भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति
Eastern Regional Power Committee
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No: ERPC/SPAR/AAR/2020-21/ 6071 Dated the 19th November, 2020

Sub: Annual Administration Report of ERPC for the year 2019-20

Sir,

The Annual Administration Report of ERPC for the year 2019-20 has been prepared based on inputs received from various constituents of ERPC. The report is uploaded on ERPC website: www.erpc.gov.in.

This is for your information please.

Thanking You.

Yours faithfully

(Sarvesh Sanatan)
Assistant Director

वार्षिक प्रशासन रिपोर्ट

Annual Administration Report

2019-20

भारत सरकार

विद्युतमंत्रालय

केंद्रीयविद्युतप्राधिकरण

पूर्वी क्षेत्रीयविद्युतसमिति

कोलकाता

GOVT. OF INDIA

MINISTRY OF POWER

CENTRAL ELECTRICITY AUTHORITY

EASTERN REGIONAL POWER COMMITTEE

KOLKATA, OCTOBER-2020

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Exhibits

Ministry of Power
Central Electricity Authority
ERPC, Kolkata

FOREWORD

The Annual Administration Report of Eastern Regional Power Committee for the year 2019-20 has been prepared, highlighting various important activities related to power sector in the region. This has been possible with the concerted efforts of all the constituents/stakeholders and the officials of ERPC Secretariat. It gives a useful insight into the grid parameters, important incidents and various affairs of Eastern Regional Power Committee. For preparation of this report, voluminous data and information have been collected from various sources, compiled and analysed.

Eastern Regional Power Committee (ERPC) was established by Govt. of India vide resolution dated 25th May, 2005 under the provision of Electricity Act, 2003.Various important functions like regional level operation analysis, inter-state/inter regional exchange of power, planning relating to inter-state/intra state transmission system, planning of maintenance of generation schedule, operational planning studies etc. were assigned to ERPC. Further, ERPC has to evolve consensus on all cases relating to economy and efficiency in the operation of power system of the region.

Eastern Region is connected with all other regions and also international connections exist with neighbouring countries for exchange of electricity. As such, ERPC plays a pivotal role in planning & operation of the regional grid and it has to resolve many issues involving operational, technical, economic and regulatory aspects of the grid.

The various profiles of the grid parameters in the Eastern Region have registered improvements in the year 2019-20. After fulfilment of requirement of Eastern Region, the region exported around 33976 MU of energy including export to Nepal and Bangladesh. During the year 2019-20, Eastern Region achieved a thermal capacity addition of 3030 MW and transmission line addition of 2190 Ckt. km.

Maximum Net demand met in ER was 23398 MW which is 2.93% more than the previous year. Daily net average energy consumption in the region was about 402 MU, which was marginally (0.91 %) more than the previous year.

Around 6046.81 MU energy was exported to Bangladesh through 400 kV D/C Berhampur (WB) – Bheramara (Bangladesh) transmission line.

Export of power from ER grid to Nepal through 400 kV (charged at 220 kV) Muzaffarpur – Dhalkheber (Nepal) line started from February'2016. The energy exported to Nepal during the year was 1571.71 MU through this line. Apart from this, 599.84 MU of energy exported to Nepal through Bihar network.

I believe that the Annual Administration Report contains valuable data which would prove to be informative and useful for the stakeholders of the Eastern Region. Finally, I would like to thank all the constituents of the Eastern Region for their timely submission of requisite data for this report. ERPC would continuously strive to improve this Annual Administration Report. For this I would like to invite suggestions for making this report more informative and attractive.

Disclaimer: This is an operational report. Data/information furnished in this report should not be used for any commercial purposes.

(N.S.Mondal)
Member Secretary

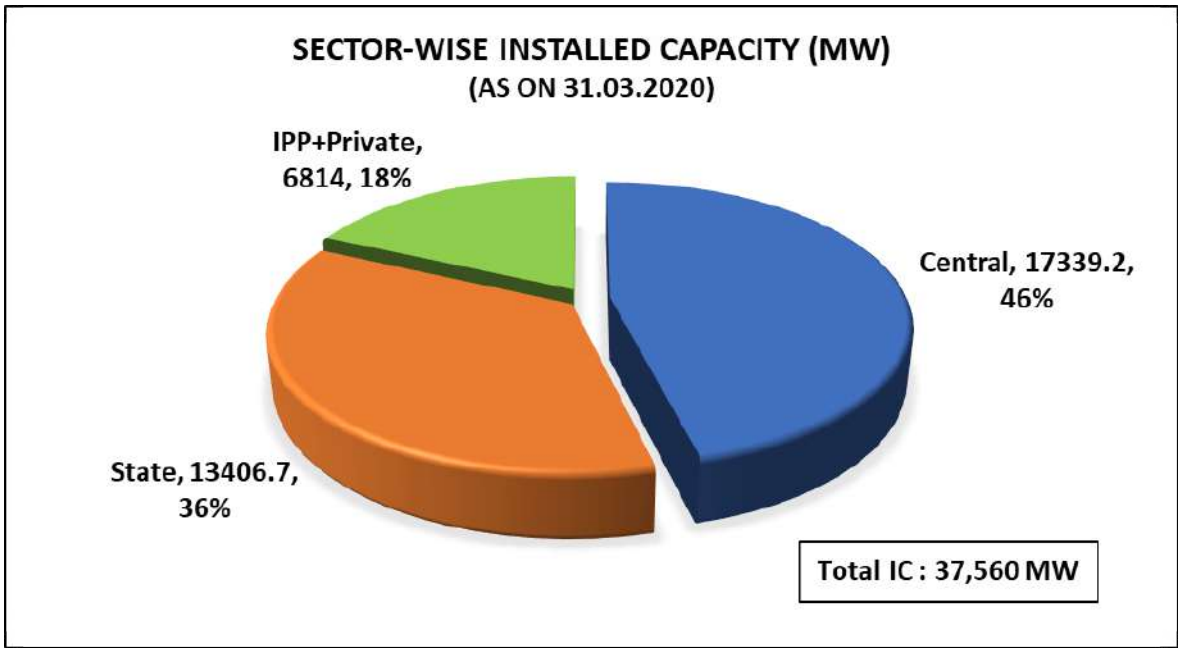
HIGHLIGHTS

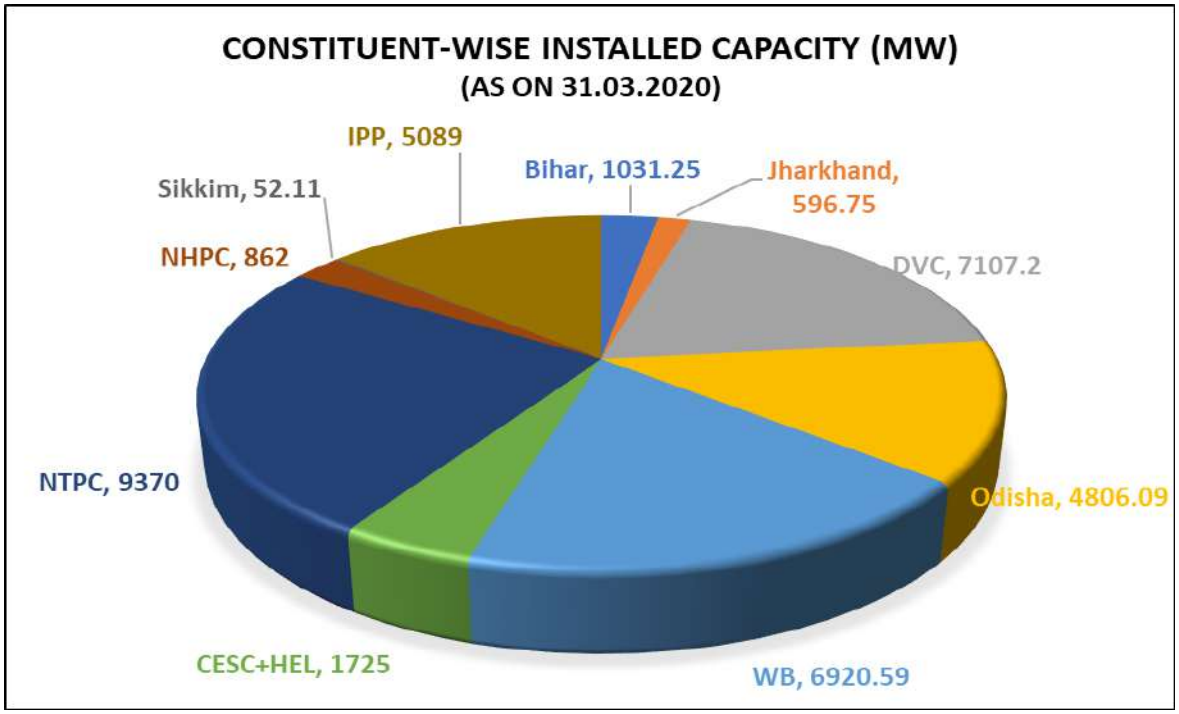
Salient features of ER Grid

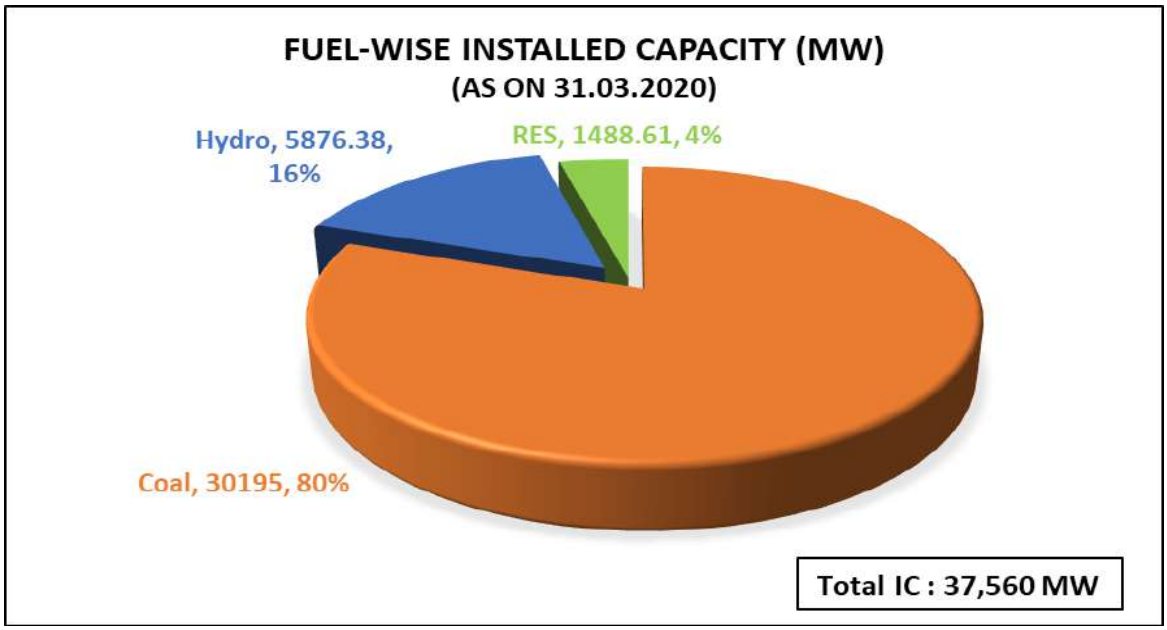
As on 31.03.2020

Installed Capacity	
Thermal	30195 MW
Hydro	5876 MW
Solar	1489 MW
Capacity addition (Thermal) During 2019-20	3030 MW
Capacity Phase out (Thermal) during 2019-20	(-)250MW
Total Installed Capacity (Thermal + Hydro + Solar)	**37560MW**
Total Effective Capacity (Thermal + Hydro + Solar)	**37495 MW**
Total Transmission Line (220kV & Above)	**49193 Ckt. km**
Transmission Line Addition During 2019-20	**2190 Ckt. Km**
Demand	
Peak Demand Met (Max.)	**23398 MW**
Increase Over Previous Year	2.93 %
Peak Demand Met (Min.)	18608 MW
ER System Load Factor (%)	**71.57 %**
Energy Requirement	147310 MU
Energy Generation (Gross) (incl. Bhutan Imp, Excl. CPP)	**185095 MU**
Increase over previous year	4.32 %
Net Energy Met	**147090MU**
Frequency Regime	
% Time frequency remained Below 49.9 Hz	6.52%
Between 49.9-50.05 Hz (IEGC Band)	**72.92%**
Above 50.05 Hz	20.56 %
Inter-regional / Outside Country Energy Exchange	
Net Energy export to WR	-16194 MU
Net Energy export to SR	17122 MU
Net Energy export to NR	23613 MU
Net Energy export to NER	1816 MU
Net Energy export to Bangladesh	6047 MU
Net Energy export to Nepal	1572 MU
Total Net Regional Export	**33976MU**
Net Energy Export to Nepal through Bihar System	**600 MU**
Hydro power import from Bhutan	**6351 MU**

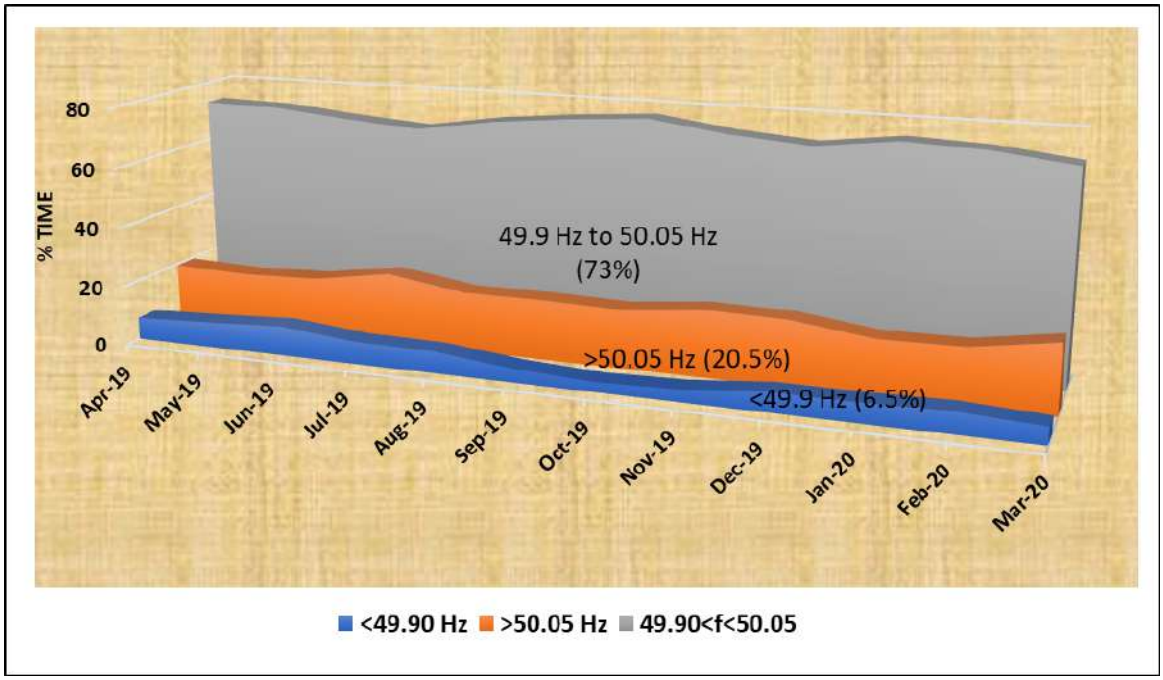
INSTALLED CAPACITY IN EASTERN REGION AS ON 31.03.2020



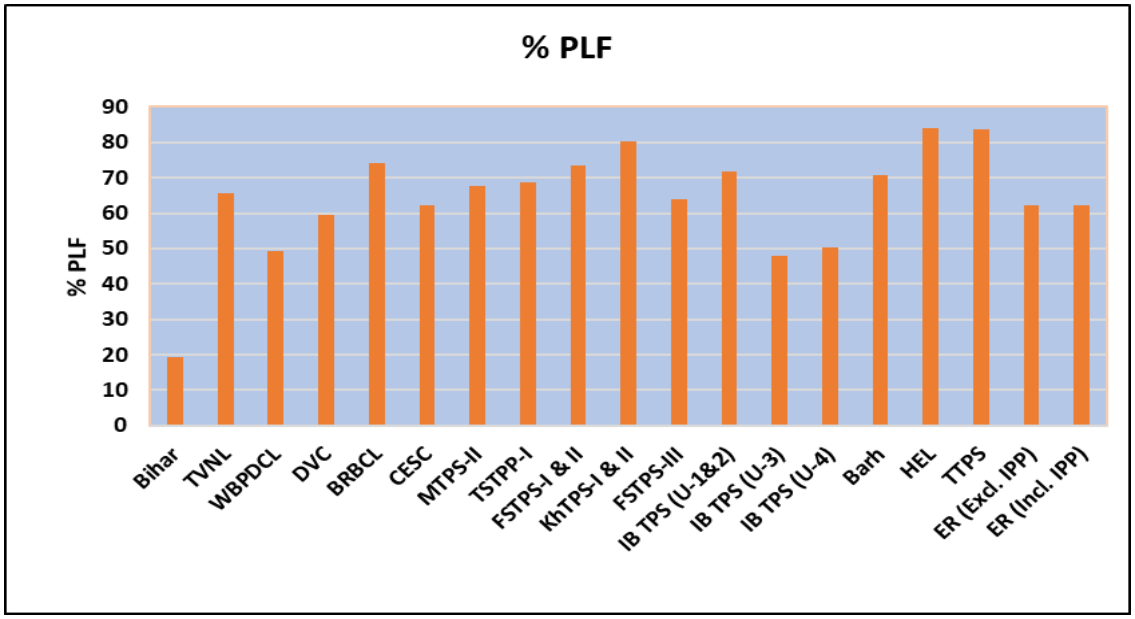




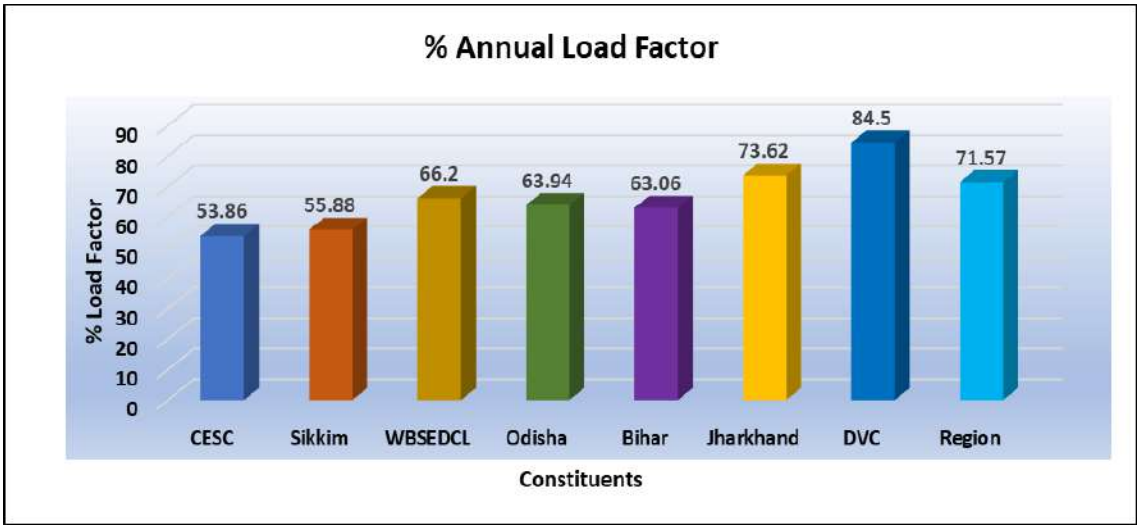
EASTERN GRID FREQUENCY REGIME DURING THE YEAR 2019-20



ANNUAL PLF OF THERMAL POWER STATION IN EASTERN REGION DURING 2019-20



ANNUAL LOAD FACTOR OF THE CONSTITUENTS IN EASTERN REGION DURING 2019-20



CHAPTER-1

CONSTITUTION, FUNCTIONS AND ORGANISATIONAL SETUP

1.1 INTRODUCTION

Electricity is the key to economic development of the country and is one of the most essential elements for growth of a country and development of modern society. Accordingly, electricity demand is increasing day by day with improvement in living standards as the nation modernizes and its economy develops. To meet the challenges of ever-growing demand, power sector has become the key area for reforms as well as to attract investment. Enactment of Electricity Act, 2003, has brought revolutionary changes in almost all the areas of the power sector. Through implementation of this Act conducive environment has been created to promote private sector participation and competition in the sector. This has led to significant investment in generation, transmission and distribution areas.

For efficient & integrated system planning and operational purposes, the power system of the country has been divided into five regions namely Northern Region, Southern Region, Western Region, Eastern Region and North-Eastern Region. Each region has its own regional power grid. Initially, State grids were inter-connected to form the regional grid. The integration of regional grids, and thereby establishment of National Grid, was conceptualized in early nineties. Initially inter-regional links were planned for exchange of operational surpluses amongst the regions. Subsequently, it was felt that synchronisation of all regional grids would help in optimal utilization of scarce natural resources by transfer of power from resource centric regions to load centric regions. Further, this should pave the way for establishment of vibrant electricity market facilitating trading of power across regions.

The integration of regional grids which began with asynchronous HVDC back-to-back inter-regional links facilitating limited exchange of regulated power subsequently graduated to high capacity synchronous links between the regions. In October, 1991 North Eastern and Eastern grids were connected. In March, 2003 WR and ER-NER were interconnected. On 26th August, 2006 North and East grids were interconnected thereby four regional grids Northern, Eastern, Western and North-Eastern grids were synchronously connected forming Central Grid (NEW GRID) operating at one frequency. On 31st December, 2013 Southern Region was connected to Central Grid (NEW GRID) in synchronous mode with the commissioning of 765kV Raichur-Solapur Transmission line, thereby achieving 'ONE NATION'-'ONE GRID'-'ONE FREQUENCY'.

The Eastern Region comprises of the States of Bihar, Jharkhand, Odisha, West Bengal and Sikkim. The region has an area of 4,25,432 Sq. km which is about 13% of the total area of the country.

The Regional Power Committees have been established by Central Government for a specified region for facilitating the integrated operation of the power system of that region. The Eastern Regional Power Committee (ERPC) is one out of five (5) Regional Power Committees.

The Organisation Chart of ERPC Secretariat is given at **Exhibit-I** & Power Maps showing transmission system of the Eastern Region are given at **Exhibit – II.**

1.2 CONSTITUTION

Eastern Regional Power Committee (ERPC) is the present form of erstwhile Eastern Regional Electricity Board (EREB). Initially EREB came into operation on 01.06.1965 in accordance with the Govt. of India's resolution no. EL-II-35 (7)/63 dated 6th March, 1964 in order to promote integrated operation of the power systems in the region and to ensure optimum utilisation of the generation in the region. Government of India, under the provision of Sub-Section 55 of Section 2 of the Electricity Act 2003 vide Resolution F.No.23/1/2004-R&R dated 25th May, 2005 had established Eastern Regional Power Committee comprising the states of Bihar, Jharkhand, Orissa, West Bengal and Sikkim with following members and was subsequently amended from time to time on 29.11.2005, 08.05.2008 and 21.12.2017.

i) Member (Grid Operation), Central Electricity Authority (CEA).
ii) One representative each of Central Generating Companies, Central Transmission Utility (CTU), National Load Despatch Centre (NLDC) and the Eastern Regional Load Despatch Centre (ERLDC).
iii) From each of the States in the region, the State Generating Company, State Transmission Utility (STU), State Load Despatch Centre (SLDC), one of the State-owned distribution companies as nominated by the State Government and one Distribution Company by alphabetical rotation out of the private distribution companies functioning in the region.
iv) A representative each of every generating company (other than central generating companies or State Government owned Generating Companies) having more than 1000 MW installed capacity in the region.
v) A representative of the generating companies having power plants in the region [not covered in (ii) to (iv) above] by alphabetical rotation.
vi) One member representing the electricity traders in the region by alphabetical rotation which has trading volume of more than 500 million units during the previous financial year.
vii) A representative each of every Nodal Agency appointed by the Government of India for coordinating cross-border power transactions with the countries having electrical inter-connection with the region.
viii) Member Secretary, ERPC – Convener.

It is further stated in the notification that wherever a member is represented by rotation, the nomination would be for a period of one year. The representative from respective organizations should be either the head of the organization or at least a person not below the rank of a Director on the Board of the company / corporate entity except for Central Public Sector Undertaking (CPSUs) where representative could also be at the level of Executive Director.

Chairperson of the ERPC would represent the States of the region by rotation in alphabetical order. Members of the ERPC from the particular State would nominate the Chairperson of ERPC from amongst themselves. Term of the Chairperson would be for a period of one year.

Shri K. B. Kunwar, Principal Chief Engineer-cum-Secretary Energy & Power Department, Government of Sikkim held the charge up to 31.10.2019 and thereafter Shri A. B. Rai, Principal Chief Engineer-cum-Secretary Energy & Power Department, Government of Sikkim were the Chairperson of ERPC for the year 2019-20. Members of ERPC for the year 2019-20 were as under:

Sl.No.	Name of ERPC Member Organisation	Designation of the Member
1.	Energy &Power Department, Govt. of Sikkim	Principal Chief Engineer-cum-Secretary
2.	GRIDCO Ltd.	Chairman-cum-Managing Director
3.	Odisha Power Transmission Corporation Ltd.	Chairman-cum-Managing Director
4.	Odisha Hydro Power Corporation Ltd.	Chairman-cum-Managing Director
5.	Odisha Power Generation Corporation Ltd.	Managing Director
6.	Bihar State Power Holding Company Ltd.	Chairman-cum-Managing Director
7.	Bihar State Power Transmission Company Ltd.	Managing Director
8.	North Bihar Power Distribution Company Ltd.	Managing Director
9.	Jharkhand Urja Vikas Nigam Limited	Chairman-cum-Managing Director
10.	Jharkhand Urja Sancharan Nigam Limited	Managing Director
11.	Jharkhand Bijli Vitaran Nigam Limited	Managing Director
12.	Tenughat Vidyut Nigam Ltd.	Managing Director
13.	West Bengal State Electricity Distribution Company Ltd.	Chairman & Managing Director
14.	West Bengal State Electricity Transmission Company Ltd.	Managing Director
15.	West Bengal Power Development Corporation Ltd.	Chairman & Managing Director
16.	Durgapur Projects Ltd.	Managing Director
17.	Damodar Valley Corporation	Chairman
18.	Central Electricity Authority	Member (GO&D)
19.	Eastern Regional Load Despatch Centre	ED, ERLDC
20.	National Load Despatch Centre	ED, NLDC
21.	NTPC Ltd.	Director (Commercial)
22.	NHPC Ltd.	Director (Finance)
23.	Power Grid Corporation of India Ltd.	Director (Operations)
24.	PTC India Ltd.	Director (C&O)
25.	NTPC Vidyut Vyapar Nigam Ltd.	Chief Executive Officer
26.	Tata Power Trading Company Ltd.	Managing Director
27.	CESC Ltd.	Managing Director
28.	Maithon Power Ltd.	Chief Executive Officer
29.	Adhunik Power & Natural Resources Ltd.	Managing Director
30.	GMR Kamalanga Energy Ltd.	Chief Operating Officer
31.	Jindal India Thermal Power Ltd.	Chief Executive Officer
32.	Teesta Urja Ltd.	Managing Director

1.3 FUNCTIONS

The functions of ERPC as per the resolution of Govt. of India dated 25.05.2005 amended vide resolution dated 29.11.2005 and the revised Indian Electricity Grid Code issued by CERC effective from 01.04.2006 are given below:

- Clause 29 (4) of the Act provides that "the Regional Power Committee in the region may, from time to time, agree on matters concerning the stability and smooth operation of the integrated grid and economy and efficiency in the operation of the power system in that region."

- As per Para (6) of the MOP Resolution dated 25.5.2005, ERPC shall discharge the following functions: -

    - To undertake Regional Level operation analysis for improving grid performance
    .
    - To facilitate inter-state / inter-regional transfer of power.

    - To facilitate all functions of planning relating to inter-state / intra-state transmission system with CTU / STU.

    - To coordinate planning of maintenance of generating machines of various generating companies of the region including those of inter-state generating companies supplying electricity to the Region on annual basis and also to undertake review of maintenance programme on monthly basis.

    - To undertake planning of outage of transmission system on monthly basis.

    - To undertake operational planning studies including protection studies for stable operation of the grid.

    - To undertake planning for maintaining proper voltages through review of reactive compensation requirement through system study committee and monitoring of installed capacitors.

    - To evolve consensus on all issues relating to economy and efficiency in the operation of power system in the region.
    - Besides, as per the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010, following specific functions have been entrusted to RPC:
    - RPC Secretariats shall carry out all Regional Energy Accounting calculations.
    - Regional Energy Accounts on monthly basis shall be prepared and issued by the RPC Secretariats for the purpose of billing and payment of various charges.

- RPC shall prepare and issue the Unscheduled inter-change (UI) account [newly terminology 'Deviation Settlement Mechanism (DSM)] for which RLDC will provide actual net injection / drawal of concerned regional entities, 15 minute-wise, based on the above meter readings on a weekly basis by each Thursday noon for the seven days period ending on the previous Sunday mid-night.

- RPC shall monitor the status of UI payment and installation of capacitor.

- RPC shall prepare and issue monthly Regional Transmission Accounts (RTA) and Regional Transmission Deviation Accounts (RTDA) based on data supplied by NLDC and ERLDC respectively.

- RPC Secretariats shall also issue the weekly statement for VAR charges, to all regional entities who have a net drawl / injection of reactive energy under low/high voltage conditions.

- RPC shall decide from time to time to utilize the money remaining in the regional reactive account after payout of all VAR charges up to 31st March of every year for training of the SLDC operators and other similar purposes which would help in improving/streamlining the operation of the respective regional grids

- The Regional Power Committee (RPC) in the region shall continuously monitor the instances of non-compliance of the provisions of IEGC and try to sort out all operational issues and deliberate on the ways in which such cases of non-compliance are prevented in future by building consensus.

- RPC shall decide on installation of capacitors by states vis-à-vis the requirement/targets.

- RPC in consultation with RLDC finalise the quantum and time frame for reactive compensation.

- RPC shall regularly monitor the status regarding the installation and healthiness of the reactive compensation equipment.

- RPC shall finalise action plan and give instructions to restore power system elements under prolonged outage in a specified time period.
- RPC will be allowed to carry out checking of Power System Stabilizers (PSS) in AVRs of generating units and further tuning it, whenever considered necessary.

- RPC will finalise the plan for providing automatic under-frequency and df/dt relays for load shedding in respective systems, to arrest frequency decline that

- could result in a collapse/disintegration of the grid and shall ensure that the above under-frequency and df/dt load shedding/islanding schemes are always functional.

- RPC Secretariat shall carry out periodic inspection of the under-frequency relays and maintain proper records of the inspection.

- RPC shall decide and intimate the action required by SEB, distribution licensee and STUs to get required load relief from Under Frequency and df/dt relays.

- RPC shall finalise the voltage control measures through voltage relay to prevent voltage collapse / cascade tripping.

- RPC shall finalise the loads to be shed through under frequency relays / df/dt relays and System Protection Scheme in order to maintain the frequency within the stipulated band and maintaining the network security.

- RPC shall monitor the forced outages of important network elements in the grid.

- The RPC Secretariat shall be primarily responsible for finalization of the annual outage plan for the following financial year by 31st January of each year and reviewed during the year on quarterly and Monthly basis.

- RPCs shall submit quarterly, half-yearly reports to the Commission indicating deviation in outages from the plan along with reasons.

- RPC Secretariat shall provide aid for finalising detailed plans and procedures for restoration of the regional grid under partial/total blackout and shall be reviewed / updated annually.

- RPC shall initiate investigation/action whether any of the regional entities are indulging in unfair gaming or collusion if such practice is detected and reported.

- RPC shall discharge any other responsibilities assigned by CERC.

Subsequently through further amendments following works were also entrusted to RPCs:

IEGC 2010, 1st Amendment:
The RPC Secretariat shall be primarily responsible for finalization of the Annual Load Generation Balance Report (LGBR) and the annual outage plan for the following financial year by 31st December of each year. The LGBR shall be prepared by the respective RPC secretariat for peak as well as off-peak scenarios.

IEGC 2010, 4th amendment:

The RPCs shall calculate Compensation for generating stations for degradation of Station Heat Rate (SHR), Auxiliary Energy Consumption and Secondary Fuel Consumption due to low unit loading operation as per the mechanism framed by the CERC.

Central Electricity Regulatory Commission (Ancillary Services Operations) Regulations, 2015:

The Regional Power Committees shall issue an Ancillary Services Statement along with the Deviation Settlement Mechanism Account.

1.4 ORGANISATIONAL STRUCTURE

Chairperson of ERPC would represent the states of the region by rotation in alphabetical order. Members of ERPC of that particular state would nominate the Chairperson of ERPC from amongst themselves. Term of the Chairperson would be for a period of one year.

Member Secretary who is an officer of Central Power Engineering Services (Group-A), is the administrative and technical head of ERPC Secretariat with the powers of the Head of Department. The other Group-A officers in the ERPC Secretariat also belong to Central Power Engineering Service (Group-A) Cadre.

Group-B officers in ERPC Secretariat are borne on the strength of CPES (Group-B) Cadre of the Govt. of India, while other Group – B, C and D (reclassified as Group-C) staff are on the strength of General Central Service of the Govt. of India.

The details regarding the present ERPC Secretariat officers and staff as on 31.03.2020 are given at **Annexure-I**.

Names of the Chairpersons and Member Secretaries of the ERPC and erstwhile EREB, since inception, are shown in **Annexure-II** and **Annexure-III,** respectively.

1.5 DETAILS OF BUDGET & EXPENDITURE FOR 2019-20

The sanctioned budget (RE) of ERPC for the year 2019-20 vis-à-vis actual expenditure for the same period is given in table (A) & (B):

(A) Major Head 2801 (Non-plan): Regional Co-ordination (RCC)

(Figures in Lac of Rs.)

Sl. No.	Sub-Head	Item	Sanctioned Budget (RE) for 2019-20	Actual Expenditure (RE) for 2019-20
1	07.01.01	Salaries	104.5	92.34
2	07.01.03	OTA	0	0
3	07.01.06	Medical Treatment	.0.8	0.02
4	07.01.11	Domestic TE	7.00	5.38
5	07.01.13	Office Expenses	5.00	2.85
6	07.01.14	Rent/Rates/Taxes	1.5	1.44
7	07.01.27	Minor Works	6.0	5.7
Total			**124.8**	**107.73**

(B) Major Head 2801 (Non-plan): Regional Load Despatch Station (RLDS)

(Figures in Lac of Rs.)

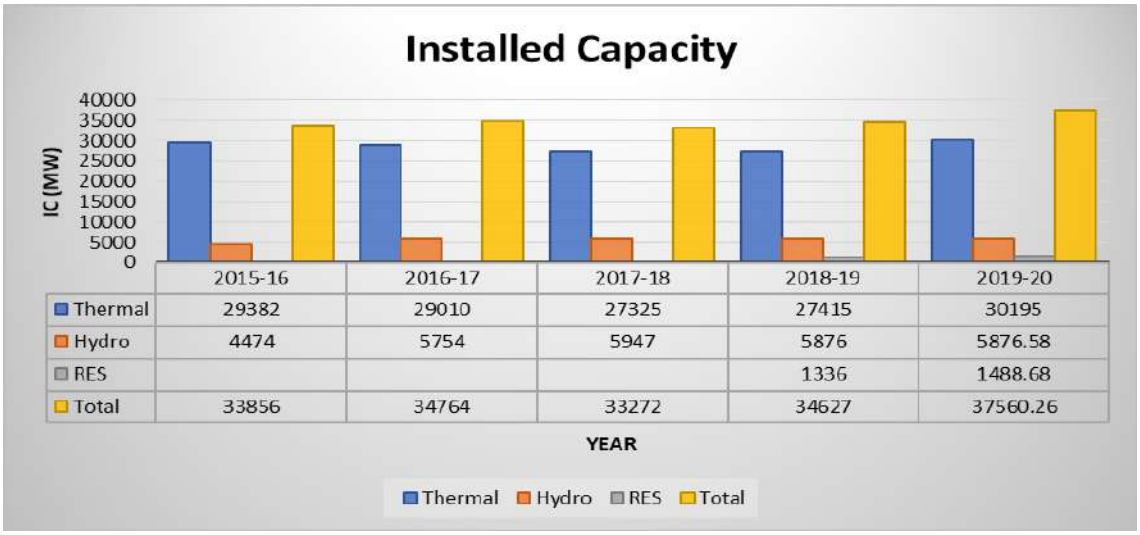
Sl. No.	Sub-Head	Item	Sanctioned Budget (RE) for 2019-20	Actual Expenditure (RE) for 2019-20
1	07.01.01	Salaries	132.58	131.63
2	07.01.03	OTA	0	0
3	07.01.06	Medical Treatment	3.4	2.39
4	07.01.11	Domestic TE	7.00	5.50
5	07.01.13	Office Expenses	37.76	25.98
6	07.01.50	Other Charges	5.00	2.75
Total			**185.74**	**168.26**

CHAPTER-2

GRID PERFORMANCES

2.1 INSTALLED CAPACITY

The installed capacity of the power generating units in Eastern Region connected to Eastern grid as on 31st March 2020 was 37560 MW, comprising 30195 MW (80%) of thermal, 5876 MW (16 %) of hydel, 1489 MW (4 %) RES. The total effective capacity of the Region as on 31.03.2020 was 37495 MW. In addition to this, Chukkha HEP, Kurichhu HEP, Tala HEP, Daghachu HEP & Mangdechhu HEP of Bhutan contributed about 360 MW, 60 MW, 1020 MW, 126 MW & 720 MW respectively of hydro power to Eastern Region. PTC is the nodal agency for facilitating power purchase from Chukha, Kurichhu, Tala & Mangdechhu HEPs and Tata Power Transmission Company Limited is the nodal agency for facilitating power purchase from Dagachu HEP in Bhutan. Constituent-wise installed and effective capacity as on 31.03.2020 are shown in **Annexure-IVA**. IB TPS Unit # 3 and Unit # 4 (660 MW each), NSTPP Unit # 1 (660 MW), Darlipalli STPS Unit # 1 (800 MW), Barauni TPS Unit # 8 (250 MW) of NTPC and Mangdechhu HEP of Bhutan (4 x180 MW) commissioned during 2019-20 whereas DPL Unit # 6 (110 MW) and CTPS Unit # 3 (140 MW) of DVC de-commissioned during the year are shown in **Annexure-IVB**. The growth in installed capacity in Eastern Region for last five years (i.e. 2015-2016 onwards) is shown in the graph below:



	2015-16	2016-17	2017-18	2018-19	2019-20
Thermal	29382	29010	27325	27415	30195
Hydro	4474	5754	5947	5876	5876.58
RES				1336	1488.68
Total	33856	34764	33272	34627	37560.26

The Compounded Annual Growth Rate of installed capacity in Eastern region during the last 5 years was 2.59 % as compared to 4.94% nationwide.

2.2 POWER SUPPLY POSITION

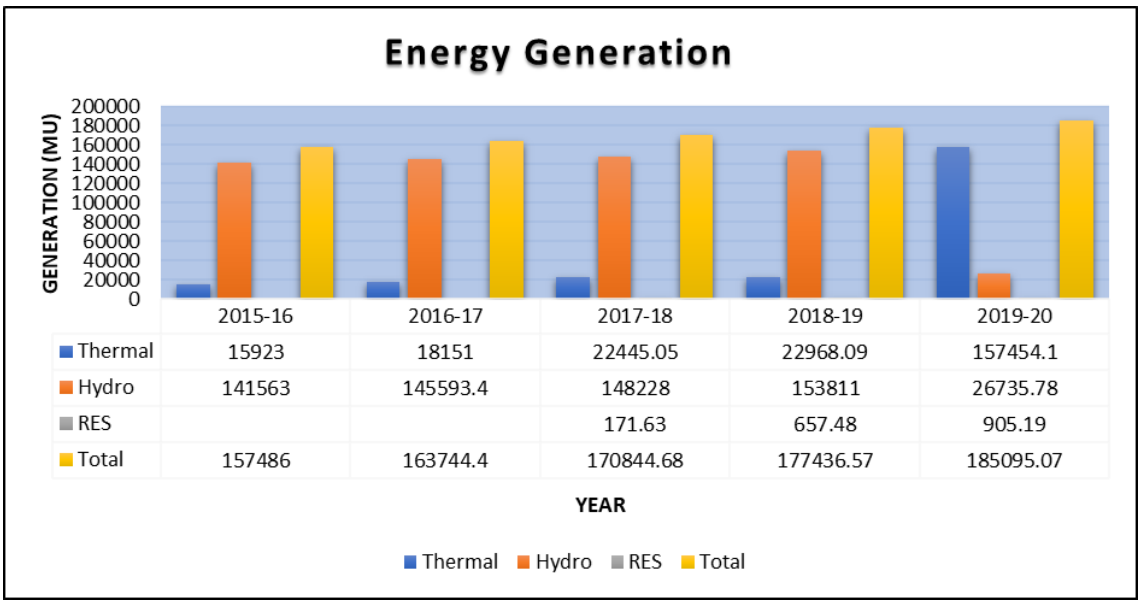
2.2.1 GENERATION:

During the year 2019-20, the total generation availability in ER (excluding generation/import from CPPs and including import from Bhutan) was 185095.07 MU (Gross) comprising of 157454.14 MU from thermal (85.07 %), 26735.74 MU from hydro (14.44 %) and 905.19 MU

(0.49 %) from RES compared to total generation of 177436.16 MU in 2018-19 comprising 153810.59 MU from thermal, 22968.09 MU from hydro and 657.48 from RES. The total generation was 7658.91 MU more than that of 2018-19. Details of constituent-wise generation and auxiliary consumption are given in **Annexure-V**.

As regards to regional thermal generation, the generation of TVNL, DVC, IB TPS and NTPC have increased reasonably but that of WBPDCL, TTPS and IPPs have been declined considerably as compared to last year. Hydro generation of IPPs has been increased significantly as compared to last year.

Generation of last five years (2015-16 to 2019-20) in the region is shown in graph below:



	2015-16	2016-17	2017-18	2018-19	2019-20
Thermal	15923	18151	22445.05	22968.09	157454.1
Hydro	141563	145593.4	148228	153811	26735.78
RES			171.63	657.48	905.19
Total	157486	163744.4	170844.68	177436.57	185095.07

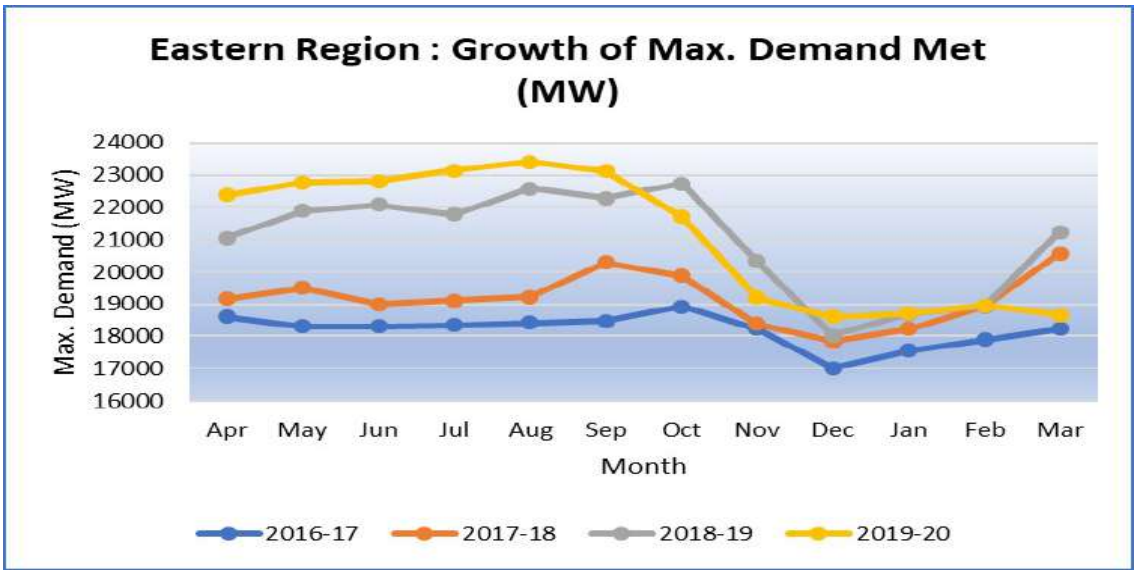
As against Compounded Annual Growth Rate (CAGR) of installed capacity of 2.59 %, the same of energy generation of the last 5 years is 4.12 % including energy import of 6350.63 MU from Bhutan. The growth in generation was mainly due to commissioning of new generating units of 3030 MW of NTPC and 720 MW of Mangdechhu HEP of Bhutan during 2019-20. Maximum utilisation of available hydel power from Tala, Kurichhu, Chukha, Mangdechhu HEP and Daghachu Hydel Power Station of Bhutan was made by import through PTC & TPTCL as nodal agency as per international agreement between Government of India and Royal Government of Bhutan.

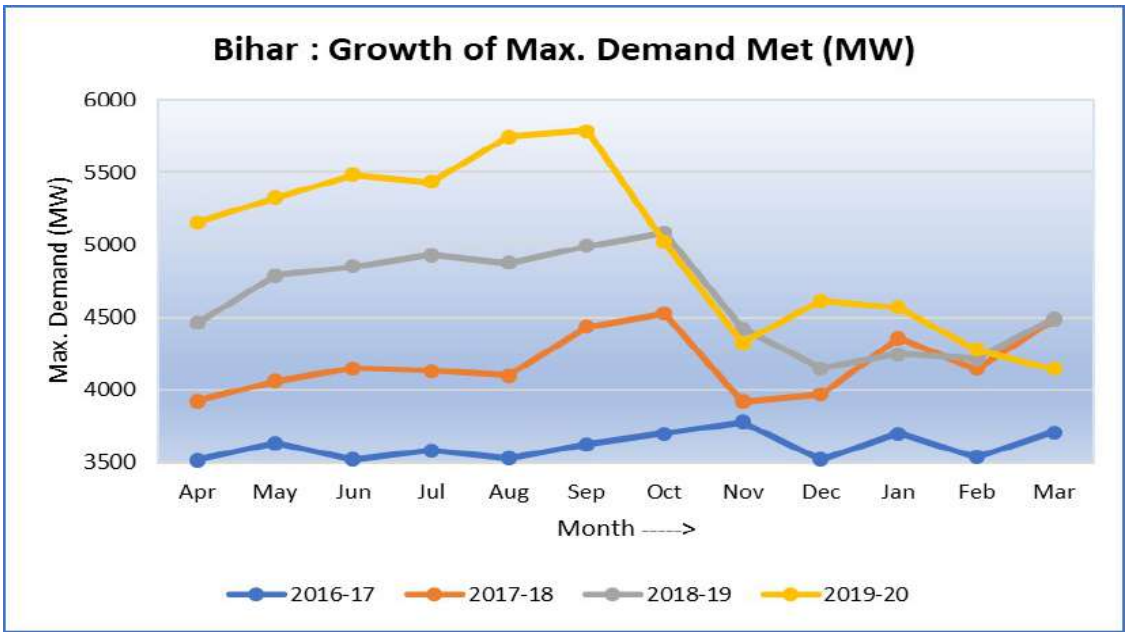
2.2.2 MAXIMUM DEMAND

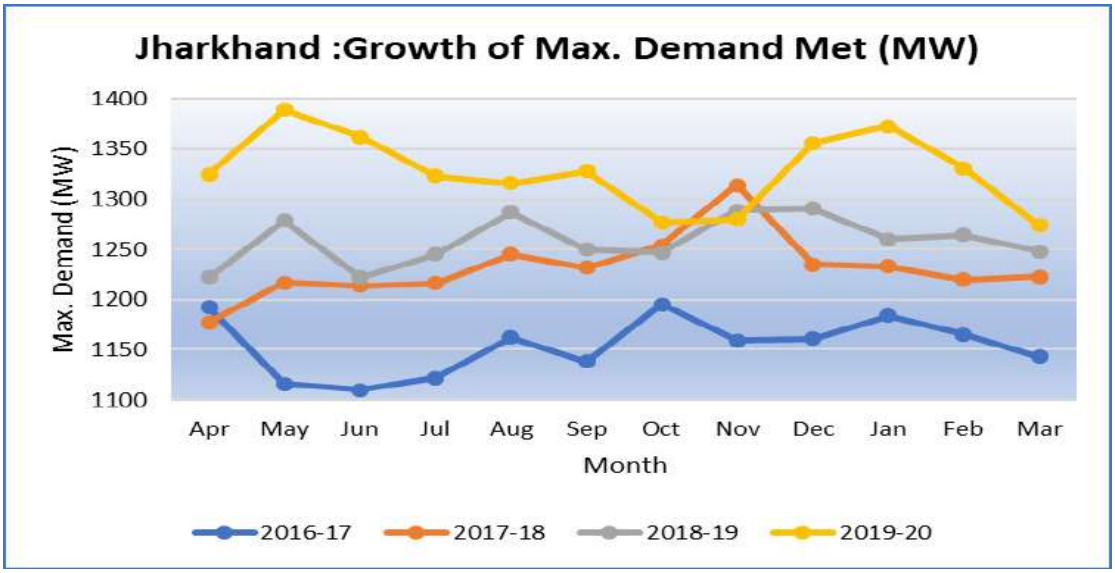
During the year 2019-20, the maximum coincident demand met in the Eastern Region was 23398 MW (net) compared to 22733 MW (net) during the preceding year. It was 665 MW (2.93%) more than the maximum demand of last year. Maximum demand met by the constituents during 2019-20 is given below:

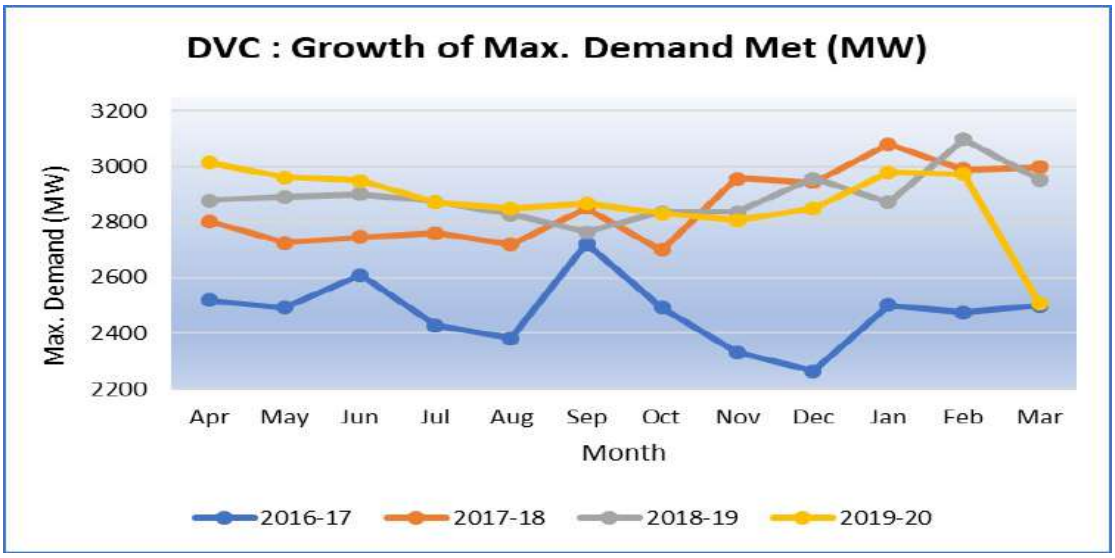
SYSTEM	MW	SYSTEM	MW
BSPHCL	5789	WBSEDCL	7269
JUVNL	1389	CESC	2329
DVC	3014	SIKKIM	115
GRIDCO	5292		
EASTERN REGION: - 23398 MW			

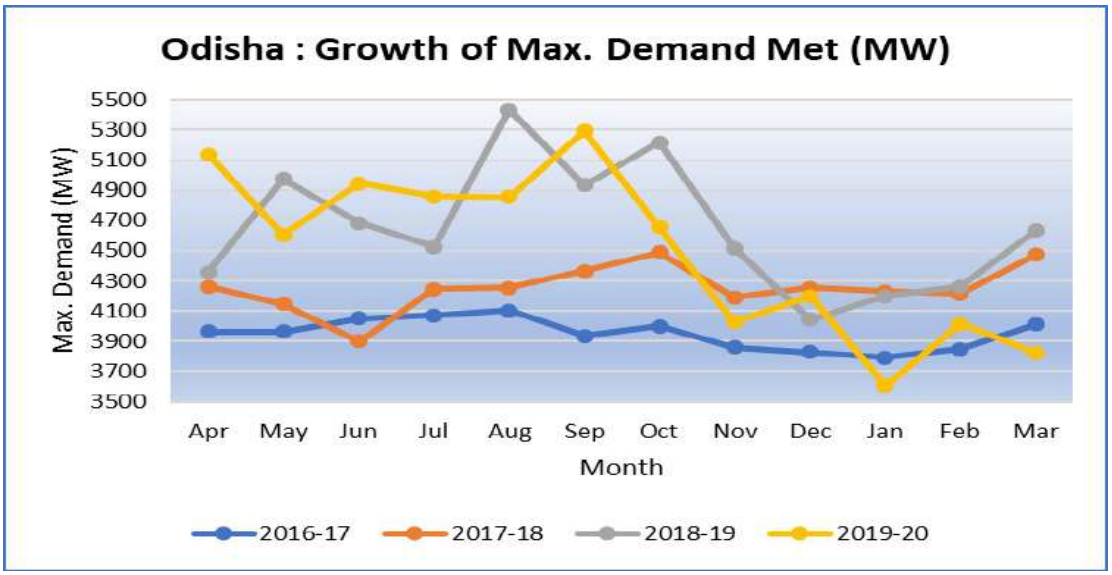
The growth in the maximum demand was somewhat restricted mainly due to bottlenecks in sub-transmission and distribution system of respective utility of E.R. The growth in Max. Demand (MW) in Eastern Region and its constituents for the last four years are shown below:

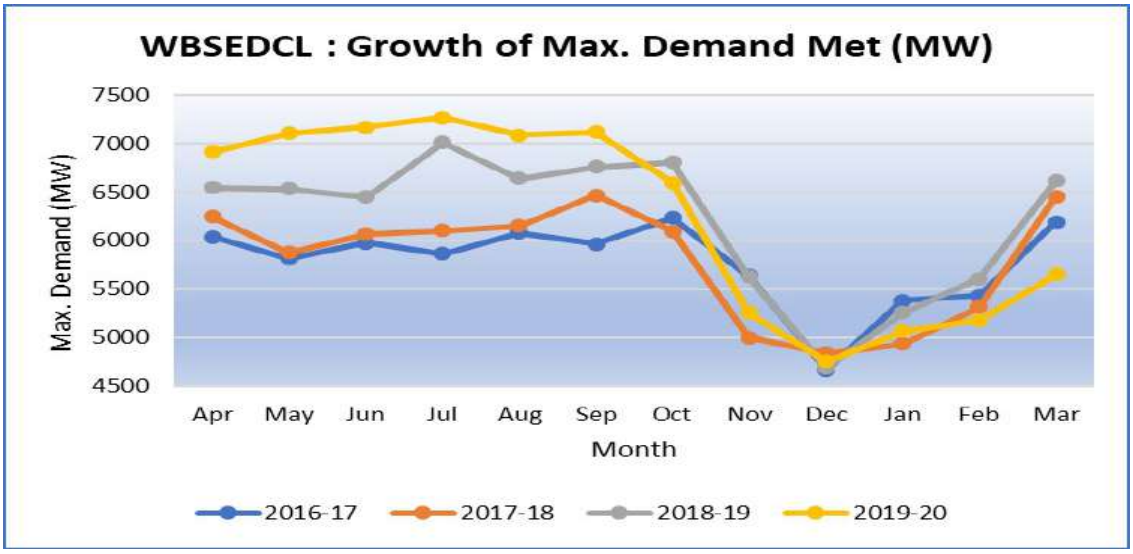


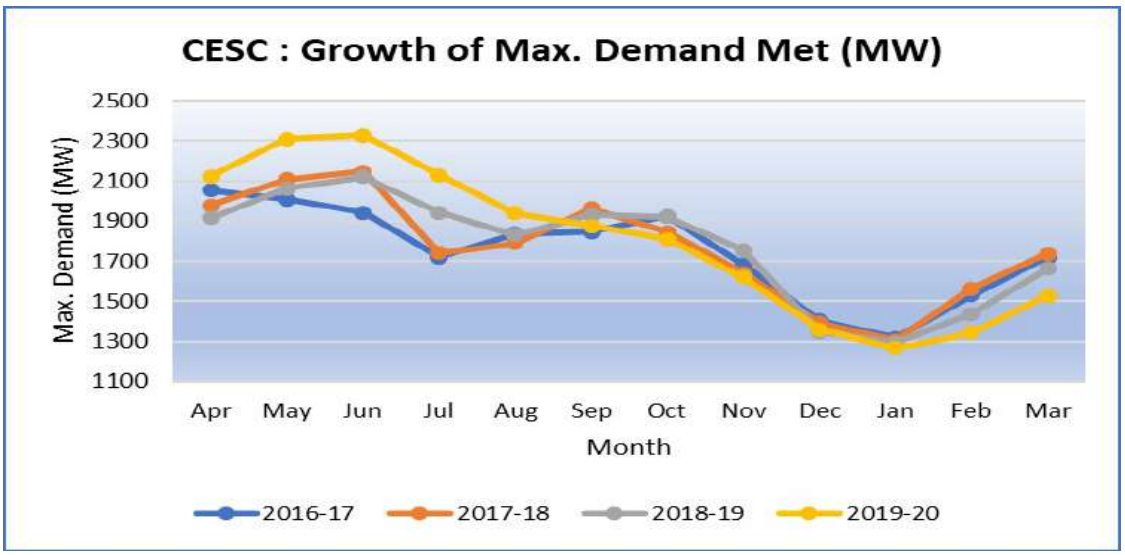


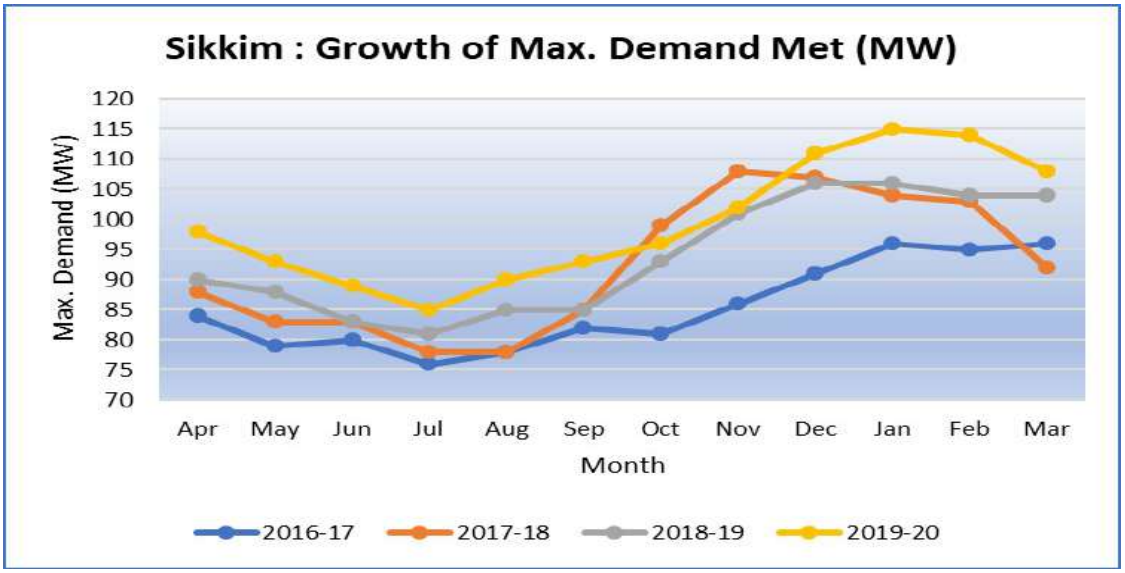

Jharkhand :Growth of Max. Demand Met (MW)
Max. Demand (MW)
1400
1350
1300
1250
1200
1150
1100
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


DVC : Growth of Max. Demand Met (MW)
Max. Demand (MW)
3200
3000
2800
2600
2400
2200
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


Odisha : Growth of Max. Demand Met (MW)
Max. Demand (MW)
5500
5300
5100
4900
4700
4500
4300
4100
3900
3700
3500
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


WBSEDCL : Growth of Max. Demand Met (MW)
Max. Demand (MW)
7500
7000
6500
6000
5500
5000
4500
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


CESC : Growth of Max. Demand Met (MW)
Max. Demand (MW)
2500
2300
2100
1900
1700
1500
1300
1100
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20

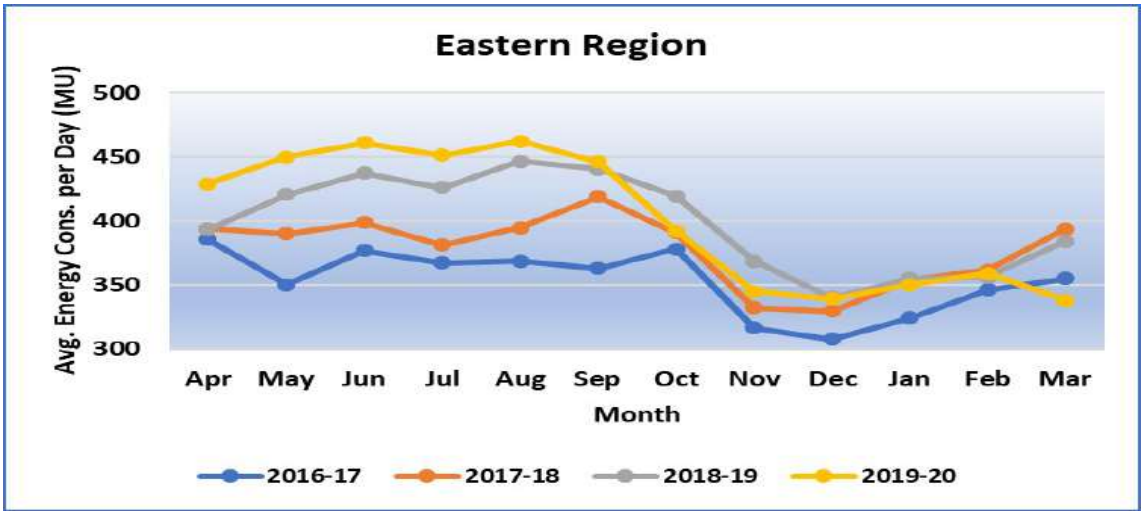

Sikkim : Growth of Max. Demand Met (MW)
Max. Demand (MW)
120
115
110
105
100
95
90
85
80
75
70
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20

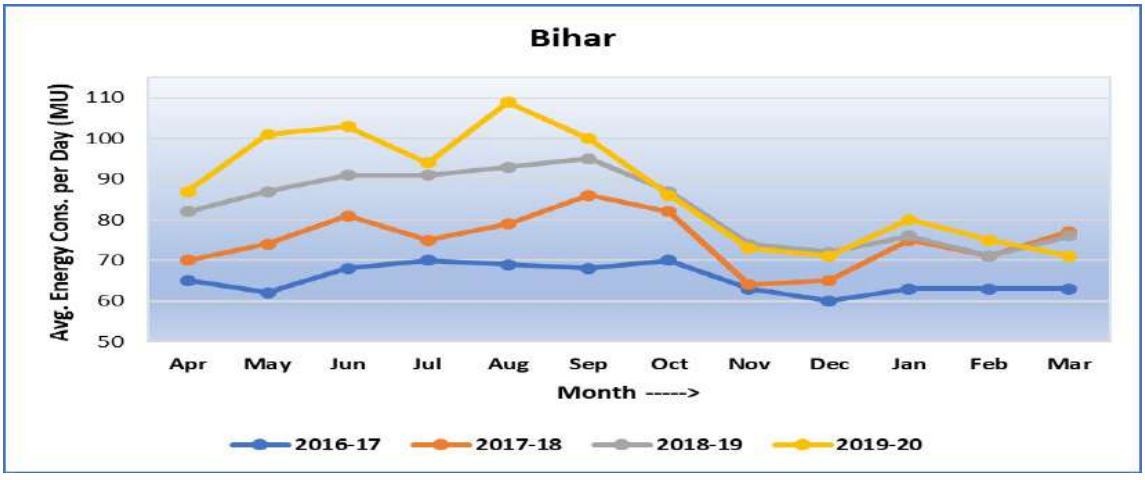
Compounded Annual Growth Rate (CAGR) of Peak Demand in ER for last five years was 6.53 %. Constituent & month wise peak demand (MW) met are shown in **Annexure-VI A & Annexure-VIB**.

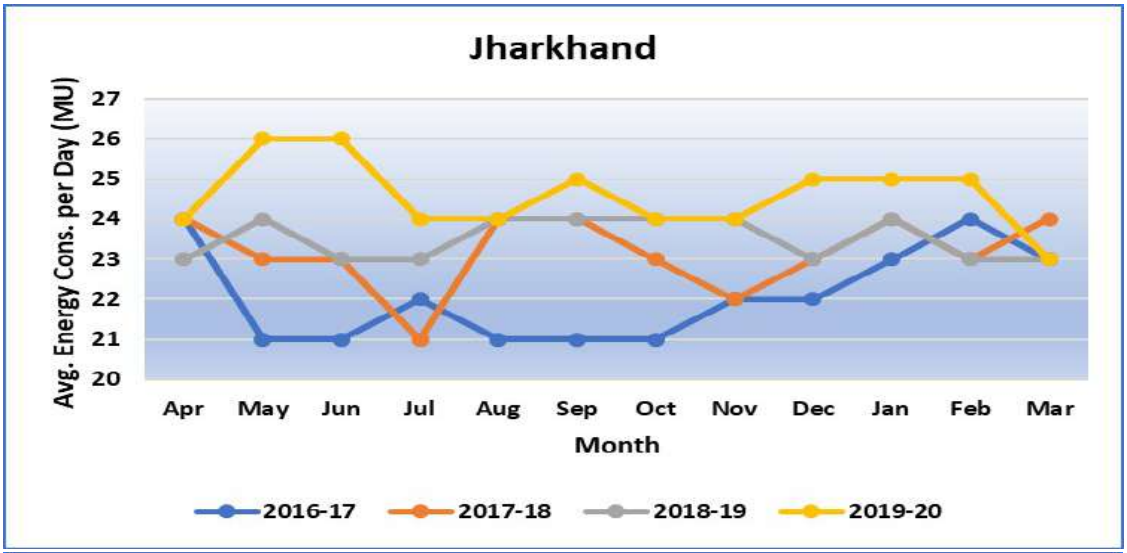
2.2.3 ENERGY CONSUMPTION

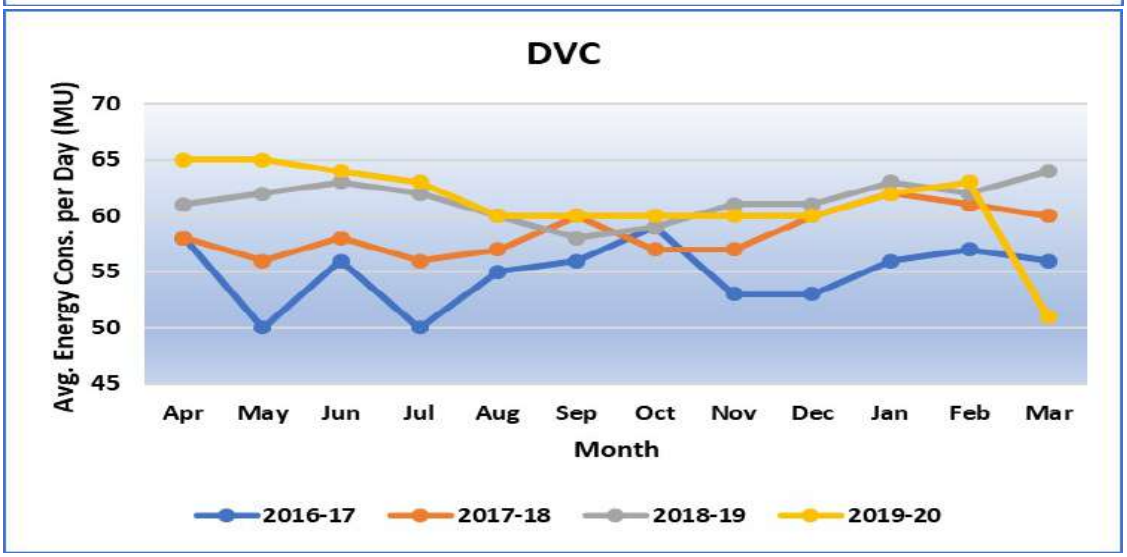
During the year 2019-20, the total energy consumption (net) in Eastern Region was 147090 MU compared to consumption of 145762 MU during previous year i.e. 1328 MU (0.91 %) more than last year's consumption. The daily average energy consumption in the region was about 402 MU/day compared to about 399 MU/day during the previous year. These figures exclude consumption of different industries from their respective captive power plants.

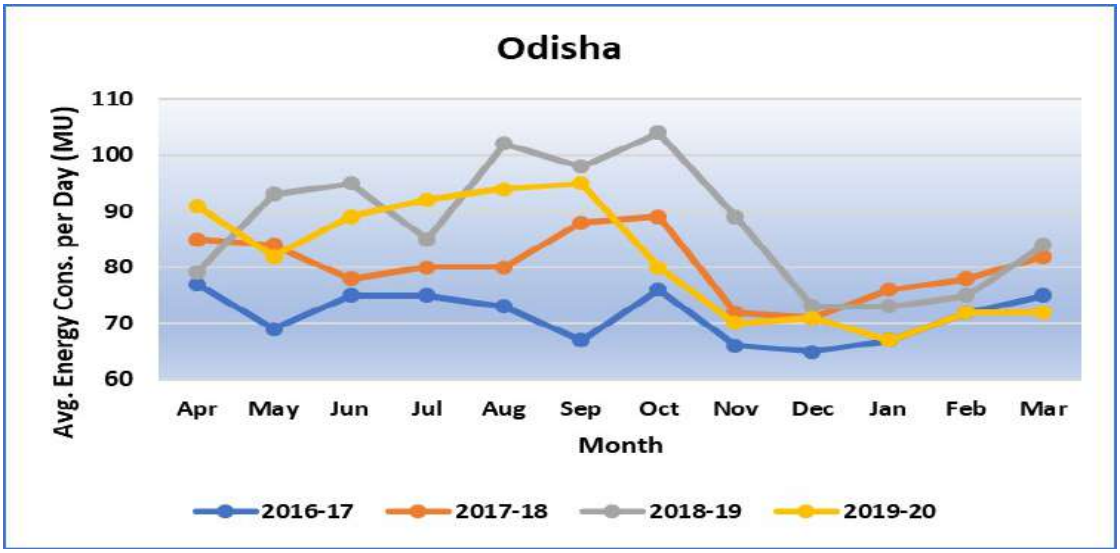
Compounded Annual Growth Rate (CAGR) of energy consumption of the last five years works out as 4.28 % as compared to the growth of peak demand figure of 6.53 %. Constituent & month wise energy consumption has been shown in **Annexure-VII.** The growth in energy consumption in Eastern Region and its constituents for the last four years are shown below:

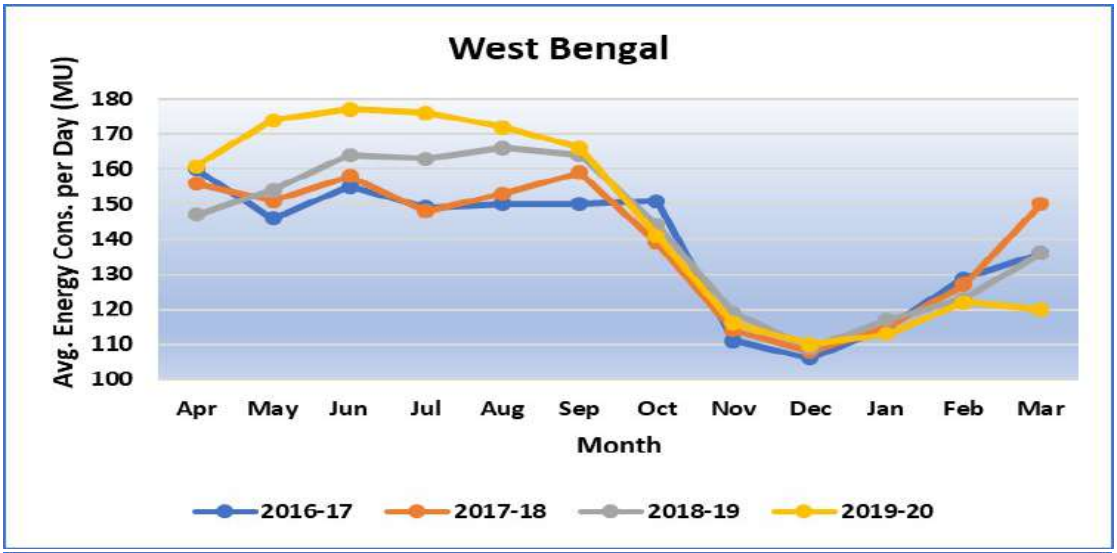


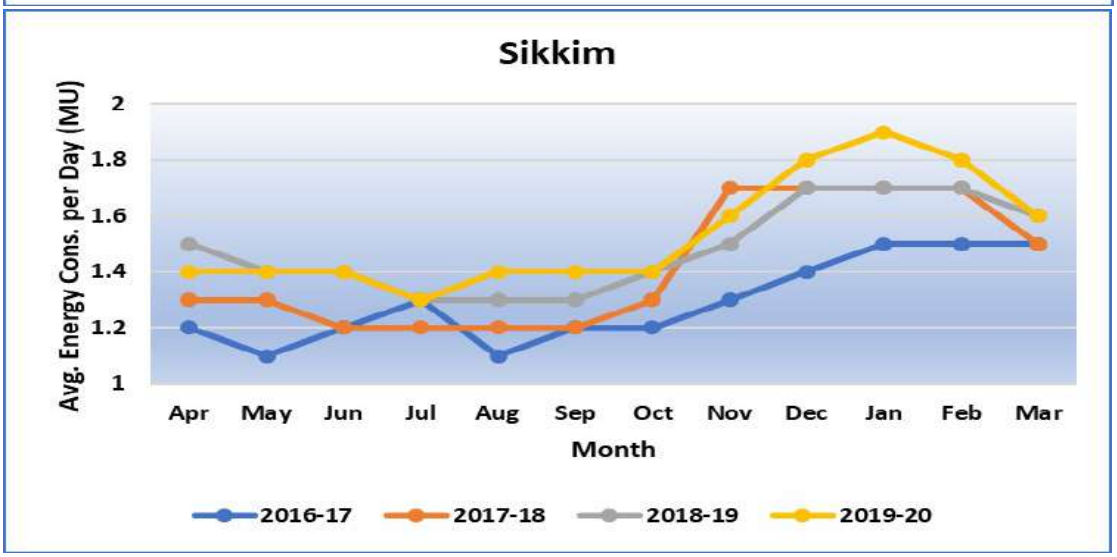



Jharkhand
Avg. Energy Cons. per Day (MU)
27
26
25
24
23
22
21
20
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


DVC
Avg. Energy Cons. per Day (MU)
70
65
60
55
50
45
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20


Odisha
Avg. Energy Cons. per Day (MU)
110
100
90
80
70
60
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Month
2016-17
2017-18
2018-19
2019-20



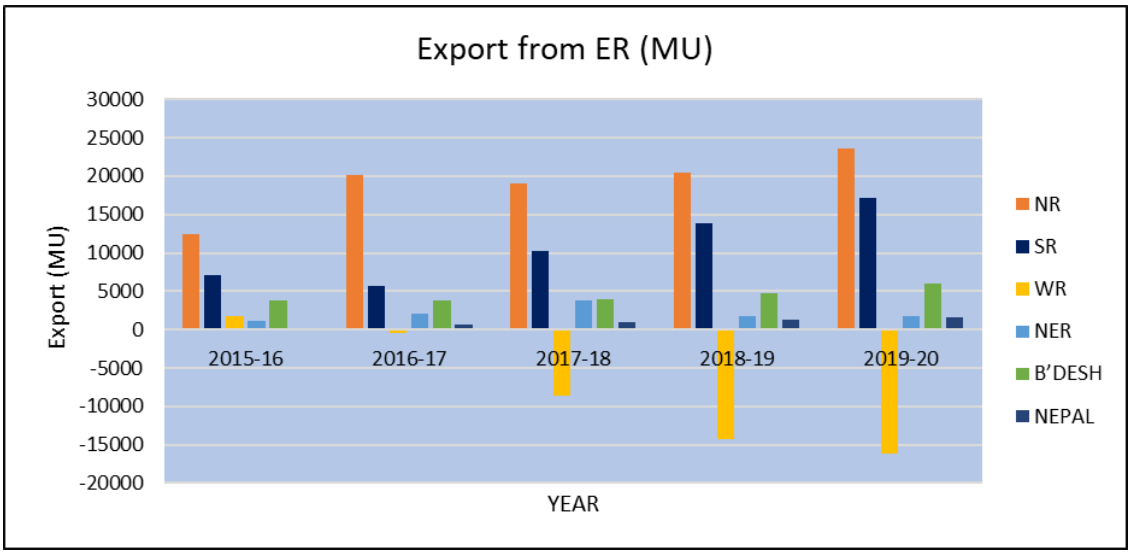


2.2.4 EXPORT TO OUTSIDE REGION

During the year 2019-20, the total net export of energy outside the region was 33976.24 MU compared to export of 27796 MU in the last year, which is 6180.24 MU more than the last year's export. Increase in export is due to increase of energy generation of Eastern Region. As per decision of the MoP, GoI, the power export to Bangladesh has been undertaken and regular supply has been commenced from October'2013 through 400 kV D/C Berhampur – Bheramara line with HVDC (B-t-B 2x500MW) station at Bheramara (Bangladesh). Also, power flow from ER grid to Nepal has been started from February'2016 through 400 kV (charged at 220 kV) Muzaffarpur - Dhalkheber (Nepal) line. The details regarding export of net energy from ER Grid are shown in table below:

EXPORT OF NET ENERGY (MU) FROM ER GRID								
Year	NR	SR	WR	NER	B'DESH	NEPAL	TOTAL EXPORT	Growth
2015-16	12435	7037	1777	1182	3764	76	26271	6.8%
2016-17	20093	5676	-386	2124	3782	666	31955	21.6%
2017-18	19054	10247	-8666	3753	3964	945	29297	-8.32
2018-19	20491	13783	-14311	1685	4808	1340	27796	-5.12
2019-20	23613.2	17122.2	-16194	1816.38	6046.81	1571.71	33976.24	22.23%

Growth of net export of Energy (MU) outside Eastern Region including transmission loss during last five years is given below:



2.2.5 VOLTAGE

During the year 2019-20, the voltage profile except a few important 400 kV sub–stations and 220 kV sub-stations remained satisfactory. Maximum & Minimum Voltage touched during 2019-20 at some of the important 765 kV & 400 kV sub-stations are shown below:

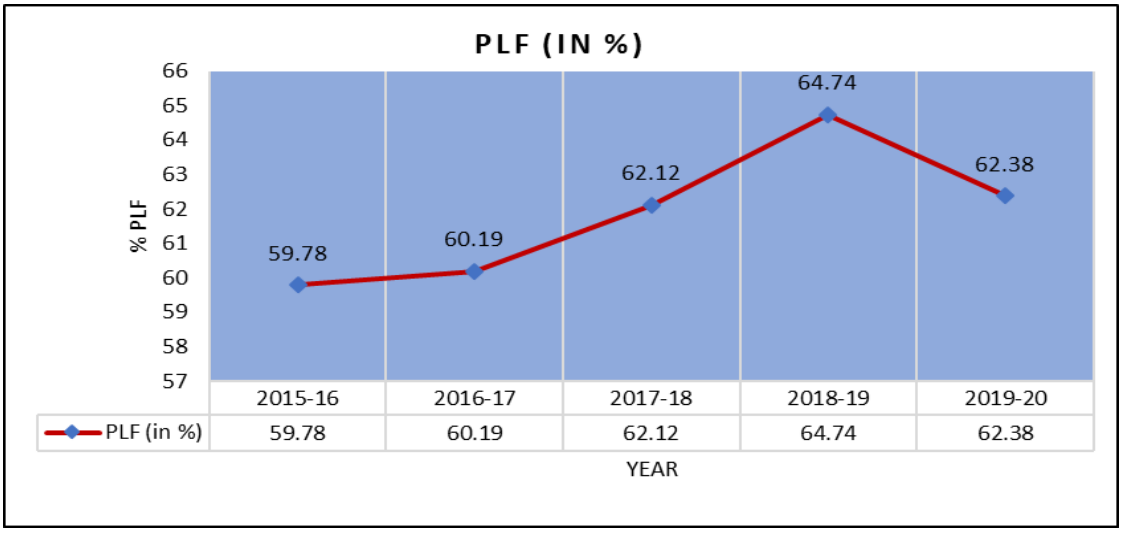
SUB-STATION	MAX. VOLTAGE (kV)	MIN. VOLTAGE (kV)
NEW RANCHI 765 KV	800	762
BINAGURI	429	397
SUBHASGRAM	426	365
JEERAT	428	370
BIHARSHARIFF	424	374
MUZAFFARPUR	430	382
JAMSHEDPUR	422	392
ROURKELA	428	372
JEYPORE	425	387
MAITHON	426	388
MERAMUNDALI	424	370
SASARAM	434	382

2.3 PLANT LOAD FACTOR

The average annual Plant Load Factor (PLF) of the thermal power stations in the Eastern Region for the year 2019-20 was 62.38% against 64.74% for 2018-19. The PLF has been calculated based on the capacity and generation of the commercially declared units only. Infirm generation and their injection period have not been considered for PLF calculations. As the IPPs were generating with restrictions for transmission & other constraints, the regional PLF has been reduced while those IPPs are being considering for Regional PLF calculations. Details of PLF have been shown in **Annexure - X**.

The average PLF (excluding IPP) of ER for the last five years is shown below: -

Period	PLF (in %)
2015-16	59.78
2016-17	60.19
2017-18	62.12
2018-19	64.74
2019-20	**62.38**



2.4 SYSTEM LOAD FACTOR

The Annual Load Factor of the Eastern Region during 2019-20 was 71.57 % compared to 73.20 % in the preceding year. The load factor was highest in DVC areas (84.50 %) due to mostly industrial flat load and the load factor was lowest in CESC (53.86 %) mainly due to domestic & commercial load.

2.5 INTERNATIONAL EXCHANGE

Eastern Region has a unique geographical advantage of having inter-Regional links with all the regions of the country along with international lines to neighbouring countries namely Nepal, Bhutan and Bangladesh. Eastern Region exchanges power to the other regions of the country. It imports power from Chukha, Kurichhu, Tala, Daghachu and Mangdechhu HEP of Bhutan and

exports power to Nepal & Bangladesh. Power export to Bangladesh is through 400 kV D/C Berhampur (WB) – Bheramara (Bangladesh) line. Power export from ER grid to Nepal is through 400 kV (charged at 220 kV) Muzaffarpur - Dhalkheber (Nepal) line. In addition to this, Bihar state network also supplies power to Nepal which has been shown separately.

The table below depicts quantum of power import from Bhutan and exchange (Net) with Nepal & Bangladesh in last five years:

YEAR	IMPORT FROM BHUTAN (CHPC, KHPC, TALA & DAGHACHU) IN MU	NET EXPORT TO NEPAL IN MU		NET EXPORT TO BANGLADESH IN MU
		Through Bihar State network by BSPHCL	Through CTU network by NVVN	
2015-16	5420.40	1210.57	76.0	3764.0
2016-17	5824.00	1197	666.0	3782.0
2017-18	5072.08	1362.87	944.74	3964.3
2018-19	4395.87	1335.62	1340.43	4808.11
2019-20	**6350.63**	**599.84**	**1571.71**	**6046.81**

Though all the international lines are not operational all the times however, details of existing lines are indicated below:

1. **Between ER – NEPAL**

(a) **Through Bihar System**

132 kV Balmiknagar (Bihar) - Surajpura (Nepal)
132 kV Kataiya (Bihar) - Duhabi (Nepal)
132 KV D/C Kataiya – Kusaha
132 kV Raxual-Parwanipur line
33 kV Thakurganj (Bihar) - Bhadarpur (Nepal)
33 kV Raxaul (Bihar) - Birganj (Nepal)
33 kV Kataiya (Bihar) - Biratnagar (Nepal)
33 kV Jaynagr (Bihar) - Siraha (Nepal)
33 kV Kataiya (Bihar) - Rajbiraj (Nepal)
33 kV Sitamari (Bihar) - Jaleswar (Nepal)
11 kV Jogbani (Bihar) - Biratnagari (Nepal)
11 kV Bargania (Bihar) - Gaur (Nepal)

(b) **Through CTU System**

400 kV (charged at 220 kV) Mazaffarpur-Dhalkheber (Nepal)

2. **Between ER – BHUTAN**

400 kV Binaguri (PGCIL) - Tala-I (Bhutan)
400 kV Binaguri (PGCIL) -Tala- II (Bhutan)
400 kV Binaguri (PGCIL) -Tala- IV (Bhutan)
400 kV Binaguri (PGCIL) -Malbase-III (Bhutan)
400 kV Alipurduar(PGCIL)- Jigmelling Ckt-I
400 kV Alipurduar(PGCIL)- Jigmelling Ckt-II
220 kV Birpara (PGCIL) - Chukha - I (Bhutan)
220 kV Birpara (PGCIL) -Chukha - II (Bhutan)
220 kV Birpara (PGCIL) - Malbase (Bhutan)
11 kV Kalchini (WBSETCL) - Phuntsholing (Bhutan)
11 kV Jaldhaka (WBSETCL) -Sibsoo (Bhutan)
11 kV Banarhat (WBSETCL) - Samchi (Bhutan)

3. **Between ER – BANGLADESH**

400 kV D/C Berhampur (PGCIL) - Bheramara (Bangladesh)

4. **Between NER - BHUTAN**

Power is also exchanged between Bhutan and India through the following lines of NER, but the exchange of power is booked against/from ER only.

132 kV Salakati (Assam, PG) – Gelephu (Bhutan)
132 kV Rangia (AEGCL) – Deothang (Bhutan)
11 kV Bongaigaon (AEGCL) -Gaylegphug (Bhutan)
11 kV Tamalpur (AEGCL) -SamdrupJongkhar (Bhutan)
11 kV Dampuri (AEGCL) -Daifan (Bhutan)

2.6 SALIENT FEATURES OF HYDRO RESERVOIR

Salient data regarding FRL, MDDL and the water level reached on the last day of the month in respect of major hydro reservoirs are given in **Annexure - XI.**

2.7 POWER CUTS IN THE REGION

Power supply position in Eastern Region was by and large satisfactory except for sub-transmission and distribution constraints in some of the constituents and shortage in area served by SBPDCL, NBPDCL and JBVNL during peak hours.

2.8 UNITS AND TRANSMISSION ELEMENTS COMMISSIONED DURING THE YEAR

Generating units and transmission elements commissioned during the year 2019-20 are given at **Annexure – IV B and IV C** respectively.

2.9 PROGRESS OF CONSTRUCTION OF GENERATING UNITS & TRANSMISSION LINES

List of ongoing Power Projects / Generating Units and progress of construction of ongoing transmission lines are given at **Annexure – XXI and XXII** respectively**.**

2.10 ALLOCATION OF POWER FROM CENTRAL GENERATING STATIONS.

Allocation of power from Central generating stations in Eastern Region including Chukha HEP, Kurichu HEP, Tala HEP& Mangdechhu HEP of Bhutan during 2019-20 is given at **Annexure – XII.**

CHAPTER-3

GRID DISTURBANCES

Grid disturbances which occurred during the year 2019-20 are as follows:

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
1	OPTCL	08-05-2019	13:05	0	0	GD - I	220 kV Mendasal - Bhanjanagar S/C was under breakdown. While taking charging attempt 400/220 kV ICT - II at Mendasal, B phase LA of its HV side burst and subsequently all 400 kV and 220 kV lines at Mendasal tripped. Pandiabili which was being supplied through Mendasal end only also became dead.
2	WBPDCL	18-05-2019	22:34	18	350	GD - I	At 22:34 hrs 220 kV main bus I at Bakreswar (BkTPP) tripped on bus differential protection leading to the tripping of 220 KV Bakreswar-Satgachia I, 220 KV Bakreswar Sadaipur I, 220 KV Bakreswar Durgapur II & 315 MVA ICT II at Bakreswar. U#3 and U#5 of Bakreswar switched to house-load mode, resulting into generation loss of around 350 MW (House load catered: 15 MW apex.) Load at Satgachia was interrupted due to an inter-tripping scheme which trips Satgachia' s load during peak hours if any one of the 220 KV Bakreswar-Satgachia D/c trips.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
3	ISTS	29-05-2019	21:44	0	0	GD - I	400 kV Darbhanga - Kishangunj D/C along with 400 kV bus II at Darbhanga tripped at 21:44 hrs due to collapse of Tower No 385(Loc. 96/0) suspension type collapsed due to high speed cyclone at Supaul Area (Bihar)-Near Koshi River.
4	NTPC	05-06-2019	19:01	0	300	GD - I	At 18:53 hrs, 500 KV Talcher- Kolar Pole 1 was hand tripped at 18:53 hrs due to heavy isolator sparking at Talcher end resulting sending SPS signal to GMR and JITPL. GMR & JITPL generation reduced by 85 MW and 55 MW respectively. Initial HVDC flow was around 1800 MW. At 19:01 hrs, jumper prot6ction of 400 kV Talcher (NTPC) - Talcher (HVDC) Q/C operated at NTPC end due to breaking of R phase isolator pole along with BPI. Due to tripping of all incoming feeders, HVDC Talcher Kolar pole 2 at Talcher end got blocked resulting back down of Unit 5 by 160 MW. At 19:03 Talcher stg 2 unit 4 tripped on teed protection.
5	OPTCL	12-06-2019	00:37	252	350	GD - I	220 KV Budhipadar-IBTPS III, IV and 220 KV Budhipadar-Concast I were out of service. At 00:37 Hrs, Y phase LA of 220 KV Budhipadar-Tarkera I @ Budhipadar failed. resulting tripping of all lines emanating from Budhipadar end.
6	JUSNL	19-06-2019	13:02	120	0	GD - I	220 KV Maithon Dumka D/C tripped at 13:02 hrs on single phase to earth fault. At the same time 132 kV Dumka Lalmatia D/C tripped leading to the load loss of 120 MW at Paku, Dumka, Deogarh.
7	ISTS	30-06-2019	09:56	0	200	GD - I	At 09:56 hrs, 400 KV Dikchu Rangpo tripped on Y-B – N fault from both ends. It is suspected that 400/132 KV

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							ICT at Dikchu tripped possibly due to overreach in overcurrent protection. s a result, both running units at Dikchu tripped on loss of evacuation. At same time 220 kV JLHEP - New Melli D/C tripped from JLHEP ends resulting tripping of both the running units and total power failure at JLHEP end A400 kV level of Dikchu HEP was in charged condition as 400 kV Teesta III - Dikchu S/C was in service. Charging attempt of 400 kV Dikchu - Rangpo S/C was taken from both Dikchu and Rangpo ends. But it could not be done because angle difference between Dikchu and Rangpo S/S was more than 15 deg which was the limit of synchronizer relay at both S/S. To facilitate charging operation of 400 kV Dikchu - Rangpo S/C, 400 kV Teesta III - Dikchu S/C was hand tripped and total power failure occurred at Dikchu S/S. Then 400 kV Dikchu - Rangpo S/C was charged to synchronize Dikchu S/S. Finally, 400 kV Teesta III - Dikchu was synchronized after reducing the generation and voltage at Teesta III.
8	ISTS	14-07-2019	10:35	0	200	GD - I	At 10:35:11 hrs, 220 kv Jorethang – New Melli D/C, 220 kv Rangpo - Tashiding S/C, 220 kv Tashiding – New Melli S/C and 220 kV Melli (New) – Rangpo – S/C tripped due to R-Y fault (Fault location is yet to be received) resulting total power failure at Jorethang, Tashiding and Melli (New) S/S. Sequence of events and relay indication are given in table I & II respectively. All the running units at Jorethang and Tashiding tripped due to loss of evacuation path.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
9	OPTCL	13-08-2019	05:53	90	0	GD - I	At 05:18 hrs (almost 30 min before the disturbance), 220 kV Bolangir (PG) – Sadaipalli S/C tripped from Sadaipalli end. At 05:53 hrs, 220 kV Bolangir (PG) – Katapalli S/C and 220 kV New Bargarh – Sadaipalli S/C tripped resulting total power failure at Sadaipalli (Bolangir New) and its surrounding connected areas.
10	CESC	16-08-2019	16:22	0	467	GD - I	220 kV EMSS - Subhasgram - I & II tripped at 16:22 and 16:23 hrs respectively resulting total power failure at EMSS. Circuit I tripped on R-N fault followed by Y-N fault. Circuit II tripped on R-N fault after unsuccessful A/R attempt.
11	BSPTCL	16-08-2019	22:23	186	0	GD - I	220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) - II was not in service. 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) - I tripped at 22:23 hrs from DMTCL end on Y-N fault (F/C 1.147 kA) leading to load loss of around 155 MW at Darbhanga, Pupri, Madhubani, Pandual, Jhanjharpur area in Bihar system. Line was charged from DMTCL at 23:15 hrs but again tripped at 23:17 hrs from Darbhanga(B) end. Later, power was extended to Darbhanga from Motipur through 220 kV Motipur-Musari-Darbhanga link and entire load progressively restored by 00:10 hrs on 17-08-19.
12	BSPTCL	18-08-2019	17:24	217	0	GD - I	At 17:24 hrs 220 kV Gaya Dehri D/C, 220 kV Sasaram – Dehri S/C and 220/132 kV ICTSs at Dehri tripped resulting total power failure at Dehri. Y phase jumper on LV side of 220/132 kV ICT IV at Dehri snapped. As per PMU data at Gaya, fault clearing time is 900 ms.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
13	ISTS	21-08-2019	00:02	0	1364	GD - I	400 KV Teesta III Kishangunj S/C and 400 kV Rangpo – Kishangunj S/C were out of service due to breakdown. At 00:00 hrs, on 21-08-19, generation was increased at Dikchu and Teesta HEP from 60 MW to 102 MW and from 900 MW to 1100 MW respectively. On further increase of generation at Teesta III to 1260 MW at 00:02 hrs., power flow through 400 kV Dikchu – Rangpo – S/C became 1365 MW resulting operation of Directional O/C protection at Rangpo end of 400 kV Dikchu – Rangpo – S/C though current was less than 2 kA at the time of the tripping (Main I I>1 relay remained picked up condition since 1 min prior to the disturbance. Current in three phases was 1.9 kA). After the tripping of 400 kV Dikchu – Rangpo – S/C, Teesta III and Dikchu HEP (on low forward power protection) generators tripped due to loss of evacuation path. At same time, O/V stage II protection occurred at Teesta III end for 400 kV Teesta III – Dikchu S/C and tripped the said line.
14	ISTS	22-08-2019	12:22	0	91	GD - I	At 12:17 hrs, all running units at Jorethang tripped due to loss of evacuation path after the tripping of 220 kV Jorethang – New Melli D/C. As per DR recorded at Jorethang end for 220 kV New Melli – I feeder, fault was cleared in Z-I and breaker opened from remote end after 500 ms.
15	BSPTCL	04-09-2019	04:36	240	0	GD - I	400 kV Motihari – Gorakhpur D/C was not in service. Motihari was radially connected to Barh via a 400 kV D/C line. At 4:36 Hrs., 400kV Barh-Motihari D/C tripped leading to a load loss of 240 MW in Bettia

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							(traction), Ramnagar, Raxaul, Motihari. Nepal load at Parwanipur got interrupted due to this disturbance. Fault location is 10 km from Motihari. Normal load of Bettia, Ramnagar, Narkatiyaganj and Traction of Bettia were shifted to Gopalganj and Motihari local load were shifted on Motipur after disturbance. Tower collapse of 26/0 location reported.
16	JUSNL	07-09-2019	17:32	180	0	GD - I	220 kV Dumka – Govindpur - II was idle charged from Dumka end. Due to improper protection setting, Dumka end failed to clear the fault in idle charged portion of 220 kV Dumka – Govindpur – II. As per voltage dip observed in PMU data, fault seems to be in high resistive nature due to rocky terrain around Dumka. To clear the fault, 400/220 kV ICTs at Maithon, 220 kV Maithon – Kalyaneshwari D/C, 220 kV Maithon – Dhanbad D/C, 220 kV Maithon – Dumka D/C also tripped resulting total power failure at Dumka and 220 kV side of Maithon S/S.
17	ISTS	13-09-2019	21:42	30	830	GD - I	Rangpo is having double main bus scheme. All elements except 400 kV Binaguri - Rangpo - II and 400 kV Dikchu Rangpo S/C were connected to bus I. At 21:42 hrs, due to suspected LBB operation associated with 315 MVA 400/220 kV ICT III at Rangpo, bus I became dead resulting tripping of 400 kV Teesta V - Rangpo D/C, 400/220 kV ICTs at Rangpo, units at Chujachen, Tashiding and Jorethang.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
18	WBSETCL	21-09-2019	12:43	0	571	GD - I	400 kV HEL – Subhasgram – I was taken shutdown in the morning on same day at 07:02:09 hrs. due to maintenance related work. HEL was radially connected through 400 kV HEL – Subhasgram – II to Subhasgram S/S. At 12:43 Hrs. 400 KV HEL - Subhasgram II tripped due to R –Y – N fault. Consequently, both running units (2*300 MW) at HEL tripped due to loss of evacuation path.
19	JUSNL	24-09-2019	17:13	169	0	GD - I	At 17:13 hrs., 220 KV Ranchi-Hatia D/C and 220 KV Patratu-Hatia D/C tripped leading to total power failure in 220 K Hatia s/s.
20	ISTS	17-10-2019	08:11	0	470	GD - I	400KV Angul –JITPL D/C tripped at 08:11 hrs while availing scheduled Shutdown of 400KV Angul –JITPL II Generation loss of 470MW occurred of JITPL Unit #2 due to loss of evacuation path.
21	JUSNL	22-10-2019	11:55	44	0	GD - I	At 11:55 Hrs, 220 KV FSTPP Lalmatia S/C tripped due to B-N Fault. At the same time, 132 KV KhSTPP-Lalmatia S/C also tripped, leading to a load loss of 44 MW. 132 KV KhSTPP - Lalmatia S/C was charged at 12:08 but tripped again while taking charging attempt of 220 KV FSTPP-Lalmatia s/c at 12:20 Hrs.
22	OPTCL	25-10-2019	04:44	111	0	GD - I	At 04:44 Hrs, B phase jumper of Bus II-isolator of 220 KV Sadaipalli – New Bargarh S/C snapped at Sadaipalli end and caught fire. For safety reason, 220 KV Bolangir (PG)-Sadaipalli was hand-tripped on emergency basis. Consequently, 220/132 KV Sadaipalli S/S became dead and load loss of 111 MW occurred in downstream areas

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							of Sadaipalli.
23	ISTS	26-10-2019	07:27	0	45	GD - I	At 07:27 hrs, 400 kV Binaguri – Rangpo – II tripped due to B-N fault. At same time, 220 kV Jorethang – New Melli D/C tripped from Jorethang end only on DEF protection resulting tripping of running unit #1 due to loss of evacuation path.
24	ISTS	26-10-2019	15:43	0	448	GD - I	At 15:43 hrs Unit 3 and 6 at Teesta III tripped on neutral overcurrent protection, and 400 KV Dikchu - Teesta III line, 400 KV Kishanganj - Teesta III tripped on overvoltage protection. All this led to loss of voltage at 400 KV Teesta III with 400 MW generation loss. Also, at this moment Dikchu unit 1 tripped @48 MW on neutral overcurrent protection on generator transformer.
25	ISTS	04-11-2019	14:18	0	38	GD - I	220 kV Jorethang - New Melli - I was under shutdown. At 14:18 hrs successful A/R occurred for 400 kV Kishangunj - Rangpo S/C on B-N fault (fault distance was 175.5 km from Kishangunj). At same time 220 kV Rangpo - New Melli S/C and 220 kV Jorethang - New Melli - II tripped resulting generation loss of 38 MW at Jorethang due to loss of evacuation path.
26	WBSETCL	05-11-2019	06:52	104	0	GD - I	At Arambagh substation isolator got stuck while changing the isolator position and this leads to bus fault at 400 kV Bus. As CT supervision function (cable cut) blocked the bus bar protection, so bus bar protection did not clear the fault. All the lines tripped either from remote end on Zone-2/3 or in Zone 4 from Arambagh end. Also, ICT 4 tripped from 220 kV side on

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							directional over current.
27	ISTS	11-11-2019	10:58	0	43	GD - I	At 10:58 hrs successful A/R occurred for 400 kV Kishangunj - Rangpo S/C on Y-N fault. At same time 220 kV Jorethang - New Melli D/C tripped only form Jorethang end resulting tripping of JLHEP unit I due to loss of evacuation path
28	ISTS	25-11-2019	15:38	0	338	GD - I	During synchronization of unit 5 of Teesta III, breaker got stuck and bus I at Teesta III tripped resulting tripping of 400kV Teesta-III-Dikchu S/C. At same time 400kV Teesta-III-Kishangunj S/C also tripped resultingtripping of both the evacuating lines from Teesta III and leading to generation loss of 303 MW at Teesta III.
29	CESC	27-11-2019	02:45	260	264	GD - I	At 02:36 Hrs, 132 KV BUS PT at Liluah S/s burst resulting tripping of 132 KV Liluah-Howrah Q/C. At the time of incident, CESC system was synchronized to rest of the grid at Howrah point (132 KV Southern-Howrah, 132 KV Southern-Botanical-Howrah D/c) which got islanded as synchronization relay at Southern operated to disconnect CESC system from rest of the grid. CESC started running in island mode for 9 minutes. At 02:45 Hrs, when re-synchronization attempt was taken at Howrah, 2 running Units (U#1, U#3-264 MW generation) at Budge Budge tripped, thereby around 260 MW load loss occurred in CESC area.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
30	BSPTCL	27-11-2019	15:30	53	0	GD - I	At 15:30 Hrs, 220 KV Gaya Sonenagar D/C tripped at Sonenagar end only due to DT receipt. No tripping was reported at gaya end. Load loss was at Aurangabad,Sonenagar and Japla.
31	JUSNL	09-12-2019	11:35	38	0	GD - I	132 KV KhSTPP - Lalmatia S/C under shutdown. At 10:26 Hrs, 220 KV FSTPP -Lalmatia S/C tripped from Lalmatia end only due to pole discrepancy. Consequently, 38 MW load loss occurred at Lalmatia. Lalmatia avaialed power from Dumka through 132 KV Dumka-Lalmatia D/C at 11:25 Hrs. At 11:35 hrs this D/C lines tripped resulting power failure at Lalmatia.
32	BSPTCL	12-12-2019	11:18	90	0	GD - I	Planned shutdown of 220 KV Gaya-Sonenagar 1 was availed at 11:12 Hrs. At 11:18 Hrs 220 KV Gaya-Sonenagar 2 tripped from Sonenagar on R-N fault leading to a load loss of 90 MW in downstream at Sonenagar and Japla (Traction loss- 20 MW at Japla). Auto-reclose was successful at Gaya.
33	BSPTCL	14-12-2019	02:50	45	0	GD - I	220 KV Darbhanga (DMTCL)-Motipur II was kept open on voltage regulation from 14:35 hrs on 13.12.19. At around 02:50 hrs on 14-12-19, 220 kV Darbhanga (DMTCL) – Motipur I and 220 kV MTPS – Motipur tripped on E/F causing load loss of around 45 MW at Motipur / Sitamari/Musari area of BSPTCL system. 220 kV Darbhanga (DMTCL) – Motipur I was taken into service at 03:25 hrs and tripped again on E/F at 03:37 hrs.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
34	BSPTCL	19-12-2019	17:09	266	0	GD - I	220 KV Bharsariff- Khizersarai S/C, 132 KV Bus at Lakhisarai & 132 KV Banka-Sultanganj D/c were out of service. 220 KV Gaya- Khizersarai I tripped at 17.09 hrs on B-N fault. 220KV Gaya-Khizersarai II tripped on overload interrupting power supply to Khizersarai S/S. In absence of feed from other sources like Biharshariff, Lakhisarai and Banka due to shut down, total power failure occured at Khizersarai and its surrounding areas.
35	TPTL	22-09-2019	14:38	0	96	GD - I	400 kV Teesta III Dikchu S/C tripped at 14:38 hrs on B-N fault. Relay indication at Teesta III: B-N, F/C 9.1 KA, 15.6 km from Teesta III; at Dikchu: B-N, Z-IV, E/F, F/C 9.195 KA, -700 m from Dikchu. On Investigation it was found some of the bushes/plantation came in to contact with B phase conductor in the out yard between ICT & GIS at Dikchu. Both units at Dikchu tripped on differential protection though overvoltage and over speed protection operated correctly. O/C earth fault protection of 400/132 kv ICT picked up but did not tripped as time delay (1.2 s) was more than fault clearing time.
36	DVC	28-12-2019	05:26	300	193	GD - I	At 05:26 Hrs 220KV CTPS A-CTPS B D/C tie lines tripped on differential protection resulting tripping of all 220 kV feeders at CTPS A and all 220/132 kV at CTPS A. At the same time, U#8 of CTPS B also tripped.
37	ISTS	05-01-2020	20:04	0	0	GD-I	Both 400 kV Teesta V – Rangpo D/C tripped from Rangpo end at 20:04 HRS on Y-N fault. Unit-III was stopped at 20:03 Hrs before the incident. No generation loss occurred at no generation at Teesta V was scheduled. However, it was observed that SF6 gas

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							failure of Unit-III GIS circuit breaker alarm was appeared in SOE of Scada at 20:04. On preliminary investigation on the checking of purity of SF6 gas of Y-Phase detected the presence of SO 2. Both circuits were restored at 22:13hrs & 22:51hrs respectively.
38	ISTS	11-01-2020	11:45	79	0	GD - I	220 KV Bus II at Rangpo under shutdown. At 11:45 Hrs, 220 KV Bus I at Rangpo became dead due to operation of bus bar protection resulting tripping of all five 315 MVA 400/220 KV ICTs at Rangpo, 220 KV Rangpo-New Melli S/C, 220 KV Rangpo-Tashiding S/C and all 3 100 MVA 220/132 KV ICTs at Rangpo. Total power failure occured at 220 kV S/S at Tashiding, New Melli and Jorethang S/S. 400 kV bus at Rangpo was in service. Power supply to Gangtok interrupted as it was being fed through 132 KV Rangpo-Gangtok D/c. No generation occured loss at Jorethang, Tashiding and Chuzachen as no machine was running.
39	BSPTCL	13-01-2020	12:40	120	0	GD - I	At 00:40 Hrs, 220 KV Gaya-Sonenagar D/C tripped due to B-N Fault, leading to load loss of 130 MW in Aurangabad, Sonenagar, Rafiganj, Japla.
40	ISTS	16-01-2020	15:48	0	0	GD-I	At 15:48 Hrs 220KV-NEW MELLI-TASHIDING-S/C, 220KV-TASHIDING-RANGPO-S/C, 220KV-NEW MELLI-JORETHANG-I tripped on B-N fault resulting total power failure at Tashiding S/S. There was no generation at Tashiding
41	JUSNL	25-01-2020	15:14	119	0	GD-I	At 15:14 Hrs, LBB operated at 220KV Bus Coupler bay at Maithon (PG) leading to tripping of 220kV Bus-1&2, 500MVA 400/220kV ICT-1&2, 220kV Maithon-Dhanbad Ckt-1&2, 220kV Maithon-Kalyaneswari Ckt-

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							1&2, 220kV Maithon-Dumka Ckt-1&2. Load loss of around 119MW in JSEB at Dumka, Pakur and Deoghar area.
42	WBSETCL	01-02-2020	21:05	300	350	GD-I	At 21:05 hrs both 220kV buses at Bidhannagar S/S tripped on Bus differential protection due to failure of 220kV Bus Coupler CT resulting into tripping of all 220kV outgoing feeders connected at Bidhannagar, 2 x 315MVA 400/220kV ICTs at Bidhannagar, 3 x 160MVA 220/132kV ICTs at Bidhannagar and two running units (unit #7 & #8) of DPL due to loss of evacuation path. There is a load loss of approx. 300 MW around Bidhannagar, DPL embedded area and Ukhra.
43	BSPTCL	09-02-2020	12:53	183	0	GD-I	At 12:53 hrs, 220 KV Muzaffarpur-Hajipur D/C tripped due to bus bar protection operation at Hazipur leading to tripping of all feeders connected to 220 KV Hajipur S/S, causing load loss at Hajipur, Amnour, Siwan, Chhapra, Hathua, New Siwean (Raghunathpur) & Gopalganj (traction load loss of approx. 25MW at Hajipur, Siwan, Chhapra)
44	BSPTCL	10-02-2020	17:32	142	0	GD-I	At 17:32 hrs, 220 KV Hajipur-Amnour D/c tripped leading to load loss of 142 MW at Amnour, Siwan, Chhapra, Hathua, New Siwan(Raghunathpur) & Gopalganj (traction load loss of approx. 15MW at Siwan, Chhapra).
45	WBSETCL	11-02-2020	08:33	43	0	GD-I	220 KV Kharagpur-Midnapur D/c under planned shutdown. At 08:33 Hrs, LBB of 220 KV Kharagpur-Vidyasagar Park I operated due to closing of earth switch at Kharagpur end resulting into tripping of both 220 KV buses at Kharagpur and total power failure at

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
							Vidyasagar Park and Egra.
46	ISTS	25-02-2020	08:14	0	48.5	GD-I	At 08:14 hrs 220 kV Tashiding - New Melli S/C, 220 kV Tashiding - Rangpo S/C, 220 kV Rangpo - New Melli - S/C tripped resulting total power failure at New Melli and Tashiding S/S and tripping of unit #2 at Tashiding due to loss of evacuation path. At the time of the incident, heavy thunderstorm and inclement weather were reported.
47	ISTS	05-03-2020	19:27	0	560	GD-I	At 19:27Hrs, 400kV JITPL-Angul D/C tripped on B-N fault. At the time of the event, inclement weather was reported. JITPL Unit#1 was generating around 560MW, which got tripped due to no evacuation path.
48	OPTCL	13-03-2020	03:26	0	0	GD-I	At 03:21 Hrs., 220 kV Budhipadar – Raigarh S/C tripped hrs. due to snapping of R phase wave trap jumper of this line. At 03:26 hrs., 220 kV Korba East - Buddhipadar 2 and 3 also tripped on R phase to earth fault and Y phase to earth fault respectively. However, after 300 ms, 220 kV bus coupler breaker along with 220 kV Budhipadar Bus 2 and all connected elements got tripped at 220/132 kV Budhipadar S/S on bus bar protection relay operation.
49	ISTS	15-03-2020	13:52	0	200	GD-I	At 13:52 hrs 400 kV Teesta III - Kishangunj S/C, 400 kV Teesta III - Dikchu S/C and 400 kV Dikchu - Rangpo S/C tripped resulting total power failure at Teesta III and Dikchu. DT received at Teesta III from remote ends for both feeders. E/F protection picked up at Dikchu end.

Sl. No	Owner/Agency	Date	Time	Load loss (MW)	Gen. loss (MW)	Category	Reasons
50	JUSNL	15-03-2020	16:12	0	300	GD-I	At 16:12 hrs 220 kV Tenughat – Biharsharif S/C and 220 kV Patratu – Tenughat S/C tripped on earth fault protection resulting in tripping of both running units at Tenughat due to loss of evacuation path.
51	JUSNL	29-03-2020	19:21	210	0	GD-I	At 19:21 hrs, R phase CT of 220 kV STPS bay of 220/132 kV Chandil s/s burst resulting tripping of all 220 kV feeders connected to Chandil S/S.

CHAPTER- 4

COMMERCIAL

4.1 REGIONAL ENERGY ACCOUNTING (REA)

CERC Regulations on Availability Based Tariff (ABT), applicable for accounting of Capacity charges and Energy charges of Central Sector Generating Stations; transmission charges of Central Sector Transmission Systems and transactions of interstate power through exchange and bilateral mechanisms, was implemented in ER w.e.f 01.04.2003. CERC has issued "*CERC Tariff Regulations, 2019-24 (Terms and Conditions of Tariff)"* which has come into force on and from 01.04.2019. This regulation shall remain in force for a period of five years, i.e up to 31.03.2024 from the date of commencement unless reviewed earlier or extended by the Commission.

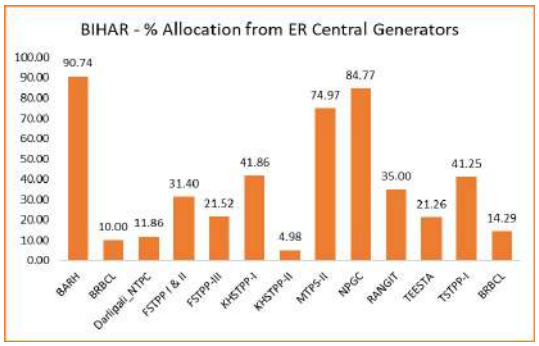
The following are the major components of Availability Based Tariff (ABT):

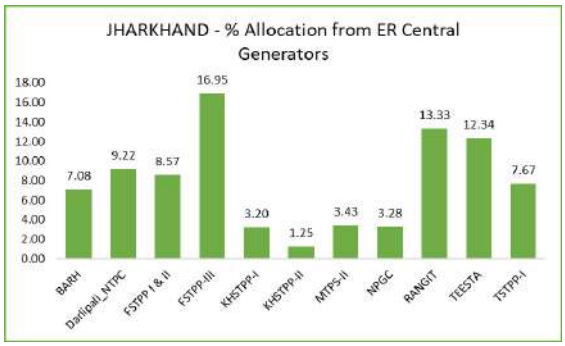
a. Capacity Charge inclusive of incentive (for recovery of Annual fixed cost)
b. Energy Charge (for recovery of primary fuel cost)
c. Transmission Charges (for recovery of annual fixed cost of transmission system)
d. Deviation Settlement Mechanism, etc

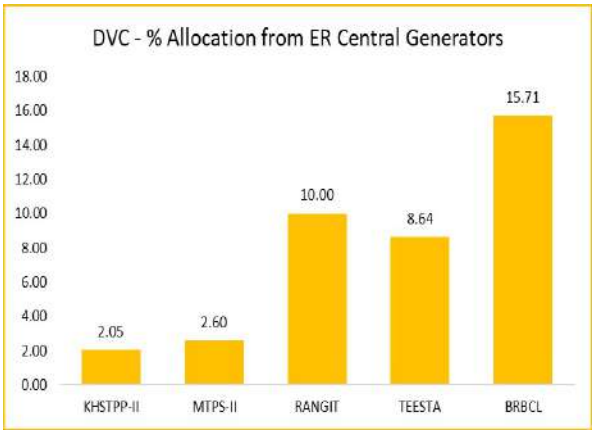
The first three topics would be dealt in this section and the fourth topic would be dealt in the next section. The regional energy accounts bring out the transactions/accounts for Central Generating Stations (CGSs), IPPs, LTOA, STOA, etc.

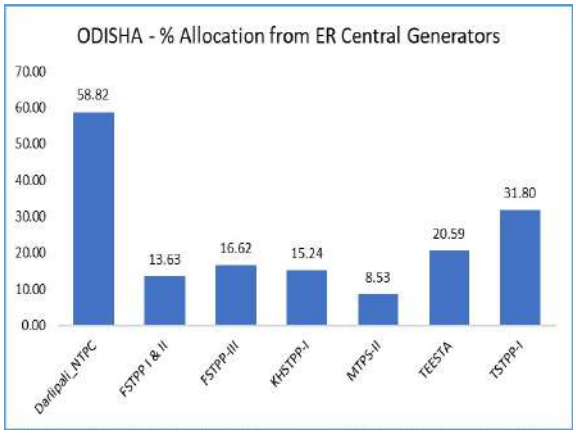
4.1.1 SHARE ALLOCATION OF ER STATES FROM CENTRAL GENERATING STATIONS

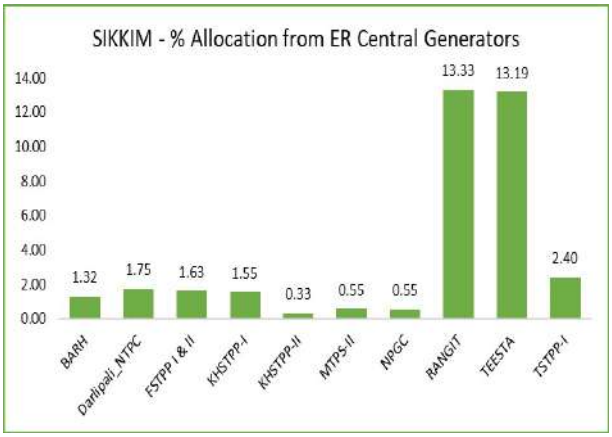
Regional Energy Accounting for Central Generating Stations (CGSs) is based on the allocation orders from MoP/CEA. The percentage share of total capacity of each ISGS in eastern region is allocated to the beneficiaries of Eastern, Northern, Western, Southern and North Eastern Region, which is revised from time to time. Weighted average allocations of shares from each ISGS in Eastern Region during 2019-20 are given at **Annexure-XII.** The percentage share allocation of ER states from ER Central Generating Stations for F.Y 2019-20 has been shown below.

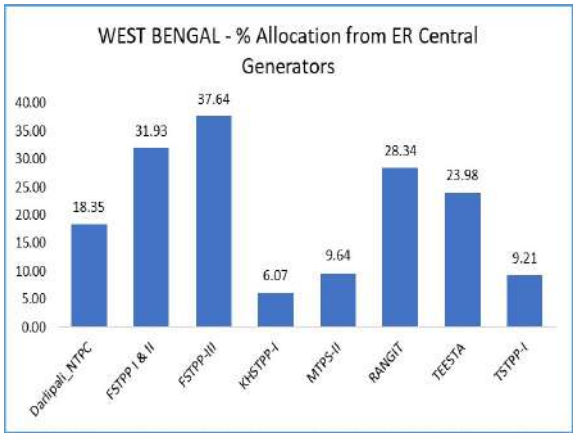












In case of Un-requisitioned surplus (URS) power, the statement of URS is being issued for adjustment of share allocation of the month based on the data for surrender/avail of URS power.

4.1.2 ACCOUNTING OF CENTRAL GENERATING STATIONS

Capacity Charges:

The capacity charge (inclusive of incentive) payable to a thermal or hydro generating station for a calendar month is ensured if availability of 85% or more is achieved in line with the prevailed tariff regulations.

For hydro generating stations the Annual Capacity charge is recoverable from the beneficiaries as per percentage share allocation of each beneficiary after adjustment of 12% free share of home state. The payment of capacity charge is independent of the energy drawn by the beneficiary and it is dependent only on the Plant Availability Factor for the Month (PAFM). To minimize the cost of power procurement, the beneficiary has the option of lower drawl of energy (paying full capacity charge for its share) and to meet demand from other source such as bilateral exchange and through power exchanges such as IEX/PXIL.

The indicative annual capacity charges per year for the thermal and hydro power stations of the Central Sector Generating stations in Eastern Region for F.Y 2019-20 for all the ISGS as shown below (as per CERC orders).

Sl. No	Station Name (CGS/ISGS)	Installed Capacity (MW)*	Annual Fixed Charges (₹ Cr/Year)
Thremal			
1	Farakka STPS-Stg I & II	1600 MW (3*200 +2*500)	₹ 915.5649
2	Farakka STPS- Stg III	500 MW (1*500)	₹ 520.5885
3	Kahalgaon STPS -I	840 MW (4*210)	₹ 596.4837
4	Kahalgaon STPS -II	1500 MW (3*500)	₹ 1140.36
5	Talcher STPS -I	1000 MW (2*500)	₹ 663.6738
6	Barh STPS -II	1320 MW (2*660)	₹ 1695.83
7	BRBCL	750 MW (3*250)	₹ 1270.72
8	MTPS (KBUNL) - II	390 MW (2*195)	₹ 724.00
9	Darlipalli STPS -I	800 MW (1*800)	₹ 1180.94
10	NPGC STPP	660MW (1*660)	₹ 1169.93
Hydro			
1	TEESTA Stage-V HPS	510 MW (3*170)	₹ 520.3158
2	Rangit HPS	60 MW (3*20)	₹ 112.1775

* Units under Commercial Operation

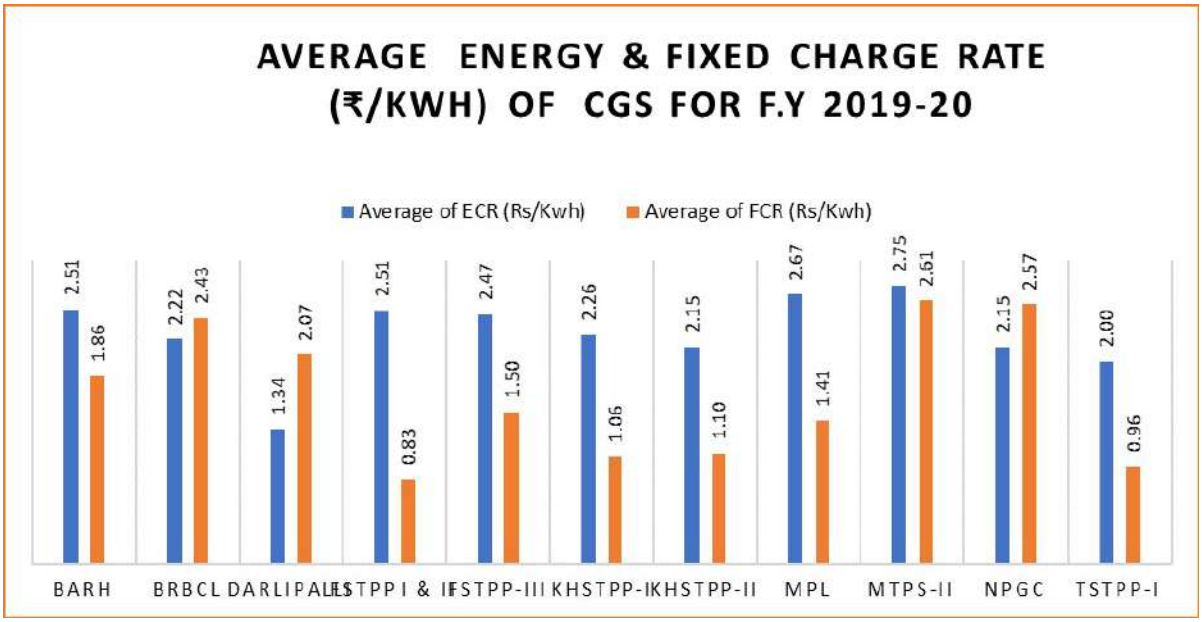
Energy Charges:

The Energy charges of the Central Generating Thermal Power Stations cover primary fuel cost and monthly fuel price adjustment (FPA). From July, 2011 onwards, the Fuel Price Adjustment has been included in the energy charges. The energy charges payable by every beneficiary for the total energy scheduled to be supplied to such beneficiaries during the month on ex-power plant basis. In case of Hydro Generating stations, the energy charge shall be payable by beneficiaries in proportional to their respective allocation in the saleable capacity of the generating station.

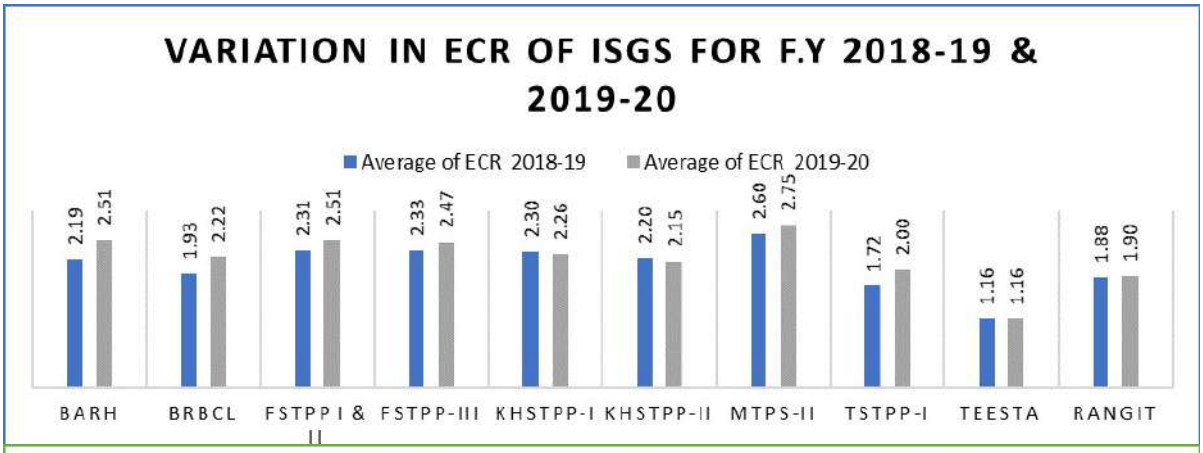
The indicative average energy rates for Central Sector Thermal stations in ER for the year 2019-20 were as under:

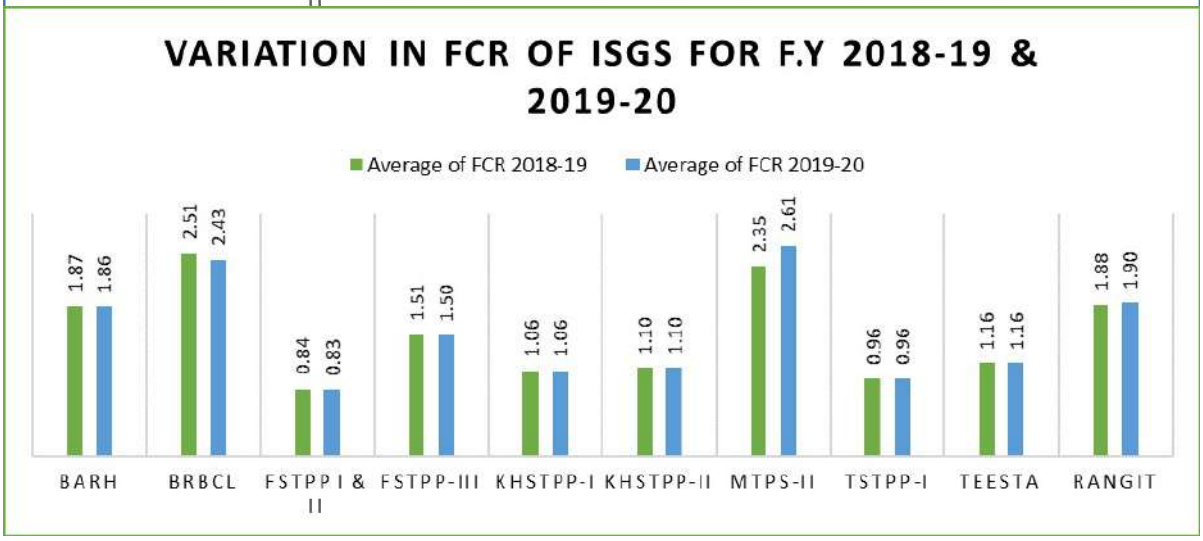
Average Energy Charge during 2019-20 (₹ /kWh)

Generator (ISGS)	Average ECR (Rs./KWh)	Average FCR (Rs./KWh)	Total Charge Rate (Rs./KWh)
TSTPP-I	2.00	0.96	2.96
KHSTPP-II	2.15	1.10	3.25
KHSTPP-I	2.26	1.06	3.32
FSTPP I & II	2.51	0.83	3.34
Darl.STPP	1.34	2.07	3.41
FSTPP-III	2.47	1.50	3.97
MPL	2.67	1.41	4.08
BARH	2.51	1.86	4.37
BRBCL	2.22	2.43	4.65
NPGC	2.15	2.57	4.72
MTPS-II	2.75	2.61	5.36



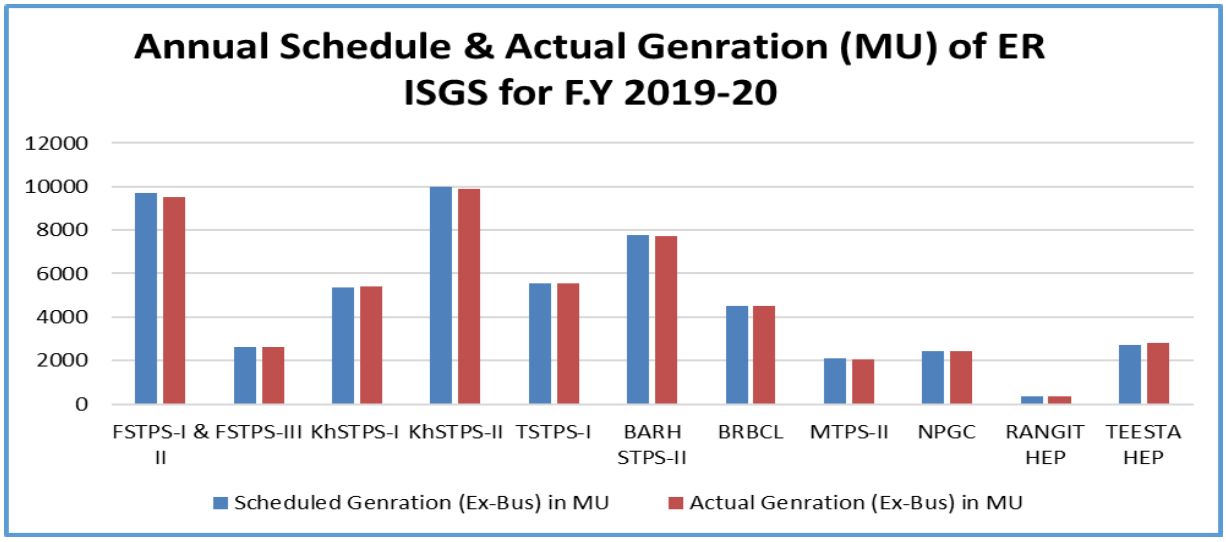
The year-wise variation in **Energy Charge Rate (ECR)** as well as **Fixed Charge Rate (FCR)** for ER ISGS for years 2018-19 & 2019-20 are given below for reference.





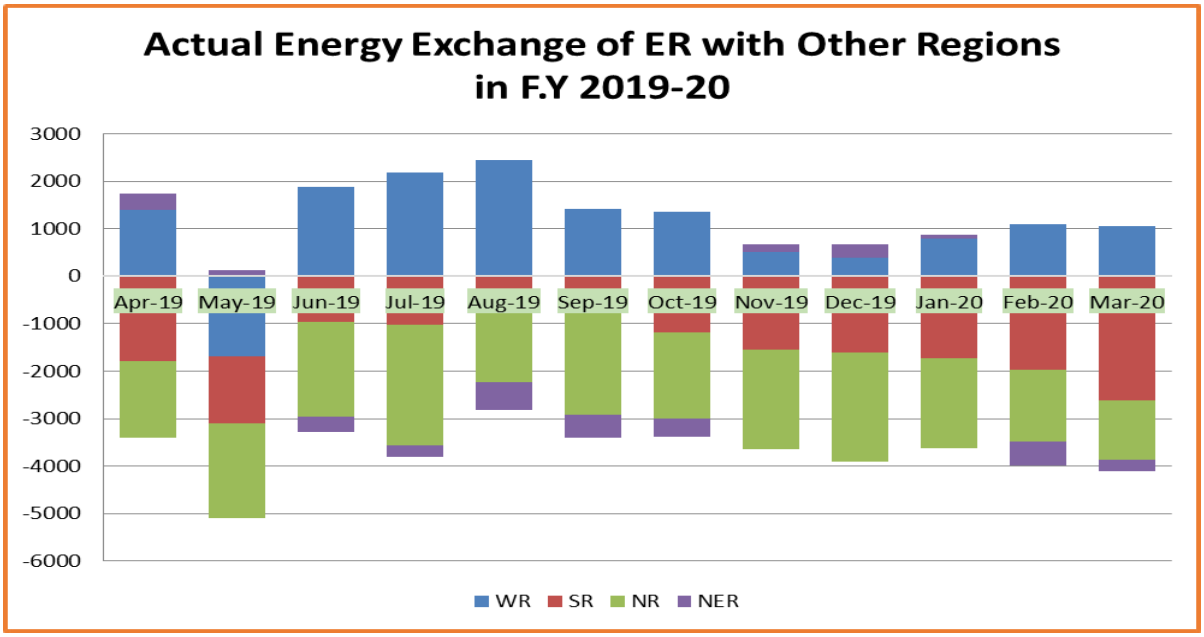
4.1.3 Annual Generation of NTPC and NHPC stations in ER during the year 2019-20:

Generating Station (ISGS)	Scheduled Generation (Ex-Bus) in MU	Actual Generation (Ex-Bus) in MU
FSTPS-I & II	9691	9516
FSTPS-III	2631	2621
KhSTPS-I	5382	5393
KhSTPS-II	9968	9890
TSTPS-I	5553	5529
BARH STPS-II	7785	7734
BRBCL	4509	4519
MTPS-II	2117	2077
NPGC	2443	2430
RANGIT HEP	346	350
TEESTA HEP	2737	2811



The details of net exchange of actual energy (MU) from Eastern Region including transmission loss with other regions for the year 2019-20 [Import (+) / Export (-)] is furnished below:

WR	SR	NR	NER	TOTAL
16194.08	-17122.23	-23613.2	-1816.38	-33976.24

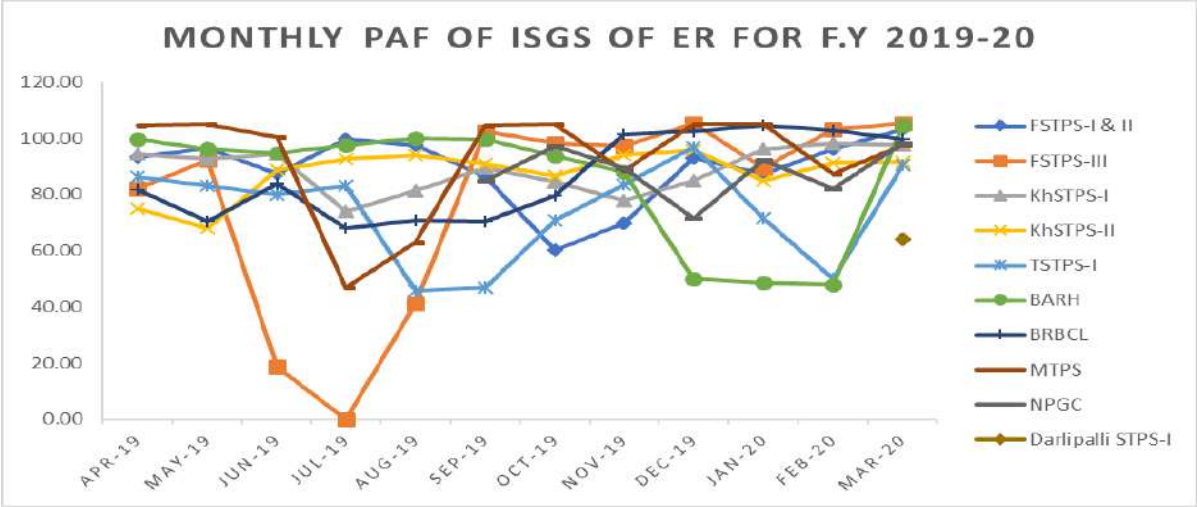


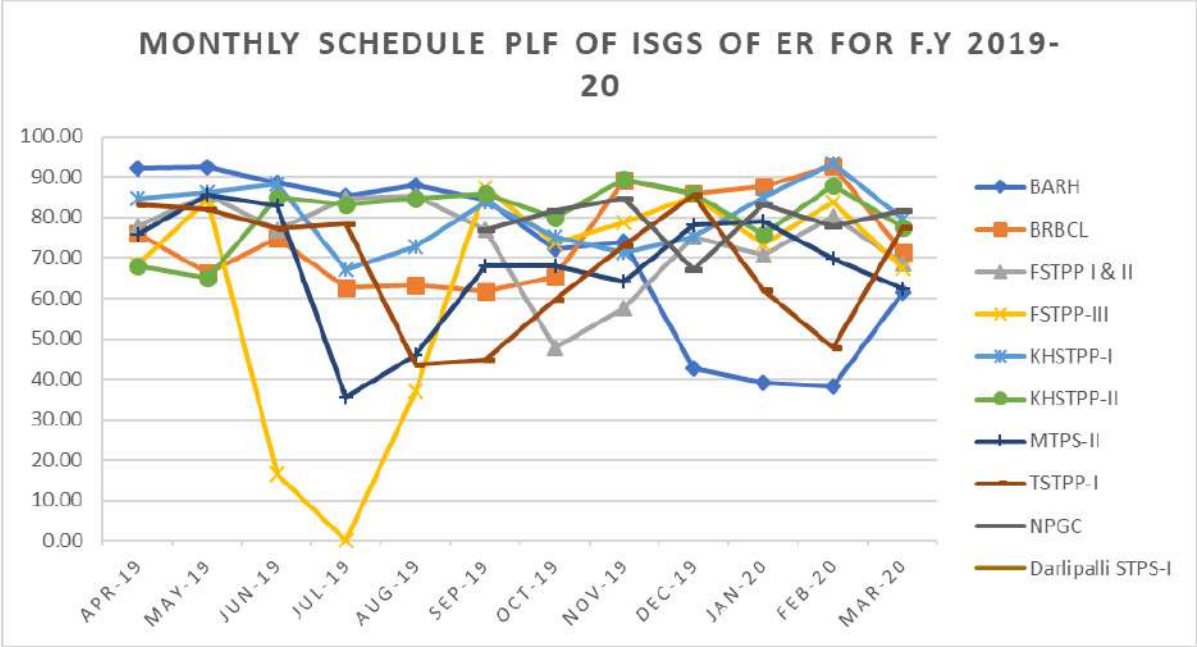
4.1.4 PAF & Schedule PLF of ISGS Thermal Stations in ER in F.Y 2019-20:

Plant Availability Factor (PAF) refers to whether a plant is available for generation or not. PAF of a generating station means the average of the daily declared capacities (DCs) for the period expressed as a percentage of the installed capacity in MW less the normative auxiliary consumption. The annual fixed cost (AFC) of a generating station would be recovered based on the cumulative availability of station.

Schedule PLF of a plant refers to percentage schedule generation against its schedule generating capacity. It is used for recovery of primary and secondary fuel cost of station and charged to beneficiaries to the extent of their drawl schedule.

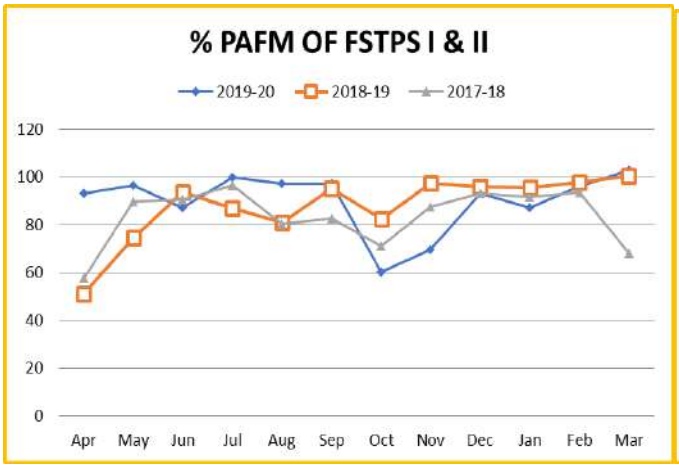
The month wise Plant Availability Factor (PAF) & Schedule PLF for year 2019-20 for NTPC stations in Eastern Region is shown below:

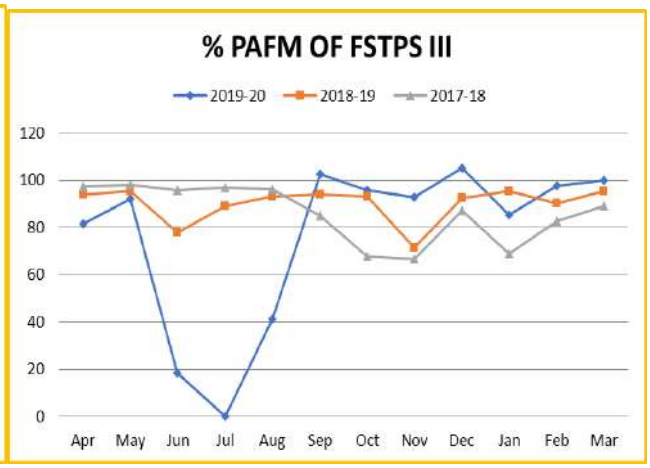


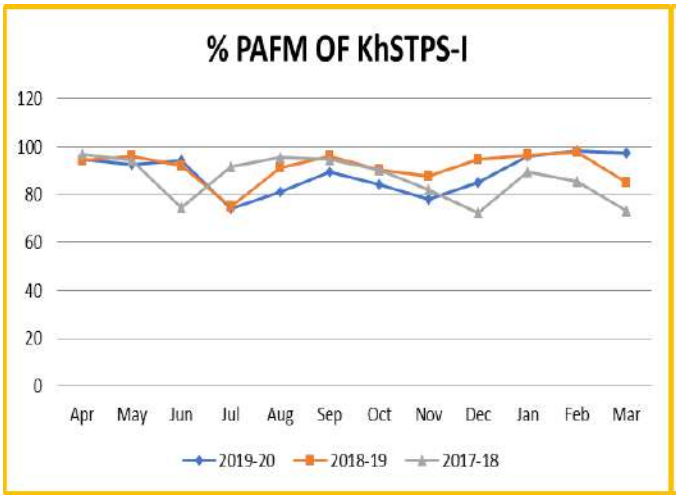


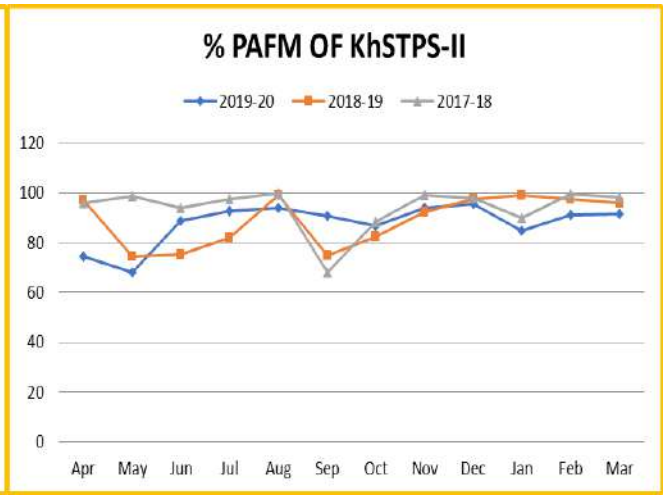
Comparative Performance of NTPC Thermal Generating Stations in ER:

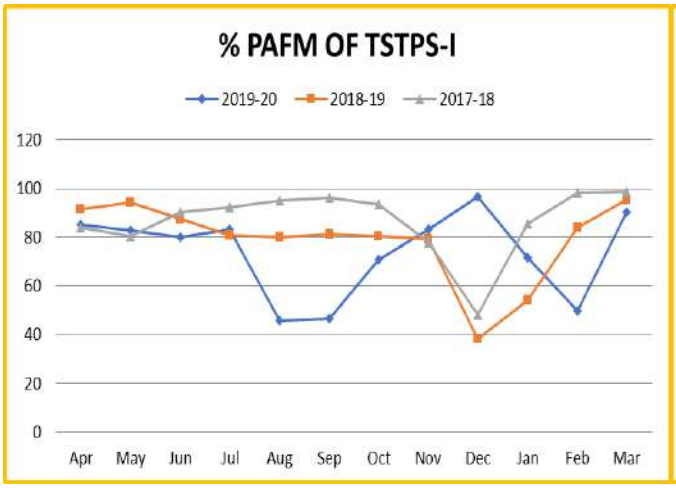
The month wise Plant Availability Factor (PAF) for years 2017-18, 2018-19 & 2019-20 for NTPC stations in Eastern Region is illustrated below:

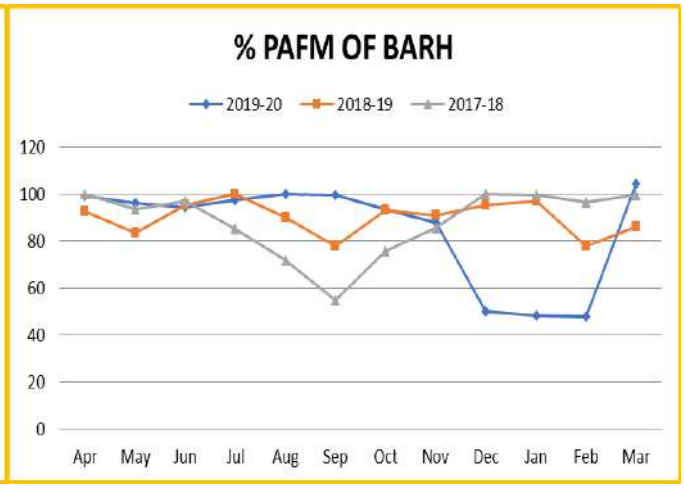

% PAFM OF FSTPS I & II
2019-20
2018-19
2017-18
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar

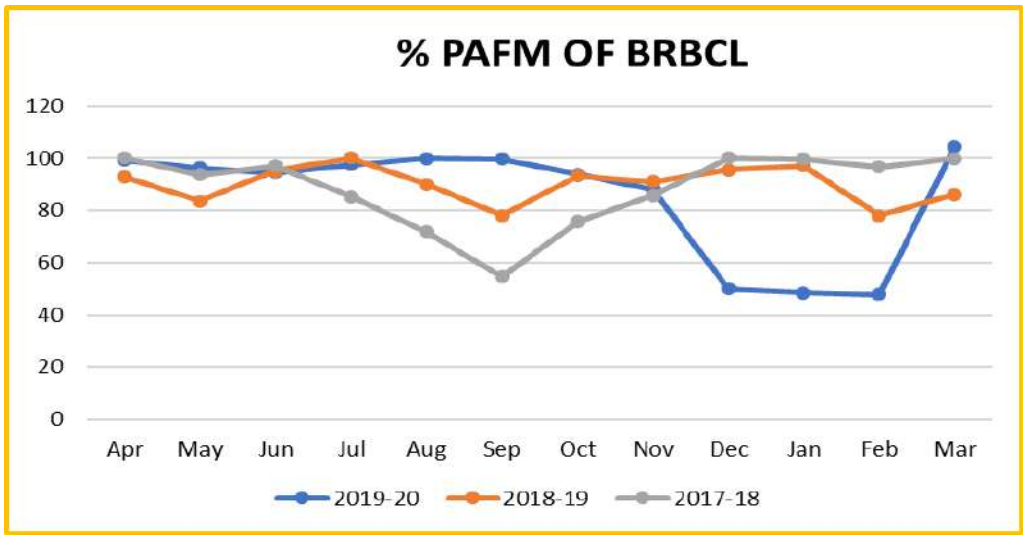

% PAFM OF FSTPS III
2019-20
2018-19
2017-18
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar


% PAFM OF KhSTPS-I
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
2019-20
2018-19
2017-18

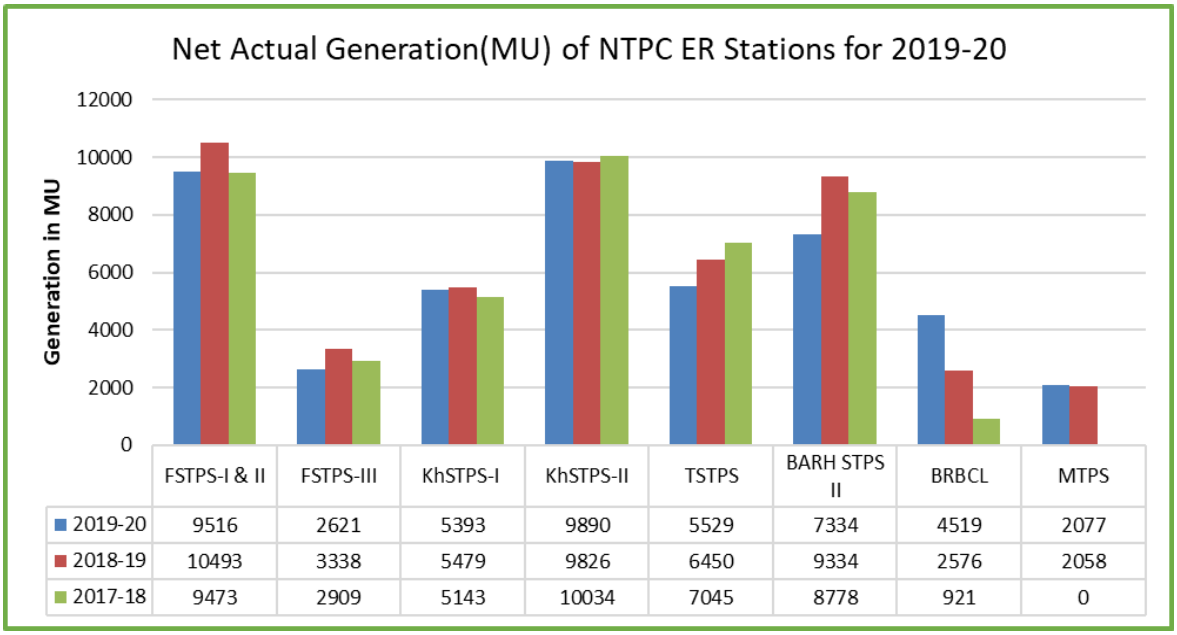

% PAFM OF KhSTPS-II
2019-20
2018-19
2017-18
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar


% PAFM OF TSTPS-I
2019-20
2018-19
2017-18
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar


% PAFM OF BARH
2019-20
2018-19
2017-18
120
100
80
60
40
20
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar



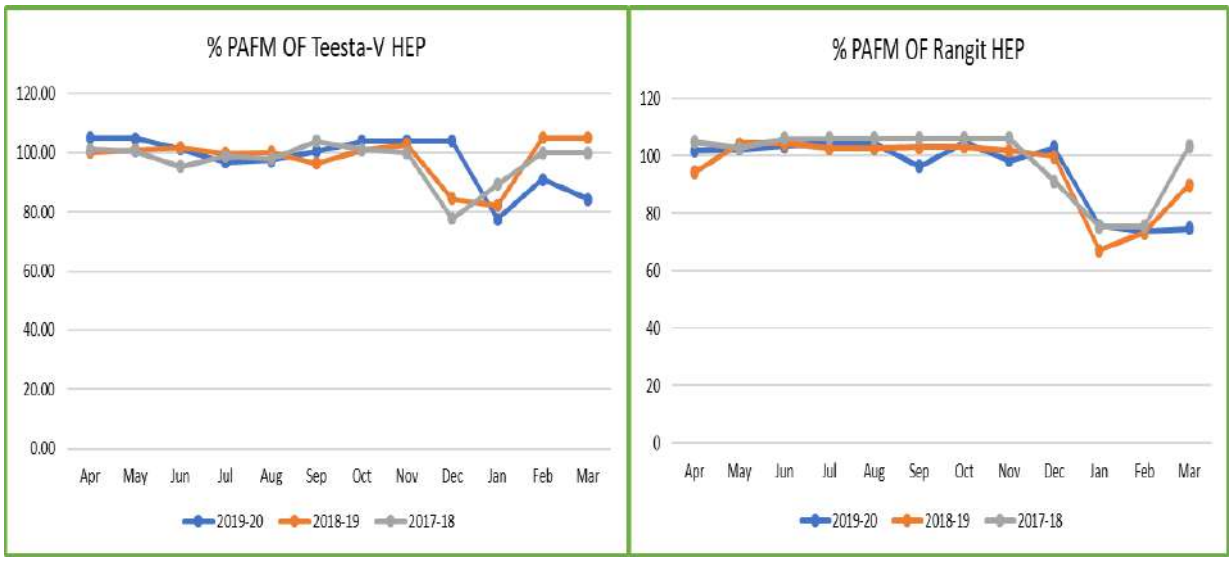
The year on year Actual Generation of NTPC ER Stations are as under:



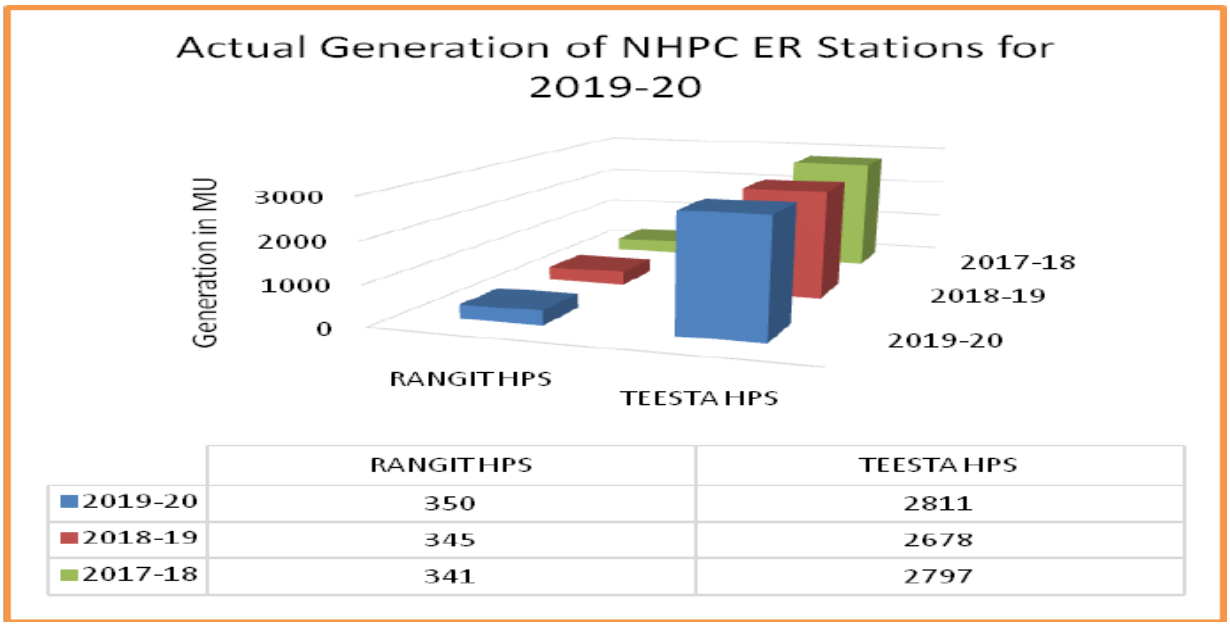
	FSTPS-I & II	FSTPS-III	KhSTPS-I	KhSTPS-II	TSTPS	BARH STPS II	BRBCL	MTPS
2019-20	9516	2621	5393	9890	5529	7334	4519	2077
2018-19	10493	3338	5479	9826	6450	9334	2576	2058
2017-18	9473	2909	5143	10034	7045	8778	921	0

4.15. Performance of NHPC stations in ER:

The month wise Plant Availability Factor (PAF) for years 2017-18, 2018-19 & 2019-20 for NHPC stations in Eastern Region is shown below:



The year on year Actual Generation of NHPC ER Hydro Stations are as under:



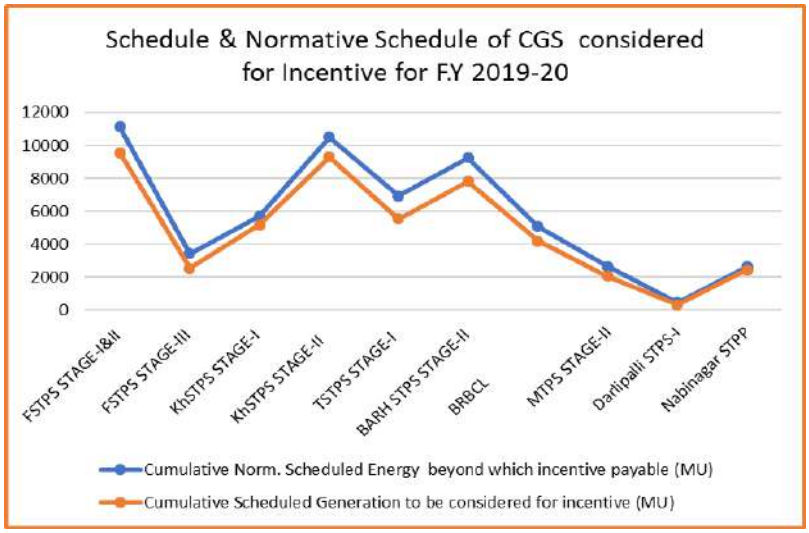
	RANGIT HPS	TEESTA HPS
2019-20	350	2811
2018-19	345	2678
2017-18	341	2797

4.1.6 Incentive to a Thermal Station:

If the cumulative schedule Energy of the generating station is above the Cumulative Normative Scheduled Energy for the financial year, then the Incentive shall be given to that generating station. The Cumulative Scheduled Generation considered for the financial year should not be included with RRAS schedule, SCED Schedule and Power Exchange (IEX & PXIL) schedule Energy.

Incentive to a generating station shall be payable at a flat rate of 50 Paisa /kWh for ex-bus scheduled energy corresponding to scheduled generation in excess of ex-bus energy corresponding to Normative Annual Plant Load Factor (NAPLF) of 85%.

For the F.Y of 2019-20 in Eastern Region no generating station is eligible for Incentive. The Cumulative Normative Scheduled Energy beyond which incentive payable (MU) and cumulative schedule Energy for F.Y 2019-20 shown in graph.



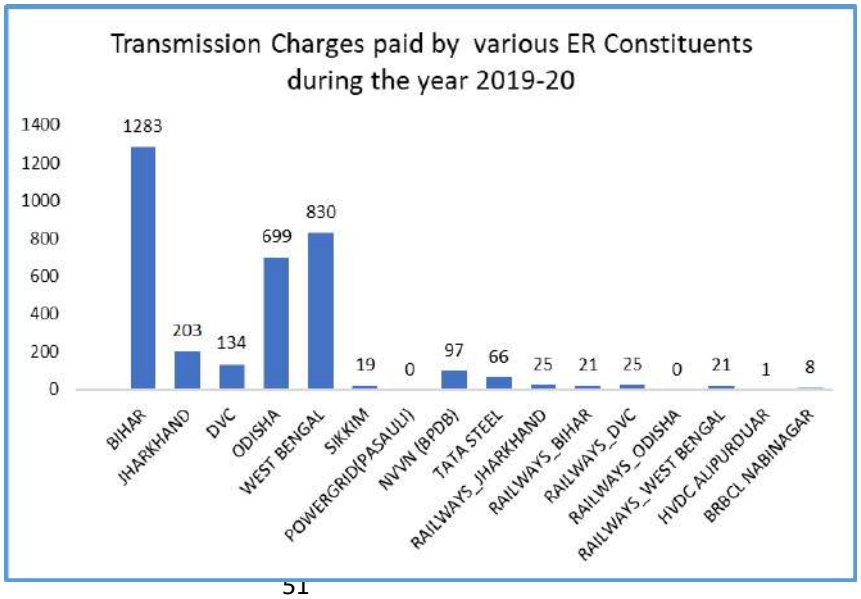
4.2 TRANSMISSION CHARGE

4.2.1 Regional Transmission Account:

From July, 2011 onwards, the transmission charges of the beneficiaries are calculated based on CERC (Sharing of Inter State Transmission Charges & Losses), Regulations, 2010. This has brought a new paradigm change in the transmission sector of the country and attempts to make transmission charges sensitive to distance, direction and use.

The objective of the new regulations is to remove pan caking in transmission charges. The new methodology uses load flow studies and point of connection charging method so as to get one injection PoC charge rate and one drawl PoC charge rate for each 400 KV nodes considering the Indian Power system as a whole and does away with the Regional Postal Stamp method used earlier. The above rates are reviewed/revised and approved on quarterly basis by the central Commission and applicable rates as on 31.03.2020 is given at **Annexure – XIII.**

The usage of lines by the nodes is calculated based on Hybrid method, which combines Marginal participation and Average Participation approaches. The electrically and physically proximate nodes are then combined to get one injection PoC rate and one drawl PoC rate for each state.



It is expected that the new system would provide signals for generators and bulk consumers and transmission licensees to create infrastructure in profitable locations.
Regional Transmission Account is being prepared by ERPC Secretariat based on the new methodology as per the data furnished by NLDC, which is also the Implementing Agency for these new regulations. The Regional Transmission Accounts is issued for the recovery of transmission charges corresponding to Long term open Access and Medium-term open Access transactions. A transmission charge paid by various constituents of Eastern Region during the year 2019-20 is furnished in **Annexure- XIV.**

4.2.2 Transmission Charges for Short Term transactions:

In case of bilateral and collective transactions, transmission charges for the energy approved for transmission separately for each point of injection and for each point of drawl, shall be payable in accordance with the provisions of Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010 and as amended from time to time.

The intra-State entities shall pay the transmission charges for use of the State network as fixed by the respective State Commission in addition to the charges specified under clauses (1) of the above regulation. Where the State Commission has not determined the transmission charges, the charges for use of respective State network shall be payable at the rate of Rs.80/MWh for the energy approved.

4.3 COLLECTION & DISBURSEMENT OF SHORT-TERM TRANSMISSION CHARGES:

The Transmission charges and the operating charges payable by the persons allowed short-term open access shall be indicated by nodal agency while approving the Open Access. The Transmission charges payable for Inter-State Transmission system and Transmission Charges for State network shall be indicated separately. The Transmission Charges and the Operating Charges shall be collected by the nodal agency except for transmission charges for State network in the case of collective transaction.

The transmission charges collected by the nodal agency for use of the transmission system other than State network, for a bilateral or collective transaction for each point of injection and each point of drawl shall be given to Central Transmission Utility (CTU) for disbursement. The CTU shall disburse these transmission charges to the long-term customers of the synchronously connected grid where the point of injection or point of drawl is situated, as the case may be, in proportion to the monthly transmission charges payable by them after making adjustments against Long-term Access to target region in accordance with the Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010 as amended from time to time. The transmission charges for use of State network shall be disbursed to the State Transmission Utility concerned.

4.4 OPEN ACCESS AND BILATERAL ENERGY TRANSACTIONS

4.4.1. Bilateral Trading 2019-20

Short term transactions are governed by "Central Electricity Regulatory Commission (Open Access in inter-State Transmission) Regulations, 2008" as amended from time to time for exchange of energy (MWh) between a specified buyer and a specified seller, directly or through a trading licensee or discovered at power exchange through anonymous bidding.

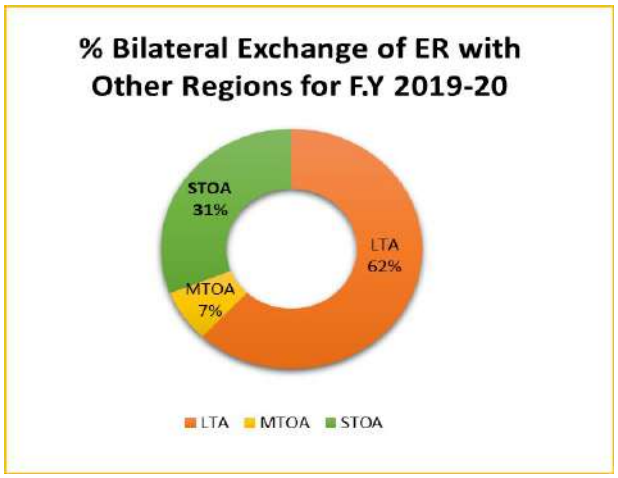
Trading of power in line with the CERC regulations on Short Term Open Access in transmission system started in Eastern Region with effect from 06.05.2004, and over the years the volume of bilateral trade has seen continuous increase. The number of traders and utilities indulging in bilateral trade and collective transactions through the IEX and PXI has also seen healthy growth. The indicative volume of trade in Eastern Region during 2019-20 by various traders through LTA, MTOA & STOA is provided in **Annexure – XV.**

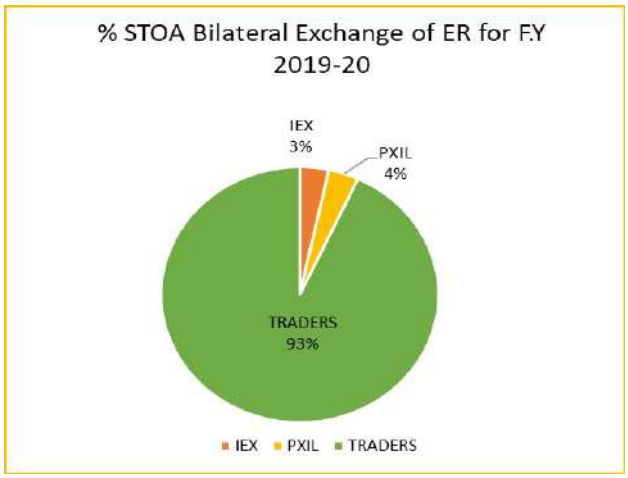
TRADERS involved in Short Term Transactions in ER	
AEL_Trader	MPPL Trader
APPCPL	NPCL(UP)
APPCPL_Trader	NR-DEL
APPL_Trader	NR-UP
BSL	NVVNL
CESC	POWER_EXCHANGE
CHUZACHEN	PTC
DB Power	PXIL
ECRD	RUVNL
ESIL_WR_Beneficiary	SAIL-RSP
GMR	SGPLNLR
GMRETL Trader	TATAHALDIA
IEXL_Trader	TATASTEEL
IPCL	TATASTL_BSL
IPCL_Trader	THEP
ITC_Munger	TPTCL_Trader
JBVNL	TSFAP_JODA
JITPL	TSKPO
JLHEP	TSL Joda
JSWEL	TSPJO
KEIPL	WBSEDCL
MANIKARAN	

The bilateral transactions consist of long term, medium term and short-term trades through traders, direct or via IEX/PXI. The participants in the short-term market trade electricity to meet short term demand or surplus situation or peaks requirement. It is also helpful in evacuation of generators for which LTA have not yet operationalized due to various constraints.

While short term market helps in balancing the energy pool by making small adjustments, it suffers from lack of assured access in case of congestion and depleted network scenario.

The breakup of bilateral trades in LTOA, MTOA, IEX/PXI, Direct and via Traders in Eastern Region is provided in the Pie-Chart are given below:

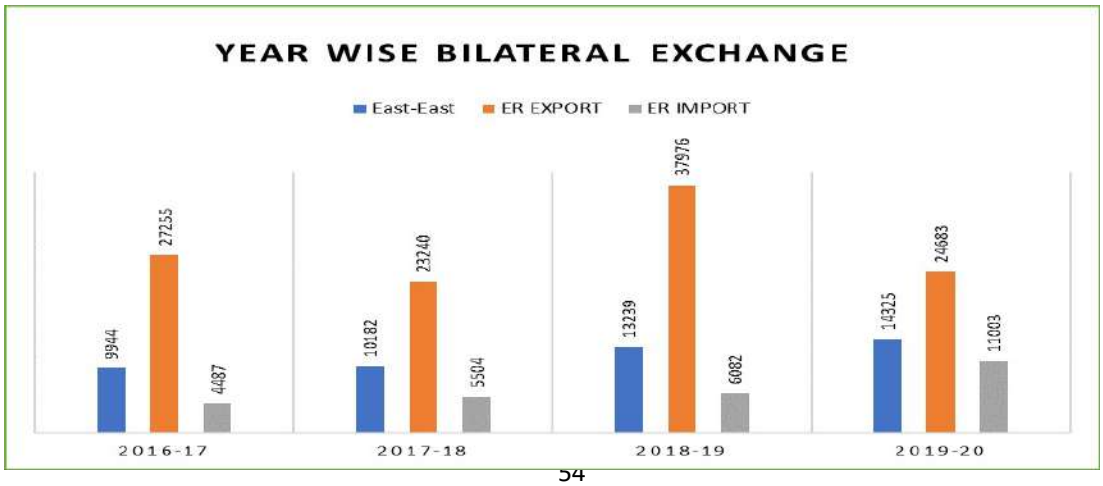


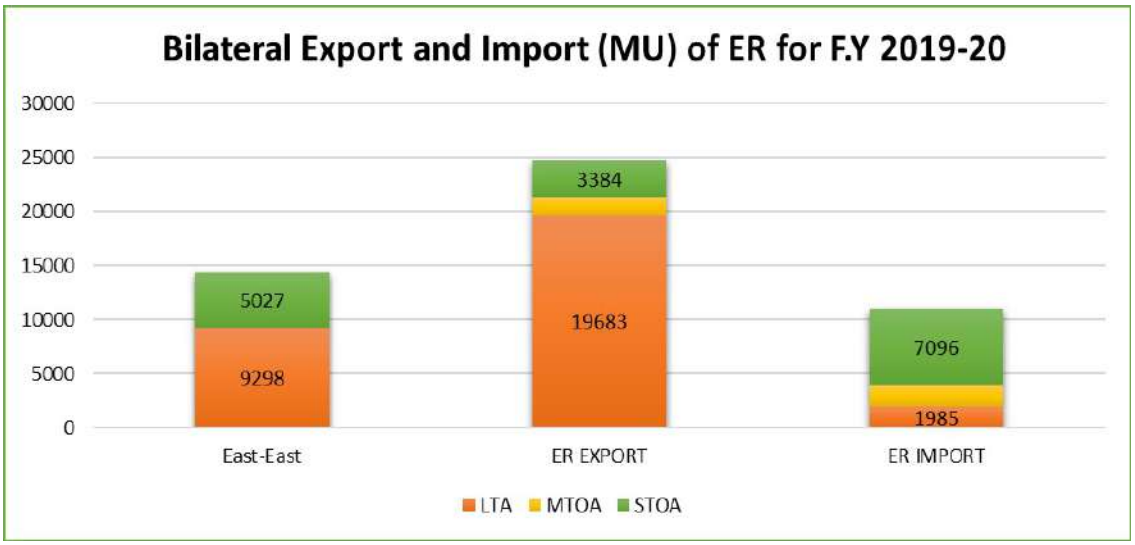


Figures in MU

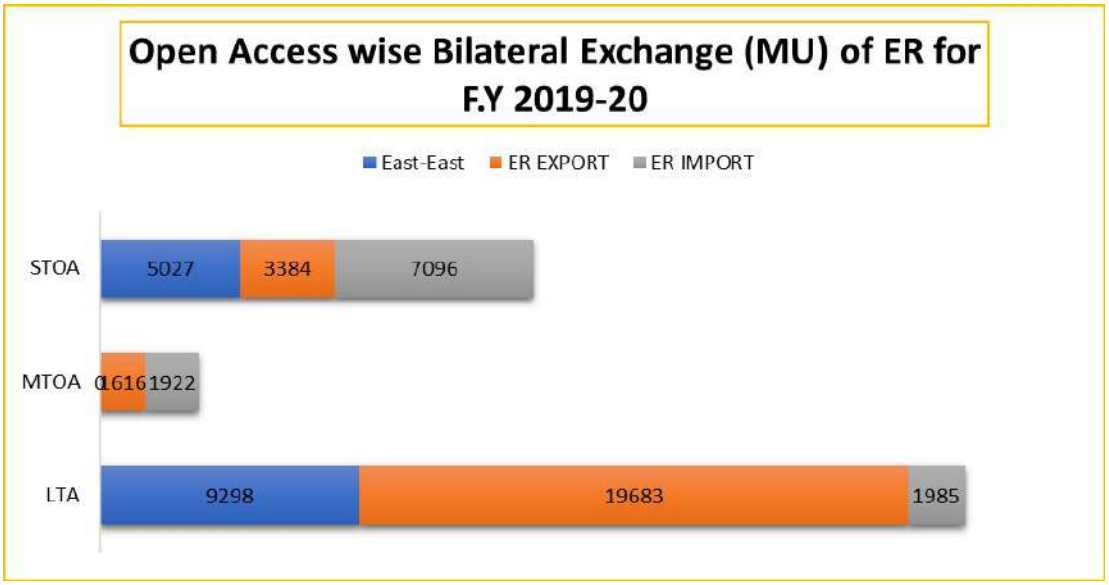
Long Term & Medium Term		Short Term Bilateral Transactions	
LTOA	**MTOA**	**IEX/PXI**	**Traders**
30967	**3538**	**1069**	**14437**

During 2019-20, scheduled bilateral transaction of power through ER was to the tune of 50011 MU. The breakup of year on year scheduled bilateral transactions has been indicated below for years 2016-17, 2017-18 ,2018-19 & 2019-20.





During the year substantial amount of transaction took place through IEX/PXI by means of anonymous bidding. The quantum of energy transactions in MU through different open access segments such as LTA, MTOA & STOA within ER Export from ER and import to ER has shown.

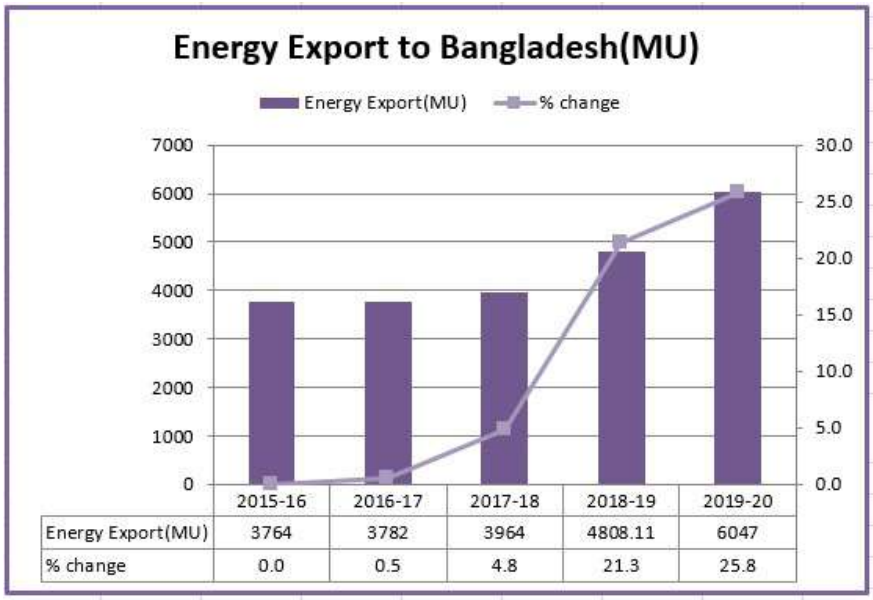


4.4.2 International Trades for year 2019-20

4.4.2.1 Trading of Power with Bangladesh:

Based on MoU between the two countries, MoP, Govt. of India decided to allocate 250 MW power round the clock (in Stages) from coal based NTPC stations in the country to Bangladesh. NTPC Vidyut Vyapar Nigam Ltd. (NVVN) as nodal agency has entered into a Power Purchase Agreement (PPA) with Bangladesh counterpart (BPDB) for cross border trading of power and to facilitate delivery of such power.

Accordingly, export of power from India (through 400 kV Behrampur (West Bengal) – Bheramara (Bangladesh) D/C line and 500 MW HVDC back-to-back at Bheramara to Bangladesh through BPDB commenced from 05.10.2013. The 2nd 500 MW Back to Back HVDC block was commissioned in June-18. Presently 800 MW power is being exported to Bangladesh comprising 250 MW (Net 232.42 MW) power from NTPC Stations (out of which 50 MW from Eastern Region station with effect from 04.12.2013), 300 MW Long term power from DVC through NVVNL and 250 MW from SEMBCORP. The actual energy (including transmission loss) exported to Bangladesh during 2019-20 was to the tune of 6047 MU from Eastern Region.

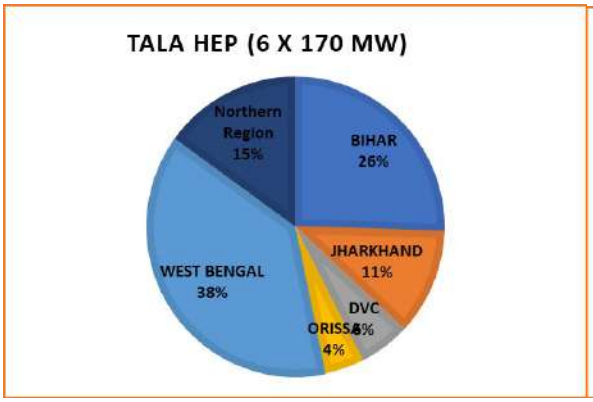


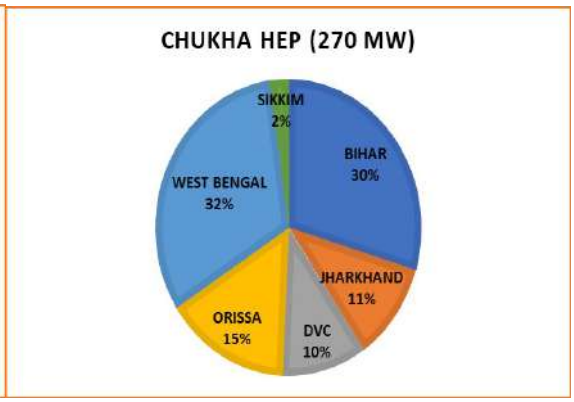
4.4.2.2 Trading of power with Bhutan:

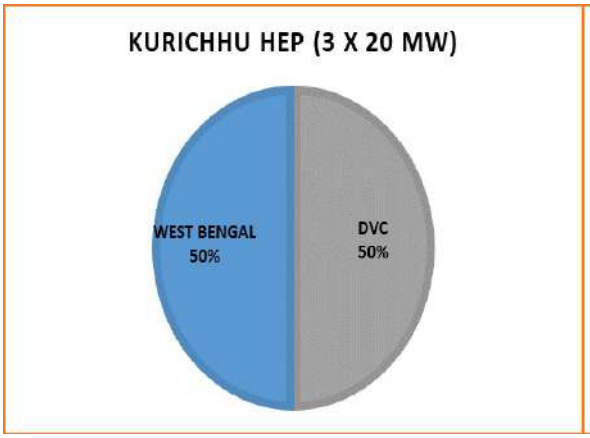
Over and above the availability of power from NTPC and NHPC stations in ER, the region has imported power from Govt. of Bhutan through PTC and TPTCL as below;

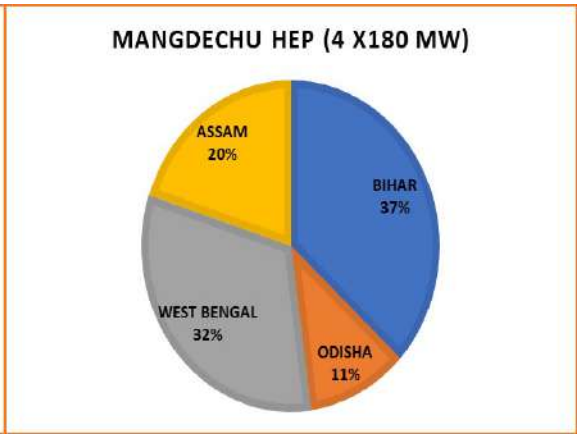
Import to India from	2015-16 (MU)	2016-17 (MU)	2017-18 (MU)	2018-19 (MU)	2019-20 (MU)
BHUTAN	5420.4	5824	5072.08	4395.87	6350.6

As per GoI orders, the majority of power from Hydro stations of Bhutan has been allocated to Eastern Region States as shown below:





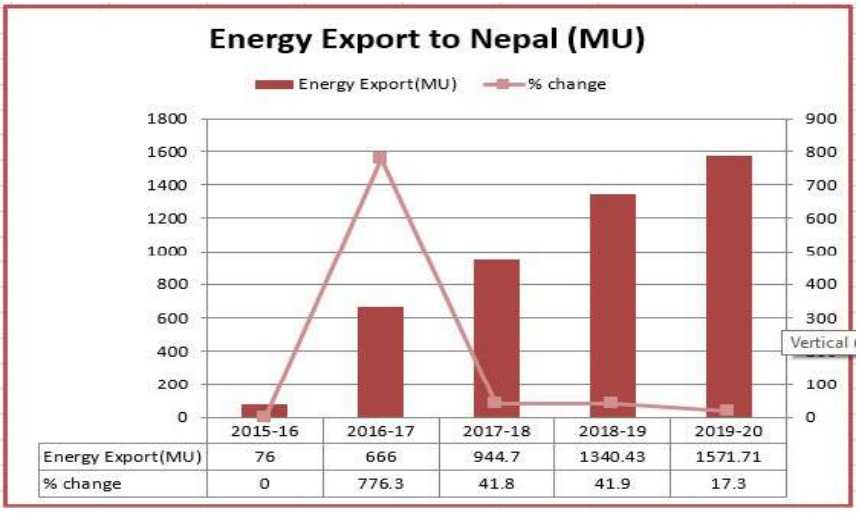




4.4.2.3 Trading of power with Nepal:

Energy exported to Nepal during 2019-20 to the tune of 1571.71 MU (inc. transmission loss) mainly through NVVN trader.

The energy exported to Nepal had been drastically increased to 666 MU in 2016-17 due to charging of 400kV Muzaffarpur – Dhalkebar line at 220 kV voltage level.



4.5 LONG TERM AND MEDIUM-TERM ACCESS

Long term transactions are governed by "Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations, 2009" on 07.08.2009.

The LTA to / from Eastern Region informed by NLDC as on 31.03.2020 is provided in Table below (except CGS):

LTA Status up to March-2020:

S. No	Name of LTA Customer (Injecting utility)	Generator/Load/Trader	Region	Quantum of LTA granted (MW)	Name of the beneficiaries
1	BRPL (DVC Power)	Load	ER	31	BRPL
2	BYPL (DVC Power)	Load	ER	19	BYPL
3	DVC (DVC Durgapur U#2)	Generator	ER	100	PSPCL
4	DVC (DVC Koderma U#1)	Generator	ER	100	Haryana
5	DVC (DVC Mejia U#7)	Load	ER	12.5	DVC
6	DVC (DVC Mejia U#8)	Load	ER	12.5	DVC
7	DVC (MPL U#1)	Load	ER	140.5	DVC
8	NDPL (DVC Power)	Load	ER	19.55	NDPL
9	WBSEDCL (MPL U #1&2)	Load	ER	141.375	WBSEDCL
10	WBSEDCL (MPL U#1&2)	Load	ER	141.375	WBSEDCL
11	Adhunik Power & Natural Resources Ltd	Generator	ER	100	WBSEDCL
12	Tata Steel Ltd (DVC, Mejia B)	Load	ER	100	Tata Steel
13	Tata Steel Ltd (DVC, DSTPS)	Load	ER	100	Tata Steel
14	Ind-Barath Energy (Utkal) Ltd, Odisha	Generator	ER	500	TANGEDCO, TN
15	KSEB (Maithon Power Ltd-RBTPP)	Load	ER	140.625	KSEB
16	BESCOM, Karnataka (Mejia 7&8, DVC)	Load	ER	200	BESCOM, Kar
17	Adhunik Power & Natural Resources Ltd	Generator	ER	100	TANGEDCO, TN
18	DVC, Raghunathpur (Unit-1 & 2)	Generator	ER	100	Haryana (U1-50MW & U2-50MW)
19	GMR Kamalanga Energy Ltd	Generator	ER	387	Haryana (312 MW)
20	DVC, Raghunathpur (Unit-1 & 2)	Generator	ER	300	Punjab (U1-150 MW & U2-150 MW)
21	KSEB (Maithon Power Ltd-RBTPP)	Load	ER	140.625	KSEB

22	GMR Kamalanga Energy Ltd	Generator	ER	260	Bihar (260 MW)
23	Bhartiya Rail Bijlee Company Limited (BRBCL)	Generator	ER	910	As per the MoP allocation to be decided by respective RPC
24	Jndal India Thermal Power Ltd (JITPL), Odisha (2x600MW)	Generator	ER	95	KSEB Ltd, Kerala
25	WBSEDCL, West Bengal (1000MW State Surplus)	DIC	ER	1000	NA
26	PSPCL (Bokaro TPS, DVC Power)	Load	ER	200	PSPCL
27	Kanti Bijlee Utpadan Nigam Ltd.	Generator	ER	121.59	As per the MoP allocation to be decided by respective RPC
28	PTC (Teesta-III HEP)	Trader	ER	174	UP
29	PTC (Teesta-III HEP)	Trader	ER	87	RAJASTHAN
30	Jndal India Thermal Power Ltd (JITPL), Odisha (2x600MW)	Generator	ER	228	Bihar Discoms
31	NVVNL (injection is from DVC, West Bengal)	Trader	ER	300	NVVNL, BPDB
32	Gati Infrastructure Limited,Chuzachen HEP (2x55MW)	Generator	ER	99	
33	Dans Energy Pvt. Ltd., Jorethang HEP (2x48MW)	Generator	ER	86.4	
34	Shiga Energy Private Limite, Tashiding HEP (2x48.5MW)	Generator	ER	87.3	
35	Nabinagar Power Generating Company Limited	Generator	ER	1856.25	As per the MoP allocation to be decided by respective RPC

MTOA Status up to March-2020:

Sl. No.	Name of the Applicant	Injection of Power		MTOA Granted for (MW)	Date from which MTOA is Granted	Date upto which MTOA Granted	Drawl of Power	
		Entity / Location of Generating Station	Region				Entity / Location of Loads	Region
1	JITPL, Odisha	JITPL, Odisha	ER	123	01-04-2017	31-03-2020	WCR, MP	WR
2	JITPL, Odisha	JITPL, Odisha	ER	21.6	01-09-2017	31-03-2020	WCR, MP	WR
3	JITPL, Odisha	JITPL, Odisha	ER	38	01-10-2017	25-04-2020	Northern Railway, Haryana	NR
4	JITPL, Odisha	JITPL, Odisha	ER	9.46	01.03.2018	31.01.2021	Northern Railway, Delhi	NR

4.6 COMMERCIAL DECLARATION OF NEW GENERATING STATIONS IN ER

The following new generating stations in ER were declared under commercial operation during the year 2019-20.

NEW UNITS DECLARED COMMERCIAL IN EASTERN REGION DURING 2019-20							
SI.	**STATE**	**AGENCY**	**Name of Power Stations**	**Type**	**Unit No.**	**Capacity (MW)**	**CoD**
1.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#3	660	03.07.2019
2.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#4	660	21.08.2019
3.	BIHAR	NTPC	Nabinagar Super Thermal Power Project	Thermal	U#1	660	06.09.2019
4.	ODISHA	NTPC	Darlipali Super Termal Power Project	Thermal	U#1	800	01.03.2020
5.	BIHAR	NTPC	Barauni Thermal Power Project	Thermal	U#8	250	01.03.2020
6	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#1	180	28.06.2019
7	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#2	180	08.07.2019
8	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#3	180	14.08.2019
9	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#4	180	16.08.2019

4.7 SOLAR POWER GENERATION IN THE REGION

The renewable sources of electricity have zero marginal cost and are must run in nature. The development of Solar Power generation in India has been initiated for quite some time. The development of solar power generation process confronts several barriers like financial, investment, technology, institutional and other incidental factors. To overcome these barriers substantial support is required for development of solar power generation. Foremost among them is the relatively high cost of solar generation. Several options were explored to give incentive to the cost of solar power and the option of "bundling" solar power with the power out of the cheaper unallocated quota of Central Coal based Stations and selling this bundled power to state distribution utilities at the CERC regulated price was decided.

In order to facilitate grid connected solar power generation in the first phase, the Mission provides for NTPC Vidyut Vyapar Nigam (NVVN) to be the designated Nodal Agency for procuring the solar power by entering into a Power Purchase Agreement (PPA) with Solar Power Generation Project Developers who will be setting up Solar Projects during the next three years, i.e. Before March 2013 and are connected to a grid at a voltage level of 33 kV and above. For each MW of installed capacity of solar power for which a PPA is signed by NVVN, the Ministry of Power (MoP) shall allocate to NVVN an equivalent amount of MW capacity from the unallocated quota of NTPC coal based stations and NVVN will supply this "bundled" power to the Distribution Utilities.

Solar power bundling implemented in ER at present:

1) Ministry of Power (GoI) has allocated 5 MW of power to Odisha from the un-allocated power of coal based NTPC power stations in Eastern Region for bundling with the power from 5 MW solar PV power project of M/s Aftaab Solar in Odisha [under JNNSM scheme (Phase-I)]. The same has been made effective from 01.05.2012 in the Regional Energy Accounts (REA) of ER.

2) Ministry of Power (GoI) has allocated 5 MW of power to GRIDCO from the un-allocated power of coal based NTPC power stations in Eastern Region for pooling with the power from 5 MW Dadri solar power project of NTPC. The same has been made effective in the Regional Energy Accounts (REA) of ER with effect from 00:00 hrs. of 30.03.2013.

3) Ministry of Power (GoI) has allocated un-allocated power of NTPC stations in ER for bundling with 65 MW of solar power from Rajasthan with effect from 00:00 hrs. of 16.08.2013 in favour of GRIDCO: 10 MW; West Bengal : 35 MW; DVC : 15 MW; and Assam : 5.

4) Ministry of Power (GoI) has allocated 5 MW of power to DVC from the un-allocated power ofcoal based NTPC power stations in Eastern Region for bundling with the power from 5 MW Talcher solar power project of NTPC. The same has been made effective in the Regional Energy Accounts (REA) of ER with effect from 00:00 hrs. of 28.03.2014.

5) Ministry of Power (GoI) has allocated 10 MW of power to DVC from the un-allocated power of coal based NTPC power stations in Eastern Region for bundling with the power from Unchahar solar power project of NTPC. The same has been made effective in the Regional Energy Accounts (REA) of ER with effect from 00:00 hrs. of 31.03.2014.

6) Ministry of Power (GoI) has allocated 5 MW of power to Gridco from the un-allocated power of coal based NTPC power stations in Eastern Region for bundling with the power from Faridabad solar power project of NTPC. The same has been made effective in the Regional Energy Accounts (REA) of ER with effect from 00:00 hrs. of 31.03.2014.

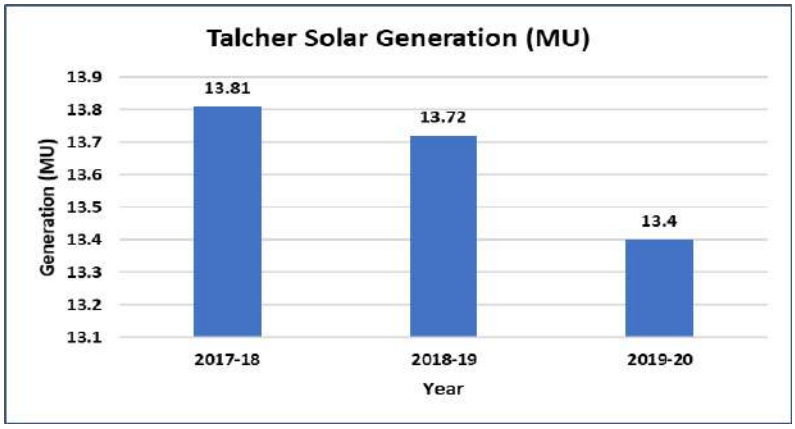
7) 25 MW of Solar Power from Rajasthan (M/s Sun Technique Solar Pvt. Ltd.) under the scheme of JNNSM Phase – I was allocated to West Bengal-15 MW, Odisha-5 MW, DVC-5 MW which which have been implemented w.e.f. 00:00 Hrs. of 05.12.2014.

8) Subsequently, DVC has surrendered its share of 40 MW of coal power from ER NTPC stations and 1.09 MW from MTPS Stg-II, KBUNL w.e.f. 01.12.2017; the same has been allocated to Telengana for bundling with 100 MW of solar power under National Solar Mission Phase-II Batch-II Tranche-I.

9) Ministry of Power (GoI) has allocated 50 MW (41.09 MW surrendered power of DVC and 8.91 MW from Barh STPS) to Telengana for bundling with 100 MW of solar power under National Solar Mission Phase-II Batch-II Tranche-I w.e.f. 00:00 Hrs of 01.12.2017.

10) Total generation from Talcher Solar Station of NTPC for 2019-20 is 13.40 MU.

The variation in Generation of Talcher Solar Station for last three years is as given below:



4.8 FUNDS TRANSFERRED TO POWER SYSTEM DEVELOPMENT FUND FROM EASTERN REGION

The Power System Development Fund (PSDF) Regulations were notified by CERC on 04.06.2010. As per this regulation the following funds are transferred to the PSDF:

1. Congestion charges standing to the credit of the "Congestion Charge Account" after release of amounts payable to Regional Entities entitled to receive congestion charge along with interest, if any, in accordance with the Central Electricity Regulatory Commission (Measures to relieve congestion in real time operation) Regulations, 2009 as amended from time to time;
2. Congestion amount arising from the difference in the market prices of different regions as a consequence of market splitting in power exchanges in accordance with Central Electricity Regulatory Commission (Power Market) Regulations, 2010.

3. Unscheduled Interchange charges standing to the credit of the "Unscheduled Interchange Pool Account Fund" after final settlement of claims of Unscheduled Interchange Charges in accordance with the Central Electricity Regulatory Commission (Unscheduled Interchange Charges and related matters) Regulations, 2009 as amended from time to time;

4. RLDC reactive energy charges standing to the credit of Reactive Energy Charges Account;

5. Such other charges as may be notified by the Commission from time to time during the financial year 2019-20 up to 07.02.2020, the amount of Rs. 343.07 Cr. has been transferred to PSDF.

4.9 ANCILLARY SERVICES

Power systems require ancillary services to maintain reliability and support their primary function of delivering energy to customers. Ancillary services are principally real-power generator control capacity services the system operator uses over various time frames to maintain the required instantaneous and continuous balance between aggregate generations and load. Ancillary Services consist of services required for:

a) Maintaining load – generation balance (frequency control)
b) Maintaining voltage and reactive power support
c) Maintaining generation and transmission reserves

Renewable energy generation is variable in nature (diurnal & seasonal) and implementation of ancillary services would facilitate integration of renewable energy generation in the country. Ancillary services will certainly help in controlling the variability of renewable generation.

- **Primary Control**

Continuous load changes result in mismatch of generation and load leading to variation in frequency of interconnected power system. Governors free to operate would enable smooth control of frequency fluctuations as well as security against grid disturbances. Time frame for primary governor control action is about a few seconds i.e. 2- 5 seconds.

- **Secondary Control**

If the load generation imbalance caused by an outage of large generator or load causing sudden variation in frequency of interconnected power system, primary response through governor action described above would help arrest the change fall in frequency. However, the frequency has to be brought back to 50 Hz through corrective action taken by the Control Area within which the generation or load is affected. Supplementary corrective action or secondary control has to be taken to bring frequency back to 50 Hz. For large interconnection system this automatic secondary control is known as Automatic Generation Control (AGC). Time line of secondary control action is a few minutes.

- **Tertiary Control**

Loss of large generator (or load) may cause a large enough system excursion that cannot be handled by regulatory reserve alone. The above secondary control reserves also needs to be restored through tertiary reserves. Tertiary reserve provides significant insurance against wide spread outages.

The ancillary services are a potent tool in the hands of the system operator. The Central Commission is actively considering bringing in regulation to implement full fledged ancillary services in the country.

4.10 DEVIATION SETTLEMENT MECHANISM (DSM)

4.10.1 Introduction

In ABT tariff system apart from Capacity (Fixed) charges and Energy charges the third important component is Deviation charges. It is the payment for deviations from schedule at a rate dependent on system conditions (Frequency) at that time. The deviation from schedule is technically termed

as Unscheduled Interchange (UI) in ABT terminology. CERC vide its notification No. L-1/132/2013/CERC dated 06.01.14 directed for implementation of Deviation Settlement Mechanism w.e.f 17.02.2014 in place of UI regulations. With the implementation of this regulation, the UI regulation stood repealed.

For a generator, Deviation is the difference between Actual generation (ex-bus) and Schedule generation (ex-bus), whereas for a beneficiary, it is equal to Actual drawl (periphery) and Schedule drawl (periphery). Deviation charge is obtained by multiplying the Deviation with deviation rate. Deviation rate is a frequency dependent energy rate notified by Central Electricity Regulatory Commission. A constituent may receive/pay Deviation charge depending on whether it has assisted/undermined the grid frequency.

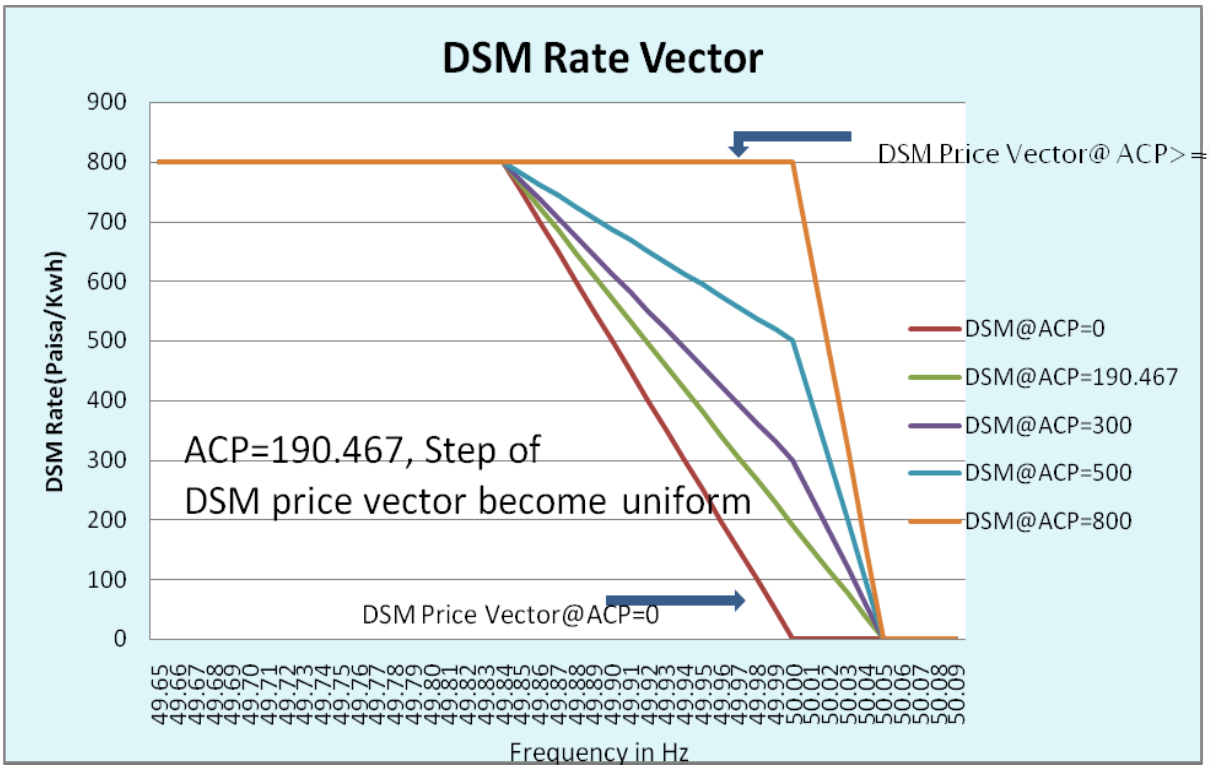
It acts like a financial barometer, which measures a licensee's responsiveness towards healthiness of the regional grid. The DSM mechanism has established a real time balancing market that is workably competitive and provides a powerful force for efficiency and innovation.

4.10.2 Rates for Deviation Charge with effect from 01.01.2019 are as under: -

The Deviation rate is a frequency-actuated signal available at any wall socket. Every utility reacts to this signal in real time and adjusts its generation/ demand and a new equilibrium is achieved. The Deviation curve by virtue of its design empowers every utility that has some means to regulate supply/demand to readjust its interchange with the grid and gain from the migration of frequency/UI rate from the earlier level. The decreasing marginal returns with every additional unit of deviation from the scheduled interchange acts as a counterweight, which forces the utility to seriously weigh the consequences of its actions.

Average freq of the time block (Hz)		Charges for Deviation
Below	**Not below**	**Paise/kWh**
	50.05	0.00
50.05	50.04	1x(P/5)
50.04	50.03	2x(P/5)
------	------	------
50.01	50.00	P
50.00	49.99	50.00+15x(P/16)
49.99	49.98	100.00+14x(P/16)
------	-----	------
49.87	49.86	700.00+2x(P/16)
49.86	49.85	750.00+1x(P/16)
49.85		800.00

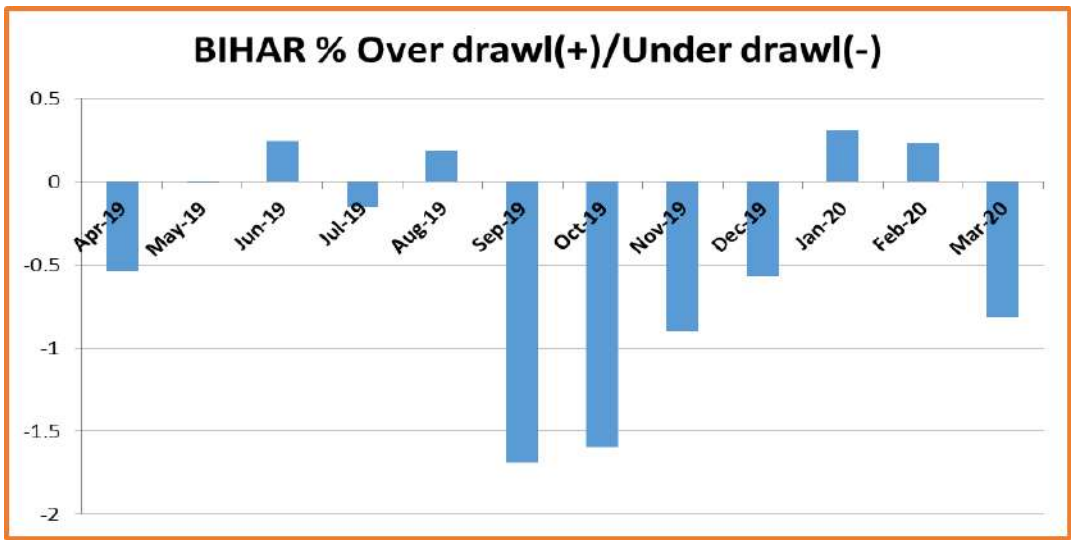
P= Average Area Clearing Price

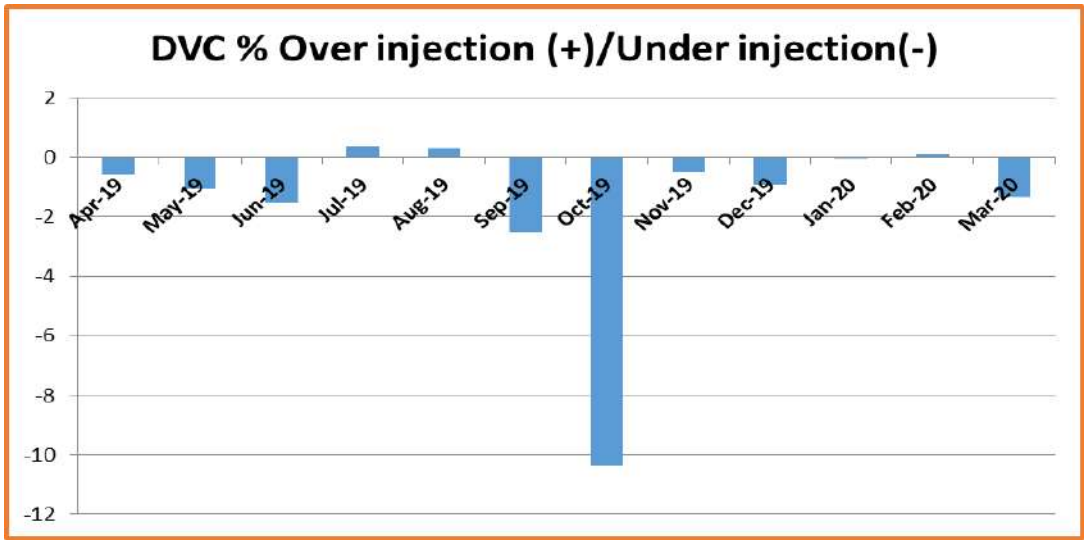


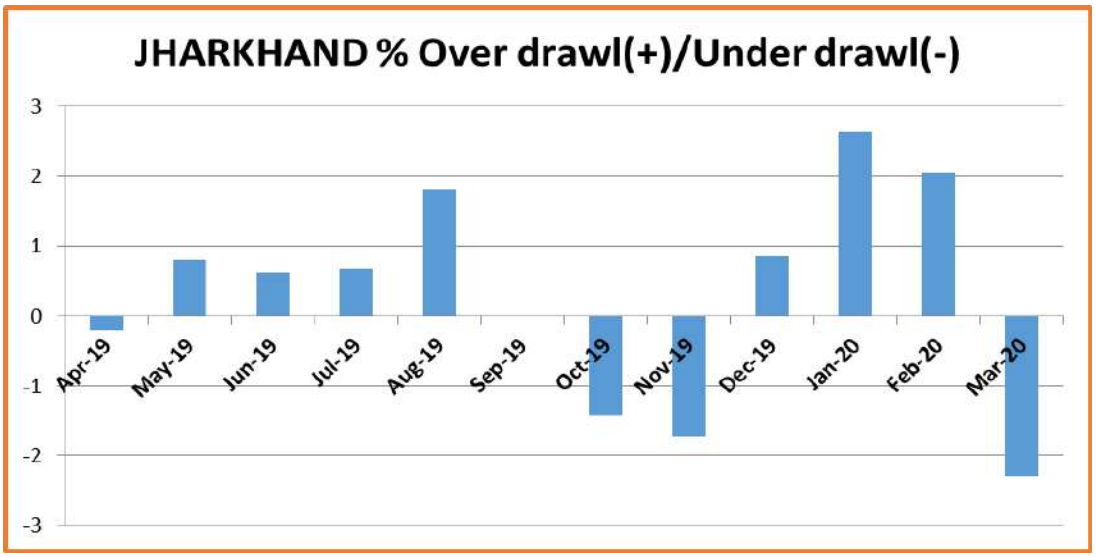
- As per DSM 4th Amendment, Charges for deviation below 49.85 Hz is fixed at 800p/u, for freq 50.05 Hz and above charges for deviation is 0 p/u.
- Charges for deviation at 50.00 Hz will be Daily Average Area Clearing Price (ACP) discovered at DAM (Max ceiling being 800 p/u).
- The Day-ahead market price of the Power Exchange having a market share of 80% or more in energy terms on a daily basis shall be taken into consideration for linking to the DSM price vector.
- If no single Power Exchange is having a market share of 80% or more, the weighted average day-ahead price of power Exchange of having market share of 20% & more shall be used for linking to the DSM price vector.
- DSM rate vector will have a dynamic slope determined by joining the identified price points at 50 Hz(daily avg. ACP),frequency below 49.85 (800p/u) and 50.05 Hz (0p/u) on daily basis.

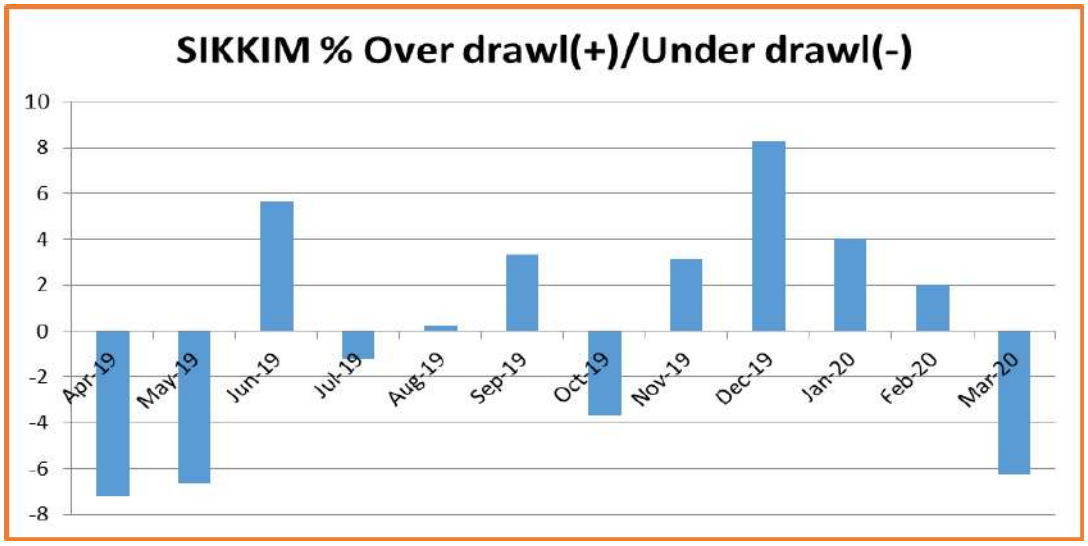
4.10.3 Performance of the constituents:

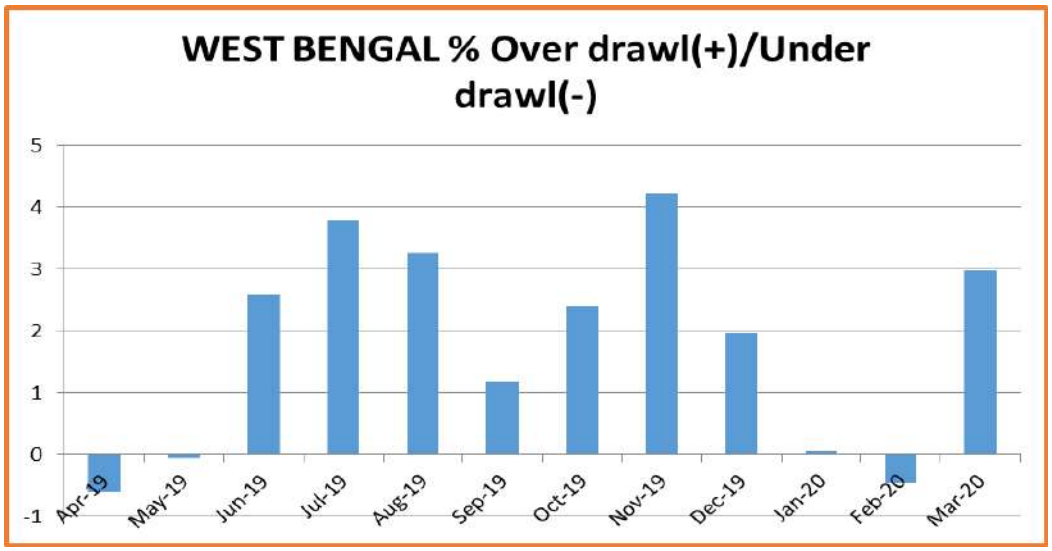
Details of Schedule Drawal/Generation, Actual Drawal/Generation, Receivable/Payable of UI/Deviation Charge amount month-wise and year-wise are furnished in **Annexure XVI-A & B**. Graphical representation is given below for ready reference.


BIHAR % Over drawl(+)/Under drawl(-)
0.5
0
-0.5
-1
-1.5
-2
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20


DVC % Over injection (+)/Under injection(-)
2
0
-2
-4
-6
-8
-10
-12
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20


JHARKHAND % Over drawl(+)/Under drawl(-)
3
2
1
0
-1
-2
-3
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20





4.11 REACTIVE ENERGY CHARGES:

Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as Possible. The Regional Entities except Generating Stations are therefore expected to provide local VAr compensation/generation such that they do not Draw VArs from the EHV grid, particularly under low-voltage condition. To Discourage VAr drawals by Regional Entities except Generating Stations, VAr Exchanges with ISTS shall be priced as follows:

i) The Regional Entity except Generating Stations pays for VAr drawl when voltage at the metering point is below 97%

ii) The Regional Entity except Generating Stations gets paid for VAr return when voltage is below 97%.

iii) The Regional Entity except Generating Stations gets paid for VAr drawl when voltage is above103%

iv) The Regional Entity except Generating Stations pays for VAr return when Voltage is above 103%.

Provided that there shall be no charge/payment for VAr drawl/return by a Regional Entity except Generating Stations on its own line emanating directly from an ISGS.

As per IEGC, the beneficiary states of the region are billed for reactive energy exchange with the CTU system. ERPC also prepares reactive energy exchange for interstate system. The procedure for reactive energy charge calculation is governed by clause 1.6 and 1.7 of IEGC. The rate for reactive energy charge was 14 paisa/unit during the year 2019-20. The statement indicating reactive energy charge billing details during the year is enclosed at **Annexure-XVII**.

In the year 2019-20 as on 03.06.2020, WBSETCL has payable amount of ₹ 19.226 Crores, GRIDCO has payable amount of ₹. 6.579 Crores, SIKKIM has payable amount of ₹ 0.0058 Crores, BSPHCL has payable amount of ₹ 1.714 Crores, JUVNL has payable amount of ₹ 0.442 Crores, DVC has payable amount of ₹ 0.0337 Crores to the ER Reactive Pool Account. The Total amount deposited in ER Reactive Pool Account for the year 2019-20 is ₹. 25.885 Crores.

4.12 REGIONAL TRANSMISSION DEVIATION CHARGES:

As per the CERC (Sharing of Transmission charges and Losses Regulations), 2016, in case the metered MWs (ex-bus) of a power station or the aggregate demand of a Designated ISTS Customer exceeds, in any time block,

(a) In case of generators: The Approved Injection + Approved Additional Medium Term Injection + Approved Short Term Injection or;

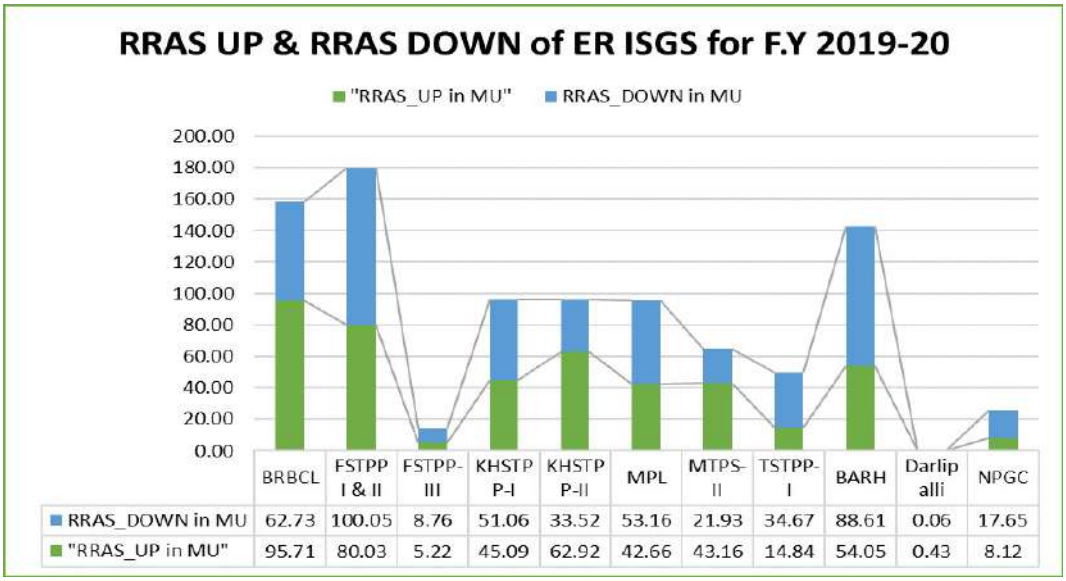
(b) In case of demand customers: The Approved Withdrawal + Approved Additional Medium Term Withdrawal + Approved Short Term Demand.

Then for first 20% deviation in any time block, the Designated ISTS Customer shall be required to pay transmission charges for excess generation or demand at the same rate and beyond this limit, the Designated ISTS Customer shall be required to pay additional transmission charges which shall be 25% above the zonal Point of Connection charges determined for zone where the Designated ISTS Customer is physically located. Such additional charges shall not be charged to the generators in case of rescheduling of the planned maintenance program which is beyond the control of the generator and certified to be so by the appropriate RPC. Further, any payment on account of additional charges for deviation by the generator shall not be charged to its long-term customer and shall be payable by the generator.

4.13 RESERVE REGULATORY ANCILLIARY SERVICES (RRAS)

As per Regulation 12 of the CERC (Ancillary Services Operations) Regulations 2015, the Regional Power Committees (RPCs) are required to issue the weekly accounts for RRAS along with the weekly DSM accounts. The RRAS accounts include fixed charges, variable charges, mark up, amount of fixed charges to be refunded to the beneficiaries and the payments made from/to the DSM pool. The RRAS energy statement for 2019-20 of Eastern Region ISGS stations is at **Annexure -XVIII**

Energy scheduled to/from Virtual Ancillary Entity (VAE) for each ISGS station of ER under RRAS ancillary services during 2019-20 has been shown below.

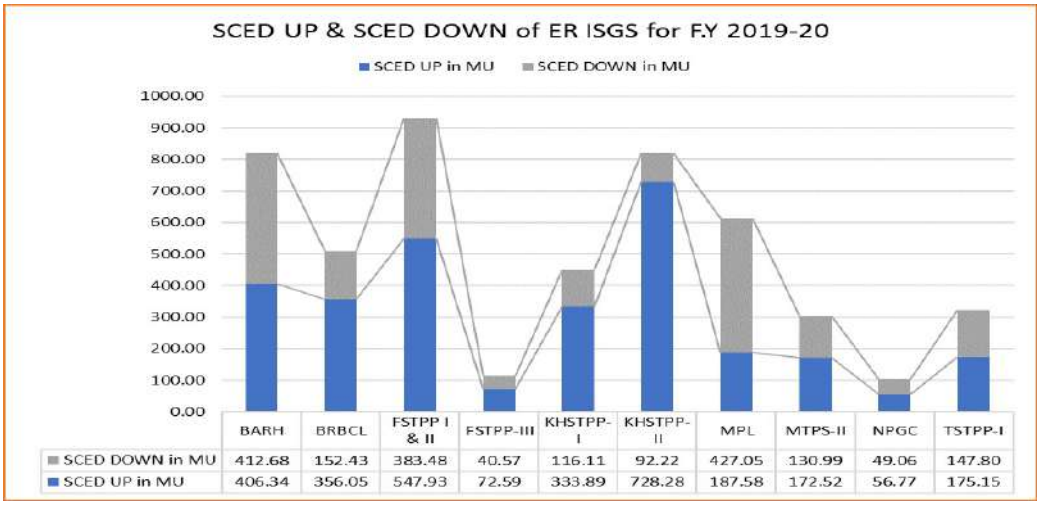


	BRBCL	FSTPP I & II	FSTPP-III	KHSTPP-I	KHSTPP-II	MPL	MTPS-II	TSTPP-I	BARH	Darlipalli	NPGC
RRAS_DOWN in MU	62.73	100.05	8.76	51.06	33.52	53.16	21.93	34.67	88.61	0.06	17.65
"RRAS_UP in MU"	95.71	80.03	5.22	45.09	62.92	42.66	43.16	14.84	54.05	0.43	8.12

4.14 SECURITY CONSTRAINED ECONOMIC DISPATCH (SCED)

CERC vide Suo-Motu order dated 31.01.2019 in petition no. 02/SM/2019 has directed Implementation of SCED for the Inter-State Generating Stations on pilot basis w.e.f 01.04.2019. RPCs and POSOCO have been directed to conduct stakeholder awareness programs for smooth implementation of SCED pan-India. Hon'ble Commission, vide Order in Petition No. 02/SM/2019 (Suo-Motu) dtd. 31st January, 2019, directed for Pilot on SCED of Inter-State Generating Stations (ISGS) Pan India

The Central Commission observed that there is an overarching objective to optimize the Scheduling and dispatch of the generation resources and reduce the overall cost of Production of electricity without major structural changes in the existing System/framework. SCED is a desired step in the Indian grid operation towards optimization methodologies.



	BARH	BRBCL	FSTPP I & II	FSTPP-III	KHSTPP-I	KHSTPP-II	MPL	MTPS-II	NPGC	TSTPP-I
SCED DOWN in MU	412.68	152.43	383.48	40.57	116.11	92.22	427.05	130.99	49.06	147.80
SCED UP in MU	406.34	356.05	547.93	72.59	333.89	728.28	187.58	172.52	56.77	175.15

4.15 FAST RESPONSE ANCILLARY SERVICE

Hon'ble CERC vide its order dated 16.07.2018 in petition No.07/SM/2018/Suo-Motu directed for implementation of FRAS on pilot basis. FRAS pilot service implemented w.e.f 26.11.2018. Fast Response Ancillary Services (FRAS) is a Frequency Regulation service. FRAS instruction has been given for every discrete 5-min time block starting from 0000 hrs of the day (e.g. 1000-1005, 1005-1010…). Central sector Hydro Generating Station with pondage/Storage facility will participate in FRAS pilot service (i.e. TEESTA-V & RANGIT of Eastern Region).

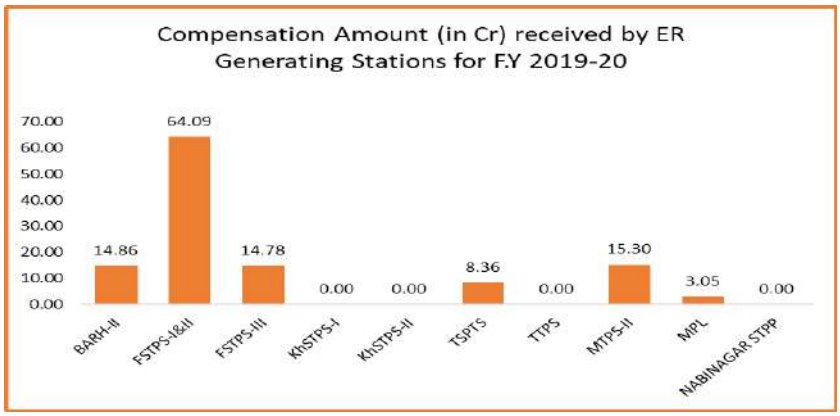
For implementing Hydro Power as FRAS, all constraints and commitments declared by the hydro stations shall be honoured and the total energy delivered over the day shall be maintained as declared by the hydro station. The total energy dispatched under FRAS shall be squared off by the end of the day. Triggering of FRAS shall be done on the stack prepared based on the balance energy available in the hydro station. The Schedules of the beneficiaries shall not be disturbed in the despatch of FRAS and the Payment for FRAS shall be based on "mileage" basis. The mileage during the day shall be computed as follows:

Net energy Enet = S(Eup) - S(Edown)(in MWh) (should be zero over the day)

Mileage Em = S | Eupt |+ S | Edownt| (in MWh)

No additional fixed charge or variable charges shall be paid for providing FRAS support. Existing fixed charges and variable charges shall continue to be paid by the beneficiaries for the normal schedules as per existing practice. The total energy despatched for hydro under FRAS shall be made zero and hence, no energy charges shall be payable to the hydro stations. Incentive shall be paid from the DSM pool on mileage basis at the rate of 10 paisa per KWH for both "up" and "down" regulation provided by Hydro station.

4.16 COMPENSATION FOR DEGRADATION OF HEAT RATE, AUX CONSUMPTION AND SECONDARY FUEL OIL CONSUMPTION, DUE TO PART LOAD OPERATION AND MULTIPLE START/STOP OF UNITS



Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Fourth Amendment) Regulations, 2016, was notified on 6th April 2016. The Amendment Regulations contained provisions relating to Technical Minimum Schedule for operation of Central Generating Stations (CGS) and Inter-State Generating Stations (ISGS), whose tariff is either determined or adopted by the Central Commission. The Amendment Regulations further provided for compensation to Generating Stations for degradation of Heat Rate, Auxiliary Consumption and Secondary Fuel Oil consumption due to part load operation and multiple start-ups of units.

This Compensation Mechanism is applicable to Coal/Gas based Central Generating Stations and Coal/Gas based Inter-State Generating Stations, whose tariff is either determined or adopted by the Central Commission (hereinafter "designated generating stations"). In case of generating stations, whose tariff is neither determined nor adopted by the Commission but which is a regional entity, they shall be required to make appropriate provisions in their PPAs or any other supplementary agreement in the light of the Compensation Mechanism. Compensation received by various generating stations of Eastern Region during the year 2019-20 is furnished in **Annexure- XIX.**

4.17 Automatic Generation Control (AGC):

Automatic generation control (AGC), is a major control function within a utility's energy control centre whose purpose is the tracking of load variations while maintaining system frequency, tie line flow within a specified parameters and optimal generation levels close to scheduled (or specified) values. Automatic generation control (AGC) regulates power generation in response to load changes through local feedback control measurements. Its main objective is to maintain system frequency (through variation in generation) and keep energy balanced within each control area in order to maintain the scheduled net interchanges between control areas.

Hon'ble CERC vide its order dated 6.12.2017 in petition no 79/RC/2017, directed for implementation of Automatic Generation Control. In compliance to CERC's direction, AGC was first implemented in NTPC Barh STPP in Eastern Region on 1st August 2019 and made operational since 23rd August, 2019.Vide order dated 28th August 2019, CERC in Petition No.: 319/RC/2018 directed that all the ISGS Stations whose tariff is determined or adopted by CERC

shall be AGC-enabled and the ancillary services including secondary control through AGC shall be implemented.

All thermal ISGS stations with installed capacity of 200 MW and above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC are directed to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by NLDC. AGC Settlement account of BARH STPS is at **Annexure-XX.**

CHAPTER-5

ISSUES ON OPERATION, PROTECTION, COMMUNICATION AND SYSTEM STUDIES

ERPC Secretariat in general does not involve in day to day real time grid operation. However, it resolves the Operational issues including Protection, Communication, System Study etc. in the meetings of various sub-committees working under ERPC viz Technical Coordination Sub-committee (TCC), Operation Coordination Sub-Committee (OCC), Protection Coordination Sub-Committee (PCC) etc. Further for any emergent operational matters, it is resolved through mutual discussion between the ERPC Secretariat and concerned utilities. Sometimes Special committees/groups are formed comprising members from utilities to resolve/investigate/study such issues. Third Party Protection Audit, Under Frequency Relay (UFR) Audit etc. are such issues which were taken up by the various audit groups as formed by OCC/PCC. In view of smooth functioning of the regional grid and uninterrupted power supply to the core sectors i.e. Railways, Coal etc. healthy protection system has become an integral part of power system operation. Some major operational/protection issues which were taken up are placed below:

5.1 MOCK BLACKSTART EXERCISES IN EASTERN REGION

After any major grid disturbance causing total black out, restoration procedure starts with the Black Start operation of power stations which supply the initial power to neighbouring load centres and the system gradually restored. Mainly the hydro units, due to their flexibility in many fronts, are used as the main source for black start operation. Hence, it is given top priority to keep ready the hydro power stations of the region for any eventuality so that they could be used for black start operation. In line with directives of IEGC, every year OCC plans to conduct mock black start of hydro generating stations. During the year 2019-20, following hydro plants conducted the mock black start exercises.

Sl. No.	Power Plant	Organisation	Date of mock black start
1	Subarnarekha HPS	Jharkhand	20.08.2019
2	Upper Indravati HPS	OHPC	07.11.2019
3	Upper Kolab HPS	OHPC	19.07.2019
4	Rengali HPS	OHPC	27.06.2019 & 17.01.2020
5	Maithon HPS	DVC	-
6	Balimela HPS	OHPC	17.07.2019 & 12.02.2020
7	TLDP-IV	West Bengal	-
8	Burla HPS	OHPC	28.07.2019 & 11.02.2020
9	Teesta-V	NHPC	28.11.2019
10	Teesta-III	Teesta Urja Ltd.	-
11	TLDP-III	West Bengal	-
12	Chuzachen	Gati Infra Ltd.	05.12.2019

As per the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010, under clause 5.8 (b) "Diesel Generator sets for black start would be tested on weekly basis and test report shall be sent to RLDC on quarterly basis". Test-run of Diesel Generator sets on weekly basis for black start in Eastern Region were generally conducted and test reports were submitted by the concerned utility to ERLDC. Status reports are being regularly reviewed in OCC meetings.

5.2 UNDER FREQUENCY RELAY (UFR) OPERATION

In 9th National Power Committee (NPC) meeting held on 22.11.2019, it was decided that total quantum of load relief based on UFR operation would be 3320 MW for ER. It was also decided that UFR would be operational in 4 (four) stages, where Stage –I would be operated at 49.4 Hz, Stage-II at 49.2 Hz, Stage-III at 49.0 Hz and Stage-IV at 48.8 Hz. Accordingly, OCC distributed and implemented the total quantum of load relief as per existing proportion for ER constituents as given below:

Control Area	Stage-I (49.4 Hz) (MW)	Stage-II (49.2 Hz) (MW)	Stage-III (49.0 Hz) (MW)	Stage-IV (48.8Hz) (MW)	Total Relief by Control Area
BSEB	98	99	99	101	397
JSEB	61	62	61	62	246
DVC	134	135.5	136	137	542.5
Odisha	181.5	183.5	184	186	735
WBSETCL & CESC	345.5	350	350	354	1399.5
Total	**820**	**830**	**830**	**840**	**3320**

The operation of UFRs, if any, in the constituent systems is reviewed regularly in the monthly OCC meetings of ERPC.

5.4 INSPECTION OF UNDER FREQUENCY RELAYS (UFR)

The enquiry committee constituted by MoP after the major grid disturbances during 30th & 31st July'2012 recommended in its report (9.3) for ensuring proper function of defence mechanism like UFR etc. Also, as per section 5.2(n) IEGC, RPC Secretariat shall have to carry out periodic testing of UFR relays. In the 22nd TCC & ERPC meeting it was decided that UFR Audit of the ER constituents would be taken up by the UFR Audit group, nominated by the respective constituents.

Accordingly, a sub-group is constituted and have been carrying out inspection of UFR relays installed in Eastern Region regularly in the following manner:

i. In case secondary injection kit is available, frequency setting and ability of the Under-Frequency Relay to actuate may be tested with the injection kit.

ii. In case secondary injection kit is not available, then frequency setting of UFR may be reset within the operating frequency available at the time of testing and the ability of UFR to actuate may be checked.

iii. The previous history of relay operation along with requisite load relief may also be checked from logbook register maintained in the sub-station.

Following UFRs were inspected during the year 2019-20.

Sl. No.	Name of the substations	Voltage rating (kV)
1	132/33kV Fatuha, 132/33kV Digha, 132/33kV Gaighat, 132/33kV Mithapur	33

All the inspected UFRs are found in service and working as per the requirement.

5.7 THIRD PARTY PROTECTION AUDIT OF EASTERN REGION

As a follow-up of one of the recommendations of Enquiry Committee headed by Chairman, CEA on grid disturbances that took place in Indian grid on 30th and 31st July 2012, Ministry of Power constituted a 'Task Force on Power System Analysis under Contingencies' in December 2012. As per the recommendations of Task force the third-party audit of the protection system needs to be carried out periodically.

The checklist of ERPC used in its 1st third party protection audit was modified in line with the recommendation by the Task Force committee and a road map for 2nd Protection Audit of ER was finalized in OCC & PCC meetings.

The latest status of 2nd Third Party Protection audit during the year 2019-20 is as follows:

Sl. No.	Name of the S/s /System	Audit Completed on
1.	400kV Patna (Powergrid)	22nd Aug, 2019
2.	220kV Fatuha (BSPTCL)	23rd Aug, 2019
3.	66/11kV Mangan (SIKKIM) 66/11kV Phodong (SIKKIM) 66kV HEP Meyong (SIKKIM) 66/11kV Tadong (SIKKIM) 66/11kV Bulbulay (SIKKIM) 66/11kV LLHP (SIKKIM) 66/11kV Mamring (SIKKIM) 66/11kV Pakyong (SIKKIM) 66/11kV Rehnok (SIKKIM) 66/11kV Rongli (SIKKIM) 66kV HEP Rongli (SIKKIM) 66/11kV Sichey (SIKKIM)	22nd April 2019 to 26th April 2019

5.6 PROTECTION PHILOSOPHY OF EASTERN REGION

Several Special PCC meetings were convened to review the zone settings based on CEA recommendations at ERPC, Kolkata. In the Special meetings of PCC held on 30.12.2014, 10.04.2015 & 20.07.2015 the Protection Philosophy for Eastern Region was agreed upon which is as given below:

Sl. No.	Zone	Direction	Protected Line Reach Settings	Time Settings (in Seconds)	Remarks
1	Zone-1	Forward	80%	Instantaneous (0)	As per CEA
2a	Zone-2	Forward	For single ckt- 120 % of the protected line	0.5 to 0.6 - if Z2 reach overreaches the 50% of the shortest line. 0.35- otherwise	As per CEA
			For double ckt- 150 % of the protected line		As per CEA
2b	Zone-2 (for 220 kV and below voltage Transmission lines of utilities)	Forward	120 % of the protected line, or 100% of the protected line + 50% of the adjacent shortest line	0.35	As per CEA with minor changes
3	Zone-3	Forward	120 % of the (Protected line + Next longest line)	0.8 - 1.0	As per CEA
4	Zone-4	Reverse	10%- for long lines (for line length of 100 km and above) 20%- for shot lines (for line length of less than 100 km)	0.5	As per CEA

Note:

1) **Zone-2: - Z2 Reach should not encroach the next lower voltage level.**
2) **Zone-3: - If Z3 reach encroaches in next voltage level (after considering "in-feed"), then Z3 time must be coordinated with the fault clearing time of remote end transformer.**
3) **Zone-4: - If utility uses carrier blocking scheme, then the Z4 reach may be increased as per the requirement. It should cover the LBB of local bus bar and should be coordinated with Z2 time of all other lines.**
4) **The above settings are recommended primarily (exclusively) for uncompensated lines.**

Subsequently, all the constituents were requested to adopt the above philosophy for their inter as well as intra state lines for better protection co-ordination of their systems and Eastern Regional system as a whole. This has been implemented in the constituent's systems of ER since 2015.

5.8 ISLANDING SCHEMES

After the last major grid disturbances occurred simultaneously in NR, ER & NER on 30th & 31st July 2012, the enquiry committee constituted by MoP has made a number of recommendations in its report published on 16.08.2012. One of the recommendations (no. 9.12 of the report) suggested planning for implementation of islanding schemes.

New Islanding schemes for ER were proposed, approved & monitored by the TCC/ ERPC in its meeting. The latest status of the same are placed below:

1. Bakreswar TPS of WBPDCL – Operational w.e.f. 31.03.2015
2. Tata Power, Haldia – Operational w.e.f. 24.04.2015.
3. Chandrapura TPS (132 kV) of DVC - Operational w.e.f. 15.06.2015
4. Farakka STPS of NTPC – Operational w.e.f. 02.04.2017
5. Bandel TPS of WBPDCL- Operational w.e.f. 15.12.2018
6. CESC as a whole Islanding Scheme, CESC
7. IB TPS Islanding Scheme of OPGC- Scheme finalized to be implemented by Mar'21
8. Kanti Islanding Scheme of KBUNL – Under implementation stage

5.9 SYSTEM (SPECIAL) PROTECTION SCHEME (SPS)

Due to enhanced complexity of electrical grid with the formation of 'NEWS' grid through addition of interconnectivity & use of high capacity transmission lines etc., System (Special) Protection Scheme (SPS) has been envisaged for safety & security of integrated grid operation. SPS is designed to detect abnormal system conditions such as outage of large generating units, high capacity corridors or HVDC interconnections. SPS preserve the integrity of electric system by using predetermined corrective measures that are simple, reliable, and safe for the system as a whole and provide acceptable system performance against all possible

extreme credible contingencies. SPS has an advantage of wide-area coverage and it is pre-emptively sensing the danger in the system and takes corrective actions. SPS has also been evolved to prevent system deterioration i.e. to reduce the impact of power failure and ensure early restoration.

Eastern Region has also adopted the SPS. Presently there are 4 (four) nos. approved SPS in Eastern Region.

a) Tripping of Talcher - Kolar HVDC Bipole (s) - SPS at Talcher stage-II, NTPC (SPS 450 & SPS 1000)

Talcher Super thermal power station having a capacity of 3000 MW (6x500 MW) is located in Orissa of Eastern Region. The station was commissioned with 2x500 MW capacity and subsequently its second stage was commissioned, and station capacity was augmented to 3000 MW with commissioning of its further 4x 500 MW machines.

The station is the largest capacity station in the region. However, the capacity of the entire stage II (4x500 MW) was allocated to the beneficiaries of southern region.

Subsequently, 10% of the capacity was allocated to the Orissa, in Eastern region. For evacuation of Talcher STPS –II generation to Southern Region, (+/-) 500kV HVDC bipole transmission system was commissioned right up to the load centre of Southern Region at Kolar. The HVDC substation at Talcher has two pole blocks 1000 MW capacity each (subsequently augmented to 1250 MW).

The very basic design of the evacuation system of Talcher stage II to SR poses a major threat to Eastern Region and subsequently to the New Grid as any sudden forced outage of one or both the poles would mean that Eastern Grid has to initially absorb a jerk of load throw off to the tune of 1800-2000 MW. The surplus power would get wheeled through 400kV Talcher- Rourkella D/C and Rengali –Baripada-Kolaghat S/C. During monsoon as such these corridors remain heavily loaded and such contingency of pole block at Talcher would lead to a definite cascade tripping leading to isolation /possible collapse of Orissa system including TSTPP station.

In order to avoid such contingency two automatic special protection schemes were envisaged and have been implemented at Talcher Super Thermal power station. The 1st scheme as commonly known as SPS 450 was first implemented and subsequently a further improvised 2nd scheme was devised as known as SPS 1000 scheme. Both the schemes and their modalities of arming and disarming is described below:

SPS 450: This scheme was originally implemented with a view that Eastern and Western Region would absorb a jerk of 450 MW, therefore rest of the generation as available at Talcher stage II generation must be shed in order avoid a cascade tripping of the network. However, during monsoon, from Eastern Regional point of view at times absorbing even 450MW under N-1 contingency criteria of Talcher-Rourkela 400kV D/C Line becomes critical when major generation at Talcher stage II must be shed in order to avoid further

criticality of the Grid. Further under any critical outage condition in the rest of the New Grid outage of HVDC bipole might pose a serious threat when it might necessitate arming of SPS 450 scheme with due coordination with NLDC. Under this mode of SPS the power injection to N-E-W grid is limited to 450 MW. The actual generation by the generators is considered for building the logic.

SPS 1000: Post formation of the NEW Grid this scheme was subsequently envisaged in order to minimize shedding of generation at Talcher STPP. The basic philosophy of this scheme is to absorb 1000MW in place of 450 MW as the Grid size increased. However, as one of the prerequisites for arming this scheme Eastern Regional operator has to ensure that sufficient evacuation margin (approx 1000 MW) is available at the AC evacuation system of TSTPP. Under this mode of SPS the power injection to N-E-W grid is limited to 1000 MW. The actual injection to the HVDC system (by measuring the flow on four a/c lines between TSTPS and Talcher HVDC station) is considered for building the logic. Under SPS 1000 scheme no generation shedding is required for a single pole tripping. For contingencies of both pole tripping and for single pole tripping with the HVDC system going to ground return mode, generation shedding will be done. Extent of generation shedding depends on the actual power flow through the HVDC link and to limit the actual injection to N-E-W grid to 1000 MW.

b) Modification in Talcher-Kolar SPS in ER Region due to Synchronisation of SR grid with NEW grid (Additional 600MW Gen Reduction)

Background:

In Southern Region, there is a provision for load shedding in three groups depending on the power loss on HVDC (Trip Signal 1 for 800 MW load shedding, Trip Signal 2 for 700 MW additional load shedding, Trip signal 3 for 500 MW additional load shedding considering extended operation of HVDC in the 2000-2500 MW range). So, a total of 2000 MW shedding is envisaged in Southern Region.

In the NEW grid side of Talcher-Kolar HVDC bi-pole, there is automatic reduction/tripping of generation at Talcher Stage-II of NTPC. Two schemes are available at Talcher Stage-II; SPS 450 and SPS 1000 where the number indicates the quantum of power injected into the NEW grid after tripping of Talcher-Kolar HVDC pole or bi-pole. In SPS 450, three units are tripped at Talcher Stage-II while in SPS 1000, a maximum of one unit is tripped and the balance reduction in generation achieved through fast automatic reduction of generation.

In normal operation, SPS 1000 is armed and in some exceptional cases such as an outage of elements in the NEW grid, SPS 450 is activated. There are instances when a single pole trips on line fault and the other pole goes to ground return. In such cases, the healthy pole retries thrice for going to metallic return and in case it fails, it goes in ground return mode where there is a restriction of 150 MW.

There have been instances when the Talcher-Kolar SPS fails to operate leading to high frequency in the NEW grid and low frequency in the Southern Grid. Post 765 kV Sholapur-Raichur in operation, the impact of any failure of Talcher-Kolar SPS would lead to wheeling of additional power to Southern Region through the NEW grid creating insecure conditions. In

fact, even injection of 1000 MW into NEW grid and inadequate load shedding in Southern Region can lead to insecure conditions as the entire power would be wheeled through 765 kV Sholapur-Raichur. So, additional safeguards are required.

Triggering the SPS and SPS action:

In case of single pole or bipole outage or blocking of Talcher-Kolar HVDC sensed at Talcher HVDC terminal, it is proposed that a trip signal be extended to nearby generators such as Vedanta, GMR, JITPL ensuring minimum communication so that the objective of restricting injection to NEW grid to 450 MW is achieved. The reduction in generation to be achieved through these stations is 600 MW so that the injection into NEW grid is restricted to 450 MW. This would be in addition to SPS 1000 already in operation at Talcher-II.
SPS 1000 will be functional as it is with additional relief of 600 MW in the event of Talcher-Kolar pole tripping to ensure grid security.

In 108th OCC held on 17.04.2015 it was decided that the generation relief during HVDC Talcher-Kolar pole tripping will be shared among GMR, Vedanta & JITPL as follows: Vedanta - 200 MW, GMR-200 MW and JITPL- 200 MW.

c) SPS for Chuzachen HPS in Sikkim

Chuzachen HPS is connected with Rangpo through 132 kV Zebra S/C line and with Melli through 132 kV Panther S/C line. Chuzachen was allowed to enhance their generation upto 99 MW with SPS operation of one unit tripping (whichever is generating more). SPS is installed at Chuzachen to reduce generation at hydro power station in event of contingency to avoid high loading and cascading tripping of neighbouring 132 kV transmission lines.

Sl No.	Event	Sensing at	Action
1	Tripping of 132 kV Rangit-Rammam	132 kV Rangit	Trip One unit at CHEP
2	Tripping of 132 kV Rangit-Kerseong	132 kV Rangit	Trip One unit at CHEP
3	Flow of Rangit-Rammam crosses 70 MW or 320 Amps	132 kV Rangit	Trip One unit at CHEP
4	Flow of Rangit-Kerseong crosses 70 MW or 320 Amps	132 kV Rangit	Trip One unit at CHEP
5	Flow of Chuzachen-Melli crosses 75 MW	132 kV Chuzachen	Trip One unit at CHEP
6	Flow of Chuzachen-Rangpo crosses 75 MW	132 kV Chuzachen	Trip One unit at CHEP

Thereafter, the scenario has been changed due to commissioning of LILO of 400 kV Teesta - Binaguri line at Rangpo 400/132 kV sub-station. Chuzachen authority requested for removal of following signals from the schemes as in the present scenario these incidences will not endanger the grid:

i. Tripping of 132 Rangit- Rammam line
ii. Tripping of 132 kV Rangit- Kurseong line
iii. Loading of 132 Melli- Chuzachen line

In 29th PCC held on 20.03.2015, PCC agreed to waive the tripping of one Chuzachen Unit from SPS on following contingencies:

- Tripping of 132kV Rangit – Rammam Line CB at Rangit End
- Tripping of 132kV Rangit – Kurseong Line CB at Rangit End

However, PCC felt that N-2 contingency may occur in North Bengal and Sikkim area and PCC decided to continue the SPS with following conditions:

- Power flow > 70 MW or Line Current > 320 A in Rangit-Rammam Feeder
- Power flow > 70 MW or Line Current > 320 A in Rangit-Kurseong Feeder
- Power flow > 75 MW in Chuzachen –Melli Feeder

d) SPS for Power Export to Bangladesh

As per decision of the MoP, GoI power export to Bangladesh has been explored and regular supply has been commenced from October'2013 through 400 kV Farakka – Berhampur – Bheramara line with HVDC (2x500 MW) station at Bheramara (Bangladesh).

The details of SPS implemented to facilitate power transfer to Bangladesh are provided below for ready reference:

Sl. no.	Condition	Action
1	400 kV Bus Voltage at Behrampur < 390 kV	Tripping of 80 MVAR Bus Reactor at Behrampur
2	400 kV Bus Voltage at Behrampur < 380 Kv	Automatic Reduction of Behrampur HVDC setpoint to 350 MW with appropriate capacitor switching to improve voltage
3	If Indian Grid Frequency is < 49.5 Hz	Automatic Reduction of Behrampur HVDC setpoint to 350 MW with appropriate capacitor switching to improve voltage
4	If 400 kV Farakka-Behrampur Line Loading> 780 MW	Automatic Reduction of Behrampur HVDC setpoint to 350 MW with appropriate capacitor switching to improve voltage
5	If 400 kV Sagardighi-Behrampur D/C and 400 kV Farakka-Bherampur S/C trips (Sending of CB status at Behrampur)	Automatic Reduction of Behrampur HVDC setpoint to 350 MW with appropriate capacitor switching to improve voltage.

In order to address low Frequency, low voltage and high line loading issue in Indian Side, SPS has been envisaged to reduce the export quantum to Bangladesh.

5.11 SCADA DATA

For effective management and monitoring of the grid parameters availability of various live data viz generation of power stations, line flows and voltages at important sub-stations are the vital inputs to the grid operators. All the required data should be made available on real time basis in the control room through SCADA system. OCC/TCC advised all constituents to do the needful for restoration of SCADA data at the earliest and the status of availability of SCADA data are monitored regularly by the OCC/SCADA O&M meetings. Apart from the concerned utility, CTU/Powergrid plays a major role in availability of the SCADA data as installation of RTU are done by them.

CHAPTER-6

MEETINGS, REPORTS, CERTIFICATION AND WORKSHOP

6.1 MEETINGS HELD DURING 2019-20

In order to discharge various duties entrusted to ERPC as per Indian Electricity Act, 2003 and IEGC, various meetings were organised during 2019-20 and detail of meetings are given at **Annexure-XXIII**.

6.2 REPORTS ISSUED

ERPC has been issuing various reports regarding system operational data, load generation balance data, system studies data, etc. The details of various reports issued during 2019-20 by ERPC are given below:

- Monthly Progress Reports
- Monthly Power Supply Position Reports
- Load Generation Balance Report for the year 2020-21
- Annual Report for the year 2018-19

6.3 CERTIFICATION OF TRANSMISSION AVAILABILITY

In line with CERC order, ERPC Secretariat has certified availability of transmission system for the year 2019-20.

6.4 TRAINING / WORKSHOP HELD

As a follow-up of one of the recommendations of Enquiry Committee headed by Chairperson, CEA on grid disturbances that took place in India on 30th & 31st July'2012, Ministry of Power constituted a "Task Force on Power System Analysis and Contingencies". The Task Force strongly recommended for training in protection related issues.

Following training programmes/workshops were held during 2019-20:

Training Programme/Workshop	Date	Venue
Workshop organised by ERPC on AGC	31.05.2019	ERPC, Kolkata
Training for Power System Engineers	22.07.2019 - 26.07.2019	AIPM, Kolkata
Simulator Training at Bakreswar TPS, WBPDCL, Bakreswar	02.09.2019 - 06.09.2019	BkTPS, WBPDCL, Bakreswar
Training Programme for Power System Engineers of ER Constituents	18.11.2019 - 22.11.2019	AIPM, Kolkata

Workshop on Draft CERC Regulations, 2019	30.12.2019	ERPC, Kolkata
National Conference on Future Scenario and Challenges of Indian Power Sector	09.01.2020 - 10.01.2020	Hotel Vivanta, Kolkata
Training Programme for Power System Engineers of ER Constituents	13.01.2020 - 17.01.2020	AIPM, Kolkata
Training on Disturbance Analysis using PSCT Software	27.01.2020 - 29.01.2020	ERPC, Kolkata
Seminar on Flexible Operation of Coal Fired Power Plants and Environment Challenges	04.02.2020	Hotel Taj Bengal, Kolkata
Workshop on "Draft Electricity Grid Code (IEGC), 2020	13.02.2020	ERPC, Kolkata

CHAPTER-7

IMPORTANT DECISIONS TAKEN IN VARIOUS MEETINGS OF ERPC DURING 2019-20

7.1 Issue: Protection Coordination for New Lines/ICTs Prior to First Time Charging ERLDC.

Several new elements are being added in the Eastern region System in every month. The addition of new elements changes the network configuration and thus impact the protection setting of existing elements in the grid. It has been observed on various occasion that when a new element is added (like Transmission line/ICT) which directly impact the Remote end Protection setting of transmission lines connected from that substation, the protection coordination is not being done. In view of the above, it is desired to adopt the following philosophy for ensuring the protection coordination w.r.t New Transmission Lines/ICT/Elements:

Prior to Charging of New Elements:

- The Utility will first take a confirmation from the utilities from where its transmission element is directly connected through email.

- In addition, the utility whose element is being charged will also take a confirmation from all remote ends substations through email that protection setting for the lines which are directly connected with substations where the new element is being integrated has been completed.

- In order to achieve so, the Utility may provide the information regarding new elements to all remote end substations prior to 30 days of charging to provide adequate time for remote end utilities for calculation and keeping the setting ready as group setting in case it is required to be changed.

- Remote end utilities will confirm the substation within 7 days of receipt of the email.

- ERLDC will intimate all the associated station regarding charging of the new elements.

After Charging of New Elements:

- The Owner utility will also intimate the remote end substation regarding charging of the element and confirm ERLDC.

7.2 Issue: Strengthening of Transmission Tower Near to River basin to avoid Frequent Tower Collapse.

Frequent Tower Collapses have been explained in the Eastern Region due to change in river course of Gandak and Kosi rivers. This has endangered the reliability of power supply to Bihar as well as to the region as a whole. It has been observed that the towers which have collapsed during most of the tower collapse events due to change in river course were not of pile type foundation recommended for river basin areas. Reports of the Standing Committee of experts on failure of EHV transmission line towers (October 2016 – March 2018) recommended the following for such transmission lines:

Pile type foundation may be considered for towers in flood prone area based on soil investigation report and latest high flood data. In case of damage of foundation of towers, the foundation design is required to be examined. The material test report of failed towers should be examined to ascertain the quality of the material. Providing proper revetment & use of geosynthetic material in foundation, concrete encasing & painting of stub in water logging areas etc. may also be considered, wherever required.

In view of the above, all transmission licensees whose lines are prone to flooding may immediately take above remedial action as suggested by the committee. It is suggested by ERLDC to have all the towers in the flood-prone zone on pile foundation along with nearby tower should be provided with revetment to avoid soil erosion.

7.3 Issue: Scheduling of Power to DISCOMs based on Payment Security Mechanism (Opening of LC).

Ministry of Power vide order dated 28th June, 2019 has given directions for implementation of scheduling of power to distribution companies throughout the country based on Payment Security Mechanism. Further, MoP vide communication dated 17th July 2019 has given the detailed procedure of scheduling of power to DISCOMs in the event of non-maintenance of Letter of Credit/Payment Security.

In this regard a meeting was convened by ERPC Secretariat on 30.07.2019 through videoconferencing to discuss the implementation preparedness by all the stakeholders. From 01.08.2019, the scheduling based on payment security mechanism has been implemented in Eastern Region. In 160th OCC, ERLDC informed that a web portal (Payment Security Administration portal link: https://psa.posoco.in) had been introduced by POSOCO on 31st July 2019. Using this portal beneficiaries and generators can update their payment security status for ISGS/LTA/MTOA transactions for the day ahead by 08:00 Hrs of the 'D-1' day using their user credential. As per the declaration in this portal, entitlement of the beneficiaries is being calculated at 09:00 Hrs of 'D-1' day for the day 'D' and uploaded in scheduling portal of ERLDC.

अध्याय–8

पूर्वी क्षेत्रीय विद्युत समिति में राजभाषा नीति का कार्यान्वयन

वर्ष 2019-20 के दौरान पूर्वी क्षेत्रीय विद्युत समिति में राजभाषा नीति के अनुपालन में निम्नलिखित कार्य किये गए है :

8.1 हिन्दी पत्राचार

- राजभाषा अधिनियम के नियम-5 के अनुपालन में, हिन्दी में प्राप्त पत्रों के उत्तर हिन्दी में ही दिए जाते हैं |
- ओ.सी.सी., प्रोटेक्शन उप समिति, वाणिज्यिक उप-समिति, तकनीकी समन्वय उप-समिति और ई.आर.पी.सी. की बैठकों के कार्यवृत्त एवं कार्यवाही के अग्रेषण पत्र को द्विभाषी रूप में जारी किये गए |

8.2 राजभाषा कार्यान्वयन समिति की बैठकें

राजभाषा नीति के अनुसार वर्ष 2019-20 में राजभाषा कार्यान्वयन समिति की बैठकें प्रत्येक तिमाही में दिनांक :12-06-19, 03 -09-19, 29-11-19 तथा 13-03-20 क्रमशः कुल चार बैठकें का आयोजन किया गया था | इन बैठकों में गृह मंत्रालय, राजभाषा विभाग से प्राप्त हिन्दी के प्रगामी प्रयोग से संबंधित तिमाही प्रगति रिपोर्ट की समीक्षा पर चर्चा की गई, कार्यालय में हिंदी के प्रयोग को बढ़ने से संबंधित निर्णय लिए गए,वार्षिक कार्यक्रम को लेकर चर्चा एवं तदनुसार निर्णय लिए गए |

8.3 कार्यशाला का आयोजन

वर्ष 2019-20 में तीन हिन्दी कार्यशाला एवं दो काव्य सम्मेलन आयोजित किये गए | कार्यालय में राजभाषा कार्यान्वयन के अनुपालन पर कार्मिकों को हिन्दी में दिन-प्रतिदिन कार्यालय कार्य करने की झिझक दूर करना और हिन्दी में काम करना आसान बनाने हेतु विभिन्न विषयों पर चर्चा करने के लिए कार्यशाला आयोजित किया गया |

8.4 प्रोत्साहन योजना

हिन्दी के प्रयोग को बढ़ावा देने एवं हिन्दी में काम करने के लिए प्रोत्साहित करने हेतु, इस कार्यालय में सरकारी नियमानुसार विभिन्न प्रकार के प्रोत्साहित योजना लागू है | हिन्दी में टिप्पण-आलेखन करना एवं कंप्यूटर पर हिन्दी में टंकन का काम करने के लिए प्रोत्साहित योजना लागू है |

8.5 हिन्दी दिवस / हिन्दी सप्ताह / हिन्दी पखवाड़ा का आयोजन

दिनांक:-13-09-19 से 19 -09-19 के दौरान इस कार्यालय में हिन्दी सप्ताह मनाया गया | इस अवसर पर विभिन्न प्रकार की प्रतियोगितओं का आयोजन किया गया था जिसमें कार्यालय के सभी अधिकारियों और कर्मचारियों ने बड़े उत्साह के साथ भाग लिया | सफल प्रतिभागियों को प्रथम, द्वितीय एवं तृतीय पुरस्कार प्रदान किया गया एवं भाग लेने वाले सभी प्रतिभागियों को प्रतिभागिता पुरस्कार प्रदान किया गया |

8.6 राजभाषा कार्यान्वयन से संबंधित अन्य कार्य

- हिन्दी के प्रगामी प्रयोग से संबंधित तिमाही एवं अर्ध-वार्षिक प्रगति रिपोर्ट नियमित रूप से मुख्यालय, के.वी.प्राधिकरण, नई दिल्ली एवं राजभाषा विभाग के क्षेत्रीय कार्यालय, कोलकाता को प्रेषित किया गया |
- सेवा पुस्तिकाओं में प्रविष्टियाँ ज्यादा से ज्यादा हिन्दी में किये गए |
- कार्यालय में नियमित रूप से उपयोग होने वाले मानकीकृत प्रपत्र को द्विभाषी रूप में इस्तेमाल किया जाता है |
- इन्टरनेट पर उपलब्ध विभिन्न प्रकार के हिन्दी साफ्टवेयरों का इस्तेमाल करके कार्यालय में कंप्यूटर पर सभी अधिकारी एवं कर्मचारी आवश्यकता के अनुसार काम करते हैं |
- वर्ष 2019-20 के दौरान कार्यालय में प्रत्येक तिमाही में सदस्य सचिव की अध्यक्षता में एक कार्यशाला आयोजित किया जाता है। जिसमें कार्यालयों के दैनिक कामकाज में हिंदी के प्रयोग को बढ़ने के बारें में समीक्षा किया गया और कार्यालयों के दैनिक कामकाज में अधिक से अधिक सरल और सहज हिन्दी का प्रयोग के लिए निर्णय लिया गया |
- दिनांक 30-09-2019 को हुई हिन्दी कार्यशाला में राजभाषा विभाग, हिन्दी शिक्षण योजना, कोलकाता से आमंत्रित श्रीमती वीनू खन्ना,हिंदी प्राध्यापक द्वारा अधिकारियों एवं कर्मचारियों को हिन्दी में कार्यालय के दैनिक कार्य करने की झिझक दूर करना तथा राजभाषा के विभिन्न विषय पर विस्तार से चर्चा किया गया |
- इसके अतिरिक्त प्रत्येक तिमाही में आयोजित कार्यशाला में विभिन्न प्रकार के विषयों को लेकर जैसे (1) “नई पेंशन योजना (NPS)” (2) “ राजभाषा नीति व नियम, टिप्पण-आलेखन एवं वर्तनी” (3) “ भारतीय संविधान ” इन विषयों को लेकर विस्तार से चर्चा किया गया | जिन अधिकारियों एवं कर्मचारियों के पास आलोचित विषयों के बारे में स्पष्ट धारणा नहीं होते उन्होंने विभिन्न प्रश्न के माध्यम से संदेह का समाधान कर खुद को समृद्ध कर लेते है | विशेष कर यह कार्यशाला नए अधिकारियों के लिए वहुत ही फायदेमंद रहा |
- इसके साथ ही इस वर्ष दो हिंदी काव्य सम्मेलन का भी आयोजन किया गया था, दिनांक :03/01/2020 को प्रथम हिंदी काव्य सम्मेलन का आयोजन किया गया था, जिसमें कोलकाता के प्रसिद्ध नागर कवि श्री जय कुमार रुसवा एवं नवीन प्रजापति को आमंत्रित किया गया था, दूसरा काव्य सम्मेलन दिनांक :27/02/2020 को आयोजित किया गया था, यह एक आतंरिक काव्य सम्मेलन था, जो कार्यालय की धूमिल पड़ गयी प्रतिभाओं को जगाने के लिए आयोजित किया गया था , जिसमें कार्यालय के सभी कार्मिकों ने बढ़-चढ़ कर भाग लिया एवं काव्य सम्मेलन को सफल बनाया।

इस कार्यालय में राजभाषा नीति और नियमों के उपबंधो के अधीन जारी किए गए निदेशों का समुचित रूप से अनुपालन तथा गृह मंत्रालय, राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम में निर्धारित लक्ष्यों की प्राप्ति के लिए हर संभव प्रयास जारी है |

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ANNEXURE-I

MANPOWER STRENGTH OF ERPC SECRETARIAT

The status of posts of various grades at ERPC Secretariat (**as on 31st March, 2020)** is given below:

POST	SANCTIONED	FILLED	VACANT
GAZETTED			
Member Secretary	1	1	0
Superintending Engineer/Director	3	3	0
Assistant Secretary/Executive Engineer	4	3	1
Assistant Executive Engineer/AD-I	4	4	0
Assistant Engineer/ AD-II	2	2	0
Private Secretary	1	0	1
NON-GAZETTED			
Head Clerk	1	1	0
Hindi Translator	1	1	0
Electrician	2	1	1
Upper Division Clerk	3	1	2
Draftsman Gr. II	1	0	1
Stenographer Gr. I	1	0	1
Stenographer Gr. II	1	0	1
Lower Division Clerk	3	1	2
Driver	2	1	1
MTS	6	0	6
TOTAL	**36**	**19**	**17**

CHAIRPERSONS / CHAIRMEN OF EASTERN REGIONAL POWER COMMITTEE (ERPC) & ERSTWHILE EASTERN REGIONAL ELECTRICITY BOARD (EREB) SINCE ITS INCEPTION

Period	Constituent	Name of the Chairmen/Chairpersons
01.06.65 to 31.05.66	BSEB	Sh. R.S. Mishra, IAS Sh. R. Prasad, IAS
01.06.66 to 31.05.67	DVC	Sh. T. Sivasankara, ICS
01.06.67 to 31.05.68	OSEB	Sh. V.V. Ananthakrishnan, IAS
01.06.68 to 31.05.69	WBSEB	Sh. Dutta Mazumdar, IAS
01.06.69 to 31.05.70	BSEB	Sh. H.N. Thakur, IAS
01.06.70 to 31.05.71	DVC	Sh. N.E.S. Raghavachari, ICS
01.06.71 to 31.05.72	OSEB	Sh. A.K. Mazumdar, IAS Sh. A.C. Bandyopadhyay, IAS
01.06.72 to 31.05.73	WBSEB	Sh. S.K. Mukherjee, IAS Sh. J.C. Talukdar, IAS
01.06.73 to 31.05.74	BSEB	Sh. B.N. Ojha
01.06.74 to 31.05.75	DVC	Sh. S.J. Majumdar, ICS Lt. Gen. P.S. Bhagat, VC, PVSM
01.06.75 to 31.05.76	OSEB	Sh. K.C. Gantayet
01.06.76 to 31.05.77	WBSEB	Brig. D.N. Mallick
01.06.77 to 31.05.78	BSEB	Sh. K.P. Sinha, IAS Sh. J.D. Sahay Brig. S.P. Kochar
01.06.78 to 31.05.79	DVC	Sh. A.C. Bandyopadhyay, IAS
01.06.79 to 31.05.80	OSEB	Sh. J.M. Patnaik Sh. B.N. Dash
01.06.80 to 31.05.81	WBSEB	Sh. N.C. Basu
01.06.81 to 31.05.82	BSEB	Sh. Z.S. Haque Sh. S.K. Chaturvedi, IAS Sh. R.P. Khanna, IAS
01.06.82 to 31.05.83	DVC	Sh. P.C. Luthar
01.06.83 to 31.05.84	OSEB	Sh. A. Panda Sh. S.K.Nanda
01.06.84 to 31.05.85	WBSEB	Sh. A. Ghatak
01.06.85 to 31.05.86	BSEB	Sh. S. Kumar Sh. I.C. Kumar, IAS
01.06.86 to 31.05.87	DVC	Lt. Gen. M.M.L. Ghai, PVSM Sh. A. Ghatak
01.06.87 to 31.05.88	OSEB	Sh. P.K. Kar
01.06.88 to 31.05.89	WBSEB	Dr. B.P. Banerjee Dr. D.K. Bose, (from 1.5.89)
01.06.89 to 31.05.90	BSEB	Sh. J.C. Jetli, IAS Sh. J.C. Kundra (from 26.12.89) Sh. P.K. Misra (from 3.4.90)

01.06.90 to 31.05.91	DVC	Sh. P.K. Sarkar, IAS
01.06.91 to 31.05.92	OSEB	Sh. K.C. Mahapatra Sh. S.K. Mahapatra (from 22.12.91)
01.06.92 to 31.05.93	WBSEB	Sh. D.K. Bose Sh. S.K. Dasgupta
01.06.93 to 31.05.94	BSEB	Sh. B. Prasad
01.06.94 to 31.05.95	DVC	Sh.Maj.Gen. Sharad Gupta,V.S.M Sh. A.K. Misra, IAS (from 1.5.95)
01.06.95 to 31.05.96	OSEB	Sh. M.Y. Rao, IAS
01.06.96 to 31.05.97	WBSEB	Sh. S.R. Sikdar
01.06.97 to 31.05.98	BSEB	Sh. R.P. Yadav Sh. A.K. Upadhyay (from 18.5.98)
01.06.98 to 31.05.99	DVC	Sh. A.K. Misra, IAS
01.06.99 to 31.05.00	GRIDCO	Sh. B.C. Jena
01.06.00 to 31.05.01	WBSEB	Dr. G.D. Gautama, IAS
01.06.01 to 31.05.02	BSEB	Sh. C.M. Jha, IAS Sh. N.K. Agrawal (from 22.10.01)
01.06.02 to 31.05.03	DVC	Sh. J.C. Jetli, IAS
01.06.03 to 31.05.04	GRIDCO	Sh. S.C. Mahapatra, IAS
01.06.04 to 31.05.05	JSEB	Sh. B.K. Chauhan Dr. H.B. Lal (from 18.10.2004)
01.06.05 to 31.03.06	WBSEB	Sh. M. K. De, IAS
01.04.06 to 31.03.07	BSEB	Sh. M. M. Singh, IAS Sh. Swapan Mukherjee (from 01.03.07)
01.04.07 to 31.03.08	JSEB	Sh. V. N. Pandey Sh. B. M. Verma (from 29.12.07)
01.04.08 to 31.03.09	OPTCL & GRIDCO	Sh. C.J.Venugopal, IAS
01.04.09 to 31.03.10	Energy and Power Deptt., Govt. of Sikkim	Sh. Pema Wangchen
01.04.10 to 31.03.11	WBSEDCL & WBSETCL	Sh. M. K. De, IAS
01.04.11 to 31.03.12	BSEB	Sh. P. K. Rai
01.04.12 to 31.03.13	JSEB	Sh. S. N. Verma
01.04.13 to 15.07.13 16.07.13 to 31.03.14	OPTCL & GRIDCO	Sh. P. K. Jena, IAS Sh. Hemant Sharma, IAS (from 16.07.13)
01.04.14 to 31.03.15 01.04.15 to 05.07.15)	Energy and Power Deptt., Govt.of Sikkim	Sh. P. B. Subba, Principal Chief Engr.-cum-Secretary Shri N. T. Bhutia, Principal Chief Engr.-cum-Secretary (w.e.f. 1.4.15 to 5.7.15)
06.07.15 to 03.01.16 04.01.16 to 31.03.16	WBSEDCL	Shri Narayan Swaroop Nigam, IAS Shri Rajesh Pandey, IAS (from 04.01.16)
01.04.16 to 31.03.17	BSPHCL	Shri Prataya Amrit, IAS
01.04.17 to 31.03.18	JUVNL	Shri N.M.Kulkarni, IAS
01.04.18 to 31.03.19	**OPTCL & GRIDCO**	**Shri Hemant Sharma, IAS**
01.04.19 to 31.10.19	Energy and Power Deptt., Govt.of Sikkim	**Shri** K. B. Kunwar, Principal Chief Engineer-cum-Secretary
01.11.19 to 31.03.20	Energy and Power Deptt., Govt.of Sikkim	**Shri** A B. Rai, Principal Chief Engineer-cum-Secretary

ANNEXURE-III

MEMBER SECRETARIES OF EASTERN REGIONAL POWER COMMITTEE (ERPC) & ERSTWHILE EASTERN REGIONAL ELECTRICITY BOARD (EREB) SINCE ITS INCEPTION

SI.	Name	From	To
1	Sh. Z.S. Haque	1964	1965
2	Sh. G. Mukherjee	1965	1967
3	Sh. B. Choudhury	1971	1977
4	Sh. M.M. Turabi (I/C)	1977	1978
5	Sh. B.C. Ghosh (I/C)	06.03.1978	06.04.1982
6	Sh. U.V. Senoy	08.04.1982	31.08.1982
7	Sh. B.C. Ghosh (I/C)	06.09.1982	12.12.1982
8	Sh. P.K. Kar	13.12.1982	15.10.1985
9	Sh. B.C. Ghosh (I/C)	16.10.1985	01.12.1987
10	Sh. B.C. Ghosh	31.12.1987	09.03.1988
11	Sh. B. Sengupta (I/C)	28.03.1988	26.03.1989
12	Sh. B. Sengupta	27.03.1989	31.05.1993
13	Sh. A. Roy(I/C)	01.06.1993	17.07.1993
14	Dr. S. Mukhopadhyay	18.07.1993	03.08.1995
15	Sh. P. Ray (I/C)	04.08.1995	04.02.1996
16	Sh. S. Santhanam	05.02.1996	16.08.1996
17	Sh. P. Ray (I/C)	17.08.1996	26.11.1997
18	Sh. V.S. Verma	27.11.1997	30.07.1998
19	Sh. P. Ray (I/C)	30.07.1998	06.07.1999
20	Sh. B.K. Mishra	07.07.1999	28.11.2003
21	Sh. R.B. Sharma	27.11.2003	31.01.2005
22	Sh. M.K. Mitra (I/C)	01.02.2005	05.12.2005
23	Sh. M.K. Mitra	06.12.2005	31.03.2006
24	Sh. K. N. Garg (I/C)	01.04.2006	30.04.2006
25	Sh. Raffi-ud-din	01.05.2006	10.09.2006
26	Sh. R. K. Grover	11.09.2006	17.09.2009
27	Sh. A. K. Rampal	18.09.2009	06.09.2011
28	Sh. A. K. Bandyopadhyaya (I/C)	07.09.2011	30.09.2014
29	Sh. A. K. Bandyopadhyaya	01.10.2014	31.10.2017
30	Sh. J. Bandyopadhyay	01.11.2017	Contd.

INSTALLED AND EFFECTIVE CAPACITY OF POWER STATIONS
IN THE EASTERN REGION AS ON 31.03.2020

SL. N0.	NAME OF THE POWER SYSTEM/ STATION	INSTALLED CAPACITY (MW)			PRESENT CAPACITY (AFTER DERATION)	EFFECTIVE CAPACITY
		NO. & CAPACITY OF UNITS 31.03.19	Commissioned(+)/ De-commissioned(-) 2019-20	TOTAL AS ON 2019-20	(MW) AS ON 31.03.2020	(MW) AS ON 31.03.20
I	**BSPGCL+BSPHCL**					
	THERMAL:					
1	NTPC, BARAUNI	2x110	1x250	470	**2x105+1x250**	460
2	NTPC MUZAFFARPUR TPS Stg.I	2x110		220	2x110	220
	SUB TOTAL (THERMAL)	**440**		**690**	**680**	**680**
3	**RES**	327.9	13.35	341.25	341.25	341.25
	GRAND TOTAL (TH+HY) (BSPHCL)	**767.9**	**263.35**	**1031.25**	**1021.25**	**1021.25**
II	**JUSNL**					
4	SUBERNREKHA (HYDRO)	2x65		130	2x65	130
5	RES	39	7.75	46.75	46.75	46.75
	GRAND TOTAL (HY+RES) (JUVNL)	**169**	**7.75**	**176.75**	**176.75**	**176.75**
	TVNL					
6	**TENUGHAT TPS (THERMAL)**	**2x210**		420	**2x210**	420
	TOTAL	**420**		**420**	**2x210**	**420**
III	**D V C**					
	THERMAL :					
7	BOKARO "B"(U#3)	1x210		210	1x210	210
8	CHANDRAPURA (U# 3,7&8)	1x140+2x250	,-1x140	500	2x250	500
9	DURGAPUR(U#4)	1x210		210	1x210	210
10	MEJIA(U#1-4, 5-6, 7-8)	4x210+2x250+2x500		2340	4x210+2x250+2x500	2340
11	DURGAPUR STEEL TPS (U#1 & 2))	2x500		1000	2x500	1000
12	KODERMA STPS (U# 1& 2)	2x500		1000	2x500	1000
13	RAGHUNATHPUR(U# 1&2)	2x600		1200	2x600	1200
14	BOKARO "A"(U#1)	500		500	1x500	500
	SUB TOTAL (THERMAL)	**7100**	**,-1x140**	**6960**	**6960**	**6960**
	HYDRO					
15	MAITHON	2x20+1x23.2		63.2	2x20+1x23.2	63.2
16	PANCHET	2x40		80	2x40	80
17	TILAIYA	2x2		4	2x2	4
	SUB TOTAL(HYDRO)	**147.2**		**147.2**	**147.2**	**147.2**
	GRAND TOTAL (TH+HY) (DVC)	**7247.2**	**,-1X140**	**7107.2**	**7107.2**	**7107.2**

Patratu #1,2,3,5 &8 retired on 21.12.2016 . Patratu #4,6,7,9 &10 Phase out during 2017-18.
DVC, DTPS U#3(140 MW) decommissioned on 10.03.2016
DVC, CTPS U#1 (140 MW) decommissioned on 13.01.2017 , CTPS U#2(140 MW) on 30.07.2017& CTPS U#3(140 MW) on 19.03.2020 respectively.
DVC, BTPS-B U#1&2(2X210 MW) each decommissioned on 30.07.2017

SL. N0.	NAME OF THE POWER SYSTEM/ STATION	INSTALLED CAPACITY (MW)			PRESENT CAPACITY (AFTER DERATION)	EFFECTIVE CAPACITY
		NO. & CAPACITY OF UNITS 31.03.19	Commissioned(+)/ De-commissioned(-) 2019-20	TOTAL AS ON 2019-20	(MW) AS ON 31.03.2020	(MW) AS ON 31.03.20
IV	**ODISHA**					
	THERMAL					
17	NTPC TALCHER TPS	4x62.5+2x110		470	**4x60**+2x110	460
18	IB TPS STG-I	2x210		420	2x210	420
	IB TPS STG-II		2x660	1320	2x660	1320
	SUB TOTAL (THERMAL)	**890**	**1320**	**2210**	**2200**	**2200**
	HYDRO ,OHPC					
19	BURLA (Hirakud-I)	2x49.5+2x32+3x37.5		275.5	2x49.5+2x32+3x37.5	275.5
20	CHIPLIMA (Hirakud-II)	3x24		72	3x24	72
21	BALIMELA	6x60+2x75		510	6x60+2x75	510
22	RENGALI	5x50		250	5x50	250
23	UPPER KOLAB	4x80		320	4x80	320
24	INDRAVATI	4x150		600	4x150	600
25	MACHKUND (Odisha Share)	57.38		57.38	57.38	57.38
	SUB TOTAL (HYDRO)	**2084.88**		**2084.88**	**2084.88**	**2084.88**
	RES(Solar)	**499.76**	11.45	511.21	**511.21**	511.21
	GRAND TOTAL (TH+HY) (ODISHA)	**3474.6**	**1331.45**	**4806.1**	**4796.1**	**4796.1**
V	**WBPDCL**					
	THERMAL					
26	BANDEL @	2x82.5+1x215		380	**2x60**+1x215	335
27	SANTALDIH (U#5&6)	2x250		500	2x250	500
28	KOLAGHAT	6x210		1260	6x210	1260
29	BAKRESHWAR	5x210		1050	5x210	1050
30	SAGARDIGHI (U# 1,2,3&4)	2x300+2x500		1600	2x300+2x500	1600
31	DPPS (U#6,7,8)	1x110+1x300+1x250	,-(1x110)	550	1x300+1x250	550
	TOTAL THERMAL(WBPDCL)	**5450**	**-110**	**5340**	**5295**	**5295**
VI	**WBSEDCL**					
32	JALDHAKA-I	3x9		27	3x9	27
33	JALDHAKA-II	2x4		8	2x4	8
34	RAMAM HYDEL	4x12.73		51	4x12.73	51
35	TISTA CANAL FALLS	9x7.5		67.5	9x7.5	67.5
36	PURULIA PUMP STORAGE	4x225		900	4x225	900
	TOTAL HYDRO (WBSEDCL)	**1053.30**		**1053.50**	**1053.30**	**1053.30**
	RES	407.15	120.14	527.29	527.29	527.29
	GRAND TOTAL (TH+HY) (WB)	**6910.45**	**10.14**	**6920.79**	**6875.59**	**6875.59**

WBPDCL, Bandel TPS U#3&4 (2X82.5 MW) each decommissioned in the month of April-2018

SL. NO.	NAME OF THE POWER SYSTEM/ STATION	INSTALLED CAPACITY (MW)			PRESENT CAPACITY (AFTER DERATION) (MW) AS ON 31.03.2020	EFFECTIVE CAPACITY (MW) AS ON 31.03.20
		NO & CAPACITY OF UNITS 31.03.19	Commissioned(+)/ De-commissioned(-) 2019-20	TOTAL AS ON 2019-20		
VII	**CESC THERMAL**					
37	SOUTHERN	2x67.5		135	135	135
40	TITAGARH	4x60		240	240	240
41	BUDGE BUDGE	3x250		750	750	750
	TOTAL (CESC)	**1125**		**1125**	**1125**	**1125**
42	**HALDIA ENERGY LTD. (HEL)(2X300 MW)**	600		**600**	600	**600**
IX	**SIKKIM**					
43	**RES**	**52.18**		**52.18**	**52.18**	**52.18**
	TOTAL (SIKKIM)	**52.18**		**52.18**	**52.18**	**52.18**
X	**NTPC**					
44	FARAKKA STPS - I&II	3x200+2x500		1600	3x200+2x500	1600
45	FARAKKA STPS - III (U# 6)	1x500		500	1x500	500
46	KAHALGAON STPS - I&II	4x210+3x500		2340	4x210+3x500	2340
47	TALCHER STPS - I	2x500		1000	2x500	1000
48	BARH (U# 4&5)	2x660		1320	2x660	1320
49	MTPS Stg-II	2X195		390	2X195	390
50	BRBCL,Nabi Nagar TPS	3X250		750	3X250	750
51	NPGCL,NSTPP		1X660	660	1X660	660
52	NTPC, Darlipali STPP		1X800	800	1X800	800
	TOTAL (NTPC)	**7900**	**1460**	**9360**	**9360**	**9360**
	NTPC TALCHER SOLAR	**10**	**0**	**10**	**10**	**10**
XI	**NHPC**					
51	RANGIT HPS	3x20		60	3x20	60
52	TEESTA HPS	3x170		510	3x170	510
53	TLDP-III*	4x33		132	4x33	132
54	TLDP-IV*	4x40		160	4x40	160
	TOTAL	**862**		**862**	**862**	**862**
XII	**IPP**					
55	MPL (Thermal U#1,2)	2x525		1050	2x525	1050
56	APNRL (Thermal U# 1,2)	2x270		540	2x270	540
57	GMR (Thermal U# 1&2)	2x350		700	2x350	700
58	JITPL(Thermal U# 1,2)	2x600		1200	2x600	1200
	TOTAL IPP (THERMAL)	3490		3490	3490	3490
59	CHUZACHEN (Hydro U#1,2)	2x55		110	2x55	110
60	JORETHANG(Hydro U#1,2)	2x48		96	2x48	96
61	TEESTA URJA St III (6x200)	6x200		1200	6x200	1200
62	DICKCHU HEP(2x 48)	2x48		96	2x48	96
63	TASHIDING(2x 48.5)	2x48.5		97	2x48.5	97
	TOTAL IPP (HYDRO)	**1599**		**1599**	**1599**	**1599**
XIV	**BHUTAN IMPORT ****					
65	CHPS	4x90		360	4x90	270
66	KURICHHU HPS	4x15		60	4x15	60
67	TALA HPS	6x170		1020	6x170	1020
68	DAGHACHU	2x63		126	2x63	126
69	MANGDECHHU HEP	4x180		720	4x180	720
	TOTAL BHUTAN IMPORT	**1566**		**2286**	**2286**	**2196**
XV	**EASTERN REGION(Excluding Bhutan import)**					
	THERMAL	**27415**	**2780**	**30195**	**30130**	**30130**
	HYDRO	**5876**		**5876**	**5876**	**5876**
	SOLAR	**1336**	**153**	**1489**	**1489**	**1489**
	ER GRAND TOTAL (Excl. Bhutan)	**34627**	**2933**	**37560**	**37495**	**37495**

*100% power of TLDP-III & IV under NHPC is allocated for West Bengal.

** Allocated import by ER from Bhutan (90 MW of Chukha power is for own consumption of Bhutan & 15% of Tala power allocated to NR)

TSTPS Stage-II (4x500 MW) of NTPC though geographically situated in Orissa but it is meant for SR, hence not considered for I.C. of ER.

ANNEXURE-IV B

NEW UNITS DECLARED COMMERCIAL OPERATION IN EASTERN REGION DURING 2019-20							
SN.	STATE	AGENCY	Name of Power Stations	Type	Unit No.	Capacity (MW)	CoD
1.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#3	660	03.07.2019
2.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#4	660	21.08..2019
3.	BIHAR	NTPC	Nabinagar Super Thermal Power Project	Thermal	U#1	660	06.09.2019
4.	ODISHA	NTPC	Darlipali Super Termal Power Project	Thermal	U#1	800	01.03.2020
5.	BIHAR	NTPC	Barauni Thermal Power Project	Thermal	U#8	250	01.03.2020

UNITS DE- COMMISSIONED IN EASTERN REGION DURING 2019-20 DUE TO UNECONOMICAL OPERARTION & OUTLIVED

SN.	STATE	AGENCY	Name of Power Stations	Type	Unit No.	Capacity (MW)	Date of De-commissioned
1	WEST BENGAL	DPL	Durgapur project Limited	Thermal	U#6	110	28.01.2020
2	JHARKHAND	DVC	Chandrapura Thermal Power Station	Thermal	U#3	140	19.03.2020

NEW UNITS DECLARED COMMERCIAL OPERATION IN BHUTAN DURING 2019-20							
SN.	STATE	AGENCY	Name of Power Stations	Type	Unit No.	Capacity (MW)	CoD
6	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#1	180	28.06.2019
7	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#2	180	08.07.2019
8	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#3	180	14.08.2019
9	BHUTAN	DGPC	Mangdechhu Hydro Station	Hydro	U#4	180	16.08.2019

ANNEXURE-IVC

New Transmission Elements Commissioned During 2019-20

A. TRANSMISSION LINES ADDITION DURING THE YEAR 2019-20

SI. No.	Name of the Lines	VOLTAGE (kV)	OWNER	Date of Commissioning
1	Jharsuguda - Raipur I	765	OGPTL	04-Apr-19
2	Jharsuguda -Raipur II	765	OGPTL	05-Apr-19
3	Alipurduar- Jigmelling Ckt I	400	PGCIL	13-Jun-19
4	Alipurduar- Jigmelling Ckt II	400	PGCIL	13-Jun-19
5	Bidhanagar-New Chanditala	400	WBSETCL	10-Jul-19
6	New Chanditala-Arambag	400	WBSETCL	16-Jul-19
7	Patna-NPGC II	400	PGCIL	17-Jul-19
8	Patna-NPGC I	400	PGCIL	18-Jul-19
9	Dalkhola-Gazole I	220	WBSETCL	25-Jul-19
10	Gazole-Malda I	220	WBSETCL	25-Jul-19
11	Dalkhola-Gazole II	220	WBSETCL	25-Jul-19
12	Gazole-Malda II	220	WBSETCL	25-Jul-19
13	Keonjhar (PG)- Keonjhar II	220	OPTCL	03-Aug-19
14	Patna -Khagaul Ckt-II	220	BGCL	08-Aug-19
15	Patna -Khagaul Ckt-III	220	BGCL	08-Aug-19
16	Arah-Sasaram(PG) -I (LILO at Nadokhar)	220	BSPTCL	08-Sep-19
17	Dumka-Govindpur-I	220	JUSNL	25-Sep-19
18	Dumka-Govindpur-II	220	JUSNL	25-Sep-19
19	New Purnea-Gokarno S/C	400	PGCIL	10-Nov-19
20	Farakka-New Purnea S/C	400	PGCIL	10-Nov-19
21	Ranchi-Hatia III	220	JUSNL	17-Dec-19
22	Alipurduar -Binaguri Ckt-3	400	ATL	16-Jan-20
23	Alipurduar -Binaguri Ckt-4	400	ATL	16-Jan-20
24	Talcher - Meramundali -II	400	PGCIL	01-Feb-20
25	Meramundali - Mendhasal - II	400	OPTCL	29-Feb-20
26	Godda-Lalmatia - I	220	JUSNL	04-Mar-20
27	Godda-Lalmatia - II	220	JUSNL	04-Mar-20
28	Meramundali-Narsinghpur - I	220	OPTCL	06-Mar-20
29	Bhanjanagar-Narsinghpur - I	220	OPTCL	06-Mar-20

ANNEXURE-IVC

New Transmission Elements Commissioned During 2019-20

B. Substations /ATRs/Reactors addition During the Year 2019-20

SI. No.	Substations/ATRs	Volatge Level (kV)	Utility	Date of Commissioning
1	315 MVA ICT - 2 at Bokaro-A	400/220	DVC	25-Apr-19
2	316 MVA ICT - 3 at Durgapur	400/220	PGCIL	07-Jun-19
3	160 MVA ICT- 1 at Gazole	220/132	WBSETCL	25-Jul-19
4	160 MVA ICT- 2 at Gazole	220/132	WBSETCL	26-Jul-19
5	500 MVA ICT-II at Rajarhat	400/220	PGCIL	15-Aug-19
6	500 MVA ICT-4 at Biharshariff	400/220	PGCIL	04-Sep-19
7	160 MVA ICT -IV at Malda	220/132	PGCIL	29-Sep-19
8	1500 MVA ICT-4 at Jharsuguda	765/400/33	PGCIL	23-Nov-19
9	1500 MVA ICT-3 at Jharsuguda	765/400/33	PGCIL	27-Nov-19
10	315 MVA ICT-III at Lakhisarai	400/132	PGCIL	29-Dec-19
11	315 MVA ICT-III at Banka	400/132	PGCIL	30-Dec-19
12	500 MVA ICT-II at Pusauli	400/220	PGCIL	16-Jan-20
13	315 MVA ICT-3 at Mendhasal	400/220	OPTCL	24-Jan-20
14	200 MVA ICT-2 at Kahalgaon	400/132	NTPC	10-Feb-20
15	255 MVA ICT-I at Darlipali	765/132	NTPC	09-Mar-20
SI. No.	**Substations/Reactors**	**Volatge Level (kV)**	**Utility**	**Date of Commissioning**
1	80 MVAR Line Reactor of Kishanganj-Darbhanga Line-2 at Kishanganj SS	400	PGCIL	14-Jun-19
2	125 MVAR Bus Reactor at Arambagh	400	WBSETCL	12-Dec-19
3	125 MVA Bus Reactor at Subhashgram	400	PGCIL	11-Jan-20
4	80 MVAR Line Reactor of Patna-Barh Ckt-I at Patna SS	400	PGCIL	28-Jan-20
5	63 MVAR Fixed line Reactor of New Purnea-Kishanganj - I at Purnea	400	PGCIL	15-Feb-20

ANNEXURE-V

CONSTITUENT-WISE PERFORMANCE DATA DURING 2019-20

SYSTEM	Gross Generation(MU)				Auxiliary power Consumption(MU			Net Generation (MU)				Import from	Net Exchang	Energy	Net Peak
	HYDRO	Thermal	RES (Hy+Solar)	Total	HYDRO	Thermal	Total	HYDRO	Thermal	RES (Hy+Solar)	Total	Captive (MU	Import(+) Export(-)	Consum-ption(MU)	DEMAND MET (MW)
BSPHCL	0.00	823.79	369.31	1193.10	0.00	140.14	140.14	0.00	683.65	369.31	1052.96	0.00	31012.79	32066	5789
JUSNL	36.12	2416.62	0.00	2452.74	0.00	299.23	299.23	36.12	2117.39	0.00	2153.51	577.68	6251.05	8982	1389
DVC	202.45	36997.83	0.00	37200.28	1.24	2649.42	2650.66	201.21	34348.41	0.00	34549.62	162.74	-12340.27	22372	3014
ODISHA(OPGC+OHPC+TTPS)	6356.88	10396.28	324.65	17077.81	45.95	998.33	1044.28	6310.93	8725.48	324.65	15361.06	6426.86	7935.83	29724	5292
WBPDCL+WBSEDCL	1555.48	23351.61	173.88	25080.96	0.00	2231.62	2231.62	1555.48	21119.99	173.88	22849.34	1304.03	18114.24	42268	7269
CESC	0.00	6137.43	0.00	6137.43	0.00	477.80	477.80	0.00	5659.63	0.00	5659.63	0.00	5358.62	11018	2329
Haldia Energy limited	0.00	4430.09	0.00	4430.09	0.00	334.48	334.48	0.00	4095.61	0.00	4095.61	0.00	-4095.61		
SIKKIM	0.00	0.00	25	25	0.00	0.00	0.00	0.00	0.00	25	25	0.00	539.50	565	115
NTPC	0.00	54494.55	13.4	54507.90	0.00	4069.66	4069.66	0.00	50409.41	13.4	50422.76	0.00	-50422.76		
MPL	0.00	6488.16	0.00	6488.16	0.00	386.26	386.26	0.00	6101.90	0.00	6101.90	0.00	-6101.90		
APNRL	0.00	2959.48	0.00	2959.48	0.00	247.57	247.57	0.00	2711.91	0.00	2711.91	0.00	-2711.91		
GMR	0.00	3758.50	0.00	3758.50	0.00	270.90	270.90	0.00	3487.60	0.00	3487.60	0.00	-3487.60		
JITPL	0.00	5199.79	0.00	5199.79	0.00	333.89	333.89	0.00	4865.90	0.00	4865.90	0.00	-4865.90		
OPGC								0.00	672.47	0.00	672.47	0.00	-672.47		
NHPC (Inc TLDP=1300.19MU)	4460.91	0.00	0.00	4460.91	0.00	0.00	0.00	4460.91	0.00	0.00	4460.91	0.00	-4460.91		
CHPC(Birpara Receipt)	1589.99	0.00	0.00	1589.99	0.00	0.00	0.00	1589.99	0.00	0.00	1589.99	0.00	-1589.99		
KHPS	235.53	0.00	0.00	235.53	0.00	0.00	0.00	235.53	0.00	0.00	235.53	0.00	-235.53		
THPS	2557.01	0.00	0.00	2557.01	0.00	0.00	0.00	2557.01	0.00	0.00	2557.01	0.00	-2557.01		
DAGACHU HPS	391.70	0.00	0.00	391.70	0.00	0.00	0.00	391.70	0.00	0.00	391.70	0.00	-391.70		
Mangdechhu HEP	1576.37	0.00	0.00	1576.37	0.00	0.00	0.00	1576.37	0.00	0.00	1576.37	0.00	-1576.37		
CHUZACHEN HPS	467.19	0.00	0.00	467.19	0.00	0.00	0.00	467.19	0.00	0.00	467.19	0.00	-467.19		
JORTHANG HPS	404.59	0.00	0.00	404.59	0.00	0.00	0.00	404.59	0.00	0.00	404.59	0.00	-404.59		
TEESTA-III HPS	5996.24	0.00	0.00	5996.24	0.00	0.00	0.00	5996.24	0.00	0.00	5996.24	0.00	-5996.24		
DIKCHU HPS	433.58	0.00	0.00	433.58	0.00	0.00	0.00	433.58	0.00	0.00	433.58	0.00	-433.58		
TASHIDING HPS	471.71	0.00	0.00	471.71	0.00	0.00	0.00	471.71	0.00	0.00	471.71	0.00	-471.71		
Total Drawal by NPGCL,Barh STg-I,DSTPP & OPGC and consumption at HVDC Sasaram& Alipurduar.													94.97	94.77	
Total	**26735.74**	**157454.14**	**905.19**	**185095.07**	**47.19**	**12439.31**	**12486.50**	**26689.05**	**145000.57**	**905.19**	**172594.82**	**8471.30**	**-33976.24**	**147090**	**23398**
				185095.07									**147090**		

		BSPHCL	JUSNL	DVC	ODISHA	WBSEDCL	CESC	SIKKIM	REGION
ANNUAL LOAD FACTOR:		**63.06**	**73.62**	**84.50**	**63.94**	**66.20**	**53.86**	**55.90**	**71.57**

Note: 1. BSPHCL exchange inclusive of the drawal of Nepal from BSPHCL network .

2. Sikkim's generarion figure is estimated

3. Net Exchange of Energy is inclusive of Transmission loss at the periphery of respectives system.

4. IB TPS Stage-II generation c 3384.53 MU is only cosidered as Odisha own generation because 672.47 MU generation from May-19 to October-19 is accounted as ISGS generation. However the matter is subjudice.

5. Mangdechhu HEP injection to indian grid from June-19 to August-19 has been considered for operation purposes.

6. All the figures considered above for operational data,need not to be used for any commercial purposes

ANNEXURE-VI A

वर्ष 2019-20 के दौरान राज्यवार मासिक वास्तविक अधिकतम मांग (मे.वा. में)

CONSTITUENT WISE MONTHLY PEAK DEMAND MET DURING 2019-20

(All figures in Net MW)

MONTH	BSPHCL	JUSNL	DVC	ODISHA	WBSEDCL	CESC	SIKKIM	ER
	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met
Apr-19	5155	1325	3014	5140	6913	2124	98	22378
May-19	5326	1389	2963	4606	7104	2312	93	22781
Jun-19	5483	1362	2950	4949	7169	2329	89	22808
Jul-19	5433	1323	2871	4861	7269	2131	85	23154
Aug-19	5748	1316	2848	4856	7091	1940	90	23398
Sep-19	5789	1328	2868	5292	7117	1876	93	23126
Oct-19	5020	1277	2831	4656	6597	1810	96	21706
Nov-19	4323	1280	2807	4026	5257	1621	102	19212
Dec-19	4614	1356	2848	4198	4754	1359	111	18608
Jan-20	4571	1373	2979	3605	5064	1266	115	18714
Feb-20	4280	1331	2973	4017	5177	1345	114	18962
Mar-20	4146	1274	2509	3824	5650	1528	108	18668
MAXIMUM	**5789**	**1389**	**3014**	**5292**	**7269**	**2329**	**115**	**23398**
MINIMUM	**4146**	**1274**	**2509**	**3605**	**4754**	**1266**	**85**	**18608**
AVERAGE	**4991**	**1328**	**2872**	**4503**	**6264**	**1803**	**100**	**21126**
% Avg.Peak Growth wrt 18-19	**7.87**	**5.50**	**-0.65**	**-3.14**	**-3.51**	**1.95**	**6.04**	**0.74**

CONSTITUENT WISE MONTHLY PEAK DEMAND MET DURING 2018-19

(All figures in Net MW)

MONTH	BSPHCL	JUSNL	DVC	ODISHA	WBSEDCL	CESC	DPL	SIKKIM	ER
	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met
Apr-18	4463	1222	2877	4358	6546	1917	264	90	21058
May-18	4790	1279	2890	4974	6533	2063	283	88	21902
Jun-18	4851	1222	2901	4684	6449	2120	287	83	22080
Jul-18	4931	1245	2874	4526	7009	1943	288	81	21790
Aug-18	4876	1287	2827	5434	6643	1832	275	85	22580
Sep-18	4992	1250	2764	4936	6759	1932	273	85	22286
Oct-18	5084	1247	2837	5219	6809	1923	278	93	22733
Nov-18	4425	1289	2837	4516	5627	1758	273	101	20322
Dec-18	4151	1291	2957	4042	4688	1346	289	106	18023
Jan-19	4249	1260	2871	4198	5259	1292		106	18702
Feb-19	4216	1264	3098	4264	5611	1439		104	18921
Mar-19	4489	1248	2954	4632	6618	1662		104	21245
MAXIMUM	**5084**	**1291**	**3098**	**5434**	**7009**	**2120**	**289**	**106**	**22733**
MINIMUM	**4151**	**1222**	**2764**	**4042**	**4688**	**1292**	**264**	**81**	**18023**
AVERAGE	**4626**	**1259**	**2891**	**4649**	**6213**	**1769**	**279**	**94**	**20970**
% AVG. Growth wrt 17-18	**10.56**	**2.19**	**1.20**	**9.31**	**7.19**	**0.02**	**3.90**	**1.62**	**9.36**

From 01.01.2019 DPL generating capacity is taken over by WBPDCL where as distribution is taken over by WBSEDCL

CONSTITUENT WISE MONTHLY PEAK DEMAND MET DURING 2017-18

MONTH	BSPHCL	JUSNL	DVC	ODISHA	WBSEDCL	CESC	DPL	SIKKIM	ER
	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met	Peak Demand Met
Apr-17	3923	1177	2803	4262	6247	1980	276	88	19164
May-17	4062	1217	2726	4149	5877	2110	274	83	19509
Jun-17	4151	1214	2746	3902	6067	2148	276	83	18994
Jul-17	4134	1216	2761	4247	6102	1742	290	78	19110
Aug-17	4101	1245	2721	4254	6151	1790	273	78	19221
Sep-17	4437	1232	2851	4365	6470	1964	257	85	20283
Oct-17	4527	1254	2700	4488	6098	1848	243	99	19882
Nov-17	3919	1314	2957	4191	4998	1643	252	108	18377
Dec-17	3969	1235	2944	4254	4836	1391	242	107	17837
Jan-18	4359	1233	3079	4232	4931	1306	256	104	18238
Feb-18	4146	1220	2989	4213	5316	1563	264	103	18918
Mar-18	4487	1223	2997	4475	6456	1738	318	92	20567
MAXIMUM	**4527**	**1314**	**3079**	**4488**	**6470**	**2148**	**318**	**108**	**20567**
MINIMUM	**3919**	**1177**	**2700**	**3902**	**4836**	**1306**	**242**	**78**	**17837**
AVERAGE	**4185**	**1232**	**2856**	**4253**	**5796**	**1769**	**268**	**92**	**19175**
% AVG. Growth wrt 16-17	**15.84**	**6.74**	**15.33**	**7.57**	**0.39**	**1.09**	**5.71**	**8.20**	**5.40**

संलग्नक / **ANNEXURE - VIB**

वर्ष 2019-20 के दौरान राज्यवार मासिक वास्तविक अधिकतम मांग (मे.वा. में)
Statewise Monthly Actual Peak Demand in MW during 2019-20

(Ex-Bus Figs)

महिना / Month	States / Actual / UR	BIHAR	JHARKHAND	DVC	ODISHA	WBSEDCL	CESC	SIKKIM	EASTERN REGION
		1	2	3	4	5	6	7	8
अप्रैल / Apr-19	Actual	5155	1325	3014	5140	6913	2124	98	22378
	Unrestricted	5157	1326	3014	5142	6950	2124	98	22415
मई / May-19	Actual	5326	1389	2963	4606	7104	2312	93	22781
	Unrestricted	5326	1396	2971	4614	7177	2315	93	22830
जून / June-19	Actual	5483	1362	2950	4949	7169	2329	89	22808
	Unrestricted	5483	1363	2962	4950	7185	2332	89	22867
जुलाई / July-19	Actual	5433	1323	2871	4861	7269	2131	85	23154
	Unrestricted	5435	1323	2874	4861	7292	2134	85	23246
अगस्त / Aug-19	Actual	5748	1316	2848	4856	7091	1940	90	23398
	Unrestricted	5778	1316	2855	4856	7098	1942	90	23421
सितंबर / Sep-19	Actual	5789	1328	2868	5292	7117	1876	93	23126
	Unrestricted	5835	1328	2881	5292	7137	1881	93	23276
अक्तूबर / Oct-19	Actual	5020	1277	2831	4656	6597	1810	96	21706
	Unrestricted	5027	1277	2831	4656	6597	1813	96	21726
नवम्बर / Nov-19	Actual	4323	1280	2807	4026	5257	1621	102	19212
	Unrestricted	4341	1280	2809	4026	5257	1623	102	19291
दिसम्बर / Dec-19	Actual	4614	1356	2848	4198	4754	1359	111	18068
	Unrestricted	4617	1356	2850	4198	4759	1359	111	18068
जनवरी / Jan-20	Actual	4571	1373	2988	3604	5064	1266	115	18714
	Unrestricted	4571	1373	2988	3615	5076	1266	115	18756
फरवरी / Feb-20	Actual	4280	1331	2973	4017	5177	1345	114	18962
	Unrestricted	4280	1331	2973	4018	5182	1345	114	18968
मार्च / March-20	Actual	4146	1274	2509	3824	5650	1528	108	18668
	Unrestricted	4146	1274	2509	3830	5650	1528	109	18767

संलग्नक / ANNEXURE - VII A

वर्ष 2019-20 में विद्युत की राज्यवार मासिक उपभोग (मि.यू. में)

Constituent wise net monthly energy consumption during 2019-20									(All Figures in Net MU)	
MONTH	BSPHCL	JUSNL	DVC (Own)	ODISHA	WBSEDCL (Own)	CESC	WEST BENGAL (Total)	SIKKIM	Eastern Region (Total)	Avg. Consumption (MU) Per day
Apr-19	2621	715	1942	2719	3801	1017	4817	43	12862	**429**
May-19	3132	818	2015	2539	4177	1206	5382	44	13943	**450**
Jun-19	3104	768	1924	2668	4174	1143	5317	43	13843	**461**
Jul-19	2918	750	1954	2852	4310	1161	5471	41	13992	**451**
Aug-19	*3383*	*758*	*1875*	*2924*	*4257*	*1060*	5317	*44*	*14307*	**462**
Sep-19	2988	743	1797	2836	3958	1022	4980	43	13384	**446**
Oct-19	2663	730	1855	2495	3436	924	4359	43	12149	**392**
Nov-19	2189	724	1793	2111	2723	754	3477	48	10348	**345**
Dec-19	2195	767	1872	2205	2718	684	3403	57	10506	339
Jan-20	2494	788	1933	2072	2822	673	3496	58	10846	350
Feb-20	2185	715	1829	2086	2886	649	3535	53	10419	**359**
Mar-20	*2194*	*707*	*1583*	*2217*	*3007*	*724*	*3731*	*50*	*10490*	*338*
TOTAL	**32066**	**8982**	**22372**	**29724**	**42268**	**11018**	**53286**	**565**	**147090**	**402**
AVERAGE	2672	748	1864	2477	3522	918	4441	47	12258	402
MAXIMUM	3383	818	2015	2924	4310	1206	5471	58	14307	462
MINIMUM	2185	707	1583	2072	2718	649	3403	41	10348	338
% Growth wrt 18-19	*5.95*	*4.44*	*-0.21*	*-7.03*	*2.74*	*2.74*	*2.74*	*4.32*	*0.91*	
Per day Consumption	**88**	**25**	**61**	**81**	**115**	**30**	**146**	**2**	**402**	

Constituent wise net monthly energy consumption during 2018-19										(All Figures in Net MU)	
MONTH	BSPHCL	JUSNL	DVC (Own)	ODISHA	WBSEDCL (Own)	DPL	CESC	WEST BENGAL (Total)	SIKKIM	Eastern Region (Total)	Avg. Consumption (MU) Per day
Apr-18	2462	680	1841	2372	3277	177	955	4409	45	11809	394
May-18	2682	732	1923	2888	3503	192	1071	4766	43	13036	421
Jun-18	2743	702	1879	2847	3655	190	1064	4909	41	13123	437
Jul-18	2821	722	1931	2635	3802	192	1055	5050	42	13204	426
Aug-18	2898	746	1853	3163	3907	181	1044	5132	40	13837	446
Sep-18	2843	733	1750	2932	3710	176	1027	4912	39	13216	441
Oct-18	2694	730	1838	3223	3347	178	944	4470	44	13009	420
Nov-18	2218	721	1823	2662	2638	178	761	3578	46	11058	369
Dec-18	2223	727	1904	2268	2501	187	676	3364	53	10556	341
Jan-19	2347	749	1966	2259	2956		667	3623	53	11009	355
Feb-19	1987	642	1740	2111	2810		637	3447	47	9986	357
Mar-19	2348	716	1972	2615	3384		823	4207	49	11917	384
TOTAL	**30265**	**8600**	**22419**	**31973**	**39490**	**1650**	**10725**	**51866**	**542**	**145761**	**399**
AVERAGE	**2522**	**717**	**1868**	**2664**	**3291**	**183**	**894**	**4322**	**45**	**12147**	**399**
MAXIMUM	**2898**	**749**	**1972**	**3223**	**3907**	**192**	**1071**	**5132**	**53**	**13837**	**446**
MINIMUM	**1987**	**642**	**1740**	**2111**	**2501**	**176**	**637**	**3364**	**39**	**9986**	**341**
% Growth wrt 17-18	**10.64**	**1.28**	**5.11**	**9.13**	**3.35**	**9.66**	**-1.45**	**1.50**	**5.66**	**5.54**	
Per day Consumption	**83**	**24**	**61**	**88**	**108**	**6**	**29**	**142**	**1**	**399**	

From 01.01.2019 DPL generating capacity is taken over by WBPDCL where as distribution is taken over by WBSEDCL

ANNEXURE-VII

Constituent wise net energy consumption during 2017-18										(All Figures in Net MU)	
MONTH	BSPHCL	JUSNL	DVC (Own)	ODISHA	WBSEDCL (Own)	DPL	CESC	WEST BENGAL (Total)	SIKKIM	Eastern Region (Total)	Avg. Consumption (MU) Per day
Apr-17	2099	731	1732	2541	3500	170	1009	4679	39	11821	**394**
May-17	2289	718	1747	2601	3398	175	1122	4695	40	12090	**390**
Jun-17	2439	685	1734	2325	3495	167	1077	4739	37	11959	**399**
Jul-17	2317	661	1728	2468	3438	171	992	4602	37	11813	**381**
Aug-17	2449	740	1770	2493	3542	174	1036	4751	36	12239	**395**
Sep-17	2582	724	1786	2654	3581	162	1034	4777	37	12560	**419**
Oct-17	2532	706	1769	2759	3219	159	932	4310	42	12117	**391**
Nov-17	1932	675	1723	2156	2527	155	748	3431	50	9965	**332**
Dec-17	2027	726	1866	2206	2493	165	682	3341	51	10216	**330**
Jan-18	2338	743	1923	2361	2712	172	670	3554	52	10972	**354**
Feb-18	1977	648	1706	2180	2733	159	669	3560	47	10118	**361**
Mar-18	2373	734	1846	2553	3573	177	913	4662	45	12213	**394**
TOTAL	**27355**	**8490**	**21329**	**29297**	**38211**	**2007**	**10882**	**51100**	**513**	**138105**	**378**
AVERAGE	**2280**	**708**	**1777**	**2441**	**3184**	**167**	**907**	**4258**	**43**	**11507**	**378**
MAXIMUM	**2582**	**743**	**1923**	**2759**	**3581**	**177**	**1122**	**4777**	**52**	**12560**	**419**
MINIMUM	**1932**	**648**	**1706**	**2156**	**2493**	**155**	**669**	**3341**	**36**	**9965**	**330**
% Growth wrt 16-17	**14.62**	**5.62**	**6.59**	**12.39**	**0.81**	**9.24**	**1.88**	**1.34**	**9.56**	**7.13**	
Per day Consumption	**74.94**	**23.26**	**58.43**	**80.27**	**104.69**	**5.50**	**29.81**	**140.00**	**1.40**	**378.37**	

वर्ष 2019-20 में विद्युत की राज्यवार मासिक आवश्यकता एवं उपभोग (मि.यू. में)

Statewise Monthly Energy Requirement and Consumption in MU during 2019-20

(EX-Bus Figs)

राज्य / States →	BIHAR		JHARKHAND		DVC		ODISHA		WBSEDCL		CESC		SIKKIM		Eastern Region	
मास / Month ↓	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement	Actual Consumption	Unrestricted Requirement
	1	2	3	4	5	6	7	8	9	10	11	12	13		14	
अप्रैल / Apr-19	2621	2626	715	724	1942	1944	2719	2720	3801	3823	1017	1017	43	43	12862	12896
मई / May-19	3132	3136	818	826	2015	2016	2539	2540	4176	4197	1206	1206	44	44	13943	13965
जून / June-19	3104	3113	768	777	1924	1925	2668	2670	4174	4191	1143	1143	43	43	13843	13862
जुलाई / July-19	2918	2930	750	756	1954	1955	2852	2852	4310	4322	1161	1160	41	41	13992	14016
अगस्त / Aug-19	3383	3407	758	762	1875	1875	2924	2925	4257	4272	1060	1061	44	43	14307	14344
सितंबर / Sep-19	2988	3007	743	744	1797	1797	2836	2836	3958	3972	1022	1023	43	43	13384	13421
अक्तूबर / Oct-19	2663	2668	730	730	1855	1855	2495	2495	3436	3440	924	924	43	42	12149	12155
नवम्बर / Nov-19	2189	2189	724	725	1793	1793	2111	2111	2723	2730	754	755	48	48	10348	10352
दिसम्बर / Dec-19	2195	2204	767	769	1872	1873	2205	2206	2718	2721	684	686	57	57	10506	10517
जनवरी / Jan-20	2494	2497	788	795	1933	1934	2072	2074	2822	2825	673	675	58	58	10846	10857
फरवरी / Feb-20	2185	2193	715	732	1829	1829	2086	2087	2886	2888	649	651	53	53	10419	10433
मार्च / March-20	2194	2196	707	710	1583	1583	2217	2217	3007	3011	724	725	50	50	10490	10493
Total	**32066**	**32166**	**8982**	**9048**	**22372**	**22380**	**29724**	**29732**	**42268**	**42393**	**11018**	**11025**	**565**	**565**	**147090**	**147310**

Note : (a) Drawl from Central Sector is at ISGS periphery.

(b) From the month of January-19, DPL Generation and Distribution load has been taken over by WBPDCL and WBSEDCL respectively.

INTER-REGIONAL AND INTRA-REGIONAL EXCHANGE OF ENERGY DURING 2019-20

All Figures in MU

	Months--->	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	TOTAL (Net)	TOTAL DRAWAL
	SYSTEM													DRAWAL	Incl. T.loss
	BSPHCL	2440.40	2963.84	2964.44	2757.64	3203.82	2845.21	2562.34	2086.42	2111.46	2404.37	2077.25	2039.93	30457.13	31012.79
	JUVNL	489.92	565.50	562.85	505.28	504.63	500.36	473.84	487.90	512.14	538.73	539.81	458.10	6139.05	6251.05
	GRIDCO	1055.68	905.38	1051.23	1169.35	1304.64	887.72	544.14	187.82	357.69	153.24	97.52	79.24	7793.64	7935.83
	WBSEDCL	1486.66	1793.16	1735.99	2256.58	2589.31	1955.50	1377.00	1120.89	800.92	758.96	856.68	1021.51	17753.17	18077.11
	SIKKIM	40.86	40.00	39.35	37.33	39.82	39.24	38.97	45.59	54.23	55.53	50.99	47.93	529.84	539.50
	NER	0.00	0.00	328.44	245.94	591.75	479.67	382.36	0.00	0.00	0.00	493.31	239.21	2760.69	2811.06
DRAWAL BY	NR	1616.73	2001.34	1992.83	2536.71	1740.15	2454.14	1814.21	2093.85	2284.44	1887.76	1524.13	1243.83	23190.12	23613.26
	SR	1793.34	1415.94	957.11	1017.57	487.29	471.64	1186.76	1553.49	1613.78	1730.64	1963.78	2624.11	16815.44	17122.27
	NEPAL	153.04	162.46	157.12	140.52	129.63	122.08	16.54	11.04	150.54	180.72	172.41	147.47	1543.55	1571.71
	BANGLADESH	567.50	665.85	603.77	669.47	639.21	641.90	625.71	401.71	214.20	229.48	294.09	385.56	5938.46	6046.81
	Barh STPS Stg-I											3.95	4.81	8.76	8.92
	HVDC SASARAM	0.58	0.69	0.67	0.64	0.64	0.61	0.58	0.52	0.55	0.54	0.52	0.58	7.11	7.24
	ALIPURDUAR	0.41	0.67	0.71	0.82	0.82	0.74	0.65	0.39	0.35	0.38	0.32	0.37	6.64	6.76
	NPGCL	4.93	0.00	0.00	0.00	5.91	2.85	1.88	3.72	4.24	4.11	3.63	1.18	32.45	33.04
	Darlipali STPS	4.66	4.41	4.32	5.31	1.84	3.53	2.18	0.00	0.00	0.00	6.56	0.00	32.82	33.41
	BRBCL INFIRM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	OPGC INFIRM	5.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.27	5.37
	Total Drawal	9659.98	10519.23	10398.84	11343.16	11239.45	10405.20	9027.17	7993.34	8104.54	7944.46	8084.95	8293.83	113014.15	115076.26
INJECTION BY	FSTPS I&II	820.28	926.76	795.55	907.66	910.78	804.79	528.49	613.52	830.18	785.67	831.63	761.07	9516.36	
	FSTPS- III	228.35	289.78	54.21	0.00	124.72	290.46	262.00	266.68	310.62	266.03	285.69	242.90	2621.44	
	KhSTPP-I	461.63	487.02	488.46	383.56	417.22	464.84	432.75	396.25	428.29	483.82	496.27	452.79	5392.89	
	KhSTPP-II	684.59	672.23	852.55	864.01	878.05	862.57	831.73	894.63	889.61	791.21	857.27	811.65	9890.09	
	TSTPS-I	553.81	565.12	516.11	541.48	297.14	297.79	410.92	486.45	590.99	427.84	307.72	533.30	5528.67	
	Barh STPS	817.64	846.18	785.77	780.52	801.07	741.26	665.35	657.12	387.94	355.77	326.90	568.27	7733.80	
	MTPS-II	190.06	221.84	207.99	90.01	116.69	169.96	175.48	159.17	204.40	207.37	170.40	163.56	2076.93	
	BRBCL	370.56	340.47	386.27	323.09	322.08	304.58	334.23	441.48	440.47	448.81	440.63	366.37	4519.05	
	BRBCL (Infirm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	NPGCL (Infirm)	0.00	6.31	55.76	120.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	182.68	
	NSTPS (firm)						288.95	375.87	372.58	306.25	381.03	331.07	374.65	2430.40	
INJECTION BY	Darlipali STPS (Infirm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.84	129.33	4.69	0.00	0.00	173.85	
	Darlipali STPS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	343.25	343.25	
	Total NTPC	4126.92	4355.70	4142.67	4010.94	3867.75	4225.20	4016.81	4327.71	4518.08	4152.25	4047.58	4617.80	50409.41	
	TALCHER Solar	1.37	1.36	1.20	0.94	0.86	0.95	1.10	1.12	1.04	1.10	1.08	1.27	13.40	
	MAITHAN Right Bank	575.71	625.51	435.68	287.91	498.94	510.79	523.43	513.77	558.39	593.26	577.78	400.73	6101.90	
	APNRL	217.54	207.25	252.27	228.47	272.29	235.69	195.05	154.28	250.10	268.94	205.69	224.33	2711.91	
	GMR KEL	381.19	368.03	270.01	365.55	197.91	173.60	122.39	342.08	375.27	305.18	319.57	266.82	3487.60	
	JITPL	349.86	352.39	476.28	445.83	341.80	314.56	343.90	363.24	385.20	468.07	617.71	407.07	4865.90	
	RHPS	21.57	29.61	38.45	44.05	43.81	39.39	43.99	28.68	18.98	14.93	11.88	14.58	349.94	
	TEESTA HPS	223.60	352.14	343.71	351.78	349.95	359.34	310.30	146.39	97.74	88.90	75.60	111.32	2810.79	
	CHUZACHEN HPS	21.55	46.41	52.45	77.80	81.98	81.38	50.77	18.99	11.76	9.22	3.98	10.90	467.19	
	JORETHANG HEP	15.80	21.17	36.00	66.73	68.69	66.95	57.18	25.72	15.78	11.36	8.37	10.86	404.59	
	TEESTA URJA	405.13	702.79	832.19	918.52	795.02	881.02	545.39	261.44	188.03	154.71	135.92	176.08	5996.24	
	TASINGDIH HPS	17.16	23.45	33.27	74.60	77.10	77.46	61.20	27.52	14.65	9.74	8.26	9.16	433.58	
	DIKCHU HPS	22.59	64.27	68.35	77.84	62.96	76.65	50.34	17.19	10.52	7.17	4.55	9.29	471.71	
	Chukha HEP	156.13	137.94	112.39	261.71	274.71	265.29	236.53	92.74	37.48	16.54	-8.39	6.91	1589.99	
	Kuruchhu HEP	6.25	24.15	36.86	68.70	71.02	64.71	10.74	6.92	-15.37	-13.28	-12.95	-12.22	235.53	
	Tala HEP	75.70	182.69	183.32	545.56	569.10	533.93	335.03	91.70	32.14	9.24	-5.87	4.47	2557.01	
	DAGACHHU HEP	14.77	15.98	19.52	65.49	69.05	69.30	53.43	26.33	18.47	14.86	12.05	12.45	391.70	
	Mangdechhu HEP	0.00	0.00	83.61	188.15	272.55	339.36	251.27	126.69	95.71	75.46	61.76	81.81	1576.37	
	DVC	1448.08	1371.55	1294.44	1224.33	929.61	662.15	405.90	886.82	972.83	1037.17	1085.02	1022.38	12340.27	
	NER	351.31	116.58	0.00	0.00	0.00	0.00	0.00	164.41	278.64	83.73	0.00	0.00	994.67	
	WR	1388.40	1679.88	1876.40	2177.62	2454.00	1421.18	1354.35	510.78	397.50	789.31	1088.50	1056.15	16194.08	
	OPGC	0.00	19.15	51.38	62.34	142.06	202.48	195.05	0.00	0.00	0.00	0.00	0.00	672.47	
	TOTAL INJECTION	9820.65	10698.01	10640.47	11544.86	11441.16	10601.38	9164.15	8134.54	8262.95	8097.84	8238.07	8432.17	115076.26	
	Transmission loss	160.67	178.78	241.63	201.70	201.71	196.19	136.98	141.20	158.41	153.38	153.13	138.34	2062.11	
	% Transmission loss	1.66	1.70	2.32	1.78	1.79	1.89	1.52	1.77	1.95	1.93	1.89	1.67	1.82	
Export by Bihar to Nepal	Export	75.22	109.18	91.39	36.02	48.49	37.13	30.41	24.46	29.25	75.59	91.89	58.97	708.02	
	Import	1.67	0.43	0.88	37.67	4.82	24.59	24.55	10.12	2.15	0.23	0.07	1.00	108.17	
	Total	73.55	108.76	90.51	-1.65	43.67	12.54	5.86	14.35	27.10	75.36	91.82	57.97	599.84	

ANNEXURE-VIII (B)

	IMPORT BY ODISHA FROM CAPTIVE STATIONS AND IPPs DURING 2019-20											ALL Figs in MU	
SN.	Name of IPP / CGPs	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
1	Aarti Steel Ltd, ghantikhal	15.859	10.054	14.910	18.681	8.739	3.367	5.527	5.949	6.781	5.232	5.851	4.566
2	ACC	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	Action Ispat	0.000	1.309	1.309	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	Aryan Ispat,	1.262	1.309	1.395	0.519	1.029	1.252	1.316	0.240	1.101	0.940	0.512	0.597
5	BPPL	75.898	58.565	73.999	66.236	47.134	60.028	69.804	35.893	83.170	83.114	62.901	69.094
6	BPSL, Jharsuguda	5.823	5.808	6.460	6.005	15.334	6.884	9.354	16.940	30.464	21.205	13.231	16.910
7	BSL, Meramundali	2.125	2.541	12.926	17.930	22.902	21.488	16.488	15.713	17.315	17.920	17.760	18.852
8	GMR Kamalanga Energy Ltd.(IPP)	188.765	203.865	218.144	198.208	56.730	75.007	170.210	174.589	173.086	178.303	128.296	184.679
9	HINDALCO, Hirakud	1.458	1.988	1.310	2.071	2.054	0.927	1.563	1.104	0.000	48.233	46.057	0.082
10	IFFCO, Paradeep	0.0002	0.0011	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0005	0.0000	0.0001	0.0001
11	IMFA , Choudwar	24.664	3.577	2.828	31.318	31.349	29.968	29.970	29.970	30.875	26.490	27.515	30.572
12	JINDAL, New Duburi	6.650	6.780	7.103	3.450	4.216	0.000	6.085	5.765	5.681	5.719	5.511	4.306
13	JSPL, Angul	33.454	54.962	89.141	96.508	49.057	35.818	34.376	30.888	38.676	32.313	33.146	40.933
14	Mahavir Ferro Alloys	0.215	0.026	0.108	0.170	0.000	0.216	0.149	0.016	0.057	0.100	0.106	0.161
15	Maithan Ispat Ltd.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	Meenakshi Power Ltd. (SH)	7.342	11.227	18.360	27.479	27.516	28.752	29.676	20.943	15.430	0.010	10.155	9.627
17	MSP, Jharsuguda	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	NALCO , Angul	0.05	0.34	0.09	0.04	1.25	0.35	0.00	0.00	17.50	8.33	9.49	8.86
19	Narbheram	0.144	0.058	0.000	0.000	0.118	0.000	0.054	0.035	0.063	0.050	0.028	0.138
20	NBVL , Kharag Prasad	0.000	12.307	11.792	15.794	28.800	23.582	6.462	6.323	7.675	8.733	7.305	5.330
21	NINL , Duburi	0.681	0.173	0.507	0.360	0.907	1.465	1.578	1.486	0.223	1.236	0.408	0.397
22	OCL	4.759	0.007	3.737	0.008	2.939	0.747	1.393	3.749	0.071	1.437	0.117	0.169
23	OPCL, Samal (SH)	6.490	7.554	4.392	5.939	6.794	8.786	8.446	8.549	8.104	6.479	6.107	6.337
24	PSAL, Keonjhar	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	RSP , Rourkela	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	Shree Ganesh	0.456	0.655	0.541	0.577	0.375	0.350	0.558	0.609	0.518	0.500	0.494	0.324
27	Shyam Metallics	0.126	0.042	0.089	0.428	0.918	0.560	1.073	0.935	0.629	0.083	0.002	0.208
28	SMC Power	0.017	0.031	0.037	0.185	0.163	0.028	0.031	0.009	0.058	0.081	0.076	0.098
29	TSIL, Joda	0.000	9.807	13.862	14.324	13.883	13.351	14.536	11.618	13.309	11.383	9.496	9.637
31	Vedanta Ltd. (IPP-Unit-2)	69.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.267	213.026	249.139
31	Vedanta, Jharsuguda	82.497	92.395	68.445	65.389	99.952	111.654	3.590	71.319	112.861	1.901	58.438	33.057
32	Vedanta, Lanjigarh	0.538	0.632	0.614	0.601	0.665	0.651	0.727	0.669	0.605	0.887	0.590	0.679
33	VISA Steel, New-Duburi	0.517	0.372	0.618	0.925	0.784	0.512	0.798	1.040	0.704	1.241	1.100	1.586
34	Yazdani Steel & Power Ltd., J.J Rd	0.308	0.365	0.342	0.351	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063
35	Vedanta Ltd. (3*600)	5.081	68.000	0.332	0.158	0.000	36.024	1.768	0.349	1.260	2.590	1.574	6.385
	Total support from CPPs & IPPs	**534.763**	**554.747**	**553.392**	**573.653**	**423.608**	**522.382**	**415.533**	**444.700**	**566.217**	**475.781**	**659.295**	**702.785**

ANNEXURE-VIII (C)

	IMPORT BY JHARKHAND FROM CAPTIVE STATIONS AND IPPs DURING 2019-20											ALL Figs in MU	
SN.	**Name of IPP / CGPs**	**Apr-19**	**May-19**	**Jun-19**	**Jul-19**	**Aug-19**	**Sep-19**	**Oct-19**	**Nov-19**	**Dec-19**	**Jan-20**	**Feb-20**	**Mar-20**	**TOTAL**
1	INLAND POWER LIMITED(1x63 MW)	35.988	34.279	33.795	32.884	34.974	35.587	32.358	17.482	21.888	35.203	35.045	36.280	385.763
2	RUNGTA (Mines)	3.621	3.486	1.877	1.832	2.273	0.877	1.850	2.338	2.866	3.570	4.270	2.190	31.050
3	AAPL-R	2.700	2.895	2.603	2.862	5.785	6.229	6.572	5.906	4.586	3.760	2.511	3.973	50.382
4	UML-R	1.280	1.264	0.000	2.031	0.420	1.351	2.262	1.338	1.532	1.551	2.774	0.070	15.873
5	UML-J (Tata Sponge Limited)	3.818	3.751	5.166	5.469	3.760	2.202	2.407	2.937	6.816	4.331	3.456	2.507	46.620
6	ABCIL	0.438	0.662	0.741	1.493	4.853	6.609	7.138	8.214	7.495	0.045	3.536	6.767	47.991
7	**TOTAL**	**47.845**	**46.337**	**44.182**	**46.571**	**52.065**	**52.855**	**52.587**	**38.215**	**45.183**	**48.460**	**51.592**	**51.787**	**577.679**

	IMPORT BY DVC FROM TISCO DURING 2019-20											ALL Figs in MU	
SN.	**Name of IPP / CGPs**	**Apr-19**	**May-19**	**Jun-19**	**Jul-19**	**Aug-19**	**Sep-19**	**Oct-19**	**Nov-19**	**Dec-19**	**Jan-20**	**Feb-20**	**Mar-20**	**TOTAL**
1	TISCO injection wheeling at Jamshedpur point	14.69	12.05	14.08	7.06	18.12	11.96	41.51	7.03	6.63	12.13	8.33	9.15	162.740

	IMPORT BY WEST BENGAL SETCL FROM CPP & IPPs DURING 2019-20											ALL Figs in MU	
SN.	**Name of IPP / CGPs**	**Apr-19**	**May-19**	**Jun-19**	**Jul-19**	**Aug-19**	**Sep-19**	**Oct-19**	**Nov-19**	**Dec-19**	**Jan-20**	**Feb-20**	**Mar-20**	**TOTAL**
1	PCBL	9.42	10.69	10.90	12.21	12.40	8.61	7.00	8.88	9.27	7.66	10.14	7.82	115.002
2	RENUKA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
3	TATA POWER HALDIA	57.19	67.39	64.07	69.71	62.99	57.15	63.30	53.87	47.21	54.62	60.92	61.06	719.486
4	ELEC. STEEL (H)	4.55	4.65	2.56	1.58	1.73	1.90	1.89	1.55	1.40	1.52	2.00	2.78	28.128
5	CONCAST BENGAL	0.31	0.39	0.37	0.02	0.25	0.38	0.12	0.63	0.47	0.50	0.43	0.24	4.135
6	HIMADRI CHEMICAL LTD	2.96	3.14	3.00	2.60	3.26	2.68	3.38	2.16	1.85	4.26	3.40	2.50	35.199
7	BENGAL ENERGY LIMITED	16.48	17.24	22.36	21.46	22.06	12.34	20.69	22.52	17.34	16.79	16.47	18.38	224.133
8	HIRRANMOYEE IMPORT	0.00	8.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.960
9	CRECSENT POWER	22.16	20.13	22.02	24.31	22.50	11.50	0.00	0.00	0.00	0.00	19.85	26.53	168.984
10	IPCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
	TOTAL	**113.08**	**132.597**	**125.277**	**131.889**	**125.197**	**94.556**	**96.380**	**89.614**	**77.551**	**85.356**	**113.214**	**119.312**	**1304.027**
1	Teesta Low Dam Project U#3&4	75.94	131.41	159.09	178.92	189.75	190.31	160.05	67.49	41.37	35.45	31.52	38.89	1300.19
2	Haldia Energy Limited	325.14	369.68	367.24	395.03	384.11	373.17	357.23	361.44	355.70	257.70	296.04	253.13	4095.61
	Grand Total Import	**514.17**	**633.68**	**651.61**	**705.84**	**699.06**	**658.03**	**613.66**	**518.54**	**474.62**	**378.50**	**440.77**	**411.34**	**6699.82**

	EXPORT BY WEST BENGAL SETCL DURING 2019-20												ALL Figs in MU	
1	Dishergarh Power Supply Company	508.76	653.87	620.76	621.68	537.05	504.42	436.70	441.19	362.32	206.92	196.98	272.43	5363.07
2	Purilia Pump Storage Plant	55.69	58.90	56.31	56.89	60.67	64.77	56.79	68.05	79.94	80.95	75.87	57.47	772.30
	TOTAL	**564.44**	**712.78**	**677.07**	**678.57**	**597.71**	**569.19**	**493.49**	**509.24**	**442.25**	**287.87**	**272.85**	**329.90**	**6135.37**

ANNEXURE - IXA

FREQUENCY SUMMARY OF THE EASTERN REGION DURING 2019-20

AVERAGE FREQUENCY (Hz) IN DIFFERENT PERIODS OF THE DAY

	< -----HOURS----->					
	00-05	**05-10**	**10-17**	**17-22**	**22-24**	**00-24**
April-19	49.99	50.00	49.99	49.99	49.95	49.99
May-19	49.99	50.01	49.98	49.99	49.95	49.99
June-19	49.99	50.01	49.98	49.98	49.95	49.99
July-19	50.01	50.00	50.00	49.98	49.99	50.00
August-19	50.00	50.00	50.01	49.97	49.99	49.99
September-19	50.00	50.00	50.01	49.99	50.01	50.00
October-19	49.99	50.00	50.00	50.00	50.00	50.00
November-19	50.00	50.00	49.99	50.02	49.99	50.00
December-19	50.00	49.98	49.98	50.01	50.01	49.99
January-20	50.00	49.98	49.99	49.99	50.00	49.99
February-20	49.99	49.98	49.99	49.99	49.99	49.99
March-20	49.99	50.01	50.00	50.00	49.99	50.00
MAXIMUM	**50.01**	**50.01**	**50.01**	**50.02**	**50.01**	**50.00**
MINIMUM	**49.99**	**49.98**	**49.98**	**49.97**	**49.95**	**49.99**
AVERAGE	**50.00**	**50.00**	**49.99**	**49.99**	**49.99**	**49.99**

ANNEXURE - IXB

AVERAGE FREQUENCY IN PERCENTAGE OF THE TIME (%) INCLUDING MAX. AND MIN. FREQUENCY DURING 2019-20

	Frequency Range (HZ) IN % OF TIME			INST. FREQ. (HZ)						15 MINUTES INTEGRATED (HZ)	
	<49.9	49.9-50.05	>50.05	MAX	Date	HRS.	MIN	Date	HRS.	MAX	MIN
April-19	7.33	73.12	19.55	50.29	7-Apr	01:12	49.65	1-Apr	23:03	50.26	49.73
May-19	8.49	72.72	18.79	50.33	1-May	18:02	49.65	9-May	14:16	50.22	49.70
June-19	9.88	70.36	19.76	50.31	16-Jun	09:49	49.63	11-Jun	22:10	50.27	49.71
July-19	7.53	68.60	23.87	50.32	7-Jul	13:06	49.64	4-Jul	00:06	50.24	49.72
August-19	7.28	72.68	20.04	50.32	15-Aug	09:34	49.55	20-Aug	19:19	50.27	49.67
September-19	4.58	75.24	20.18	50.27	5-Sep	08:04	49.62	9-Sep	18:50	50.21	49.70
October-19	3.28	77.07	19.65	50.31	23-Oct	13:03	49.67	24-Oct	07:07	50.19	49.75
November-19	4.06	73.62	22.32	50.27	26-Nov	22:00	49.65	18-Nov	06:21	50.19	49.73
December-19	6.47	71.68	21.85	50.34	15-Dec	23:59	49.65	11-Dec	16:17	50.19	49.76
January-20	6.48	75.00	18.52	50.47	8-Jan	18:00	49.69	6-Jan	14:27	50.15	49.76
February-20	7.06	73.95	18.99	50.33	21-Feb	18:03	49.68	4-Feb	06:13	50.15	49.79
March-20	5.72	71.04	23.24	50.32	22-Mar	17:04	49.69	18-Mar	16:29	50.27	49.78
MAXIMUM	9.88	77.07	23.87	50.47			49.69			50.27	49.79
MINIMUM	3.28	68.60	18.52	50.27			49.55			50.15	49.67
AVERAGE	6.52	72.92	20.56	50.32			49.65			50.22	49.73

ENERGY GENERATION BY VARIOUS POWER STATIONS AND PLANT LOAD FACTOR OF THERMAL STATIONS OF EASTERN REGION FOR THE YEAR 2017-18 , 2018-19 & 2019-20

(Comparison Statement)

SYSTEM	TYPE	POWER STATION	INSTALLED CAPACITY IN MW as on 31.03.2020	EFFECTIVE CAPACITY IN MW as on 31.03.2020	2017-18		2018-19		2019-20	
					Generation (MU)	PLF (%)	Generation (MU)	PLF (%)	Generation (MU)	PLF (%)
BSPHCL	Th	NTPC, BTPS(U#6&7)	220.00	210.00	39.44	2.14	44.86	2.44	123.68	6.70
		NTPC, BTPS(U#8)	250.00	250.00					112.41	28.40
		NTPC, MTPS Stg-I	220.00	220.00	752.16	39.03	735.76	38.18	587.70	30.41
		Thermal Total	**690.00**	**680.00**	**791.60**	**13.29**	**780.62**	**20.72**	**823.79**	**19.28**
	RES		341.25	341.25	**14.37**		**415.74**		**369.31**	
	Total BSPHCL		**1031.3**	**1021.3**	**805.97**		**1196.4**		**1193.1**	
JUVNL	Hy	Subarnrekha	130.00	130.00	190.28		102.46		36.12	
	RES		46.75	46.75	0.00		0.00		0.00	
TVNL	Th	Tenughat TPS	420.00	420.00	1933.31	52.55	1689.05	45.91	2416.62	65.50
DVC	Th	Bokaro-B (U #3)	210.00	210.00	573.94	18.82	688.44	37.42	94.03	5.10
		Chandrapura(U#3)			321.10	21.22	0.00	0.00	0.00	0.00
		Chandrapura(U 7-8)	500.00	500.00	3754.87	85.73	3562.60	81.34	3425.66	78.00
		Durgapur(U #4)	210.00	210.00	947.05	51.48	981.29	53.34	437.91	23.74
		Mezia(U 1-6)	1340.00	1340.00	7109.48	60.57	7025.15	59.85	7263.99	61.71
		Mezia(U 7-8)	1000.00	1000.00	5368.97	61.29	5719.15	65.29	5276.78	60.07
		Durgapur STPS (U 1-2)	1000.00	1000.00	6503.95	74.25	6293.54	71.84	6319.03	71.94
		Koderma STPS (U 1-2)	1000.00	1000.00	5911.25	67.48	6278.77	71.68	6459.72	73.54
		Raghunathpur (U 1-2)	1200.00	1200.00	2277.30	21.66	3208.40	30.52	5030.71	47.73
		Bokaro-A (U 1)	500.00	500.00	2924.19	66.76	2920.73	66.68	2690.01	61.25
		Thermal Total	**6960.00**	**6960.00**	**35692.10**	**56.04**	**36678.08**	**59.05**	**36997.83**	**59.45**
	Hy	Maithon	63.20	63.20	114.40		101.33		83.62	
		Panchet	80.00	80.00	141.95		79.77		114.15	
		Tilaya	4.00	4.00	10.85		5.30		4.68	
		Hydro Total	**147.20**	**147.20**	**267.20**		**186.41**		**202.45**	
		RES(Small Hy+Solar)			10.92					
	Total DVC		**7107.20**	**7107.20**	**35970.22**		**36864.48**		**37200.28**	
WBPDCL	Th	Bandel (1,2,5)	380.00	335.00	1926.03	65.63	1315.38	44.82	861.06	29.26
		Santaldih(U 5-6)	500.00	500.00	2941.58	67.16	3552.62	81.11	3693.93	84.11
		Kolaghat	1260.00	1260.00	4749.84	43.03	4422.85	40.07	2871.40	25.94
		Bakreswar	1050.00	1050.00	7486.39	81.39	7182.22	78.08	6996.73	75.86
		Sagardighi TPS	1600.00	1600.00	6342.12	45.25	6050.92	43.17	6695.28	47.64
		DPPS	550.00	550.00	2524.46	43.66	2343.64	40.54	2233.21	39.68
	Total WBPDCL		**5340.00**	**5295.00**	**25970.43**	**55.99**	**24867.64**	**52.52**	**23351.61**	**49.36**
WBSEDCL	Hy	Jaldhaka	35.00	35.00	145.18		197.02		188.97	
		Ramam	51.00	51.00	122.46		236.94		247.29	
		Teesta CF	67.50	67.50	131.02		85.47		43.75	
		Purulia PSP	900.00	900.00	1014.36		1103.94		1075.47	
	Total WBSEDCL		**1053.50**	**1053.50**	**1413.01**		**1623.36**		**1555.48**	
		RES	527.29	527.29	**6.04**		**4.60**		**173.88**	
		Total	***6,921***	***6,876***	***27,389***		***26,496***		***25,080.97***	

DVC, DTPS U#3(140 MW) decommissioned on 10.03.2016
DVC, CTPS U#1 ,2,3 (140 MW each) decommissioned on 13.01.2017,30.07.2017 & 19.03.2020 resp
DVC, BTPS-B U#1&2(2X210 MW each) decommissioned on 30.07.2017
WBPDCL, BTPS U#3 &U#4 (82.5 MW each)decommissioned from 01.04.2018
DPL,DPPS U#6 (110 MW) decommissioned on 28.01.2020

ENERGY GENERATION BY VARIOUS POWER STATIONS AND PLANT LOAD FACTOR OF THERMAL STATIONS OF EASTERN REGION FOR THE YEAR 2017-18 , 2018-19 & 2019-20

(Comparison Statement)

SYSTEM	TYPE	POWER STATION	INSTALLED CAPACITY IN MW	EFFECTIVE CAPACITY IN MW	2017-18		2018-19		2019-20	
					Generation (MU)	PLF (%)	Generation (MU)	PLF (%)	Generation (MU)	PLF (%)
CESC	Th	Titagarh	240.00	240.00	0.00	0.00	0.00	0.00	0.00	0.00
		Southern	135.00	135.00	303.75	25.68	283.78	24.00	339.26	28.61
		Budge-Budge	750.00	750.00	6033.39	91.83	6014.68	91.55	5798.16	88.01
	Total CESC		**1125.00**	**1125.00**	**6337.14**	**64.30**	**6298.46**	**63.91**	**6137.42**	**62.11**
HEL	Th	Haldia	600.00	600.00	4525.90	86.11	4614.82	87.80	4430.09	84.06
ODISHA	TH	Talcher-I	250.00	240.00	2058.16	97.90	1924.50	91.54	1857.81	88.37
		Talcher-II	220.00	220.00	1722.58	89.38	1680.12	87.18	1520.46	78.89
	(NTPC)	Thermal Total	**470.00**	**460.00**	**3780.74**	**93.82**	**3604.62**	**89.45**	**3378.27**	**83.84**
	TH (OPGC)	IB TPS (U#1 &2)	420.00	420.00	2842.35	77.25	3085.15	83.85	2643.54	71.85
		IB TPS (U# 3)	660.00	660.00					2293.34	47.85
		IB TPS (U # 4)	660.00	660.00					2081.12	50.25
	OHPC, HYDRO	Burla (Hirakud-I)	275.50	275.50	613.63		380.29		547.38	
		Chiplima (Hirakud-II)	72.00	72.00	249.40		168.31		242.65	
		Balimela	510.00	510.00	1477.33		1734.15		1509.39	
		Rengali	250.00	250.00	762.57		837.87		666.25	
		Upper Kolab	320.00	320.00	706.85		922.09		828.44	
		Indravati HPS	600.00	600.00	1742.51		2142.62		2253.60	
		Mckd.(Orissa dr)	57.38	57.38	239.73		271.57		309.16	
		Hydro Total	**2084.88**	**2084.88**	**5792.02**		**6456.89**		**6356.88**	
	RES	RES	511.21	511.21	96.45		197.42		324.70	
Total ODISHA (NTPC +OPGC+ OHPC+RES)			**3486.09**	**3476.09**	**12511.56**		**13344.08**		**17077.86**	
SIKKIM*	RES	Total	52.18	52.18	30.00		26.00		25	
NTPC	THERMAL	FSTPS - I&II	1600.00	1600.00	10229.34	72.98	11264.02	80.37	10320.79	73.43
		FSTPS - III (U#6)	500.00	500.00	3127.43	71.40	3582.35	81.79	2811.84	64.02
		KhSTPP-I & II	2340.00	2340.00	16316.76	79.60	16486.14	80.43	16504.36	80.30
		TSTPP - I	1000.00	1000.00	7679.19	87.66	7020.94	80.15	6043.30	68.80
		BARH STPS - II	1320.00	1320.00	9272.26	80.19	9845.23	85.14	8219.09	70.89
		Muzaffarpur Stg-II	390.00	390.00	998.83	32.66	2305.61	67.49	2316.90	67.63
		BRBCL	750.00	750.00	1060.29	29.56	2793.94	60.10	4887.10	74.18
		Nabinagar STPP	660.00	660.00			13.55		2783.78	77.85
		Darlipali STPP	800.00	800.00					607.42	62.66
	Total NTPC		**9360.00**	**9360.00**	**48684.10**		**53311.78**	**79.23**	**54494.57**	**73.74**
	RES	Talcher Solar	10	10	13.81		13.72		13.40	
NHPC	Hy	Rangit	60	60	341.14		345.13		349.94	
		Teesta HEP-V	510	510	2796.90		2677.83		2810.78	
		TLDP (NHPC)	292	292	859.01		1249.67		1300.19	
	Total NHPC		**862.00**	**862.00**	**3997.04**		**4272.64**		**4460.91**	
EASTERN REGION		THERMAL (exclud.. IPP)	**26705.00**	**26640.00**	**130557.66**	**63.31**	**134930.21**	**65.18**	**139048.22**	**62.38**
	5876.58	HYDRO (exclud. IPP)	**4277.58**	**4277.58**	**11659.55**		**12641.76**		**12611.83**	
		RES(Small Hy+Solar)	**1489**	**1489**	**171.6**	**0**	**657.48**		**905.19**	
IPP	Th	MPL (U 1&2)	1050	1050	7406.14	80.52	7267.86	79.02	6488.19	70.35
		APNRL (U 1&2)	540	540	2909.86	61.51	2875.74	60.79	2959.47	62.39
		GMR (U 1-2)	700	700	3687.57	60.14	4523.33	73.77	3758.50	61.13
		JITPL(U 1-2)	1200	1200	3666.42	34.88	4213.59	40.08	5199.78	49.33
		Total IPP (Thermal)	3490	3490	17669.99	57.80	18880.52	61.76	18405.94	60.04
	Hy	CHUZACHEN (U 1-2)	110	110	442.46		413.66		467.19	
		JORTHANG (U# 1&2)	96	96	405.56		407.97		404.59	
		Teesta Urja St III	1200	1200	4392.65		4227.22		5996.24	
		DIKCHU(U 1-2)	96	96	379.97		460.00		471.71	
		TASHIDING (U 1-2)	97	97	92.78		421.60		433.58	
EASTERN REGION		Total IPP (Hydel)	**1599.00**	**1599.00**	**5713.42**		**5930.47**		**7773.31**	
		THERMAL (INCL. IPP	**30195.00**	**30130.00**	**148227.73**	**62.12**	**153810.59**	**64.74**	**157454.14**	**62.10**
		HYDRO	**5876.58**	**5876.58**	**17372.97**		**18572.22**		**20385.15**	
		RES	**1488.68**	**1489**	**171.63**		**657.48**		**905.19**	
		TOTAL(TH+HY+RES)	**37560.26**	**37495.26**	**165772.33**		**173040.29**		**178744.47**	
IMPORT FROM BHUTAN	Hy	CHPC	360.00	270.00	1580.65		1348.07		1589.99	
		KHPS	60.00	60.00	347.31		285.57		235.53	
		TALA HPS	1020.00	1020.00	2702.48		2411.73		2557.01	
		DAGACHU	126.00	126.00	441.65		350.49		391.69	
		Mangdchhu HEP **	720.00	720.00					1576.38	
		Total Bhutan Import	**2286.00**	**2196.00**	**5072.08**		**4395.87**		**6350.60**	
GRAND TOTAL (TH+HY) INCLUDING IMPORT FROM BHUTAN					**170844.42**		**177436.16**		**185095.07**	

** Sikkim's data are estimated as actual data not received.*

** All the figures considered above for operational data,need not to be used for any commercial purposes

NEW UNITS DECLARED COMMERCIAL OPERATION IN EASTERN REGION DURING 2019-20

SN.	STATE	AGENCY	Name of Power Stations	Type	Unit No.	Capacity (MW)	Date of COD	In firm gross Generation (MU)
1.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#3	660	03.07.2019	**224.06**
2.	ODISHA	M/s OPGC	IB Thermal Power Station	Thermal	U#4	660	21.08..2019	**298.16**
3.	BIHAR	NTPC	Nabinagar Super Thermal Power Project	Thermal	U#1	660	06.09.2019	**218.85**
4.	ODISHA	NTPC	Darlipali Super Termal Power Project	Thermal	U#1	800	01.03.2020	**234.45**
5.	BIHAR	NTPC	Barauni Thermal Power Project	Thermal	U#8	250	01.03.2020	**59.58**

UNITS DE- COMMISSIONED IN EASTERN REGION DURING 2019-20

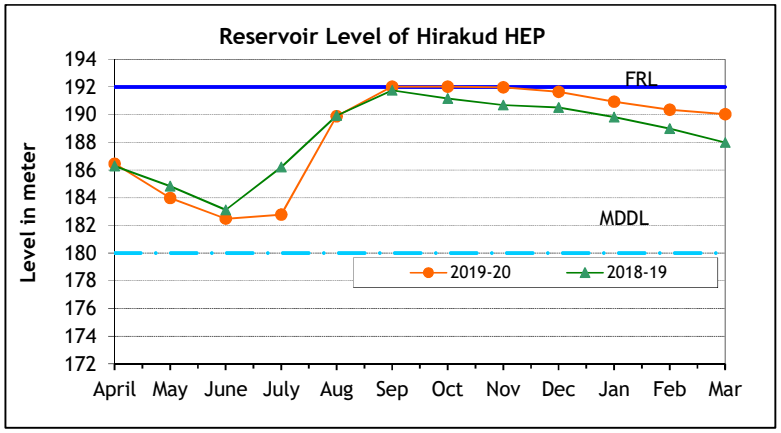
SN.	STATE	AGENCY	Name of Power Stations	Type	Unit No.	Capacity (MW)	Date of De-commissioned	Generation (MU)
1	WEST BENGAL	WBPDCL/ DPL	Durgapur Thermal Power Stations	Thermal	U#6	110	28.01.2020	NIL
2	JHARKHAND	DVC	Chandrapura Thermal Power Station	Thermal	U#3	140	19.03.2020	NIL

ANNEXURE-XI (Page-1/2)

WATER LEVEL IN THE MAJOR HYDRO RESERVOIRS IN THE REGION DURING 2019-20

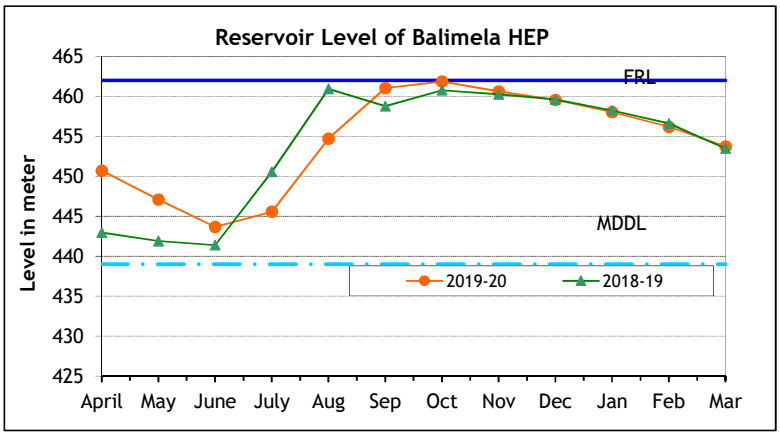
Reservoir Level of Hirakud HEP

Month	FRL	MDDL	2019-20	2018-19
April	192.00	180.00	186.449	186.285
May	192.00	180.00	183.977	184.834
June	192.00	180.00	182.481	183.12
July	192.00	180.00	182.786	186.211
Aug	192.00	180.00	189.89	189.93
Sep	192.00	180.00	192.024	191.756
Oct	192.00	180.00	192.015	191.161
Nov	192.00	180.00	191.97	190.689
Dec	192.00	180.00	191.66	190.51
Jan	192.00	180.00	190.942	189.814
Feb	192.00	180.00	190.348	189.00
Mar	192.00	180.00	190.021	187.991



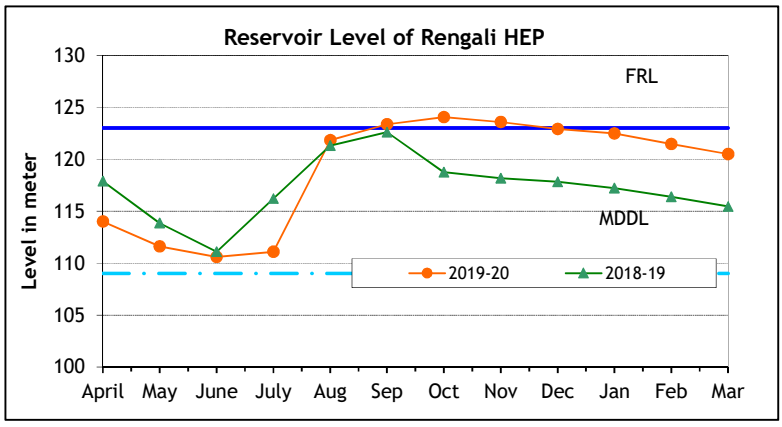
Reservoir Level of Balimela HEP

Month	FRL	MDDL	2019-20	2018-19
April	462.00	439.00	450.708	442.97
May	462.00	439.00	447.08	441.90
June	462.00	439.00	443.667	441.38
July	462.00	439.00	445.557	450.56
Aug	462.00	439.00	454.701	460.95
Sep	462.00	439.00	461.04	458.78
Oct	462.00	439.00	461.863	460.77
Nov	462.00	439.00	460.614	460.25
Dec	462.00	439.00	459.547	459.61
Jan	462.00	439.00	458.053	458.24
Feb	462.00	439.00	456.194	456.62
Mar	462.00	439.00	453.725	453.48



Reservoir Level of Rengali HEP

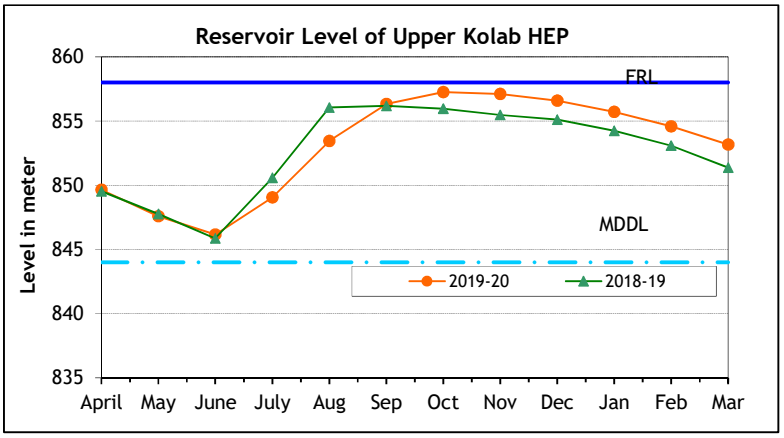
Month	FRL	MDDL	2019-20	2018-19
April	123.00	109.00	114.00	117.88
May	123.00	109.00	111.60	113.86
June	123.00	109.00	110.59	111.09
July	123.00	109.00	111.09	116.21
Aug	123.00	109.00	121.82	121.30
Sep	123.00	109.00	123.35	122.60
Oct	123.00	109.00	124.05	118.75
Nov	123.00	109.00	123.58	118.17
Dec	123.00	109.00	122.90	117.81
Jan	123.00	109.00	122.47	117.22
Feb	123.00	109.00	121.47	116.38
Mar	123.00	109.00	120.48	115.45



WATER LEVEL IN THE MAJOR HYDRO RESERVOIRS IN THE REGION DURING 2019-20

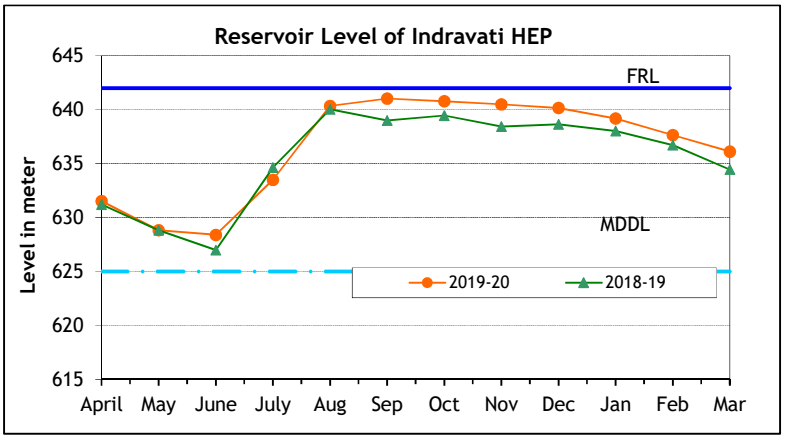
Reservoir Level of Upper Kolab HEP

Month	FRL	MDDL	2019-20	2018-19
April	858.00	844.00	849.65	849.53
May	858.00	844.00	847.59	847.77
June	858.00	844.00	846.16	845.86
July	858.00	844.00	849.06	850.58
Aug	858.00	844.00	853.46	856.05
Sep	858.00	844.00	856.33	856.18
Oct	858.00	844.00	857.25	855.96
Nov	858.00	844.00	857.12	855.48
Dec	858.00	844.00	856.6	855.11
Jan	858.00	844.00	855.72	854.24
Feb	858.00	844.00	854.58	853.08
Mar	858.00	844.00	853.18	851.38



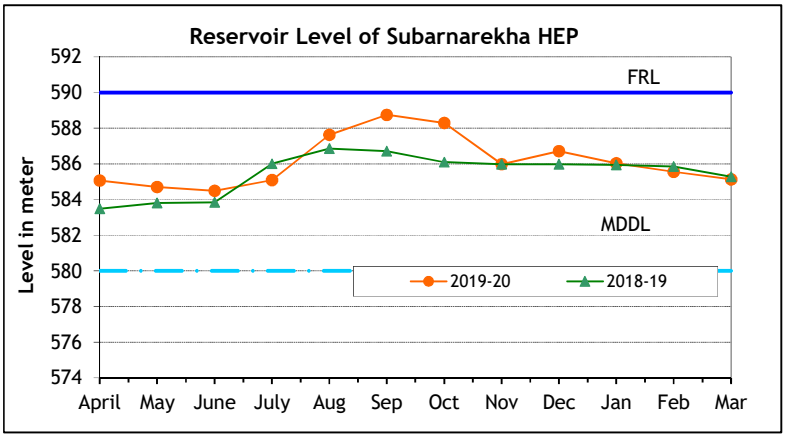
Reservoir Level of Indravati HEP

Month	FRL	MDDL	2019-20	2018-19
April	642.00	625.00	631.52	631.22
May	642.00	625.00	628.82	628.83
June	642.00	625.00	628.40	626.98
July	642.00	625.00	633.50	634.64
Aug	642.00	625.00	640.34	640.04
Sep	642.00	625.00	641.03	639.01
Oct	642.00	625.00	640.79	639.46
Nov	642.00	625.00	640.50	638.45
Dec	642.00	625.00	640.17	638.65
Jan	642.00	625.00	639.19	638.03
Feb	642.00	625.00	637.66	636.72
Mar	642.00	625.00	636.11	634.45



Reservoir Level of Subarnarekha HEP

Month	FRL	MDDL	2019-20	2018-19
April	590.00	580.00	585.06	583.48
May	590.00	580.00	584.70	583.81
June	590.00	580.00	584.48	583.84
July	590.00	580.00	585.09	586.01
Aug	590.00	580.00	587.62	586.86
Sep	590.00	580.00	588.75	586.71
Oct	590.00	580.00	588.29	586.10
Nov	590.00	580.00	585.98	585.98
Dec	590.00	580.00	586.71	585.98
Jan	590.00	580.00	586.04	585.95
Feb	590.00	580.00	585.55	585.86
Mar	590.00	580.00	585.12	585.28



Annexure-XII (Page-1/2)

% WEIGHTED AVERAGE SHARE ALLOCATION FOR THE MONTH OF APRIL-2019 (FIRST MONTH OF F.Y.2019-20)

BENEFICIARIES	Region	FSTPP I & II	FSTPP-III	KHSTPP-I	KHSTPP-II	TSTPP-I	BARH	BRBCL	MTPS-II	TEESTA	RANGIT	CHUKHA	TALA	KURICHU
BIHAR	ER	31.397866	26.517874	41.858038	4.979865	41.245379	90.736309	10.000	74.972	21.260	35.000	29.630	25.500	
JHARKHAND	ER	8.574292	16.948474	3.200751	1.248565	7.667664	7.081288		3.433	12.340	13.330	10.740	11.460	
DVC	ER	0.000000	0.000000	0.000000	2.050000	0.200000	0.000000		2.600	8.640	10.000	10.370	5.540	50.000
ODISHA	ER	13.630000	16.620000	15.240000		31.800000			8.527	20.590	0.000	15.190	4.250	
ODISHA (COAL POWER - AFTAB)	ER	0.099049		0.098249	0.106629	0.099049								
ODISHA (COAL POWER - DADRI)	ER	0.082937	0.162663	0.082268	0.089285	0.082937								
ODISHA (COAL POWER - Rajasthan)	ER	0.275736	0.183824	0.275736	0.275736	0.275736								
ODISHA (COAL POWER - Raj-II SunTech)	ER		0.091912											
ODISHA (COAL POWER - Faridabad)	ER	0.095840	0.091354	0.078653	0.098967	0.086460								
WEST BENGAL	ER	31.930000	37.638940	6.070000	0.000000	9.210000	0.000000		9.635	23.980	28.340	31.850	38.250	50.000
West Bengal (COAL POWER - Rajasthan)	ER	0.919117	0.643382	0.919117	0.919117	0.919117								
West Bengal (COAL POWER- Raj-II SunTech)	ER		0.275735											
SIKKIM	ER	1.630000		1.550000	0.330000	2.400000	1.318009		0.554	13.190	13.330	2.220		
RLY BIHAR	ER							10.465						
RLY DVC	ER							15.698						
TELANGANA (NSM-II)	SR	0.751558	0.733930	0.682150	0.763112	0.712870	0.675000		0.279					
TAMILNADU	SR	1.290000		0.700000		0.850000								
CHHATTISGARH	WR				2.000000									
GUJARAT	WR				9.400000									
MADHYA PRADESH	WR				4.930000									
MAHARASHTRA	WR				9.870000									
DADRA & NAGAR HAVELI	WR				0.200000									
DAMAN & DIU	WR				0.130000									
RLY MADHYA PRADESH	WR							10.465						
RLY MAHA RASHTRA	WR							25.116						
UTTAR PRADESH	NR	2.080000		9.120000	16.730000									
HARYANA	NR	0.690000		3.040000	4.580000									
RAJASTHAN	NR	0.690000		3.040000	7.110000								1.470	
J & K	NR	0.850000		3.680000	5.560000								1.770	
HIMACHAL PRADESH	NR				1.530000									
DELHI	NR	1.390000		6.070000	10.490000								2.940	
PUNJAB	NR				8.020000								2.940	
UTTARAKHAND	NR	0.000000		0.000000	1.870000									
CHANDIGARH	NR	0.000000		0.000000	0.200000									
RLY UTTAR PRADESH(ISTS Points)	NR							7.326						
UTTAR PRADESH	NR							20.930					4.410	
HARYANA	NR							0.000					1.470	
ASSAM	NER	2.455737		2.104847	5.093479	2.095419								
ASSAM (COAL POWER - Rajasthan)	NER	0.091912	0.091912	0.091912	0.091912	0.091912								
MEGHALAYA	NER	0.000000												
NAGALAND	NER	0.429803		0.424446		0.424823								
ARUNACHAL PRADESH	NER	0.191917		0.191747		0.196898								
MIZORAM	NER	0.141736		0.141610		0.141736								
NVVN POWER - A/C BPDB	Others	0.312500		1.190476	1.333333	1.500000								
POWERGRID (ALIPURDUAR)	Others			0.150000			0.189394							
TOTAL		100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000	100.000000

% WEIGHTED AVERAGE SHARE ALLOCATION FOR THE MONTH OF MARCH-2020 (LAST MONTH OF F.Y.2019-20)

BENEFICIARIES	Region	FSTPP-I&II	FSTPP-III	KHSTPP-I	KHSTPP-II	TSTPP-I	BARH	BRBCL	MTPS-II	TEESTA	RANGIT	NPGC	CHUKHA	TALA	KURICHU	MANGDECHHU	DARLIPALLI
BIHAR	ER	31.397866	25.851207	41.858038	4.979865	41.245379	90.736309	10.000	74.972	21.260	35.000	84.766	29.630	25.500		36.870	11.860
JHARKHAND	ER	8.574292	16.948474	3.200751	1.248565	7.667664	7.081288		3.433	12.340	13.330	3.276	10.740	11.460		10.970	9.220
DVC	ER	0.000000	0.000000	0.000000	2.050000	0.148387	0.000000		2.600	8.640	10.000		10.370	5.540	50.000		0.000
ODISHA	ER	13.630000	16.620000	15.240000		31.800000			8.527	20.590	0.000		15.190	4.250			58.820
ODISHA (COAL POWER - AFTAB)	ER	0.099049	0.666667	0.098249	0.106629	0.099049											
ODISHA (COAL POWER - DADRI)	ER	0.082937	0.162663	0.082268	0.089285	0.082937											
ODISHA (COAL POWER - Rajastha	ER	0.275736	0.183824	0.275736	0.275736	0.275736											
ODISHA (COAL POWER - Raj-II S	ER		0.091912														
ODISHA (COAL POWER - Faridab	ER	0.095840	0.091354	0.078653	0.098967	0.086460											
WEST BENGAL	ER	31.930000	37.638940	6.070000	0.000000	9.210000	0.000000		9.635	23.980	28.340		31.850	38.250	50.000	32.140	18.350
West Bengal (COAL POWER - Raja	ER	0.919117	0.643382	0.919117	0.919117	0.919117											
West Bengal (COAL POWER- Raj-I	ER		0.275735														
SIKKIM	ER	1.630000		1.550000	0.330000	2.400000	1.318009		0.554	13.190	13.330	0.546	2.220				1.750
RLY BIHAR	ER							15.301									
RLY DVC	ER							16.831									
TELANGANA (NSM-II)	SR	0.751558	0.733930	0.682150	0.763112	0.712870	0.675000		0.279								
TAMILNADU	SR	1.290000		0.700000		0.850000											
CHHATTISGARH	WR				2.000000												
GUJARAT	WR				9.400000												
MADHYA PRADESH	WR				4.930000												
MAHARASHTRA	WR				9.870000												
DADRA & NAGAR HAVELI	WR				0.200000												
DAMAN & DIU	WR				0.130000												
RLY MADHYA PRADESH	WR							7.651									
RLY MAHA RASHTRA	WR							18.362									
UTTAR PRADESH	NR	2.080000		9.120000	16.730000							11.412					
HARYANA	NR	0.690000		3.040000	4.580000												
RAJASTHAN	NR	0.690000		3.040000	7.110000			0.279						1.470			
J & K	NR	0.850000		3.680000	5.560000									1.770			
HIMACHAL PRADESH	NR				1.530000												
DELHI	NR	1.390000		6.070000	10.490000	0.051613								2.940			
PUNJAB	NR				8.020000			0.975						2.940			
UTTARAKHAND	NR	0.000000		0.000000	1.870000												
CHANDIGARH	NR	0.000000		0.000000	0.200000												
RLY UTTAR PRADESH(ISTS Point	NR							8.415									
UTTAR PRADESH	NR							19.891						4.410			
HARYANA	NR							2.295						1.470			
ASSAM	NER	2.455737		2.104847	5.093479	2.095419										20.020	
ASSAM (COAL POWER - Rajastha	NER	0.091912	0.091912	0.091912	0.091912	0.091912											
MEGHALAYA	NER	0.000000															
NAGALAND	NER	0.429803		0.424446		0.424823											
ARUNACHAL PRADESH	NER	0.191917		0.191747		0.196898											
MIZORAM	NER	0.141736		0.141610		0.141736											
NVVN POWER - A/C BPDB	Others	0.312500		1.190476	1.333333	1.500000											
POWERGRID (ALIPURDUAR)	Others			0.150000			0.189394										
		100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000

Annexure-XIII

Slabs for PoC Rates - Eastern Region (April 2019- June 2019)				
SL NO.	**Name of Entity**	**PoC Slab Rate (₹/MW/Month)**	**Reliability Support Charges Rate(₹/MW/Month)**	**HVDC Charges Rate for ER (₹/MW/Month)**
1	Bihar	262478	31315	11309
2	West Bengal	354241	31315	11309
3	Odisha	446004	31315	11309
4	Jharkhand	216596	31315	11309
5	DVC	216596	31315	11309
6	Bangladesh	78952	31315	11309
7	Sikkim	78952	31315	11309
8	West Bengal Inj.	78952	31315	11309
9	GMR Kamalanga	400122	31315	11309

Slabs for PoC Rates - Eastern Region (July 2019- September 2019)				
SL NO.	**Name of Entity**	**PoC Slab Rate (₹/MW/Month)**	**Reliability Support Charges Rate(₹/MW/Month)**	**HVDC Charges Rate for ER (₹/MW/Month)**
1	Bihar	264383	31855	11200
2	West Bengal	310603	31855	11200
3	Odisha	449264	31855	11200
4	Jharkhand	264383	31855	11200
5	DVC	218163	31855	11200
6	Bangladesh	79503	31855	11200
7	Sikkim	79503	31855	11200
8	West Bengal Inj.	79503	31855	11200
9	GMR Kamalanga	403044	31855	11200

Slabs for PoC Rates - Eastern Region (October 2019- December 2019)				
SL NO.	**Name of Entity**	**PoC Slab Rate (₹/MW/Month)**	**Reliability Support Charges Rate(₹/MW/Month)**	**HVDC Charges Rate for ER (₹/MW/Month)**
1	Bihar	263722	31725	11146
2	West Bengal	310261	31725	11146
3	Odisha	449878	31725	11146
4	Jharkhand	263722	31725	11146
5	DVC	217182	31725	11146
6	Bangladesh	77565	31725	11146
7	Sikkim	77565	31725	11146
8	West Bengal Inj.	77565	31725	11146
9	GMR Kamalanga	403339	31725	11146

Slabs for PoC Rates - Eastern Region (January 2020- March 2020)				
SL NO.	**Name of Entity**	**PoC Slab Rate (₹/MW/Month)**	**Reliability Support Charges Rate(₹/MW/Month)**	**HVDC Charges Rate for ER (₹/MW/Month)**
1	Bihar	169957	32046	11748
2	West Bengal	169957	32046	11748
3	Odisha	449682	32046	11748
4	Jharkhand	169957	32046	11748
5	DVC	281847	32046	11748
6	Bangladesh	58067	32046	11748
7	Sikkim	58067	32046	11748
8	West Bengal Inj.	58067	32046	11748
9	GMR Kamalanga	337792	32046	11748

Annexure- XIV

Regional Transmission Charges paid by various ER Constituents during the year 2019-20		
SL NO.	**Constituents**	**Charges (Rs. Cr.)**
1	BIHAR	1283
2	JHARKHAND	203
3	DVC	134
4	ODISHA	699
5	WEST BENGAL	830
6	SIKKIM	19
7	POWERGRID(PASAULI)	0
8	NVVN (BPDB)	97
9	TATA STEEL	66
10	RAILWAYS_JHARKHAND	25
11	RAILWAYS_BIHAR	21
12	RAILWAYS_DVC	25
13	RAILWAYS_ODISHA	0
14	RAILWAYS_WEST BENGAL	21
15	HVDC ALIPURDUAR	1
16	BRBCL NABINAGAR	8
	Total	**3434**

Annexure -XV(A)

LTA Energy Transactions (MU) in F.Y 2019-20

TRADERS	Export	Import
BESCOM	2262.42819	0
BYPL	573.11927	0
DELHI	2514.71132	0
DVC	963.14334	0
FARIDABAD_SOLAR	0	6.85609
GIWEL_SECI-II_RE	0	205.76188
GMR	1538.96164	0
HARYANA	1284.23869	0
HIRAKUD HEP	15.9432	0
JITPL	1718.47327	751.13364
KSEB	2955.41173	0
NVVNL	1867.0575	0
PTC	4266.38543	1163.38659
PUNJAB	3631.1766	0
RAJ_SOLAR	132.607	0
SECI_Trader	299.74354	0
TAL SOLAR	13.57926	0
TISCO	1088.17771	0
TPDDL	1825.28652	0
Tuticorin_Mytrah	0	173.70554
Tuticorin_Orange	0	3.31166
WEST_BENGAL	1709.87407	0
TOTAL	**28660.31828**	**2304.1554**

MTOA Energy Transactions (MU)in F.Y 2019-20

TRADERS	Export	Import
JITPL	1615.89134	0
PTC	0	1108.734588
SECI_Trader	0	26.991145
SEIL_PROJECT2	0	786.305245
TOTAL	**1615.89134**	**1922.030978**

Annexure -XV(B)

STOA Energy Transactions (MU) in F.Y 2019-20

TRADERS	Export	Import
AEL_Trader	0	0.53225
APPCPL	552.658305	538.70662
APPL_Trader	7.2	0
BSL	0.24	0
CESC	0	1.82
CHUZACHEN	364.5662266	0
DB Power	0	29.3
ECRD	12.435565	0
ESIL_WR_Beneficia	74.544	0
GMRETL Trader	192.39261	211.56
IEXL_Trader	105.5609075	0
JBVNL	1244.664535	0
IPCL_Trader	0	29.78822
ITC_Munger	0	5.7364
JHARKHAND	20.57688	0
JITPL	93.777285	0
JLHEP	273.0432612	0
JSWEL KPCL	0	4.956
KEIPL	398.39802	338.37089
MANIKARAN	15.3	0
NPCL(UP)	34.10438	0
NR-DEL	4.435614823	0
NR-UP	14.21599433	0
NVVNL	225.1997149	1745.453764
PXIL	144.746	360.412285
PTC	1665.007603	1757.786587
RUVNL	268.6	0
SAIL-RSP	0	15.552
SGPLNLR	0	637.4180225
TATAHALDIA	0	2.4
TATASTEEL	121.676	0
THEP	273.9395333	0
TISCO	0.288	0
TPTCL_Trader	528.42904	0
TSBSLA	0.24	0
TSFAP_JODA	3.684	0
TSKPO	7.385	0
TSL Joda	8.6592	0
WBSEDCL	1433.78024	0
TOTAL	**8089.747916**	**5679.793039**

Month-wise Statement of Over/Under generation of ISGS & Over/Under Drawl by the Constituents during 2019-20

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
Apr-19	RANGIT	21,168.00000000	21,574.64640000	406.64640000	9,33,548.60
	TEESTA	2,18,162.97250000	2,23,599.59570400	5,436.62320400	61,75,683.60
	BSPHCL	-24,53,739.11457400	-24,40,430.62393000	13,308.49064400	-1,94,67,896.10
	DVC	14,56,532.52637500	14,48,076.11396800	-8,456.41240700	-32,26,403.90
	HVDC ALIPURDUAR	-437.31185600	-406.52760000	30.78425600	65,690.00
	HVDC SASARAM	-541.84839800	-580.36543800	-38.51704000	-1,34,661.40
	JUVNL	-4,90,885.32491500	-4,89,919.42705200	965.89786300	-2,68,78,983.70
	GRIDCO	-10,03,392.24927400	-10,55,677.93227400	-52,285.68300000	-8,79,64,890.50
	SIKKIM	-44,035.47809700	-40,861.11875000	3,174.35934700	64,40,053.80
	WBSETCL	-14,95,738.93203100	-14,86,664.87218900	9,074.05984200	-2,13,09,931.90
	NR	-7,11,255.53331200	-16,16,726.64238000	-9,05,471.10906800	-2,70,46,75,546.20
	NVVN-BD	-5,69,675.29830300	-5,67,497.51874800	2,177.77955500	-1,28,44,713.70
	NVVN-NEPAL	-1,51,390.44743600	-1,53,038.17600000	-1,647.72856400	-66,75,889.60
	WR	9,64,183.33749900	13,88,399.55718300	4,24,216.21968400	1,24,23,03,464.30
	SR	-19,98,786.94539800	-17,93,343.00916400	2,05,443.93623400	65,53,88,299.60
	NER	-88,945.59328000	3,51,314.01018200	4,40,259.60346200	1,30,16,65,367.50
	BARH	8,22,987.86740400	8,17,641.04063600	-5,346.82676800	-82,24,433.90
	BRBCL	3,74,276.95325500	3,70,555.26608100	-3,721.68717400	-72,77,263.20
	FSTPP I&II	8,37,521.68020400	8,20,277.25735500	-17,244.42284900	-3,28,45,985.40
	FSTPP-III	2,30,922.53691400	2,28,353.84511100	-2,568.69180300	-53,63,091.00
	KHSTPP-I	4,66,098.99987100	4,61,633.87388200	-4,465.12598900	-71,96,737.90
	KHSTPP-II	6,89,980.67063200	6,84,591.46053100	-5,389.21010100	-72,63,063.10
	MAITHON R/B	5,75,136.91250000	5,75,711.80697600	574.89447600	34,74,019.10
	MTPS-II	1,93,707.22767700	1,90,061.34000000	-3,645.88767700	-81,92,741.00
	TSTPP	5,56,770.82019000	5,53,810.29450800	-2,960.52568200	-30,85,333.30
	CHUZACHEN	21,738.79640000	21,549.82920000	-188.96720000	-6,22,221.10
	DIKCHU	22,174.76245800	22,586.81787800	412.05542000	7,66,984.00
	JORETHANG LOOP HI	17,592.79505600	15,800.28800000	-1,792.50705600	-16,35,505.50
	THEP	17,918.49078600	17,164.48000000	-754.01078600	-3,84,706.10
	Teesta-III(TUL)	4,13,196.69233200	4,05,126.97586800	-8,069.71646400	-1,48,58,574.90
	APNRL	2,19,495.08513900	2,17,544.35853000	-1,950.72660900	-31,72,154.40
	GMRKEL	3,94,448.80317800	3,81,194.75693000	-13,254.04624800	-2,85,28,552.20
	JITPL	3,51,338.28238600	3,49,864.43005400	-1,473.85233200	-26,31,983.90
	TPTCL	17,276.12805600	14,767.69879200	-2,508.42926400	-59,41,101.00
	TALCHER SOLAR	1,359.58250000	1,372.17915000	12.59665000	1,01,770.73
	CHUKHA	29,030.93250000	1,56,126.23512600	1,27,095.30262600	32,40,93,022.20
	KIRICHU	7,317.01000000	6,252.24240000	-1,064.76760000	-22,57,306.70
	TALA	1,88,153.13750000	75,700.79796100	-1,12,452.33953900	-23,83,98,958.70
	VAE	31,630.66000000	0.00000000	-31,630.66000000	-9,06,73,601.50
	NPGC_INFIRM	0.00000000	-4,930.57941700	-4,930.57941700	-1,44,62,936.50
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	-5,269.59799100	-5,269.59799100	-1,57,66,099.90
	DARLIPALI_INFIRM	0.00000000	-4,661.90844700	-4,661.90844700	-1,54,24,304.10
May-19	RANGIT	29,355.75000000	29,605.17360000	249.42360000	7,78,854.50
	TEESTA	3,45,844.00000000	3,52,144.24809500	6,300.24809500	75,57,240.90
	BSPHCL	-29,64,062.02517900	-29,63,842.94138000	219.08379900	-4,90,38,389.90
	DVC	13,86,365.83969000	13,71,551.52899400	-14,814.31069600	-4,13,04,365.50
	HVDC ALIPURDUAR	-516.15873800	-668.30040000	-152.14166200	-5,48,604.40
	HVDC SASARAM	-645.52254700	-687.46627400	-41.94372700	-1,55,860.10
	JUVNL	-5,60,920.32655100	-5,65,496.45023100	-4,576.12368000	-3,73,21,377.10
	GRIDCO	-8,80,983.27587400	-9,05,376.99164800	-24,393.71577400	-3,42,87,198.60
	SIKKIM	-42,836.47714300	-39,995.21327100	2,841.26387200	84,97,851.70
	WBSETCL	-17,94,207.02650100	-17,93,160.65573500	1,046.37076600	-19,46,709.90
	NR	-17,55,891.04025600	-20,01,339.51351000	-2,45,448.47325400	-54,15,18,852.60
	NVVN-BD	-6,64,450.00261000	-6,65,850.02685500	-1,400.02424500	-1,11,48,097.80
	NVVN-NEPAL	-1,60,978.54242000	-1,62,464.32000000	-1,485.77758000	-34,88,012.70
	WR	7,81,004.28756900	16,79,876.01785300	8,98,871.73028400	2,63,31,95,016.40
	SR	-10,67,853.59649000	-14,15,936.52910900	-3,48,082.93261900	-1,06,76,19,607.40
	NER	2,83,875.84537100	1,16,580.24770700	-1,67,295.59766400	-64,60,36,836.50
	BARH	8,52,458.28459500	8,46,183.69460700	-6,274.58998800	-94,08,599.30
	BRBCL	3,42,372.37887400	3,40,472.13899400	-1,900.23988000	-40,36,734.10
	FSTPP I&II	9,49,195.31022500	9,26,756.76612800	-22,438.54409700	-4,52,57,526.40
	FSTPP-III	2,94,141.60248000	2,89,779.92503100	-4,361.67744900	-87,90,356.70
	KHSTPP-I	4,90,054.34512400	4,87,015.04069900	-3,039.30442500	-44,77,638.60
	KHSTPP-II	6,80,788.44616900	6,72,230.26364200	-8,558.18252700	-1,34,41,368.20
	MAITHON R/B	6,26,231.95000000	6,25,508.67866100	-723.27133900	12,64,618.60
	MTPS-II	2,25,943.01323200	2,21,836.47600000	-4,106.53723200	-83,68,618.50
	TSTPP	5,66,951.56991800	5,65,119.23350500	-1,832.33641300	-17,96,917.10
	CHUZACHEN	45,853.84901300	46,408.78440000	554.93538700	23,46,412.30
	DIKCHU	62,062.49832400	64,272.36299500	2,209.86467100	59,83,422.10
	JORETHANG LOOP HI	25,322.50050500	21,165.92000000	-4,156.58050500	-81,93,633.20
	THEP	27,559.14051400	23,454.78400000	-4,104.35651400	-82,35,930.60
	Teesta-III(TUL)	7,05,917.37625600	7,02,794.97186100	-3,122.40439500	69,44,588.50
	APNRL	2,12,339.46646400	2,07,246.75858000	-5,092.70788400	-1,01,66,965.50
	GMRKEL	3,78,882.84686900	3,68,025.01151700	-10,857.83535200	-2,33,95,714.70
	JITPL	3,54,405.25371700	3,52,393.52091400	-2,011.73280300	-47,35,726.20
	TPTCL	22,258.40714500	15,979.10344800	-6,279.30369700	-1,41,06,624.70
	TALCHER SOLAR	1,386.26250000	1,363.02510000	-23.23740000	-2,29,419.08
	CHUKHA	78,274.82000000	1,37,939.34273400	59,664.52273400	15,21,44,531.80
	KIRICHU	11,669.97500000	24,150.79440000	12,480.81940000	2,64,59,339.30
	TALA	2,64,264.97250000	1,82,693.98022200	-81,570.99227800	-17,29,30,504.50
	VAE	-4,601.44000000	0.00000000	4,601.44000000	2,26,03,649.60
	NPGC_INFIRM	0.00000000	1,227.83944500	1,227.83944500	-1,74,82,071.30
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	19,154.76691800	19,154.76691800	1,39,97,894.00
	DARLIPALI_INFIRM	0.00000000	-4,409.45844700	-4,409.45844700	-1,50,93,048.00

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
	RANGIT	38,160.25000000	38,450.44440000	290.19440000	12,01,930.80
	TEESTA	3,34,555.50000000	3,43,714.72107600	9,159.22107600	2,38,58,836.80
	BSPHCL	-29,57,267.74884800	-29,64,437.62500500	-7,169.87615700	-10,01,75,062.50
	DVC	13,14,195.13972800	12,94,440.19610800	-19,754.94362000	-3,31,65,688.00
	HVDC ALIPURDUAR	-669.51205700	-714.68520000	-45.17314300	-1,93,587.50
	HVDC SASARAM	-682.00788500	-674.97451600	7.03336900	12,940.60
	JUVNL	-5,59,366.48707900	-5,62,847.45408300	-3,480.96700400	-4,83,36,510.80
	GRIDCO	-10,06,032.01795300	-10,51,231.73897600	-45,199.72102300	-14,39,01,304.20
	SIKKIM	-37,245.72079500	-39,347.26574000	-2,101.54494500	-76,43,597.10
	WBSETCL	-16,92,512.90252100	-17,35,992.63445900	-43,479.73193800	-11,98,08,607.70
	NR	-19,97,729.27380300	-19,92,833.22967500	4,896.04412800	5,76,45,460.40
	NVVN-BD	-6,01,613.98345400	-6,03,772.93659600	-2,158.95314200	-1,85,55,006.80
	NVVN-NEPAL	-1,55,869.82410000	-1,57,116.49600000	-1,246.67190000	-67,65,473.20
	WR	7,70,031.36165400	18,76,404.33348900	11,06,372.97183500	3,46,85,08,313.20
	SR	-3,10,701.96882700	-9,57,114.44128500	-6,46,412.47245800	-2,04,11,16,245.50
	NER	27,234.58316900	-3,28,441.22881900	-3,55,675.81198800	-1,18,37,40,251.40
Jun-19	BARH	7,89,400.07725900	7,85,773.35196600	-3,626.72529300	-59,16,925.90
	BRBCL	3,86,246.80727600	3,86,271.46593300	24.65865700	-25,83,007.40
	FSTPP I&II	8,25,642.43754400	7,95,545.64308700	-30,096.79445700	-7,32,67,557.10
	FSTPP-III	55,561.40414700	54,211.64813200	-1,349.75601500	-32,36,271.90
	KHSTPP-I	4,85,721.27581900	4,88,458.43205100	2,737.15623200	1,00,69,412.90
	KHSTPP-II	8,60,660.53633400	8,52,551.29494600	-8,109.24138800	-1,45,92,983.30
	MAITHON R/B	4,33,947.88750000	4,35,679.37408400	1,731.48658400	57,92,487.10
	MTPS-II	2,11,873.47185000	2,07,990.87200000	-3,882.59985000	-96,35,981.60
	TSTPP	5,17,659.89075500	5,16,106.38186400	-1,553.50889100	-17,23,811.30
	CHUZACHEN	52,790.60298000	52,452.06720000	-338.53578000	-1,07,209.10
	DIKCHU	65,893.27398800	68,347.27193700	2,453.99794900	72,49,622.80
	JORETHANG LOOP H	41,359.30934300	36,001.53600000	-5,357.77334300	-1,03,76,854.30
	THEP	37,368.58572700	33,267.23200000	-4,101.35372700	-73,66,769.80
	Teesta-III(TUL)	8,53,464.30037300	8,32,190.89804300	-21,273.40233000	-3,44,21,021.90
	APNRL	2,57,853.06487000	2,52,269.74002100	-5,583.32484900	-1,17,44,820.70
	GMRKEL	2,82,351.14950300	2,70,005.88526100	-12,345.26424200	-2,69,47,325.50
	JITPL	4,78,155.69369800	4,76,278.53786300	-1,877.15583500	-52,42,575.50
	TPTCL	34,803.54566100	19,524.86104800	-15,278.68461300	-3,50,01,508.50
	TALCHER SOLAR	1,185.07750000	1,199.40330000	14.32580000	97,863.83
	CHUKHA	66,231.99750000	1,13,069.28601000	46,837.28851000	11,94,35,086.30
	KIRICHU	10,107.60750000	36,860.82660000	26,753.21910000	5,67,16,826.00
	TALA	2,41,036.77750000	1,82,649.44742000	-58,387.33008000	-12,37,81,140.70
	VAE	-23,928.45500000	0.00000000	23,928.45500000	11,23,33,315.90
	NPGC_INFIRM	0.00000000	54,797.92813100	54,797.92813100	6,78,59,682.90
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	51,382.50111000	51,382.50111000	5,20,61,837.20
	DARLIPALI_INFIRM	0.00000000	-4,315.71167700	-4,315.71167700	-1,32,32,658.40
	RANGIT	43,804.50000000	44,053.38840000	248.88840000	5,02,644.60
	TEESTA	3,43,843.00000000	3,51,781.04822400	7,938.04822400	1,96,24,401.60
	BSPHCL	-27,61,724.83662500	-27,57,638.55609000	4,086.28053500	-3,71,74,216.80
	DVC	12,19,918.75549100	12,24,327.46953700	4,408.71404600	4,49,02,100.90
	HVDC ALIPURDUAR	-848.98758400	-818.60340000	30.38418400	23,134.20
	HVDC SASARAM	-578.88964300	-642.23155000	-63.34190700	-2,14,759.70
	JUVNL	-5,01,837.61219400	-5,05,277.68481600	-3,440.07262200	-2,52,44,089.00
	GRIDCO	-11,02,679.27977400	-11,69,352.12890800	-66,672.84913400	-16,98,46,008.30
	SIKKIM	-37,776.36748100	-37,327.48473300	448.88274800	2,18,304.70
	WBSETCL	-21,74,084.38341500	-22,56,583.12311200	-82,498.73969700	-20,68,65,308.80
	NR	-23,87,432.69860900	-25,36,709.68056700	-1,49,276.98195800	-29,40,94,724.70
	NVVN-BD	-6,65,831.04258300	-6,69,471.40859400	-3,640.36601100	-1,53,29,587.00
	NVVN-NEPAL	-1,41,433.67013900	-1,40,518.41600000	915.25413900	-15,04,723.70
	WR	12,08,757.62018900	21,77,618.86820900	9,68,861.24802000	2,33,64,43,831.70
	SR	-8,60,063.68715000	-10,17,566.80054600	-1,57,503.11339600	-47,46,98,472.70
	NER	3,19,792.06665000	-2,45,941.11946700	-5,65,733.18611700	-1,68,40,39,393.00
Jul-19	BARH	7,86,759.44669200	7,80,523.51453400	-6,235.93215800	-97,05,689.10
	BRBCL	3,21,520.89968500	3,23,091.32107000	1,570.42138500	11,80,836.60
	FSTPP I&II	9,41,431.14617200	9,07,658.56547000	-33,772.58070200	-7,36,39,282.90
	FSTPP-III	0.00000000	0.00000000	0.00000000	0.00
	KHSTPP-I	3,81,872.71808000	3,83,555.54674600	1,682.82866600	69,24,613.70
	KHSTPP-II	8,71,421.54769900	8,64,008.51490800	-7,413.03279100	-1,21,74,156.20
	MAITHON R/B	2,87,762.88000000	2,87,910.72292000	147.84292000	2,22,613.10
	MTPS-II	93,460.88234800	90,007.12400000	-3,453.75834800	-72,45,453.30
	TSTPP	5,43,450.55473300	5,41,480.81144900	-1,969.74328400	-14,68,216.70
	CHUZACHEN	77,118.94039600	77,795.12580000	676.18540400	9,74,829.40
	DIKCHU	75,662.77253600	77,836.72648100	2,173.95394500	55,37,081.60
	JORETHANG LOOP H	71,790.85300700	66,732.16000000	-5,058.69300700	-1,01,27,881.90
	THEP	73,210.33015800	74,598.68800000	1,388.35784200	40,99,428.30
	Teesta-III(TUL)	9,17,908.34597400	9,18,523.69704400	615.35107000	53,81,357.00
	APNRL	2,38,687.88525200	2,28,468.21289600	-10,219.67235600	-1,96,11,476.90
	GMRKEL	3,89,516.81393400	3,65,553.52065000	-23,963.29328400	-4,92,73,901.90
	JITPL	4,46,605.17441700	4,45,829.73800300	-775.43641400	-16,23,945.20
	TPTCL	84,599.27536800	65,486.62428000	-19,112.65108800	-4,31,11,314.60
	TALCHER SOLAR	913.03750000	940.19820000	27.16070000	1,94,091.09
	CHUKHA	2,05,608.62750000	2,61,709.94672700	56,101.31922700	14,30,58,365.20
	KIRICHU	31,976.42750000	68,701.67460000	36,725.24710000	7,78,57,523.30
	TALA	6,68,616.02750000	5,45,595.76970300	-1,23,020.25779700	-26,08,02,947.60
	VAE	7,527.34000000	0.00000000	-7,527.34000000	-1,00,66,089.20
	NPGC_INFIRM	0.00000000	1,20,614.52270200	1,20,614.52270200	14,65,73,279.20
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	62,344.39712600	62,344.39712600	7,05,19,799.90
	DARLIPALI_INFIRM	0.00000000	-5,309.93337500	-5,309.93337500	-2,02,82,049.90

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
	RANGIT	43,482.25000000	43,809.57360000	327.32360000	8,43,376.90
	TEESTA	3,44,436.50000000	3,49,946.06642000	5,509.56642000	1,38,56,213.00
	BSPHCL	-31,97,697.79738500	-32,03,818.00086200	-6,120.20347700	-6,87,47,956.20
	DVC	9,26,608.39163100	9,29,605.34455300	2,996.95292200	3,64,55,839.60
	HVDC ALIPURDUAR	-942.91289700	-823.66980000	119.24309700	3,40,788.50
	HVDC SASARAM	-608.83731100	-636.89341600	-28.05610500	-63,712.00
	JUVNL	-4,95,641.16099500	-5,04,627.52755100	-8,986.36655600	-4,39,70,486.00
	GRIDCO	-11,54,483.67296400	-13,04,643.75285600	-1,50,160.07989200	-47,46,62,689.50
	SIKKIM	-39,728.01440000	-39,822.53523800	-94.52083800	-15,58,619.40
	WBSETCL	-25,07,792.10993500	-25,89,310.59876600	-81,518.48883100	-22,17,55,062.60
	NR	-19,15,283.94367500	-17,40,150.80654200	1,75,133.13713300	59,94,51,060.90
	NVVN-BD	-6,38,047.26206800	-6,39,211.77255600	-1,164.51048800	-50,24,539.80
	NVVN-NEPAL	-1,24,708.77621200	-1,29,625.32800000	-4,916.55178800	-1,62,78,877.10
	WR	16,66,133.80275100	24,54,004.33977600	7,87,870.53702500	2,20,15,19,282.30
	SR	-47,988.07649900	-4,87,289.90924700	-4,39,301.83274800	-1,20,44,52,695.50
	NER	-1,17,682.91347800	-5,91,746.58152400	-4,74,063.66804600	-1,44,26,79,305.30
Aug-19	BARH	8,11,033.85773500	8,01,067.18619800	-5,081.03091200	-78,61,881.20
	BRBCL	3,21,667.76438400	3,22,083.77564100	416.01125700	8,96,879.70
	FSTPP I&II	9,46,212.16314400	9,10,778.93255600	-35,433.23058800	-8,09,23,430.40
	FSTPP-III	1,28,749.45307000	1,24,724.10300500	-4,025.35006500	-98,87,534.80
	KHSTPP-I	4,14,216.32682000	4,17,219.98387800	3,003.65705800	92,34,840.50
	KHSTPP-II	8,85,768.39047400	8,78,054.66538600	-7,713.72508800	-1,49,28,901.80
	MAITHON R/B	4,97,364.91000000	4,98,941.01063000	1,576.10063000	39,69,234.50
	MTPS-II	1,21,233.02401600	1,16,688.51200000	-4,544.51201600	-1,03,08,738.90
	TSTPP	3,00,963.87129400	2,97,139.18447500	-3,824.68681900	-62,39,070.70
	CHUZACHEN	81,702.66744000	81,980.37120000	277.70376000	4,02,693.70
	DIKCHU	62,296.91903500	62,955.99931400	659.08027900	14,23,042.40
	JORETHANG LOOP H	74,002.67035800	68,688.73600000	-5,313.93435800	-1,10,67,974.20
	THEP	76,110.22035900	77,101.82400000	991.60364100	35,53,788.00
	Teesta-III(TUL)	7,97,600.21440600	7,95,021.44439900	-2,578.77000700	-22,79,129.80
	APNRL	2,79,109.03788600	2,72,292.57616700	-6,816.46171900	-1,01,31,520.90
	GMRKEL	2,12,508.93368400	1,97,909.44955400	-14,599.48413000	-3,22,44,273.50
	JITPL	3,42,499.26288100	3,41,799.26641000	-699.99647100	-17,20,933.80
	TPTCL	87,362.66424000	69,054.04968000	-18,308.61456000	-4,15,30,280.80
	TALCHER SOLAR	866.51000000	859.83150000	-6.67850000	-1,03,018.11
	CHUKHA	1,93,809.10000000	2,74,706.49001800	80,897.39001800	20,62,88,344.10
	KIRICHU	25,168.21250000	71,022.50640000	45,854.29390000	9,72,11,100.80
	TALA	7,23,955.96500000	5,69,104.90385100	-1,54,851.06114900	-32,82,84,250.20
	VAE	55,106.53250000	0.00000000	-55,106.53250000	-16,42,77,844.80
	NPGC_INFIRM	0.00000000	-5,907.34622400	-5,907.34622400	-2,06,25,131.10
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	NA	NA	NA	NA
	DARLIPALI_INFIRM	0.00000000	-1,836.97186200	-1,836.97186200	-56,74,046.70
	RANGIT	39,031.50000000	39,393.26760000	361.76760000	8,12,384.90
	TEESTA	3,50,463.66750000	3,59,343.15720300	8,879.48970300	2,10,65,653.50
	BSPHCL	-28,94,063.61834500	-28,45,213.56358000	48,850.05476500	-56,73,882.30
	DVC	6,79,333.53231400	6,62,148.17182700	-17,185.36048700	-3,53,17,008.50
	HVDC ALIPURDUAR	-833.01824000	-742.77240000	90.24584000	2,13,161.10
	HVDC SASARAM	-647.58254900	-607.43325100	40.14929800	1,14,227.20
	JUVNL	-5,00,374.54643300	-5,00,359.77309700	14.77333600	-1,66,08,053.30
	GRIDCO	-6,66,455.49397600	-8,87,723.41481100	-2,21,267.92083500	-51,05,58,692.10
	SIKKIM	-37,978.18225700	-39,244.57740000	-1,266.39514300	-35,46,159.50
	WBSETCL	-19,32,867.29072300	-19,55,495.05923000	-22,627.76850700	-4,49,13,675.60
	NR	-22,77,745.41060000	-24,54,142.00035800	-1,76,396.58975800	-36,72,06,697.40
	NVVN-BD	-6,43,277.01651100	-6,41,897.59079000	1,379.42572100	-30,10,279.80
	NVVN-NEPAL	-1,21,199.43465600	-1,22,075.96800000	-876.53334400	-64,91,859.30
	WR	2,72,102.92555700	14,21,180.67535200	11,49,077.74979500	2,77,40,35,746.30
	SR	-78,514.35291000	-4,71,640.42282000	-3,93,126.06991000	-93,75,46,813.00
	NER	-78,287.59923500	-4,79,669.00863100	-4,01,381.40939600	-1,00,44,35,032.50
Sep-19	BARH	7,50,954.30430700	7,41,260.82570000	-5,072.49423200	-80,37,632.30
	BRBCL	3,03,718.32590600	3,04,584.50312100	866.17721500	7,95,224.90
	FSTPP I&II	8,26,803.67780600	8,04,785.48659100	-22,018.19121500	-4,91,21,819.40
	FSTPP-III	2,95,793.33380400	2,90,464.34746600	-5,328.98633800	-1,18,66,639.60
	KHSTPP-I	4,61,728.14203900	4,64,836.72630700	3,108.58426800	85,07,991.00
	KHSTPP-II	8,69,872.14799300	8,62,569.13864800	-7,303.00934500	-1,28,25,752.60
	MAITHON R/B	5,07,844.06750000	5,10,794.17147200	2,950.10397200	83,40,743.70
	MTPS-II	1,73,989.42424100	1,69,955.78000000	-4,033.64424100	-82,53,827.20
	TSTPP	2,99,475.10098000	2,97,787.58784100	-1,687.51313900	-13,22,314.30
	NPGC	2,85,655.39105000	2,88,953.11109900	3,297.72004900	-18,28,419.00
	CHUZACHEN	80,419.72398400	81,383.30940000	963.58541600	24,83,103.10
	DIKCHU	73,537.17790400	76,649.63557900	3,112.45767500	76,81,253.90
	JORETHANG LOOP H	71,674.36007000	66,949.60000000	-4,724.76007000	-98,24,748.70
	THEP	74,715.07639100	77,459.90400000	2,744.82760900	55,74,483.70
	Teesta-III(TUL)	8,78,875.46762000	8,81,020.71561500	2,145.24799500	1,82,90,700.20
	APNRL	2,47,796.49776200	2,35,690.90396600	-12,105.59379600	-1,72,23,099.30
	GMRKEL	1,86,454.74594000	1,73,596.07017800	-12,858.67576200	-2,72,40,752.40
	JITPL	3,13,499.32750000	3,14,559.92122300	1,060.59372300	30,74,653.40
	TPTCL	88,012.89792000	69,302.00692800	-18,710.89099200	-3,95,37,131.30
	TALCHER SOLAR	975.29000000	948.83550000	-26.45450000	-3,16,057.12
	CHUKHA	1,66,843.17500000	2,65,293.12013400	98,449.94513400	25,10,47,360.90
	KIRICHU	30,204.69000000	64,706.93460000	34,502.24460000	7,31,44,760.80
	TALA	7,05,249.75500000	5,33,929.38368500	-1,71,320.37131500	-36,31,99,187.50
	VAE	-9,076.82000000	0.00000000	9,076.82000000	60,45,785.60
	NPGC_INFIRM	0.00000000	-2,852.06400000	-2,852.06400000	-70,20,971.60
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	NA	NA	NA	NA
	DARLIPALI_INFIRM	0.00000000	-3,532.76883600	-3,532.76883600	-1,31,11,423.80
	MANGDECHHU	3,44,079.16500000	3,39,357.81188600	-4,721.35311400	-1,94,51,977.00

ANNEXURE-XVIA (Page 4/6)

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
	RANGIT	43,491.25000000	43,989.48240000	498.23240000	9,86,596.40
	TEESTA	3,00,638.00000000	3,10,302.72127100	9,664.72127100	2,34,05,067.40
	BSPHCL	-26,03,889.95868800	-25,62,340.02380000	41,549.93488800	2,06,48,263.50
	DVC	4,52,846.62549900	4,05,895.21794700	-46,951.40755200	-11,77,89,106.80
	HVDC ALIPURDUAR	-795.25610900	-648.06540000	147.19070900	3,61,749.40
	HVDC SASARAM	-637.00249200	-578.65332900	58.34916300	1,56,299.10
	JUVNL	-4,80,703.84138700	-4,73,838.14756800	6,865.69381900	55,29,986.40
	GRIDCO	-3,36,911.78689100	-5,44,137.54700000	-2,07,225.76010900	-49,29,96,817.60
	SIKKIM	-40,442.89825900	-38,972.54006500	1,470.35819400	11,80,827.10
	WBSETCL	-13,44,739.08975200	-13,77,000.27827100	-32,261.18851900	-6,87,19,896.30
	NR	-18,81,354.41816100	-18,14,212.85105800	67,141.56710300	20,50,24,270.20
	NVVN-BD	-6,26,949.44998000	-6,25,712.49993800	1,236.95004200	-32,30,189.10
	NVVN-NEPAL	-15,555.10876800	-16,542.28800000	-987.17923200	-44,12,181.90
	WR	4,08,672.98399400	13,54,352.57330600	9,45,679.58931200	2,34,28,29,453.30
	SR	-6,99,308.14407800	-11,86,757.27256100	-4,87,449.12848300	-1,28,29,36,409.70
	NER	-14,527.65832200	-3,82,363.87218700	-3,67,836.21386500	-89,40,86,712.60
Oct-19	BARH	6,66,200.32188400	6,65,350.06270700	1,464.38144800	42,77,311.40
	BRBCL	3,32,435.13002000	3,34,229.88456600	1,794.75454600	25,45,015.30
	FSTPP I&II	5,30,215.64141500	5,28,492.62531700	-1,723.01609800	-58,28,033.20
	FSTPP-III	2,64,046.89611900	2,61,995.95589900	-2,050.94022000	-56,23,988.10
	KHSTPP-I	4,27,124.51113400	4,32,745.01349900	5,620.50236500	1,36,75,048.00
	KHSTPP-II	8,38,169.69658900	8,31,726.81647100	-6,442.88011800	-1,09,27,576.30
	MAITHON R/B	5,21,126.47500000	5,23,426.93474600	2,300.45974600	66,46,543.50
	MTPS-II	1,79,885.63540700	1,75,479.69600000	-4,405.93940700	-93,27,606.70
	TSTPP	4,12,051.52857900	4,10,923.25932700	-1,128.26925200	2,91,308.40
	NPGC	3,76,568.80927600	3,75,871.32913900	-697.48013700	4,06,521.10
	CHUZACHEN	51,348.41035300	50,765.41260000	-582.99775300	-9,60,501.70
	DIKCHU	52,407.19632000	50,341.27219100	-2,065.92412900	-37,73,584.80
	JORETHANG LOOP HI	60,832.31123500	57,176.03200000	-3,656.27923500	-68,60,122.20
	THEP	61,813.09715800	61,203.55200000	-609.54515800	-5,56,104.30
	Teesta-III(TUL)	5,53,735.80159100	5,45,393.95555000	-8,341.84604100	-37,41,991.00
	APNRL	2,01,078.84931400	1,95,054.32232600	-6,024.52698800	-93,24,428.00
	GMRKEL	1,22,888.35750000	1,22,394.25184700	-494.10565300	-4,15,108.00
	JITPL	3,46,013.72250000	3,43,898.03020700	-2,115.69229300	-43,32,534.60
	TPTCL	63,722.25161300	53,427.19351200	-10,295.05810100	-2,23,41,072.90
	TALCHER SOLAR	1,122.27000000	1,101.19830000	-21.07170000	-2,34,757.28
	CHUKHA	1,15,523.91750000	2,35,465.64719900	1,19,941.72969900	30,58,51,412.10
	KIRICHU	28,394.46500000	48,191.31360000	19,796.84860000	4,19,69,319.30
	TALA	4,87,509.70000000	3,05,005.96462200	-1,82,503.73537800	-38,69,07,919.70
	VAE	4,299.70750000	0.00000000	-4,299.70750000	-67,99,253.10
	NPGC_INFIRM	0.00000000	-1,881.30240000	-1,881.30240000	-46,62,714.60
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	NA	NA	NA	NA
	DARLIPALI_INFIRM	0.00000000	-2,184.69937900	-2,184.69937900	-1,01,63,210.10
	MANGDECHHU	2,58,163.89000000	1,41,611.41531100	-1,16,552.47468900	-48,01,96,194.40
	RANGIT	27,827.12500000	28,683.13200000	856.00700000	20,38,139.70
	TEESTA	1,40,606.06250000	1,46,385.66916000	5,779.60666000	1,30,37,602.60
	BSPHCL	-21,05,343.67050500	-20,86,421.13167600	18,922.53882900	61,55,882.80
	DVC	8,91,312.46184300	8,86,820.80188400	-4,491.65995900	-1,18,52,216.80
	HVDC ALIPURDUAR	-529.62809000	-391.85400000	137.77409000	3,36,912.30
	HVDC SASARAM	-585.86334600	-522.97828600	62.88506000	1,53,642.10
	JUVNL	-4,96,499.61919500	-4,87,899.82592600	8,599.79326900	1,41,37,592.70
	GRIDCO	-1,89,842.87978300	-1,87,816.11715800	2,026.76262500	27,36,230.60
	SIKKIM	-44,193.14649400	-45,589.19807400	-1,396.05158000	-42,60,430.50
	WBSETCL	-10,75,454.61293100	-11,20,891.51943200	-45,436.90650100	-8,23,88,249.00
	NR	-20,35,899.41632000	-20,93,849.16455500	-57,949.74823500	-18,39,36,459.50
	NVVN-BD	-4,00,394.97466000	-4,01,711.84771900	-1,316.87305900	-69,92,044.80
	NVVN-NEPAL	-7,379.85900000	-11,035.72800000	-3,655.86900000	-51,80,977.60
	WR	2,16,646.25773800	5,10,784.56106400	2,94,138.30332600	87,05,87,565.30
	SR	-12,13,818.60683700	-15,53,491.30530600	-3,39,672.69846900	-94,45,18,938.70
	NER	12,425.10295300	1,64,411.57486400	1,51,986.47191100	34,64,95,864.70
Nov-19	BARH	6,58,198.44135900	6,57,120.93614100	2,405.14944700	29,45,611.30
	BRBCL	4,40,424.78896500	4,41,475.11992000	1,050.33095500	17,28,859.60
	FSTPP I&II	6,19,677.92336900	6,13,520.78811300	-6,157.13525600	-1,29,01,193.60
	FSTPP-III	2,65,658.58945600	2,66,679.29864900	1,020.70919300	21,42,276.80
	KHSTPP-I	3,93,017.57455800	3,96,254.21915700	3,236.64459900	93,66,762.20
	KHSTPP-II	9,05,345.00448800	8,94,626.31058800	-10,718.69390000	-1,76,14,968.10
	MAITHON R/B	5,11,625.95750000	5,13,771.26227800	2,145.30477800	88,88,835.50
	MTPS-II	1,63,910.58054700	1,59,171.08800000	-4,739.49254700	-91,82,493.60
	TSTPP	4,89,359.95479200	4,86,446.80353500	-2,913.15125700	-25,78,137.70
	NPGC	3,77,046.05894200	3,72,576.20267300	-4,469.85626900	-61,28,743.50
	CHUZACHEN	18,751.37822600	18,992.30400000	240.92577400	4,67,188.60
	DIKCHU	16,904.39785400	17,187.72705100	283.32919700	9,61,342.30
	JORETHANG LOOP HI	27,593.97178600	25,720.25600000	-1,873.71578600	-25,12,334.90
	THEP	28,182.46626200	27,524.16000000	-658.30626200	-2,73,610.00
	Teesta-III(TUL)	2,68,321.76527000	2,61,441.86879500	-6,879.89647500	-44,72,630.50
	APNRL	1,58,739.53065000	1,54,277.01469000	-4,462.51596000	-74,46,998.40
	GMRKEL	3,43,741.39837600	3,42,084.93910600	-1,656.45927000	-29,86,099.40
	JITPL	3,66,261.54857200	3,63,235.92080500	-3,025.62776700	-60,30,121.10
	TPTCL	36,144.87283200	26,328.79603200	-9,816.07680000	-2,03,38,900.80
	TALCHER SOLAR	1,133.85500000	1,119.30975000	-14.54525000	-1,45,363.05
	CHUKHA	26,636.38000000	92,742.83963400	66,106.45963400	16,85,71,474.30
	KIRICHU	14,538.23750000	6,917.23800000	-7,620.99950000	-1,61,56,521.40
	TALA	1,85,259.93250000	91,704.76564400	-93,555.16685600	-19,83,36,953.90
	VAE	-64,026.62500000	0.00000000	64,026.62500000	12,30,80,548.50
	NPGC_INFIRM	0.00000000	-3,717.26640000	-3,717.26640000	-91,81,815.30
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	DARLIPALI_INFIRM	0.00000000	39,836.15889400	39,836.15889400	3,95,77,365.90
	MANGDECHHU	1,26,587.86250000	1,26,694.25062400	106.38812400	4,38,326.60

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
	RANGIT	18,539.00000000	18,984.10440000	445.10440000	13,71,665.10
	TEESTA	93,221.75000000	97,743.52508100	4,521.77508100	1,09,46,661.90
	BSPHCL	-21,23,593.43629100	-21,11,458.88209900	12,134.55419200	-1,55,53,371.90
	DVC	9,81,884.76191300	9,72,834.03493900	-9,050.72697400	-2,05,51,026.40
	HVDC ALIPURDUAR	-483.65812800	-353.25900000	130.39912800	3,80,810.50
	HVDC SASARAM	-639.40217000	-545.71074400	93.69142600	2,54,814.10
	JUVNL	-5,07,812.25911300	-5,12,139.41236600	-4,327.15325300	-2,86,85,436.90
	GRIDCO	-3,55,840.64700700	-3,57,686.09410900	-1,845.44710200	-1,02,10,132.80
	SIKKIM	-50,084.59667800	-54,229.53085300	-4,144.93417500	-1,27,78,654.10
	WBSETCL	-7,85,518.79836500	-8,00,924.47155400	-15,405.67318900	-43,50,628.20
	NR	-22,23,752.17204600	-22,84,442.47997600	-60,690.30793000	-22,73,42,999.90
	NVVN-BD	-2,11,298.91277500	-2,14,201.23136700	-2,902.31859200	-1,15,55,681.20
	NVVN-NEPAL	-1,53,669.43775800	-1,50,539.23200000	3,130.20575800	1,22,398.10
	WR	3,52,820.03249600	3,97,498.47432100	44,678.44182500	23,36,19,590.90
	SR	-14,00,405.73022700	-16,13,776.57644100	-2,13,370.84621400	-68,28,92,596.30
	NER	-946.94064200	2,78,639.04492200	2,79,585.98556400	77,20,96,348.40
Dec-19	BARH	3,92,388.96016000	3,87,940.50295600	-2,359.61670500	-58,36,455.50
	BRBCL	4,36,271.85146700	4,40,472.39260500	4,200.54113800	73,55,116.60
	FSTPP I&II	8,33,222.93268100	8,30,177.79135500	-3,045.14132600	-74,06,778.00
	FSTPP-III	3,08,489.49737900	3,10,619.63029200	2,130.13291300	50,66,461.30
	KHSTPP-I	4,27,319.94307800	4,28,287.74489100	967.80181300	40,44,543.00
	KHSTPP-II	8,99,804.47257600	8,89,608.84264600	-10,195.62993000	-1,96,33,586.00
	MAITHON R/B	5,55,707.96500000	5,58,390.97125500	2,683.00625500	92,73,907.00
	MTPS-II	2,06,828.21397200	2,04,401.92400000	-2,426.28997200	-52,02,471.30
	TSTPP	5,92,263.11644300	5,90,994.90945300	-1,268.20699000	9,80,258.60
	NPGC	3,08,726.90720400	3,06,249.38081400	-2,477.52639000	-23,05,554.80
	CHUZACHEN	11,421.86094000	11,757.54240000	335.68146000	7,65,716.70
	DIKCHU	10,440.84873100	10,523.45438800	82.60565700	4,45,456.00
	JORETHANG LOOP HI	17,032.18702400	15,779.61600000	-1,252.57102400	-18,23,720.50
	THEP	15,022.57251200	14,651.52000000	-371.05251200	-1,77,430.20
	Teesta-III(TUL)	1,89,405.21060900	1,88,026.97852900	-1,378.23208000	11,64,847.60
	APNRL	2,50,226.60117100	2,50,099.99456300	-126.60660800	20,56,607.10
	GMRKEL	3,81,657.80706400	3,75,266.90237000	-6,390.90469400	-1,30,84,532.60
	JITPL	3,90,186.31152000	3,85,196.93876000	-4,989.37276000	-1,09,28,886.20
	TPTCL	26,041.97740800	18,472.86672000	-7,569.11068800	-1,66,04,301.10
	TALCHER SOLAR	1,061.09500000	1,040.75205000	-20.34295000	-1,99,127.60
	CHUKHA	1,502.40000000	37,484.27887500	35,981.87887500	9,17,53,794.70
	KIRICHU	702.66000000	-15,370.17840000	-16,072.83840000	-3,40,74,416.10
	TALA	1,08,294.54000000	32,137.33604400	-76,157.20395600	-16,14,53,273.80
	VAE	32,582.64000000	0.00000000	-32,582.64000000	-9,66,69,447.00
	NPGC_INFIRM	0.00000000	-4,240.87920000	-4,240.87920000	-1,19,96,812.00
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	DARLIPALI_INFIRM	0.00000000	1,29,327.56348300	1,29,327.56348300	17,06,10,532.50
	MANGDECHHU	96,937.30000000	95,711.99736800	-1,225.30263200	-50,48,225.70
	RANGIT	14,524.50000000	14,933.35800000	408.85800000	9,48,109.00
	TEESTA	84,819.00000000	88,903.77962600	4,084.77962600	1,04,11,721.70
	BSPHCL	-23,96,916.59664200	-24,04,370.91150700	-7,454.31486500	-5,43,74,850.10
	DVC	10,37,434.14048200	10,37,167.27611700	-266.86436500	1,18,99,869.40
	HVDC ALIPURDUAR	-455.39406600	-377.79720000	77.59686600	2,35,121.60
	HVDC SASARAM	-709.19226700	-536.49257800	172.69968900	5,06,982.40
	JUVNL	-5,24,833.26847000	-5,38,731.93554900	-13,898.66707900	-5,57,86,259.40
	GRIDCO	-1,56,638.50654200	-1,53,244.51645600	3,393.99008600	-57,17,306.90
	SIKKIM	-53,384.69598900	-55,528.29046000	-2,143.59447100	-66,99,991.60
	WBSETCL	-7,58,468.44964200	-7,58,957.63286200	-489.18322000	1,77,45,090.70
	NR	-19,95,669.49611300	-18,87,758.97254200	1,07,910.52357100	25,49,24,643.50
	NVVN-BD	-2,30,918.21478100	-2,29,484.28558900	1,433.92919200	-58,06,134.50
	NVVN-NEPAL	-1,82,639.56889200	-1,80,715.34400000	1,924.22489200	9,32,090.90
	WR	7,08,876.30091600	7,89,309.58810400	80,433.28718800	22,26,23,323.50
	SR	-14,95,280.27509200	-17,30,641.39653000	-2,35,361.12143800	-64,62,46,267.00
	NER	-1,14,514.22882500	83,728.75913800	1,98,242.98796300	56,00,16,839.50
Jan-20	BARH	3,59,375.50744500	3,55,769.77593200	-1,892.51429100	-47,76,282.70
	BRBCL	4,46,449.75954700	4,48,811.97436700	2,362.21482000	28,54,959.30
	FSTPP I&II	7,86,437.67408800	7,85,667.29714700	-770.37694100	-21,04,818.50
	FSTPP-III	2,66,205.06619400	2,66,029.05620600	-176.00998800	-4,42,243.80
	KHSTPP-I	4,83,841.35746900	4,83,824.57082500	-16.78664400	12,64,669.00
	KHSTPP-II	7,93,922.42171000	7,91,206.33721500	-2,716.08449500	-52,56,037.60
	MAITHON R/B	5,88,941.33000000	5,93,260.17106000	4,318.84106000	1,30,90,688.20
	MTPS-II	2,08,965.35332500	2,07,374.34800000	-1,591.00532500	-34,55,643.80
	TSTPP	4,28,434.46369500	4,27,841.73559700	-592.72809800	1,62,854.90
	NPGC	3,82,731.66920500	3,81,033.86742900	-1,697.80177600	-20,94,010.60
	CHUZACHEN	8,949.81812800	9,219.81120000	269.99307200	5,43,535.50
	DIKCHU	7,098.81890200	7,170.36353400	71.54463200	2,78,078.10
	JORETHANG LOOP HI	12,255.88417500	11,356.35200000	-899.53217500	-9,95,735.60
	THEP	10,916.84747800	9,738.88000000	-1,177.96747800	-22,83,224.90
	Teesta-III(TUL)	1,56,432.61990800	1,54,705.01555500	-1,727.60435300	-6,08,471.80
	APNRL	2,68,113.33557400	2,68,940.57617300	827.24059900	44,12,841.20
	GMRKEL	3,12,962.99448300	3,05,179.12119100	-7,783.87329200	-1,69,26,504.10
	JITPL	4,73,047.58289200	4,68,067.26523100	-4,980.31766100	-1,17,34,787.20
	TPTCL	19,416.25276800	14,857.86271200	-4,558.39005600	-1,05,34,669.70
	TALCHER SOLAR	1,113.82750000	1,098.03000000	-15.79750000	-1,53,736.35
	CHUKHA	0.00000000	16,542.03305600	16,542.03305600	4,21,82,184.30
	KIRICHU	0.00000000	-13,282.03440000	-13,282.03440000	-2,81,57,913.70
	TALA	66,844.37500000	9,236.37820600	-57,607.99679400	-12,21,28,951.20
	VAE	37,845.76500000	0.00000000	-37,845.76500000	-9,81,92,015.40
	NPGC_INFIRM	0.00000000	-4,113.33120000	-4,113.33120000	-1,18,61,744.40
	BRBCL U-III_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	OPGC_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	DARLIPALI_INFIRM	0.00000000	4,690.98235400	4,690.98235400	-75,14,352.50
	BARH SG1_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	MANGDECHHU	75,557.16250000	75,461.88875100	-95.27374900	-3,92,521.20

Month	Constituent	Total Scheduled (MWH)	Total Actual (MWH)	Total Deviation (MWH)	Total Deviation Amount Cap(Rs.)
	RANGIT	11,717.50000000	11,882.55960000	165.05960000	5,06,801.70
	TEESTA	72,006.50000000	75,596.90721900	3,590.40721900	87,58,878.00
	BSPHCL	-20,72,410.22715300	-20,77,248.38646000	-4,838.15930700	-4,93,77,437.70
	DVC	10,83,838.66803700	10,85,024.52246600	1,185.85442900	1,07,12,027.80
	HVDC ALIPURDUAR	-383.94731300	-319.10700000	64.84031300	2,22,131.40
	HVDC SASARAM	-663.46895000	-521.68884500	141.78010500	4,30,643.10
	JUVNL	-5,28,942.76316600	-5,39,809.22299700	-10,866.45983100	-4,20,51,734.70
	GRIDCO	-1,20,690.55187900	-97,517.13626300	23,173.41561600	3,32,42,569.70
	SIKKIM	-49,990.51034100	-50,992.59203100	-1,002.08169000	-37,96,068.50
	WBSETCL	-8,60,682.14850500	-8,56,684.80312900	3,997.34537600	2,68,70,710.60
	NR	-17,90,622.84804700	-15,24,127.55300200	2,66,495.29504500	70,49,89,594.90
	NVVN-BD	-2,94,253.29998900	-2,94,093.52155000	159.77843900	-57,99,615.60
	NVVN-NEPAL	-1,70,114.03600000	-1,72,409.47200000	-2,295.43600000	-86,55,178.50
	WR	9,65,450.97590300	10,88,503.30051800	1,23,052.32461500	29,80,93,100.40
	SR	-18,89,017.24941200	-19,63,776.85037500	-74,759.60096300	-12,76,54,843.70
	NER	-3,01,972.81087700	-4,93,312.42687400	-1,91,339.61599700	-53,96,66,704.70
Feb-20	BARH	3,28,226.09509000	3,26,901.78227500	-813.58376000	-18,88,951.00
	BRBCL	4,40,624.28197400	4,40,632.72000600	8.43803200	-8,89,148.90
	FSTPP I&II	8,34,677.74735600	8,31,632.78127900	-3,044.96607700	-71,11,866.00
	FSTPP-III	2,83,096.69279700	2,85,687.68712400	2,590.99432700	64,60,693.10
	KHSTPP-I	4,97,268.11796400	4,96,267.78640700	-1,000.33155700	-6,10,367.20
	KHSTPP-II	8,60,527.25815500	8,57,266.11742100	-3,261.14073400	-65,78,729.30
	MAITHON R/B	5,76,445.35750000	5,77,775.44353300	1,330.08603300	54,49,374.40
	MTPS-II	1,72,482.71411000	1,70,397.84400000	-2,084.87011000	-45,62,487.30
	TSTPP	3,08,710.50136900	3,07,718.72658500	-991.77478400	-8,64,902.50
	NPGC	3,35,436.67982700	3,31,074.43109200	-4,362.24873500	-86,88,328.70
	CHUZACHEN	4,026.16928900	3,980.20800000	-45.96128900	-1,05,643.90
	DIKCHU	4,667.86662000	4,553.54539200	-114.32122800	-1,46,725.60
	JORETHANG LOOP HI	8,892.74048100	8,365.11783600	-527.62264500	-5,00,845.70
	THEP	8,494.89268700	8,256.86400000	-238.02868700	-2,65,432.70
	Teesta-III(TUL)	1,36,192.19057400	1,35,916.43353000	-275.75704400	13,30,936.00
	APNRL	2,12,101.04983200	2,05,692.86788400	-6,408.18194800	-1,22,28,254.50
	GMRKEL	3,25,038.38821500	3,19,568.79400500	-5,469.59421000	-1,17,87,386.60
	JITPL	6,23,554.87735400	6,17,705.37289600	-5,849.50445800	-1,30,71,768.70
	TPTCL	14,223.13902000	12,046.55944800	-2,176.57957200	-50,45,609.00
	TALCHER SOLAR	1,122.48000000	1,084.62720000	-37.85280000	-3,62,299.36
	CHUKHA	30.00000000	-8,388.86407200	-8,418.86407200	-2,14,68,100.20
	KIRICHU	0.00000000	-12,952.47960000	-12,952.47960000	-2,74,59,257.90
	TALA	31,288.28750000	-5,873.05939100	-37,161.34689100	-7,87,82,056.00
	VAE	-9,110.28000000	0.00000000	9,110.28000000	1,47,41,405.50
	NPGC_INFIRM	0.00000000	-3,626.40240000	-3,626.40240000	-1,05,97,893.00
	BRBCL				
	OPGC Infirm				
	DARLIPALI_INFIRM	0.00000000	-6,563.66296400	-6,563.66296400	-1,95,79,456.20
	BARH SG1_INFIRM	0.00000000	-3,945.95280000	-3,945.95280000	-1,15,81,154.60
	MANGDECHHU	61,677.17500000	61,756.03438200	78.85938200	3,24,899.50
	RANGIT	14,410.25000000	14,577.67440000	167.42440000	6,31,385.00
	TEESTA	1,06,698.00000000	1,11,322.86997100	4,624.86997100	1,03,48,880.20
	BSPHCL	-20,56,750.07723600	-20,39,931.36764700	16,818.70958900	-2,77,54,621.90
	DVC	10,36,062.16059100	10,22,383.42381500	-13,678.73677600	-2,82,72,453.40
	HVDC ALIPURDUAR	-523.88268700	-373.85940000	150.02328700	3,36,672.60
	HVDC SASARAM	-729.49606300	-579.59922000	149.89684300	3,60,308.00
	JUVNL	-4,68,844.49144600	-4,58,101.06964400	10,743.42180200	1,41,255.10
	GRIDCO	-96,828.72198700	-79,236.87983400	17,591.84215300	3,41,85,354.10
	SIKKIM	-51,135.24669200	-47,929.47433500	3,205.77235700	71,93,291.50
	WBSETCL	-9,92,011.22925800	-10,21,507.84710000	-29,496.61784200	-5,24,01,928.60
	NR	-10,88,064.67616700	-12,43,831.01602000	-1,55,766.33985300	-42,31,79,832.60
	NVVN-BD	-3,85,393.99902800	-3,85,560.86605700	-166.86702900	-1,33,97,993.50
	NVVN-NEPAL	-1,51,554.59943200	-1,47,466.62400000	4,087.97543200	28,40,760.00
	WR	8,07,582.40692100	10,56,152.71560500	2,48,570.30868400	47,52,46,859.70
	SR	-25,63,191.57564000	-26,24,110.33449400	-60,918.75885400	-1,37,30,997.70
	NER	-2,64,698.30862300	-2,39,209.40933400	25,488.89928900	7,60,46,921.40
Mar-20	BARH	5,67,215.34297600	5,68,267.32884000	1,746.79102400	50,06,482.10
	BRBCL	3,62,853.15200800	3,66,371.08422200	3,517.93221400	42,39,139.50
	FSTPP I&II	7,60,137.82597100	7,61,066.83800700	929.01203600	38,56,288.40
	FSTPP-III	2,38,104.28050800	2,42,898.85217100	4,794.57166300	97,59,992.10
	KHSTPP-I	4,53,608.13817700	4,52,788.69747900	-819.44069800	4,64,780.60
	KHSTPP-II	8,11,951.92744100	8,11,651.80090100	-300.12654000	14,72,062.20
	MAITHON R/B	3,99,197.43500000	4,00,726.53620100	1,529.10120100	66,07,140.70
	MTPS-II	1,64,849.84726800	1,63,561.88000000	-1,287.96726800	-25,22,180.60
	TSTPP	5,37,131.34791400	5,33,297.45662500	-3,833.89128900	-46,06,536.10
	NPGC	3,76,347.28402900	3,74,646.28720500	-1,700.99682400	-13,52,503.10
	CHUZACHEN	10,926.94198600	10,901.07840000	-25.86358600	1,11,417.50
	DIKCHU	9,489.23946400	9,285.72712500	-203.51233900	-23,615.90
	JORETHANG LOOP HI	11,343.87970500	10,856.38400000	-487.49570500	66,152.50
	THEP	9,234.94776000	9,160.70400000	-74.24376000	3,40,051.60
	Teesta-III(TUL)	1,77,283.97702800	1,76,078.46941500	-1,205.50761300	42,84,949.60
	APNRL	2,31,610.02759600	2,24,331.84937500	-7,278.17822100	-1,07,51,983.40
	GMRKEL	2,72,755.46750000	2,66,824.43065500	-5,931.03684500	-1,10,21,240.00
	JITPL	4,11,118.90263600	4,07,071.15723800	-4,047.74539800	-83,22,093.70
	TPTCL	15,065.89900800	12,451.81845600	-2,614.08055200	-51,81,072.60
	TALCHER SOLAR	1,339.97250000	1,272.96405000	-67.00845000	-6,60,423.79
	CHUKHA	1,701.15500000	6,912.54104200	5,211.38604200	1,32,89,034.30
	KIRICHU	0.00000000	-12,216.60000000	-12,216.60000000	-2,58,99,193.40
	TALA	48,023.50000000	4,468.00060500	-43,555.49939500	-9,23,37,655.60
	VAE	-22,963.71250000	0.00000000	22,963.71250000	3,14,87,014.70
	NPGC_INFIRM	0.00000000	-1,182.40560000	-1,182.40560000	-29,15,700.10
	BRBCL INFIRM				
	OPGC INFIRM				
	DSTPS_U#2_INFIRM	0.00000000	0.00000000	0.00000000	0.00
	BARH SG1_INFIRM	0.00000000	-4,813.15680000	-4,813.15680000	-1,15,68,866.20
	MANGDECHHU	81,541.31000000	81,814.68797700	273.37797700	11,26,326.30
	DARLIPALI	3,40,725.93362500	3,43,245.62388300	2,519.69025800	30,28,104.20

Details of DSM Transactions from April-19 to March-20

BGNEFICIARY	SCHEDULE (MWH)	ACTUAL (MWH)	DSM Charges (Rs.) (-) Payable (+) Receivable
RANGIT	345511.875	349936.8048	1,15,55,437.20
TEESTA	2735294.953	2810784.309	16,90,46,841.20
BSPHCL	-30587459.11	-30457152.01	-40,05,33,539.10
DVC	12466333	12340274.1	-18,75,08,431.60
HVDC ALIPURDUAR	-7419.667765	-6638.5008	17,73,979.70
HVDC SASARAM	-7669.113621	-7114.487447	14,20,863.40
JUVNL	-6116661.701	-6139047.931	-30,50,74,096.70
GRIDCO*	-7070779.084	----	----
SIKKIM	-528831.3346	-529839.821	-1,67,53,191.90
WBSETCL	-17414076.97	-17753173.5	-77,98,44,197.30
NR	-22060700.93	-23190123.91	-2,91,99,20,083.00
NVVN-BD	-5932103.457	-5938465.506	-11,26,93,883.60
NVVN-NGPAL	-1536493.305	-1543547.392	-5,55,57,924.60
WR	9122262.293	16194085	19,09,90,05,547.30
SR	-13624930.21	-16815444.85	-8,76,80,25,587.60
NER	-338248.4551	-1766010.01	-4,33,83,62,894.50
BARH	7785198.507	7733800.002	-4,94,27,446.10
BRBCL	4508862.093	4519051.647	68,09,877.90
FSTPP I&II	9691176.16	9516360.772	-38,65,52,002.50
FSTPP-III	2630769.353	2621444.349	-2,17,80,702.60
KHSTPP-I	5381871.45	5392887.636	5,12,67,917.20
KHSTPP-II	9968212.52	9890091.563	-13,37,65,060.30
MAITHON R/B	6081333.128	6101897.084	7,30,20,205.40
MTPS-II	2117129.388	2076926.884	-8,62,58,243.80
TSTPS-I	5553222.721	5528666.385	-2,22,50,817.80
NPGC	2442512.8	2430404.609	-2,19,91,038.60
CHUZACHGN	465049.1591	467185.8438	62,99,321.00
DIKCHU	462635.7721	471710.9039	2,63,82,356.90
JORGTHANG LOOP HGP	439693.4627	404591.9978	-6,38,53,204.20
THGP	440546.6678	433582.592	-59,75,457.00
Teesta-III(TUL)	6048333.962	5996241.424	-2,29,84,441.00
APNRL	2777150.432	2711909.175	-10,53,32,253.70
GMRKGL	3603207.706	3487603.133	-24,38,51,390.90
JITPL	4896685.94	4865900.1	-6,73,00,702.70
TALCHGR SOLAR	13579.26	13400.3541	-20,10,476.08
VAG	35285.3125	0	-15,63,86,531.20
NPGC_INFIRM	0	144188.7134	10,36,25,172.20
BRBCL INFIRM	0	0	0.00
OPGC DRAWAL	0	-5269.597991	-1,57,66,099.90
DSTPS Drawal	0	-32815.11499	-11,25,60,197.20
DSTPS_INFIRM	0	173854.7047	20,26,73,545.90
BARH SG1_INFIRM	0	-8759.1096	-2,31,50,020.80
DARLIPALI	340725.9336	343245.6239	10,98,881.90

* DSM Account Settlement of Odisha is before Hon'ble CERC in relation to generation of IB TPS Stg.II (2x660 MW)

ANNEXURE - XVII

STATUS OF REACTIVE ENERGY CHARGES ACCOUNT

RECEIVABLE IN ER POOL AS PER PUBLISHED A/C FROM 01.04.2019 to 29.03.2020 (2019-20)

as on 03.06.2020

Constituents	Amount Receivable in the Pool (Rs.)	Amount Received in the Pool (Rs.)	Total Outstanding (Rs.)
WBSETCL	192263313	191522996	740317
DVC	337488	337488	0
BSPHCL	17140671	0	17140671
SIKKIM	58018	31793	26225
JUVNL	4423750	1164132	3259618
GRIDCO	65798937	65798937	0
TOTAL	**280022177**	**258855346**	**21166831**

Annexure-XVIII

RRAS Settlement Account by ERPC for the Year 2019-20

A. Payments to the RRAS Provider(s) from the DSM pool for UP Regulation

Sr.No	RRAS Provider Name	Energy Scheduled to VAE under RRAS(MWh)	Fixed Charges (Rs) (A)	Variable charges(Rs) (B)	Markup as per CERC Order(Rs) (C)	Total Charges (A+B+C)
1	BARH	54051.39750	100696332	133766429	27025699	261488460
2	BRBCL	95699.74689	231874444	212722231	47849873	492446548
3	Darlipali_NTPC	431.32250	892406	577110	215661	1685177
4	FSTPP I & II	80029.57142	66535411	202695412	40014786	309245609
5	FSTPP-III	5220.06250	7864853	12611540	2610031	23086424
6	KHSTPP-I	45093.85250	47605986	101818903	22546926	171971816
7	KHSTPP-II	62920.27534	69017710	134159150	31460138	234636997
8	MTPS-II	43161.41808	115886887	117910773	21580709	255378369
9	NPGC	8115.27000	21202480	17111457	4057635	42371572
10	TSTPP-I	14836.91000	14369828	32616441	7418455	54404724
11	MPL	42663.12300	60368048	113714267	21331561	195413876
	Grand Total	**452222.94973**	**736314385**	**1079703713**	**226111475**	**2042129573**

B. Payments by the RRAS Provider(s) to the DSM pool for DOWN Regulation

Sr.No	RRAS Provider Name	Energy Scheduled to VAE under RRAS(MWh)	Total Variable charges for generation reduced(Rs) (A)	Variable charges to be paid to the DSM pool (B=75% of A))
1	BARH	88614.41799	133766429	164435066
2	BRBCL	62752.44547	212722231	105248506
3	Darlipali_NTPC	58.75500	577110	58961
4	FSTPP I & II	100054.94582	202695412	185524115
5	FSTPP-III	8761.64278	12611540	15750977
6	KHSTPP-I	51057.16382	101818903	86984282
7	KHSTPP-II	33513.35312	134159150	54463929
8	MTPS-II	22061.45242	117910773	45984821
9	NPGC	17654.17854	17111457	28300660
10	TSTPP-I	34666.88371	32616441	52596877
11	MPL	53160.14000	142444923	106833692
	Grand Total	**472355.37867**	**1108434369**	**846181885**

Annexure- XIX

Compensation received by various generating stations of ER during the year 2019-20		
SL No.	**Station**	**Compensation (Rs. Cr.)**
1	BARH-II	14.86
2	FSTPS-I&II	64.09
3	FSTPS-III	14.78
4	KhSTPS-I	0.00
5	KhSTPS-II	0.00
6	TSPTS	8.36
7	TTPS	0.00
8	MTPS-II	15.30
9	MPL	3.05
10	NABINAGAR STPP	0.00
	Total	**120.43**

ANNEXURE-XX

AGC Settlement Account of ERPC
Revised AGC Account for the Period: 19-Aug-2019 to 31-Mar-2020

Payments to the AGC Provider(s) from the DSM pool

Sr.No	Weeks	AGC Provider Name	UP Regulation due to AGC(MWh)	Down Regulation due to AGC(MWh)	Net Energy(MWh)	Variable Charges (Rs)	Markup Charges as per CERC order (Rs)	Total Charges (Rs)
1	19.08.2019-25.08.2019	BARH	233.484375	2123.156250	-1889.671875	-4469074	1178321	-3290753
2	26.08.2019-01.09.2019	BARH	1203.834375	4180.209375	-2976.375000	-7039126	2692022	-4347104
3	02.09.2019-08.09.2019	BARH	1354.321875	3363.534375	-2009.212500	-4751788	2358928	-2392860
4	09.09.2019-15.09.2019	BARH	1404.993750	2203.115625	-798.121875	-1887559	1804056	-83503
5	16.09.2019-22.09.2019	BARH	2191.096875	3021.581250	-830.484375	-2047143	2606340	559197
6	23.09.2019-29.09.2019	BARH	447.253125	1438.181250	-990.928125	-2442637	942717	-1499920
7	30.09.2019-06.10.2019	BARH	1172.193750	2007.037500	-834.843750	-2057890	1589616	-468274
8	07.10.2019-13.10.2019	BARH	69.140625	1560.768750	-1491.628125	-3676863	814957	-2861906
9	14.10.2019-20.10.2019	BARH	0.000000	0.000000	0.000000	0	0	0
10	21.10.2019-27.10.2019	BARH	0.000000	0.000000	0.000000	0	0	0
11	28.10.2019-03.11.2019	BARH	419.390625	736.012500	-316.621875	-785539	577701	-207838
12	04.11.2019-10.11.2019	BARH	0.000000	0.000000	0.000000	0	0	0
13	11.11.2019-17.11.2019	BARH	0.000000	0.000000	0.000000	0	0	0
14	18.11.2019-24.11.2019	BARH	700.087500	3008.371875	-2308.284375	-5655297	1854231	-3801066
15	25.11.2019-01.12.2019	BARH	365.846928	1297.877915	-932.030987	-2283476	831862	-1451614
16	02.12.2019-08.12.2019	BARH	160.706140	648.679123	-487.972983	-1195533	404693	-790840
17	09.12.2019-15.12.2019	BARH	186.710541	688.848185	-502.137644	-1230238	437779	-792459
18	16.12.2019-22.12.2019	BARH	512.761802	788.943423	-276.181621	-695978	650852	-45126
19	23.12.2019-29.12.2019	BARH	207.384375	905.896875	-698.512500	-1760252	556641	-1203611
20	30.12.2019-05.01.2020	BARH	289.021875	608.071875	-319.050000	-804007	448547	-355460
21	06.01.2020-12.01.2020	BARH	194.145521	981.359596	-787.214075	-1983779	587753	-1396026
22	13.01.2020-19.01.2020	BARH	399.150438	826.384816	-427.234378	-1095526	612768	-482758
23	20.01.2020-26.01.2020	BARH	443.953125	742.696875	-298.743750	-852018	593325	-258693
24	27.01.2020-02.02.2020	BARH	440.512500	371.193750	69.318750	197696	405853	603549
25	03.02.2020-09.02.2020	BARH	904.856250	756.131250	148.725000	424164	830494	1254658
26	10.02.2020-16.02.2020	BARH	532.181250	850.715625	-318.534375	-908069	691449	-216620
27	17.02.2020-23.02.2020	BARH	1456.209375	645.562500	810.646875	2306290	1050887	3357177
28	24.02.2020-01.03.2020	BARH	315.954025	1490.456983	-1174.502958	-3341460	903205	-2438255
29	02.03.2020-08.03.2020	BARH	1023.759375	902.840625	120.918750	344014	963300	1307314
30	09.03.2020-15.03.2020	BARH	1758.093750	2509.012500	-750.918750	-2136364	2133553	-2811
31	16.03.2020-22.03.2020	BARH	2547.468750	3215.606250	-668.137500	-2009091	2881539	872448
32	23.03.2020-29.03.2020	BARH	660.206250	33.937500	626.268750	1883190	347072	2230262
33	30.03.2020-31.03.2020	BARH	0.000000	0.000000	0.000000	0	0	0
	Total	BARH	21594.719145	41906.184416	-20311.465271	-49953353	31750461	-18202892

(+) means payable from DSM Pool to AGC provider
(-) means payable to DSM Pool by AGC provider

LIST OF ASSETS TO BE COMMISSIONED IN ER-I-2020-21

Sl. No.	Name of the Project	Name of the Trans line/ Substation/ Extn.	Scope	MVA addition	Length (CKM)	IA/ RCE Sch.	Indic. Cap. Cost	Balance work/ Gang			Target Completion	Remarks/ Critical Issues
								Fdn (Nos)	TE (Nos)	Stgg (Km)		
	Target :Q1 (April'20 to June'20) incl slipped target from FY 19-20											
1	ERSS XX	• Installation of Owner supplied 1x80 MVAR, 765 KV Reactor at Ranchi (Bero) S/S Agency: M/s TBEA Sch Coml:12th Dec'19	Reactor to be Diverted from Kaddapa			May'20	5				~~**Jun'20**~~ **Sep'20**	**Reactor is ready. To be charged with Ranchi Mednipur line.**
2	ERSS-XVIII	2 no. of 765kV line bays at Ranchi (New) for termination of Ranchi (New) - Medinipur 765kV D/c line (line under TBCB) Agency: M/s McNally Sch Coml:May'20				Jul'20	25				~~**Jun'20**~~ **Oct'20**	**Bays charged on 14.08.2020.** **Commissioning matching with TBCB line.**
3	ERSS-XVIII	240MVAR 765kV (765kV, 3x80 MVAR 1 ph) switchable L/R with 750Ω NGR in each circuit at Ranchi (New) end of Ranchi (New) – Medinipur 765kV D/C T/L (under TBCB). Agency: M/s TBEA Sch Coml: Jan'20				Jul'20	35				~~**Jun'20**~~ **Oct'20**	**All 06 nos Reactor ready. Commissioning matching with TBCB line.**
4	North Karanpura	400 KV GIS Bays extension at Chandwa Agency: Hyosung	02 Nos 400kV GIS Bays for Northkaranpura at Chandwa			Sep'17	15				~~**Jun'20**~~	**GIS bays ready.** CEA Clearance received. **Decision on DOCO pending completion of TBCB line.** (uncertain).
5	North Karanpura	400 KV Bays extension at Gaya Agency: GE Sch Compln: Jan'19	02 Nos 400kV AIS Bays for Northkaranpura at Gaya			Sep'19	10				~~**Jun'20**~~	**GIS bays ready.** CEA Clearance received. **Decision on DOCO pending completion of TBCB line.** (uncertain).
Total (ER-I)				**0**	**0**		**90**					
TBCB												
	Target :Q1 (April'20 to June'20)											
1	ERSS-XVIII	Ranchi- M'pur 765kV D/C Agency: M/s L&T Sch Coml: Dec'19	ER-I portion of Ranchi Mednipur T/L		238	Jul'20	300	Nil	Nil	0.9/ 02	~~**Jun'20**~~ **Oct'20**	**Work in progress. Diversion of line in process to avoid the felling of 03 Nos Sarna Tree (Puja Tree) in the section 15/0-16/0.**
2	ERSS-XXI	LILO of both circuits of Nabinagar-II – Gaya 400kV D/C (Q Moose) line at Chandauti (New) Agency: M/s TPL Sch Coml: Apr'20	LILO of both circuits of Nabinagar-II – Gaya 400kV D/C (Q Moose) line at Chandauti (New)		7	Mar'21	9	Nil	Nil	Nil	**Jun,20**	**LILO of Nabinagar - Gaya Line at Chandauti has been charged 1st time upto Dead Tower on 24.06.20, through cross Jumpering Nabinagar- Gaya line charged via LILO line as contigency measure.**
3	ERSS-XXI	400/220/132kV Chandauti (New) Agency: M/s ABB Sch Coml: Mar'20	2x500MVA 400/220kV ICT and 2x200MVA 220/132kV ICT with 2x125MVAR B/R	1900		Mar'21	152				~~**Jun'20**~~ **Nov'20**	**Work in progress. Progress affected due to heavy rain.**
	Sub total of Q-I			**1900**	**245**		**460**					

LIST OF ASSETS TO BE COMMISSIONED IN ER-I-2020-21

Sl. No.	Name of the Project	Name of the Trans line/ Substation/ Extn.	Scope	MVA addition	Length (CKM)	IA/ RCE Sch.	Indic. Cap. Cost	Balance work/ Gang			Target Completion	Remarks/ Critical Issues
								Fdn (Nos)	TE (Nos)	Stgg (Km)		
	Target :Q1 (April'20 to June'20) incl slipped target from FY 19-20											
1	ERSS XX	• Installation of Owner supplied 1x80 MVAR, 765 KV Reactor at Ranchi (Bero) S/S Agency: M/s TBEA Sch Coml:12th Dec'19	Reactor to be Diverted from Kaddapa			May'20	5				~~**Jun'20**~~ **Sep'20**	**Reactor is ready. To be charged with Ranchi Mednipur line.**
2	ERSS-XVIII	2 no. of 765kV line bays at Ranchi (New) for termination of Ranchi (New) - Medinipur 765kV D/c line (line under TBCB) Agency: M/s McNally Sch Coml:May'20				Jul'20	25				~~**Jun'20**~~ **Oct'20**	**Bays charged on 14.08.2020. Commissioning matching with TBCB line.**
3	ERSS-XVIII	240MVAR 765kV (765kV, 3x80 MVAR 1 ph) switchable L/R with 750Ω NGR in each circuit at Ranchi (New) end of Ranchi (New) – Medinipur 765kV D/C T/L (under TBCB). Agency: M/s TBEA Sch Coml: Jan'20				Jul'20	35				~~**Jun'20**~~ **Oct'20**	**All 06 nos Reactor ready. Commissioning matching with TBCB line.**
4	North Karanpura	400 KV GIS Bays extension at Chandwa Agency: Hyosung	02 Nos 400kV GIS Bays for Northkaranpura at Chandwa			Sep'17	15				~~**Jun'20**~~	**GIS bays ready.** CEA Clearance received. **Decision on DOCO pending completion of TBCB line.** (uncertain).
5	North Karanpura	400 KV Bays extension at Gaya Agency: GE Sch Compln: Jan'19	02 Nos 400kV AIS Bays for Northkaranpura at Gaya			Sep'19	10				~~**Jun'20**~~	**GIS bays ready.** CEA Clearance received. **Decision on DOCO pending completion of TBCB line.** (uncertain).
Total (ER-I)				**0**	**0**		**90**					
TBCB												
	Target :Q1 (April'20 to June'20)											
1	ERSS-XVIII	Ranchi- M'pur 765kV D/C Agency: M/s L&T Sch Coml: Dec'19	ER-I portion of Ranchi Mednipur T/L		238	Jul'20	300	Nil	Nil	0.9/ 02	~~**Jun'20**~~ **Oct'20**	**Work in progress. Diversion of line in process to avoid the felling of 03 Nos Sarna Tree (Puja Tree) in the section 15/0-16/0.**
2	ERSS-XXI	LILO of both circuits of Nabinagar-II – Gaya 400kV D/C (Q Moose) line at Chandauti (New) Agency: M/s TPL Sch Coml: Apr'20	LILO of both circuits of Nabinagar-II – Gaya 400kV D/C (Q Moose) line at Chandauti (New)		7	Mar'21	9	Nil	Nil	Nil	**Jun,20**	**LILO of Nabinagar - Gaya Line at Chandauti has been charged 1st time upto Dead Tower on 24.06.20, through cross Jumpering Nabinagar- Gaya line charged via LILO line as contigency measure.**
3	ERSS-XXI	400/220/132kV Chandauti (New) Agency: M/s ABB Sch Coml: Mar'20	2x500MVA 400/220kV ICT and 2x200MVA 220/132kV ICT with 2x125MVAR B/R	1900		Mar'21	152				~~**Jun'20**~~ **Nov'20**	**Work in progress. Progress affected due to heavy rain.**
	Sub total of Q-I			**1900**	**245**		**460**					

Sl. No.	Name of the Project	Name of the Trans line/ Substation/ Extn.	Scope	MVA addition	Length (CKM)	IA/ RCE Sch.	Indic. Cap. Cost	Balance work/ Gang			Target Completion	Remarks/ Critical Issues
								Fdn (Nos)	TE (Nos)	Stgg (Km)		
4	ERSS-XXI	400/220/132 KV Sitamarhi (New) Agency: M/s KEC Sch Compl: Feb'20	2x500MVA 400/220kV ICT and 2x200MVA 220/132kV ICT with 2x125MVAR B/R	1400		Jan'21	146				**Nov'20**	**Work in progress. Progress affected due to heavy rain on almost daily basis.**
5	ERSS-XXI	400 KV D/C Sitamarhi-Motihari (Triple Snowbird) Agency:M/s TPL Sch Compl:Apr'20	400 KV D/C Sitamarhi-Motihari (Triple Snowbird)		171.2	Jan'21	130	Nil	02/ 01	19/ 03	**Nov'20**	**Work in progress. Progress affected due to heavy rain on almost daily basis.**
6	ERSS-XXI	400/132 KV Motihari S/S (Extn.) Agency:M/s KEC Sch Compl:Apr'20	1x315 MVA 400/132 KV ICT	315		Jan'21	46				**Nov'20**	**Work in progress. Progress affected due to heavy rain on almost daily basis.**
7	ERSS-XXI	400 KV D/C Sitamarhi-Darbhanga (Triple Snowbird) Agency:M/s TPL Sch Compl:Apr'20	400 KV D/C Sitamarhi-Darbhanga (Triple Snowbird)		158	Jan'21	119	Nil	16/ 02	30/ 02	**Dec'20**	**Work in progress. Progress affected due to heavy rain and flood.**
8	ERSS-XXI	400/220 KV Darbhanga S/S(Extn) Agency:M/s KEC Sch Compl:Apr'20	400 &220 KV Line Bays			Jan'21	18				**Dec'20**	**Work in progress. Progress affected due to heavy rain.**
	Sub total of Q-III			**1715**	**329**		**459**					
	Target :Q-IV (Jan'21 to Mar'21) (Best Effort)											
9	ERSS-XXI	LILO of both circuits of 400 KV D/C Kishanganj-Patna(Q Moose) at Saharsa(New) Agency:M/s TPL Sch Compl:Apr'20	LILO of both circuits of 400 KV D/C Kishanganj-Patna(Q Moose) at Saharsa(New)		150	Mar'21	151	46 /02	58/ 00	39/ 00	**Mar'21**	**Slow progress due to heavy rain and flood.**
10	ERSS-XXI	400/220/132kV Saharsa (New) Agency: M/s ABB Sch Coml: Mar'20	2x500MVA 400/220kV ICT and 2x200MVA 220/132kV ICT with 2x125MVAR B/R	1400		Mar'21	131				**Mar'21**	**Work in progress. Progress affected due to heavy rain on daily basis.**
	Sub total of QIV			**1400**	**150**		**282**					
	Sub total of TBCB			**5015**	**724**		**1201**					

ANNEXURE XXIII

IMPORTANT MEETING HELD DURING 2019-20

A. **ERPC MEETING**

Sl No	Description	Date	Venue
1.	41st ERPC Meeting	27.08.2019	Kochi
2.	42nd ERPC Meeting	13.12.2019	Port Blair, A& N Islands

B. **TCC MEETING**

1.	41st TCC Meeting	26.08.2019	Kochi
2.	42nd TCC Meeting	12.12.2019	Port Blair, A& N Islands

C. **OPERATION COORDINATION SUB-COMMITTEE (OCC) MEETINGS**

1.	156th OCC Meeting	25.04.2019	Kahalgaon STPS
2.	157th OCC Meeting	20.05.2019	ERPC, Kolkata
3.	158th OCC Meeting	27.06.2019	Bakreswar TPP
4.	159th OCC Meeting	19.07.2019	ERPC, Kolkata
5.	160th OCC Meeting	09.08.2019	ERPC, Kolkata
6.	161st OCC Meeting	20.09.2019	Barh STPS, NTPC
7.	162nd OCC Meeting	22.10.2019	ERPC, Kolkata
8.	163rd OCC Meeting	15.11.2019	Pride Ananya Resort, Puri
9.	164th OCC Meeting	23.12.2019	ERPC, Kolkata
10.	165th OCC Meeting	22.01.2020	ERPC, Kolkata
11.	166th OCC Meeting	20.02.2020	Bhubaneshwar
12.	167th OCC Meeting	16.03.2020	ERPC, Kolkata

D. **COMMERCIAL SUB-COMMITTEE (CC) MEETINGS**

1.	40th CCM	02.07.2019	ERPC, Kolkata
2.	41st Commercial Committee Meeting	27.11.2019	ERPC, Kolkata
3.	42nd CC Meeting	25.02.2020	ERPC, Kolkata

E. **PROTECTION COORDINATION SUB-COMMITTEE (PCC) MEETINGS**

1.	78th PCC Meeting	22.04.2019	ERPC, Kolkata
2.	79th PCC Meeting	21.05.2019	ERPC, Kolkata
3.	80th PCC Meeting	25.06.2019	ERPC, Kolkata
4.	81st PCC Meeting	18.07.2019	ERPC, Kolkata
5.	82nd PCC Meeting	19.08.2019	ERPC, Kolkata
6.	83rd PCC Meeting	27.09.2019	ERPC, Kolkata
7.	84th PCC Meeting	23.10.2019	ERPC, Kolkata
8.	85th PCC Meeting	19.11.2019	ERPC, Kolkata
9.	86th PCC Meeting	18.12.2019	ERPC, Kolkata
10.	87th PCC Meeting	21.01.2020	ERPC, Kolkata
11.	88th PCC Meeting	18.02.2020	ERPC, Kolkata
12.	89th PCC Meeting	13.03.2020	ERPC, Kolkata

F. **LOAD GENERATION BALANCEC REPORT MEETING**

1.	LGBR Meeting	06.12.2019	ERPC, Kolkata

G. **SPECIAL MEETINGS**

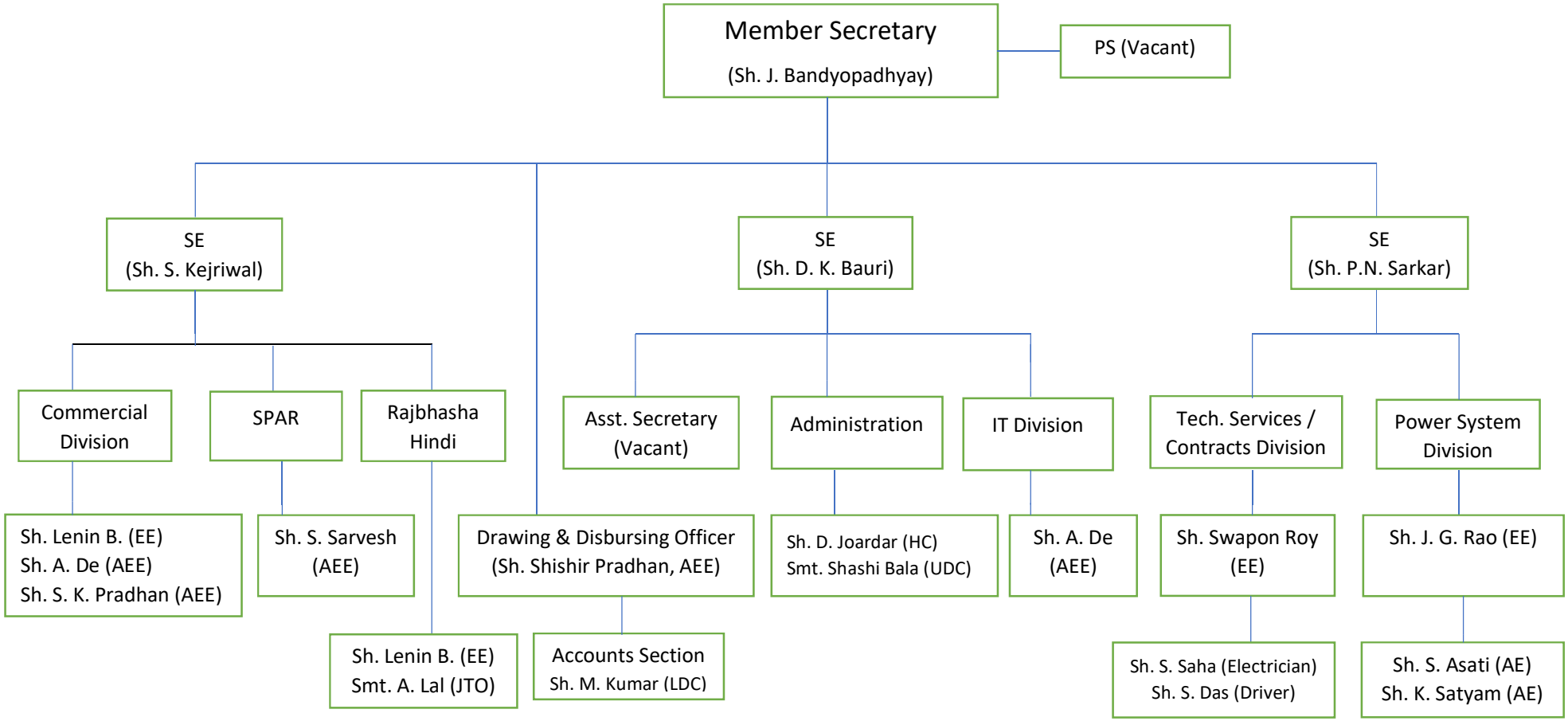
Sl No	Description	Date	Venue
1.	Meeting on Shutdown of Unit – V of FSTPS	02.04.2019	WBSEDCL, Kolkata
2.	ISO Meeting	05.04.2019	ERPC, Kolkata
3.	Meeting on Durgapur BUS Splitting	08.04.2019	ERPC, Kolkata
4.	Meeting of Study Group Committee on 3rd 315 MVA 400/220kV at Durgapur S/s	10.04.2019	ERPC, Kolkata
5.	SCADA Meeting	24.04.2019	ERLDC, Kolkata
6.	ISO Meeting	01.05.2019	ERPC, Kolkata
7.	Meeting on Mangdechhu Power	08.05.2019	ERPC, Kolkata
8.	OCC Shutdown meeting	15.05.2019	ERLDC, Kolkata
9.	Meeting with PGCIL & TPTCL on certification of Tr.	21.05.2019	ERPC, Kolkata
10.	Hindi Meeting	24.05.2019	ERPC, Kolkata
11.	Workshop on AGC	31.05.2019	ERPC, Kolkata
12.	Validation Committee Meeting at ERLDC	31.05.2019	ERLDC, Kolkata
13.	3rd Special SCADA Meeting	07.06.2019	ERLDC, Kolkata
14.	Meeting with CPWD	11.06.2019	ERLDC, Kolkata
15.	Monthly ISO Review Meeting	11.06.2019	ERPC, Kolkata
16	Meeting with CERC	24.06.2019	CERC, New Delhi
17.	7th SSCM	01.07.2019	ERPC, Kolkata
18.	2nd ERSCT Meeting	05.07.2019	Siliguri
19.	Special Meeting on Low Voltage issue in WB System	08.07.2019	ERPC, Kolkata
20	Monthly ISO Review Meeting	08.07.2019	ERPC, Kolkata
21.	Meeting on OPGC Issue	16.07.2019	ERPC, Kolkata
22.	Meeting on OCC Shutdown	17.07.2019	ERLDC, Kolkata
23.	Training for Power System Engineers	22.07.2019 to 26.07.2019	AIPM, Kolkata
24.	Meeting with CPWD	29.07.2019	ERPC, Kolkata
25.	4th Special SCADA Meeting	31.07.2019	ERLDC, Kolkata
26.	Meeting on Nabinagar Issues	02.08.2019	ERPC, Kolkata
27.	Meeting with Transmission Licensees	02.08.2019	ERPC, Kolkata
28.	OCC Shutdown Meeting	08.08.2019	ERLDC, Kolkata
29.	Special Meeting on S/d of 400 kV Farakka -Gokarno Line II	08.08.2019	ERPC, Kolkata
30.	Meeting with CPWD	09.08.2019	ERPC, Kolkata
31.	2nd Meeting on S/d of 400 kV Farakka - Gokarno Line II	14.08.2019	ERPC, Kolkata
32.	Meeting taken by Hon'ble Minister-in-charge of Power &NES,Govt. of West Bengalon Action plan for uninterrupted power supply to consumers and supply of coal to Thermal power Station during the ensuing puja festival,2019	20.08.2019	WBSEDCL,Vidyut Bhawan, Saltlake Kolkata.
33.	Simulator Training	02.09.2019 to 06.09.2019	BkTPS, WBPDCL
34.	Special Meeting on Connection of U#4 (660 MW) of OPGC to STU N/W of Odisha	05.09.2019	ERPC, Kolkata

Sl No	Description	Date	Venue
35.	Celebration of Hindi week	13.09.2019 to 19.09.2019	ERPC, Kolkata
36.	OCC Shutdown Meeting	16.09.2019	ERLDC, Kolkata
37.	Meeting on Coal Issues	18.09.2019	ERPC, Kolkata
38.	Special Meeting on Mangdechu HEP	25.09.2019	ERPC, Kolkata
39.	Meeting with CPWD	26.09.2019	ERPC, Kolkata
40.	Hindi Workshop	30.09.2019	ERPC, Kolkata
41.	OCC Shutdown Meeting	18.10.2019	ERLDC, Kolkata
42.	Meeting with NPTI	21.10.2019	ERPC, Kolkata
43.	TeST Meeting of ERPC	24.10.2019	ERPC, Kolkata
44.	1st U-NMS Meeting	24.10.2019	ERPC, Kolkata
Sl No	Description	Date	Venue
45.	2nd OPGW Provisioning Technical Committee Meeting	24.10.2019	ERPC, Kolkata
46.	3rd Committee Mtg. on Tr. Availability	24.10.2019	ERPC, Kolkata
47.	Meeting related to shutdown of ICT at Maithon	25.10.2019	ERPC, Kolkata
48.	Meeting on NVVN Issue	07.11.2019	ERPC, Kolkata
49.	OCC Shutdown Meeting	13.11.2019	ERLDC, Kolkata
50.	Training Programme for Power System Engineers of ER Constituents	18.11.2019 to 22.11.2019	AIPM, Kolkata
51.	Meeting on OPGC Issue	20.11.2019	ERPC, Kolkata
52.	2nd TeST Meeting of ERPC	26.11.2019	ERPC, Kolkata
53.	Review Meeting for National Conference	29.11.2019	NPTI, Durgapur
54.	Hindi Committee Meeting	29.11.2019	ERPC, Kolkata
55.	Meeting with Transmission Licensee	04.12.2019	ERPC, Kolkata
56.	Hindi Workshop	09.12.2019	ERPC, Kolkata
57.	Meeting with CPWD	10.12.2019	ERPC, Kolkata
58.	Meeting with AIPM	10.12.2019	ERPC, Kolkata
59.	8th State Standing Committee Meeting	19.12.2019	ERPC, Kolkata
60.	OCC Shutdown Meeting	19.12.2019	ERPC, Kolkata
61.	3rd TeST Meeting	20.12.2019	ERPC, Kolkata
62.	Workshop on Draft CERC Regulations, 2019	30.12.2019	ERPC, Kolkata
63.	Meeting with PWC	02.01.2020	ERPC, Kolkata
64.	Hindi Kavi Sammelan	03.01.2020	ERPC, Kolkata
65.	National Conference on Future Scenario and Challenges of Indian Power Sector	09.01.2020 to 10.01.2020	Hotel Vivanta, Kolkata
66.	Training Programme for Power System Engineers of ER Constituents	13.01.2020 to 17.01.2020	AIPM, Kolkata
67.	OCC Shutdown Meeting	20.01.2020	ERLDC, Kolkata
68.	Meeting with AIPM	20.01.2020	ERPC, Kolkata
69.	Meeting with PTC	21.01.2020	ERPC, Kolkata
70.	Special Meeting on "Restoration of important transmission lines under long outage in ER"	24.01.2020	Powergrid ER – I, Patna
71.	Meeting with DMTCL	27.01.2020	ERPC, Kolkata
72.	Training on Disturbance Analysis using PSCT Software	27.01.2020 to 29.01.2020	ERPC, Kolkata
73.	4th TeST Meeting of ERPC	31.01.2020	ERPC, Kolkata
74.	Meeting with CPWD	31.01.2020	ERPC, Kolkata

Sl No	Description	Date	Venue
75.	Meeting on Jaldhaka Issues	03.02.2020	ERPC, Kolkata
76.	Workshop on "Draft Electricity Grid Code (IEGC), 2020	13.02.2020	ERPC, Kolkata
77.	OCC Shutdown Meeting	17.02.2020	ERLDC, Kolkata
78.	Special-Meeting-on-220KV-Bolangir-Katapalli-Metering-issue	19.02.2020	ERPC, Kolkata
79.	5th TeST Meeting	24.02.2020	ERPC, Kolkata
80.	Special. Meeting on Shutdown of 220 kV Bus at 400/220/132 kV Rangpo S/stn.	26.02.2020	ERPC, Kolkata
81.	Hindi Kavi Sammelan	27.02.2020	ERPC, Kolkata
82.	Meeting with CPWD	28.02.2020	ERPC, Kolkata
83.	Blood Donation Camp	28.02.2020	ERPC, Kolkata
84.	Special Meeting to review methodology of Reactive Energy Accounting	04.03.2020	ERPC,Kolkata
85.	Training Programme for Power System Engineers of ER Constituents	02.03.2020 to 06.03.2020	AIPM, Kolkata
86.	Special-Meeting-on-shut down of 400KV-Nabinagar-Sasaram	12.03.2020	ERPC, Kolkata
87	OCC Shutdown Meeting	12.03.2020	ERLDC, Kolkata
88.	Meeting on tripping of 400 Kv D/C Kisanganj-Darbhanga	13.03.2020	ERPC,Kolkata

EXHIBIT - I

Organisation Chart of ERPC Secretariat, Kolkata
(As on 31.03.2020)



POWER MAP OF EASTERN REGION

पूर्वी क्षेत्रीय विद्युत समिति
प्रगति के पथ को रोशन

NEPAL
BHUTAN
SIKKIM
BNC
TO AGRA
ASSAM
BANGLADESH
UTTAR PRADESH
BIHAR
JHARKHAND
WEST BENGAL
DVC
ODISHA
CHATTISGARH
ANDHRA PRADESH
BAY OF BENGAL

1--Tashiding
2 X 48 MW

Dhalkebar
GORAKHPUR
GOPALGUNJ
MTPS (610MW)
MUZAFARPUR
DARBHANGA
Laukahi
MUSOURI
HAZIPUR
MOTIPUR
DARBHANGA
MOTIHARI
UJIYRPUR
Amnour
KHAGAUL
BARH 2 X 660 MW
BEGUSARAI
Khagaria New
FATUAH
BTPS (o)
Mokama
BALIA
VARANASI
ARAH
PATNA
SIPARA
N. SASARAM
SASARAM
ALLAHBAD
SAHUPURI
FATHEPUR
BIHARSHARIFF
N.sheikhpura
BANKA
LAKHISARAI
BSF (B)
DEHRI
BODHGAYA
GAYA
Khizirsarai
Nawada
Nabinagar
Nabinagar 3 X 250 MW
N. SONENAGAR
NPGC (1X660 MW)
MADHEPURA
KISHANGANJ (B)
KISHANGANJ
N.PURNEA
PURNEA (old)
N.Jamalpur
N.sabor
KAHALGAON B (3X500MW)
KAHALGAON A (4X210MW)
MALDA
Gazole
LALMATIA
Godda
FARAKKA (2100MW)
DALKHOLA (WB)
DALKHOLA (PG)
TEESTA III 6X 200 MW
DIKCHU 2 X 48 MW
JLHEP 2 X 48 MW
TEESTA-V (510MW)
N. Melli
RANGPO
TALA HPS (1020MW)
CHUKHA HPS (336MW)
SEMTOKA
BASOCHU (2 x 12MW)
RURICHU (2 x20 MW)
Punastangchu
Mangdechu (6 x180 MW)
TLDP III 4 X 33 MW
TLDP IV 2 X 40 MW
MALBASE
S. GAON
DAGHACHU
2 x 63 MW
TSIRANG
JIGMELING
BINAGURI
SHILIGURI
NJP (WB)
BIRPARA
ALIPURDUAR PG
ALIPURDUAR WB
BONGAIGAON
SALAKATI
GARWHA
CHANDAWA
Daltongunj PG
Lathehar
Daltongunj
Lohardanga
TVNL (420MW)
PTPS
KODARMA (2x 500MW)
GIRIDIH (J)
GIRIDIH (D)
MPL (2x525 MW)
MAITHON B
MAITHON A
Govindpur (J)
DHANBAD
ESC
CTPS B (2X250 MW)
BOKARO
CTPS (500MW)
RAMGARH
BTPS (210 MW)
MEJIA B (2X500 MW)
DSTPS (2X500 MW)
MEJIA (4X210 MW+2*250)
RTPS (2X600 MW)
HATIA (N)
RANCHI
N RANCHI
CHANDIL
STPS (500MW)
ASANSOL
BARJORA
WARIA (210 MW)
DPL (300 MW)
IISCO
B'PUR
M'PARA
TAMLA
PANSKURA
DURGAPUR A
DURGAPUR B
BIDHANNAGAR
JK NAGAR
N.BISHNUPUR
HURA
PPSP (900MW)
N.PPSP
DHARMJAYGARH
SIPAT
ROURKELA
CHAIBASA (J)
JSDPR (DVC)
R'PUR
APRNL) (2X270MW)
JAMSHEDPUR
CHAIBASA
TISCO
RSP
RAIGARH
RAIPUR
KORBA
IBEUL (350MW)
TARKERA
BONAI
CHANDIPOSH
Dadripali (1X800 MW)
Aditya Al
JHARSHUGUDA
VEDANTA (1215MW)
BARKOT
OPGC (2X660 MW)
SPS
BHUSAN STL (410MW)
BUDIPATAR SEL (2400MW)
Basundhara
IB VALLEY (420MW)
LAPANGA
KATAPALLI
Bargarh
BOLANGIR
BOLANGIR (PG)
JSPL (270MW)
BSL
TSTPP (3000MW)
TTPS (240MW)
NALCO (1200MW)
M'MUNDALI (3x350MW)
GMR
ANGUL
JITPL (2x600MW)
Narsinghapur
INDRAVATI
UPPER INDRAVATI (600MW)
THERUBALI
LAXMIPUR
JEYPORE
JEYNAGAR
KOLAR
UPPER KOLAB (320MW)
BALIMELA (510MW)
Malkangiri
U-SILLERU
GAZUWAKA
SRIKAKULAM
RENGALI
RENGALI PH (225MW)
NINL
BALASORE
BHADRAK
TSL
DUBURI
DUBURI (N)
PARADEEP
IOCL
ESSAR STEEL
Goda
RO'HIT
JSL (250MW)
MINL (30MW)
VISA (50MW)
CHANDKA B
CHANDKA
MEHNDASAL
BIDANASI
Cuttack
Info city
NAYAGARH
ATRI
PANDIABILI
Samangara
NARENDRAPUR
BARIPADA
JODA
JINDAL
KEONJHAR (O)
KEONJHAR
DUMKA
Jasidhi
SAGARDIGHI (600MW)
GOKARNA
Sadaipur
BKTPP (1050MW)
Rejinagar
BEHRAMPUR
KRISHNANAGAR
BHERAMARA (2x 500MW)
ISHURDI
KHULNA
SATGACHIA
DHARAMPUR
JEERAT
RISHRA
ARAMBAG
DOMJUR
F. Park
Barasat
N.Coshi pur
CHANDITALA
RAJARHAT
HOWRAH
PRINCEP ST
KASBA
N.TOWN
Bantala
EM-BYPASS
EM-South
MIDNAPORE
KOLAGHAT (1260MW)
V. PARK
SUBHASGRAM (PG)
SUBHASGRAM (WB)
LAKHIKANTAPUR
KHARAGPUR
BUDGEBUDGE (750MW)
IPCL (3x150MW)
HALDIA (2x300MW)
EGRA
N.HALDIA

Eastern Regional Power Committee
Transmission Network of ER (220kV & Above)

765 KV S/S
400 KV S/S
220KV S/S
400 KV S/S State
400KV LINE charged at 220 kV
HVDC S/S
STATCOM
765KV LINE
400KV LINE
220KV LINE
HVDC LINE
THERMAL PS
HYDRO PS
Bus Section Open
Isolator Open
T-Connection

[Updated till Oct,20