251.21	2.65%
Total	5,040.40	53.22%
Total Volume in PXs during FY 2020-21	9,470	

TABLE: 59

4. TOP TEN BUYERS ON THE POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21 IN RTM

The percentage share of top 10 purchasers during FY 2020-21 in the power exchanges is **75.60** % of total volume of electricity transacted in RTM. The volume of electricity transacted by top ten buyers along with their share in total volume are provided in the **Table: 60**.

Entity Name	Purchase (MU)	Percent
J&K	2182.68	23.05%
Telangana	1224.88	12.93%
Andhra Pradesh	768.08	8.11%
Rajasthan	752.89	7.95%
Maharashtra	473.15	5.00%
West Bengal	441.20	4.66%
Uttar Pradesh	372.03	3.93%
Delhi	341.40	3.61%
Orissa	311.30	3.29%
Gujarat	291.29	3.08%
Total	7,158.88	75.60%
Total Volume in PXs during FY 2020-21	9,470	

TABLE: 60

Table: 61**SELLERS IN DAM ON POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21.**

Entity Name	Sell (MU)				
		Jorethang	326.91	Adani Green Energy	28.51
		Telangana	324.75	Nineteen Limited	
Odisha	4878.28	Maharashtra	322.29	NLC	28.41
Uttar Pradesh	4827.79	GMR Kamalanga	319.98	Khargone STPP	17.76
Teesta -3	4675.61	Sikkim	316.16	NLC TPS-II Expn	12.53
Himachal Pradesh	2720.12	Tashiding HEP	304.75	Nagaland	12.45
Jaypee Nigrie	2697.80	Haryana	297.61	RGPPL	9.25
West Bengal	2442.94	ACBIL	294.74	TRN Energy	6.55
Sembcorp Gayatri	2416.30	Uttarakhand	285.81	Nathpa Jhakri	5.97
Madhya Pradesh	2050.84	Chuzachen	251.20	Dhariwal	5.91
Raipur Energen	1844.66	Torrent Power	249.09	KSK Mahanadi	5.42
Jindal Power	1834.47	Chandigarh	237.71	Simhadri Stg-2	5.17
J&K	1544.71	Gujarat	233.67	Shree Cement	4.59
Jindal Power Ltd. Stg-II	1350.92	Kerala	231.21	Ramagundam Stg-3	4.43
Chhattisgarh	1340.83	Meghalaya	226.12	Talcher Stg-2	3.47
Adani Power STG2	1329.15	Korba Stg 3	178.20	Rampur HEP	3.26
DB Power	1301.99	Arunachal Pradesh	177.59	NTPC Gadarwara	2.40
Assam	1259.81	SKS Power	164.01	Talcher	1.70
JITPL	1178.99	DVC	160.24	Kahalgaon	1.01
Rajasthan	1129.77	Andhra Pradesh	148.91	Meenakshi Energy	0.96
Bihar	1086.66	Tripura	144.92	Farakka	0.67
Karnataka	1032.16	Palatana	119.17	AGBPP	0.62
Delhi	1027.00	Adhunik Power	119.14	NTPC Sholapur	0.56
Raigarh Energy Ltd.	967.85	BALCO 2	115.80	Mouda Stg-2	0.51
Essar Power MP Ltd	960.80	Tamil Nadu	102.91	Kahalgaon-II	0.43
MB Power	777.15	Bongaigaon	97.13	BRBCL	0.40
GMR Warora	737.68	IL&FS	88.76	AGTPP	0.37
Thermal Powertech	678.64	NLC TPS-II	88.41	Unchahar-IV	0.28
DGEN Mega Power	589.98	Dadra & Nagar Haveli	68.05	NTPC Kudgi	0.24
Adani Power STG3	511.16	Punjab	58.84	Unchahar-II	0.22
Karcham Wangtoo	471.79	Jindal Steel	51.13	Ranganadi	0.14
AD Hydro	456.04	Mizoram	49.53	Unchahar-III	0.13
Maruti Clean Coal Power	425.23	Ramagundam Stg-1	49.34	Unchahar-I	0.10
Goa WR	404.29	Singoli Bhagwati	49.05	Kawas	0.09
Spectrum Coal	401.90	Manipur	45.44	Mouda Stg-1	0.08
Dikchu	397.89	Farakka Stg 3	40.01	Pare HEP	0.06
Kameng HEP	386.49	NTPL	39.86	Dadri Stg-2	0.04
RKM Power	386.04	NLC TPS-II Stg-2	36.61	Doyang	0.03
Jharkhand	376.55	Lanco Budhil	32.65	Gandhar_RLNG Fuel	0.03
Costal Energen	373.82	Kijal Solar (Maharashtra) Pvt. Ltd.	30.76	Kawas_RLNG Fuel	0.03
Sainj HEP	354.72			Khandong	0.02
Jhabua Power	345.25			Auraiya_RLNG Fuel	0.02

Table: 62**BUYERS IN DAM ON POWER EXCHANGES DURING FY 2020-21**

Entity Name	Purchase (MU)
Gujarat	8483.95
Andhra Pradesh	8334.34
Maharashtra	7990.23
Telangana	7038.44
Tamil Nadu	4265.95
Punjab	3342.59
Haryana	2803.62
Rajasthan	2664.91
Uttar Pradesh	2557.86
Uttarakhand	1955.03
Delhi	1890.53
J&K	1539.81
Bihar	1287.61
ArcelorMittal Nippon steel (ESIL)	1127.98
Karnataka	739.24
Assam	724.55
Himachal Pradesh	580.02
Dadra & Nagar Haveli	565.85
Madhya Pradesh	511.09

Kerala	444.21
Odisha	392.18
West Bengal	376.22
Chhattisgarh	333.97
Jharkhand	240.52
Daman & Diu	122.93
Meghalaya	79.85
Goa WR	75.65
Manipur	52.46
Chandigarh	43.26
KAPS 3&4	13.99
Nagaland	11.33
Arunachal Pradesh	11.04
Goa SR	10.27
DVC	4.04
Tripura	0.64
WORAM0	0.48
Kakrapar	0.48
Meenakshi Energy	0.24
NNTPS UNIT-2	0.01

Table: 63**SELLERS IN RTM ON POWER EXCHANGES (IEX & PXIL) DURING FY 2020-21**

Entity Name	Sell (MU)				
Orissa	723.47	Adani Power STG3	53.99	Dikchu	5.10
Madhya Pradesh	702.77	Jindal Power	48.73	AGTPP	4.61
West Bengal	672.45	Meenakshi Energy	44.78	DGEN Mega Power	4.41
Telangana	583.88	SKS Power	41.78	RGPPL_IR	4.33
Uttar Pradesh	572.84	Sikkim	40.91	NSPCL Bhilai	3.93
Rajasthan	517.88	DB Power	40.65	Dadra & Nagar Haveli	3.43
Karnataka	457.77	NTPC Kudgi	39.99	Chuzachen	3.20
Delhi	299.29	Sasan UMPP	34.28	Spectrum Coal	3.06
J&K	258.84	Barh Stg-2	34.07	Uttarakhand	2.41
Sembcorp Gayatri	251.21	BALCO 2	33.40	Arunachal Pradesh	2.07
NLC TPS-II	214.56	Raigarh Energy Ltd.	33.35	ACBIL	2.02
Maharashtra	203.70	TRN Energy	32.78	Singoli Bhagwati	1.99
DVC	201.43	Mouda Stg-2	28.64	RGPPL_Others	1.35
RKM Power	194.27	Farakka Stg 3	27.06	Coastal Gujrat Power Limited	1.33
Kameng HEP	189.79	NTPC Sholapur	26.37	Chandigarh	1.28
Chhatisgarh	176.73	Tamilnadu	26.34	Kahalgaon-II	1.21
MB Power	157.31	Torrent Power	25.99	Dadri_Combined	1.20
NLC TPS-II Stg-2	150.51	Teesta -3	25.75	RLNG Fuel	
NLC	150.27	Bongaigaon	23.47	RGPPL	1.15
Tripura	138.35	GMR Kamalanga	22.60	Auraiya	0.90
GMR Warora	128.12	Ramagundam Stg-3	19.73	Shree Cement	0.88
Andhra Pradesh	126.81	Essar Power MP Ltd	19.55	Kawas_NAPM	0.85
Jhabua Power	122.08	Mouda Stg-1	19.49	Dhariwal	0.84
Jindal Power Ltd. Stg-II	100.17	Jharkhand	18.59	JITPL	0.83
Adani Power STG2	97.13	BRBCL	16.80	NTPC Lara	0.77
Raipur Energen	93.84	NTPC Gadarwara	16.43	Darlipalli	0.73
Haryana	93.03	Nagaland	16.25	Kahalgaon	0.73
Assam	90.97	Jorethang	14.94	Talcher	0.65
Neyveli New Thermal Power Project	88.62	IL&FS	14.55	Karcham Wangtoo	0.62
NLC TPS-II Expn	85.71	Kawas	14.34	Korba Stg 3	0.62
NTPL	73.57	Punjab	14.21	Sainj HEP	0.60
Bihar	71.67	Palatana	13.93	Adhunik Power	0.59
Kerala	70.80	Meghalaya	13.53	Simhadri Stg-1	0.56
Ramagundam Stg-1	68.64	Tashiding HEP	11.92	Maithon Power	0.48
Himachal Pradesh	67.89	Dadri GPP	10.91	Goa WR	0.30
Manipur	65.94	Farakka	10.42	Ranganadi	0.28
Khargone STPP	62.21	Simhadri Stg-2	9.73	Anta	0.22
Gujarat	58.73	AGBPP	9.41	Gandhar	0.09
Thermal Powertech	55.78	AD Hydro	9.09	Doyang	0.08
		Maruti Clean Coal Power	7.41	Pare HEP	0.08
		ArcelorMittal	6.85	Khandong	0.07
		Nippon steel (ESIL)			
		Rihand-II	6.51		

Table: 64**BUYERS IN RTM ON POWER EXCHANGES DURING FY 2020-21**

Entity Name	Sell (MU)				
J&K	2194.98	DGEN Mega Power	15.53	Vindhyachal stg-1	1.38
Telangana	1222.95	Tripura	15.26	Khargone STPP	1.35
Andhra Pradesh	767.13	Teesta -3	15.16	Costal Energen	1.27
Rajasthan	755.29	Goa WR	14.47	Barh Stg-2	1.16
Maharashtra	471.00	Sikkim	14.41	Kawas	1.14
West Bengal	436.55	Talcher	13.89	Sipat Stg-1	1.13
Uttar Pradesh	373.61	ArcelorMittal		Vindhyachal stg-3	1.10
Delhi	341.53	Nippon steel (ESIL)	12.93	NTPC Gadarwara	1.07
Orissa	311.37	Jorethang	12.49	Chandigarh	1.05
Gujarat	296.80	DB Power	11.90	Vindhyachal stg-5	0.98
Haryana	233.24	Tashiding HEP	11.70	Mouda Stg-1	0.94
Bihar	228.09	NLC TPS-II Expn	11.27	Vindhyachal stg-4	0.93
Punjab	223.25	GMR Warora	11.12	MB Power	0.91
Assam	155.83	Ramagundam Stg-1	9.28	Korba Stg 3	0.90
Tamilnadu	148.77	Raigarh Energy Ltd.	8.93	Dadri GPP	0.80
Karnataka	124.77	Palatana	8.09	Jaypee Nigrie	0.77
Himachal Pradesh	112.87	Maruti Clean Coal		AD Hydro	0.77
Chhatisgarh	101.38	Power	8.05	Spectrum Coal	0.69
Madhya Pradesh	74.13	Talcher Stg-2	8.03	Vindhyachal stg-2	0.50
Kerala	65.83	Essar Power MP Ltd	7.17	Sipat Stg-2	0.40
Sembcorp Gayatri	47.84	SKS Power	5.69	Bongaigaon	0.38
NLC TPS-II	46.79	Nagaland	5.28	Arunachal Pradesh	0.35
Jharkhand	46.63	BALCO 2	5.19	Chuzachen	0.33
NLC	46.50	Kahalgaoon-II	4.17	Karcham Wangtoo	0.29
DVC	41.11	Rihand-I	4.07	Adani Power STG2	0.27
NLC TPS-II Stg-2	40.80	NPGC Nabinagar	4.01	Kawas_Combined	
Meghalaya	38.13	Daman & Diu	3.86	RLNG Fuel	0.25
Adani Power STG3	34.32	Rihand-III	3.74	Anta	0.22
Raipur Energen	31.29	Jindal Steel	3.70	RGPPL_IR	0.17
Neyveli New		NSPCL Bhilai	3.02	Meenakshi Energy	0.17
Thermal Power		Rihand-II	2.99	NTPC Sholapur	0.14
Project	25.18	Goa SR	2.90	JITPL	0.10
Jindal Power Ltd.		Farakka Stg 3	2.61	Dhariwal	0.10
Stg-II	23.05	Kameng HEP	2.32	Gandhar	0.06
Dadra & Nagar		Korba	2.23	Auraiya	0.04
Haveli	20.87	Singrauli	2.19	Dikchu	0.02
Manipur	19.12	GMR Kamalanga	1.91	Gandhar_Combined	
Uttarakhand	18.80	Kahalgaoon	1.88	RLNG Fuel	0.02
Jindal Power	18.06	Ramagundam Stg-3	1.62	Auraiya_Combined	
Sasan UMPP	18.01	BRBCL	1.59	RLNG Fuel	0.01
Jhabua Power	16.25	Thermal Powertech	1.55	Dadri_Combined	
Torrent Power	16.04	RGPPL	1.55	RLNG Fuel	0.01
		Darlipalli	1.55	IL&FS	0.01
		ACBIL	1.41		

Annexure: I

MONTH WISE TOP TEN SELLER AND PURCHASER IN DAM ARE GIVEN BELOW:

April, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Orissa	448.52	12.15%	RKM Power	1335.01	36.16%
Uttar Pradesh	431.14	11.68%	Ramagundam Stg-3	755.28	20.46%
Himachal Pradesh	362.85	9.83%	Jindal Power Ltd. Stg-II	552.40	14.96%
DGEN Mega Power	262.58	7.11%	KBUNL(MTPS-II)	343.11	9.29%
Teesta -3	229.47	6.22%	Costal Energen	186.93	5.06%
Assam	213.99	5.80%	OPGC Unit-4	107.32	2.91%
Uttarakhand	161.61	4.38%	Pondicherry	89.42	2.42%
JITPL	145.26	3.93%	Kahalgaon	72.34	1.96%
Delhi	127.04	3.44%	Chamera-II	56.16	1.52%
Chhattisgarh	115.44	3.13%	NTPC Kudgi	52.76	1.43%
Total	2497.90	67.66%	Total	3550.73	96.17%
Total Volume in PXs	3692.04		Total Volume in PXs	3692.04	

May, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Odhisa	651.27	11.64%	Maharashtra	1366.23	24.41%
Teesta -3	469.01	8.38%	Andhra Pradesh	1118.53	19.99%
J&K	386.05	6.90%	Gujarat	818.80	14.63%
Himachal Pradesh	382.29	6.83%	Punjab	788.69	14.09%
Jaypee Nigrie	249.53	4.46%	Telangana	294.50	5.26%
Chhattisgarh	243.13	4.34%	Tamil Nadu	197.93	3.54%
Uttar Pradesh	238.16	4.26%	Bihar	154.64	2.76%
Raipur Energen	235.58	4.21%	Haryana	136.88	2.45%
JITPL	234.18	4.18%	Uttar Pradesh	134.26	2.40%
Sembcorp Gayatri	159.17	2.84%	Rajasthan	117.00	2.09%
Total	3248.38	58.05%	Total	5127.47	91.63%
Total Volume in PXs	5595.97		Total Volume in PXs	5595.97	

June, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Teesta -3	696.56	16.63%	Maharashtra	865.43	20.66%
J&K	523.70	12.50%	Telangana	751.68	17.94%
Orissa	321.07	7.66%	Gujarat	501.14	11.96%
Himachal Pradesh	269.19	6.43%	Punjab	438.28	10.46%
Raipur Energen	170.77	4.08%	Andhra Pradesh	370.03	8.83%
Assam	155.12	3.70%	Tamilnadu	222.39	5.31%
Madhya Pradesh	124.24	2.97%	Haryana	158.55	3.78%
Uttar Pradesh	117.65	2.81%	ArcelorMittal Nippon steel	123.36	2.94%
Sembcorp Gayatri	116.55	2.78%	Rajasthan	106.14	2.53%
Delhi	92.30	2.20%	Uttar Pradesh	96.45	2.30%
Total	2587.15	61.76%	Total	3633.45	86.73%
Total Volume in PXs	4189.37		Total Volume in PXs	4189.37	

July, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Teesta -3	712.87	15.43%	Maharashtra	785.03	17.00%
Himachal Pradesh	431.31	9.34%	Telangana	673.12	14.57%
Orissa	348.92	7.55%	Andhra Pradesh	421.85	9.13%
J&K	277.70	6.01%	Gujarat	420.89	9.11%
Jaypee Nigrie	255.71	5.54%	Haryana	298.51	6.46%
Sembcorp Gayatri	197.32	4.27%	Tamilnadu	265.00	5.74%
Tripura	132.08	2.86%	Uttar Pradesh	262.33	5.68%
Assam	127.69	2.76%	Rajasthan	222.28	4.81%
Kameng HEP	123.01	2.66%	Uttarakhand	198.77	4.30%
Uttar Pradesh	120.80	2.62%	ArcelorMittal Nippon steel	198.05	4.29%
Total	2727.42	59.05%	Total	3745.82	81.10%
Total Volume in PXs	4618.79		Total Volume in PXs	4618.79	

August, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Teesta -3	673.63	14.97%	Haryana	737.81	16.40%
Himachal Pradesh	430.32	9.57%	Maharashtra	608.14	13.52%
Orissa	326.75	7.26%	Gujarat	466.11	10.36%
Jaypee Nigrie	214.59	4.77%	Telangana	446.35	9.92%
J&K	210.97	4.69%	Tamilnadu	353.14	7.85%
Sembcorp Gayatri	198.83	4.42%	Andhra Pradesh	308.83	6.87%
Raipur Energen	153.47	3.41%	Uttar Pradesh	266.98	5.93%
Karnataka	121.05	2.69%	Uttarakhand	221.16	4.92%
Uttar Pradesh	105.22	2.34%	Delhi	199.12	4.43%
Essar Power MP Ltd	103.17	2.29%	Bihar	156.88	3.49%
Total	2538.01	56.42%	Total	3764.52	83.68%
Total Volume in PXs	4498.46		Total Volume in PXs	4498.46	

September, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Teesta -3	608.27	12.56%	Andhra Pradesh	634.71	13.11%
Himachal Pradesh	350.52	7.24%	Maharashtra	580.12	11.98%
Sembcorp Gayatri	285.24	5.89%	Gujarat	486.86	10.06%
Jaypee Nigrie	250.24	5.17%	Uttar Pradesh	460.58	9.51%
Adani Power STG2	232.93	4.81%	Tamilnadu	382.08	7.89%
Jindal Power	232.70	4.81%	Delhi	374.07	7.73%
Orissa	221.49	4.58%	Telangana	330.37	6.82%
Raipur Energen	194.61	4.02%	Uttarakhand	292.90	6.05%
Essar Power MP Ltd	183.91	3.80%	Haryana	250.54	5.18%
Raigarh Energy Ltd.	135.77	2.80%	Punjab	217.87	4.50%
Total	2695.67	55.68%	Total	4010.10	82.83%
Total Volume in PXs	4841.19		Total Volume in PXs	4841.19	

October, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Teesta -3	497.70	8.97%	Gujarat	905.37	16.31%
Orissa	390.74	7.04%	Andhra Pradesh	715.04	12.88%
Sembcorp Gayatri	387.90	6.99%	Punjab	624.88	11.26%
Jaypee Nigrie	347.78	6.27%	Tamilnadu	394.85	7.11%
Raipur Energen	303.23	5.46%	Rajasthan	369.59	6.66%
Jindal Power	297.27	5.36%	Uttar Pradesh	315.08	5.68%
Adani Power STG2	285.32	5.14%	Uttarakhand	283.35	5.11%
Uttar Pradesh	198.37	3.57%	Maharashtra	268.13	4.83%
Madhya Pradesh	196.97	3.55%	Haryana	220.84	3.98%
Jindal Power Ltd. Stg-II	188.31	3.39%	Bihar	219.16	3.95%
Total Volume	3093.60	55.74%	Total Volume	4316.28	77.77%
Total Volume in PXs	5550.26		Total Volume in PXs	5550.26	

November, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Jaypee Nigrie	393.64	8.02%	Andhra Pradesh	903.25	18.40%
Orissa	384.62	7.83%	Punjab	536.16	10.92%
Chhattisgarh	378.61	7.71%	Tamilnadu	526.75	10.73%
Uttar Pradesh	268.63	5.47%	Rajasthan	434.13	8.84%
Teesta -3	251.81	5.13%	Maharashtra	394.11	8.03%
DB Power	251.40	5.12%	Uttarakhand	359.54	7.32%
Raipur Energen	238.17	4.85%	Gujarat	350.67	7.14%
Sembcorp Gayatri	226.70	4.62%	J&K	189.68	3.86%
Madhya Pradesh	214.29	4.37%	Delhi	185.63	3.78%
Costal Energen	171.89	3.50%	Haryana	175.82	3.58%
Total	2779.77	56.63%	Total	4055.74	82.62%
Total Volume in PXs	4909.08		Total Volume in PXs	4909.08	

December, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
West Bengal	674.81	12.03%	Andhra Pradesh	1094.84	19.51%
Uttar Pradesh	560.37	9.99%	Maharashtra	626.85	11.17%
Odisha	551.09	9.82%	Tamil Nadu	531.92	9.48%
Jindal Power Ltd. Stg-II	444.18	7.92%	Gujarat	472.42	8.42%
Jindal Power	437.06	7.79%	Telangana	444.53	7.92%
Jaypee Nigrie	283.00	5.04%	Rajasthan	429.45	7.65%
Chhattisgarh	223.60	3.99%	UT of J&K and Ladakh	282.61	5.04%
Madhya Pradesh	206.53	3.68%	Delhi	253.53	4.52%
Teesta -3	168.01	2.99%	Haryana	241.67	4.31%
DB Power	165.34	2.95%	Uttar Pradesh	214.74	3.83%
Total	3713.99	66.19%	Total	4592.56	81.85%
Total Volume in PXs	5610.99		Total Volume in PXs	5610.99	

January, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
West Bengal	726.91	13.04%	Telangana	996.78	17.88%
Uttar Pradesh	698.36	12.52%	Gujarat	706.01	12.66%
Odisha	577.81	10.36%	Andhra Pradesh	580.15	10.40%
Jaypee Nigrie	260.66	4.67%	Maharashtra	494.83	8.87%
Adani Power STG2	260.27	4.67%	Tamil Nadu	442.88	7.94%
Madhya Pradesh	250.53	4.49%	UT of J&K and Ladakh	434.64	7.79%
Rajasthan	188.76	3.39%	Rajasthan	310.42	5.57%
Sembcorp Gayatri	171.15	3.07%	Delhi	247.86	4.44%
Raipur Energen	163.33	2.93%	Uttar Pradesh	232.12	4.16%
Bihar	151.40	2.72%	Haryana	173.23	3.11%
Total	3449.18	61.85%	Total	4618.93	82.83%
Total Volume in PXs	5576.24		Total Volume in PXs	5576.24	

February, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Uttar Pradesh	878.80	17.21%	Gujarat	1274.94	24.96%
West Bengal	494.45	9.68%	Telangana	906.13	17.74%
Odisha	447.55	8.76%	Andhra Pradesh	464.15	9.09%
JITPL	385.17	7.54%	Tamil Nadu	442.32	8.66%
Bihar	205.96	4.03%	UT of J&K and Ladakh	334.82	6.56%
Jaypee Nigrie	178.67	3.50%	Rajasthan	295.75	5.79%
Delhi	165.64	3.24%	Maharashtra	220.60	4.32%
Madhya Pradesh	158.59	3.11%	Haryana	163.09	3.19%
Sembcorp Gayatri	141.42	2.77%	Uttar Pradesh	138.46	2.71%
Karnataka	128.42	2.51%	Dadra & Nagar Have	104.49	2.05%
Total	3184.68	62.36%	Total	4344.75	85.07%
Total Volume in PXs	5107.20		Total Volume in PXs	5107.20	

March, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Uttar Pradesh	1136.47	17.35%	Telangana	1527.49	23.32%
Madhya Pradesh	659.48	10.07%	Gujarat	1526.11	23.30%
Rajasthan	487.62	7.45%	Andhra Pradesh	967.69	14.78%
Sembcorp Gayatri	360.45	5.50%	Maharashtra	443.07	6.77%
Bihar	263.22	4.02%	Tamilnadu	434.36	6.63%
West Bengal	231.63	3.54%	Uttarakhand	210.67	3.22%
Orissa	207.46	3.17%	Uttar Pradesh	196.83	3.01%
DB Power	194.39	2.97%	J&K	191.78	2.93%
Delhi	175.84	2.69%	Haryana	190.51	2.91%
Jaypee Nigrie	174.72	2.67%	Rajasthan	186.35	2.85%
Total	3891.28	59.42%	Total	5874.86	89.71%
Total Volume in PXs	6548.94		Total Volume in PXs	6548.94	

Annexure: II

MONTH WISE TOP TEN SELLER AND PURCHASER IN RTM ARE GIVEN BELOW:

Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Telangana	181.15	35.08%	J&K	93.99	18.20%
Maharashtra	85.57	16.57%	Madhya Pradesh	42.82	8.29%
Rajasthan	42.96	8.32%	NLC TPS-II Stg-2	40.02	7.75%
Andhra Pradesh	40.38	7.82%	NLC TPS-II	39.39	7.63%
Haryana	29.27	5.67%	Orissa	32.90	6.37%
West Bengal	26.20	5.07%	Uttar Pradesh	23.02	4.46%
Assam	23.42	4.53%	Sembcorp Gayatri	18.25	3.53%
Chhattisgarh	12.41	2.40%	Karnataka	16.31	3.16%
Delhi	11.35	2.20%	NLC	14.40	2.79%
Gujarat	8.94	1.73%	Delhi	14.01	2.71%
Total	461.64	89.39%	Total	335.12	64.89%
Total Volume in PXs	516.43		Total Volume in PXs	516.43	

August, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
J&K	154.22	17.92%	Telangana	220.12	25.58%
Karnataka	148.75	17.28%	West Bengal	113.02	13.13%
Madhya Pradesh	50.88	5.91%	Haryana	108.94	12.66%
Orissa	47.73	5.55%	Rajasthan	76.49	8.89%
Uttar Pradesh	43.44	5.05%	Maharashtra	57.89	6.73%
NLC	39.58	4.60%	Andhra Pradesh	56.27	6.54%
Sembcorp Gayatri	30.34	3.53%	Delhi	53.50	6.22%
Chhattisgarh	24.41	2.84%	Uttar Pradesh	32.46	3.77%
Delhi	17.93	2.08%	Assam	26.29	3.06%
NLC TPS-II Expn	17.12	1.99%	Bihar	24.01	2.79%
Total	574.40	66.75%	Total	768.99	89.36%
Total Volume in PXs	860.57		Total Volume in PX	860.57	

October, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Orissa	78.76	9.67%	Andhra Pradesh	132.30	16.24%
Telangana	60.50	7.43%	J&K	117.07	14.37%
Kameng HEP	56.52	6.94%	West Bengal	82.75	10.16%
Karnataka	55.09	6.76%	Punjab	74.20	9.11%
Uttar Pradesh	45.82	5.63%	Rajasthan	74.10	9.10%
West Bengal	33.66	4.13%	Maharashtra	55.09	6.76%
NLC	30.58	3.75%	Telangana	47.72	5.86%
Neyveli New Thermal Power Project	29.09	3.57%	Delhi	30.50	3.74%
Ramagundam Stg-1	25.92	3.18%	Orissa	24.46	3.00%
Adani Power STG2	23.05	2.83%	Bihar	24.18	2.97%
Total	439.00		Total	662.36	
Total Volume in PXs	814.48		Total Volume in PX	814.48	

July, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
J&K	180.75	23.01%	Telangana	185.39	23.60%
Orissa	72.85	9.28%	Rajasthan	154.18	19.63%
Karnataka	57.87	7.37%	Andhra Pradesh	80.38	10.23%
Uttar Pradesh	56.03	7.13%	Haryana	49.88	6.35%
NLC	32.10	4.09%	Maharashtra	47.29	6.02%
Sembcorp Gayatri	29.59	3.77%	Delhi	40.11	5.11%
Delhi	27.49	3.50%	Uttar Pradesh	34.59	4.40%
Maharashtra	26.98	3.44%	Chhattisgarh	29.09	3.70%
West Bengal	24.87	3.17%	West Bengal	25.70	3.27%
Adani Power STG3	24.10	3.07%	Assam	22.31	2.84%
Total	532.63	67.82%	Total	668.90	85.17%
Total Volume in PXs	785.39		Total Volume in PX	785.39	

September, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
J&K	56.56	8.03%	Telangana	101.01	14.35%
Karnataka	55.99	7.95%	Maharashtra	91.56	13.00%
Madhya Pradesh	40.47	5.75%	Andhra Pradesh	89.34	12.69%
Orissa	35.49	5.04%	West Bengal	74.79	10.62%
West Bengal	30.67	4.36%	Delhi	57.52	8.17%
Kameng HEP	27.51	3.91%	Assam	49.21	6.99%
Uttar Pradesh	26.91	3.82%	Rajasthan	35.45	5.04%
Neyveli New Thermal	24.18	3.43%	Uttar Pradesh	32.82	4.66%
NLC	22.27	3.16%	Haryana	30.40	4.32%
Telangana	21.36	3.03%	Bihar	27.91	3.96%
Total	341.40		Total	590.00	
Total Volume in PXs	704.04		Total Volume in PX	704.04	

November, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Telangana	81.76	9.15%	J&K	400.55	44.82%
Orissa	64.76	7.25%	Andhra Pradesh	97.24	10.88%
NLC TPS-II	51.03	5.71%	Rajasthan	90.81	10.16%
Sembcorp Gayatri	50.30	5.63%	Maharashtra	36.16	4.05%
West Bengal	41.14	4.60%	Uttar Pradesh	35.24	3.94%
NLC TPS-II Stg-2	40.22	4.50%	Delhi	31.42	3.52%
RKM Power	30.99	3.47%	West Bengal	26.55	2.97%
Uttar Pradesh	29.45	3.30%	Bihar	24.00	2.69%
GMR Warora	29.06	3.25%	Himachal Pradesh	22.25	2.49%
Kameng HEP	26.41	2.96%	Orissa	21.86	2.45%
Total Volume	445.13	49.81%	Total Volume	786.09	87.97%
Total Volume in PXs	893.62		Total Volume in PX	893.62	

December, 2020					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Orissa	144.42	12.79%	J&K	482.94	42.77%
West Bengal	111.40	9.87%	Rajasthan	117.21	10.38%
Uttar Pradesh	77.90	6.90%	Telangana	99.14	8.78%
Sembcorp Gayatri	69.16	6.13%	Andhra Pradesh	77.72	6.88%
RKM Power	60.94	5.40%	Maharashtra	59.28	5.25%
Delhi	50.90	4.51%	Uttar Pradesh	42.04	3.72%
MB Power	43.60	3.86%	Delhi	30.06	2.66%
Rajasthan	39.58	3.51%	Orissa	22.30	1.98%
Jhabua Power	35.68	3.16%	Chhattisgarh	21.82	1.93%
Madhya Pradesh	35.29	3.13%	Gujarat	18.82	1.67%
Total	668.87	59.24%	Total	971.34	86.03%
Total Volume in PXs	1129.09		Total Volume in PXs	1129.09	

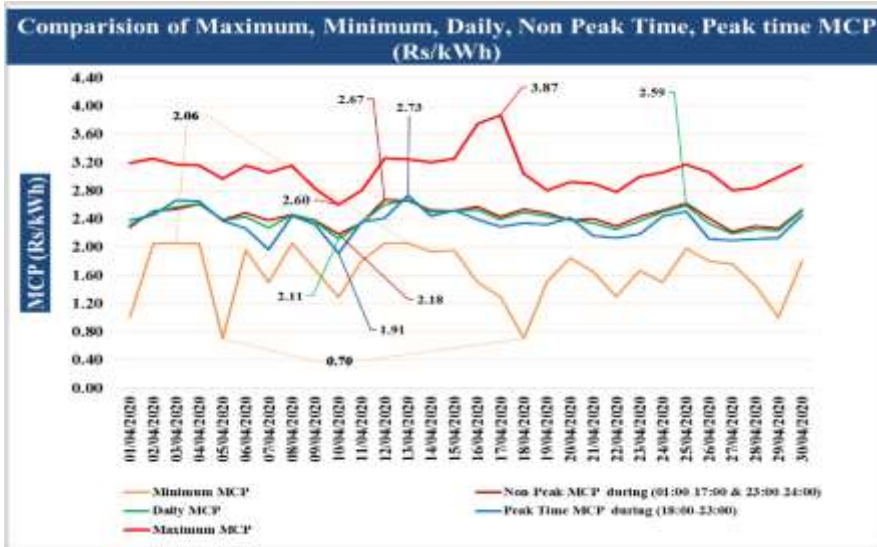
January, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Orissa	158.32	12.84%	J&K	390.78	31.69%
Madhya Pradesh	141.67	11.49%	Telangana	161.71	13.11%
Uttar Pradesh	112.20	9.10%	Rajasthan	139.58	11.32%
West Bengal	98.40	7.98%	Andhra Pradesh	94.17	7.64%
Karnataka	72.50	5.88%	Gujarat	49.19	3.99%
Delhi	48.96	3.97%	Punjab	46.49	3.77%
Tripura	38.86	3.15%	Uttar Pradesh	46.08	3.74%
Rajasthan	38.33	3.11%	Maharashtra	41.64	3.38%
NLC TPS-II	34.75	2.82%	West Bengal	38.52	3.12%
Sembcorp Gayatri	33.85	2.74%	Delhi	36.28	2.94%
Total	777.83	63.07%	Total	1044.45	84.69%
Total Volume in PXs	1233.31		Total Volume in PXs	1233.31	

February, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Uttar Pradesh	130.75	11.69%	J&K	305.82	27.34%
Orissa	123.49	11.04%	Telangana	251.31	22.47%
West Bengal	103.10	9.22%	Rajasthan	112.75	10.08%
Madhya Pradesh	74.46	6.66%	Gujarat	88.30	7.89%
DVC	68.01	6.08%	Andhra Pradesh	60.49	5.41%
Karnataka	59.62	5.33%	Uttar Pradesh	33.94	3.03%
RKM Power	59.40	5.31%	Punjab	33.74	3.02%
Delhi	36.75	3.29%	Delhi	33.63	3.01%
Sembcorp Gayatri	36.71	3.28%	Orissa	27.91	2.50%
MB Power	31.82	2.85%	Maharashtra	26.82	2.40%
Total	724.12	64.74%	Total	974.70	87.15%
Total Volume in PXs	1118.45		Total Volume in PXs	1118.45	

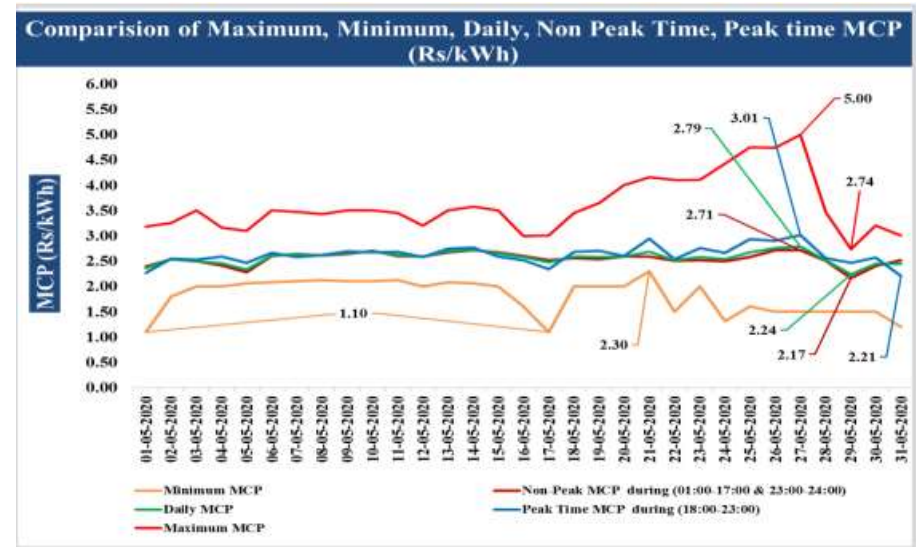
March, 2021					
Entity Name	Sell		Entity Name	Purchase	
	(MU)	Percent (%)		(MU)	Percent (%)
Madhya Pradesh	328.22	23.21%	Telangana	310.27	21.94%
West Bengal	187.69	13.27%	J&K	223.08	15.78%
Rajasthan	163.88	11.59%	Andhra Pradesh	158.05	11.18%
DVC	115.79	8.19%	Rajasthan	100.94	7.14%
Uttar Pradesh	68.79	4.86%	Orissa	78.10	5.52%
Orissa	63.30	4.48%	Gujarat	75.95	5.37%
Delhi	43.65	3.09%	Maharashtra	69.44	4.91%
MB Power	25.53	1.81%	Bihar	55.82	3.95%
Chhattisgarh	25.05	1.77%	Tamilnadu	51.26	3.63%
Karnataka	24.18	1.71%	Uttar Pradesh	47.74	3.38%
Total	1046.07	73.98%	Total	1170.66	82.79%
Total Volume in PXs	1413.96		Total Volume in PXs	1413.96	

Annexure: III

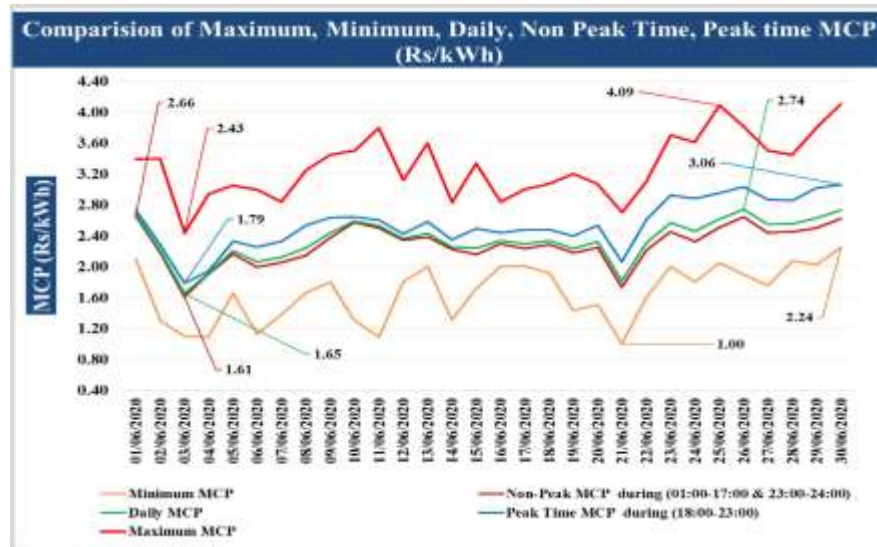
Month wise variation of Maximum, Minimum, Daily, Non Peak Time, Peak Time MCP in DAM are given below:



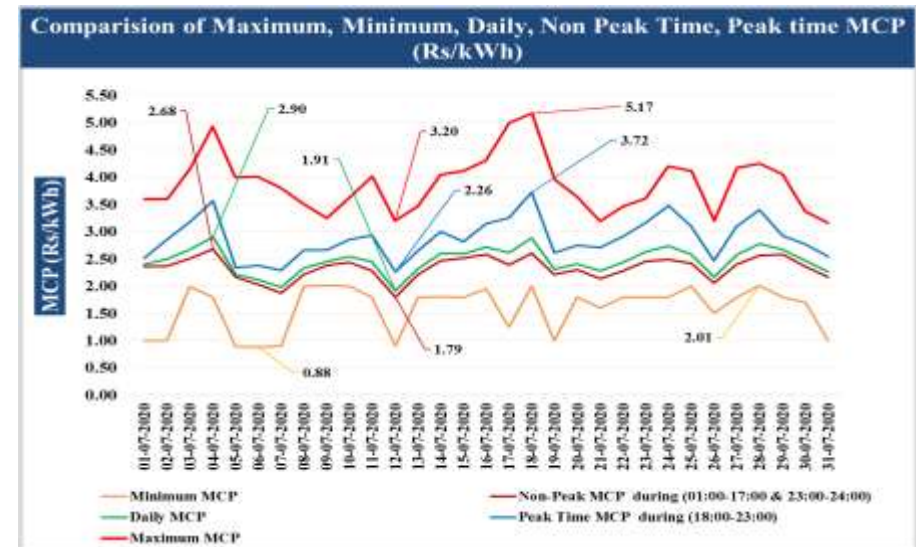
APRIL, 2020



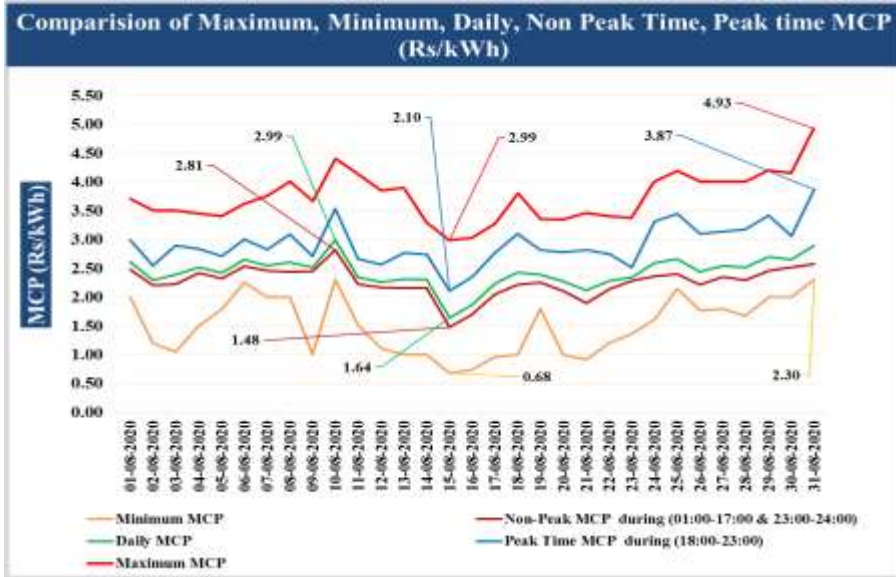
MAY, 2020



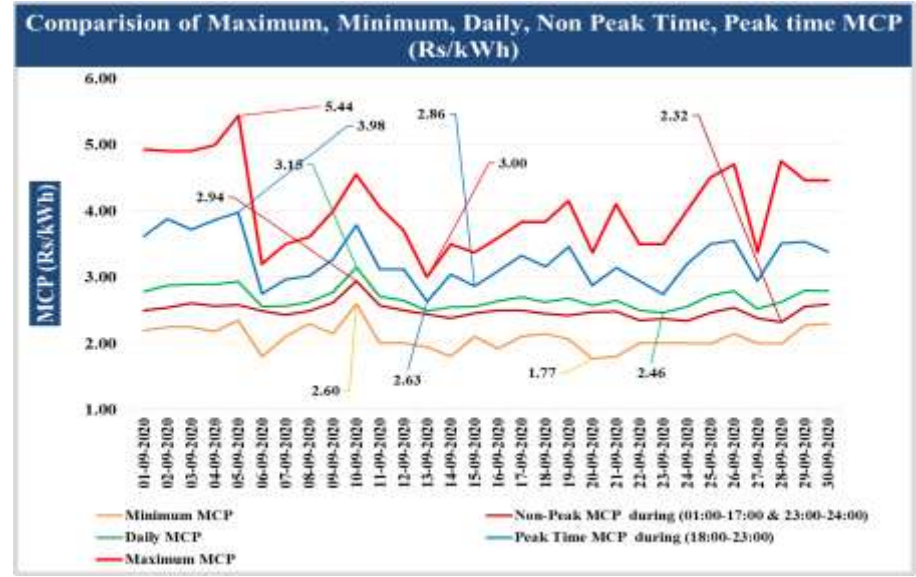
JUNE, 2020



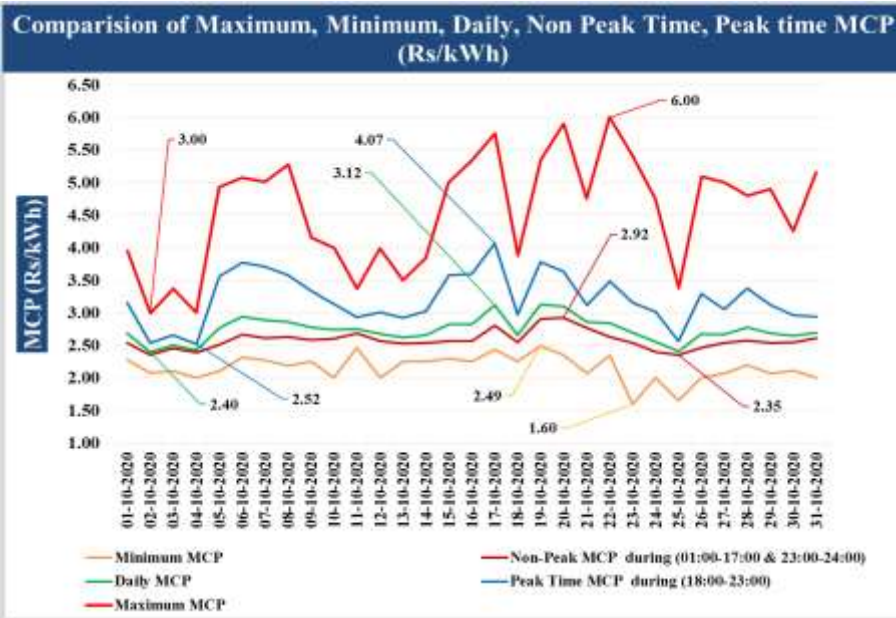
JULY, 2020



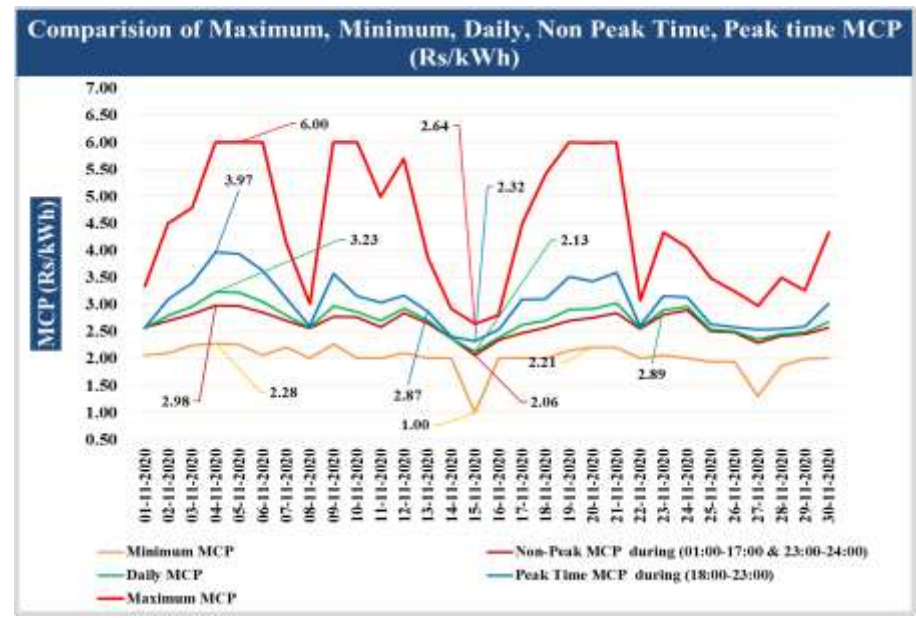
AUGUST, 2020



SEPTEMBER, 2020



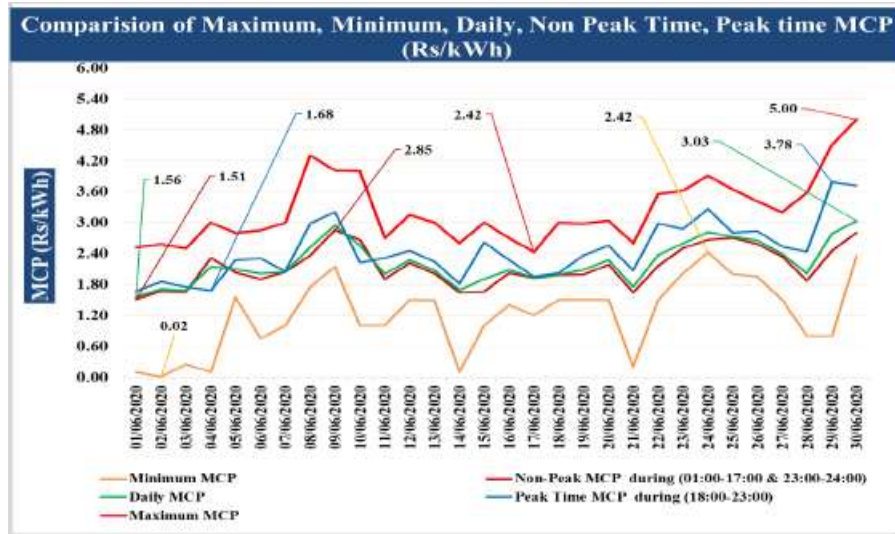
OCTOBER, 2020



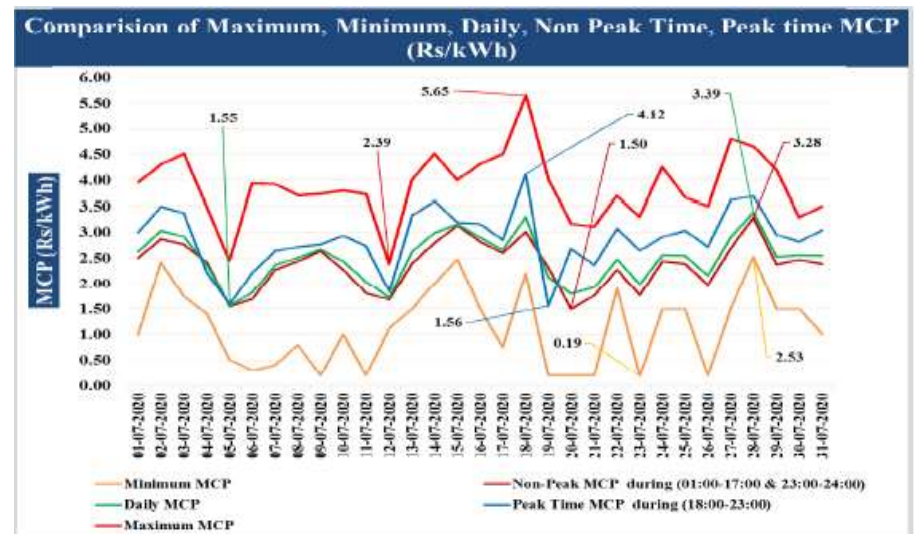
NOVEMBER, 2020

Annexure: IV

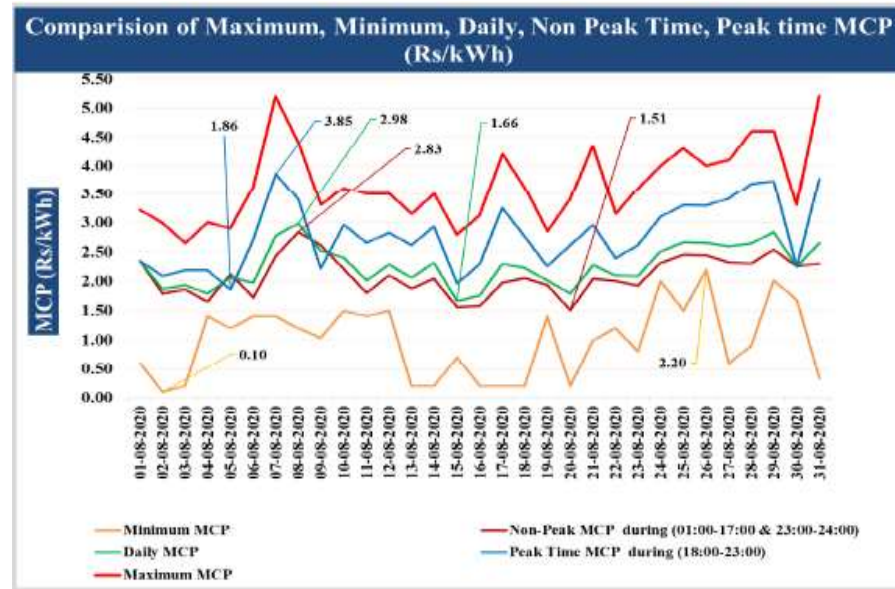
Month wise variation of Maximum, Minimum, Daily, Non Peak Time, Peak Time MCP in RTM are given below



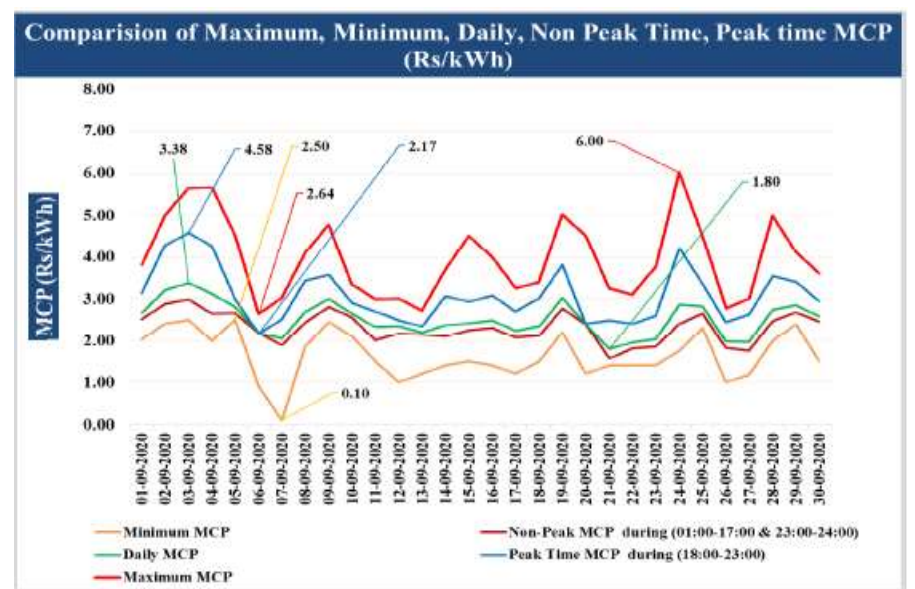
JUNE, 2020



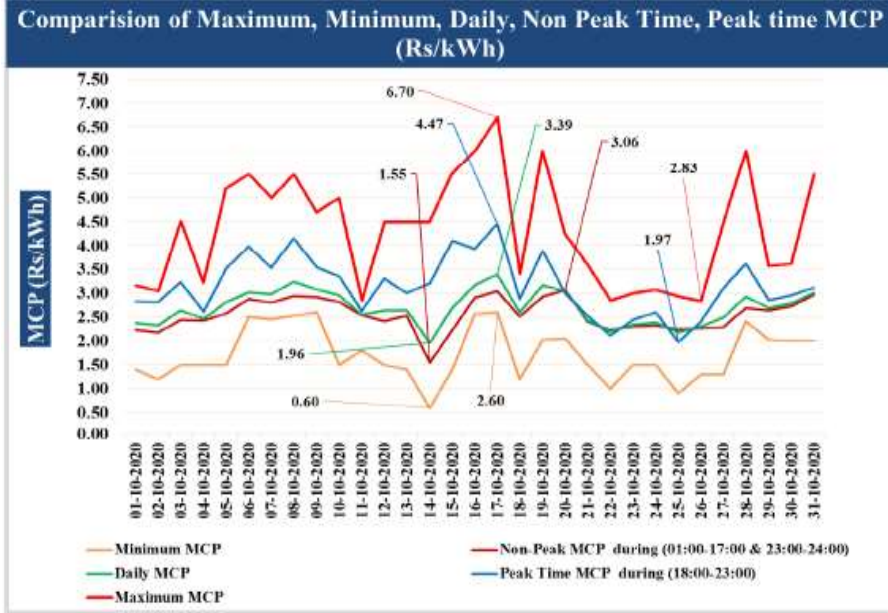
JULY, 2020



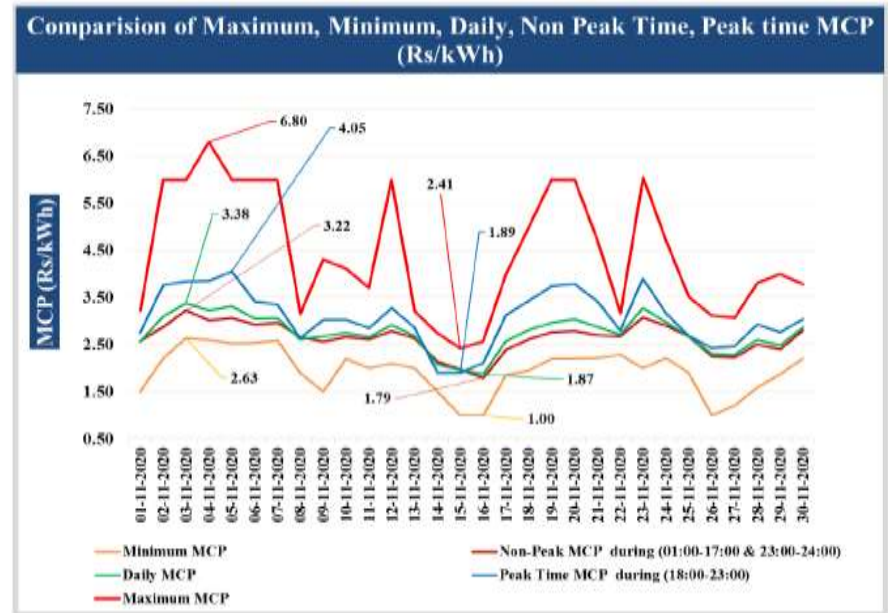
AUGUST, 2020



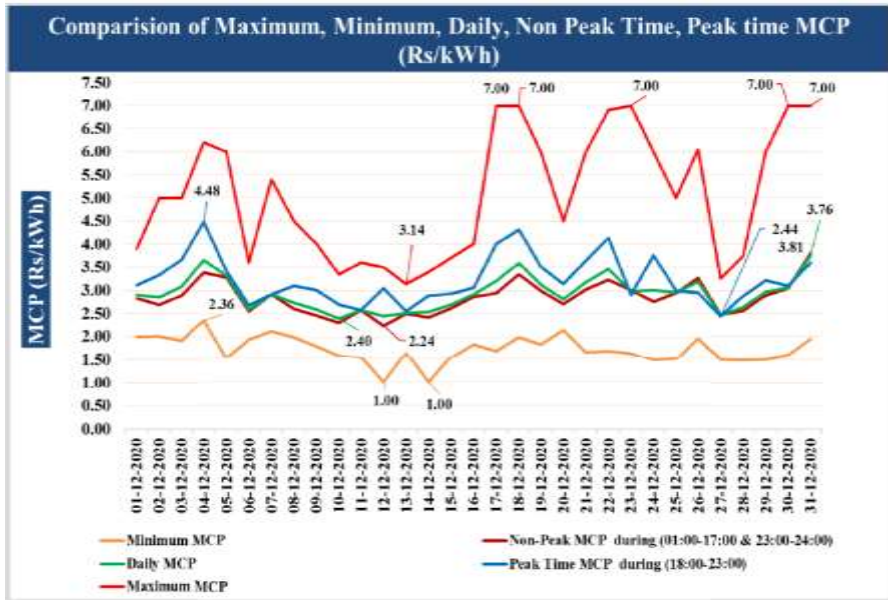
SEPTEMBER, 2020



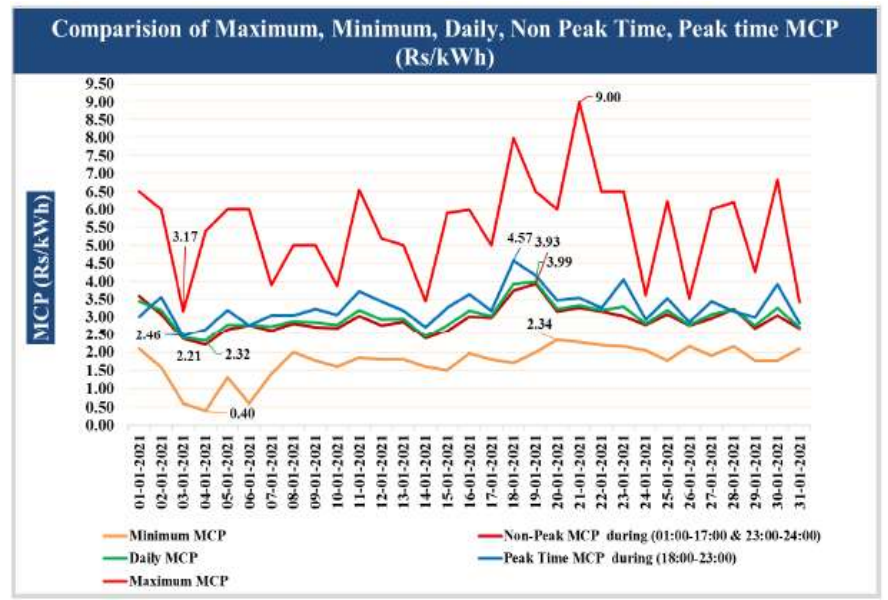
OCTOBER, 2020



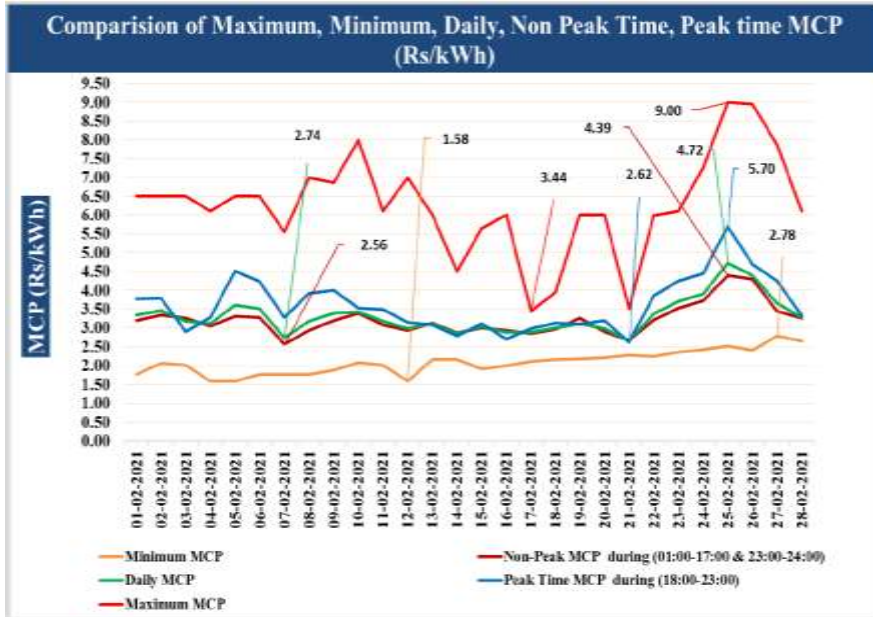
NOVEMBER, 2020



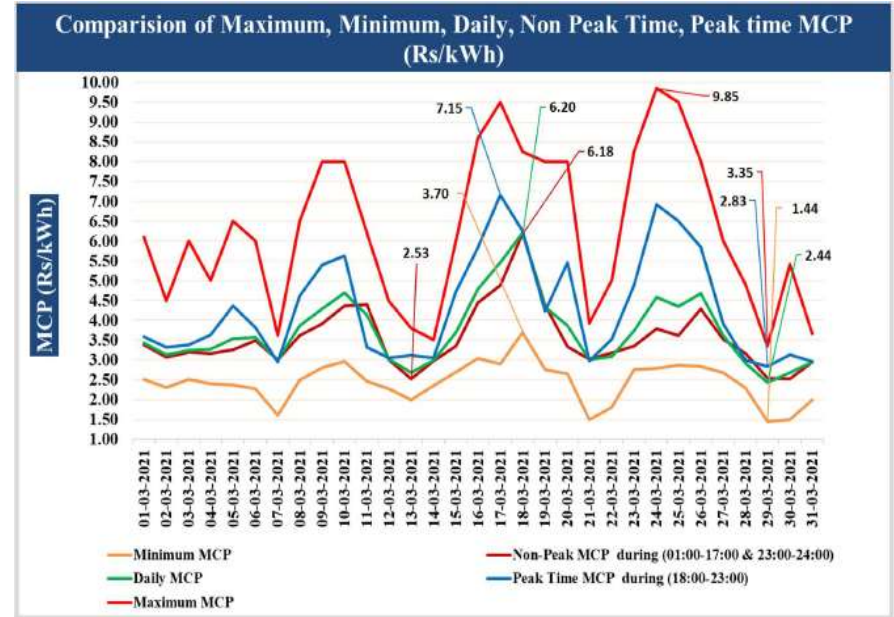
DECEMBER, 2020



JANUARY, 2021



FEBRUARY, 2021



MARCH, 2021