File No.CEA-CH-14-12/1/2021-Coordination Division /77/164

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
समन्वय प्रभाग /Coordination Division
*****

विषय:- केंद्रीय विद्युत प्राधिकरण की वर्ष 2020-21 की वार्षिक रिपोर्ट ।

केंद्रीय विद्युत प्राधिकरण की वर्ष 2020-21 की वार्षिक रिपोर्ट आपकी जानकारी हेतु संलग्न है।

संलग्नक : ऊपरोक्त अनुसार

भवदीय

31/12/2021

(एम एम धकाते)
मुख्य अभियंता

प्रति:

संलग्न सूची के अनुसार (ईमेल के माध्यम से)।

Email Addresses List:

File No.CEA-CH-14-12/1/2021-Coordination Division

a)

1. Secretary, Ministry of Power
2. Additional Secretary & Financial Advisor, Ministry of Power
3. Additional Secretary(Hydro, Distribution and Vigilance), Ministry of Power
4. Additional Secretary(Thermal, Transmission, IC, DVC, UMPP, IPP and Fuel Supply), Ministry of Power
5. Economic Advisor, Ministry of Power
6. Joint Secretary(Coordination, Parliament, Hydro, Admin, Public Grievance, RTI, Reservation), Ministry of Power
7. Joint Secretary(IT & Cyber Security Wing, Distribution), Ministry of Power
8. Joint Secretary(Transmission, OM, R&R), Ministry of Power
9. Chief Engineer(Thermal), Ministry of Power

b)

1. Chairperson, CEA
2. All Members, CEA
3. Principal Chief Engineers (PCE-I & PCE-II), CEA
4. All Chief Engineers, CEA,
5. Member Secretary, RPCs
6. Secretary, CEA
7. Economic Advisor, CEA
8. Dy. DG (St), CEA
9. Director, (Adm.), CEA
10. Library Room, CEA

c)

1. Chairman and Managing Director, NTPC
2. Chairman and Managing Director, NHPC
3. Chairman and Managing Director, PGCIL
4. Chairman and Managing Director, PFC
5. Chairman and Managing Director, THDC
6. Director General, NPTI
7. Director General, BEE

CEA
ANNUAL REPORT
2020-21

CENTRAL ELECTRICITY AUTHORITY
MINISTRY OF POWER
GOVERNMENT OF INDIA

THE AUTHORITY
(As on 31.03.2021)

Sh. Prakash Mhaske
Chairperson &
Addl. Charge of Member (Power System)

Sh.Sandesh Kumar Sharma
Member (Planning)

Sh. Dinesh Chandra
Member (Hydro)

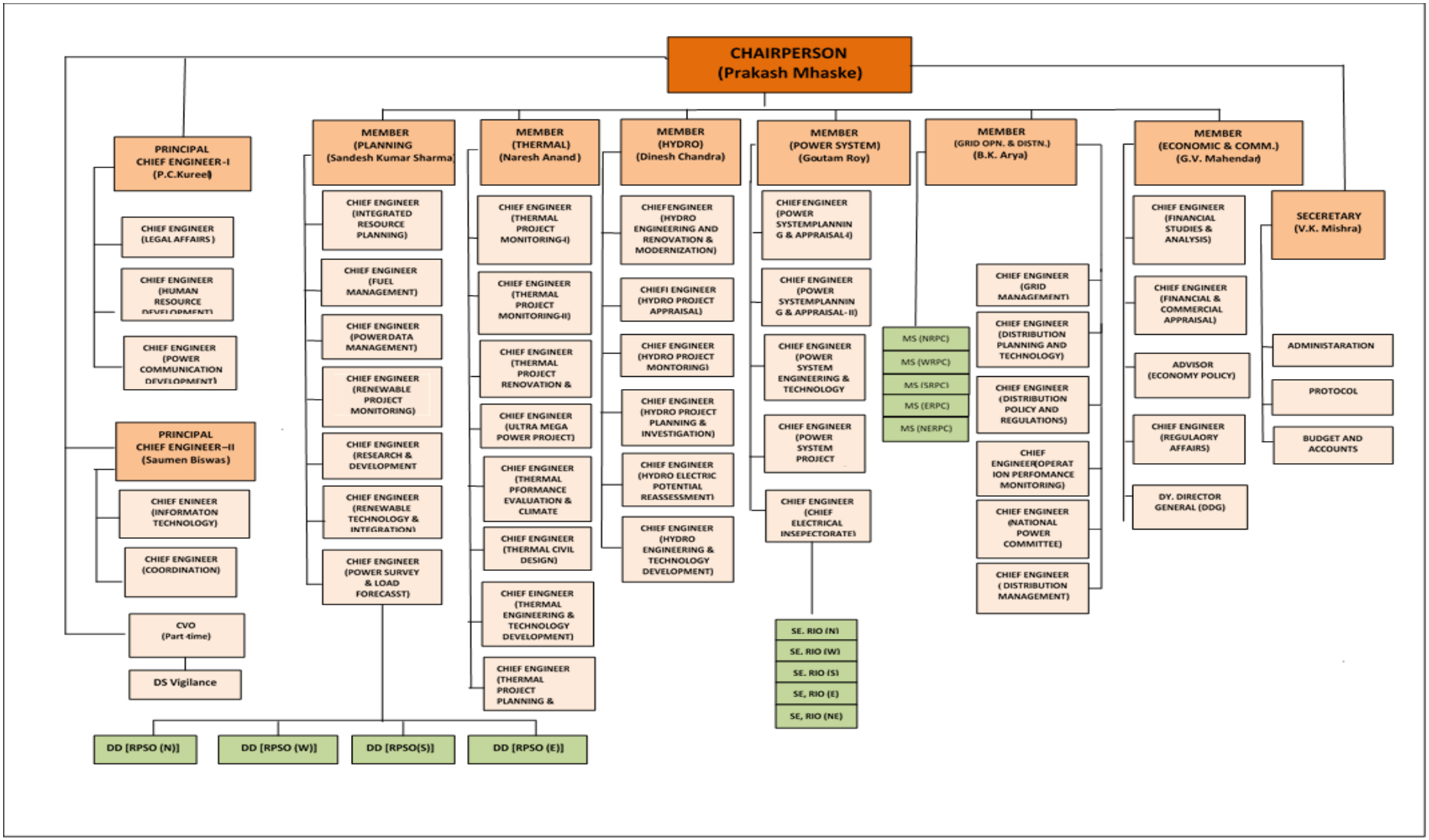
Sh. G.V. Mahendar
Member (E&C)

Sh. Goutam Roy
Member (Power System)

 **Sh. B.K. Arya** Member (GO&D)	 **Sh. Naresh Anand** Member(Thermal)

****

ORGANIZATION CHART OF CEA
(As on 31.03.2021)



CENTRAL ELECTRICITY AUTHORITY
Sewa Bhawan, R.K. Puram, New Delhi – 110066
CEA Website: www.cea.nic.in

Sub ordinate Offices:

Regional Power Committee Secretariat:

1. **Member Secretary, Eastern Regional Power Committee,** 14 Golf Club Road, Tollygunge, Kolkata – 700033.
2. **Member Secretary**, **Northern Regional Power Committee,** 18-A, Shaheed Jeet Singh Marg, New Delhi – 110016.
3. **Member Secretary**, **Southern Regional Power Committee,** 29 Race Course Cross Road, Near Anand Rao Circle, Bangaluru – 560009.
4. **Member Secretary, Western Regional Power Committee,** Plot No. F-3, Opposite SEEPZ Complex, MIDC Area Marol, Andheri (East), Mumbai – 400093.
5. **Member Secretary**, **North-Eastern Regional Power Committee,** Meghalaya NERPC Complex, 3rd Floor, Dong Parmaw, Lapulang, Shillong-793006.

Regional Power Survey Offices (RPSOs):

1. **Dy. Director, Regional Power Survey Office (East),** Room No. 201, C.G.O. Complex, 'DF'- Block, Salt Lake City, Kolkata – 700064.
2. **Dy. Director, Regional Power Survey Office (North),** 224, 2nd Floor, Sewa Bhawan, R.K. Puram, New Delhi– 110066.
3. **Dy. Director, Regional Power Survey Office (South),** Post Box No. – 38, 6th Floor, 'F' – Wing, Kendriya Sadan, Koramamgala, Bangaluru – 560034.
4. **Dy. Director, Regional Power Survey Office (West),** 5th Floor, Plot No. F-3, Opposite SEEPZ Complex, MIDC Area Marol, Andheri (East), Mumbai – 400093.

Regional Inspectorial Organisations:

1. **Superintending Engineer, Regional Inspectorial Organisation (East),** 14 Golf Club Road, Tollygunge, Kolkata – 700033.
2. **Superintending Engineer, Regional Inspectorial Organisation (North),** 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi – 110016.
3. **Superintending Engineer, Regional Inspectorial Organisation (South),** Block-IV, Floor-III, Shastri Bhawan, Chennai – 600006.
4. **Superintending Engineer, Regional Inspectorial Organisation (West),** Ground Floor, WRPC Building, F-3, MIDC Area Marol, Andheri (East), Mumbai – 400093.
5. **Superintending Engineer, Regional Inspectorial Organisation (North-East),** NERPC Complex, 3rd Floor, Dong Parmaw, Lapulang, Shillong-793006.

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From the Chairperson

Electricity is one of the most vital component of infrastructure for the inclusive economic growth and development of the nation. The sustained growth with continuous transformation according to new challenges has been characteristic of Indian power sector. Central Electricity Authority (CEA) has played key role in this process since many decades. The journey of power sector on growth trajectory has continued in the year 2020-21 with focus on reliable, economic and quality power to all. CEA, as one of the apex technical organizations in the country, has been carrying out statutory functions including planning, specifying technical standards, facilitating timely completion of schemes and advising Central Government, State Governments, Electricity Regulatory Commissions as well as other stakeholders on technical matters to ensure sustainable power sector development.

It is our pleasure to bring out this Annual Report of CEA for the year 2020-21. The Report gives an insight into the organization structure, functions and activities of CEA highlighting the contributions made in the development of power sector in the country during the year 2020-21.

With the objective of developing environmentally susitainable power sector, CEA has carried out several activities including study on optimal generation capacity mix for the year 2029-30, planning of adequate transmission system for evacuation of RE power, testing of thermal power stations for flexibilisation , facilitating implementation of environmental norms through various study reports as well as monitoring of FGD installation, RE power generation monitoring, rendering techno- commercial advice for creation of coducive policies and plans facilitating large scale integration of RE power. Power sector being critical infrastructure, CEA has taken several steps like revision of "Disaster Management Plan" for the Power Sector in line with the National Disaster Management Plan 2019 and coordinating all the activities for cyber security of power sector. Towards the goal of financially viable and self dependent power sector, CEA has been playing active role in facilitating private sector participation in transmission through various committees, helping creation of infrastructure and establishment of policy/procedure for cross border transaction of electricity, promotion of make in India and Atm Nirbhar Bharat, preparation of various reports on financial & economic aspect of power sector , advice to Governemet and Regulatory Commissions on technical and commercial issues. CEA has also carried out various other activities to serve the power sector in different areas including R&D, man power development, hydro power development, power system operation, equipment & procedural standardization in power sector in the country, which are described in detail in this report.

I take this opportunity to express my deep appreciation for the committed efforts put in by the officers and staff of CEA in accomplishing the statutory functions, successfully for serving the nation. I am confident that CEA will continue to work with the same zeal, devotion and co-operation for development of the power sector in the country.

(Dinesh Chandra)
Chairperson, CEA

CHAPTER – 1

CEA AS AN ORGANIZATION

1.1 Organization of CEA

1.1.1 The Central Electricity Authority (CEA) is a statutory organization originally constituted under Section 3(1) of the repealed Electricity (Supply) Act, 1948 since substituted by Section 70 of the Electricity Act, 2003. It was established as a part- time body in the year 1951 and made a full- time body in the year 1975.

1.1.2 As per Section 70(3) of the Electricity Act, 2003, the Authority shall consist of not more than fourteen members (including its Chairperson) of whom not more than eight shall be full-time Members to be appointed by the Central Government.

1.1.3 CEA is headed by a Chairperson who as the Chief Executive of the Authority largely oversees the development of Power Sector in the country. A Secretary, appointed by the Authority with the approval of the Central Government under Section 72 of the Electricity Act 2003, assists the Chairperson in discharging of CEA's statutory functions. The Secretary also assists the Chairperson in all matters pertaining to administration and technical matters including concurrence of hydro power projects etc. There are six (6) Wings in CEA namely Planning, Hydro, Thermal, Grid Operation & Distribution, Economic & Commercial and Power System each headed by a Member of the Authority. Under each Member, there are technical Divisions, headed by an officer of the rank of Chief Engineer. At present, there are forty Divisions in CEA headquarter at New Delhi.

1.1.4 Sub-ordinate offices of CEA

There are 14 subordinate offices of CEA viz. five (5) Regional Inspectorial Organizations, four (4) Regional Power Survey Organizations and five (5) Regional Power Committees located in various parts of the country.

A) Regional Inspectorial Organization (RIO)

Under Chief Engineer (CEI) in Power System Wing, five (5) Regional Inspectorial Organization (RIO) offices, each headed by an officer of the rank of Superintending Engineer, function at New Delhi, Mumbai, Chennai, Kolkata and Shillong to inspect the HV/MV installations of the Central Government.

B) Regional Power Survey Organization (RPSO)

Four (4) Regional Power Survey Organisation (RPSO) offices, each headed by an officer of the rank of Deputy Director, function at New Delhi, Mumbai, Bangalore and Kolkata under Chief Engineer (PS&LF) in the Planning Wing to carry out surveys to forecast the demand of power in their respective regions.

C) Regional Power Committees (RPCs)

Secretariat of all Five (5) Regional Power Committees (RPCs), each headed by a Member Secretary, an officer of the rank of the Chief Engineer, are functioning at New Delhi, Mumbai, Bangalore, Kolkata and Shillong to facilitate the integrated operation of the Regional Electricity Grids.

1.2 Functions of CEA

The functions and duties of the Authority are delineated under Section 73 of the Electricity Act, 2003. Besides, CEA has to discharge various other functions as well under Sections 3, 8, 34, 53, 55 and 177 of the Act.

Section 73 - Functions and Duties of the Authority

(a) advise the Central Government on the matters relating to the national electricity policy, formulate short- term and perspective plans for development of the electricity system and coordinate the activities of the planning agencies for the optimal utilization of resources to subserve the interests of the national economy and to provide reliable and affordable electricity to all consumers;

(b) specify the technical standards for construction of electrical plants, electric lines and connectivity to the grid;

(c) specify the safety requirements for construction, operation and maintenance of electrical plants and electric lines;

(d) specify the Grid Standards for operation and maintenance of transmission lines;

(e) specify the conditions for installation of meters for transmission and supply of electricity;

(f) promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system;

(g) promote measures for advancing the skills of persons engaged in electricity industry;

(h) advise the Central Government on any matter on which its advice is sought or make recommendation to that Government on any matter if,in the opinion of the Authority, the recommendation would help in improving the generation, transmission, trading, distribution and utilization of electricity;

(i) collect and record the data concerning the generation, transmission, trading, distribution and utilization of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters;

(j) make public from time to time the information secured under this Act, and provide for the publication of reports and investigations;

(k) promote research in matters affecting the generation, transmission, distribution and trading of electricity;

(l) carry out, or cause to be carried out, any investigation for the purpose of generating or transmitting or distributing electricity;

(m) advise any State Government, licensees or the generating companies on such matters which shall enable them to operate and maintain the electricity system under their ownership or control in an improved manner and where necessary, in coordination with any other Government, licensee or the generating company owning or having the control of another electricity system;

(n) advise the Appropriate Government and the Appropriate Commission on all technical matters relating to generation, transmission and distribution of electricity; and

(o) Discharge such other functions as may be provided under this Act.

In addition to above functions and duties, CEA has to perform the following functions in terms of the under mentioned Sections of the

Electricity Act, 2003: -

Section 3 - National Electricity Policy and Plan

(1) The Central Government shall, from time to time, prepare the National Electricity Policy and Tariff Policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

(2) The Central Government shall publish the National Electricity Policy and Tariff Policy from time to time.

(3) The Central Government may, from time to time, in consultation with the State Governments and the Authority, review or revise the National Electricity Policy and Tariff Policy referred to in sub-section (1).

(4) The Authority shall prepare a National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five years.

PROVIDED that the Authority while preparing the National Electricity Plan shall publish the draft National Electricity Plan and invite suggestions and objections thereon from licensees, generating companies and the public within such time as may be prescribed;

PROVIDED FURTHER that the Authority shall –

(a) notify the plan after obtaining the approval of the Central Government;

(b) revise the plan incorporating therein directions, if any, given by the Govt. while granting approval under clause (a).

(5) The Authority may review or revise the National Electricity Plan in accordance with the National Electricity Policy.

Section 8 - Hydro-Electric Generation

(1) Notwithstanding anything contained in Section 7, any generating company intending to set up a hydro-generating station shall prepare and submit to the Authority for its concurrence, a scheme estimated to involve a capital expenditure exceeding such sum, as may be fixed by the Central Government, from time- to time, by notification**.**

(2) The Authority shall, before concurring in any scheme submitted to it under sub-section (1) have particular regard to, whether or not in its opinion:-

(a) the proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood- control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river- works;

(b) the proposed scheme meets, the norms regarding dam design and safety.

(3) Where a multi-purpose scheme for the development of any river in any region is in operation, the State Government and the generating company shall co-ordinate their activities with the activities of the person responsible for such scheme insofar as they are inter-related.

Section 34 – Grid Standards

Every transmission licensee shall comply with such technical standards, of operation and maintenance of transmission lines, in accordance with the Grid Standards, as may be specified by the Authority.

Section 53 Provision relating to Safety and Electricity Supply

The Authority may, in consultation with the State Governments, specify suitable measures for-

(a)protecting the public (including the person engaged in the generation, transmission or distribution or trading) from dangers arising from the generation, transmission or distribution or trading of electricity, or use of electricity supplied or installation, maintenance or use of any electric line or electrical plant;

(b)eliminating or reducing the risks of personal injury to any person, or damage to property of any person or interference with use of such property;

(c)prohibiting the supply or transmission of electricity except by means of a system which conforms to the specification as may be specified;

(d)giving notice in the specified form to the Appropriate Commission and the Electrical Inspector, of accidents and failures of supplies or transmission of electricity;

(e)keeping by a generating company or licensee the maps, plans and sections relating to supply or transmission of electricity;

(f)inspection of maps, plans and sections by any person authorized by it or by Electrical Inspector or by any person on payment of specified fee;

(g)specifying action to be taken in relation to any electric line or electrical plant, or any electrical appliance under the control of a consumer for the purpose of eliminating or reducing the risk of personal injury or damage to property or interference with its use.

Section 55 Use, etc. of Meters

(1) For proper accounting and audit in the generation, transmission and distribution or trading of electricity, the Authority may direct the installation of meters, by a generating company or licensee at such stages of generation, transmission or distribution or trading of electricity and at such locations of generation, transmission or distribution or trading, as it may deem necessary.

Section 177 Powers of Authority to make Regulations

(1)The Authority may, by notification, make regulations consistent with this Act and the rules generally to carry out the provisions of this Act.

(2)In particular and without prejudice to the generality of the power conferred in sub-section (1), such regulations may provide for all or any of the following matters, mainly: -

(a)the Grid Standards under section 34;

(b)suitable measures relating to safety and electricity supply under section 53;

(c)the installation and operation of meters under section 55;

(d)the rules of procedure for transaction of business under sub- section (9) of section 70;

(e)the technical standards for construction of electrical plants and electric lines and connectivity to the grid under clause (b) of

section 73;

(f)the form and manner in which and the time at which the State Government and licensees shall furnish statistics, returns or other information under section 74;

(g)any other matter which is to be, or may be, specified;

(3)All regulations made by the Authority under this Act shall be subject to the conditions of previous publication.

1.3 Broad Functional Areas of work of Chairperson and the Members of the Authority

Chairperson

Chairperson is the Chief Executive of the Authority.

Member (Planning)

Formulation of National Electricity Plan; integrated resource planning; coordinating the activities of planning agencies for optimization of resource utilization; formulation of short, medium and long term power plans; long and short term demand forecast and sensitivity studies; material and manpower planning; surveys for power demand growth; identification and testing of co-lateral parameters for economic model for demand forecasting; collection, compilation and publication of statistics of Power Sector; securitization of resources/fuel availability and fuel efficiency with the support of emerging technologies; modernization of project management; concepts of skill development; pro-active technology forecasting approaches; research and development in Power Sector, co-ordination with multiple agencies involved in research and development activities, coordination of fuel oil/liquid fuel supplies; coal quantity and quality control; development of renewable energy resources for electricity generation etc.

Member (Thermal)

Overall thermal power development in the country; updating, development and evaluation of thermal technologies; design and engineering of thermal projects; quality assurance standards and plans; preparation of model documents and standards; thermal projects investigation and ash utilization; coal, oil and gas linkages to power projects; energy conservation; energy auditing; environmental aspects of thermal projects; monitoring of construction and stabilization of thermal projects and suggesting remedial measures to problems involved; renovation, modernisation and life extension programmes of thermal generating stations; making operating norms for thermal generating stations, development of Ultra Mega Power Projects (UMPPs) etc.

Member (Hydro)

Overall hydro power development in the country; technical appraisal of hydro-electric projects; integrated planning for utilization of water resources; assessment of hydro potential; assistance to States on investigation and project report preparation; construction & investigation, monitoring of hydro projects and suggesting remedial measures to problems involved; updating, development and evaluation of hydro technologies; environmental aspects of hydro projects; quality assurance plans and standardization, design and engineering of hydro projects; renovation, modernization and up rating of hydro stations; co- operation with neighboring countries of Nepal, Bhutan and Myanmar for development of water resources for mutual benefits; etc.

Member (Power System)

Planning and development of transmission system consistent with national power plans; studies for the purpose of appraisal of transmission projects; transmission technology development; design and engineering; standardization and preparation of model document; renovation and modernization of transmission schemes; construction monitoring of transmission projects; coordination of telecommunication system and power lines; matters related to communication, data acquisition and software support in power sector; inspection of existing electrical installations in Union Territories and Central Government Departments; investigation of accidents on electrical installations and suggesting remedial measures for their minimization and prevention etc.

Member (Grid Operation & Distribution)

Formulation of policies for safe, secure and economic operation of regional grids; integrated operation, co-ordination of five regional grids through Regional Power Committees(RPCs); monitoring of delivery of shares from Central Sector projects; intra and inter-regional exchange of power; regional energy accounting; load generation balance; investigation of grid disturbances; matters related to distribution planning, policy and regulations; monitoring of rural electrification programme and distribution schemes of the Central Government; allmatters relating to power development in union territories; operation monitoring and performance review of thermal power stations; updating of maintenance procedures; generation data collection; performance analysis; maintenance monitoring etc.

Member (Economic & Commercial)

Economic evaluation of power policies and projects; appraisal of tariff for Nuclear Power Stations; analysis of financial packages; financial parameters; interest during construction and completed cost; performance of power sector utilities, Examination of Power Purchase Agreement, advice and legal matters, amendments in Electricity Act, 2003 National Electricity Policy, Tariff Policy and Electricity Rules, etc. National Electricity Policy, Tariff Policy and Electricity Rules, etc.

Secretary

The Secretary (CEA) appointed by the Authority with the approval of the Government of India, assists the Authority in discharge of CEA's statutory functions. The Secretary also assists the Chairperson (CEA) in all matters pertaining to administration and technical matters including techno-economic appraisal and concurrence of hydro power projects, planning of budget and expenditure control etc.

1.4 Personnel and Administration

1.4.1 Staff strength of CEA

The staff strength of CEA as on 31.03.2021 was 684 as against the sanctioned strength of 1286 leaving 602 posts vacant. The summarized position of staff strength is shown in the table below:

Category	Sanctioned Strength			Filled Strength		
	Head-Quarters	Sub-Office	Total	Head-Quarters	Sub-Office	Total Strength
Chairperson/Members	07	-	07	07	-	07
CPES GROUP-A	348	84	432	242	70	312
CPES GROUP-B	90	19	109	32	07	39
Non CPES Group						
Group-A	71	01	72	41	00	41
Group-B	252	38	290	88	09	97
Group-C	104	70	174	51	44	95
Group-C(MTS)	145	57	202	64	29	93
Total	**1017**	**269**	**1286**	**525**	**159**	**684**

1.4.2 No. of Women Employees in CEA

Category	No. of Govt. Employees		No. of Women employees In position	% age
	Sanctioned	Filled		
Chairperson/ Members	07	07	00	00
CPES GROUP-A	432	312	37	11.8%
CPES GROUP-B	109	37	02	5.4%
Non CPES Group				
Group-A	72	41	21	51.2%
Group-B	290	97	48	49.4%
Group-C	174	95	17	17.9%
Group-C(MTS)	202	93	9	9.6%
Total	**1286**	**681**	**134**	**19.6%**

1.4.3 Representation of Scheduled Castes, Scheduled Tribes, OBC & Physically Handicapped Employees

Category	No. of Govt. Employees		No. of SC Govt. employees in position	No. of ST Govt. employees in position	No. of OBC Govt. employees in position	No. of Phy. H. Govt. employees in position
	Sanctioned	Filled				
Chairperson	01	01	01	00	00	00
Member	06	05	03	00	01	00
CPES GROUP-A	432	312	57	21	51	04
CPES GROUP-B	109	37	03	02	03	01
Non CPES Group						
Group-A	72	41	07	04	00	01
Group-B	290	97	12	01	02	03

Group-C	174	95	20	05	23	03
Group-C(MTS)	202	93	40	04	13	03
Total	**1286**	**681**	**141**	**37**	**92**	**15**

1.4.4 Representation of Physically Handicapped employees

Group	**Total employees as on 31.03.2020**	**Physically Challenged Employees**				**Percentage of Physically Challenged**
		VH	HH	OH	Total	
Group A (CPES+NON-CPES)	353	00	01	04	05	1.41%
Group B	136	00	00	04	04	2.94%
Group C	95	01	00	02	03	3.15%
Group –C(MTS)	93	01	00	02	03	3.22%
Total	**677**	**02**	**01**	**12**	**15**	**4.43%**

1.5 Annual Budget

1.5.1 During the year 2020-21, budgetary allocation of Rs. 126.27 Crores (Revised Estimates) was made for CEA. Out of this, Rs. 98.58 Crores was allocated under Salary Head and Rs. 27.69 Crores under Non Salary Head. Against this, during the FY 2020-21 an expenditure of Rs. 93.38 Crores was booked under Salary Head and expenditure of Rs.21.00 Crores was booked under Non Salary Head upto 31.3.2021. The total expenditure incurred in respect of RE during the year was 99.59%.

1.5.2 Consultancy Services by CEA

CEA renders Consultancy Services for design and Engineering of thermal and hydro projects to various SEBs and power utilities. Bill raised by CEA towards consultancy services rendered to various Departments/ Organisations during the year 2020-21 and outstanding of previous years is Rs. 0.89 Crores.

1.6 Progressive use of Hindi in Official work of CEA

In pursuance of sub-rule 4 of rule 10 of the Official Language Rules, 1976 CEA was notified in the official Gazette of the Govt. of India and under the sub-rule 4 of rule 8, the officials having proficiency in Hindi were specified to do their entire officials works in Hindi.

1.6.1 Quarterly Meetings of Official Language Implementation Committee:

During the year following four meetings of Official Language Implementation Committee were held:

- 1st meeting - 5th Aug, 2020
- 2nd meeting - 4th Sep, 2020

- 3rd meeting - 24th Dec, 2020
- 4th meeting - 22nd Mar, 2021

During these meetings, action are taken for implementation of official language policy.

i. During the year all the work like noting, drafting, issuing office orders, letters etc. were done as per Section 3(3) of the Official Language Act in all Divisions/Sections.

ii. Efforts were also made to achieve target of Hindi Correspondence by all Divisions/Sections.

iii. All letters received in Hindi were answered to in Hindi only. Thus Rule 5 of the Official Language Rules, 1976 was complied with.

1.6.2. Letters sent in Hindi during the financial year 2020-21:

Quarterly percentage of Letters sent in Hindi during the year 2020-21 is as follows-

Quarter	Letters sent in Hindi (All Regions)	% of Hindi letters
1st	5858	91%
2nd	9076	93%
3rd	9682	93%
4th	10855	95%

1.6.3. During the year, following Reports/Documents were issued in bilingual form:

i) Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020
ii) Guidelines for Renovation & Modernisation/Life Extension works of Coal/Lignite based Thermal Power Stations.
iii) Guidelines for Preparation and Vetting of Revised Cost Estimates of Hydro Electric Projects of Central Power Sector Undertakings and other Hydro Electric Schemes funded by government of India in India and abroad.
iv) Annual report 2019-20

1.6.4. Hindi Pakhwada Celebration:

Hindi Pakhwada was organized in the Central Electricity Authority from 14/09/2020 to 28/09/2020 through G-meet adhering to COVID-19 safety guidelines. On **14.09.2020**, Hindi Pakhwada was inaugurated by the Chairperson, Central Electricity Authority. Many officers/ employees including all the Members, Secretary and Chief Engineers of CEA graced the occasion. Officers and employees of all Delhi based attached/subordinate offices of CEA also participated in this event. On this occasion, a workshop on *"Neeti se nahi neeyat se hi sambhav hai Rajbhasha ka Vikas''* was also organized. For this workshop, Dr. Ganga Prasad Sharma 'Gunashekhar', a renowned Hindi scholar, former Professor, Guangdong University, China, and former Professor Tehran University and LBS National Academy of Administration, Mussoorie was invited to share his views. 5 competitions, namely; Hindi Essay Writing, Hindi Noting and Drafting, Hindi Paragraph Writing (for MTS only), General Knowledge of Official Language Rules/Act and Hindi Language / Literature and Hindi Debate for Officers were organized through virtual mode. 50 officers and employees took part enthusiastically in these competitions.

Award distribution ceremony was celebrated on 28/09/2020. In this ceremony, 15 winners were given cash prizes. In addition to it 7 personnel who have done maximum noting and drafting work originally in Hindi during 2019-20 were also rewarded with Cash Prize under

the Annual Incentive Scheme. The Chairperson congratulated the officers/ employees who received awards/prize and appealed to other employees to do their maximum official work in Hindi. Apart from this, RPM Division and PDM Division were awarded "Chal Vaijayanti".

A poem recital session was also conducted on the concluding day of Hindi Pakhwada 2020. The Chairperson, CEA, all the Members, Secretary, Chief Engineers and Officers and staff of all the offices under CEA at Delhi joined through G-meet in this session. A poet of international fame and Russian Pushkin Award winner Dr. Budhinath Mishra, former literary editor Hindi Daily 'Aaj' and former Chief Manager, Rajbhasha, ONGC Dehradun, was invited to recite his poems. Dr. Mishra presented his classical compositions *'Chand'* and *'Ek baar Jaal aur Fek re Machhere'* apart from many of his other poems.

1.6.5. Conducting Hindi Workshops:

This office is regularly conducting Hindi Workshops for implementation of Official Language Policy. In order to minimize the difficulties faced by CEA officers and employees working in Hindi and to increase use of Hindi in the office, a series of Hindi Workshops on regular basis were organized during the year. Three such workshops were organized through G-Meet. Officers and employees, at large, actively participated in these workshops.

1.6.6. Inspection by Parliamentary Committee on Official Language:

The 2nd sub-committee of Parliamentary Committee on Official Language headed by Mrs Rita Bahuguna Joshi, MP Lok Sabha inspected this office on 10 Dec, 2020 to review the progress of use of Official language in CEA headquarters. The sub convener of the Committee Shri Sushil Kumar Gupta, MP appreciated the efforts of this office on implementation of OL Policy on many points, however he stressed upon achieving annual targets set by Dept of Official Language, Ministry of Home Affairs, Govt. of India. The office is putting all its efforts to achieve the same in near future.

1.7 Hiring of Consultants

CEA has acute shortage of technical manpower as well as non-technical staff and to cope up with this situation
13 Consultants were hired in CEA during the year 2020-21.

1.8 Welfare Activities in CEA

1.8.1 Welfare of SC /ST /OBC

Shri K.S.Babu, Director (IRP Division) has been designated as Liaison Officers in CEA to look after the welfare of SC/ST/OBC and PwD employees.

1.8.2 Activities related to Women employees

Women employees of CEA have been participating in various activities viz. sports, recreation & cultural activities.

An Internal Complaints Committee (ICC) has been constituted in CEA for handling the cases of Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal). The 7 member of ICC is headed by Smt. Vandana Singhal, Chief Engineer, CEA as Chairman includes Ms. Vibha Maurya, All India Democratic Women's Association as the independent member.

1.8.3 Recreation and Sports:

The employees of are actively participating in the Sports & Cultural Tournaments/ Competitions at All India Civil Services (A National Status), Inter Ministry and Inter CPSU levels every year regularly. For the year 2020-21, the following Sports Team/Individual of CEA are participated in the AICS/Inter-Ministry/ Inter-CPSU Tournaments and brings the laurels to CEA by winning the medals. The achievementsof these Sports/Individuals are as under:-

Badminton

Shri Ashwani Kumar, Section Officer(Welfare), CEA has been selected to represent the Central Secretariat Badminton Team in the All India Civil Service Badminton Tournament 2020-21 **(A National Status)** held at Tyagraj Stadium, New Delhi and brings the laurels to CEA by winning the Silver Medal in Men Team Championship.

Shri Ashwani Kumar has also been selected as Badminton Convenor by Central Civil Services Cultural & Sports Board, DoPT for the year 2019 to 2021.

Carrom

The CEA Carrom Team/individuals has been participated in the Inter-CPSU Carrom Tournament 2020-21 organised by REC held at Dehradun from 24-27 February, 2021 and won the following medals:

- Shri Sumeet Kumar, Dy. Director has won the Gold Medal in Men Singles Event.
- Shri Sumeet Kumar, DD/Shri Saurabh Parth Sarthi, AD-II won the Gold Medal in Men Doubles Event
- CEA Men Carrom Team has won the 2nd Runners-up Trophy in Men Team Championship.

The name of team members is as under:

1. Shri Sumeet Kumar, Deputy Director----------(Captain)
2. Shri Saurabh Parth Sarthi, AD-II
3. Shri Ajay Kumar Arya, Deputy Director
4. Shri Sanjeev Dhingra, PPS
5. Shri Girdhai Lal, Director
6. Shri Rohit Bisht, ASO
7. Shri Ramesh Kumar, ASO, ----------(Coach)
8. Shri Rajesh Kumar, Professional Assistant----------(Manager)

Chess

The CEA Chess Team/individuals has been participated in the Inter-CPSU Chess Tournament 2020-21 organized SJVN Ltd. held at Shimla w.e.f. 13-15 March, 2021and won the following medals:

- Shri Lalrinsanga, Deputy Director has won the **Silver Medal** in the Inter-CPSU Chess Tournament 2020-21 held at at Shimla from 13-15 March, 2021 at SJVN, Shimla
- CEA Chess Team has won the Third Place in Men Team Championship. The name of team members is as under:

S.No.	Name & Designation S/Sh.	Division/Section
1.	Lalrinsanga, Superintending Engineer**(**Captain**)**	RA Division
2.	Pradeep Kumar, Deputy Director(Manager)	O/o Secretary
3.	Rajesh, Deputy Director	PSPM Division
4.	Asif Iqbal, Assistant Director-	TPPD Division

	II	
5.	Nishant Kumar, AD-II	R&D Division
6.	Nitish Kumar, Stenographer	O/o DS(Vig.)

Volleyball

Shri Anish, (RPSO-N) LDC, APAR Section, CEA has been selected to represent the Central Secretariat Volleyball Team in the All India Civil Service Volleyball Tournament 2020-21 **(A National Status)** held at Dronacharya Stadium, Kurushetra, Haryana 20-24 September, 2021 and brings the laurels to CEA by Winning the Third place.

1.9 Vigilance Activities/Disciplinary Cases in CEA

The Vigilance Division, CEA is headed by Chief Vigilance Officer (CVO) and is the nodal point in Vigilance set up of the Authority and its Subordinate Offices. The Division deals with various facets of vigilance mechanism and functions for carrying out investigations into complaints, suggesting corrective measures for improving the control system, compliance of laid down procedures and also for carrying out preventive vigilance exercises.

As part of preventive vigilance, the Vigilance Division conducts Periodic inspections of Subordinate offices under CEA from time to time. Scrutiny of Immovable Property Returns (IPRs) filed by Officers of CEA are being carried out by this Division at regular intervals. Vigilance Awareness Week-2020 was observed in Central Electricity Authority and its Subordinate Offices from 27.10.2020 to 02.11.2020. The Vigilance Awareness week was observed to highlight the theme "Satark Bharat, Samridh Bharat (Vigilant India, Prosperous India)".

Complaints other than anonymous/pseudonymous were taken up for investigation promptly and after completion of investigations, reports submitted to the prescribed competent authority. As on 31.03.2021, disciplinary case against one Data Entry Operator (since retired) is under process and sent to Ministry of Power for onward transmission to the Union Service Public Commission for seeking advice of the Commission as per Rule 9 of the Central Civil Services (Pension) Rule 1972. Prescribed periodical returns were sent to Ministry of Power and Central Vigilance Commission in time.

1.10 Electric Power Information Society

The Electric Power Information Society (EPIS) was established in June, 1996 under the aegis of Central Electricity Authority on no-loss-no profit basis for bringing out various CEA publications. These are also available on sale for general public.

1.11 Grievance Cell

In accordance with the instructions of Department of Administrative Reforms and Public Grievances (DAR&PG), Shri Mangal Hembram, Chief Engineer (Distribution Monitoring), is functioning (w.e.f. 28th February, 2020) as Grievance Officer for CEA. The Grievances dealt by CEA are mainly service matters (pension, promotion, administrative etc.) and technical/policy matters related to power sector. Further, the Grievances on matters of public /individual concerns, issues of Research and Development/Inventions /suggestions for Power Sector Development are also dealt with.

During the year 2020-21, 104 Nos. of Grievances were received and out of these, a total of 81 Nos. Grievances were settled/disposed off during the period between 01.04.2020 to 31.03.2021. Only 23 Nos. were pending as on 31.03.2021.

1.12 Right to Information Act, 2005

Under the Right to Information Act, 2005, the Chief Engineer (Coordination) acts as the Nodal Officer for RTI for CEA. 931 applications were

received during the year 2020-21 (i.e. up to 31.03.2021), under the Act and were disposed of by various CPIOs in CEA. Further, 57 on-line and 3 Hard copy applicants filed appeal to the Appellate Authority which were also decided.

The RTI Act under section 4 provides a comprehensive framework for promoting openness in the functioning of the public authorities. RTI Suo moto disclosure in the format specified by CIC and approved by Chairperson, CEA was uploaded on website of CEA. The details as per above format was also sent to CIC for carrying out transparency audit.

Third Party Audit on "Proactive Disclosures" of CEA as mandated by Central Information Commission for facilitation of suo moto disclosure of information under section 4 of RTI Act 2005.The Audit was conducted in the month of July, 2021 in CEA Head Quarter by NPTI.

1. 13 Parliament Questions/Assurances, VIP references

(A) Works relating to various assignments given below were carried out:

1. Parliament Questions
2. Parliamentary Assurances
3. Oral evidence
4. PMO/VIP/MOP references
5. Consultative Committees
6. Standing Committee on Energy
7. Material for Calling Attention Motion
8. Material for Economic Survey
9. Major Achievements in Power Sector
10. Annual Report of the MOP
11. Material for interview of Power Minister and Secretary (power) to various press media
12. Monitorable targets and Achievements
13. Power Ministers' Conference
14. Material for various speeches.
15. International Cooperation with various countries
16. Inputs for regional meeting relating to power matters of the regions
17. Action taken reports were prepared based on the inputs received from various divisions.
18. Niti Aayog Dashboard
19. Examination of DPRs
20. Material for President's Address to both the Houses of Parliament and Finance Minister's Budget Speech.
21. Compilation and processing of material for matters such as:

i) Power sector reform,
ii) Private Sector participation including action taken reports, and
iii) Ministers meeting on power scenario etc.

(B) During the year 2020-21 (till 31.03.2021) there were two Parliament Sessions and the Admitted version of Questions were dealt with as follows:

Sr.	Session	Starred	Un-starred
1.	Monsoon Session	-	160
4.	Budget Session 2020	57	274

1.14 Monthly Reports

The CEA receives data regularly on various aspects of Indian Power Sector, such as generation, transmission and distribution of power. The information received is incorporated in the following regular reports:

- Report on important developments during the month for Prime Minister's Office
- Summary report for Council of Ministers on important developments in Power Sector during the month.
- Monthly Executive Summary
- DO letter from Chairperson, CEA to Secretary (Power)

- Inputs for DO letter from Secretary (Power) to Cabinet Secretary on important developments in Power Sector

1.15 Computerization in CEA

All Divisions and Sections of CEA have been equipped with the latest IT infrastructure. All computers of CEA office at Sewa Bhawan, West Block-II and NRPC building are interconnected through wired or wireless network. The important statistics/data/information of CEA is uploaded on the bilingual (English & Hindi) website of Central Electricity Authority (www.cea.nic.in) for global access. The CEA dynamic website has been designed and developed by a developer i.e. M/s Kreate Technologies Pvt. Ltd. as per CEA tender document no. CEA-CH-13-19/1/2018-IT Division dated 25-09-2019 and maintained in-house by IT Division, CEA. The content of this website is updated on daily/monthly basis. A state of the art Data Center is running at Sewa Bhawan building since 2011 for collecting and scrutinizing on-line data from various power sector utilities/organizations.

1.15.1 National Power Data Management System (NPDMS) / National Power Portal (NPP):

Hon'ble Minister of State(IC) for Power and New & Renewable Energy launched the National Power Portal (NPP) on 14-11-2017. The portal is accessible at https://npp.gov.in.

- NPP is a centralized system for Indian Power Sector which facilitates online data capture/input (daily, monthly, annually) from generation, transmission and distribution utilities in the country and disseminate Power Sector Information (operational, capacity, demand, supply, consumption, etc.) through various analyzed reports, graphs, statistics for generation, transmission and distributional all India, region, state level for central, state and private sector.

- The NPP Dashboard has been designed and developed to disseminate analyzed information about the sector through GIS enabled navigation and visualization chart windows on capacity, generation, transmission, and distribution at National, State, DISCOM, town, feeder level and scheme based funding to states. The system also facilitates various types of statutory reports required to be published regularly. The Dashboard also act as single point interface for all Power Sector Apps launched by the Ministry like TARANG, UJALA, VIDYUTPRAVAH, URJA, MERIT, etc.

- NPP is integrated with associated systems of Central Electricity Authority (CEA), Power Finance Corporation (PFC), Rural Electrification Corporation (REC) and other major utilities and serve as single authentic source of power sector information to apex bodies, utilities for the purpose of analysis, planning, monitoring as well as for public users. The system is available 24x7 and ensures effective and timely collection of data. It standardized data parameters and formats for seamless exchange of data between NPP and respective systems at utilities.

- The stakeholders of NPP are Ministry of Power (MoP), CEA, PFC for Integrated Power Development Scheme (IPDS), REC for Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), other power sector utilities in government as well as private sector, Apex Bodies, other government organizations and public users. The Nodal Agency for implementation of NPP and its operational control is CEA. The system has been conceptualized, designed and developed by

National Informatics Centre (NIC).

1.15.2 E-Office in CEA:

For conducting file and letter handling processes in more efficient and transparent manner, e-office (https://cea.eoffice.gov.in) application has been working successfully. The E-Office application is hosted on the Cloud of National Informatics Centre (NIC) and provides features like e-sign facility for ascertaining authentication & non-repudiation, integration of E-mail service with the application, role based work flow, tracking and searching facility, etc.

1.15.3 Cyber Security in Power Sector:

Government of India under the Information Technology Act 2000 (Amendment 2008) has constituted two bodies, National Critical Information Infrastructure Protection center (NCIIPC) and The Indian Computer Emergency Response Team (CERT-In) for protection against Cyber Attacks. In line with this, Ministry of Power, GoI has constituted six Sectoral CERTs (CERT-Thermal, CERT-Hydro, CERT-Transmission, CERT-Distribution, CERT-Grid Operation and CERT-Renewable Energy). CERT-Distribution is housed in CEA and CE (DP&T), CEA is the nodal officer. Chief Engineer (IT&CS), CEA has been nominated as the Chief Information Security Officer, Ministry of Power (CISO-MoP). CISO-MoP looks after overall activity of Cyber Security in Power Sector in coordination with MoP, CERT-In, NCIIPC, other Govt. agencies and six Sectoral CERTs. Nodal Officers of the sectoral CERTs works in co-ordination with CISO-MoP and also co-ordinate with their respective constituent Utilities for nomination of Utility level CISO and Alternate CISO, preparing and implementation of Utility specific Cyber Crisis Management Plan (C-CMP) and for early identification of their Critical Information Infrastructures (CIIs). As per the model Cyber Crisis Management Plan (CCMP) released by CERT-In, Sectoral CERTs have developed Sector specific Model CCMP and shared the same with their constituent Utilities. Following the Sector specific Model CCMP various Power Utilities have either developed their Organizational CCMP or in process of development of the same.

Sectoral CERTs work for their specific sector in coordination with MoP, CISO-MoP, NCIIPC, CERT-In and nominated CISOs of their constituent organizations and look after implementation of Cyber security activities in their Subsectors. On bottom level nominated CISOs of Power Utilities work in co-ordination of respective CERTs and responsible for implementation of Cyber Security Activity in their organization.

Considering the urgency to gear up to the challenge of cyber-attacks, Ministry of Power had constituted Committee to look into the issue of Power firms seeking to enter Indian Power Transmission Sector and related issues of cyber security. In order to ensure cyber security during procurement of ICT based component/equipment/system for use in Power Supply System, a scheme for identification of Trusted Sources and Trusted Vendors has been prepared and is under consideration of MoP. Another committee was constituted to examine whether the presence of some of the equipment of foreign make in the transmission System is vulnerable particularly for the perspective of security of the grid. MoP had also constituted Group of Officers (GOO) to study contractual and related legal issues in Cyber Supply Chain Mechanism. CE (IT&CS), CEA as member Convener prepared and presented the Reports of the Committees and Group of Officers. Actions on the accepted recommendation are in progress like setting up National Cyber Testing

Lab at CPRI Bengaluru. To implement the MoP order on Testing power system equipment for use in the Supply System and Networks in the country for cyber security, work on all associated activity like designating Testing labs, and Testing protocols to be followed, etc. are being taken up on high priority. A drafting Committee to frame the CEA Regulation on cyber security measures has been constituted by MoP and as an interim measure CEA has been directed to frame and issue guidelines on Cyber Security for Power Sector.

CERT-In conducts regular training programmes for network / system administrators and CISOs of all utilities of Power Sectors for securing the IT and OT infrastructure and mitigating cyber-attacks. Cyber security mock drills in co-ordination with CERT-In are being conducted regularly in utilities of Power Sectors. A refresher course on cyber security has been worked out by CEA and the course is being conducted at NPTI for all load dispatchers of RLDCs and SLDCs. Similarly course on cyber security is being worked out for other sectors of Power also.

Ministry of Information and Technology, Ministry of Power, NCIIPC and CERT-In are issuing regular guidelines & advisories regarding cyber security. The guidelines and advisories issued on Cyber Security from time to time are further being complied and implemented by Sectoral CERTs and CISOs on Power Utilities level. All Utilities of Power sectors has been directed by Ministry of Power to on board Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) of CERT-In. The daily advisories issued by CSK to the Utilities are being monitored for action taken and closure reports by CISO-MoP.

1.15.4 Digitization of Approvals/ Clearances given by CEA:

As per the direction of Project Monitoring Group of Cabinet Secretariat, on-line application for the following approvals/clearances, given by Central Electricity Authority, have been implemented by NIC:

- Online Application for Inspection of Electrical Installations
- DPR Approval Process Monitoring System for Hydro Projects
- Prior approval of GoI for installation of overhead lines as per Section 68 of the Electricity Act 2003

This digitization of approvals/clearances is ensuring transparency and timely approval by CEA. This also facilitates developers to track the status of their application.

1.15.5 Other Information Communication Technology (ICT) enabled activities

- All IT related items has been procured through GeM Portal and their payment is also being made via PFMS.
- All tenders has been uploaded on Central Public Procurement (CPP) Portal.
- Process of e-HRMS has been initiated.

1.16 ISO 9001:2008 Quality Management System Certification (QMS)

After successful completion of Surveillance cum transition audit of CEA for transition from ISO: 9001:2008 to ISO 9001:2015, Bureau of Indian Standards has provided CEA with the latest version of ISO 9001 QMS certification i.e. ISO 9001:2015 Quality Management System.

1.17 Market Monitoring Cell

Ministry of Power in March, 2019 had

entrusted CEA with the task of monitoring the volume and price of electricity transacted on both the power exchanges of India i.e. IEX and PXIL.

Subsequently, Market monitoring Cell (MMC) was created in Regulatory Affairs Division of CEA with the objective of analysis of movement of prices discovered for the electricity transacted on both the power exchanges in India in the Day Ahead Market (DAM), Term Ahead Market (TAM), Green TAM and Real Time Market (RTM), suggest modalities for deepening the electricity market, facilitate introduction of new products in the power exchanges, etc.

The MMC has started preparing reports since April, 2019. The activities performed by MMC from **April, 2020 to March, 2021** are mentioned below.

1. Carried out detailed analysis of electricity transacted in both the power exchanges in India (i.e., IEX and PXIL) for the months April, 2020 to March, 2021and prepared the monthly Market Monitoring Reports for the months April, 2020 to March, 2021, which are available on CEA's website.

The salient points from these reports are as under:

(i) The total volume of electricity transacted in both the power exchanges in Day Ahead Market (DAM) during the period April, 2020 to March, 2021 was **60,632.69 MU**. Total scheduled volume of electricity transacted in Day Ahead Market in IEX constituted more than **99%** of total transacted volume of electricity in both the power exchanges (i.e., IEX and PXIL) during the months April, 2020 to March, 2021.

(ii) The monthly average Market Clearing Price (MCP) in IEX in Day Ahead Market varied from **Rs 2.35/ kWh** to **Rs 4.07/ kWh** during the period April, 2020 to March, 2021. The minimum and maximum MCP were observed in the months of June, 2020 and March, 2021respectively. During this period, the Area Clearing Price (ACP) in IEX for a particular time block varied from minimum of **Rs 0.68/ kWh** in the month of August, 2020 to maximum of **Rs 9.88/ kWh** in the month of March, 2021.

(iii) Similarly, the monthly average Market Clearing Price (MCP) in PXIL in Day Ahead Market varied from **Rs 2.56/ kWh** to **Rs 4.32/ kWh** during the period April, 2020 to March, 2021. During this period, the minimum and maximum MCP were observed in the months of June, 2020 and March, 2021respectively. During this period, the ACP in PXIL for a particular time block varied from minimum of **Rs 1.04/ kWh** in the month of September, 2020 to maximum of **Rs 13.95/ kWh** in the month of February, 2021.

(iv) The cumulative real time curtailment happened in IEX in the Day Ahead Market during the period April, 2020 to March, 2021was **0.16 MU**. There was no real time curtailment in PXIL during the above period.

(v) The regression analysis using double log function was carried out for Market Clearing Price w.r.t. purchase Bid and other independent variables in IEX for the months April, 2020 to March, 2021, which showed that the purchase bid is most significant variable which determined market clearing price in IEX.

(vi) The total volume of electricity transacted in both the power exchanges in Term Ahead Market (TAM) during the period April, 2020 to March, 2021 on delivery date was **8,732.99 MU**, whereas the total volume of electricity transacted in both the power exchanges in Term Ahead Market during the period April, 2020 to

March, 2021 on trade date basis was **8,444.32 MU.**

(vii) The transactions in Green Term Ahead Market (GTAM) was started in IEX from **21st, August, 2020**, whereas, GTAM transactions in PXIL started from **24th March 2021** onwards. The total volume of electricity transacted in IEX in **GTAM (Solar)** on delivery date basis during the period August, 2020 to March, 2021was **554.06 MU**, whereas the same on trade date basis was **554.52 MU.** While, the total volume of electricity transacted in IEX in **GTAM (Non-Solar)** on delivery date basis during the period August, 2020 to March, 2021was **231.09 MU**, whereas the same on trade date basis was **231.33 MU.** Further, the total volume of electricity transacted in PXIL in **GTAM (Non-Solar)** on delivery date basis during the period 24th March to 31st March, 2021was **0.39 MU**, whereas the same on trade date basis was **0.59 MU.** While, **no solar energy** transactions happened during this period on PXIL.

(viii) The transactions in Real Time Market (RTM) was started in both the power exchanges from **1st, June, 2020**. The total volume of electricity transacted in both the power exchanges in RTM during the period June, 2020 to March, 2021was **9,470.24 MU**.

(ix) The monthly average Market Clearing Price (MCP) in IEX in Real Time Market (RTM) varied from **Rs 2.22/ kWh** in June, 2020 to **Rs 3.73/ kWh** in March, 2021. Whereas, the monthly average Market Clearing Price (MCP) in PXIL in Real Time Market (RTM) varied from **Rs 2.59/kWh** in June, 2020 to **Rs 2.61/kWh** in July, 2020 during the period of June, 2020 to March, 2021. (Transactions in PXIL happened only in the months of June and July, 2020).

CHAPTER - 2

GRID OPERATION AND MANAGEMENT

2.1 Organizational Structure in Grid Operation and Management

The Central Government has established Regional Power Committee (RPC) in each region in accordance with the provisions of Electricity Act, 2003 to facilitate integrated operation of the power system in that region. The real time operation of the power system is looked after by the Regional Load Dispatch Centres (RLDCs) set up in the five Regions and at the national level by National Load Dispatch Centre (NLDC). The Regional Power Committee is a conglomerate of all the players partaking in grid operation, i.e. Regional Load Dispatch Centre, generating companies, transmission utilities, distribution utilities, power traders, etc. Its Secretariat is manned by the officers of Central Electricity Authority (CEA).

The Regional Power Committee(RPC) operates through a number of Sub-Committees, viz. Operation Sub Committee, Commercial Sub Committee, Protection Sub Committee, System Studies Sub Committee and Technical Coordination Sub Committee. The Operation Sub Committee meets every month to review the grid operation in the previous month and plan grid operation for the next month. The Commercial Sub Committee discusses commercial issues viz. energy accounting related matters, matters pertaining to Special Energy Meters (SEMs), settlement of dues, etc. The Protection Sub Committee discusses and analyses the various trippings which took place since its last meeting and recommends/monitors the corrective actions to avoid recurrence of such trippings. It also finalizes the various protection schemes including protection coordination. The System Studies Sub Committee meets periodically for the purpose of system studies related to assessment of network elements for reactive compensation, operational load flow, transient stability studies etc. The Technical Coordination Sub-Committee (TCC) meets before the Regional Power Committee for deliberating on the various technical, operational and commercial issues and the decisions are placed forth for final resolution in the Regional Power Committee. The RPCs play an important role in planning grid operation, since they are responsible for protection coordination, outage planning of generating units and transmission system, planning reactive compensation etc. Member (Grid Operation & Distribution), CEA is also a Member of the Regional Power Committees and guides the Committees to arrive at amicable solutions with uniformity of approach through unbiased decisions. Apart from RPCs, the Ministry of Power (MoP) had vide Order dated 25th March, 2013, established the National Power Committee (NPC) to evolve a common approach to issues related to reliability and security of the grid.

CEA monitors the power supply position in the country, prepares the All-India monthly power supply position report, harmonizes all matters of grid operation and management between the five Regions, coordinates enquiry of grid disturbances, recommends to the Ministry of

Power the quantum of allocation from Central Generating Stations and also facilitates the implementation of the allocation through the Regional Power Committees. The anticipated Power Supply Position for the next year known as Load Generation Balance Report (LGBR), is also prepared every year.

2.2 Power Supply Position

The Central Electricity Authority brings out the All India Power Supply Position on a monthly basis, both in terms of Energy and Peak, giving the Energy Requirement, Energy Supplied in Million Units (MUs) and Energy not Supplied in Million Units (MUs) as well as in percentage and the Peak Demand, Peak Met in Mega Watt (MW) and Demand not Met in Mega Watt (MW) as well as in percentage. The total Energy Requirement in the country during the year 2020-21 was 1,275,534 MUs as against 1,291,010 MUs during the previous year 2019-20, registering a decrease of 1.2%. The total Energy Supplied in the country during the year 2020-21 was 1,270,663 MUs as against 1,284,444 MUs during the previous year 2019-20, registering a decrease of 1.1%. The Energy not Supplied during the year 2020-21 was 4,871 MUs (0.4%) against 6,566 MUs (0.5%) during the previous the year 2019-20. The Peak Demand during the year 2020-21 was 190,198 MW as against 183,804 MW during the previous year 2019-20, registering an increase of 3.5%. The Peak Met during the year 2020-21 was 189,395 MW as against 182,533 MW during the previous year 2019-20, registering an increase of 3.8%. The Demand not Met during the year 2020-21 was 802 MW (0.4%) as against 1,271 MW (0.7%) during the previous year 2019-20.

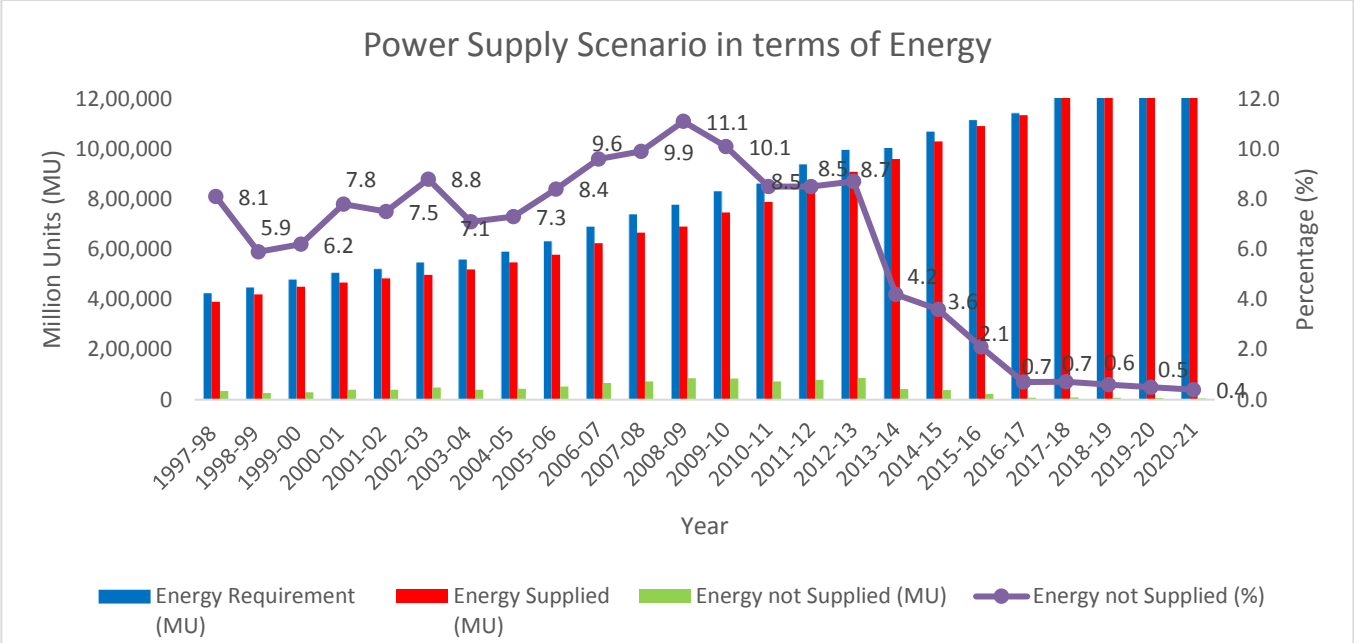
In the context of power supply, it may be mentioned that there is adequate availability of electricity in the country. The marginal gap between demand and supply of electricity is generally on account of factors other than inadequacy of power availability in the country e.g. constraints in distribution network, financial constraints, commercial reasons, forced outage of generating units etc.

The power supply position since beginning of 9th Plan is as under:

ENERGY:

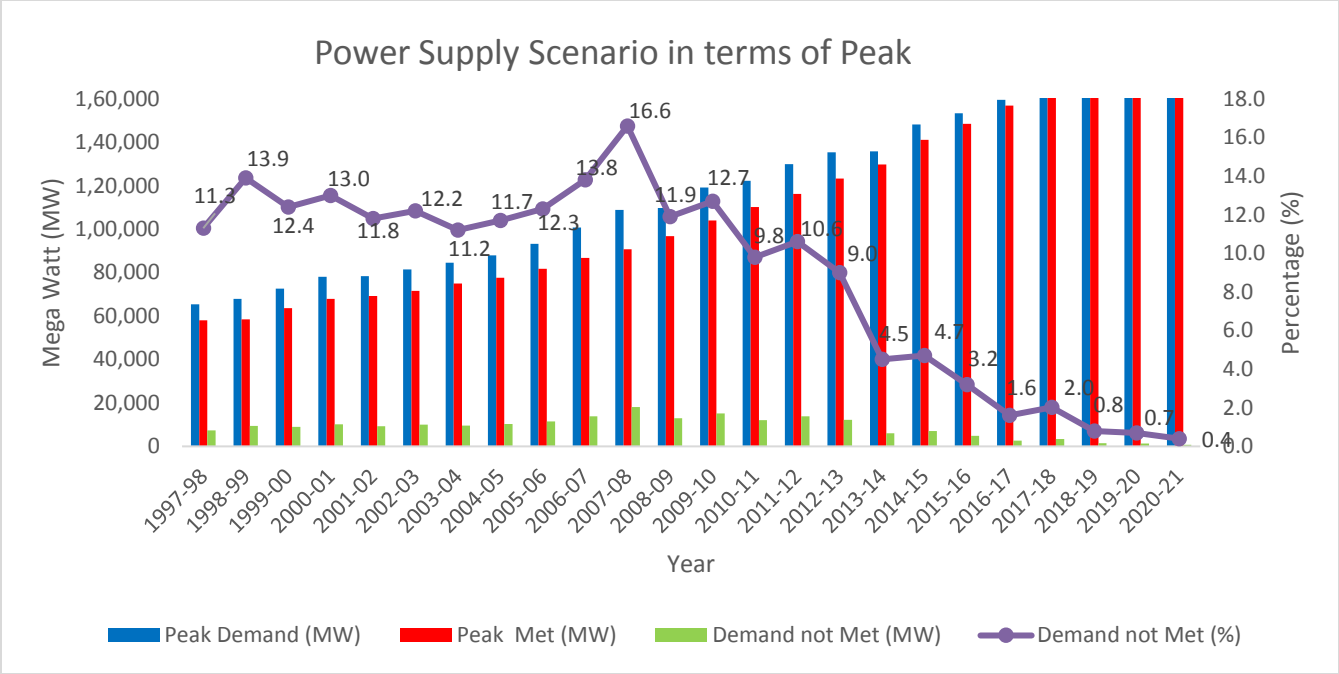
Year	Energy Requirement (MU)	Energy Supplied (MU)	Energy not Supplied	
			(MU)	(%)
1997-98	424,505	390,330	34,175	8.1
1998-99	446,584	420,235	26,349	5.9
1999-00	480,430	450,594	29,836	6.2
2000-01	507,216	467,400	39,816	7.8
2001-02	522,537	483,350	39,187	7.5
2002-03	545,983	497,890	48,093	8.8
2003-04	559,264	519,398	39,866	7.1
2004-05	591,373	548,115	43,258	7.3
2005-06	631,554	578,819	52,735	8.4

2006-07	690,587	624,495	66,092	9.6
2007-08	739,343	666,007	73,336	9.9
2008-09	777,039	691,038	86,001	11.1
2009-10	830,594	746,644	83,950	10.1
2010-11	861,591	788,355	73,236	8.5
2011-12	937,199	857,886	79,313	8.5
2012-13	995,557	908,652	86,905	8.7
2013-14	1,002,257	959,829	42,428	4.2
2014-15	1,068,923	1,030,785	38,138	3.6
2015-16	1,114,408	1,090,850	23,558	2.1
2016-17	1,142,928	1,135,332	7,596	0.7
2017-18	1,213,326	1,204,697	8,629	0.7
2018-19	1,274,595	1,267,526	7,070	0.6
2019-20	1,291,010	1,284,444	6,566	0.5
2020-21	1,275,534	1,270,663	4,871	0.4



PEAK:

Year	Peak Demand (MW)	Peak Met (MW)	Demand not Met	
			(MW)	(%)
1997-98	65,435	58,042	7,393	11.3
1998-99	67,905	58,445	9,460	13.9
1999-00	72,669	63,691	8,978	12.4
2000-01	78,037	67,880	10,157	13.0
2001-02	78,441	69,189	9,252	11.8
2002-03	81,492	71,547	9,945	12.2
2003-04	84,574	75,066	9,508	11.2
2004-05	87,906	77,652	10,254	11.7
2005-06	93,255	81,792	11,463	12.3
2006-07	100,715	86,818	13,897	13.8
2007-08	108,866	90,793	18,073	16.6
2008-09	109,809	96,785	13,024	11.9
2009-10	119,166	104,009	15,157	12.7
2010-11	122,287	110,256	12,031	9.8
2011-12	130,006	116,191	13,815	10.6
2012-13	135,453	123,294	12,159	9.0
2013-14	135,918	129,815	6,103	4.5
2014-15	148,166	141,160	7,006	4.7
2015-16	153,366	148,463	4,903	3.2
2016-17	159,542	156,934	2,608	1.6
2017-18	164,066	160,752	3,314	2.0
2018-19	177,022	175,528	1,494	0.8
2019-20	183,804	182,533	1,271	0.7
2020-21	190,198	189,395	802	0.4



The State/UT/Region-wise Power Supply Position in terms of Energy and Peak during the year 2020-21 is enclosed at **Annexure-2A.**

The details of the State/UT-wise allocation from Conventional Central Generating Stations in the country as on 31.03.2021, is enclosed at **Annexure-2B.**

2.3 System Operation in the Regions

2.3.1 Northern Region

The installed capacity in the Northern Region was 102,689.05 MW as on 31.03.2021 comprising of 62,188.65 MW thermal, 20,288.77 MW hydro, 1,620.00 MW nuclear and 18,591.63 MW from renewable energy sources. The gap between Energy Requirement and Energy Supplied was 1.0% in the Northern Region during the year 2020-21 as compared to the respective figure of 1.4% during the year 2019-20. Further, the Northern Region witnessed a gap of 0.7% between Peak Demand and Peak Met during the year 2020-21 as against the corresponding figure of 1.0% during the year 2019-20.

2.3.2 Western Region

The installed capacity in Western Region was 125,181.40 MW as on 31.03.2021 comprising of 86,526.61 MW thermal, 7,562.50 MW hydro, 1,840.00 MW nuclear and 29,252.29 MW from renewable energy sources. During the year 2020-21 as well as 2019-20, there was negligible gap between Energy Requirement and Energy Supplied in the Western Region. Further, the Western Region witnessed a gap of 0.1% between Peak Demand and Peak Met during the year 2020-21 while Western Region was able to meet its Peak Demand completely during the year 2019-20.

2.3.3 Southern Region

The installed capacity in Southern Region was 115,164.97 MW as on 31.03.2021 comprising of

55,469.99 MW thermal, 11,774.83 MW hydro, 3,320.00 MW nuclear and 44,600.15 MW from renewable energy sources. During the year 2020-21 as well as 2019-20, there was negligible gap between Energy Requirement and Energy Supplied in the Southern Region. Further, the Southern Region was able to meet its Peak Demand completely during the year 2020-21 while there had been a gap of 0.2% between Peak Demand and Peak Met during the year 2019-20.

2.3.4 Eastern Region

The installed capacity in Eastern Region was 34,176.90 MW as on 31.03.2021 comprising of 27,952.45 MW thermal, 4,639.12 MW hydro and 1,585.33 MW from renewable energy sources. The gap between Energy Requirement and Energy Supplied was 0.4% in the Eastern Region during the year 2020-21 as compared to the respective figure of 0.2% during the year 2019-20. Further, the Eastern Region was able to meet its Peak Demand completely during the year 2020-21 while there had been a gap of 0.1% between Peak Demand and Peak Met during the year 2019-20.

2.3.5 North-Eastern Region

The installed capacity in North-Eastern Region was 4,863.64 MW as on 31.03.2021 comprising of 2,550.48 MW thermal, 1,944.00 MW hydro and 369.17 MW from renewable energy sources. The gap between Energy Requirement and Energy Supplied was 2.5% in the North-Eastern Region during the year 2020-21 as compared to the respective figure of 3.7% during the year 2019-20. Further, the North-Eastern Region witnessed a gap of 5.7% between Peak Demand and Peak Met during the year 2020-21 as against the corresponding figure of 3.7% during the year 2019-20.

2.4 Frequency Profile of National Grid

The five regional grids of the country are operating as an integrated National Grid. The Indian Electricity Grid Code (IEGC) specified by the Central Electricity Regulatory Commission (CERC) mandates the operating band for frequency of grid as 49.90 Hz to 50.05 Hz. The percentage of time during which the power system of the country operated below 49.90 Hz, between 49.90 to 50.05 Hz (IEGC Band) and above 50.05 Hz and the maximum and minimum frequencies of the National Grid along with the average frequency level during the year 2019-20 and 2020-21, are tabulated below:

Frequency Profile of National Grid

Year	% of Time when Frequency was			Average Frequency (Hz)	Maximum Frequency (Hz)	Minimum Frequency (Hz)
	Below 49.90 Hz	Between 49.90-50.05 Hz (IEGC Band)	Above 50.05 Hz			
2019-20	6.45	72.89	20.95	50.00	50.34	49.55
2020-21	5.28	77.92	16.80	50.00	50.39	49.57

It may be seen from the above that the average grid frequency during the year 2020-21 was precisely at the nominal frequency level of 50 Hz.

2.5 National Power Committee (NPC)

1. National Power Committee (NPC) was established by Ministry of Power vide Order dated 25th March, 2013, to evolve a common approach on issues related to reliability and security of the grid, at national level. Chairperson, CEA is the Chairperson of NPC. Member (GO&D), CEA, Member Secretaries and Chairpersons of RPCs, the Chairpersons of Technical Co-ordination Sub Committees (TCC) of five regions, are members of NPC with Chief Engineer (NPC), CEA, as its Member Secretary.

2. Since its formation, NPC has taken several initiatives on improving Defense mechanism (like Under Frequency Relay and rate of change of frequency relay based load shedding scheme and System Protection Scheme) to enhance grid security. The methodology of settlement of accounts for bilateral short term and collective transactions, for the period of Grid Disturbance finalized by NPC was submitted to Central Electricity Regulatory Commission (CERC). The methodology/procedure for computing actual drawl/ injection of entities in case of non-availability of Main/Check/Standby Meter Data was also finalized. In addition, the "Guidelines on availability of communication system" was finalized by NPC and submitted to CERC.

3. During the year 2020-21, as decided in the 9th meeting of NPC, a Sub-committee under the chairmanship of Member Secretary, WRPC was constituted to review the Automatic Under Frequency Load Shedding (AUFLS) scheme and work out a common approach for df/dt relay settings in all the five regions. Further, a Sub-group under the chairmanship of Member Secretary, WRPC was also constituted comprising of representatives of RPCs, NPC, NLDC, NTPC and NHPC to finalize a common procedure for tuning of Power System Stabilizers (PSS).

In addition, a Joint Committee comprising members from RPCs, CEA, and CTU/POWERGRID and POSOCO was constituted to harmonize the Technical Specification (TS) of the 5/15 minute Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR), Meter Data Processing (MDP) system at all India basis.

2.6 Power System Development Fund (PSDF):

i) Ministry of Power vide letter No. 29/9/2010-R&R (Vol-II) dated 10th January, 2014 circulated a scheme regarding operationalization of the Power System Development Fund (PSDF) and utilization of funds deposited therein. The total fund transferred from regulatory Pool Accounts to PSDF since launch of the scheme up to 31.03.2021 was ₹ 16,272.50 Crores. During the financial year 2020-21, an amount of ₹ 653.21 Crores was transferred to PSDF. The total funds under PSDF collection account including interest and other credits up to 31.03.2021 is ₹ 17,431.19 Crores. The total fund transferred from regulatory Pool Accounts to PSDF since launch of the scheme up to 31.03.2020 was

₹17267.57 Crores. During the financial year 2020-21 up to 31.03.2021, an amount of ₹ 653.21 Crores was transferred to PSDF.

ii) During the FY 2020-21, the following meetings related to operation/implementation of PSDF were held:

a) Two (02) meetings of Techno-economic subgroup (headed by Chief Engineer NPC, CEA) were held on 21.08.2020 & 11.12.2020.

b) Two (02) meeting of Project Monitoring Group (headed by Member (GO&D)) were held on 15.10.2020 & 14.12.2020

c) One (01) meeting of Appraisal Committee (headed by Chairperson, CEA) was held on 11.01.2021

d) One (01) meeting of Monitoring Committee (headed by Secretary, Power) was held on 08.03.2021

iii) A total of 174 schemes have been sanctioned since operationalization of PSDF (till 31.03.2021), with a total grant amount of ₹12,191.09 Crores from PSDF. Details of sanctioned grant under PSDF are as given below:

S.NO	Project Entity	During FY 2020-21		Cumulative (Up to 31.03.2020)	
		Number of Project Proposals	Sanctioned Grant (₹ crores)	Number of Project Proposals	Sanctione d Grant (₹ crores)
1	State/UT	14	539.30	(143 + 14)*	6953.86+539.30
2	RPCs	-	-	9	115.61
3	BBMB	-	-	1	23.27
4	DVC	-	-	2	166.46
5	PGCIL	-	-	4	4159.56
6	PGCIL/ RECTP CL	-	-	1	233.03
	Total	14	539.30	160	**12191.09**

Note-(*)- Includes a scheme of MPPTCL, approved by Monitoring Committee in its 16th meeting subject to submission of Board approval & DISCOM wise list of meters from MPPTCL. The Sanction Order for the same was yet to be issued by MoP.

iv) A total amount of ₹7722.57 Crores (since operationalization of PSDF till 31.03.2021) was disbursed to the project entities for implementation of the schemes under PSDF. Out of this, ₹348.71 Crores was disbursed during the FY 2020-21.

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CHAPTER – 3

POWER GENERATION

3.1 Power Generation

Generation of power from conventional sources (Th,Nu&Hy) by the Central Sector, State Sector, Pvt. utilities &IPPs was about 1234607.64 million units during the Year 2020-21. This represents a growth of about -1.29% over the same period during previous year 2019-20 as per details given below:

Power Generation during 2020-21

Category	Programme (MU)	Actual (MU)	Shortfall (-)/ Excess(+)	% of Programme	Growth (%) with respect to previous year Actual Gen.
Thermal	1138533.00	1032513.54	106019.46	90.69	-0.98
Nuclear	43880	43029.08	850.92	98.06	-7.41
Hydro	140357	150299.52	-9942.52	107.08	-3.51
Bhutan Imp	7230	8765.5	-1535.50	121.24	51.27
TOTAL	**1330000.00**	**1234607.64**	**95392.36**	**92.83**	**-1.29**

Note: *Generation from stations having installed capacity less than 25MW is not being monitored in CEA since 01.04.2010.*

The highlights / achievements of operation performance of generating stations in the country during the year 2020-21 are as under:

- Gross annual generation of the country was 1234.61 BU.
- The annual growth in the energy generation during the year was -1.29%.
- Thermal, Nuclear, Hydro and Import from Bhutan achieved a growth rate of -0.98%,-7.41%,-3.51% and 51.27% respectively. The electricity generation during the year 2020-21 from coal based thermal power stations was 950.94 BU showing a growth rate of -1.07% against -2.68% over same period last year.
- In Eastern Region, the growth in thermal generation was 8.42% with respect to last year, which was highest amongst all the regions.
- The national average PLF for thermal stations was 54.51% and 85 Stations with an aggregate installed capacity of 112180 MW, achieved PLF above national average.
- 03 number of thermal power stations with an aggregate installed capacity of 9540 MW achieved above 90% PLF

.

The Sector-Wise Generation and PLF during 2020-21 is given below:

Category / Sectors	Programme (MU)	Actual (MU)	PLF (%)
CENTRAL SECTOR			
THERMAL	369543.00	363365.79	63.40
NUCLEAR	43880.00	43029.08	72.45
HYDRO	57840.00	60623.70	
TOTAL	**471263.00**	**467018.57**	
STATE SECTOR			
THERMAL	375900.00	290403.13	46.23
HYDRO	68768.00	75729.63	
TOTAL	**444668.00**	**366132.76**	
PVT. SECTOR IPP			
THERMAL*	374338.00	363654.21	54.57
HYDRO	12279.00	12421.49	
TOTAL	**386617.00**	**376075.70**	
PVT. SECTOR UTL.			
THERMAL	18752.00	15090.41	57.18
HYDRO	1470.00	1524.70	
TOTAL	**20222.00**	**16615.11**	
TOTAL PVT	**406839.00**	**392690.81**	
BHUTAN IMP	**7230.00**	**8765.50**	
ALL INDIA REGION			
THERMAL	1138533.00	1032513.54	54.51
NUCLEAR	43880	43029.08	72.45
HYDRO	140357	150299.52	
BHUTAN IMP	7230	8765.5	
TOTAL	**1330000.00**	**1234607.64**	

*****Includes import from some of the Captive Plants

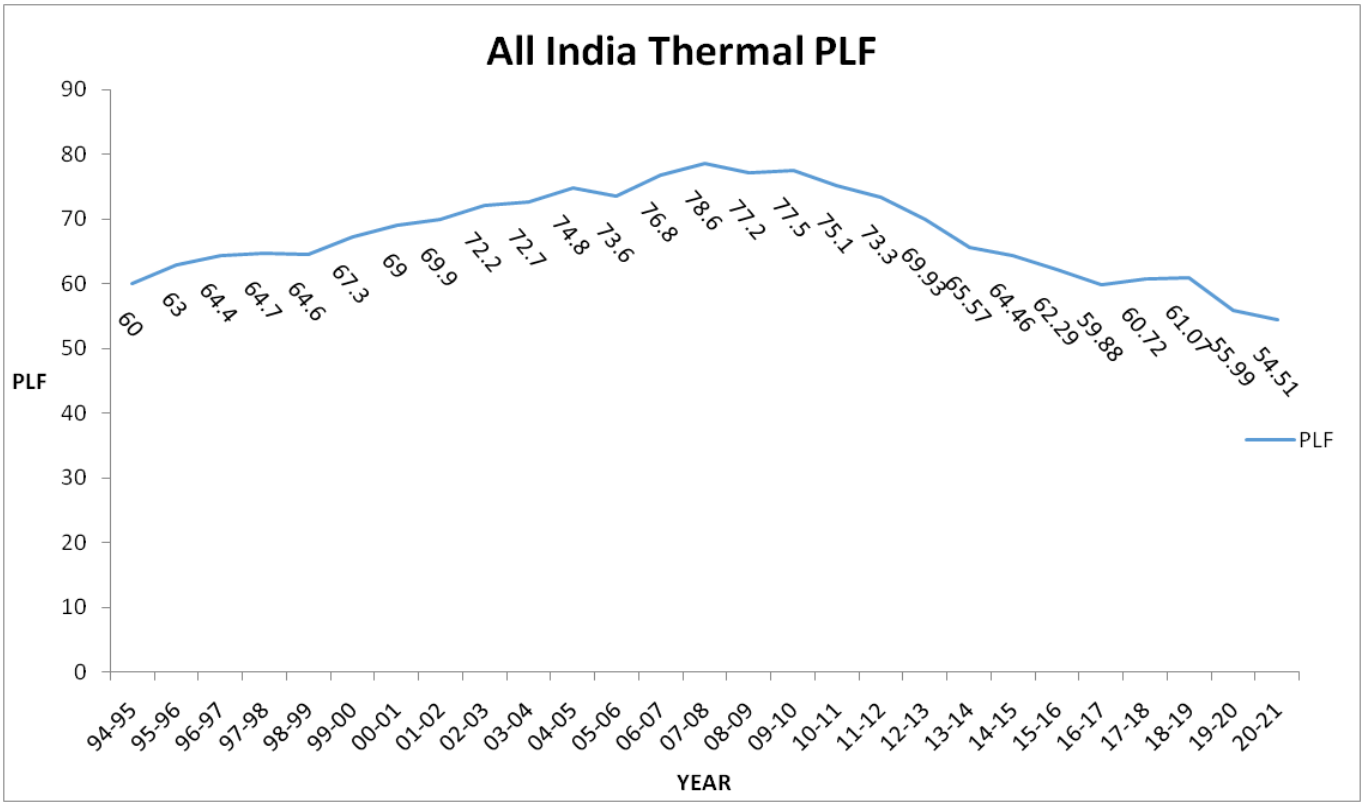
3.2 Plant Load Factor of Thermal Power Stations

During the year 2020-21 the average PLF of Thermal Power Stations was 54.51 % and for Nuclear Power Stations was 72.45%. **85** Thermal power plants (Coal and Lignite based) achieved PLF higher than the All India average PLF of 54.51% as per details given in the table below:

S. No.	STATION NAME	CAPACITY (in MW)	SECTOR	STATE	% PLF
1	SASAN UMTPP	3960.00	IPP SECTOR	Madhya Pradesh	96.25
2	KORBA STPS	2600.00	CENTRAL SECTOR	Chhatisgarh	93.66
3	SIPAT STPS	2980.00	CENTRAL SECTOR	Chhatisgarh	90.12
4	RIHAND STPS	3000.00	CENTRAL SECTOR	Uttar Pradesh	89.04
5	AMARKANTAK EXT TPS	210.00	STATE SECTOR	Madhya Pradesh	88.74
6	VINDHYACHAL STPS	4760.00	CENTRAL SECTOR	Madhya Pradesh	88.73
7	KOTHAGUDEM TPS (STAGE-7)	800.00	STATE SECTOR	Telangana	87.18
8	PATHADI TPP	600.00	IPP SECTOR	Chhatisgarh	86.93
9	BAKRESWAR TPS	1050.00	STATE SECTOR	West Bengal	85.85
10	KODARMA TPP	1000.00	CENTRAL SECTOR	Jharkhand	85.72
11	SINGRAULI STPS	2000.00	CENTRAL SECTOR	Uttar Pradesh	85.39
12	TALCHER (OLD) TPS	460.00	CENTRAL SECTOR	Odisha	84.51
13	TALCHER STPS	3000.00	CENTRAL SECTOR	Odisha	83.32
14	BUDGE BUDGE TPS	750.00	PVT SECTOR	West Bengal	82.54
15	ANPARA C TPS	1200.00	IPP SECTOR	Uttar Pradesh	82.44
16	NABINAGAR STPP	1320.00	CENTRAL SECTOR	Bihar	81.89
17	DHARIWAL TPP	600.00	IPP SECTOR	Maharashtra	80.46
18	HALDIA TPP	600.00	IPP SECTOR	West Bengal	80.38
19	SGPL TPP	1320.00	IPP SECTOR	Andhra Pradesh	80.17
20	KORBA-WEST TPS	1340.00	STATE SECTOR	Chhatisgarh	79.90
21	BANDAKHAR TPP	300.00	IPP SECTOR	Chhatisgarh	79.56
22	SANTALDIH TPS	500.00	STATE SECTOR	West Bengal	78.61
23	CHAKABURA TPP	30.00	IPP SECTOR	Chhatisgarh	77.77
24	PAINAMPURAM TPP	1320.00	IPP SECTOR	Andhra Pradesh	77.77
25	KAMALANGA TPS	1050.00	IPP SECTOR	Odisha	77.20
26	PARAS TPS	500.00	STATE SECTOR	Maharashtra	76.91
27	BARADARHA TPS	1200.00	IPP SECTOR	Chhatisgarh	76.80
28	DSPM TPS	500.00	STATE SECTOR	Chhatisgarh	76.18
29	NEYVELI (EXT) TPS	420.00	CENTRAL SECTOR	Tamil Nadu	75.75
30	GMR WARORA TPS	600.00	IPP SECTOR	Maharashtra	74.86
31	MUNDRA UMTPP	4000.00	IPP SECTOR	Gujarat	74.80
32	BOKARO TPS `A` EXP	500.00	CENTRAL SECTOR	Jharkhand	74.69
33	CHANDRAPURA(DVC) TPS	500.00	CENTRAL SECTOR	Jharkhand	74.63
34	KAWAI TPS	1320.00	IPP SECTOR	Rajasthan	74.29
35	JALIPA KAPURDI TPP	1080.00	IPP SECTOR	Rajasthan	74.27
36	SANJAY GANDHI TPS	1340.00	STATE SECTOR	Madhya Pradesh	73.40
37	RAMAGUNDEM STPS	2600.00	CENTRAL SECTOR	Telangana	73.37
38	BHILAI TPS	500.00	CENTRAL SECTOR	Chhatisgarh	73.29
39	DAHANU TPS	500.00	PVT SECTOR	Maharashtra	73.20

40	KOTHAGUDEM TPS (NEW)	1000.00	STATE SECTOR	Telangana	72.10
41	BALCO TPS	600.00	IPP SECTOR	Chhatisgarh	71.95
42	CHHABRA TPP	2320.00	STATE SECTOR	Rajasthan	70.96
43	NIGRI TPP	1320.00	IPP SECTOR	Madhya Pradesh	70.11
44	SEIONI TPP	600.00	IPP SECTOR	Madhya Pradesh	69.96
45	SINGARENI TPP	1200.00	STATE SECTOR	Telangana	69.87
46	MAITHON RB TPP	1050.00	IPP SECTOR	Jharkhand	69.40
47	MUNDRA TPS-III	1980.00	IPP SECTOR	Gujarat	69.02
48	SAGARDIGHI TPS	1600.00	STATE SECTOR	West Bengal	68.47
49	SURAT LIG. TPS	500.00	IPP SECTOR	Gujarat	67.94
50	KHAPARKHEDA TPS	1340.00	STATE SECTOR	Maharashtra	67.56
51	BARH II	1320.00	CENTRAL SECTOR	Bihar	67.49
52	JOJOBERA TPS	240.00	IPP SECTOR	Jharkhand	67.41
53	AKALTARA TPS	1800.00	IPP SECTOR	Chhatisgarh	66.43
54	ANPARA TPS	2630.00	STATE SECTOR	Uttar Pradesh	66.32
55	BARSINGSAR LIGNITE	250.00	CENTRAL SECTOR	Rajasthan	66.29
56	DURGAPUR STEEL TPS	1000.00	CENTRAL SECTOR	West Bengal	65.99
57	MAHADEV PRASAD STPP	540.00	IPP SECTOR	Jharkhand	65.82
58	KAKATIYA TPS	1100.00	STATE SECTOR	Telangana	65.61
59	NABINAGAR TPP	750.00	CENTRAL SECTOR	Bihar	64.91
60	FARAKKA STPS	2100.00	CENTRAL SECTOR	West Bengal	64.84
61	RAJPURA TPP	1400.00	IPP SECTOR	Punjab	64.84
62	KAHALGAON TPS	2340.00	CENTRAL SECTOR	Bihar	64.55
63	ROSA TPP Ph-I	1200.00	IPP SECTOR	Uttar Pradesh	64.22
64	ANUPPUR TPP	1200.00	IPP SECTOR	Madhya Pradesh	63.30
65	CHANDRAPUR(MAHARASHTRA) STPS	2920.00	STATE SECTOR	Maharashtra	62.93
66	MEJIA TPS	2340.00	CENTRAL SECTOR	West Bengal	62.58
67	TIRORA TPS	3300.00	IPP SECTOR	Maharashtra	62.44
68	PRAYAGRAJ TPP	1980.00	IPP SECTOR	Uttar Pradesh	61.98
69	TENUGHAT TPS	420.00	STATE SECTOR	Jharkhand	60.83
70	TUTICORIN (JV) TPP	1000.00	CENTRAL SECTOR	Tamil Nadu	60.40
71	TANDA TPS	1760.00	CENTRAL SECTOR	Uttar Pradesh	59.55
72	KASAIPALLI TPP	270.00	IPP SECTOR	Chhatisgarh	59.38
73	LARA TPP	1600.00	CENTRAL SECTOR	Chhatisgarh	59.28
74	MUNDRA TPS-I & II	2640.00	IPP SECTOR	Gujarat	59.21
75	JSW RATNAGIRI TPP	1200.00	IPP SECTOR	Maharashtra	58.97
76	MEJA STPP	1320.00	CENTRAL SECTOR	Uttar Pradesh	58.37
77	KALISINDH TPS	1200.00	STATE SECTOR	Rajasthan	57.93
78	D.P.L. TPS	550.00	STATE SECTOR	West Bengal	57.87
79	GADARWARA TPP	1600.00	CENTRAL SECTOR	Madhya Pradesh	57.56
80	IB VALLEY TPS	1740.00	STATE SECTOR	Odisha	56.70
81	DERANG TPP	1200.00	IPP SECTOR	Odisha	56.47
82	KORBA-III	0.00	STATE SECTOR	Chhatisgarh	55.36
83	RATIJA TPS	100.00	IPP SECTOR	Chhatisgarh	55.21
84	AVANTHA BHANDAR	600.00	IPP SECTOR	Chhatisgarh	54.74
85	TROMBAY TPS	750.00	PVT SECTOR	Maharashtra	54.59

The trend in All India PLF of coal and Lignite based thermal power stations from 1994-95 onwards is shown below:



All India Sector-wise/Organization-wise target, actual generation and PLF(%) for the year 2020-21 is at the **Annexure-3A.**

3.3 Generating Capacity Addition

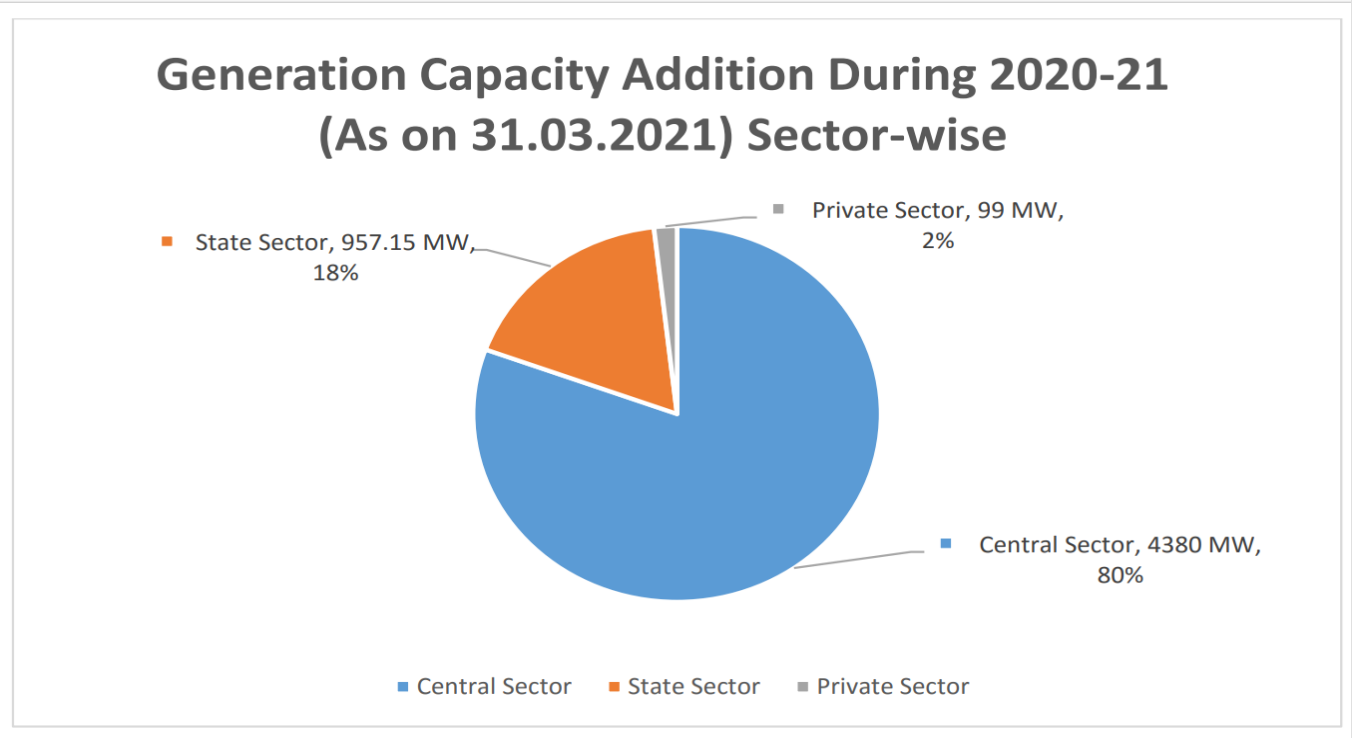
During the year 2020-21, a total of 5436.15 MW generation capacity was added from conventional sources. The capacity addition during the last 10 years Sector-wise and mode-wise is given below:

Capacity addition during the last 10 years – Sector-wise

(Figures in MW)

Year	Central Sector	State Sector	Private Sector	Total
2010-11	3330.00	2209.00	6621.50	12160.50
2011-12	4770.00	3761.00	11971.00	20502.00
2012-13	5397.30	3977.00	11257.50	20631.80
2013-14	2574.01	3367.00	11884.00	17825.01
2014-15	4395.21	4886.10	13285.00	22566.31
2015-16	3775.60	7070.00	13131.00	23976.60
2016-17	4310.50	5177.30	4722.00	14209.80
2017-18	3560.00	1960.00	3985.00	9505.00
2018-19	2070.00	2879.755	972.00	5921.755

2019-20	4240.00	2780.00	45.00	7065.00
2020-21	4380.00	957.15	99.00	5436.15

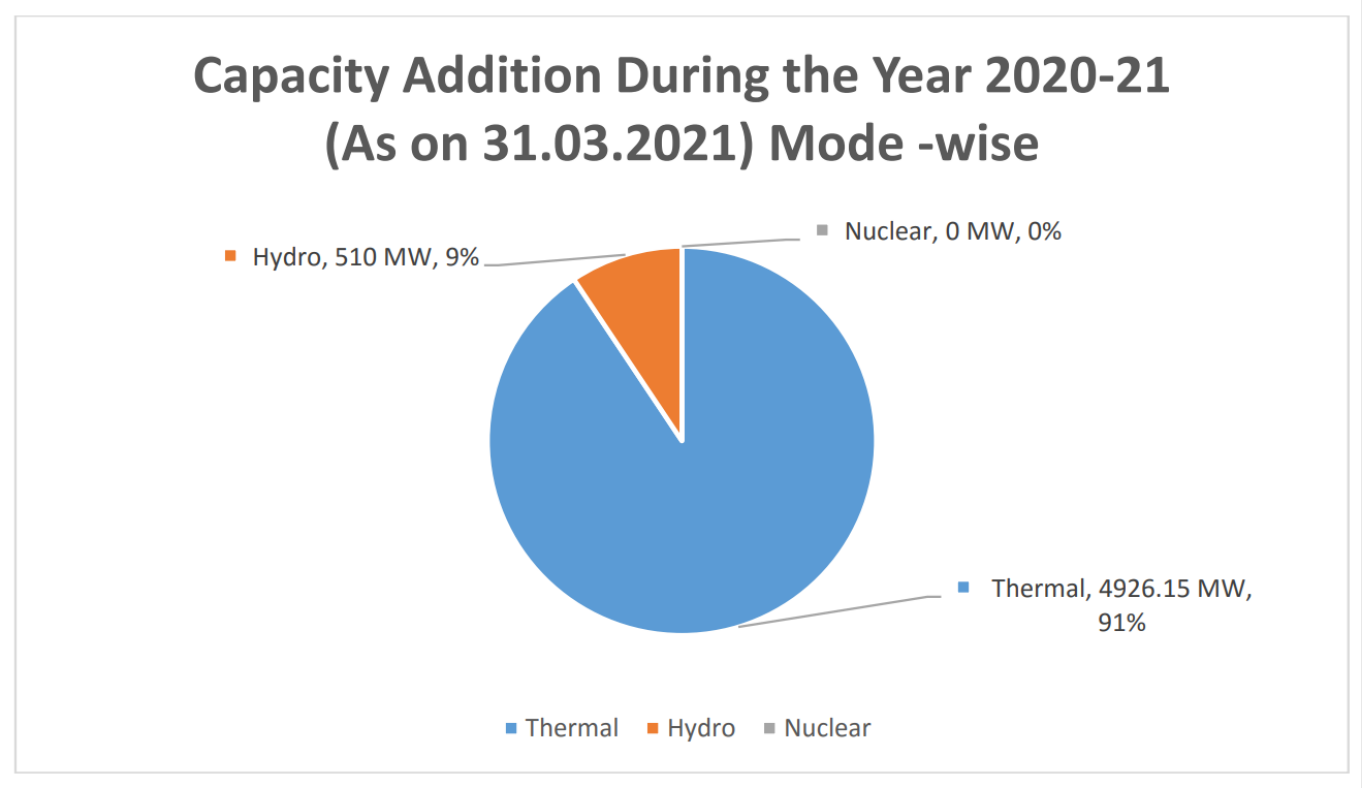


TOTAL 5436.15 MW

Capacity addition during the last 10 years – Mode-wise

(Figures in MW)

Year	Thermal	Hydro	Nuclear	Total
2010-11	11250.50	690.00	220.00	12160.50
2011-12	19079.00	1423.00	0.00	20502.00
2012-13	20121.8	510.00	0.00	20631.80
2013-14	16767.00	1058.01	0.00	17825.01
2014-15	20830.30	736.00	1000.00	22566.31
2015-16	22460.60	1516.00	0.00	23976.60
2016-17	11550.80	1659.00	1000.00	14209.80
2017-18	8710.00	795.00	0.00	9505.00
2018-19	5781.755	140.00	0.00	5921.755
2019-20	6765.00	300.00	0.00	7065.00
2020-21	4926.15	510.00	0.00	5436.15



TOTAL 5436.15 MW

3.4 Installed Electricity Generating Capacity

Total All India Installed Electricity Generating Capacity as on 31.03.2021 is 382151.22 MW comprising of Thermal 234728.22 MW, Hydro 46209.22 MW, Nuclear 6780.00 MW and 94433.79 MW from Renewable Energy Sources (RES). The details are shown in the Tables given below:

All India Installed Electricity Generating Capacity- Sector wise

Type	Central Sector (MW)	State Sector (MW)	Private Sector (MW)	Total (MW)
THERMAL	73447.91	74404.86	86875.45	234728.22
HYDRO	15646.72	27069.50	3493.00	46209.22
NUCLEAR	6780.00	0.00	0.00	6780.00
RES	1632.30	2395.27	90406.21	94433.79
Total	**97506.93**	**103869.64**	**180774.66**	**382151.22**

The growth of installed generating capacity in the country is shown in the table below:

Growth of Installed generating capacity in the country- Mode wise

Year	Thermal	Nuclear	Hydro	RES*	Total
Dec.1947	854	-	508	-	1362
Dec.,1955	1755	-	940	-	2695
March, 1961	2736	-	1917	-	4653
March, 1966	4903	-	4124	-	9027
March, 1974	9058	640	6966	-	16664
March, 1980	16424	640	11384	-	28448
March, 1985	27030	1095	14460	-	42585
March, 1990	43764	1565	18307	-	63636
March, 1991	45768	1565	18753	-	66086
March, 1992	48086	1785	19194	-	69065
March, 1996	60083	2225	20986	-	83294
March, 1997	61012	2225	21658	900	85795
March, 1998	64005	2225	21904	968	89102
March, 1999	67566	2225	22479	1024	93294
March, 2000	70193	2680	23857	1155	97885
March, 2001	72343	2860	25153	1270	101626
March, 2002	74429	2720	26269	1628	105046
March, 2003	76762	2720	26767	1628	107877
March, 2004	77969	2720	29507	2488	112684
March, 2005	80902	2770	30942	3812	118426
March, 2006	82410	3360	32326	6191	124287
March, 2007	86015	3900	34654	7760	132329
March, 2008	91907	4120	35909	11125	143061
March, 2009	93725	4120	36878	13242	147965
March, 2010	102454	4560	36863	15521	159398

March, 2011	112824	4780	37567	18455	173626
March, 2012	131603	4780	38990	24504	199877
March, 2013	151531	4780	39491	27542	223344
March, 2014	168255	4780	40531	34988	248554
March, 2015	188898	5780	41267	38959	274904
March, 2016	210675	5780	42783	45924	305163
March, 2017	218330	6780	44478	57244	326833
March, 2018	222907	6780	45293	69022	344002
March, 2019	226279	6780	45399	77642	356100
March, 2020	230600	6780	45699	87028	370106
March, 2021	234728	6780	46209	94434	382151

*Renewable Energy Sources (RES) includes Wind, Small Hydro Project, Biomass Gasifier, Biomass Power, Urban & Industrial Waste Power & Solar Power.

All India Installed Capacity (in MW) of Power Stations located in the Regions of Main Land and Islands (as on 31.03.2021) are given at **Annexure-3B**.

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CHAPTER-4

PLANNING FOR POWER DEVELOPMENT

4. Power Planning

4.1.1 National Electricity Plan

Section 3(4) of the Electricity Act, 2003 stipulates that the Authority shall prepare the National Electricity Plan, in accordance with the National Electricity Policy and notify such plan once in five years, after obtaining the approval of the Central Government. National Electricity Plan, Volume1 (Generation) has been Notified vide Extra Ordinary Gazette No. 1871, Sl. No. 121 under part-III, Section IV dated 28.03.2018.

The major highlights of the National Electricity Plan (Vol-I- Generation) are as follows:

1. The actual capacity addition during 12th Plan from conventional sources as on 31st March, 2017 is 99,209.6 MW (Coal 83560 MW, Lignite 1290 MW, Gas 6880.5 MW, Hydro 5479 MW, Nuclear 2000 MW) against a target of 88,537 MW. This is about 112% of the target.

2. As per the 19th Electric Power Survey, the projected Peak Demand is 226 GW and Energy requirement is 1,566 BU at the end of year 2021-22.

3. By 2021-22, the Renewable Energy capacity target has been set to 175 GW.

4. Considering the demand projections for the year 2021-22 as per the 19th EPS, committed capacity addition from Gas 406 MW, Hydro 6,823 MW, Nuclear 3,300 MW, RES 1,17,756 MW and likely retirement of 22,716 MW (5,927 MW-old and inefficient units + 16,789 MW-completing 25 years by 2022 and without FGD space) of coal based capacity during 2017-22, a coal based capacity addition of 6,445 MW is required during the period 2017-22. However, a total capacity of 47,855 MW coal based power projects are currently under different stages of construction and are likely to yield benefits during the period 2017-22.

5. The Renewable Energy Generation will contribute about 20.1 % of the total energy requirement in 2021-22.

6. The total coal requirement in the year 2021-22 has been estimated as 735 MT.

7. The average CO2 emission factor is estimated at 0.721 kg CO2/kWh during 2015-16 (including renewables). It is expected that this average CO2 emission factor may reduce to 0.604 kg CO2/kWh by the end of year 2021-22

Committee for formulation of next National Electricity Plan under the Chairperson CEA and Chief Engineer (IRP) as Member Secretary has been constituted. Ten Sub-committees have been constituted to furnish inputs on different aspects of the NEP. This NEP will cover the review for the period 2017-22, detailed plan for the period 2022-27 and perspective plan for the period 2027-32.

4.1.2 Generation Planning Studies

Following studies were/are being carried out using the State of the art, sophisticated ORDENA Software modeling tool:

i) Studies have been carried out on All India basis to assess the optimal generation mix by the year 2029-30 using the software modeling tool considering possible/feasible technology options, fuel constraints if any, intermittency associated with Renewable Energy sources etc. Final Report on the optimal generation mix for the year 2029-30 has been approved and published.

ii) Generation planning exercise has been carried out for the State of Madhya Pradesh and final report on "Resource adequacy and capacity expansion plan for the state of Madhya Pradesh for the year 2021-22 to 2029-30" has been submitted.

iii) Chief Engineer (IRP) has been requested to prepare a Power portfolio Management Plan for BSES (BRPL &BYPL). Accordingly, studies are being carried out.

4.1.3 Capacity addition during the Year 2020-21

i) For the Year 2020-21, against a schedule of capacity addition of 11197.15 MW, Capacity addition of 5436.15 MW was achieved comprising of 510 MW Hydro, 4926.15 MW Thermal, 0 MW Nuclear.

4.1.4 Participation of CEA as Committee Member /Interaction Meets etc.

i) Joint study with Lawrence Berkeley Lab under USDOE Flexible Resource Initiative to assess the flexible resources requirement by 2030 in view of large scale RE penetration is being carried out.

ii) Collaboration with Danish Energy Agency (DEA) under INDO Danish energy partnership: CEA is jointly working with DEA in the field of energy planning, modelling and forecasting scenarios. CEA is also developing technology catalogue for Indian Power Sector.

iii) CEA is providing assistance to a World Bank team for their ongoing analysis on system flexibility and energy storage in ISTS and coordinating related activities with all the stakeholders.

iv) A Committee was constituted for preparation of Roadmap and perspective plan for Power sector in Union Territory of Jammu & Kashmir and Ladakh in which a Director from IRP division was a member along with members from other wings of CEA. Reports in this regard have been prepared and submitted to MoP. A study for baseline assessment of energy scenario for Carbon neutral Ladakh has also been entrusted to CEA in which IRP division is a member and report on study done is prepared and submitted to MoP.

v) Chief Engineer (IRP) is a member of the Expert Group constituted by NITI Aayog for comprehensive study on the future coal scenario in India till 2050.

4.2 National Level Data Registry System

Section 74 of Electricity Act, 2003 and Regulation 4 & 5 of CEA (Furnishing of statistics, returns and information) Regulations, 2007, mandates every licensee, generating company, or person(s) generating electricity for its or his own use to furnish the statistics, returns or other information relating to generation, transmission, distribution, trading to CEA.

In accordance with the above provisions, a framework of National Level Data Registry System (NLDRS) has been devised to collate the statistics of the power generation projects. The framework provides for mandatory registration of each power generating unit of the country having installed capacity of 0.5 MW or above

with CEA.

In order to facilitate the registration process, a web portal (https://egen.cea.gov.in) has been developed that is now operational in public domain. The registration with the portal is now one of the mandatory conditions for availing grid connectivity w.e.f. 20.11.2020 as per CEA Regulations "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019" issued vide Notification No. 12/X/STD (CONN)/GM/CEA/2018 dated 06.02.2019 and CEA Order No. No. CEA-PL-15-13(11)/1/2020-PSLF dated 05.11.2020.

4.3 Electricity Demand Forecasts

The electricity demand of the country is reassessed periodically, once in five years, for the medium term and long term period. The demand projection exercise is carried out by obtaining inputs from Regional Power Survey Offices located in various regions, along with data obtained from various organizations/ utilities. The electricity demand forecast is the basic input for the formulation of Developmental Plans and Programmes & Schemes concerning generation, transmission, trading, distribution, and utilization of electricity.

So far, 19 such exercises viz. Electric Power Survey (EPS) have already been conducted. The 19th EPS report has been brought out in four volumes.

The Volume-I of the 19th EPS report covering Discom-wise, state/UT-wise, region-wise, and all-India electricity demand projection was published in January 2017.

The electricity demand projection of the National Capital Region (Volume-II of EPS) was published in December 2019.

The Volume-III of 19th EPS report covering electricity demand forecasts of Mega Cities was brought out into two parts. The part I & part II of the report were prepared in September 2018 & August 2020 respectively.

The report titled "Report on Nineteenth Electric Power Survey of India (Econometric Method)", i.e. Volume-IV of EPS Report was published in August 2019. The Report contains electricity demand projection by two econometric models (i) Partial Adjustment Model (PAM) and (ii) Seemingly Unrelated Regression Estimation (SURE) model. The independent variables used for carrying out the electricity demand projections comprise of Gross Domestic Product (GDP), electricity pricing, temperature, rainfalls and past electricity consumptions.

Now, the 20th edition of EPS is in progress. The 20th EPS Committee has already been constituted by the CEA in May 2020. The first meeting of the committee was held in November 2020.

4.4 Crisis and Disaster Management Plan

CEA prepares "Disaster Management Plan" for the whole Power Sector on behalf of Ministry of Power to fulfil its obligations under the provisions of section 37 of the Disaster Management Act, 2005 and revises it on regular basis to keep it abreast with the new challenges and issues coming up with changing time. The document has recently been revised in accordance with the National Disaster Management Plan 2019 prepared by National Disaster Management Authority (NDMA). The plan is consistent with the three landmark global agreements reached in 2015 – (i) the Sendai Framework for Disaster Risk Reduction, (ii) Sustainable Development Goals of United Nations and (iii) Climate Change Agreement (COP21) that together represent a nearly complete agenda for Disaster Risk Reduction. The plan also aims at achieving the

contemporary national priorities set within Prime Minister's Ten Point Agenda for Disaster Risk Reduction.

Also, as per the Crisis Management Plan (CMP) of the Government of India prepared by the Cabinet Secretariat, each Central Nodal Ministry is required to prepare a detailed Crisis Management Plan for dealing with crisis situations falling in the areas of their responsibility. The plan indicates Ministry of Power as the nodal ministry for crisis situations arising out of disruption in generation, transmission, distribution and supply of electricity. Accordingly, CEA has also prepared "Crisis Management Plan for the Power Sector" on behalf of Ministry of Power. Apart from that, sector-specific generic documents on crisis and disaster management for thermal, hydro, renewable, transmission and distribution sector are also prepared and updated periodically by CEA. Crisis Management Plans for Cyber Security for each such sector have also been prepared separately.

These crisis and disaster management plans provide broad guidelines to the power utilities to prepare their own documents for crisis and disaster management encompassing the emergency situations to which their establishments are vulnerable.

4.5 Publications on All India Electricity Statistics – General Review & Growth Electricity Sector in India

In fulfillment of its duties and functions under section 73 (i) & (j) and exercising powers vested under Section 74 of the Electricity Act, 2003, CEA publishes following documents containing annual electricity statistics.

4.5.1 All India Electricity Statistics – General Review

In General Review-2020, Nationwide electricity statistics relating to Generation, Transmission, Distribution, Consumption and Trading are included along with important information relating to growth of the Indian Electricity Sector, organizational structure of Electricity Supply Industry in India and reforms carried out by Utilities are incorporated.

The General Review incorporates important statistics/ data on installed capacity, electric energy generation and utilization of electric energy along with the transmission and distribution losses, per capita consumption.

This publication will also contain energy utilization by various categories of electricity consumers like domestic, commercial, irrigation, industries (LV /MV, HV /EHV), public lighting, public water works, etc. The various Chapters/Tables of the publication indicate the above Information State wise/ Sector wise/ Category wise/ Mode wise etc.

In addition to the above, the GR-2020 also contains information about the Installed Capacity and generation of captive power plants of about 6051 Nos. General Review-2020 containing the data for the year 2018-19 was published in October, 2020. General Review-2021 containing data for the year 2019-20 is approved and under process of printing.

4.5.2 Growth of Electricity Sector in India

Publication titled "Growth of Electricity Sector in India from 1947-2020" was published in October, 2020 containing data for the year 2018-19 and provisional /estimated data for the year 2019-20 in respect of Indian Electricity Sector. The data for these publications has been sourced from various Utilities and Non-utilities and various National & International sources. This publication illustrates the growth of vital

development indicators like installed generating capacity, electrical energy production, transmission and distribution network, captive power plants in industries and pattern of consumption of electricity etc. The important statistics have been compared with the International data with respect to some of the developed and developing nations. The publication also contains charts indicating state of basin wise and region wise Hydro Electric Potential development in the country.

The booklet contains maps and charts presenting a panoramic view of the growth of Indian Electricity Sector.

4.6 Implementation of initiative of Working Group III on NMEEE for retirement of old and inefficient Thermal Units

Ministry of Power, under National Action Plan on Climate Change (NAPCC) has initiated National Mission on Enhanced Energy Efficiency (NMEEE). Working Group -III under NMEEE had inter-alia recommended retirement of old and inefficient Thermal Units.

4.7 Standing Committee on Derating, Uprating and Retirement of installed capacity of Generating Stations

A Standing Committee is constituted under the chairmanship of Member (Planning) for considering the proposals of de-rating, uprating & retirement of electricity generating units. The Committee considers the performance of the units for de-rating & uprating, analyses the performance data and the overall generation throughout the life of the plant/unit and carries out detailed scrutiny of technical parameters of proposed units.

A total of 16401.74 MW have been retired from 10th Plan onwards. Out of which 701.50 MW during 10th Plan, 2398 MW during 11th Plan, 5082.44 MW during 12th Plan and 8219.80 MW after 12th Plan (out of which 2550.38 MW during the year 2017- 18, 2409 MW during the year 2018-19, 2462.92 during 2019-20 and 797.50 MW during 2020-21) was retired

During the year 2020-21, 17 Nos. of thermal generating units with aggregate capacity of 797.50 MW have been retired.

The list of the generating units retired during the year 2020-21 is given below: -

Sl. No.	Name of Station/Plant	State	Unit No.	Retired (MW)	Retired on
1.	Neyveli TPS-I	Tamil Nadu	2,4,8	200.00	08.07.2020
2.	Neyveli TPS-I	Tamil Nadu	3	50.00	30.07.2020
3.	NAMRUP CCPP	Assam	4,5	35.00	19.08.2020
4.	Neyveli TPS-I	Tamil Nadu	5	50.00	28.09.2020
5.	Neyveli TPS-I	Tamil Nadu	6	50.00	30.09.2020
6.	Korba-III	Chhattisgarh	1,2	240.00	01.01.2021
7.	Kutch Lig. TPS	Gujarat	1,2	140.00	22.01.2021

8.	Baramura GT	Tripura	1,2,3	16.50	09.03.2021
9.	Rokhia GT	Tripura	1,2	16.00	09.03.2021
	Total		**17**	**797.50**	

Plan wise and Fuel wise summary of retired capacity

Plan	Coal		Lignite		Gas		Diesel		Plan wise Total	
	No.of Units	MW	No.of Units	MW	No.of Units	MW	No.of Units	MW	No.of Units	MW
10 th Plan	**9**	629.50	0	0.00	2	72.00	0	0.00	**11**	**701.50**
11 th Plan	**38**	2135.00	0	0.00	11	261.00	5	2.00	**54**	**2398.00**
12 th Plan	**49**	4721.50	0	0.00	7	205.00	9	155.94	**65**	**5082.44**
After 12th Plan	**70**	6875.38	11	740.00	12	276.50	10	327.92	**103**	**8219.80**
Total	**166**	**14361.38**	**11**	**740.00**	**32**	**814.50**	**24**	**485.86**	**233**	**16401.74**

4.8 Research & Development in Power Sector

4.8.1 R&D activities in Power Sector: -

Central Electricity Authority (CEA) under Section 73(k) of the Electricity Act, 2003 is vested with the function to promote research in the matters affecting the generation, transmission, distribution and trading of electricity.

CEA oversees and promotes the activities of research and development in the Power Sector through co-ordination with multiple agencies involved in research and development activities. Chairperson, CEA is the Chairman of the Standing Committee on Research & Development (SCRD). Currently, following are the research schemes for the power sector facilitated by the CEA:

i) National Perspective Plant (NPP) aimed at improving design of an individual plant component, evolving cost-efficient overall process in the plant, improving control & monitoring for system performance parameters, etc.

ii) Research Scheme on Power (RSOP) for need based research in power sector including solving of operational problems encountered in the power system.

iii) In-house Research and Development (IHRD) scheme for Central Power Research Institute (CPRI)

iv) Uchhatar Avishkar Yojana (UAY), an initiative of Ministry of Human Resource Development to promote innovation of a high order that directly impacts on and meets the needs of the industry and thereby improves the competitive edge of Indian manufacturing. It may be noted that from phase 3 onwards the UAY scheme will be merged with the IMPRINT scheme.

v) Impacting Research Innovation & Technology (IMPRINT) scheme which is a national initiative of Ministry of Human Resource Development for promoting high quality research and innovation in the higher educational institutions covering 10 domains which address the most relevant engineering challenges faced by the Nation with the aim to translate knowledge into viable technology (products or processes) for achieving inclusive growth and self- reliance.

4.8.2 Action taken for implementation of R&D for power sector:

Total 126 projects under NPP, RSoP and IHRD (including projects under UAY and IMPRINT) Schemes with an outlay of Rs. 75.5495 crores were approved during 12th Five Year Plan and 3 year action plan period (2017-18, 2018-19 and 2019-20). Total of 68 projects have been completed till date.

Further, total of forty five (45) projects are on-going under the NPP, RSoP and IHRD schemes. Eight (8) projects under IMPRINT-I Scheme are ongoing and five (5) projects under UAY-II are on-going. Contribution from Ministry of Power is 25% of the total cost of project under UAY and 50% under IMPRINT.

4.8.3 Updation of thrust areas for R&D in power sector and identification of high priority areas of power sector:

The thrust areas for R&D in power sector were updated and high priority areas were identified/updated for dissemination to the power sector organizations under the Central /State/Private Sector. In addition to above, inputs/comments on the following references received concerning research and innovation policy/programme were provided from time to time:

- Science Technology Innovation Policy (STIP)-2020 Policy Formulation.

- Technical Cooperation Program "Science and Technology Research Partnership for Sustainable Development (SATREPS)" for FY 2021 under the Official Development Assistance (ODA) Scheme.
- Invest India, Ministry of Power Project Development Cell (PDC)
- Meeting on Asset Monetization – areas where investment can be made related to R&D activities and manufacturing of electrical equipment.
- Empowered Technology Group (ETG) under the Chairmanship of Principal Scientific Adviser to Government of India.
- Technical Committee on Grid, Distribution and Energy Conservation Research
- Technical Committee on Hydro Research
- Technical Committee on Thermal Research
- Technical Committee on Transmission Research

4.8.4 Other R&D initiatives in CEA (MoU with IIT, Delhi):

CEA, being an apex technical organization for the development of power sector, its human resources needs to be developed through enhancing their technical knowledge and exposure to R&D activities.

A Memorandum of Understanding (MoU) was signed between Central Electricity Authority (CEA) and Indian Institute of Technology, Delhi (IITD) for development of Human Resources relevant to the need of Power Sector to further strengthen R&D initiatives in CEA through enhancing their technical knowledge and R&D exposure.

Under the obligation of MoU one CEA Chair Professorship has been instituted at IIT Delhi. Further, five officers of CEA are currently pursuing part time M. Tech/MBA course from IIT Delhi.

4.9 Standardization activities

4.9.1 Standardization activities and efforts to enhance the implementation of standards in the field of Power Sector:

The Ministry of Commerce and Industry has developed the Indian National Strategy for Standardization (INSS) for acknowledging the standards for goods and services critical to the establishment of robust 'Quality Ecosystem' in India. In pursuance to the strategic consideration envisaged in INSS, BIS has brought out a 'Standards National Action Plan (SNAP)'. In order to fulfill the above objective with respect to Power Sector a Standardization Cell has been established in CEA under the Chairmanship of Shri Ashok Kumar Rajput, CE (R&D) under the aegis of Ministry of Power.

The Standardization Cell is envisaged to act as a channel of communication among the Government, Industry and Bureau of Indian Standards to facilitate the identification of new subjects and relevant experts for standardization and enhance implementation of Indian standards.

It has come to the notice that the representation from State Power Utilities in various Technical Committees of BIS concerning Electrical equipment is very few in number and only in very few committees. In order to have participation of expert(s) from all segments of Power Sector (from Central/State/Private) nominations from the power sector organizations were sought and sent to the BIS for consideration to facilitate BIS in identification of new areas/ technologies and need for revision and up-dation of Indian Standards in respect of power sector and formulation/revisions of standards thereof.

Experts from CEA are contributing in

formulation of standards through various Sectional Committees of BIS constituted regarding developing national standards on products, processes and services related to Power Sector from time to time.

4.9.2 In addition to above, inputs/comments on the following references received concerning formulation/revision/updation of standards were provided from time to time:

- Indian Standards on mass consumption products/consumer goods-ref. from Ministry of Consumer Affairs

- Draft Standard on "Technical requirements for Photovoltaic Grid Tie Inverters to be connected to the Utility Grid in India" – draft formulation under the aegis of MNRE.
- ACSR conductors to be brought under mandatory certification of BIS.
- BIS is in the process of developing the Strategic Roadmap of Electrotechnical Division Council (ETDC). Roadmap would reflect its vision of national standardization in its area of work and provide a broad standardization roadmap with a five year perspective. Chief Engineer (R&D), CEA has been designated as member of the working group to examine the comments received from various members of ETDC and develop the draft document on Strategic Roadmap for ETDC.

4.10 Make in India and Aatma Nirbhar Bharat Abhiyan initiatives:

With respect to Power Sector, Chief Engineer (R&D), CEA has been designated as the Nodal Officer to assist Ministry of Power in promoting manufacturing of goods and services in India related to Generation, Transmission and Distribution segments of the power sector under "Make in India" and "Aatma Nirbhar Bharat" initiatives of Government of India. Chief Engineer (R&D), CEA is acting as an interface between the Ministry of Power/DPIIT and the PSUs/Organizations/Autonomous Bodies under the administrative control of the Ministry of Power as well as the Industry Associations.

4.10.1 Major activities undertaken by CEA in relation to Public Procurement (Preference to Make in India), Order 2017 (PPP-MII) Order, 2017:

Some of the major activities undertaken in the R&D Division in this regard are given as under:

- Assistance to MoP in identification of following lists for giving purchase preference to local suppliers inter alia, notifying the Minimum Local Content (MLC) of the equipment, in compliance of the provisions contained in the DPIIT's PPP-MII Orders issued from time to time:

○ List of items in respect of the goods, material, equipment etc. used in the power sector under the classification of "where local capacity and local competition" exists and where only the local suppliers shall be eligible to bid irrespective of purchase value of the goods, equipment and material.

○ List of equipment used in the power sector which are manufactured under license from foreign manufacturers holding intellectual property rights and where there is a transfer of technology agreement.

○ List of general guidelines, which may be selectively adopted in an appropriate manner by the procuring entities in their tendering process to further encourage Make in India initiatives and promote manufacturing and production of goods and services in India.

4.10.2 Action taken by CEA in relation to the scheme formulated by the MoP for creation of Manufacturing Hub/Zone for Power

Sector:

- Chief Engineer (R&D), CEA has been designated by the MoP as a member of the "Committee on Indigenisation" and "Joint Task Force of MoP and MNRE" to identify equipment/components/spares which are presently imported and how their indigenisation can be done through formulation of an exclusive scheme for their manufacturing in Common Facility Centres.
- CEA in consultation with all the stakeholders of the power sector including industry associations has developed a database of all the equipment being imported in different categories such as those with zero domestic capacity, with limited capacity, volume of import, source of import and tentative demands.
- /On the basis of above inputs of CEA the Joint Task Force (of MoP and MNRE) is finalising a manufacturing scheme for exclusive manufacturing of Power Sector and RE equipments under one roof in the form of earmarked "Manufacturing Zones (Hub)" envisaged as a "One Stop Solution" with single window clearances and having modern "Common Infrastructure Facilities (CIF)" and latest state-of-the-art "Common Testing Facilities (CTF)".
- CEA/MoP is encouraging 'Transfer of Technology' in respect of imported equipment/components so that in a fixed timeframe the substitution of these imported equipment through indigenisation takes place
- CEA/MoP is also enhancing 'Research and Development (R&D)' efforts in the electricity sector for enabling manufacturing of equipment/components used in establishment of Power Sector infrastructure.

4.10.3 Registration of bidders from countries sharing land border with India:

Keeping in view the defense of India and national security, DoE issued Order (Public Procurement No.1) dated 23rd July 2020 prescribing the requirement of prior registration of bidders from countries sharing land border with India for participation in the public procurement. Pursuance to this Order a Registration Committee in DPIIT has been constituted for processing the applications as per the Standard Operating Procedure (SoP), in compliance of the DOE Order dated 23-07-2020.

MoP is the Nodal Ministry related to registration of bidders pertinent to power sector. Applications of various bidders from countries sharing land border with India received in DPIIT are being forwarded to CEA through MoP.

In this connection, 33 applications pertinent to power sector have been received in CEA so far (during the year 2020-21). CEA gathered inputs from concerned power sector stakeholders and carried out comprehensive analysis in order to ascertain the demand/supply scenario and necessity in respect of the goods/services/works for which registration is sought by the bidders. Inputs/recommendations on acceptance or rejection of such applications have been furnished to the MoP for conveying final decision in this regard to the DPIIT.

4.10.4 Inputs/comments on various other references/ issues concerning Make in India and Aatma Nirbhar Bharat initiatives of Government of India were taken up from time to time and to name a few are:

- IEEMA Submission on removal of concessions allowed under Project Imports Scheme under Chapter 98 of Customs Tariff
- Inputs for Road map for reduction of imports under the Project Imports Scheme
- Indigenisation of Power Sector equipment
- Review by Hon'ble Minister for the steps to be

taken for Make in India

- Inputs/comments on the MoP Report "Promotion of Manufacturing Zones"
- Details of Indian manufacturers and manufacturing capacities
- Representation dated 15.07.2020 received from All India Transformers Manufacturing Association (AITMA) having subject titled" Impact on the current sourcing of input materials from China"
- Constitution of Committee on Grievance in respect of Public Procurement (Preference to Make in India) Order, 2017.
- Note on CRGO Electrical Steel-Need to manufacture in India.
- Input on India's External Trade dependence
- ALMM Development of Dynamic Web-Portal for ALMM in Power Sector
- Request of POSOCO for Closure of the case regarding grievance on non-compliance of the Public Procurement Preference to Make in India Order, 2017 (PPP-MII, Order, 2017).
- Predatory pricing/ abnormally low bids by foreign companies.
- Review of effects of amendments implemented in Public Procurement (Preference to Make in India) Order, 2017 and GFR, 2017
- Material for speech of HMOSP on Make in India and AatmaNirbhar Bharat.
- Exclusive Manufacturing Zones for Power & Renewable Energy Equipment.
- Suggestions by ASSOCHAM for incorporation in the Electrical Transmission and Distribution Project tender clauses for effective implementation of Public Procurement (Preference to Make in lndia) Order towards vision of making a Self-reliant lndia (an Aatma Nirbhar Bharat) - regarding usage of prime aluminum produced in the county by cable and conductor manufacturing industry.
- Constitution of Committee for creation of manufacturing hub for indigenization of power sector equipment - Joint Task Force on Manufacturing Zones
- Proposal no 5395 - Approval of FDI proposal regarding Promoter subscription of share capital of Mr Xiaopeng Zhang (Individual) in the case of KAIDI INDIA ELECTRIC POWER ENVIRONMENTAL PVT. LTD pursuant to Ministry of Commerce FDI Proposal as per Press note 3 (2020)
- Grievance under PPP- MII Order – M/s Maha Hydraulics Private Limited appeal for using Imported Hydraulic Motor for Wagon Tipler and Side Arm Charger in Coal Handling Plant Package of NTPC Thermal Power Plant of 3 x 800 MW capacity being implemented by Patratu Vidyut Utpadan Nigam Limited (PUVNL) in Jharkhand
- Restrictive conditions in the tender of South Bihar, Power Distribution Company Limited under IPDS- Grievance of M/s Tejas Network.
- Request of BHEL for kind intervention in preventing private entities from procuring equipment from countries sharing land borders with India in violation of prevalent GOI Rules.
- Grievance of M/s Vertex Networks regarding NHPC Ltd. Firewall Tender uploaded on GeM.
- Reference received from TPRM, CEA about applications for registration of foreign bidders regarding FGD.
- M/s tkES India representation regarding CRGO Steel approved source in State Power utilities.

4.10.5 Information on Electric Vehicle Charging Infrastructure (EVCI):

CEA has been assigned the task of gathering information related to installation of Electric Vehicles Charging Stations in the country. As such, CEA is collecting this information from various utilities viz. Discoms, NTPC, Powergrid, etc.

As per the information received in CEA as on 31th March, 2021, 534 number of Electric Vehicle charging stations have been installed

under the jurisdiction of different discoms/licensees.

4.10.6 National Electricity Plan (NEP) 2022-2027:

Various Sub-Committees on broad issues of power sector have been constituted under the 'Committee on National Electricity Plan' for preparation of National Electricity Plan for the next five years (2022-2027).

The Sub-Committee on the subject **"Technological Advancement and Research and Development"** is headed by DG, CPRI. Chief Engineer (R&D) has been designated as the Member Secretary of the sub-committee.

The Sub Committee is to deliberate on the following topics as per the Terms of Reference of the Committee:

- Review of existing R&D facilities & programmes in Power sector

Recommendation regarding science and technology programmes to be implemented during 2022-27, including identification, transfer and diffusion of technology in various areas of the power sector.

The Chapter of the NEP 2022-2027 on "Technological Advancement and Research & Development" is under preparation. Following are the tentative topics that will be covered under this Chapter:

- Review of existing facilities and programs in power sector
- R&D activities to be taken up during 2022-27
- Identification of technologies that may be developed indigenously to reduce import dependence and becoming self-reliant.
- Initiatives for improving R&D in generation, transmission and distribution segments of the power sector.
- R&D in renewable energy.
- R&D for mitigation of adverse effects on Environment.

4.11 Advance Chemistry Cell (ACC)- Giga Scale battery manufacturing:

Comments on following references were furnished:

- Report on Standard and Labelling Program of BEE on ACC Cells and Batteries.
- National Program on Advanced Chemistry Cell (ACC) battery manufacturing scheme formulated by NITI.
- Model bid document of National Program on Advance Chemistry Cell (ACC) battery storage.

4.12 Other important references on which comments/inputs were provided are as under:

- Standing Committee on Energy (2019-20): Statement of Minister in compliance of Article - 73A of the Directions of Speaker (Lok Sabha) in respect of various reports of the Committee.
- Request for amendment in Guidelines for Tariff Based Competitive Bidding Process for Procurement of Round-The Clock Power from Grid Connected Renewable Energy Power Projects, complemented with Power from Coal Based Thermal Power Projects.
- Draft Electricity (Rights of Consumers) Rules, 2020
- Comments on National Electricity Policy.
- DHI's Expression of Interest (EoI) inviting Proposals for availing incentives under FAME India Scheme Phase II for deployment of EV charging infrastructure on Highways / Expressways.
- Promotion of Electric Vehicle Manufacturing in India Preliminary Project Report - (PPRID -

10842) PPR of NITI Aayog (11.05.2020)

- Consideration of Power Generation from Black Liquor Dry Solids (BLDS) as Renewable Energy.
- Draft Report by Policy Group (June 2020) titled "Promoting Waste Heat Recovery Applications from Energy Intensive Industries" - consideration of waste heat power as alternative to renewable energy.
- Standing Finance Committee for Appraisal of the Projects for setting up solar PV capacity of 20 MWac/ 50 MWp with battery storage of 50 MWh at Phyang, Leh and 1 MW solar-wind hybrid plant with battery storage of 1 MWh at Nyoma under J&K Prime Minister Development Package (PMDP) – 2015.
- Draft BRICS Energy Ministerial Communique to be adopted during the Ministerial meeting - Email from IC Division MOP dated 24-09-2020.
- Inputs on Core Group of Secretaries on India-Japan Investment Promotion Partnership.
- Comments on "DST's Draft Note for CoS-concerted action plan on technological intervention to handle and utilize the waste in India".
- Background note for Chairperson, CEA for the Power Ministers Conference.
- Formulation of Project Development Cell (PDC) for "Attracting Investment in India".
- Comments on EFC memo from M/o Steel regarding draft note for expenditure Finance Committee for Appraisal of Production Links Incentives (PLI) Scheme for Specialty Steel.
- Preliminary Project Report from NITI Aayog regarding Technical assistance for building advanced battery manufacturing capabilities in India.
- Preliminary Project Report from NITI Aayog regarding Developing Long-term Energy Modelling Tools-IESS-2047.
- Preliminary Project Report from Karnataka Government regarding Demonstration of Smart operation management through Battery Energy Storage System (BESS).
- Suggestions for development of e-Mobility for decarbonizing the power and transport sectors in ASEAN member states.
- Comments on the report on inclusion of new product category Quadricycle under FAME-India Scheme-II.
- Comments on United Kingdom Presidency of the G7 2021 "Policy Priorities for Leaders" summit concept note December 2020.
- Standing Committee on Energy 2020-21-Examination of the Demands for Grants of MoP for the year 2021-22.Comments on Terms of Reference (ToR) of sub-committee on public charging infrastructure for electrical vehicles for effective coordination on cross-cutting themes.
- SFC proposal of M/o Steel for promotion of research & development in iron & steel sector.
- Inputs regarding manufacturing capabilities and competition in respect of air cooled condenser technology as well normal cooling tower capacities.
- NITI Aayog and Department of Science and Technology manual for EV charging infrastructure handbook.
- Note to ministry on mandatory approval and necessary cyber testing for import of SCADA systems and components.

4.13 Nominations of officers of R&D Division, CEA in various Committees:

- Member (Planning), CEA is the special invitee in the Sub-Committee on Public Charging Infrastructure for Electric Vehicles for effective coordination on Cross-Cutting Themes – vide MoP OM dated -*18.12.2020.
- Chief Engineer (R&D) is representing power sector in the Inter-Ministerial Committee of Ministry of Mines, for the purpose of Aluminum import substitution.
- Chief Engineer (R&D) is a member of the Task Force constituted to formulate testing standards & procedure and identify requirement

of infrastructure upgradation for creating a separate test bed for Cyber Security.

- Chief Engineer (R&D) and Chief Engineer (PSETD) has been nominated from CEA as a member of the Committee constitution by the MoP for creation of manufacturing hub for indigenization of power sector equipment – vide MoP Order dated 31.08.2020
- Director (R&D) was nominated from CEA for the Monitoring Group constituted by the MoP related to implementation of capital projects of CPRI.Director (R&D) is representing CEA in the Committee related to CPRI issues related to gaps in testing infrastructure of CPRI constituted by the MoP.Director (R&D) was nominated from CEA in the Committee constituted for review of projects under Uchhatar Avishkar Yojana (UAY), an initiative of Ministry of Human Resource Development to promote innovation.
- Deputy Director (R&D) has been nominated as a member of the Committee constituted in CEA to study for Water consumption in Thermal Power stations (TPS) in present scenario

4.14 Fuel Management and Analysis

Central Electricity Authority (CEA) plays a pivotal role in optimal utilization of coal for the power sector. It monitors coal supply to the power plants so that plants have sufficient coal stock as per norms. CEA in association with MoP, MoC, Railways and other stakeholders closely monitors the coal supply to power plants and take necessary steps to improve supply of coal to power plants. With the concerted efforts of all stakeholders, the coal supply to power utilities is maintained to meet their coal requirement. At the beginning of the year (as on 01.04.2020), the coal stock available with the thermal power plants was 51.73 Million Tonnes (MT), which was sufficient to run these plants for an average of 25 days. However, as on 31st March 2021, the total coal stock available with the plants reduced to 31.93 Million Tonnes, which was sufficient to run these plants for an average of about 17 days

4.14.1 Monitoring Mechanism

The coal stock position of all the power plants in the country having coal linkages are being monitored by CEA on a daily basis and daily report is published on National Power Portal (NPP) (www.npp.gov.in). Moreover, on monthly basis, the power plants designed on imported coal, plants having dedicated coal block, plants getting coal through e-auctions apart from the plants having coal linkages are monitored and monthly report is published which is uploaded on CEA website.

CEA is a member of an Inter-ministerial subgroup constituted by the Infrastructure Constraints Review Committee under the Chairmanship of Joint Secretary, Ministry of Coal comprising of representatives from Ministry of Railways, Ministry of Power, Shipping, NITI Aayog, CEA, CIL and NTPC Limited. The subgroup reviews and monitors coal supply and related infrastructural constraints on day-to-day basis for adequate supply of coal to power plants.

4.14.2 Coal Scenario for the Power Sector during 2020-21

4.14.2.1 Estimation of coal requirement for the year 2020-21.

During 2020-21, total coal requirement was estimated to be about 690 MT, which included coal requirement of about 645 MT for the plants designed on domestic coal and 45 MT for imported coal based plants.

The break-up of coal requirement during 2020-21 is given as under:

(Figs. in MT)

Coal Requirement	2020-21

Domestic Coal based Plants	645.2
Imported Coal based Plants	45.0
Total Requirement	**690.2**

4.14.2.2 Coal Supply Position for the year 2020-21

For the year 2020-21, total receipt of coal (domestic + imported) was 596.3 MT against the estimated coal requirement of 690.2 MT. However, the coal consumption was about 615.4 MT during the period, which was met from the stock available with the plants. The details of coal receipt and consumption for year 2020-21 are given as under:

(Figures in MT)

A. Estimated Requirement (Domestic + Imported)	690.2 (645.2 + 45)
B. Receipt	
a. Domestic coal	550.8
b. Imported coal for blending	10.4
c. Imported coal for plants designed on imported coal	35.1
d. Total Receipt (a+b+c)	596.3
C. Consumption (Actual) (includes Imported coal)	615.4

During the year 2020-21, the receipt of coal by the power plants from domestic sources was 550.8 MT as against 569.5 MT during 2019-20 resulting in reduction of about 18.7 MT, whereas receipt of imported coal during the year 2020-21 was 45.5 MT as against 69.2 MT during previous year reducing by about 23.7 MT. Total coal consumption during 2020-21 was 615.4 MT as against 622.2 MT during last year. Plant-wise details of coal receipt and coal consumption during 2020-21 is enclosed at **Annexure-4A.**

4.14.2.3 Source-wise Receipt of coal during 2020-21

During the year 2020-21, source-wise break-up of coal receipt at the power stations is given below:

Source	**Actual Receipt (MT)**
CIL	422.4
SCCL	43.2
Captive Mines	50.1
E-Auction	35.1
Total Domestic Receipt	**550.8**
Total Import	**45.5**
Total Receipt	**596.3**

4.14.2.4 Import of coal during the year 2020-21

Power plants designed on imported coal import coal to meet its fuel requirement. Further, plants designed on domestic coal also import coal for blending purpose in view of their cost-economics as well as to bridge the shortfall in the availability of domestic coal. With the increased availability of domestic coal, Govt. has taken initiative to substitute the imported coal used for blending purpose with domestic coal. Ministry of Power vide letter dated 28.04.2020 also advised generating companies who are importing coal for blending purpose to make best efforts to replace their import with domestic coal. Further, Ministry of Coal in May 2020 has constituted an Inter-Ministerial Committee (IMC) under the Chairmanship of Additional Secretary (Coal) for the purpose of substitution of imported coal and to suggest measures to eliminate substitutable coal import. Member (Planning), CEA also took several meetings with the stakeholders to discuss and resolve the issues in the substitution of imported coal used for blending purpose. With the concerted efforts of MoP, MoC, CIL, CEA and

power plants, the import of coal has reduced.

During 2020-21, the coal imported by the power plants for blending was 10.4 MT vis-à-vis 23.8 MT during previous year resulting in reduction of 13.4 MT (about 56%). In addition to above, power plants designed on imported coal have imported 35.1 MT coal during 2020-21 vis-à-vis 45.5 MT during last year resulting in reduction of 10.4 MT (about 23%). The total import by power plants has reduced by about 34% as compared to previous year.

4.14.2.5 Generation Loss

During the year, 2020-21 power utilities have reported generation loss of about 5.6 Billion Units (BU) (**Provisional**) due to shortage of coal.

4.14.2.6 Specific Coal Consumption

During the year 2020-21, the Specific Coal Consumption (kg/kWh) of the power plants designed on domestic coal was 0.667 kg/kWh as compared to 0.668 kg/kWh in 2019-20. However, for the plants designed on imported coal, it was 0.457 kg/kWh as against 0.481 kg/kWh in 2019-20.

4.14.3 Coal Quality Issues

In order to address the issue of quality of coal dispatched by coal companies to the power utilities and grade slippage, it was decided in MoP on 28.10.2015 that coal samples shall be collected and analyzed by a single Third Party Agency, Central Institute of Mining and Fuel Research (CIMFR). Subsequently, vide MoP's OM dated 20.05.2016, it was decided that Third Party Sampling at unloading end may also be carried out by CIMFR only.

Based on the above decisions, CIMFR started Third Party Sampling at both the ends (loading-end and unloading-ends) for the generating stations. This has resulted into lowering of Energy Charge Rate (ECR), thus benefiting the end consumers of electricity. A portal is also being developed by CIMFR for monitoring of the sampling and analysis work. Further, based on the results of CIMFR, debit/ credit notes are being issued by the coal companies.

4.14.4 New initiatives for addressing issues related to coal supply to Power Plants

A. Flexibility in Utilization of Domestic Coal

The Government, on 04.05.2016, approved the proposal for allowing flexibility in utilization of domestic coal amongst power generating stations to reduce the cost of power generation. Under the scheme, the Annual Contracted Quantity (ACQ) of each individual coal linkage as per Fuel Supply Agreement is aggregated as consolidated ACQ (AACQ) for each State and Company owning Central Generating Stations instead of individual generating station. The State/Central Gencos have flexibility to utilize their coal in most efficient and cost effective manner in their own power plants as well as by transferring coal to Power plants of other State/Central Gencos for generation of cheaper power. The methodology provides for utilizing coal amongst State/Central Generating Stations through four cases- i) within state ii) one state to another state iii) one state to CGSs & vice versa and iv) within CGSs & other CGSs. The methodology in this regard has been issued by CEA on 08.06.2016.

The methodology for use of coal transferred by a State to Independent Power Producer (IPP) generating stations (Case-4) has been issued by Ministry of Power, Govt. of India on 20.02.2017. As per the methodology, the State

can divert their coal and take equivalent power from IPP generating station which is selected through an e-bidding process. The guiding principle of the methodology is that the landed cost of power from IPP generating station at the State's periphery should be lower than the variable cost of generation of the State generating station whose power is to be replaced by generation from IPP. The landed cost of power is inclusive of the transmission charges and transmission losses.

Current Developments of the Scheme:

- All State/Central gencos have signed supplementary agreement with Coal Companies for aggregation of their ACQ. CIL, on quarterly basis, allocates coal to the plants of State /Central Gencos as per their requirement under their AACQ. Based on their AACQ, State/Central Gencos are utilizing coal optimally in their more efficient power plants and getting benefitted in terms of payment of performance incentive (PI) / penalty as PI / penalty are now calculated based on AACQ with a coal company.

- As per the methodology issued by MoP on 20.02.2017 for Case-4, Gujarat Urja Vikas Nigam Limited (GUVNL) and Maharashtra State Power Generation Company Limited (MSPGCL) invited bids for supply of power from willing IPPs.

- GMR Chhattisgarh Energy Limited (GCEL) emerged as successful bidder in case of bid invited by GUVNL and was awarded contract to take equivalent power of 500 MW at a tariff of Rs 2.81 per unit for a period of 8 months starting from November 2017 to June 2018. However, power supply started from January 2018. The contract was later extended by GUVNL till November, 2018.

- Gujarat has again invited bids and awarded contract to GCEL for supply of 1000 MW at a tariff of Rs. 3.16 per unit. The Power purchase agreement (PPA) was signed on 21.12.2018 and the contract period was upto June, 2019. However, the supply of power started from January, 2019 and the contract was extended till December, 2019.

- Maharashtra tied up 400 MW (185 MW with Dhariwal Infrastructure Ltd. and 215 MW with Ideal Energy Projects Ltd. – Bela TPS) for a period of 8 months at a tariff of Rs. 2.76 per unit. The supply of power started by Dhariwal Infrastructure Ltd. from April 2018 and by Bela TPS from May 2018. Maharashtra has again tied up 185 MW with Dhariwal Infrastructure Ltd. from November 2019 to October 2020.

B. National Power Portal

National Power Portal (NPP) has been developed in CEA for collection of various power sector related data and various reports are generated with the help of these data. Through this portal, the power plants are furnishing their coal related data. Daily Coal Report, Monthly Coal Report and Monthly Gas Report are being generated through this portal.

4.14.5 Gas Supply Position

CEA monitors 63 Nos. of gas based power stations with a total installed capacity of 23902 MW (As on 31st March 2021) using gas as primary fuel. The production and supply of gas have not been keeping pace with the growing demand of gas in the country including in power sector. Even gas allocations committed for power stations are not fulfilled due to shortage of gas in the country. The domestic gas supply during 2020-21 was 18.38 MMSMMD only against allocation of 84.89 MMSCMD. The PLF achieved during 2020-21 was 24.2% only against PLF of 23% during previous year due to higher import of gas (RLNG). Plant-wise details of gas allocated and supplied/consumed during 2020-21 is enclosed at **Annexure-4B**.

The gas supply position in gas based power plants during 2020-21 is as under:

(Figures in MMSCMD)Category	Domestic Gas			RLNG (Imported)		TOTAL	PLF (%)
	APM / Non - APM/ PMT	KGD-6	Total	Long Term Contract	SPOT		
Gas Allotted (Domestic)	52.51	32.37	84.89	7.48	-	92.37	24.2%
Gas Supplied	18.38	0.00	18.38	3.52	8.18	30.08	
% Gas Supplied w.r.t Gas Allotted	**35%**	0%	22%	47%	-	33%	

(MMSCMD: Million Metric Standard Cubic Meter per Day.)

4.15 Progress of Grid connected Renewable Energy Projects:

The Government of India has set a target of achieving Renewable Energy Capacity of 175 GW by the year 2022. This includes 100 GW of Solar, 60 GW of Wind, 10 GW consisting of Biomass & Bagasse and 5 GW of Small Hydro. As on 31-03-2021, the total grid connected installed capacity from renewable energy sources is 94433.79 MW.

4.16 Generation from Renewable Sources:

Generation from Renewable Energy Sources and conventional sources for the years 2014-15, 2015-16, 2016-17,2017-18, 2018-19, 2019-20 & 2020-21 and the percentage of RE to total generation for the above period are given below:

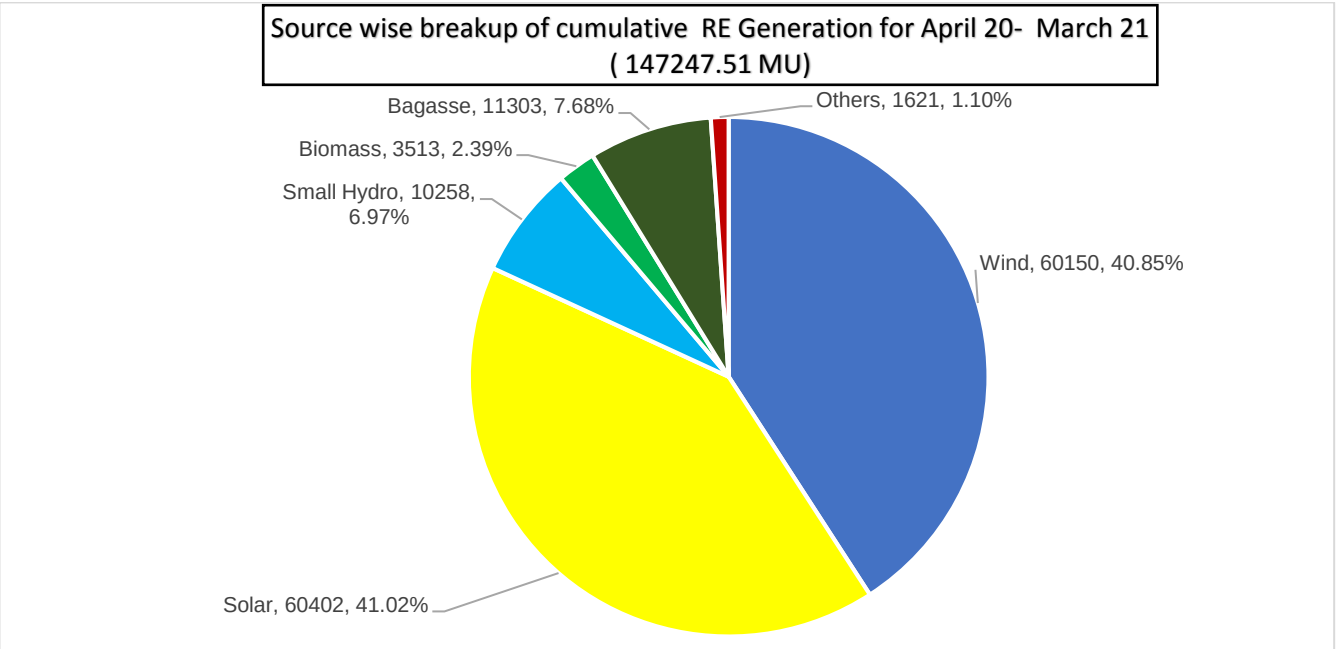
Years	Non RES Generation (MU)	RES Generation (MU)	Total Generation (MU)	% of RE w.r.t. total generation
2014-15	1048672.90	61719.25	1110392.15	5.56
2015-16	1107822.28	65780.86	1173603.14	5.61
2016-17	1160140.90	81548.21	1241689.11	6.57
2017-18	1206306.20	101839.48	1308145.68	7.79
2018-19	1249340.00	126760.00	1376100.00	9.21
2019-20	1250783.91	138337.02	1389120.93	9.95
2020-21	1234607.64	147247.51	1381855.15	10.66

4.16.1 Renewable energy generation was about 10.66% of total energy generation in the country during 2020-21. Year wise generation from renewable energy sources (RES)

indicating the growth rates is given below:

Year	Generation from RES (BU)	Year-wise growth (%)
2014-15	61.72	--
2015-16	65.78	6.58
2016-17	81.55	23.97
2017-18	101.84	24.88
2018-19	126.76	24.47
2019-20	138.33	09.13
2020-21	147.25	06.44

4.16.2 The charts indicating source-wise generation from RE sources for the month of March 2021 and Cumulative source-wise generation from RE sources for year 2020-21 are given below:



4.17 Development of Renewable Energy (RE) sources

For sustainable development and economic growth, focus of the Government of India is towards de-carbonization of Indian Power Sector and shifting from the fossil fuels based Energy to the renewable sources based Energy, which are cleaner, safer, environment friendly and more sustainable.

Government of India has set a target of achieving 175 GW of Renewable Energy (RE) installed capacity by 2022 comprising of 100 GW of solar, 60 GW of wind, 10 GW of biomass and 5 GW of small hydro. Further, the renewable energy installed capacity target has been revised to 400 GW by 2030 and by that time 60% of our installed power generation capacity is expected to be from Non-Fossil fuel based sources of energy. As per MOP OM No. 15/2/2016-H-I(Pt.) dated 8th March, 2019 the hydro power plants having a capacity above 25 MW have been declared as renewable sources of power. However, increasing penetration of solar and wind power renewable sources having inherent variability and intermittency nature is expected to pose challenges of grid stability and security.

The Renewable Technology and Integration (RT&I) Division in the Planning Wing of the CEA has been entrusted with responsibility to assist in promotion of renewable sources of energy and to help in development of the standards, regulations and guidelines for the smooth and rapid integration of RE in Indian Power Grid. CEA is contributing in faster development of RE sources and reduction of dependency of power sector on fossil fuels. Related to this, the following tasks were accomplished during 2020-21:

4.17.1 Formulation of Technical standards/ regulations in RE sector

The draft standards on "Technical requirements for Photovoltaic Grid Tie Inverters to be connected to the Utility Grid in India" were examined and comments were provided to the Ministry of New and Renewable Energy (MNRE) for the finalization of the above standard by Bureau of Indian Standards (BIS). It will be an inclusive standard covering efficiency, grid interactive and environmental testing related aspects essential for complete performance testing of inverters for quality assurance.

4.17.2 Advice on Policy/Guidelines related to Renewable Energy

1. Provided advice on following important references/issues of policy matter/guidelines:

2. Guidelines for Tariff Based Competitive Bidding (TBCB) process for procurement of power from grid connected renewable power projects, with or without energy storage system and/or balancing power.

3. Interaction with various stake holders and MoP/MNRE for promotion of Waste to Energy [particularly Municipal Solid Waste (MSW) to Energy] and providing of necessary regulatory/policy assistance to Waste to Energy (WtE) Projects.

4. Request for Selection (RfS) Document of Solar Energy Corporation of India (SECI) for Selection of RE Power Developers for Supply of 5000 MW of Round-the-Clock (RTC) Power complemented with Power from Coal based Thermal Power Projects in India under Tariff-based Competitive Bidding (RTC-II).

5. Inclusion of gas-based power plants under Round-the-Clock (RTC) Power complemented with Gas based thermal power projects in India under Tariff-based Competitive Bidding.

6. Reference received from PMO regarding New Initiatives to be undertaken for unlocking full potential of NER pertaining to power sector.

7. Reference received from Ministry of Power (MoP) regarding Inputs on National Bamboo Mission.

8. Various grievances received from PMO through the Grievance Officer of CEA.

9. Reference received from MOP regarding Draft Memorandum for Public Investment Board (PIB) for setting up of 100 MW (AC)

(160 MW DC capacity) Solar PV Power Plant with 40 MW/ 120 MWh of Battery Energy Storage System (BESS) in Chhattisgarh.

10. Provided comments on the proposal of Copenhagen Infrastructure Partners (CIP) for the development of an offshore wind farm in the Mannar Gulf region received from MoP. Proposal aims at helping Government of India to fulfil its offshore wind ambitions through scope, speed, skills and scale under the India-Denmark Green Strategic Partnership. It has been sent by CIP as part of the agreement arrived at between Hon'ble Prime Minister of India and the Prime Minister of Denmark on 28th September 2020.

11. Participated in the meeting of the Inter-departmental Committee to recommend the areas of Research & Development in Geothermal Energy and presented its views on this subject.

12. Prepared inputs on various aspects of Hydrogen Economy in India for a high-level Committee under NITI Aayog to discuss the launch a Hydrogen Economy in India.

13. RT&I Division of CEA is representing in Hydrogen Mission of Government of India.

4.17.3 Evaluation of various Technologies for RE sector

Examined various new technologies in the field of renewable energy like waste heat to electricity from industries, tri-generation systems, Policy Proposal incentivizing Waste Heat Recovery (WHR) from Industries and Power Plants, Disposal of Bio-medical Waste and Generation of Electricity from it etc. CEA has received representations from industries for classification and promotion of power produced from waste heat in cement industry, biomass based co-firing and exothermic reaction of sulphuric acid as renewable energy. These proposals were examined and commented upon.

4.17.4 Establishment of Renewable Energy Management Centres (REMCs) in RE Rich States and other parts of the country

Ministry of Power in February, 2020 directed CEA to submit the third-Party evaluation report of 11 commissioned REMCs and progress report of REMC in Telangana and EMC in South Andaman. An assessment has been made of the facilities installed under REMC projects vis-à-vis as envisaged in the Detailed Project Report (DPR) and utilization of various tools provided at REMCs for the management of RE generation. Based on the evaluation, the recommendations have been made towards further development of REMCs for better management of Renewable Energy Sources (RES). A report in this regard was submitted to MOP.

Further, observations/comments on the DPR of UP REMC based on the ongoing assessment of 11 Nos. REMCs were offered to PGCIL.

4.18 Advice on technological and engineering issue

CEA provided advice on technological and engineering issue to external agencies including Central and State Government. These are:

- Feasibility of the proposal from Government of Uttarakhand for the proposed project in the Energy Sector titled "Harnessing Renewable Energy for Sustainable Rural Development" as grant with external assistance from ADB and Preliminary Project Report regarding "enhancing the livelihood of Rural Community of Meghalaya through use of Renewable Energy Systems".
- Preliminary Project Report regarding Solar Energy Projects for Women and Child

Development (WCD) Institutions and Preliminary Project Report regarding Infrastructure support for Women and Child Development (WCD) Institutions were examined and provided views on techno-economic aspects of the projects.

- Some of the other studies examined and provided opinion are:

1. Department of Science and technology's (DST's) Note for the approval of Committee of Secretaries (CoS) on the concerted action plan on technological intervention to handle and utilize the waste in India.
2. Draft EFC Memo" for "National Programme on Solar PV Manufacturing, etc.
3. SFC proposal of Ministry of Environment, Forest and Climate Change (MoEF&CC) on Central Sector Scheme titled "Sustainable Management of Wastes and Hazardous Substances.
4. Guidelines related to latest technologies in the waste and waste water treatment by Ministry of Housing and Urban Affairs (MOHUA).

4.19 Monitoring and implementation of R&D Schemes in the field of renewables

Promoting R&D in renewable energy sector will help in building up of indigenous capability, bring technology advancement for existing and emerging technologies, cost reduction, enhanced reliability and increased efficiency in the renewable sector. CEA provided its views/comments on projects in RE sector in the area of Advanced Solar Thermal, Solar Photo voltaic (SPV), Biogas, Wind, Wind-Hybrid, Storage, Small Hydro Power, Hydrogen and Fuel Cells etc. to various organizations working in the field of Renewable power.

4.20 Assistance in matters pertinent to international cooperation

With the establishment of International Solar Alliance (ISA), India has been positioned among the world leaders in the Renewable Energy (RE) sector and the ambitious target set for RE in the country can be fulfilled with cooperation among the countries.

To enhance the external cooperation, CEA has provided its opinion to Ministry of Power (MoP) and MNRE for transfer of technology, mobilizing investment, sharing experiences, regulatory and policy frameworks and best practices in RE sector through collaborative approach.
Some of the important external cooperation references in which CEA has provided its inputs/advice to MNRE and MoP are:
1. Comments for the upcoming BRICS Senior Energy Officials and Energy Efficiency Working Group meeting
2. Comments on Joint Action Plan for sustainable goal (SG) pillar under India US strategic energy partnership
3. Core Group of Secretaries on India-Japan Investment Promotion Partnership etc.
4. Joint Work Programme 2021-2023 between the Government of India and the International Energy Agency (IEA).
5. Providing inputs on draft report from IEA on Renewable Integration in India 2021.
6. Provided inputs on Concept Note on Renewable Energy for Energy Security on cooperation with the Republic of Korea on theme "Renewable Energy for Energy Security".
7. Provided inputs on Concept paper of the Video Conference to Disseminate Study on "Assessment of Wind and Solar Power Forecasting Techniques in SAARC Countries".

4.21 Investment and R&D needs in RE Sector

Establishment of Solar and Wind and other sources of Renewable Power facilities require timely availability of funds. The facilities need to be developed based on proper survey and assessment for available resources potential, with availability of adequate power evacuation and control system. The plans developed may either be off Grid (in remote areas) or grid connected as per the feasibility. The National Institute of Solar Energy (NISE) & the National Institute of Wind Energy (NIWE) are involved in undertaking Solar and Wind potential assessment. CEA is playing a pivotal role in rapid growth of Renewable Energy integration areas.

CHAPTER – 5

POWER SYSTEMS PLANNING AND DEVELOPMENT

5.1 Transmission Planning

All issues relating to planning and development of Transmission System in the country are dealt in the Power System Wing of CEA. This includes evolving long term and short term transmission plans in coordination with central, state transmission utilities and generating companies. The network expansion plans are optimized based on power system studies. This also involves formulation of specific schemes, evolving a phased implementation plan in coordination with the Central and State transmission utilities and their implementation, issues pertaining to development of national power grid in the country and issues relating to cross border electricity interconnections. Transmission planning studies are being conducted to identify evacuation system from generation projects and to strengthen the transmission system in various regions. In addition, the Power System Planning & Appraisal Division, CEA, also works on planning and development of cross-border transmission links with neighbouring countries. They also provide technical and policy inputs to facilitates cross border trade of electricity.

5.2 Inter-regional transmission system in India – National Grid.

A national grid in the country has been developed in phased manner. All the regional grids have been inter-connected synchronously to form One grid – One Nation – One frequency. Inter-regional transmission capacity by the end of 9th plan was 5,750 MW which increased to 14,050 MW by the end of 10th plan and to 27,750 MW and 75,050 MW by the end of 11th and 12th plan respectively. Interregional transmission capacity added during plan period 2017-22 (up to 31st Mar'2021) is 30,000 MW. As on 31.03.2021, inter-regional transmission capacity in the country is 105,050 MW. Details of interregional transmission lines are given at **Annexure-5A**. The increase in inter-regional transmission capacity would further facilitate smooth flow of power from surplus to deficit regions.

5.3 Regional Standing Committee on Power System Planning/ Regional Standing Committee on Transmission /Regional Power Committee (Transmission planning)

5.3.1 Brief Introduction:

The Regional Standing Committees on Power System Planning constituted by CEA have representation of CEA, Transmission Utilities of constituent States of the region, Central Transmission Utility of India Limited, POWERGRID, POSOCO, representative of Central Sector Generating companies and Regional Power Committee. The interstate transmission system for evacuation of generation & system strengthening schemes and some of the major intra-state transmission schemes are firmed up through discussion in the meetings of the Regional Standing Committee on Power System Planning.

MoP vide letter dated 13th April, 2018, had constituted Regional Standing Committees on

Transmission for NR, WR, SR, ER and NER, under the chairmanship of Member (Power System), CEA.

In supersession of MoP order dated 13th April, 2018 , MoP vide letter dated 4th November, 2019, constituted five Regional Power Committees (Transmission Planning) [RPC(TPs)] viz. Eastern Regional Power Committee (Transmission Planning) [ERPC(TP)], Western Regional Power Committee (Transmission Planning) [WRPC(TP)], Northern Regional Power Committee (Transmission Planning) [NRPC(TP)], Southern Regional Power Committee (Transmission Planning) [SRPC(TP)] and North Eastern Regional Power Committee (Transmission Planning) [NERPC(TP)] under the chairmanship of Member (Power System), CEA, with Chief Operating Officer (CTU), Director (System Operation), POSOCO, Heads of State Transmission Utilities (STUs) of the states of respective regions, Member Secretary of Regional Power Committee of respective region, CMD/ MD/ Chairman of NTPC/ NHPC/SECI/DVC/NEEPCO as members and Chief Engineer (Power System Wing), CEA, as Member Secretary. Terms of Reference (ToR) of the Committee are as follows:

i. Carry out a quarterly review of the Transmission System in the region; assess the growth in generation capacity and the demand in various parts of the region; and draw up proposals for strengthening inter- Regional transmission system. The transmission planning is required to keep in mind the areas where the generation is likely to grow and areas where load demand will grow so that the transmission system at any point of time is capable to meet the demand in every corner of the country and comply with the mandate under the Tariff Policy of developing transmission system ahead of the generation for ensuring smooth operation of the grid .
ii. Assess the transmission system requirements in the near, medium and long term and draw up transmission schemes to meet these requirements. While doing this a perspective plan for the next 15-20 years may also be kept in mind and accordingly the requisite allowance/margin may be factored in the system during planning process.
iii. Examine applications for connectivity and access and ensure that these are granted speedily, provided that the requisite fees/charges are paid.
iv. Review the upstream and downstream network associated with transmission schemes.
v. Examine and evaluate the intra-state transmission proposals.
vi. Review and facilitate the construction of the inter-regional grid strengthening schemes.

5.3.2 Following Meetings of RPC(TP) were held during 2020-21:

Northern Region:

- 2nd Meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] was held on 01.09.2020 through video conferencing.
- 3rd Meeting of Northern Regional Power Committee (Transmission Planning) [NRPC(TP)] was held on 19.02.2021 through video conferencing.

Western Region:

- 2nd meeting of Western Regional Power Committee (Transmission Planning) [WRPC(TP)] was held on 04.09.2020 through video conferencing.

Southern Region:

- 2nd meeting of Southern Regional Power Committee (Transmission Planning)

[SRPC(TP)] was held on 01.10.2020 through video conferencing.

Eastern Region:

- 2nd meeting of Eastern Regional Power Committee (Transmission Planning) [ERPC(TP)] was held on 30.09.2020 through video conferencing.
- 3rd meeting of Eastern Regional Power Committee (Transmission Planning) [ERPC(TP)] was held on 09.02.2021 through video conferencing.

North Eastern Region:

- 2nd meeting of North Eastern Regional Power Committee (Transmission Planning) [NERPC(TP)] was held on 25.09.2020 through video conferencing.

The transmission systems firmed-up in these meetings are given in **Annexure – 5B.**

5.4 Private Sector Particiaption in Transmission Sector

5.4.1 Brief Introduction:

- Promotion of competition in the electricity industry in India is one of the key objectives of the Electricity Act, 2003. As per the provisions under Section 63 of the Electricity Act, 2003 and the Tariff Policy dated 6th January, 2006, Ministry of Power, issued "Guidelines for Encouraging Competition in Development of Transmission Projects" and Tariff Based Competitive Bidding Guidelines for Transmission Services". These guidelines aim at laying down a transparent procedure for facilitating competition in the transmission sector through wide participation in providing transmission services and tariff determination through a process of tariff based competitive bidding.

- As envisaged in the Guidelines, Ministry of Power had constituted an Empowered Committee on Transmission to identify inter-state transmission projects to be developed through competitive bidding and to oversee the process of competitive bidding. Ministry of Power has also issued Standard Bidding Documents (SBDs), viz. Request for Qualification (RfQ), Request for Proposal (RfP), and Transmission Service Agreement (TSA) and Share Purchase agreement (SPA). As provided in the Guidelines, Ministry of Power has appointed PFC Consulting Limited (PFCCL) and REC Transmission Projects Company Limited (RECTPCL) as the Bid Process Coordinators (BPC) for carrying out the bidding process.

- Further, MoP in compliance with provisions laid down in Tariff Policy dated 6th January, 2006 issued an O.M on 9th December, 2010 which provides that since 6th January, 2011, all the ISTS transmission projects are to be implemented through tariff based competitive bidding except some projects as identified by MoP which are to be implemented by CTU under compressed time schedule.

- The Revised Tariff Policy issued by Ministry of Power on 28th January, 2016 states the following: -

Clause 5.3: "The *tariff of all new generation and transmission projects of company owned or controlled by the Central Government shall continue to be determined on the basis of competitive bidding as per the Tariff Policy notified on 6th January, 2006 unless otherwise specified by the Central Government on case to case basis.*

Further, intra-state transmission projects shall be developed by State Government through competitive bidding process for projects costing above a threshold limit which shall be decided by the SERCs."

Clause 7.1(7): "*While all future inter-state transmission projects shall, ordinarily, be developed through competitive bidding process, the Central Government may give exemption from competitive bidding for (a) specific category of projects of strategic importance, technical upgradation etc. or (b) works required to be done to cater to an urgent situation on a case to case basis".*

- Subsequently, MoP vide its office order no. 15/3/2017-Trans dated 13.04.2018 reconstituted the Empowered Committee on Transmission (ECT) and also constituted the National Committee on Transmission (NCT). The NCT recommended the mode of implementation {Tariff Based Competitive Bidding (TBCB) / Regulated Tariff Mechanism (RTM)} of transmission schemes agreed in Regional Standing Committee on Transmission (RSCTs). Based on the recommendations of NCT, ECT allocated the transmission projects to BPCs.

- MoP vide letter dated 4th November, 2019, has reconstituted the "National Committee on Transmission" and has dissolved Empowered Committee on Transmission. The reconstituted NCT with changed Terms of Reference is also required to keep the guidelines of Tariff Policy in mind.

- As far as Inter-State transmission system is concerned, till 31st March, 2021, fifty-six projects have been awarded through Tariff Based Competitive Bidding out of which thirty projects have already been commissioned/ready for commissioning and twenty-two are under implementation by various Transmission Service Providers. Out of balance four projects, one project has been cancelled by CERC, in one project the TSP has requested for closure and construction of two projects could not start due to litigation. Apart from this, there are fourteen projects which are presently under bidding.

5.4.2 Status of the Transmission schemes notified through TBCB:

Projects awarded through TBCB	**56**
Projects commissioned so far	30
Projects under implementation	22
Stalled projects	04
Projects under bidding	**14**

Stalled projects	**04**
Project cancelled by CERC	01
Projects not taken up & CERC cancelled license	01
Projects under litigation	02

The schemes notified through TBCB during 2020-21 are given at **Annexure – 5C.**

5.4.3 Following meetings of the National Committee on Transmission (NCT) were held during 2020-21:

In the year 2020-21, two meeting of National Committee on Transmission has been held which is given below:

- 3rd meeting of the National Committee on Transmission (NCT) was held on 26th and 28th May, 2020 through Video Conferencing.
- 4th meeting of the National Committee on Transmission (NCT) was held on 20th and 28th January, 2021 through Video Conferencing.

The transmission schemes and relevant issues taken up in this meeting are given at **Annexure – 5D**.

5.5 Examination of Detailed Project Reports (DPRs) / Feasibility Reports (FRs) of Hydro Power Projects for processing of concurrence by CEA

Following DPRs/FRs of hydropower projects examined for processing of concurrence by CEA

Northern Region:

(i) DPR examination of Bowala Nand Prayag (300 MW) by M/s UJVNL.

(ii) DPR examination of Kirthai I (390 MW) HEP by M/s JKSPDC.

(iii) DPR examination of Thana Plaun (191 MW) by M/s HPPCL.

(iv) DPR examination of Dugar (500 MW) by M/s NHPC

Western Region: NIL

Southern Region:

(i) DPR examination of Pinnapuram PSP (1200 MW) by M/s GEPL.

Eastern Region: NIL

North Eastern Region

(i) Wah Umiam Stage-III HEP (Erstwhile Mawphu HEP, Stage-II (85 MW) in Meghalaya by NEEPCO Ltd.

5.6 Examination of DPR/FR of Transmission Works for processing of clearance by CEA

Northern Region:

- DPR for Transmission System regarding Uprating, Upgrading and Strengthening of Intra-State Transmission Schemes for Renewable Energy Evacuation in Western Rajasthan to be implemented by RRVPNL with an estimated cost of Rs. 4813.89 Cr.

Western Region: NIL

Eastern Region: NIL

North Eastern Region: NIL

Southern Region:

- DPR of KPTCL for construction of 400 kV D/C line with quad moose ACSR for the length of 64.5 km from BPS- Ramapura limits upto Anchor point 39/0 near proposed 400/220 kV S/S at Jagalur**.**
- DPR of KPTCL for Establishing 2x100 MVA, 220/110 kV & 1x10 MVA, 110/11 kV substation at Mughalkod and construction of 220 kV D/C LILO on MC towers from existing 220 kV Ghataprabha- Chikkodi transmission line.
- DPR of KSEB for Attapaddy Green Power Corridor Project.
- DPR of KSEB for Ramakkalmedu Green Power Corridor Project.

5.7 Grant of prior approval of Government to transmission proposals under Section 68 of Electricity Act, 2003 during 2020-21.

The list of transmission proposals examined for approval of the Government of India under Section 68(1) of Electricity Act, 2003 is given below:

Northern Region:

- "Connectivity system for 300 MW solar power plant in Bikaner, Rajasthan" to M/s Azure Power India Private Limited
- "Connectivity system for 300 MW solar power project (SECI-III) in Jodhpur, Rajasthan" to M/s Azure Power India Private Limited
- "Connectivity system for 300 MW solar power project (SECI-IV) in Jodhpur, Rajasthan" to M/s Azure Power India Private Limited
- Common Connectivity system to M/s NTPC Limited for 150 MW and 90 MW solar power plant in Devikoot, Rajasthan
- Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley HEPs to M/s Power Grid Corporation of India Ltd.
- "Transmission System Strengthening Scheme for Evacuation of power from Solar Energy Zones in Rajasthan (8.1 GW) under Phase-II Part E" to M/s Bhadla - Sikar Transmission Limited
- "Transmission System Strengthening Scheme for evacuation of power from Solar Energy

Zones in Rajasthan (8.1 GW) under Phase-II Part G" to M/s Khetri Narela Transmission Limited

- Connectivity system of M/s SB Energy Renewables Ten Private Ltd for its 450 MW Wind-Solar Hybrid project in Jaisalmer, Rajasthan
- Connectivity system to M/s SBE Renewables Sixteen Private Limited for 180 MW Solar project in Jaisalmer, Rajasthan
- Connectivity system to M/s NTPC Ltd. for its 300 MW solar power project in Nokhra, Bikaner, Rajasthan
- Connectivity system to M/s NTPC Limited for 250 MW and 300 MW solar projects in Bikaner, Rajasthan
- Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A to M/s Ramgarh (New) Transmission Limited.
- Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B to M/s Fatehgarh Bhadla Transco Limited
- Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part C to M/s Sikar New Transmission Limited
- Connectivity system to M/s ReNew Sun Waves Private Limited for its proposed 300 MW Jaisalmer-I solar project in Jaisalmer, Rajasthan
- Connectivity system to M/s SBE Renewables Fifteen Private Limited for 600 MW solar project in Jodhpur, Rajasthan
- Connectivity system to M/s Mahoba Solar (UP) Private Limited for 390 MW Hybrid power plant in Jaisalmer, Rajasthan
- Connectivity system to M/s Adani Green Energy Nine Limited for 300 MW Hybrid power plant in Jaisalmer, Rajasthan
- Connectivity system to M/s Adani Green Energy Seven Limited for 300 MW Hybrid power plant in Jaisalmer, Rajasthan
- Connectivity system to M/s Adani Renewable Energy Park Rajasthan Limited for 1000 MW Renewable Energy Park in Fatehgarh, Rajasthan
- Connectivity system of M/s Ayana Renewable Power One Private Ltd (ARPOPL) for its 300 MW solar power project in Bikaner, Rajasthan
- Connectivity system of M/s ACME Solar Holdings Limited (ASHL) for its 4 x 300 MW solar power plants in Jaisalmer, Rajasthan
- Connectivity system to M/s ReNew Sun Bright Private Limited for its proposed 300 MW Jaisalmer-II solar project in Jaisalmer, Rajasthan
- Transmission System Strengthening Scheme for Evacuation of power from Solar Energy Zones in Rajasthan (8.1 GW) under Phase-II Part F
- Connectivity system for 925MW Solar Park at village Nokh, Jaisalmer, Rajasthan.
- Connectivity system of M/s Thar Surya 1 Private limited (a 100% subsidiary of Avikiran Surya India Private Limited) for its 300 MW solar power project in Dholera, Bikaner, Rajasthan

Western Region:

- Connectivity for 300 MW wind farms to M/s Netra Wind Private Limited in Kutch, Gujarat.
- Connectivity to M/s Adani Green Energy Limited for its proposed 300 MW wind farms in Bhuj, Gujarat.

Southern Region:

- "Evacuation of Power from RE Sources in Karur/Tiruppur Wind Energy Zone (Tamil Nadu) (2500 MW) to PFC Consulting Limited
- "Connectivity system for 300 MW wind power project of Ostro Kannada Power Private Limited in Chitradurga, Karnataka to M/s Ostro Kannada Power Private Limited
- Transmisison scheme for NTPC's 230 MW solar power project at Ettayapuram, Tuticorin, Tamil Nadu to NTPC Limited

- Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh to PFC Consulting Limited
- Transmission scheme for Solar Energy Zone in Gadag (2500 MW) common/upgradtion of Narendra –Kolhapur to Power Grid Corporation of India Ltd.
- Connectivity transmission system for evacuation of 500 MW Blended Power project (Wind: 400 MW & Solar: 100 MW) to JSW Renew Energy Limited in Tuticorin, Tamil Nadu.

Eastern Region:

- Prior approval of the Government of India under Section 68(1) of Electricity Act, 2003 to DVC on 23.11.2020 for construction of 132 kV and 33 kV consumer line under DVC.
- Prior approval of the Government of India under Section 68(1) of Electricity Act, 2003 to POWERGRID on 27.10.2020 for installation of 'Sitamarhi (POWERGRID) – Dhalkebar (Nepal) 400 kV D/C (Quad) line (Indian portion)' under Transmission system for power evacuation from Arun-3 (900 MW) HEP, Nepal of M/s SAPDC.
- Prior approval of the Government of India under Section 68(1) of Electricity Act, 2003 to POWERGRID on 16.03.2020 for following scope of work:

(a) LILO of second circuit of Kishanganj (POWERGRID) -Dharbanga (DMTCL) 400 kV D/C (Quad) line at Saharsa (New) S/s.

(b) Bypassing of Farakka –Kahalgaon (ckt-3 & ckt-4) and Farakka-Durgapur 400 kV D/C line of POWERGRID so as to form Kahalgaon-Durgapur 400 kV D/C line.

North Eastern Region:

- To M/s POWERGRID for "LILO of Palatana - Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar (TSECL) S/s" on 27.10.2020.

5.8 Grant of authorization to transmission proposals for Section 164 of Electricity Act, 2003 during 2020-21.

The list of transmission proposals examined for approval of the Government of India under Section 164 of Electricity Act, 2003 is given below:

Northern Region:

- Establishment of Transmission System associated with LTA applications from Rajasthan SEZ-Part-D to M/s Adani Transmission Ltd.
- Connectivity System to M/s Eden Renewable Cite Private Limited for 300MW Solar Power Plant in Village Lakhasar, Jaisalmer, Rajasthan
- Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer, Rajasthan to M/s Adani Transmission Ltd.
- Connectivity system of M/s Ayana Renewable Power One Private Limited (ARPOPL) for its 300 MW solar power project in Bikaner, Rajasthan
- Connectivity System to M/s Mahindra Susten Private Limited for its proposed 250 MW solar project in Jodhpur, Rajasthan
- Connectivity System for 350 MW solar power plant in Bikaner, Rajasthan to M/s Avaada Energy Private Limited
- Transmission system associated with LTA Applications from Rajasthan SEZ Part-C to M/s Power Grid Corporation of India Ltd.
- Construction of Ajmer (PG) - Phagi 765 kV D/C line along with associated bays for Rajasthan SEZ to M/s Power Grid Corporation of India Ltd.
- Connectivity System to M/s Adani Green Energy Seven Limited for 300 MW Hybrid power plant in Jaisalmer, Rajasthan

- Connectivity system to M/s Adani Green Energy Nine Limited for 300 MW Hybrid power plant in Jaisalmer, Rajasthan."
- Connectivity system to M/s Mahoba Solar (UP) Private Limited (MSUPPL) for 390 MW Hybrid power plant in Jaisalmer, Rajasthan.
- Connectivity system to M/s Adani Renewable Energy Holding One Limited for 390 MW Hybrid power plant in Jaisalmer, Rajasthan

Western Region:

- Connectivity to M/s Sitac Kabini Renewables Private Limited for its proposed 300 MW wind farms in Bhuj, Gujarat.
- Jam Khambaliya Pooling Station and Interconnection of Jam Khambaliya Pooling Station for providing connectivity to RE projects (1500 MW) in Dwarka (Gujarat) and Installation of 400/220 kV ICT along with associated bays at M/s CGPL Switchyard by M/s Jam Khambaliya Transo. Ltd.
- Transmission System associated with RE generations at Bhuj-II, Dwarka & Lakadia by M/s Adani Transmission Ltd.
- Transmission System for Western Region Strengthening Scheme – 21 (WRSS – 21) Part – A – Transmission System Strengthening for Relieving Over Loadings Observed in Gujarat Intra-State System Due to Re-injections in Bhuj PS by M/s Adani Transmission Ltd.
- Transmission System for providing connectivity to RE Projects at Bhuj-II (2000MW) in Gujarat by M/s Powergrid Bhuj Transmission Ltd.
- WRSS-21 (Part-B) Transmission System Strengthening for relieving overloading observed in Gujarat Intra-state system due to RE injections in Bhuj PS by M/s Lakadia Vadodara Transmission Ltd. (a subsidiary of Sterlite Power Transmission Ltd.)
- Additional Connectivity to M/s ACB (India) Limited (Lead Generator) for 1x63 MW TPS of M/s SV Power Ltd. at Korba, Chhattisgarh.
- *Connectivity to M/s Adani Green Energy Limited for its proposed 300 MW wind farms in Bhuj, Gujarat.*
- *Connectivity system for M/s SBESS Services Projectco Two Private Limited for 324.4 MW Generation Wind Project in Dhar, MP.*

Eastern Region: NIL

Southern Region:

- M/s Spring Renewable Energy Private Limited for construction of 230 kV Single Circuit Transmission line from "230/33 kV Mulanur pooling substation (Tirupur) to 400/230 kV Pugalur Substation".

North Eastern Region: NIL

5.9 Cross-Border power exchange

5.9.1 India-Bangladesh Cross Border Interconnection & Power Trade

Bangladesh has been connected with both Eastern and North Eastern Region of India with power transfer capacity of 1160 MW from India to Bangladesh through following links:

i. 1,000 MW through Baharampur (India) to Bheramara (Bangladesh) AC link with 1000MW HVDC back-to-back station at Bheramara, and

ii. 160 MW through Surajmaninagar (India) to North Comilla (Bangladesh) – South Comilla (Bangladesh) 400 kV D/c link (presently operated at 132 kV).

iii. Further, 2nd Baharampur - Bheramara 400 kV D/c line is under implementation for increasing reliability of 1000 MW power supply to Bangladesh at Bheramara.

iv. Implementation of the 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link has been agreed and

modalities of its implementation are being finalized

5.9.2 India-Bhutan Cross Border Interconnections & Power Trade

India and Bhutan have MoU on cooperation for exchange of power between the two countries. Bulk power generated at Hydro Electric Projects at Tala HEP (1020 MW), Chukha HEP (336 MW), Kurichu HEP (60 MW) and Mangdechu HEP (720 MW) in Bhutan is being exported to India through 400kV, 220kV and 132kV lines.

Presently, about 2000 MW power from the existing hydro projects in Bhutan is being imported to India from Bhutan. The associated cross-border transmission system for evacuation and transfer of power from these HEPs is being operated in synchronism with the Indian Grid.

RGoB is in the various phases of developing the hydro potential of which Punatsangchu-I (1200MW) & Punatsangchu-II (1020MW) HEPs are under construction and expected to be commissioned in 2024-25.

The transmission system for transfer of this power from these projects to India is already in place. With the commissioning of these HEPs the power transfer between Bhutan and India would be enhanced to about 4200 MW.

5.9.3 India-Nepal Cross Border interconnection and Power Trade

- At present, about 700 MW of power is being exported to Nepal through 11kV, 33kV, 132 kV voltage level transmission lines and Dhalkebar (Nepal) – Muzaffarpur (India) 400 kV D/C line.
- For transfer of bulk power, 400 kV Dhalkebar (Nepal) - Muzaffarpur (India) D/C transmission line was charged to its rated voltage of 400 kV on 11th November, 2020.
- Further, 2nd High Capacity 400 kV Gorakhpur – New Butwal D/c (Quad) line is being taken up for implementation to facilitate increased transfer of power between the two countries.
- Nanpara, Bihar (India) – Kohalpur (Nepal), stringing of second circuit of 132kV line Kataiya (India) – Kushaha (Nepal) and 132 kV Raxaul (India) – Parwanipur (Nepal) lines have been agreed.

5.9.4 India-Myanmar Cross Border Interconnections & Power Trade

- India is providing about 2-3 MW of power (Since 5th April 2016) from Manipur (India) to Myanmar through 11 kV transmission line from Moreh in Manipur (India) to Tamu town in Myanmar.
- Addition of low capacity interconnections at 33 kV and 11 kV are under discussion. Further, feasibility of a high capacity interconnection between India and Myanmar at 400 / 500 kV with HVDC back-to-back system is also under discussion.

5.9.5 Guidelines for Import/Export (Cross Border) of Electricity

- Guidelines for Import/Export (Cross Border) of Electricity were issued by Ministry of Power on 18.12.2018 for facilitating import/export of electricity between India and neighboring countries.
- Procedure for approval and facilitating Import/Export (Cross Border) of Electricity by the Designated Authority were issued on 26.02.2021.
- Verification Mechanism for export of power from eligible fuel by generating stations under Import/Export (Cross Border) of Electricity-Guidelines2018 were issued by Ministry of Power on 5th March, 2021.

5.9.6 Approvals granted by Designated Authority for Import/Export (Cross Border)

of Electricity during 2021-22.

- Approval to NVVN for the supply of power to NEA, Nepal through Muzzafarpur (India)-Dhalkebar (Nepal) line

(a) upto 225 MW power from 31st July, 2020 to 30th November, 2020,
(b) upto 250 MW power from 1st December, 2020 to 17th February, 2021,
(c) upto 350 MW power from 18th February, 2021 to 30th April, 2021,
(d) upto 200 MW power from 1st May, 2021 to 30th June, 2021

- Approval to PTC India Limited for the supply of upto 65 MW power to NEA, Nepal through Tanakpur (India)- Mahendra nagar (Nepal) line from 15th September, 2020 to 31st July, 2021
- Approval to PTC India Limited for the supply of 200 MW of Power to BPDB, Bangladesh through alternate source of Sembcorp Energy India Ltd (Project 2) (SEIL-P2) from

(a) 16th April, 2020 to 30th June, 2020
(b) 2nd July, 2020 to 31st December, 2020

5.10 Miscellaneous works

5.10.1 Green Energy Corridor:

a) Transmission Works under Green Energy Corridors-I

The report on Green Energy Corridor has been prepared by PGCIL as a comprehensive scheme for evacuation & integration of the renewable energy (RE) capacity addition of 32,713 MW during 12th Plan Period. Total fund requirement of Rs. 34141 Crore was initially assessed for the development of the transmission system and control infrastructure for the addition of RE capacity in the renewable rich States of Andhra Pradesh, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Maharashtra, Rajasthan, Madhya Pradesh and Tamil Nadu.

Intra State transmission schemes are to be funded as 20% equity of the State Govt., 40% grant from National Clean Energy Fund (NCEF) and 40% soft loan, whereas, the Inter State transmission schemes are to be funded as 30% equity by PGCIL and 70% soft loan.

For the funding of green energy corridors in both intra and inter State transmission projects, under the framework of cooperation between Govt. of India and Govt. of Germany, KfW Germany is providing soft loan to the tune of Euro 1 Billion. For Inter-state transmission projects pertaining to Part A, B and C of Green Energy Corridor, Loan agreement for financial assistance of Euro 500 million from KfW, Germany has been signed by PGCIL. For implementation of transmission schemes under Green Energy Corridor-Part D, POWERGRID has taken loan from ADB. All the transmission schemes have been commissioned.

For Intra-State transmission projects under Green Energy Corridor; Tamil Nadu, Rajasthan, Himachal Pradesh, Andhra Pradesh, Gujarat and Madhya Pradesh have signed the loan agreements from KfW, Germany for financial assistance of Euro 76 million, Euro 49 million, Euro 57 million, Euro 68 million, Euro 114 million and Euro 124 Million respectively.

The status of award of inter-State and intra-State transmission works during the Financial Year 2020-2021 (up to 31st March, 2021) is attached at **Annexure-5E**.

5.10.2 Study, analysis and formulation of policies on specific issues relating to transmission

Long Term Planning Studies:

Transmission system planning studies were carried out to evolve a composite system for evacuation of power from generation projects

envisaged till the year 2026-27. Studies were carried out to identify long-term system strengthening requirements in various regions/states. Studies carried out to evolve long term perspective plan are as follows:

i. System studies for development of infrastructure at EHV level in UT of Jammu and Kashmir during 13th and 14th Five Year Plans.
ii. System studies for evacuation of 15 GW RE power from Khavda region, Gujarat.
iii. Transmission System for evacuation of power from Dholera UMSP -Phase I (4 GW).
iv. Study to identify high voltage nodes in WR.
v. System studies for evacuation of 20 GW power from Solar Energy Zones in Rajasthan (Phase-III).

5.11 Consultancy services and Technical assistance/Advice to MoP/Various Power Utilities /CPRI/BIS etc.

Technical assistance/advice relating to transmission system in the Country provided from time to time to MoP/ Power Utilities/State Utilities/Other Ministries/ BIS/ CPRI etc.

5.12 Formulation/review of Regulations, Guidelines and audit.

a) Guidelines for Availability of Spares and Inventories for Power Transmission System (Transmission Lines & Substation/Switchyard) Assets was published.

b) Guidelines for the Validity Period of Type Test(s) Conducted on Major Electrical Equipment in Power Transmission System was published.

c) Standard Specifications and Technical parameters of Transformers and Reactors (66 kV & above voltage class) has been finalized by the Standardization Committee and sent to MoP for approval.

d) Technical Specifications (along with test procedures) for Bird Flight Diverter (BFD) to be placed in Transmission & Distribution line to avoid the chances of collision of Great India Bustard & other birds, was published.

e) Draft Public Procurement (Preference to Make in India) order in respect of Transmission System modified in line with DPIIT order dated 4.06.2020.

f) Input was provided to MoP for preparation of Scheme for setting up manufacturing hub for power equipment.

g) Report of Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal Area is under finalization.

h) Concept paper on Insulated Cross arm is under preparation.

5.13 Representation/ Nomination in the Committees/Task force

Chairman of the Standing committee of experts to investigate the failure of

- Towers of transmission lines of 220kV & higher voltages of power utilities
- equipment of 220kV and above substation

a) Member of Technical Committee on Transmission Research for Review, recommendation & monitoring of R&D proposals under IHRD, RSOP, NPP schemes of MoP, Govt. of India.

b) Member of various Technical Committees of BIS pertaining to EHV transmission lines (Conductor, Earthwire, insulator & hardware and transmission line towers) and substations (surge arrestor, switchgear, transformer, HVDC, power electronics, high voltage engineering, battery etc.).

c) Member of Sub group for techno- economic appraisal of DPRs for system improvement under PSDF funding.

d) Member of Cost Committee and Bid Evaluation Committee for projects being awarded through Tariff Based Competitive Bidding (TBCB).

e) Member of Task Force on Cyclone Resilient Robust Electricity Transmission & Distribution Infrastructure in Coastal Areas.

f) Member of the committee for creation of manufacturing hub for indigenization of power sector equipment

g) Member of the committee constituted by MoP for independent verification of self-declarations and auditor's / accountant's certificates of Class-I/ Class-II local suppliers.

h) Member of the committee to examine whether the presence of some of the equipment of foreign make in the transmission system is vulnerable particularly for prospective of security of the Grid.

i) Member of Group of Officers constituted by Ministry of Power to look into the issues flagged by EPTA.

j) Chairman of the Committee constituted for preparation of Standard Technical Specification for Power Transformers for Solar Power Park pooling Station.

k) Chairman of the Committee constituted for preparation of Standard Technical Specification for steel Pole Type Structure.

l) Member of the Sub-Committee No.8 on Transmission Planning for National Electricity Plan, 2022-27.

m) Member of the Sub-Committee No.4 on Technological Advancement and Research & Development for National Electricity Plan, 2022-27.

n) Member of the Sub-Committee No.7 on Key Inputs for Power Sector for National Electricity Plan, 2022-27.

5.14 Analysis of causes of failure of transmission line towers & substation equipment.

(a) Transmission Line towers:

Report of the Standing Committee of Experts on Failure of EHV Transmission Towers (April 2018 to March 2019) was published.

(b) Substation equipment failures:

Report of Standing Committee of Experts on Failure of 220kV & above Voltage Class Substation Equipment **(April 2018 to March 2019**) was published.

5.15 Amendment of CEA Regulations / Miscellaneous Works

a) Amended draft of Chapter IV Part A and Chapter V Part A of CEA (Technical Standard for construction of Electric Plants & lines) Regulations was prepared

b) Monitoring Progress of left over work relating to 220kV & 132kV Transmission system covered under Hon'ble PMRP-2004, which involve number of Transmission lines and Substations of 220kV & 132kV levels.

c) Examination of various proposals/DPRs submitted for grant under PSDF Funding.

d) Inputs relating to Specific Technical Requirements for transmission lines and sub-stations in Request for Proposal (RfP) documents of the projects to be awarded through TBCB.

e) Reply to various Parliament questions & RTI was provided.

5.16 Construction Monitoring of Transmission Projects

The monitoring of construction of transmission lines and sub-station (220 kV & above) covered under various transmission projects under central/state/private sector is being carried out with a view to achieve timely completion of transmission projects to ensure evacuation of power from new Generation Projects as well as strengthening of existing transmission network required for transmission of power to load centers.

The delay in execution of transmission projects are primarily due to RoW, compensation & forest issues, contractual issues, poor financial

condition of the executing agencies, land acquisition for substation, delay in getting statutory approval from various agencies like Railways & State / National Highway Authority etc. and law & order problem.

In respect of transmission lines, 15,791 CKm (3531 Ckm of ± 800 kV HVDC, 2487 CKm of 765 kV, 3762 CKm of 400 kV and 6011 CKm of 220 kV) was targeted for FY 2020-21. Out of which 16750 CKm (3531 Ckm of ± 800 kV HVDC, 288 Ckm of ± 320 kV HVDC, 1237 CKm of 765 kV, 5389 CKm of 400 kV and 6305 CKm of 220 kV) have been commissioned as on 31st March 2021 resulting in overall achievement of 106 %. Details of transmission lines commissioned /completed during FY 2020-21 (as on 31st March 2021) are given in **Annexure-5F.**

Similarly, in respect of substations, 63050 MVA of transformation capacity (6000 MW at ±800 kV HVDC, 13500 MVA at 765 kV, 26155 MVA at 400 kV and 17395 MVA at 220 kV level) was targeted for FY 2020-21. Out of which, 57575 MVA (3000 MW at ±800 kV HVDC, 1000 MW at ±320 kV HVDC, 7700 MVA at 765 kV, 23955 MVA at 400 kV and 21920 MVA at 220 kV level) have been commissioned as on 31st March 2021 resulting in overall achievement of 91.32%. Details of substations commissioned / completed during FY 2020-21 (as on 31st March 2021) are given in **Annexure-5G.**

Voltage-wise/Sector-wise program vs achievement for the financial year 2020-21 in respect of transmission lines and sub Stations (220kV and above voltage level) are given in **Charts I to VII and VIII to XIV** respectively given at the end of the chapter.

A national grid in the country has been developed in phased manner. All the regional grids have been inter-connected synchronously to form One grid – One Nation – One frequency. Inter-regional transmission capacity by the end of 9th plan was 5,750 MW which increased to 14,050 MW by the end of 10th plan and to 27,750 MW and 75,050 MW by the end of 11th and 12th plan respectively. Interregional transmission capacity added during plan period 2017-22 (up to 31st Mar'2021) is 30,000 MW. As on 31.03.2021, inter-regional transmission capacity in the country is 105,050 MW. Details of interregional transmission lines are given at **Annexure-5A**. The increase in inter-regional transmission capacity would further facilitate smooth flow of power from surplus to deficit regions.

Total 16,750 Ckms of transmission line and 57,575 MVA of transformation capacity in substations (220kV and above voltage levels) have been added during the financial year 2020-21 resulting in all India transmission network of 441821 Ckms of transmission lines and 1025468 MVA of the transformation capacity (220kV and above voltage level) as on 31st March 2021.

For the year 2021-22, Program for Transmission Lines and Transformation Capacity (Substations) is as under:

Annual Target for FY 2021-22:

Transmission line (Ckm)	19,255
Substation (MVA)	81,545

5.17 Inspection of Electrical Installation

The Chief Electrical Inspector and Electrical Inspectors appointed by the Central Government under section 162 of Electricity Act, 2003 discharge the functions described in 'The Qualifications, Powers and Functions of Chief Electrical Inspector and Electrical Inspectors Rules, 2006'. These rules stipulate the statutory inspection of electrical installations by Central and State Electrical Inspectors in respect of installations within their

respective jurisdictions as per Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 (as amended). The Chief Engineer of Chief Electrical Inspectorate Division is appointed as Chief Electrical Inspector to the Government of India, Headquartered at New Delhi and is assisted by the officers of Chief Electrical Inspectorate Division and Electrical Inspectors and the officers from five Regional Inspectorial Organizations (RIOs) located at Chennai, Shillong, Mumbai, Kolkata and New Delhi in discharging the various responsibilities, briefly described as under:

(a) Periodic inspection of electrical installations for compliance under Regulation 30 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 (as amended).

(b) Inspection of new electrical installations under Regulations 43 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 (As amended) for according approval for energization of electrical installation of voltage exceeding notified voltage.

(c) Amendment of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 as required.

(d) Inquiry of fatal and non-fatal electrical accidents and suggesting remedial measures to be taken to avoid recurrence of such accidents in future.

(e) Collection of Statistics, Return & information relating to electrical accidents in Format-19 & 20 under furnishing of Statistics, Returns & Information regulations 2007.

(f) Issue of Electrical Contractor licenses and competency certificates to Supervisors and wireman through the Licensing Board in respect of Union Territory of Puducherry & Chandigarh.

5.18 Review of Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010:

(a) Comprehensive review of the above mentioned regulations is in process. The regulation was put in public domain on 12.02.2021 for inviting comments from all the stakeholders including public latest by 27.03.2021.

5.19 MAJOR ACHIEVEMENT IN TERMS OF INSPECTIONS DURING THE YEAR 2020-21 (Important installations inspected):

5.19.1 New Electrical Installations/ Apparatus under Regulation 43 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 (as amended): -

The region wise summary of total inspections carried out is given below: -

RIOs	NR	SR	WR	ER	NER
No.of Inspections	62	342	355	186	42

A. Substations:

(i) **765kV Substations**: Mednipore, Bhadla, Bikaner, GOS PS Koteshwar, Meerut, Phagi, Jethana, Peesangan, Ajmer-Rajasthan, Fatehpur- UP, Champa, Vindhyachal, Sipat, Durg, Parli, Khandwa, Jabalpur, Singrauli, Kutch, Bhuj, Seoni, Rajnandgaon, Bilaspur, Raigarh.

(ii) **400kV Substations:** Maithon, Ranchi, Malda, New Jeerat, Subhasgram, Binaguri, Jeypore, Rourkela, Sitamarhi, Chandauti, Motihari, Muzzaffarpur, Karanpura, Bhadla,

Bikaner, Fatehgarh, Bikaner-Rajasthan, Chamba, GOS PS Koteshwar, Gorakhpur, Panipat, Rihand, Sonebhadra, GIS Sorang, Daudsar, Saharanpur GIS Papankalan, Abdullahpur Haryana, Sikar- Rajasthan, Phagi, Fatehpur-UP, Misa, Palatana, Lalmati, P.K. Bari, Surajmaninagar, Silchar, Rajgarh, Gwalior, Aurangabad, Solapur, Parli, Warora, Shajpur, Vadodara, Indore, Bhachau, Rewa, Akola, Raigarh, Banaskantha, Pugalur, Thiruvallam, Vellore, Kozhikode & Kochi.

(iii)**220kVSubstations**:Rourkela,Maithon,Rangpo, Jeypore Andal, Parulia, Kalyaneswari, Rangpo, Paradip, Bhadla, Chamba, Auraiya Uttar Pradesh, Gorakhpur,panipat, Saharanpur, Jodhpur, Pokharan, Dwarka(GIS), Yamuna Nagar Haryana, Ghatampur Kanpur UP, Gorakhpur UP, Dimapur, Solapur, Ahmedabad, Vadodara, GIS - BPCL Kochi Refinery, Kochi & RINL, Visakhapatnam& MRPL Mangalore

RIOs	**NR**	**SR**	**WR**	**ER**	**NER**
No. of Inspections	12	4	24	16	1

(iv) **132kV Substations:** Durgapur, Talcher, Rangpo, Motihari. Jamuria, Kanpur, Bijoura Meja Tehsil Prayagraj, Balipara, Surajmaninagar, Itanagar, Baghmari,

(v) **HVDC Substations:** Bishwanath Chairiyali, Raigarh, Vindhyachal, Champa.

The details of electrical apparatus inspected at different voltage levels during the year 2020-21 is as follow: -

Apparat-us Voltage level	**Transfor-mers/ICT (MVA)**	**React-ors (MVAr)**	**Cap ac-itors (MVAr)**	**Bays (no.)**	**Bus (no.)**	**Statcom (no.)**
765 kV	11260	2080	NIL	38	19	NIL
400 kV	11234.8	2080	NIL	182	NIL	2
220 kV	2963	NIL	NIL	106	NIL	NIL
132 kV	783	NIL	NIL	39	NIL	NIL
66 kV	113	NIL	NIL	9	NIL	NIL
33 kV	1398.55	16	NIL	NIL	NiL	NIL
HVDC 800 kV	3540	NIL	NIL	10	NIL	NIL

The data above are based on the cumulative inspections carried out by all RIOs

B) Generating Units: The region wise summary of inspections carried out is given below: -

RIOs	NR	SR	WR	ER	NER
No. of Inspections	5	13	1	2	0
Gen.Capacity (MW)	799	18.07	700	913	0

NTPC Darlipali, MBPCL Rangpo, Singoli Bhatuari HEP, Uttrakhand, Nangal, Ropar, Tanda, Thiruvananthapuram, Kozhikode, Hyderabad, Puducherry, Bangalore, Cochin Refinery, Madras.

C) **Transmission Lines:** The region wise summary of inspections carried out is given below: -

(i) **765 kV Lines:** Ranchi-Mednipore, Fatehgarh Bhadla,

(ii) **400 kV Lines**: Rajarhat-Gokharno & Rajarhat-Purnea, Subhasgram-Sagardigih (LILO-Jeerat), Kharagpur-Chanditala (LILO-Medinapur), Alipurduar-Jingmeli, Sitamarhi-Darbhanga, Sitamarhi – Motihari, Binaguri-Rangpo, WBSETCL Jeerat – PGCIL New Jeerat, Mariani- Kohima D/C line, ESSAR TPS – Bhachau SS, Wardha-Aurangabad, Kochi –

Thrissur(LILO), Pavagada – Devanahalli(DC), Pugalur HVDC Station to Arasur Line, Ariyalur(Villupuram) D/C Line .

(iii**) 220 kV Lines**: DTPS-Parulia(LILO-DSTPS), Rongnichu-Rangpo, SAIL Rourkela – NSPCL Rourkela,Srinagar to Rudrapur(DC), Chamba- Chamera(DC), Bhadla to Pokhran, Bhadla to Bhiv Ji Ka Village rajasthan

iv) **132 kV Lines:** Borjora-Lalwani, Maithon – Patherdih, Meja TPP to Bijoura, Sirsa, Meja Tehsil,

(v) **800 kV HVDC Lines: NIL**

Summary of transmission lines inspected at different voltage levels (Data given in Circuit Km):-

RIOs / kV	NR	SR	WR	ER	NER
765 kV	560.74			540	
400 kV	13.412	486.606	802	813	240
220 kV	275.547	NIL	NIL	20	1.33
132 kV	NIL	NIL	NIL	8	25
110 kV	NIL	NIL	NIL	NIL	NIL
66 kV	NIL	NIL	13	NIL	NIL
33 kV	3.6	NIL	NIL	19	NIL
11 kV	NIL	NIL	52	NIL	NIL
800 kV HVDC	NIL	NIL	NIL	NIL	NIL

The data above are based on the cumulative inspections carried out by all RIOs

D) Electrical installations of the following organisations were inspected during the year 2020-21: PGCIL, SAIL, GAIL, IOCL, HPCL, BPCL, ONGC, NPCIL, AAI, NALCO, BALCO, NMDC, CGPL, AIR, CPWD, Port Trust-JNPT, Mumbai Airport, RCFL, Mazagon Dock, BMCTPL, NEEPCO, BARC, NBCC,

RIOs	NR	SR	WR	ER	NER
No. Of Inspections	NIL	10	2	NIL	NIL

NHPC, SBI, DVC ESIC, AIIMS, NIT, IIT, IIM, NIFT, DOAE, RINL,JSW , NBCC,Rashtriya Ispat nigam Ltd.,RITES,IIFT,GRSE, Balmer Lawrie etc.

5.19.1.1 Inspections done for Renewables:

The region wise summary of inspections carried out is given below:

RIOs	NR	SR	WR	ER	NER
No. of Inspections	17	19	25	5	1

HPCL Panagarh,SAIL Rourkela ,HPCL Paradip ,IOCL Jharsuguda,NTPC Kahalgaon, Solar Power Plant, IOCL Banthara Depot, IOCL, Madanpur Khadar, New Delhi, IOCL Najibabad Bijnor UP, Mahindra Renewable Power Ltd, Azure Power India Private Limited Bikaner, NTPC, SB Energy Six Pvt ltd, HPCL LPG Bottling plant, Alfanar Energy Private Limited, ReNew Power Limited, Adani Wind Energy Kutchh Three Limited , SIPCOT SEZ, and many Govt organisations (i.e DRDO,HPCL,BPCL, NLC ,GAIL, HUL etc).

Summary of Generation capacity of Renewable Energy Sources inspected: -

RIOs	NR	SR	WR	ER	NER
Gen.Capacity (MW)	1100.4543	41.521	535	3.623	750

5.19.2 Cinemas/Theatres installations inspected: -

Summary of Cinemas/Theatres installations inspected during the year 2020-21 is given below:

5.20 Periodical Inspections (under Regulation 30 of Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010: -

Major installations inspected:

a) **Generating plants** - Chuzachen Hydro Electric, NALCO Angul CPP, IOCL Paradip CPP, DVC Chandrapura, Chamera-II Power Station Karian, of NHPC Limited, Meja Urja Nigam Pvt Ltd, NTPC Rihand, NTPC Tanda stage-1, **:** Pare HEP NEEPCO, Raipur Energen Ltd, Raigarh Energy Generation Limited, Jaypee Nigrie, KSK Mahanadi Power, Jhabua, DB Power, KAPS 1 and 2, NTPC Lara, RKM Power,

Major installations inspected:
REGL, NTPC Jhanor, NTPC Vindhyachal, MB Power Anupur, SASAN UMPP, TRN Energy, ACBIL, ONGC Rajahmundry, NTPC Ramagundam, GMR International Airport, Hyderabad, BIAL, Bangalore.

b) **Substations**: NALCO Angul, NPGC Nabhinagar, NTPC Barauni, IOCL Haldia, AAI Jharsuguda, NSPCL Rourkela, KPT Haldia, JSW Paradip, CBPTCL Muzzaffarpur, IOCL Balasore, PGCIL Purnea,, BTPS-Bokaro, DVC Chandrapura, DVC-BTPS, KHTAKAR JIND HARYANA, NIFTEM, Kundli, Sonepat, Haryana, Shree Mega Power – A unit of Shree Cement Ltd, Beawar, Rajasthan, PGCIL Shahjahanpur, UP, Balipara, Misa,Silchar,Khaleriat,Champa,Raigarh,Jabalpur,Kotra,Tamnar,Indore, Korba, Bina, Seoni, Mundra,Tamnar, Damoh, janjgir Champa,Kutch, Shajapur, Bharuch, Aurangabad, Solapur, Bhuj, Raipur, Vadodara, SASAN, Tamnar, Wardha, Warora, Kolhapur, Bhadrawathi, Parli, Bhopal, Dhule, Karaikal Port, FACT(Cochin), NTPC Ramagundam, NPCIL Tuticorin, PGCIL Palakkad, Tuticorin GIS, Tuticorin PS.

UTs	AN	DNH	DD	PDY
No. of Inspections	10	133	67	50

c) Electrical installations of IOCL, OIL, NRL, HPCL, AIIMS, PNB, Taj Sats, KPT, ONGC , Shyama Prasad Mukheerjee Port, SBI LHO, NCSM Kolkata, HPCL, JITPL Talcher,NFL, Pride plaza hotel,aerocity, IGI, Oak Infrastructures Developers Ltd, Aspen Buildtech Ltd,BPCL, Delhi International Airport Ltd, CELEBI Delhi cargo terminal Mgmt Pvt Ltd, IGI, Indian Synthetic Rubber Pvt Ltd, Saurya Urja Company of Rajasthan Ltd, PGCIL, NEEPCO, BPCL, ONGC, AAI, IIT, BALCO, IIM, IIT, SEZ, BDTCL, KTL ETC.
d) **HVDC:** Vindhyachal

5.21 Self-certifications approval issued by RIOs:-

No. of self-certifications issued during the year 2020-21 is given below: -

5.22 Inspections done in UTs: -

Details of inspections done in UTs during the year 2020-21is given below: -

AN: Andman & Nicobar, DNH: Dadar & Nagar Haveli, DD: Daman & DIU, PDY: Puducherry.

5.23 Investigation of Electrical Accidents:

1. Fatal Electrical Accident happened MRSS-OSCOM Housing Colony Overhead Line , IREL Ltd. Odisha,
2. Fatal Electrical Accident happened at 400/220KV Power Grid, Parli Sub Station, PGCIL.
3. Fatal Electrical Accident happened at 33KV/220KV switchyard of Ariunsun Clean Energy Pvt Ltd., Rewa District, Madhya Pradesh.
4. Fatal Electrical Accident happened at CGPL Generating station, Mundra.

5.24 Electrical safety Awareness

Conferences:

1. Webinar was organized for Faculty of KIT Kalyani College on 14-05-2020
2. Electrical safety workshop for Officials of M/s BPCL was convened on 17.12.2021 on virtual platform.
3. Electrical safety workshop for Officials of M/s IOCL was convened on 26.11.2020 on virtual platform.
4. Electrical safety awareness conferences through video conference for organisations like

M/s. HPCL - 12.03.2021
M/s. BPCL - 17.12.2020
M/s. IOCL - 26.11.2020
M/s. GAIL - 10.09.2020
M/s. ICAI - 28.08.2020
M/s. NMDC - 27.07.2020
CEA-NSC - 26.06.2020

5. Electrical safety Awareness online program on 30.06.2020 for Capacity building program for officers of Govt. of Odisha.
6. Electrical safety Awareness online programs through National Electrical Safety Campaign-2020 on 28.08.2020, 11.09.2020, 25.09.2020, 16.10.2020, 9.10.2020, 20.11.2020, 04.12.2020, 28.12.2020, 05.02.2021, 12.03.2021.

RIOs	NR	SR	WR	ER	NER
No.	1	4	1	11	NIL

7. Electrical safety Awareness program conducted for NPTI, Faridabd on 10.11.2020.
8. Electrical safety Awareness online program for Tata Power Discom Officials on 26.11.2020.
9. Electrical safety Awareness online program for IOCL officers on 15.12.2020.

Chart-I

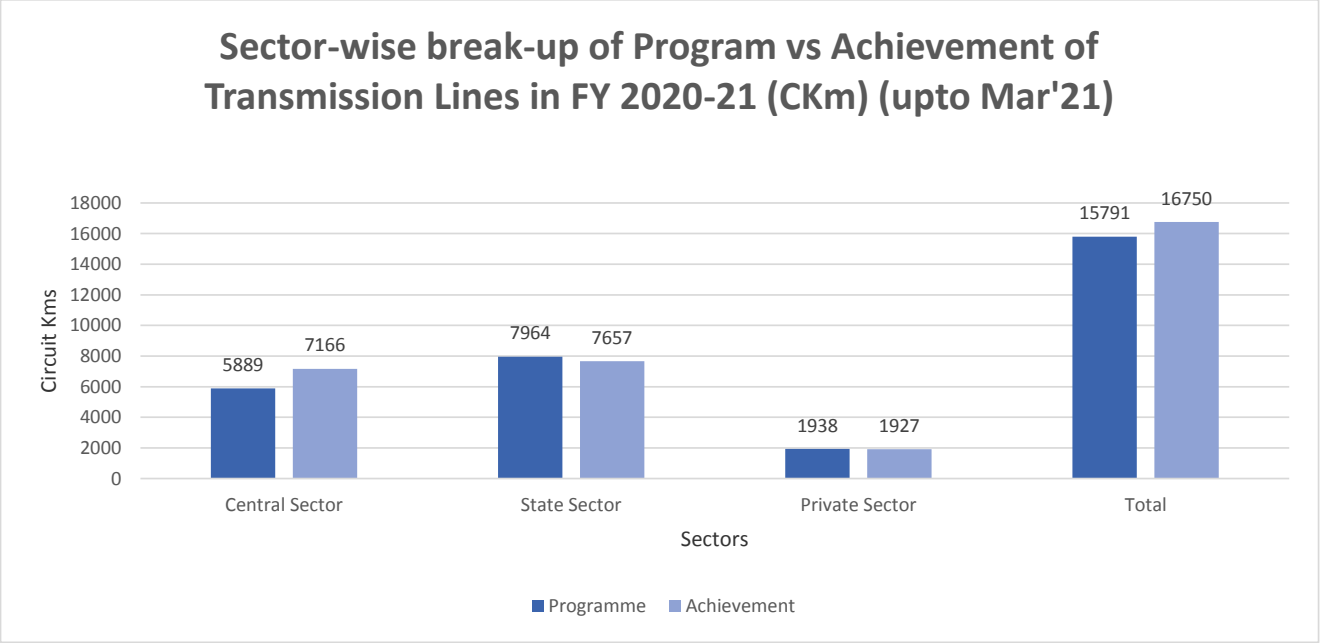


Chart-II

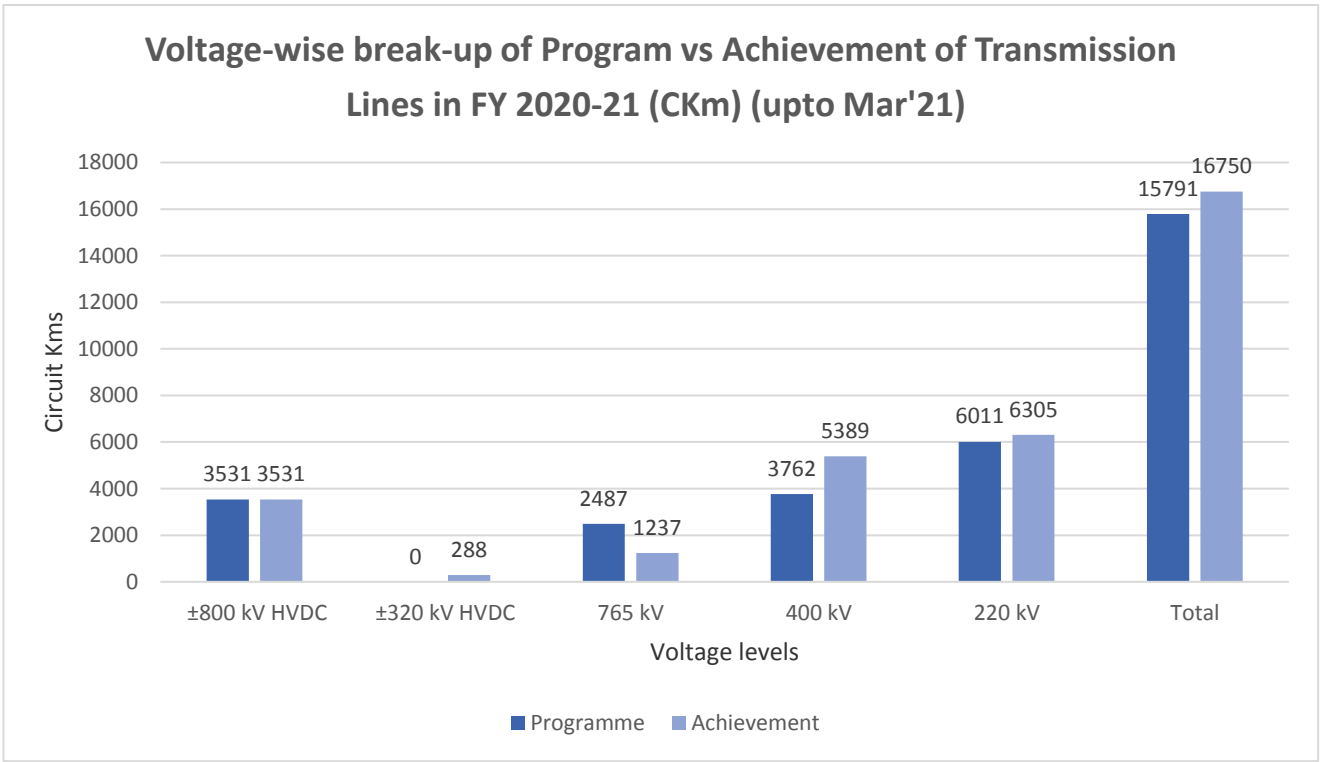


Chart-III

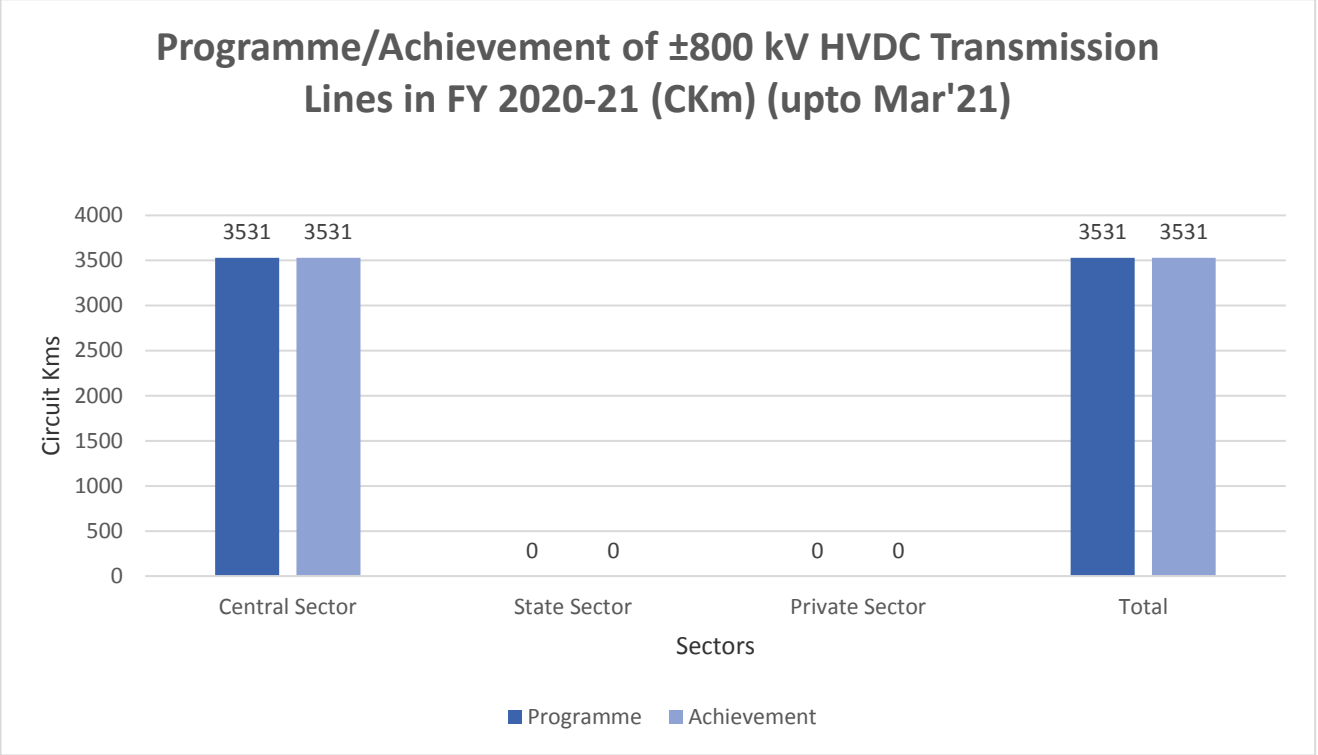


Chart-IV

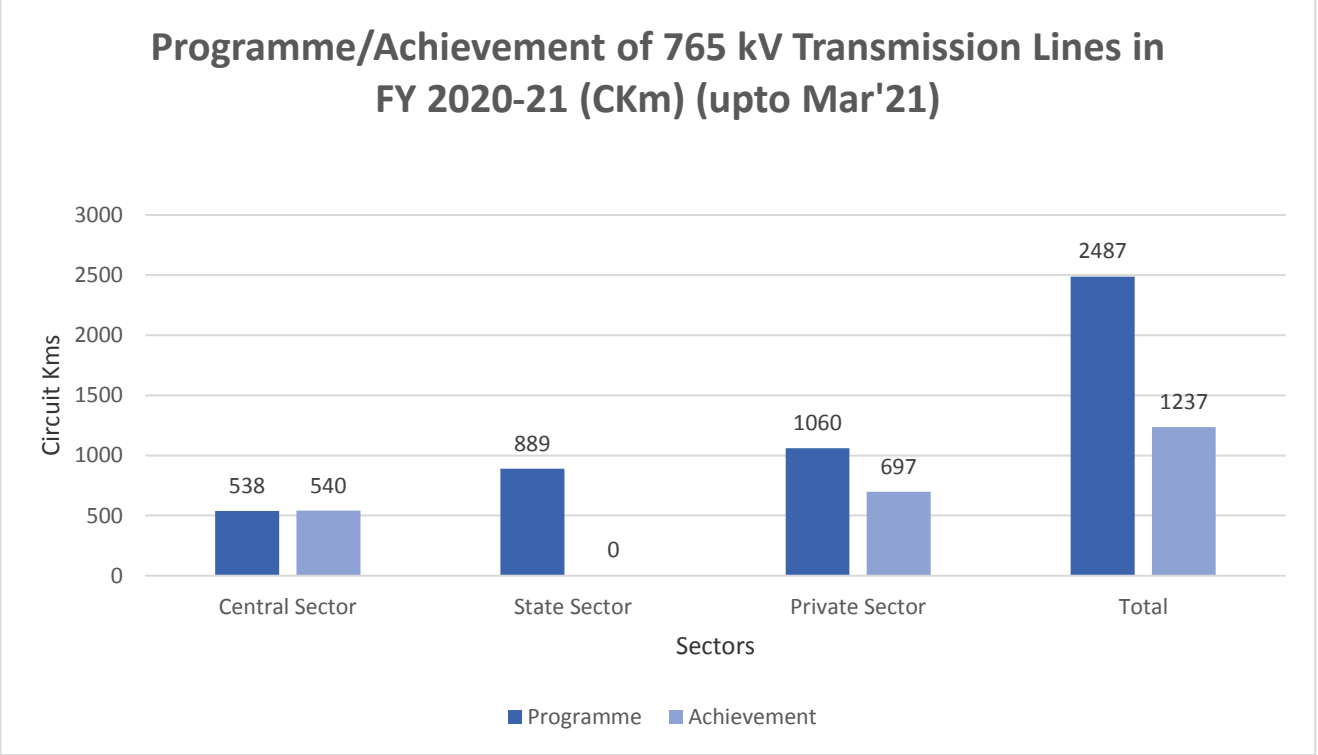


Chart-V

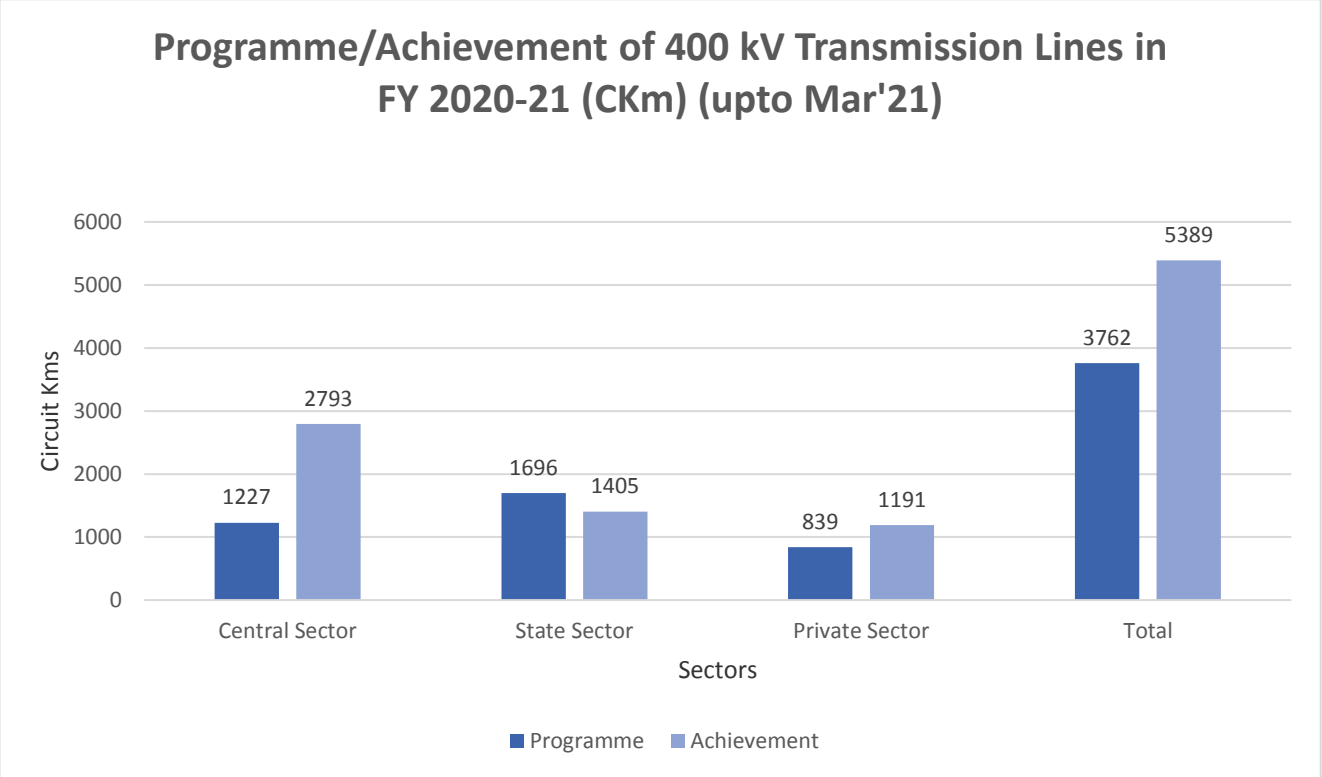


Chart-VI

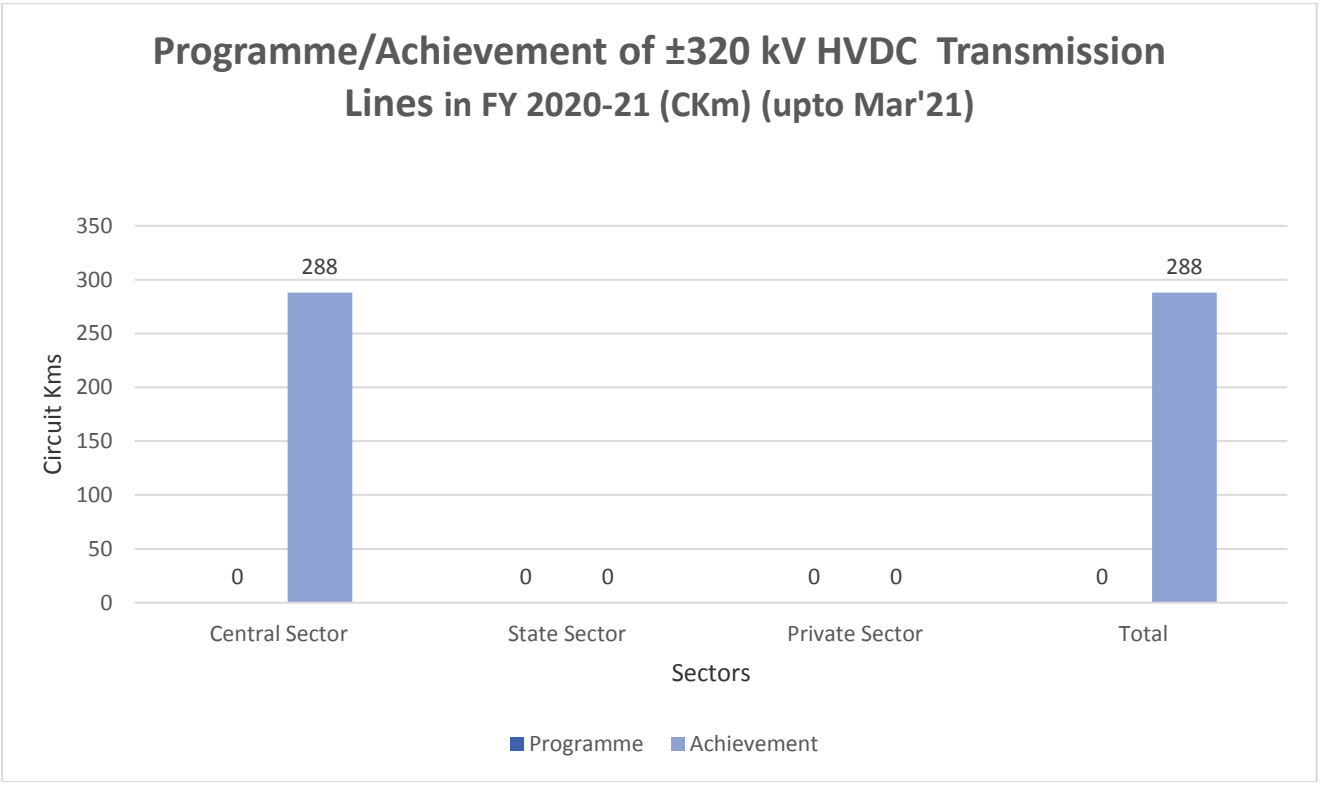


Chart-VII

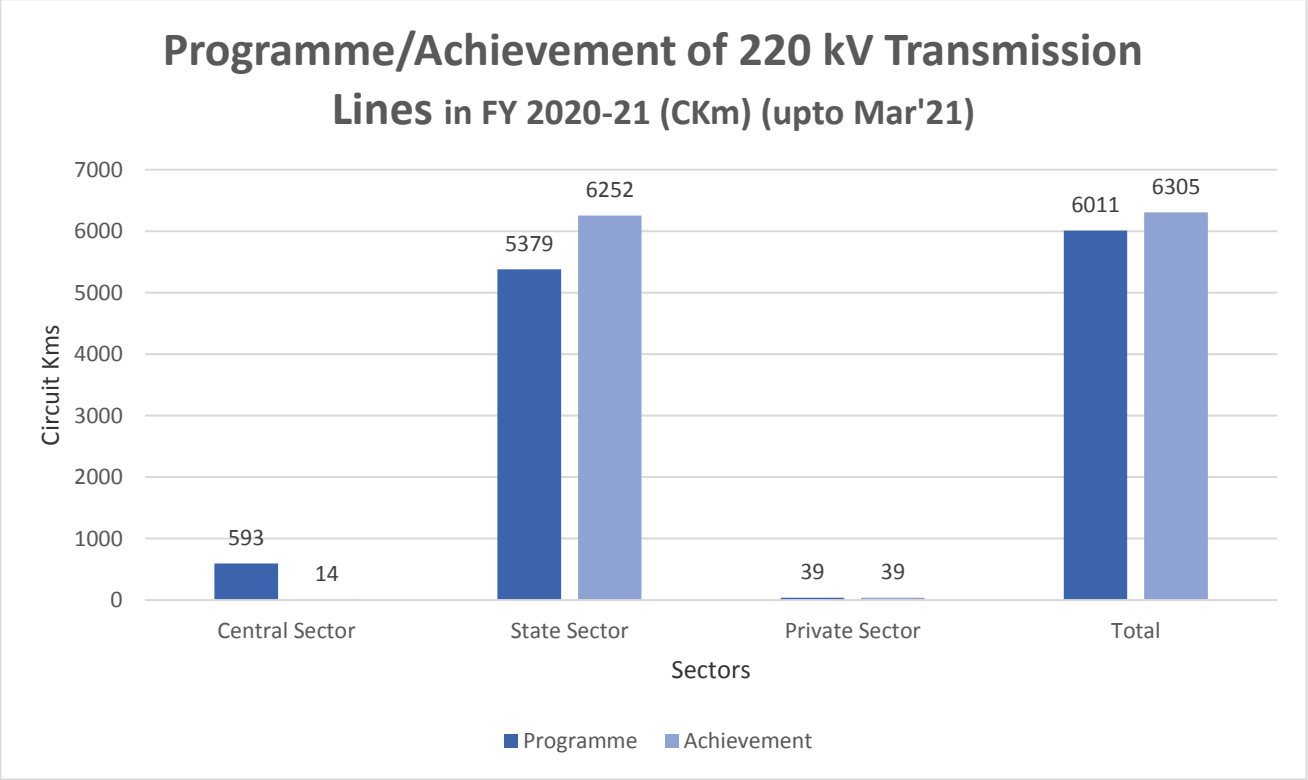


Chart-VIII

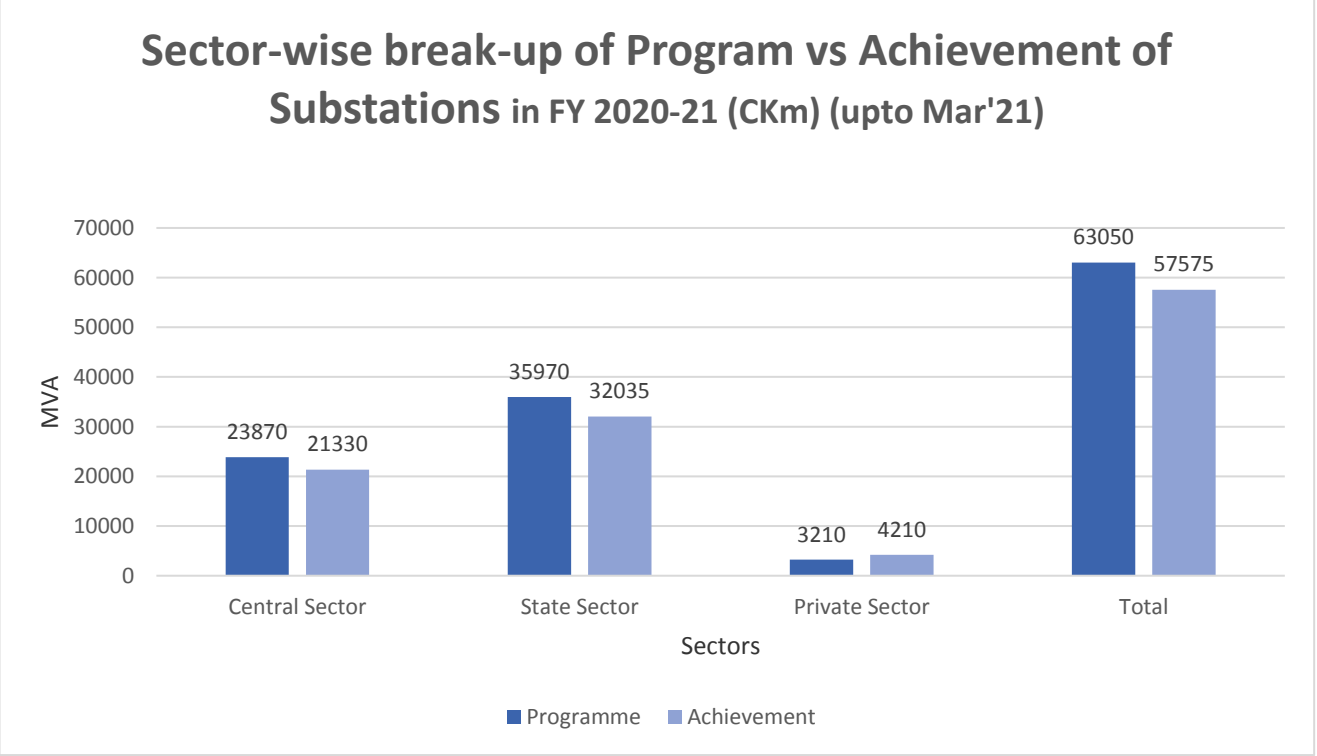


Chart-IX

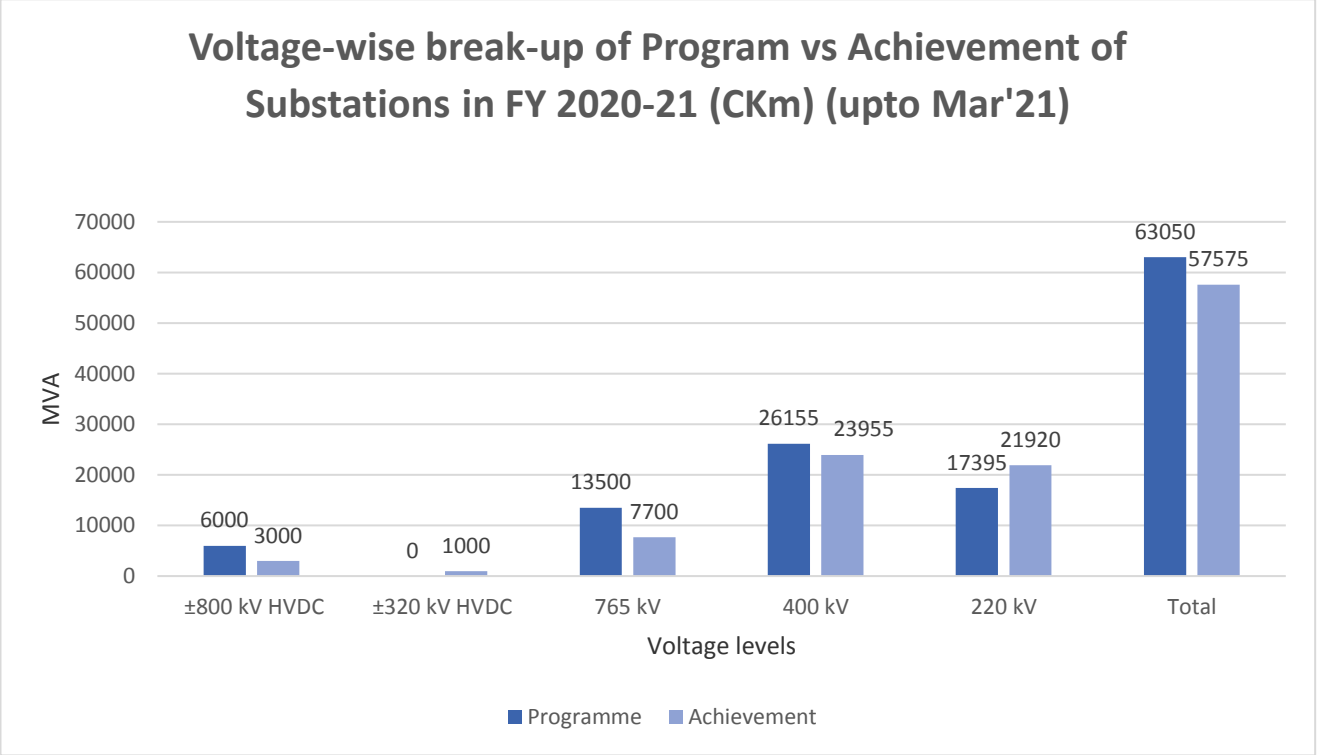


Chart-X

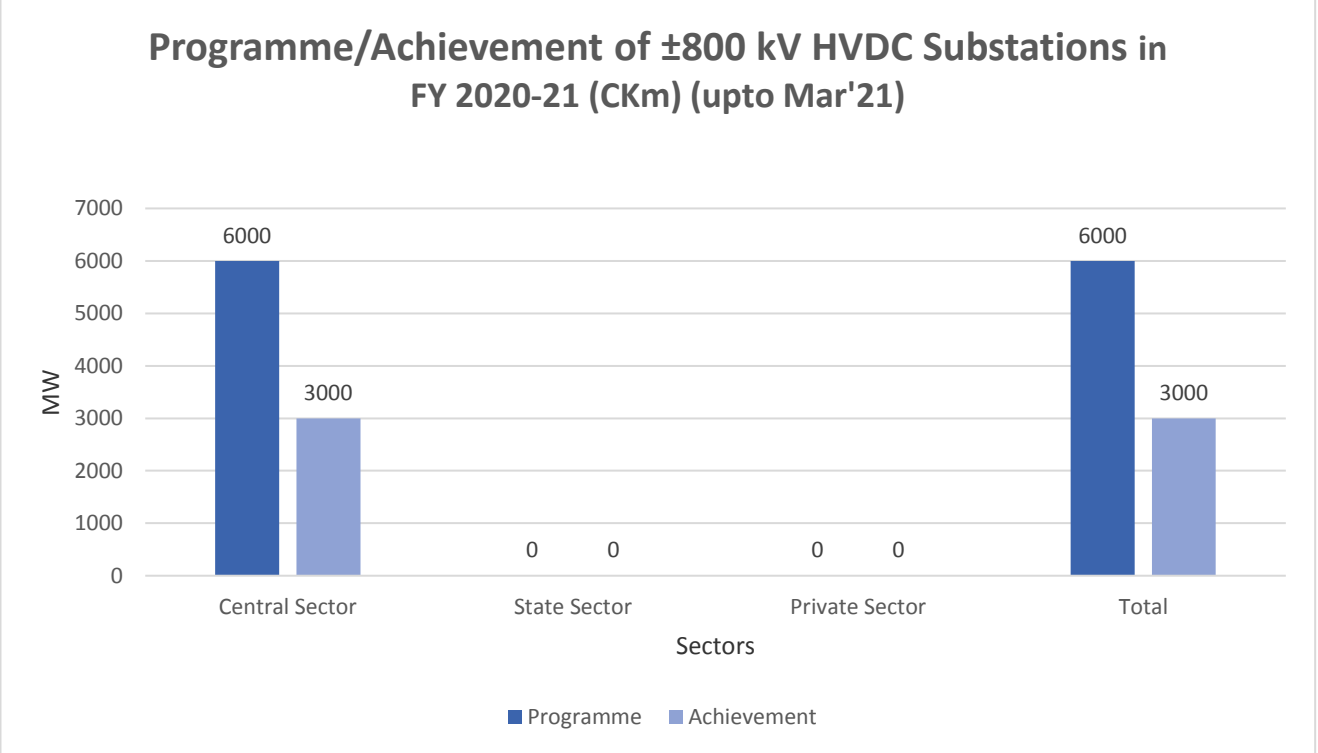


Chart-XI

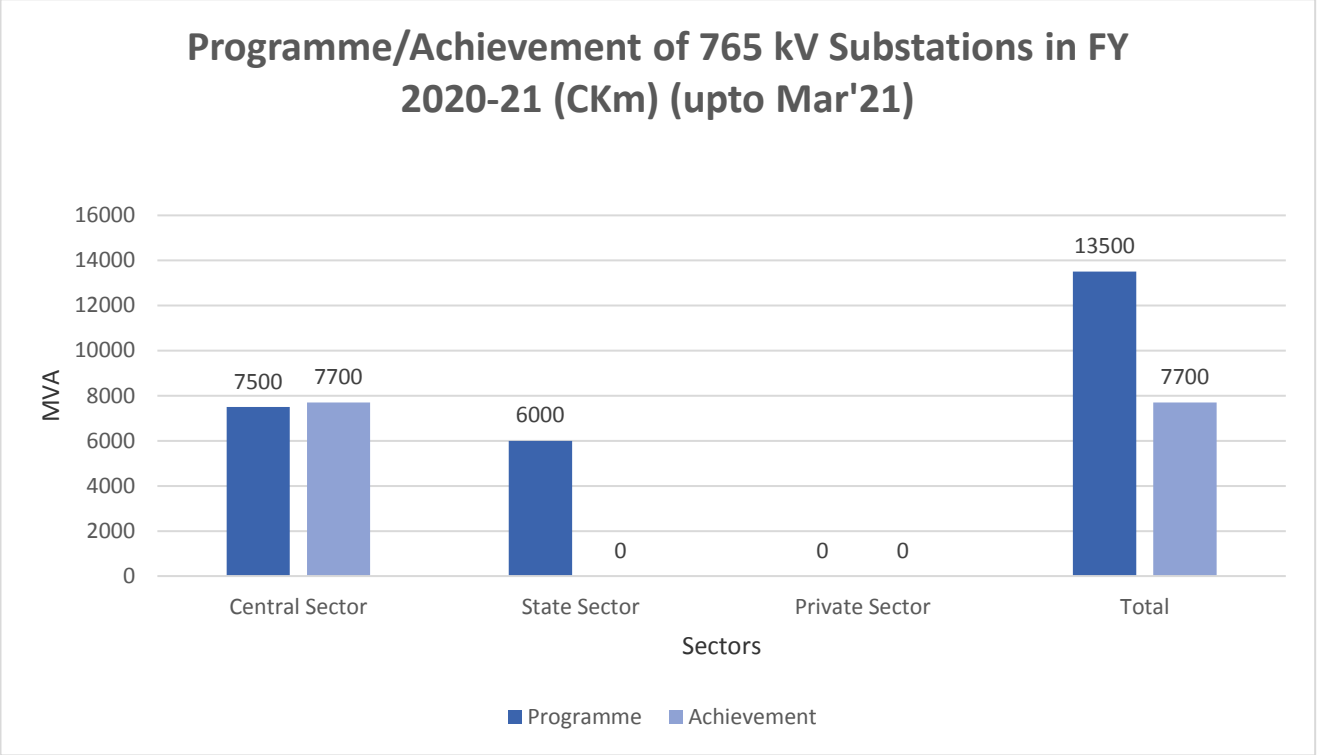


Chart-XII

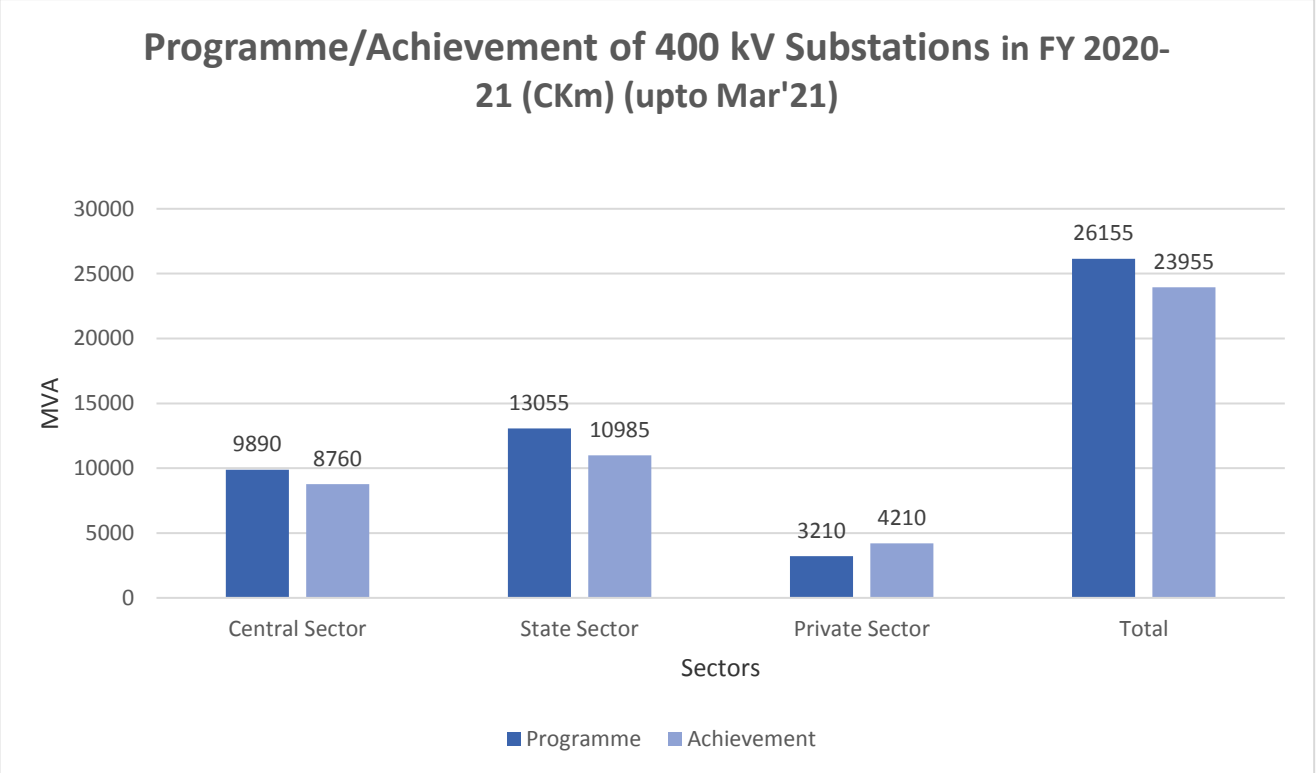


Chart-XIII

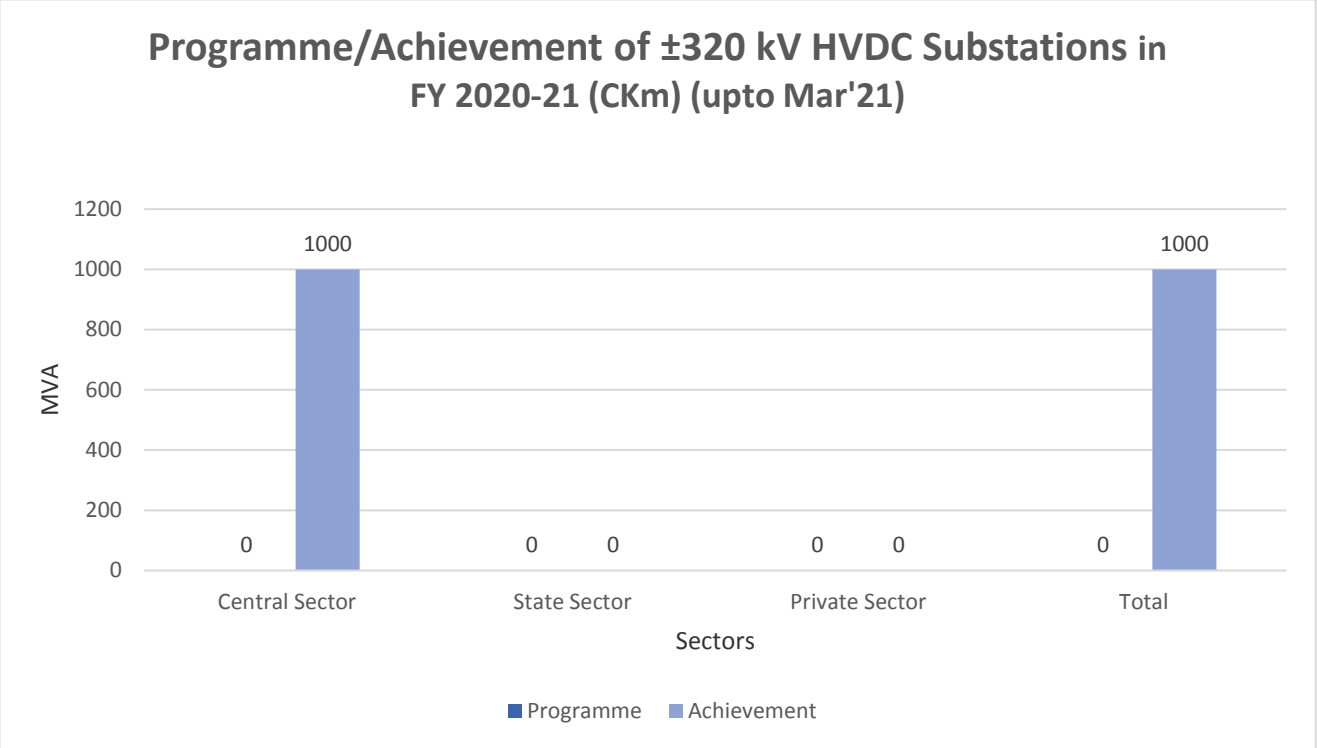
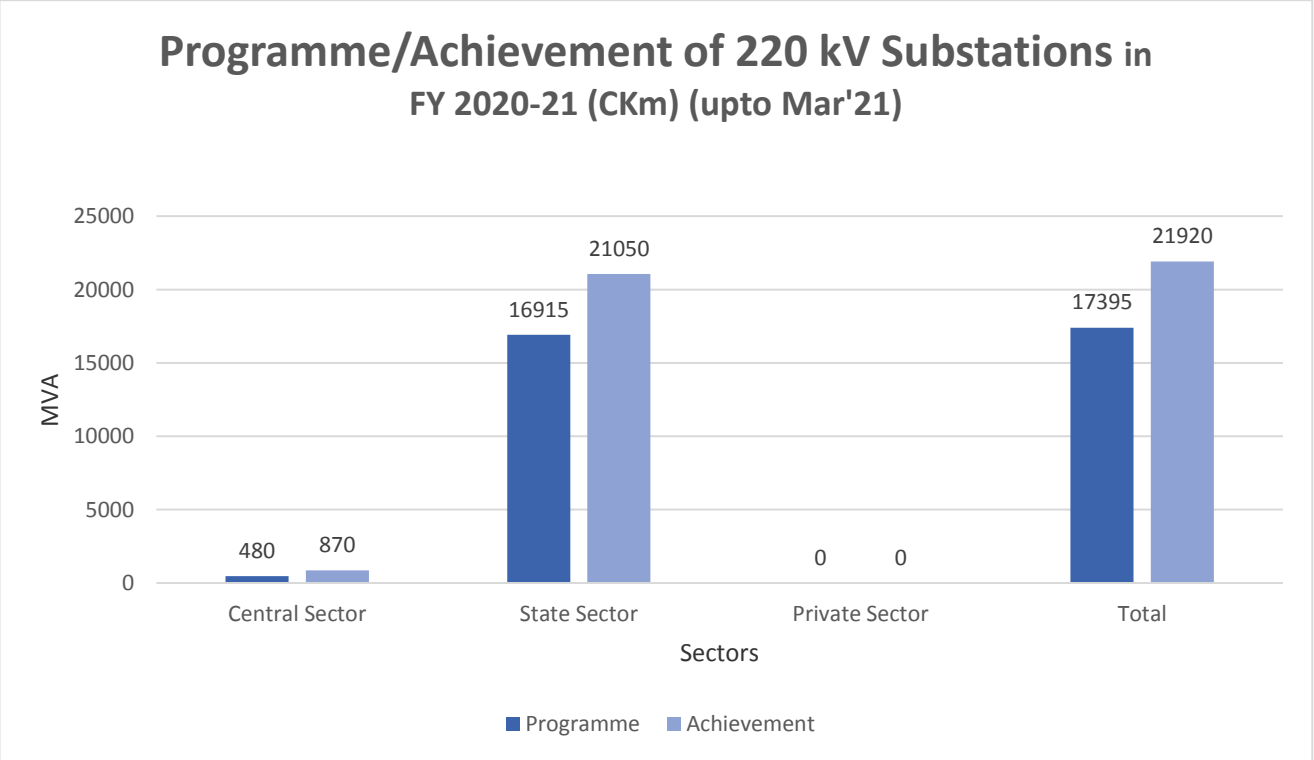


Chart-XIV



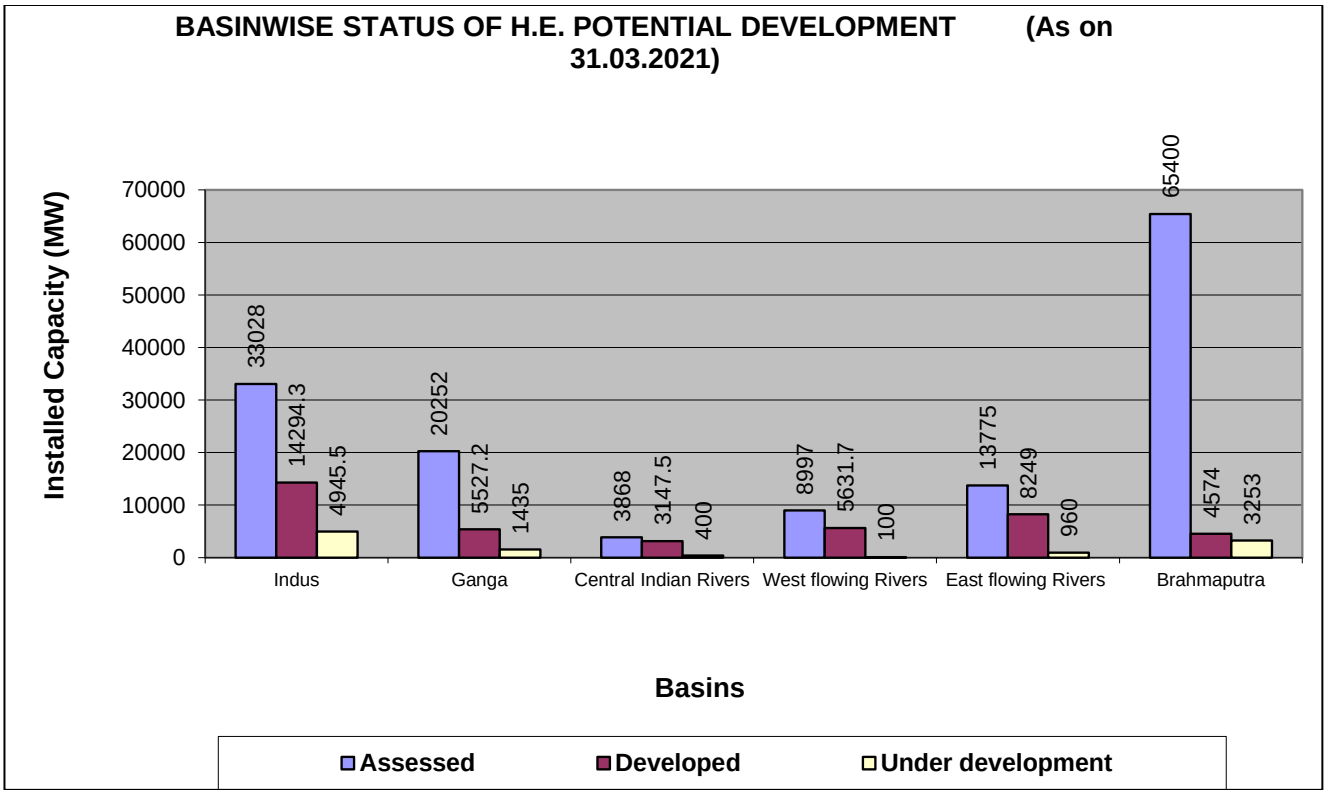
CHAPTER – 6

HYDRO POWER DEVELOPMENT

6.1 Hydro Potential and its Development

The re-assessment studies of hydro-electric potential of the country, completed by Central Electricity Authority in 1987, had assessed the economically exploitable hydro power potential in terms of installed capacity as 148701 MW out of which 145320 MW of capacity is from schemes having capacity above 25 MW.

The basin-wise details of hydroelectric potential development in terms of Installed Capacity are indicated in the table below. As on 31.03.2021, the hydroelectric schemes in operation account for only 28.51% (41423.6 MW) and those under execution for 7.63% (11093.5 MW) of the total potential in terms of installed capacity. Thus, the bulk of the potential (63.86%) remains to be developed.



In addition, 63 sites for development of Pumped Storage Schemes (PSS) with probable total installation of 96529.6 MW were identified in the country. At present, 9 Nos. Pumped Storage Projects (above 25 MW) having total installed capacity of 4785.60 MW are in operation and 3 Pumped Storage projects (1580 MW) are under construction.

6.2 50,000 MW Hydro-Electric initiative

Under the 50,000 MW Initiative, preparation of Preliminary Feasibility Reports (PFRs) for 162 hydro-electric projects spread over 16 states was taken up by CEA in the year 2003-04 as nodal agency with CPSUs/State agencies as Consultants. The role of CEA included overall

coordination, facilitating collection of data, and quality control by vetting conceptual planning, assessment of power benefits and selection of project parameters, evacuation of power and monitoring of works. NHPC Ltd., WAPCOS, NEEPCO, SJVN Ltd. and number of State Power Utilities were associated in preparation of these Preliminary Feasibility Reports. All the 162 Nos. of PFRs were completed in Sept., 2004 for all these projects with an installation of 47,930 MW. Details of these projects are given at **Annex -6A**.

Out of 162 schemes (47930 MW), DPRs in respect of 37 schemes (20435 MW) have already been prepared. Out of these 37 schemes, 1 scheme (105 MW) has been commissioned while 8 schemes (1968 MW) are under construction in the country. A total of 15 schemes (8251 MW) have been concurred by CEA while 3 schemes (510 MW) are under examination in CEA/CWC. DPRs of 10 HEPs with aggregate capacity of 9601 MW have been prepared but returned for various reasons. A total of 6 schemes (2079 MW) are under Survey & Investigation (S&I) for preparation of DPRs while DPR in respect of remaining 119 schemes (25416 MW) is yet to be prepared due to various issues.

6.3 Construction Monitoring of Hydro Projects:

Hydro Project Monitoring Division is monitoring the progress of construction of on-going sanctioned hydro power projects (above 25 MW) in pursuance to following Sections of Electricity Act, 2003 which is reproduced as under:

Section 73(f). Promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system;

Section 73(i). collect and record the data concerning the generation, transmission, trading, distribution and utilisation of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters;

Section 73(j). Make public from time to time the information secured under this Act, and provide for the publication of reports and investigations;

The progress of each project is monitored continuously through site visits, interaction with the developers & other stake holders. Chairperson, CEA/ Member (Hydro), CEA holds regular review meetings with the developers/contractors and monitoring divisions of CEA.

6.4 Hydro additions during 2019-20:

Hydro capacity addition of 300 MW was achieved against the targets of 1190 MW for the year 2019-20. Project-wise details are given at **Annex-6B**.

6.4.1 Hydro capacity additions during 2020-21: 510 MW Hydro capacity has been added against the targets of 606 MW for the year 2020-21. Project-wise details are given at **Annex-6C**.

6.4.2 Hydro capacity programme during 2021-22: Hydro Capacity Addition Monitorable Targets planned for the Year 2021-22 is 493 MW (100 MW in State Sector, and 393 MW in Private Sector.). Project-wise details are given at **Annex- 6D.**

6.5 Survey & Investigation of Hydro Projects

CEA has been monitoring the progress of Survey and Investigation of all the hydro schemes (above 25 MW capacity) by conducting periodical review meetings with

developers. In order to accelerate the pace of hydro development in the country, Guidelines for formulation of DPRs for Hydro Electric Schemes, their acceptance and examination for concurrence have been issued by Ministry of Power in 2014 and accordingly, CEA provides assistance to various Central/ State agencies in the matter of survey, investigation and preparation of DPRs of hydro projects costing more than ₹1000 crores.

In line with the above Guidelines, *Consultation Meetings* are held by CEA, CWC, GSI and CSMRS with the project developer and guidance is provided to him for making a good quality DPR. During the year, consultation meetings were held for Reoli Dugli HEP, Purthi HEP and Bardang HEP in Himachal Pradesh and Upper Sileru PSP in Andhra Pradesh, Uri-I Stage-II HEP and Dulhasti Stage-II HEP in J&K and Anjaw HEP in Arunachal Pradesh.

DPRs of 11 nos. of HEPs with aggregate installed capacity of 5628 MW have so far been prepared in consultation with appraising agencies since 2014 and submitted for further examination in CEA/ CWC and out of which DPRs of 4 HEPs with aggregate installed capacity of 2772 MW have been concurred by CEA. DPRs of Pinnapuram PSP (1200 MW) & Dugar HEP (500 MW) have been prepared and submitted to CEA during the period of 2020-21. In addition, a total of 21 HEPs including 8 Pumped Storage Schemes with aggregate capacity of 10971 MW (having cost of more than Rs.1000 Crores) are presently under Survey & Investigation in the country and DPRs of these are to be submitted to CEA for concurrence.

6.6 Project Planning & Optimization Studies

- Rendering of Consultancy Services for Preparation/ Updation of Detailed Project Report of Kuri-Gongri HEP (2640 MW) in Bhutan and Baranium HEP (240 MW) in J&K.

- Power Potential Studies of Rangit Stage-IV (120 MW) HE Project in Sikkim, Dagmara (130 MW) HE Project in Bihar, Talong Londa HE project (225 MW) in Ar. Pradesh, Upper Indravati PSP (600 MW) in Odisha, Saundatti PSP (1260MW) in Karnataka, Dugar HE Project (500 MW) in Himachal Pradesh, Jangi Thopan Powari HE Project (804 MW) in Himachal Pradesh, Upper Sileru Pumped Storage Project (1350 MW) in Andhra Pradesh, Devsari HE Project (194 MW) in Uttarakhand and Indrapuri Reservoir Scheme (150MW) in Bihar were carried out.

6.7 Studies & Other Activities Related to Hydro Power Planning

- Report on Ceiling Tariff of Hydro Power projects for HPO benefits was prepared and also vetted the draft note on HPO & draft notification on HPO trajectory.

- Guidelines for Budgetary Support for Enabling Infrastructure & Flood moderation were prepared.

- Matter relating to advance excavation in Pinnapuram before grant of TEC was examined.

- Prepared Report on various alternatives for developing Upper Siang Project in association with NHPC and CWC.

- Represented in Internal Committee on Upper Siang MPP constituted by DoWR, RD& GR and prepared report.

- Matter relating to implementation of minimum environmental flows in River Ganga (up to Unnao) was examined.

- 116th Meeting of Permanent Indus Commission was attended wherein issues related to storage projects Pakaldul HEP (1000MW) and Lower Kalnai HEP (48MW) were discussed with Pakistan.

- A perspective plan has been prepared in which 79 no. of hydro schemes with an aggregate capacity of about 30,000 MW (i.e. including 11 Pumped Storage Schemes of 8700 MW) and which include 13084.5 MW of HE projects under construction for providing benefits during the period 2020-21 to 2029-30.

- Inputs were furnished for Sub Committee 3 on" Review of Generation capacity addition (2017-22) and Generation Planning" of National Electricity Plan (2022-27).

- Inputs were furnished for preparation of National Electricity Plan (Vol-II Transmission) for the period 2022-27 and 2027-32.

- Report of the Expert Committee constituted by Department of Water Resources, RD & GR, Ministry of Jal Shakti to examine the issue of uprating of Karcham Wangtoo HEP from 1000 MW to 1091 MW with 10% overload on continuous basis was examined and proposal for uprating of the project was put up to Authority for approval.

- Provisional expenditure for upcoming Hydro-Electric Projects have been worked out in connection with Task Force for consolidating the National Infrastructure Pipeline of Rs. 100 lakh crore FY 2019-20 to FY 2024-25.

- Draft EFC Memo for Dam Rehabilitation and Improvement Project (DRIP)- Phase-II and III was examined and commented upon.

- Matter related to filling of Tehri reservoir from EL 828m to EL 830m was examined and commented upon.

- Power Potential Studies were examined/ carried out in connection with preparation of Draft reports for Basin wise reassessment of Hydro Electric Potential in Country

- Guidelines for operationalizing of HPO and notification of HPO Trajectory were prepared and notified.

- Consultation meetings for Reoli Dugli HEP, Purthi HEP and Bardang HEP in Himachal Pradesh and Upper Sileru PSP in Andhra Pradesh**,** Uri-I Stage-II HEP and Dulhasti Stage-II HEP in J&K, Anjaw HEP in Arunachal Pradesh were held.

- DPRs of Pinnapuram PSP (1200 MW) & Dugar HEP (500 MW) have been prepared and submitted to CEA for further examination.

- EFC Proposal of D/o Promotion of Industry and internal Trades regarding CSS for Industrial Development of Jammu and Kashmir was examined and commented upon.

- Draft Cabinet Note on "Redefining Public Sector Participation in Commercial Enterprises Policy for Atma-Nirbhar Bharat (REPUB-SPACE Policy)" was examined and commented upon.

- Draft Cabinet Note on national logistics Policy was examined and commented upon.

- High-level Dialogue on Energy – 2021 under the auspices of the UN General Assembly "Energy Transition" was examined and commented upon.

- Draft India Energy Outlook Report was examined and commented upon.

6.8 Co-operation with Neighboring Countries in Hydro Power

During the year, following works were handled in connection with development of water resources of the common rivers of India and neighboring countries of Bhutan, Nepal etc. for mutual benefits:

- Consultancy Services for Preparation of Detailed Project Report of Kuri Gongri HEP (2640 MW) in Bhutan. In addition, proposal for additional funds of INR 12.923 Crore for carrying out additional investigations and

studies are required for preparation of bankable DPR of Kuri Gongri HEP was examined.

- Matter relating to revision of tariff of Chukha HEP in Bhutan.

- Internal meeting of Joint Team of Experts (JTE)- India side, JPO– SKSKI was attended.

- 8th Indo- Nepal Joint Steering Committee (JSC) and Joint Working Group (JWG) meeting was attended.

- 3rd Joint Working Group (JWG) and Joint Steering Committee (JSC) Meeting between India and Myanmar on Corporation in power sector was attended.

- Meeting of Committee for DPR finalization of Pancheswar MPP was attended.

- Inputs were provided for sixth meeting of India – Nepal Joint Commission held in New Delhi in January, 2021.

6.9 Hydro Power Plants Performance & Operation Monitoring

- The report "Review of Performance of Hydro Power Stations" for the year 2019-20, in this regard, is in the process of completion. Performance of 712 units in 205 Hydro Stations with aggregate Installed Capacity of 45699.2 MW (above 25 MW) has been analyzed in respect of their outages & generation in this report.

- Month-wise/station-wise hydro generation targets for year 2021-22 in respect of all the HE Stations (above 25 MW) in the country were finalized as 149.54 BU in consultation with respective utilities including 61.01 BU in respect of CPSUs, 14.30 BU for private sector projects and 74.19 BU for state sector hydro projects. The overall programme for generation from hydro projects during 2021-22 is 149.544 BU.

- Midterm review of generation performance of hydroelectric stations of the country for the year 2020-21 was carried out in December 2020 after withdrawal of South-West monsoon by interaction with Power Utilities of Central Sector and the generation programme was reviewed for the remaining part of the year 2020-21. The total likely generation from hydro stations in 2020-21 would be about 150.30 BU against original programme of 140.357 BU.

- Visit to Srisailam Left Bank Power Station, TSGENCO in Telangana was conducted as part of Expert Committee constituted to look into the issues of fire incident took place in the Srisailam Left Bank Power Station (6x150 MW=900 MW) of M/s Telangana State Power Generation Corporation Limited (TSGENCO) in Nagarkurnool District of Telangana on 20th August, 2020.

6.10 Hydel Generation Performance during year 2020-21

The region wise summary of Hydel Generation performance in the country is as follow:

Region	Generation (BU)		Deviation (+/-)
	Programme	Actual	(%)
Northern	73.24	75.23	2.72

Western	14.26	16.68	16.97
Southern	27.29	31.35	14.88
Eastern	19.19	21.17	10.32
N-Eastern	6.37	5.85	-8.16
All India	**140.36**	**150.30**	**7.08**

Against programme of 140.36 BU, the actual energy generation during the year 2020-21 was 150.30 BU, which was 7.08 % more than the target.

6.11 RENOVATION & MODERNISATION (R&M) OF HYDRO ELECTRIC PROJECTS

Renovation & Modernisation, Uprating and Life Extension (RMU&LE) of the existing old hydroelectric power projects is considered a cost effective option to ensure optimization of resources, efficient operations, and better availability and also to augment (uprating) capacity addition in the country.

Recognizing the benefits of R&M of hydro-electric power projects, Govt. of India set up a National Committee in 1987 and a Standing Committee in 1998 and thereafter had identified the projects/ schemes to be taken up for implementation under R&M. The National Perspective Plan document for R&M of hydroelectric power projects in the country was also prepared in CEA during the year 2000. The status of various projects/schemes already identified for implementation/completion till the end of XI Plan, i.e. March, 2012 has been incorporated in the National Perspective Plan.

6.11.1 Achievements During VIII, IX, X XI and XII Plan Period:

The R&M works at 104 (21 in Central and 83 in State Sector) hydro power plants (13 up to the VIII Plan, 20 in the IX Plan, 32 in the X Plan, 18 in the XI Plan & 21 in the XII Plan) with an aggregate installed capacity of 20611 MW have been completed by the end of the XII Plan, total benefit of 3636 MW through Life Extension, Uprating and Restoration has been accrued.

6.11.2 Present Status (2017-22 and 2022-27)

During 2017-22

The Renovation, Modernization, Uprating and Life Extension works at 31 Hydro Electric Plants (HEPs) with an aggregate capacity of 6430.3 MW is programmed for completion during 2017-22 with the breakup as 4452.60 MW through R&M at 17 HEPs, 1217.7 MW through Life Extension at 10 HEPs and 760 MW through Life Extension & Uprating at 4 HEPs. The 4 HEPs where both Life Extension & Uprating are envisaged, the aggregate capacity of 760 MW shall be uprated to 883.7 MW resulting in additional benefit of 123.7 MW. As such, the revised aggregate capacity after RMU&LE works of these 31 projects will be 6554 MW.

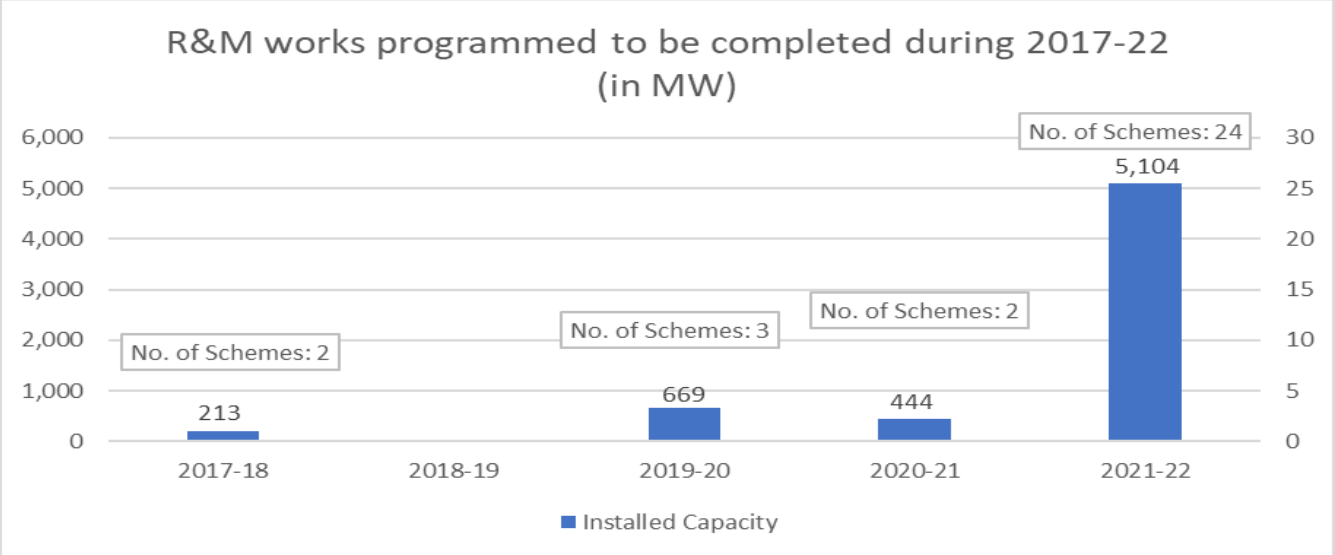
Out of these 31 schemes, five (7) schemes with an aggregate installed capacity of about 1226.4 MW have been completed till March, 2021, which includes 1154 MW through R&M, 102.4 MW through Life Extension and 84 MW (70+14MW) through LE & Uprating. The state-wise list of hydro R&M schemes expected for completion during 2017-22 is given at **Annex-6E.**

During 2022-27

The Renovation, Modernization, Uprating and Life Extension works at 49 Hydro Electric Plants (HEPs) with an aggregate capacity of 7547.3 MW is programmed for completion during 2022-27 with the breakup as 1450.35 MW through R&M at 6 HEPs, 5031.95 MW through Life Extension at 34 HEPs and 1065 MW through Life Extension & Uprating at 9 HEPs. The 9 HEPs where both Life Extension & Uprating are envisaged, the aggregate capacity of 1065 MW shall be uprated to 1147 MW resulting in additional benefit of 82 MW. As such, the revised aggregate capacity after RMU&LE works of these 49 projects will be 7629.3 MW. The state-wise list of hydro R&M schemes expected for completion during 2022-27 is given at **Annex-6F.**

I Programme of R&M works during 2017-22

Sl. No.	Category	No. of Project			Capacity covered under RMU & LE (MW)	Estimated Cost (Rs. in Crs.)	Benefit (MW)
		Central Sector	State Sector	Total			
1	Programmed	8	23	31	6430.30	2982.27	2101.40 [1977.70(LE) +123.7(U)]
2	Completed	3	4	7	1326.40	292.12 (actual cost)	186.40 [172.40(LE) + 14(U)
3	Under Implementation	5	19	24	5103.90	2486.76	2101.40 [1977.70(LE) +123.7(U)]



II Programme of R&M works during 2022-27

Sl.	Category	No. of Project	Capacity covered	Benefit (MW)

No.		Central Sector	State Sector	Total	under RMU & LE (MW)	
1	Programmed	6	43	49	7547.3	6178.95 [6096.95(LE)+ 82(U)]
2	Under Implementation	1	11	12	2209.35	847 [819(LE)+ 28(U)]
3	Under Tendering	2	8	10	1061.75	1073.75 [1061.75LE)+ 12(U)]
4	Under DPR Preparation/ Finalisation/Approval	3	6	9	1739.2	1772.20 1739.20(LE)+ 33(U)]
5	Under RLA Studies	0	18	18	2537	2486 [2477(LE)+ 9(U)]

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension; RLA- Residual Life Assessment

6.11.2.1 Achievements under R&M in Hydro during the year 2020-21

R&M works of Idukki 1st Stage (3x130 MW) and Sholayar (3x18 MW) of KSEB in State Sector with an aggregate installed capacity of 444 MW have been completed and have achieved benefit of 54 MW through Life Extension.

6.11.2.2 Programme for the year 2021-22

For the year 2021-22, it is programmed to complete following 24 schemes having capacity under R&M of 5103.9 MW. On completion of these schemes, there will be a benefit of 1805.3 MW through Life Extension and 109.7 MW through Uprating.

S. No.	Name of Scheme	Capacity under R&M (No. x MW)	Agency
1	Bhakra RB	5x157	BBMB
2	Bhakra LB	5x108	BBMB
3	Dehar Power House (Unit-3)	1x165	BBMB
4	Ganguwal & Kotla Power House	4x24.2	BBMB
5	Baira Siul	3x60	NHPC
6	Bhabha Power House	3x40	HPSEB
7	Chenani	5x4.66	J&KSPDC
8	Ganderbal	2x3+2x4.5	J&KSPDC
9	Mukerian St.I, St.II, St.III & St.IV	3x15, 3x15, 3x19.5&3x19.5	PSPCL
10	Shanan HEP	1x50+4x15	PSPCL
11	Rihand	6x50	UPJVNL

12	Obra	3x33	UPJVNL
113	Ukai	3x75	GSECL
14	Kadana PSS	4x60	GSECL
15	Nagarjuna Sagar Ph-II works	1x110+7x100.8	TSGENCO
16	Nagarjuna Sagar Left Canal Power House	2x30.6	TSGENCO
17	Munirabad Dam Power House	2x9 + 1x10	KPCL
18	Kuttiyadi	3x25	KSEB
19	Bargi	2x45	MPPGCL
20	Pench	2x80	MPPGCL
21	Bansagar Ton-I,	3x105	MPPGCL
22	Balimela,	6x60	OHPC
23	Hirakud-I	2x37.5 (U5&6)	OHPC
24	Hirakud-II (Chiplima)	3x24	OHPC
Total (24 Schemes)		**5103.90 MW**	

6.12 Concurrence / Appraisal of Hydro Schemes:

During the year 2020-21 (till 31.03.2020), DPR of one HE Scheme with an installed capacity of 382 MW has been examined and the project was accorded concurrence by CEA. Details are given as under:

No.	Name of Scheme/ State/ Executing Agency	Installed Capacity (MW)	Estimated Cost (₹ in crores)	Date of concurrence/ appraisal by CEA
1	Sunni Dam HEP in Himachal Pradesh by SJVNL	4x73 +1x73 + 1x17= 382	2475.35 (Price at July, 2020 level)	11.02.2021
	TOTAL	**382**		

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CHAPTER-7

THERMAL POWER DEVELOPMENT

7.1 Setting up of Ultra Mega Power Projects

Government of India took an initiative in November 2005 for the Development of Ultra Mega Power Projects (UMPPs) in India. It is a step taken for achieving capacity addition at an accelerated pace, catering to the need of power to number of States and to ensure cheaper tariffs utilizing economies of scale. The objective behind the initiative is also to mitigate the risk relating to tie up the essential inputs/clearances such as land, fuel, water and other statutory clearances etc. UMPPs are very large sized projects about 4000 MW capacity with Super Critical Technology. Ministry of Power has identified Central Electricity Authority (CEA) as the Technical Partner and Power Finance Corporation (PFC) as the Nodal Agency for development of the UMPPs in the country.

The projects are awarded to the successful developers through tariff based International Competitive Bidding (ICB) route. To tie-up the necessary inputs/ clearances, project-specific shell companies i.e. Special Purpose Vehicles (SPVs) are set up as a wholly owned subsidiaries of the Power Finance Corporation (PFC) Ltd. These SPVs, along-with the various clearances etc. are subsequently transferred to the successful developer.

Initially following nine (9) numbers, Ultra Mega Power Projects (UMPPs) were proposed to be set up in different states:

i. Sasan UMPP in M.P- coal pithead
ii. Mundra UMPP in Gujarat- coastal
iii. Krishnapatnam UMPP in A.P.- coastal
iv. Tilaiya UMPP in Jharkhand- coal pithead
v. UMPP in Chhattisgarh- coal pithead
vi. Bedabahal UMPP in Odisha - coal pithead
vii. Cheyyur UMPP in Tamil Nadu- coastal
viii. Munge UMPP in Maharashtra- coastal
ix. Niddodi UMPP in Karnataka – coastal

In addition to the above nine UMPPs originally identified, request has come from some of the

State Governments for installation of additional UMPPs in their states. These are given below:

i) Second UMPPs in Odisha at Sakhigopal
ii) Third UMPPs in Odisha at Ghogarpalli
iii) Second UMPP in Gujarat at Gir Somnath
iv) Second UMPP in Jharkhand at Deoghar
v) Second UMPP in Tamil Nadu at Nagapattinam
vi) UMPP in Bihar at Banka
vii) UMPP in Uttar Pradesh at Etah
viii) Second UMPP in Andhra Pradesh at Nainapalli

Status of UMPPs

I. UMPPs Awarded:

Initially, four UMPPs namely Mundra in Gujarat, Sasan in Madhya Pradesh, Krishnapattnam in Andhra Pradesh and Tilaiya in Jharkhand were awarded to the successful bidders. The details of these project are given as below:

Sl.	Name of UMPP	Type	Date of Transfer	Levellised Tariff (in Rs. Per kWh)	Successful developer
1.	Mundra, Gujarat	Coastal	23.4.2007	2.264	Tata Power Ltd.
2.	Sasan, Madhya Pradesh	Pithead	07.08.2007	1.196	Reliance Power Ltd.
3.	Krishnapatnam, Andhra Pradesh	Coastal	29.01.2008	2.333	Reliance Power Ltd.
4.	Tilaiya, Jharkhand	Pithead	07.08.2009	1.77	Reliance Power Ltd.

II. UMPPs Operational:

Out of the above four awarded UMPPs; only two projects namely Mundra (5x800MW) and Sasan (6x660MW) are in operation. A brief on these operational UMPPs are given as below:

a) Mundra UMPP in Gujarat: The project was handed over to the successful bidder M/s. Tata Power Company Ltd., on 23.04.2007 at an evaluated levelised tariff of Rs. 2.26367/kWh. Mundra UMPP was fully commissioned in 2013. The generation and PLF for last three years are as below:

Parameters	2018-19	2019-20	2020-21
Generation (MU)	26839.30	26495.39	26208.53
PLF (%)	76.60	75.41	74.80

b) Sasan UMPP in Madhya Pradesh: The project was handed over to the successful bidder M/s Reliance Power Ltd., on 07.08.2007 at an evaluated levelised tariff of Rs. 1.19616/kWh. Sasan UMPP was fully commissioned in 2015. The generation and PLF for last three years are as below:

Parameters	2018-19	2019-20	2020-21
Generation (MU)	32877.27	33340.92	33387.69
PLF (%)	94.78	95.85	96.25

III. UMPPs on fast - track:

Two UMPPs are being fast-tracked for bidding. Various clearances have been taken. The bidding shall be initiated after the issuance of Standard Bidding Documents (SBDs). The status of these two UMPPs is as follow:

a) Bedabahal UMPP in Odisha: The site for this UMPP is in village Bedabahal in Sundergarh district. RfQ and RfP issued in 2013 were withdrawn. Expert Committee was constituted under the Chairmanship of Shri Pratyush Sinha, former CVC to review the existing Bidding documents for UMPPs and to recommend the revised Standard Bidding Documents (SBDs) applicable to UMPPs/Case2. The SBDs are under finalization. Operating SPV namely Odisha integrated Power Limited (OINPL) has been incorporated on 24.08.2006. Infrastructure SPV namely Odisha Infra Power Limited (OIPL) has been incorporated on 23.01.2014. Fresh bids would be issued after finalization of SBDs and allocation of coal blocks to the Infra Special Purpose Vehicle (SPV).

b) Tilaiya UMPP in Jharkhand: The project was handed over to M/s Reliance Power Ltd. (RPL) on 07.08.2009 at an evaluated levelised tariff of Rs. 1.770 per kWh. Operating SPV namely Jharkhand integrated Power Limited (JIPL) has been incorporated on 02.01.2007. Infrastructure SPV namely Jharkhand Infra Power Limited (JINPL) has been incorporated on 10.12.2015. The developer, Jharkhand Integrated Power Ltd (JIPL), a subsidiary of RPL, has issued notice of termination of Power Purchase Agreement (PPA) on 28.04.2015 citing non-transfer of land to the developer by Jharkhand Government. Jharkhand Urja Vikas Nigam Ltd. (JUVNL) has informed that JIPL has been taken over by the procurers on 16.05.2018 from RPL.

IV. UMPPs in Pipeline:

Two UMPPs are under various stages of development. Various clearances, coal block allocation, land allocation are being sought. The status of these two UMPPs is as follows:-

a. Banka UMPP in Bihar: A site at Kakwara in Banka District has been identified for setting up of UMPP in Bihar. Infrastructure SPV namely Bihar Infra power Limited has been incorporated on 30.06.2015. Operating SPV namely Bihar Mega Power Limited (BMPL) has been incorporated on 09.07.2015.

b. Deoghar UMPP in Jharkhand: A site at Husainabad, Deoghar Distt has been identified

for setting up of 2nd UMPP in Jharkhand. Operating SPV namely Deoghar Mega Power Ltd and Infrastructure SPV namely Deoghar Infra Limited has been incorporated on 26.4.2012 and 30.06.2015 respectively. However, due to resistance from the local public, Government of Jharkhand has proposed an alternate site at Mohanpur Anchal in Deoghar District. The approval of alternate site at Mohanpur in Deoghar is awaited from Government of Jharkhand.

V. UMPPs stalled due to various reasons:

a. Cheyuur UMPP in Tamil Nadu: The site at Cheyyur in Kanchipuram district has been identified along with captive port at Panaiyur village. Cheyyur UMPP was originally envisaged to be setup on imported coal. Later on Ministry of Power has decided for setting up the same on domestic coal instead of imported coal. Ministry of Coal has also been requested to allocate suitable explored coal block for this project. However, recently all the Procuring States have decided to opt out of Cheyyur UMPP. In view of that TANGEDCO vide email dated 18.08.2020 has informed that they have recommended for closure of this project and is under consideration by GoTN.

b. Krishnapatnam UMPP in Andhra Pradesh: The project was handed over to Reliance Power Ltd. on 29.01.2008 at the levelised tariff of Rs. 2.33/kWh. However, the developer has stopped the construction work at the project site in June 2011 citing new Regulation of the Govt. of Indonesia as the reason, which prohibits sale of coal, including sale to affiliate companies, below benchmark price. Lead Procurer APSPDCL issued Notice of Termination of PPA on 15.03.2012. CAPL filed petition before Hon'ble High Court of Delhi for seeking interim relief against Termination Notice, which was dismissed by Single Judge on 02.07.2012. CAPL later filed an appeal in Division Bench of Hon'ble High Court of Delhi against Order of Single Judge, which was also dismissed on 15.01.2019.

VI. UMPPs being considered for Closure:

MoP vide letter dated 26.07.2019 had informed the procurers of the below mentioned five UMPPs, that the activities with respect to the said projects are not progressing at all for a considerable time due to various reasons. Subsequently, MoP vide letter dated 08.04.2020 had again requested for the confirmation from the State Governments for closure of these UMPPs.

a. Second UMPP in Odisha: Site at Bijoypatna in Chandbali Tehsil of Bhadrak district has been identified.

b. Third UMPP in Odisha: Site at Narla & Kasinga sub division of Kalahandi district has been identified.

c. UMPP in UP: A UMPP in Uttar Pradesh is also in consideration. Land has been tentatively identified at Etah district.

d. Second UMPP in Gujarat: A site in Gir Somnath Districthas been identified by Government of Gujarat to explore the possibilities for setting up of an UMPP.

e. Second UMPP in Tamil Nadu: Site near Nagapattinam was identified by Govt of Tamil Nadu which was found unsuitable by TANGEDCO Ltd. CEA has requested TANGENDCO to identify an alternative site for setting up second UMPP in Tamil Nadu.

VII. UMPPs closed:

Niddodi UMPP in Karnataka**,** Nainapalli second UMPP in Andhra Pradesh, UMPP in Chattisgarh and Munge UMPP in Maharashtra have been closed.

7.2 Construction Monitoring Of Thermal Power Projects

CEA closely monitors the progress of various construction activities of Thermal Power Projects under construction in the country. Section 73 (f) of Electricity Act, 2003 defines the functions and duties of the authority related to Project Monitoring activities which inter-alia envisages "To Promote and Assist in Timely Completion of Various Schemes and Projects." Regular visits are made by CEA officers to the project sites for assessing the progress of various construction activities and rendering necessary advice/ assistance in resolving the problems being faced by the Project Authorities to meet the schedule of commissioning. Regular Review Meetings are also held in CEA with Project Authorities, Main Plant & Equipment Manufacturers and other equipment Suppliers to review the progress status of the Projects.

As on 31.03.2021, Thermal capacity of 56650 MW is at various stages of under construction in the country. Out of which, there are 28 Thermal power projects comprising of 24365 MW which are held up due to various reasons such as financial issues, lack of PPA or FSA etc. The commissioning of these projects is uncertain.

7.2.1 Key initiatives

Based on the past experience, there has been a significant shift in approach in the area of project monitoring. Some key initiatives taken during recent past in the role of a facilitator, includes the following:

- Detailed schedules were drawn up for project milestones commitments from project authorities for on-going under construction projects.

- Participation in various review meetings held in the Ministry of Power, Ministry of Heavy Industries, Project Monitoring Group and NITI Aayog etc.

- Review Meetings were held with various implementing agencies including suppliers to review the progress of work and finalizing the completion schedule of under construction thermal power projects.

- Thermal projects visit to assess the progress of various activities at site including Gas based projects.

7.3 New Thermal Power Projects accorded Environmental Clearance

7.3.1 Power Projects accorded Environment Clearance

During the year 2020-21, Environment clearance has been granted to 03 nos. of thermal power project totaling to a capacity of 4800 MW. The list of such plants is as below:

Sl. No.	Name of the project	Date of Clearance	Environment Clearance Capacity (MW)
01	2x800 MW, Singrauli STPP, Stage III, District Sonbhadra, UP by NTPC	13.07.2020	1600
02	800 MW, coal based supercritical TPP, Tehsil Songadh, district Tapi, Gujarat by GSECL	13.10.2020	800
03	3x800 MW NLC Talabira Thermal Power Project (NTTPP) at in district jharsuguda and sambalpur, Odisha by NLC India Ltd.	02.02.2021	2400

	Total	**4800 MW**

7.3.2 Power Projects for which order placed

During the year 2020-21, orders for 660 MW thermal capacity was placed as listed below:

Sl.	Project	Implementing Agency	Plant Configuration	Capacity (MW)	Main Plant (BTG)
01	Sagardighi Thermal Power Phase-III Expansion U#5	WBPDCL	660	660	M/S BHEL on 01.07.2020

7.4 Coal Block Allocation

There are 64 nos. of coal blocks allotted to Power Sector. Out of which 50 nos. of Coal Blocks (Central sector – 12 nos., State sector – 33 nos., Private Sector – 5 nos.) have been allotted to power sector as per Coal Mines (Special Provisions) (CMSP) Act 2015. Another 11 nos. of Coal Blocks (Central sector – 3 nos. and State sector- 8 nos.) have been allotted to power sector under Mines and Minerals (Regulation and Development) Act (1957) i.e. MMDR Act. 03 nos. of Coal Blocks [Central sector – 1 no. and Ultra Mega Power Project (UMPP) – 2 nos.) have been allotted to power sector under Coal Mines (Nationalization) Act, 1973.

Total nos. of coal blocks allotted to Central Sector is 16 nos., State Sector is 41 nos., Private sector is 05 nos and UMPP is 02 nos.

Out of these 64 Coal Blocks, production has been started from 26 Coal Blocks and likely start of production during 2021-24 is from 20 Blocks. Out of the remaining 18 nos. of coal blocks, 3 nos. coal block which were allotted in 2019-20 are likely to start production beyond 2024-25, 12 nos. coal blocks are likely to be surrendered and 03 nos. coal blocks have yet to complete the exploration due to various issues. The quantity of coal produced in the FY 2020-21 is 40.31 MT. The expected coal production in the year 2021-22 is around 77.0 MT.

7.5 Linkage under SHAKTI Policy, 2017

Ministry of Coal in May 2017 has formulated a new policy for allocation of coal to power sector named SHAKTI (Scheme for Harnessing and Allocating Koyala transparently in India), 2017. Since, the inception of the policy, coal linkage has been accorded to various Govt./Private power utilities under its various provisions/clauses. Status up to March 2021 is as under:

7.5.1 Shakti Policy Para B (i):-

Policy: - CIL/SCCL may grant Coal linkages for Central Government, State Government Gencos and JVs formed between or within CPSUs and State Govt./PSUs at the notified price of CIL/SCCL.

Achievement: SLC (LT) has accorded coal Linkage to 23 nos. Thermal Power Projects totaling 25,340 MW under Central /State

Sector category under SHAKTI policy.

7.5.2 Shakti Policy Para B (ii): -

Policy: - CIL/SCCL may grant coat linkages on notified price on auction basis for power producers/lPPs having already concluded long term PPAs (both under section 62 and section 63 of The Electricity Act, 2003) based on domestic coal.

Achievement: - Three rounds of bidding for coal linkage under Shakti B(ii) have been held so far. In first round of bidding, coal linkages were allocated to 10 nos. Thermal Power Projects having PPA. The installed capacity of these 10 nos. projects was 11,549 MW against which signed PPAs were available for 9,045 MW capacity. CIL has allotted coal to various developers totaling to 32.68 MTPA (G-13 grade equivalent).

In the second round of auction held under SHAKTI B(ii), coal linkages through auction process were awarded by CIL to 8 Nos. of Thermal Power Projects totaling to 1240 MW of installed capacity and having long-term PPA signed capacity of 877.4 MW. CIL has provisionally allotted coal linkages to these power projects totaling to 3.3355 MTPA (G13 grade equivalent).

In the third round of auction held under SHAKTI B(ii), coal linkages through auction process were awarded by CIL to 5 Nos. of Thermal Power Projects having installed capacity 5430 MW and PPA capacity of 1,054 MW. CIL provisionally allotted coal linkages to these power projects totaling to 3.4659 MTPA (G-13 grade equivalent). 2 out of 5 bidders have signed FSA with the respective CIL subsidiaries.

7.5.3 Shakti Policy Para B(iii):-

Policy: - CIL/SCCL may grant future coal linkages on auction basis for power producers /IPPs without PPAs that are either commissioned or to be commissioned. All such power producers/IPPs may participate in this auction and bid for premium above the notified price of the coal company. Coal drawl will be permitted only against valid long term and medium term PPAs, which the successful bidder shall be required to procure and submit within two years of completion of auction process.

Achievement: - Coal linkages were awarded by CIL to 7 nos. of Thermal Power Projects without PPA having installed capacity of 5995 MW and non-PPA capacity of 3774.94 MW. CIL has allotted coal to various developers totaling to 7.15 MTPA (G-13 grade equivalent).

7.5.4 Shakti Policy Para B(iv):-

Policy: - In this clause coal linkage may be earmarked to the states for fresh PPAs, by pre-declaring the availability of coal linkage with description. States may indicate these linkages to Discoms/State Designated Agencies (SDA). The states/Discoms may, based on such linkage, undertake tariff based competitive bidding for long-term and medium-term procurement of Power.

Achievement: - Under this clause, on the request of various states and recommendations of MoP, coal linkages have been allotted by CIL to Gujarat state for 3915 MW, to UP state for 1600 MW and to MP state for 3000 MW power to be raised through tariff based competitive bidding.

7.5.5 Shakti Policy Para B(viii)(a):-

Policy: - All such power plants including private generators which do not have PPAs, shall be allowed Coal linkage under B (iii) and B (iv) of Shakti Policy for a period of minimum 3 months upto a maximum of 1 year, provided further that the power generated through that

linkage is sold in Day Ahead Market (DAM) through power exchanges or in short term through a transparent bidding process through Discovery of Efficient Energy Price (DEEP) portal.

Achievement: -

Five rounds of quarterly auctions for coal linkage under SHAKTI B (viii)(a) have been held so far:

In the first round of auction for the quarter Apr-Jun 2020, 1.57 MT (G-13 grade equivalent) of coal was booked by 9 Nos. of Thermal Power Projects with 7320 MW of installed capacity and having 6061.88 MW of non-PPA capacity.

In the second round of auction for the quarter Jul-Sep 2020, 0.74 MT (G-13 grade equivalent) of coal was booked by 8 Nos. of Thermal Power Projects with 6190 MW of installed capacity and having 4001 MW of non-PPA capacity.

In the third round of auction for the quarter Oct-Dec 2020, 0.41 MT (G-13 grade equivalent) of coal was booked by 7 Nos. of Thermal Power Projects with 5340 MW of installed capacity and having 4223 MW of non-PPA capacity.

In the fourth round of auction held for the quarter Jan-Mar 2021, 0.66 MT (G-13 grade equivalent) of coal was booked by 7 Nos. of Thermal Power Projects with 4960 MW of installed capacity and having 3334.41 MW of non-PPA capacity.

7.6 Bridge Linkage

Ministry of Coal vide Office Memorandum dated 08.02.2016, had issued policy guidelines for grant of bridge linkage to End Use Plants (EUPs) of Central and State public sector undertakings which have been allocated Coal Mines/Coal Blocks. Based on these guidelines, 32 nos. Thermal Projects totalling 38530 MW were granted Bridge Linkage so far out of which a capacity of 1600 MW has been accorded Bridge linkage in the year 2020-21.

7.7 Use of Treated Sewage Water by TPS under Tariff Policy-2016.

As per Tariff Policy, dated 28.01.2016, notified by Government of India, the sewage treated water is to be used by Thermal Power Plants (Thermal Power Plants which are located within 50 Kms from Sewage Treatment Plants) for cooling purpose. Accordingly, MoP/ Central Electricity Authority (CEA) is exploring the feasibility for the usage of Sewage Treated Water by Thermal Power Plants for cooling purpose.

Presently, 07 nos. of Thermal Power Station totaling capacity of 8999.2 MW are utilizing 585 MLD of STP water i.e. Koradi TPS, Khaperkheda TPS & Nasik TPP Phase-I in Maharashtra, Pragati CCGP & Pragati-III in Delhi, Bhavnagar Lignite TPS in Gujrat and Yelahanka CCP in Karnataka are utilizing STP water. While 02 nos. of Thermal Plants (3580 MW) have successfully placed the order of construction of the project (Tertiary Treatment Plant and Pipeline), STP water associated with these projects amounts to 90 MLD.

7.8 Clean Development Mechanism:

Central Electricity Authority (CEA), brings out a CO_2Baseline Database for all grid connected Power Stations in the country on annual basis. The objective of this Database is to facilitate the consistent and accurate quantification of CO_2 emissions baseline to be used by CDM project developers in country. Version15.0 of Database for the year 2018-19is available on CEA's website www.cea.nic.in.Version 16.0 of Database for the year 2019-20 is under the process of approval of the competent authority and likely to be uploaded shortly.

7.8.1 Environment aspects of electricity generation:

CEA is collecting and compiling the monthly environmental data viz. stack emissions, Ambient Air Quality and Effluent Discharge for the year 2019-20 for thermal power stations. This database has been compiled and being reviewed on Quarterly basis. Data base for the year 2020-21 is under compilation.

7.8.2 National Energy Conservation Awards 2020:

Ministry of Power had undertaken a scheme to encourage, motivate as well as give recognition through National Energy Conservation Awards to industrial units and other establishments, who have taken extra efforts to reduce energy intensities while maintaining the production levels. The scheme is aimed to create an environment that would spur industries and other establishment in achieving excellence in efficient use of energy and its conservation. The awards were given away for the first time in December, 14, 1991 which is now celebrated as National Energy Conservation Day throughout the country. Chief Engineer (TPE&CC), CEA is a member of Technical Sub-Committee to assist the Award Committee in the finalization of awards. During the year 2019-20 proposals received from three industrial sectors viz. Thermal Power Stations, Dairy and Aluminum were evaluated by CEA. Due to pandemic, the awards could not be given by organizing National Energy Conservation Day function on 14th December, 2020. Instead, the awards to the best performing industrial units in all the sectors covered during 2019-20 were given virtually on 11th January in New Delhi.

7.8.3 Phasing Plan for Implementation of New Environment Norms:

New Environmental norms have been issued by Ministry of Environment, Forest and Climate Change (MoEF&CC) in December 2015 and amended in June,2018 & October,2020 for Thermal Power Stations making norms for Particulate Matter (PM), SO2, NOx, Mercury and water consumption.

7.9 THERMAL CAPACITY ADDITION PROGRAMME

7.9.1 Thermal capacity addition vis a vis target during 2019-20

The Thermal capacity addition target for the year 2019-20 was 10296.15 MW against which a capacity of 6765 MW was achieved. This includes 6720 MW capacity which was achieved from the target and 45 MW additional capacity achieved. Sector-wise details of target and achievement during the year 2019-20 are as follows:

SECTOR	CAPACITY (MW)	
	Target	Achieved
CENTRAL	6040	3940
STATE	4256.15	2780
PRIVATE	0	45
TOTAL	**10296.15**	**6765**

The details of target/ achievements for the year 2019-20 is enclosed at **Annexure 7A**.

7.9.2 Thermal Capacity Addition Program for the year 2020-21

The thermal capacity addition target for the year 2020-21 was 10591.15 MW against which a capacity of 4926.15 MW was achieved up to 31.03.2021. Sector-wise details of target and achievement during the year 2020-21 are as follows:

SECTOR	CAPACITY (MW)	
	Target	Achieved
CENTRAL	5790	4080
STATE	4276.15	846.15
PRIVATE	525	0
TOTAL	**10591.15**	**4926.15**

The details of target/ achievements for the year 2020-21 is enclosed at **Annexure 7B**.

7.10 Thermal Engineering & Technology Development

Thermal Engineering & Technology Development (TE&TD) division of CEA has been actively associated in developing road map for introduction of new technologies for thermal power generation. The important responsibilities entrusted to TE&TD division are:

Technology evaluation and up-gradation for coal, lignite and natural gas based thermal power plants, providing expert technical advice on issues related to thermal power generation to Central/State power utilities, Electricity Regulatory Commissions and other power stakeholders, preparation of Standard specifications/ Standard Technical Documents etc for thermal power stations, Preparation/review of CEA Regulations, Investigation of Accidents/failures related to thermal power stations and examining Research & Development (R&D) proposal related to thermal power sector**.**

7.11 Important Activities

The following important activities have been done/undertaken during the Year 2020-21 by TE&TD Division.

(a) National Electricity Plan

Under Section 3(4) of the Electricity Act, preparation of the National Electricity Plan (NEP) is a statutory responsibility entrusted to CEA. The plan is prepared in accordance with the National Electricity Policy and notified once in five years after obtaining the approval of the Central Government. For this purpose, ten subcommittees have been constituted on

issues ranging from Demand Projection, Fuel & Fund Requirement, Infra Requirement, R&D etc. CE (TETD) is Member Secretary of the subcommittee - 7 constituted under the chairmanship of CMD, NTPC for providing "Key Inputs for Power sector" which focusses on material and infrastructure requirement of the power sector. To accomplish this task, representatives from MoP&NG, Ministry of Railways, Ministry of Steel, Ministry of Road, Transport and Highway, Ministry of Shipping, MNRE, CPRl, PFC, BHEL, NHPC, CII, Private Equipment Manufacturer, etc have been opted as members of the subcommittee. The first and second meeting of the subcommittee were held on 29th October 2020 and 15th February 2021. Further, four one to one meetings were held with individual members from 25th February to 9th March 2021. Most of the inputs have been received from the committee members. The draft report of the above Sub-Committee 7 is under preparation.

(b) Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Thermal Power Sector

The Government of India has issued Public Procurement (Preference to Make in India) Order 2017 vide Department of Industrial Policy and Promotions (DIPP) Notification to encourage "Make in India" and to promote manufacturing and production of goods and services in India with a view to enhancing income and employment.

In pursuance of the aforesaid order of DIPP, Ministry of Power notifies that preference shall be given by all public procuring entities to domestically manufactured products used in the Power Sector. In this regard, Minimum Local Content (MLC) in respect of Thermal Power Sector equipment/services was finalized in consultation with all stake holders.

(c) Safety Audit of Thermal Power Plants as per Hon'ble NGT order

The Hon'ble National Green tribunal (NGT) in its order dated 22nd December 2020 (taking cognizance of the accident in Unit #6 (210 MW) on 1st July 2020 of NLCIL thermal power station (TPS-II)) directed Secretaries, Ministry of Power and Coal, Government of India, in coordination with such other Departments/ Institutions, as may be necessary, to undertake Safety Audits of similarly placed thermal power stations throughout the country. On the above direction of Hon'ble NGT order, a Safety Audit Committee has been constituted by Central Electricity Authority under the chairmanship of Chief Engineer (TETD) and representatives from Central Boiler Board (CBB), Director General Fire Safety (DGFS), Oil Industry Safety Directorate (OISD), NTPC, NLCIL, BHEL, TCD and TETD division, CEA. The committee started its activity of Safety Audit and has undertaken the preparation of an extensive safety checklist to assist the auditing process. The actual physical Audits are also being planned subsequent to the response of the power plants on the above Safety Checklist.

(d) Committee to study the water consumption in Thermal Power Stations (TPS) in present scenario

A Committee was formed by CEA "To study the water consumption in TPS in present scenario" under the chairmanship of Chief Engineer (TETD) and representatives from NTPC, DVC, NLC, BHEL, TATA Power, TANGEDCO, MAHAGENCO, APGENCO, UPRVUNL, TCE and JSW Energy. The committee has to study the effects of Environments norms (DeSOx, DeNOX etc.), use of Sewage Treated Plant (STP) water and part load operation of Power plant on Specific Water Consumption of Thermal Power Stations. The first meeting of the committee

was held on 18th February, 2021 and work is under progress.

(e) Technical Committee on Thermal Research

The Technical Committee on Thermal Research is hosted by Central Power research Institute (CPRI) and has members from CEA, IIT Bombay, NTPC, BHEL& Tata Power. The committee is responsible for evaluation of various research proposals/projects under the schemes of CPRI. The seventh & eighth meetings of the committee were held on 23rd June 2020 and 3rd February 2021. The projects reviewed include Bio-processing of coal industrial effluent and coal fines recovery, unsteady aerodynamic response in LP turbine blade, Thermoelectric Power Generator, High-Temperature erosion characteristics of boiler etc.

(f) Committee for formulating technical specifications for Dry Sorbent Injection (DSI) flue gas desulphurization technology.

A Committee was formed by CEA under CE (TETD) to prepare a technical specification for Dry Sorbent Injection (DSI) system in December 2020. The DSI technology is considered suitable for controlling SO2 levels within limits in smaller size thermal power plants/ units with low PLF and short remnant life. The committee has representation from NTPC, BHEL, Thermax, GE, K C Cottrell, L&T Boilers, and Melco. The first meeting of the committee was held on 19th March 2021. The work of preparation of specification is under progress.

(g) Comprehensive Review of Regulations entitled "Central Electricity Authority (Technical Standard for construction of Electrical plants and Electrical lines) Regulations, 2010 was undertaken incorporating the amendments and discussed in Authority Meetings. Authority later decided to prepare a comprehensive fresh regulations instead of issuing amendments. The comprehensive fresh Regulation (with suitable amendments) has been prepared and is under the process of approval of the Authority before circulation for comments of stakeholders and public in general.

(h) Comprehensive review of CEA Regulations entitled "Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) Regulations, 2011" was taken up and the same is under progress.

(i) A Committee was constituted by MoP under chairmanship of Member (Thermal), CEA and GM, NTPC as Member-Convener with members from Ministry of Agriculture, PSPCL & HPGCL for standardization of rates of agro residue based pellets and raw agro residue in bale form. The Committee prepared the report and submitted to MoP in July, 2020.

(j) Ministry of Power, GoI, in order to address the issue of Air pollution due to farm stubble burning and to reduce the carbon footprints of thermal power plants, decided to set up a 'National Mission on use of Biomass in coal based thermal power plants'. A Concept Note including modalities for the National Mission has been proposed to MoP for consideration.

(k) A Committee was constituted under chairmanship of Chief Engineer (TE&TD), CEA with members from CPRI, NTPC, BHEL, PSPCL, HPGCL & Tata Power to carry out research in utilization of agro residue in thermal power plants including increasing the percentage of co-firing of biomass pellets with coal. The Committee, in consultation with members and other stakeholders, is

finalizing the report, identifying the areas of research to be undertaken related to Biomass co-firing.

7.12 Renovation and Modernisation and Life Extension Programme of Thermal Power Plants.

The main objective of Renovation & Modernization (R&M) of thermal generating units is to make the operating units well equipped with modified / augmented with latest technology with a view to improve their performance in terms of output, reliability, availability, reduction of outage time, ease of maintenance and minimizing inefficiencies. The R&M programme is primarily aimed at generation sustenance and overcoming problems. The life extension (LE) programme on the other hand focuses on plant operation beyond their original design life after carrying out specific life assessment studies of critical components.

7.12.1 Renovation and Modernisation (R&M) and Life Extension Programme (LEP) from 7th Plan onwards till 12th Plan.

R&M Programme in a structured manner was initiated in 1984 as a centrally sponsored programme during 7th Plan and the programme continued during the two Annual Plans 1990-91 & 1991-92. The Plan wise details are given below:

-

S. No.	Five Year Plan	Year	No. of TPS / No. of Units	Capacity (MW)	Additional Generation Achieved MU/ Annum*	Equivalent MW**
1	7th Plan & 2 Annual Plans	85-86 to 89-90 & 90-91, 91-92	**34 / 163**	**13570**	10000	2000
2	8th Plan (R&M) (LEP)	1992 to 1997	**44 / 198** 43/(194) 1 /(4)	**20869** (20569) (300)	5085	763
3	9th Plan (R&M) (LEP)	1997 to 2002	**37 / 152** 29/ (127) 8/ (25)	**18991** (17306) (1685)	14500	2200
4	10th Plan (R&M) (LEP)	2002 to 2007	**9/25** 5/(14) 4/(11)	**3445** (2460) (985)	2000	300
5	11th Plan (R&M) (LEP)	2007 to 2012	**21/72** 15/(59) 6/(13)	**16146** (14855) (1291)	5400	820
6	12th Plan (R&M) (LEP)	2012 to 2017	**18/37** 8/16 10/21	**7202.5** 4560.50 2641.76	---- ----	---- ----

*Tentative figure.
** Equivalent MW has been worked out assuming PLF prevailing during that period.

7.12.2 R&M/ LE Programme during (2017 - 22)

71 thermal generating units with aggregate capacity of 14929 MW have been identified for implementation of R&M/LE works during 2017-22 period. Out of this a total of 35 nos. thermal generating units with aggregate capacity of 7570 MW for LE works and 37 nos. thermal generating units with aggregate implementation of R&M/LE works during the period 2017-22. Out of this a total of 35 nos. thermal generating units with aggregate capacity of 7570 MW for LE works and 37 nos. thermal generating units with aggregate capacity of 7359 MW for R&M works have been identified fir the period 2017-22. Break-up summary of LE and R&M works of 14929 MW to be taken up during 2017-22 in terms of Central/ State sector-wise is furnished below:

7.13 Achievements of R&M & LE Projects during 2017-22 upto 31-03-2021:

Life Extension works on 4 thermal generating units with aggregate capacity of 820 MW and R&M works on 2 thermal generating units with aggregate capacity of 67 MW were completed during 2017-22 upto 31-03-2021. Details of achievements is furnished below:

	Name of the TPS	Unit No.	Date of S/D	Capacity (MW)	Utility	Sector	Date of Achievement
1. 2017-18							
LE	Ukai TPS	4	07-12-2016	200	GSECL	State	17.05.2017
	Wanakbori TPS	3		210	GSECL	State	27-11-2017
R&M	Kathalguri CCGT	3	--	33.5	NEEPCO	Central	20-07-2018
	Kathalguri CCGT	6	--	33.5	NEEPCO	Central	31-03-2018
Sub Total		**34 (Units)**		**477.00**			
2. 2018-19							
LE	Koradi TPS	6	25-08-2015	210	MAHAGENCO	State	16-07-2018(oil firing) 20-08-2018(coal firing)
	Obra TPS	12	01-10-2016	200	UPRVUNL	State	24-09-2018
R&M	--	--		--	---	--	--
Sub Total		**02(unit)**		**410**			
3. 2019-20							
LE	---	--	--	--	--	--	--
R&M	---	--	--	--	--	--	--
4. 2020-21							
LE	---	--	--	--	--	--	--
R&M	---	--	--	--	--	--	--

Total LE 04 (820)	**State**	**04(unit)**	**820**
	Centre	**--**	**--**
Total R&M 02 (67)	**State**	**--**	**--**
	Centre	**02(unit)**	**67**
Grand Total		**06(units)**	**887.00**

Category	**LE/R&M works identified during 2017-22 No. of units & capacity (MW)**		**Total (State Sector + Central Sector)**
	State Sector	**Central Sector**	
LE	34 (7570)	--	34 (7570)
R&M	30 (7135)	07 (224)	37 (7359)
Total	64 (14705)	07 (224)	71 (14929)

7.14 Monitoring of R&M Projects:

The progress of R&M and LE works being implemented at Thermal Power units are monitored by carrying out site visits, holding the review meetings and Information compiled on monthly/quarterly basis. Based on data / information collected & compiled, Quarterly Review Report on status of R&M projects were prepared.

7.15 Thermal units under shutdown for R&M/ LE Works

The following 3 units are under shut down for R&M and Life Extension works.

Sl.No.	**Name of Project**	**Utility**	**State**	**Unit No.**	**Capacity (MW)**
1.	Barauni TPS	BSPGCL	Bihar	6	110
2.	Obra TPS	UPRVUNL	U.P.	13	200
Total					**310**

7.16 Implementation of Phasing Plan for FGD installation/ ESP upgradation in respect of new Environmental Norms:

It is to be mentioned that the timeline for meeting the new emission norms (Dec 2015) has been revised by MOEF&CC vide gazette notification dated 31.03.2021 which has categorized thermal power plants in three categories having different timelines along with the environment compensation for non-compliance as follows:

Category A - Within 10 km radius of NCR or cities having million plus population as per 2011 census of India. Completion timeline 31.12.2022

Category B - Within 10 km radius of critically polluted areas or Non-Attainment cities as defined by CPCB. Completion timeline 31.12.2023

Category C - Other than those included in category A and B. Completion timeline 31.12.2024

Based on the March 2021 notification, MOEF&CC has constituted a task force comprising of representative from MOEF&CC, MOP, CEA and CPCB to categorize the thermal power plants in above mentioned three categories. The finalization of aforementioned categorization is still under progress presently. The timelines and category of all power plant may be decided only after finalization of above categorization process

The year-wise ESP Upgradation Plan are given below:

i) Year wise ESP Upgradation Plan

Year	No. of Units	Capacity (MW)
2018	1	500
2019	2	1300
2020	27	10405
2021	97	23495
2022	93	27725
Total	220	63425

7.16.1 Summary of Current Status of Implementation of phasing plan for FGD Installation:

General Summary

S. No.	Sector (Capacity in MW)	FGD planned	Feasibility Study Started	Feasibility Study Completed	Tender Spec Made	NIT Issued	Bids Awarded	FGD Commissioned
1	Central Sector	55260	55260	55260	55260	55260	47740	840
2	State Sector	53225	53225	52025	37495	31375	4320	0
3	Private Sector	61237	59327	56247	50092	44692	16600	1320
	Total	169722	167812	163532	142847	131327	68660	2160

S.No.	Sector (No. of units)	FGD planned	Feasibility Study Started	Feasibility Study Completed	Tender Spec Made	NIT Issued	Bids Awarded	FGD Commissioned
1	Central Sector	149	149	149	149	149	114	4
2	State Sector	166	166	164	111	85	12	0

3	Private Sector	133	129	119	104	93	29	2
	Total	448	444	432	364	327	155	6

Units > 500 MW & located in areas either critically polluted or having population density > 400/km2

S.No.	Sector (Capacity in MW)	FGD planned	Feasibility Study Started	Feasibility Study Completed	Tender Spec Made	NIT Issued	Bids Awarded	FGD Commissioned
1	Central Sector	29320	29320	29320	29320	29320	28320	0
2	State Sector	13980	13980	12780	12280	12280	2600	0
3	Private Sector	13510	13510	12910	10670	8270	4970	1320
	Total	56810	56810	55010	52270	49870	35890	1320

S.No.	Sector (No. of units)	FGD planned	Feasibility Study Started	Feasibility Study Completed	Tender Spec Made	NIT Issued	Bids Awarded	FGD Commissioned
1	Central Sector	57	57	57	57	57	55	0
2	State Sector	25	25	23	22	22	4	0
3	Private Sector	22	22	21	17	13	8	2
	Total	104	104	101	96	92	67	2

NCR Summary

S.No.	Sector (Capacity in MW)	FGD planned	Feasibility Study Started	Feasibility Study Completed	Tender Spec Made	NIT Issued	Bids Awarded	FGD Commissioned
1	Central Sector	3320	3320	3320	3320	3320	3320	840
2	State Sector	4770	4770	4770	3850	3350	0	0
3	Private Sector	4700	4700	4700	4700	4700	4700	1320
	Total	12790	12790	12790	11870	11370	8020	2160
S.No.	**Sector (No. of units)**	**FGD planned**	**Feasibility Study Started**	**Feasibility Study Completed**	**Tender Spec Made**	**NIT Issued**	**Bids Awarded**	**FGD Commissioned**
1	Central Sector	9	9	9	9	9	9	4
2	State Sector	17	17	17	13	11	0	0
3	Private Sector	7	7	7	7	7	7	2
	Total	33	33	33	29	27	16	6

7.16.2 FGD- ESP Phasing Plan of Thermal Power Plants located in Delhi NCR

Sl. No	Name of Thermal Power Station	Timeline for FGD	Current Status
1	**Dadri (NCTPP), U.P Unit 1-4 (210X4 MW) NTPC**	**31.12.2019**	**FGD**: Commissioned **DE-NOx**: Meeting norms. **ESP**: Meeting norms.

	Dadri (NCTPP), U.P Unit 5-6 (490X2 MW) NTPC	**30.04.2020 28.02.2020**	**FGD**: Awarded. Work in progress **DE-NOx:** Meeting norms. **ESP**: Meeting norms.
2	**GHTP (Lehra Mohabbat), Punjab Unit 1-4 (210X2 &250X2 MW) PSPCL**	**30.04.2022 30.04.2022 28.02.2022 28.02.2022**	**FGD**: Ongoing bidding process cancelled due to very low PLF. Retendering to be done for DSI. **ESP**: Meeting norms. **De-NOx:** Matter being taken up with BHEL.
3	**Harduaganj, U.P Unit-8&9 (250X2 MW) UPRVNL**	**31.12.2021 31.10.2021**	**FGD**: Tender has been cancelled due to exorbitant L1 pricing. Retendering to be done. **ESP**: Meeting norms. **De-NOx:** Combustion modification planned by March-21
4	**Indira Gandhi STPP, Haryana Unit 1-3 (500X3 MW) NTPC**	**31.10.2020 30.04.2020 29.02.2020**	**FGD**: Bid awarded **ESP**: Meeting norms.. **DE-NOx:** Bid Awarded
5	**Mahatma Gandhi TPP, Haryana Unit-1-2 (660x2 MW) CLP**	**31.12.2019**	**FGD**: Operation of FGD started. **ESP**: Meeting norms. **DE-NOx:** Meeting norms.
6	**Panipat TPS, Haryana Unit-6 (1X210 MW) HPGCL**	**30.04.2020**	**FGD**: NIT issued. **ESP**: Meeting norms. **De-NOx:** Combustion modification planned by 31.12.2022
	Panipat TPS, Haryana Unit-7-8 (2X250 MW) HPGCL	**28.02.2021 31.12.2020**	**FGD**: NIT issued. **ESP:** Meeting norms. **De-NOx:** Combustion modification planned by 31.12.2022
7	**Rajiv Gandhi TPS, Hisar, Haryana Unit-1 (2X600 MW) HPGCL**	**30.04.2022 28.02.2022**	**FGD**: NIT issued. **ESP**: Meeting norms. **De-NOx:** Combustion modification planned by 31.12.2022
8	**Yamunanagar (DCTPS), Haryana Unit-1 (2X300 MW) HPGCL**	**31.12.2021 31.10.2021**	**FGD**: NIT issued. **ESP:** Meeting norms. **De-NOx:** Combustion modification planned by 31.12.2022
9	**Talwandi Sabo TPS, Mansa, Punjab Unit-1-3(660x3 MW) TSPL**	**28.02.2021 31.12.2020 31.10.2020**	**FGD**: Bid awarded **ESP:** Meeting norms. **De-NOx**: Meeting norms.
10	**Nabha Power Ltd, Rajpura, Punjab Unit-1-2(700x2 MW) GMR**	**30.04.2021 28.02.2021**	**FGD**: Bid awarded **ESP:** Meeting norms. **De-NOx:** Meeting norms.
11	**GGSSTP Ropar (4x210 MW) PSPCL**	**31/12/2022**	**FGD:** NIT issued **ESP:** Meeting norms. **De-NOx:** Meeting norms.
	Total	**12790 MW**	

7.17 Flexible Operation of Thermal Power Stations

India's Intended Nationally Determined Contributions (INDCs) include a reduction in the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level, and to create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent. Generating power from renewable sources of energy is of cardinal importance if India is to meet its INDC targets. With the aim to ensure future security & reliability of power supply and stability of electricity grids while maximizing generation from renewables flexibilization of existing coal-fired power plants is an important measure.

A committee has been constituted in CEA to find out the level of flexibilization required from thermal power stations and future roadmap for integration of 175 MW RES generation into Indian grid by 2022. The committee has come up with the findings of the quantum of flexibilization, minimum thermal load, and ramp rate required in its interim report in June 2018. The final report of the committee was released by Secretary (Power) on 18th March 2019. The report has been shared with the stakeholders of power sector. A pilot test of 40% minimum load operation and 3% ramp up/ ramp down (i.e. 15 MW/ Min) has been successfully conducted in Dadri TPS of NTPC. Study at Anpara-B TPS of UPRVUNL and Vindhyachal TPS of NTPC is being conducted by JCOAL to improve the flexibility of the plants. Another flexible operation study has been organized by CEA and carried out by BHEL at Ukai Thermal Power Station Unit # 6 (500MW), GSECL on 04.03.2020. Minimum load of 40% with ramp rate of 3% was successfully achieved.

Presently, Flexible operation (up to 40% load) test was planned to conduct during last week of March, 2021 at DSTPS, Andal of DVC and MPL, Maithon of TATA Power under IGEF. However, the same has been postponed to June-July, 2021 due to second wave of Covid-19.

With the anticipated 175 GW of RE Capacity, it has been targeted to adapt 60% of the installed fleet of Thermal power plants to operate at 55% Minimum Technical Load (MTL). The MoP (Ministry of Power) has set the targets for achieving the flexibility (55% MTL) of thermal power plants (Coal/Lignite) in a time bound manner.

The targets set by MoP are 20%, 30%, 40%, 50% and 60% of the total fleet compliant of 55% MTL from year 2020 to 2024.

Further CERC vide IEGC regulations 2016 has lowered and made mandatory the technical minimum limit to 55% and provided compensation to the Coal/Lignite based generating stations on account of partial loading of the units.

Under this key initiative the minimum load and ramp rates of thermal generating units are required to be improved. A committee has been constituted in CEA under chairmanship of Chief Engineer (TPRM) for flexible operation test of thermal power plant for smooth integration of intermittent RES generation. Based on the finding of CEA's flexibilisation report, the committee shall identify the thermal units in consultation with State/Central utilities for the flexibilisation. The identified units shall have to undergo the pilot tests to ascertain their capability, do gap analysis and carry modifications, if required.

7.18 Japan-India Co-operation for Study on Efficiency and Environmental Improvement of Coal Fired Stations

Under Indo- Japan Co- operation for Efficiency and Environmental Improvement of Coal Fired Power Stations. Three MoUs have already been implemented between Central Electricity Authority (CEA) and Japan Coal Energy Centre (JCOAL) in the field of efficiency improvement and environmental improvement of coal fired

power stations. The 4th MoU between CEA and JCOAL has been signed on 16th December, 2019 for Efficiency & Environment Improvement for Sustainable, Stable and Low Carbon Supply of Electricity. The purpose of this MoU is to address issues and barriers in expediting sustainable, stable and low carbon thermal power development by means of studies, training program and knowledge-sharing activities, outcomes of which are to be conducive to overall power development in India as well as to expedite relevant policy implementation by the Government of

India. Following activities to be carried out under 4th MoU:

- *Update on the current and future policy trend in the Indian power sector and consideration of the identified issues/barriers to find out those which could be addressed through mutual collaboration.*
- *Identification of issues to be addressed regarding both existing and upcoming facilities, and also operation and maintenance.*
- *Implementation of studies with priorities, but not limited to environmental technologies for coal fired power generation Flexibilization measures and biomass utilization are also of high priority*
- *Biomass study on Co firing of biomass pellets and Waste to Energy technologies and Coal GCV loss in power plant and its remedies*
- *Implementation of an annual workshop in India and CCT Training Programme in Japan*
- *Holding a joint meeting to discuss issues that have arisen or may arise in the course of implementation of the Cooperation*

Under Clean Coal Technology (CCT) Training Programme study tours to Japan have been organized in which representatives from MoP, CEA and different power utilities have participated. The participants visited the latest USC power stations and updated about various applicable technologies and equipment as well as O&M technique. During the year 2020-21 also, one group of 10 participants have undergone the CCT Training Programme from 19th Jan 2021 to 21st Jan., 2021.

Under Indo-Japan Cooperation, a one-day Workshop (Virtual) on "Project on Efficiency and Environmental Improvement for Sustainable, Stable and Low-carbon Supply of Electricity" has been organized jointly by CEA and JCOAL on Monday, 25th January 2021.

7.19 Fly Ash Generation at Coal/Lignite based Thermal Power Stations & its Utilization

7.19.1 Monitoring by CEA

Central Electricity Authority has been monitoring, since 1996, fly ash generation and its utilization at coal/ lignite based thermal power stations in the country. Data on fly ash generation and utilization is obtained from thermal power stations on half yearly and yearly basis. The said data is analyzed and reports bringing out the status of fly ash generation as well as its utilization are prepared. The Reports are forwarded to Ministry of Power and Ministry of Environment, Forest & Climate Change. The said report is now also being uploaded on website of CEA for bringing the information in public domain.

7.19.2 MoEF & CC Notification on Fly Ash Utilization

To address the problem of pollution caused by fly ash and to reduce the requirement of land for disposal of fly ash, MoEF&CC issued notification dated 14th September, 1999 on fly ash utilization and subsequently issued amendments to the said notification on 27th August, 2003, 3rd November, 2009 and 25th January, 2016. The 3rd November, 2009

notification had stipulated targets for utilization of the fly ash, so as to achieve 100% utilization by all thermal power stations in a phased manner - existing thermal power units within five years and those commissioned after 3rd November, 2009 within four years.

However, the goal of 100% fly ash utilization could not be achieved within the stipulated timeline. In view of the same, further notification in January, 2016 has followed.
This latest MoEF&CC's Notification of 25th January, 2016, emphasizing towards the efforts in the direction of enhancing gainful utilization of fly ash, stipulates mandatory uploading on TPS's website
fly ash availability during the current month including stock in ash pond.; increase in mandatory jurisdiction of area of application from 100 km to 300 km; cost of transportation of fly ash to be borne entirely by TPS up to 100 km and equally shared between user and TPS for more than 100 km and up to 300 km; and mandatory use of fly ash based products in all Government schemes or programmes e.g. Pradhan Mantri Gramin Sadak Yojana, Mahatma Gandhi National Rural Employment Guarantee Act, 2005, Swachh Bharat Abhiyan, etc.

7.19.3 Fly Ash as a Resource Material

Traditionally, ash (Fly ash and bottom ash) generated at coal/lignite based thermal power stations has been disposed off in ash ponds as waste material. Ash has now been recognized as a 'resource material' and 'useful commodity' capable of being utilized in most of the civil construction activities in an eco-friendly manner. Fly ash has pozzolanic properties and has large number of applications in various construction activities.

7.19.5 Important Areas of Ash Utilization

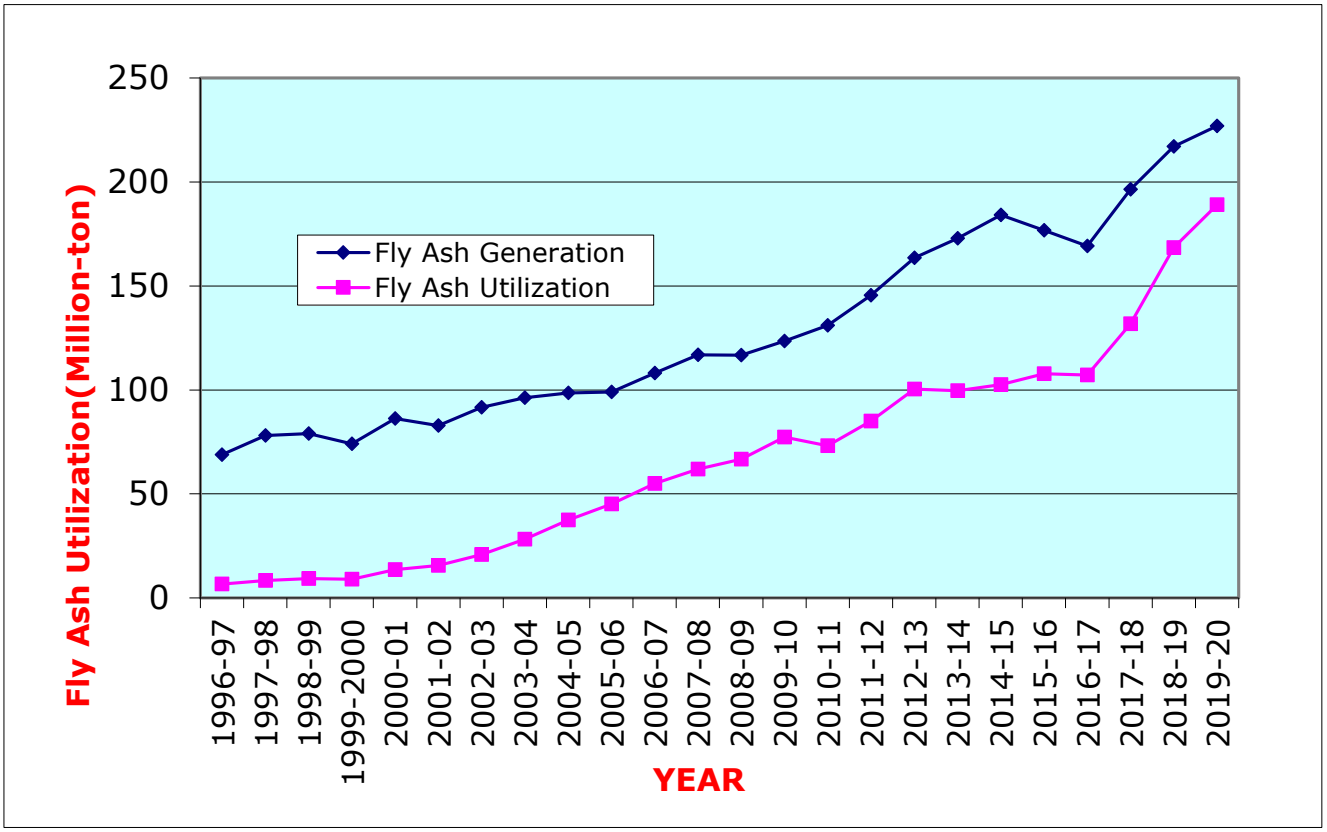
The important areas in which ash is being presently utilized are as under:

- In manufacturing of Portland Pozzolana cement;
- As a part replacement of cement in concrete;
- In making fly ash based building products like bricks, blocks, tiles, road blocks, Kerb Stones etc.;
- In the construction of roads, flyovers, embankments, ash dykes etc.;
- In construction of Roller Compacted Concrete Dams in Hydropower Sector;
- In reclamation of low lying areas and raising of ground level;
- Backfilling/ stowing of mines;
- In agriculture and waste-land development.

7.19.4 Progressive Fly Ash Generation & Utilization during the Period from 1996-97 to 2019-20

The fly ash utilization has increased from 6.64 million tonnes in 1996-97 to a level of **189.01** million tonnes in 2019-20. A graph showing about progressive trend in fly ash generation and its utilization for the period from 1996-97 to 2019-20 is given below.

PROGRESSIVE GENERATION AND UTILIZATION ONFLY ASH DURING THE PERIOD FROM 1996-97 TO 2019-20



It may be seen from above graph that utilization of fly ash in terms of quantity has been increasing over the years except that there was a dip in fly ash utilization during 2010-11, which has picked up during 2011-12. During 2012-13 to 2016-17, there has been slight variation in utilization. However, it picked up again in the year 2017-18, 2018-19 & 2019-20 at a much better pace.

7.19.6 Web based Monitoring System and A Mobile Application for Utilization of Fly Ash

Annual Fly ash utilization has remained 83.28 % of the fly ash generated and therefore, it has become a matter of concern because of its environmental effect. Besides, progressive accumulation may lead to a situation when ash pond may not be in a position to accommodate fly ash further.

Due to the importance of utilization of fly ash & slag for reducing the burden on the environment, NITI AAYOG convened several meetings on policy framework on utilization of fly ash and slag. In a meeting held on 17.03.2017, it was decided by NITI AAYOG that an online repository of the fly ash generated by thermal power plants indicating the following parameters should be launched by Ministry of Power by 15th April, 2017:

- Cumulative amount of fly ash available in the ash ponds as on 31.3.2017
- Quantum of fly ash generated for the respective month (Ex. For the month of April 2017)
- Number of ash ponds available and their approved capacity in metric tons
- Cumulative stock of fly ash available in the ponds for the month as on 30th April 2017
- Total quantum of fly ash disposed to the consuming industries, which is located within the vicinity of 100 Kms., 101-300 Kms., etc. along with the details of the consumers. In this detail, it should also be indicated whether the transportation was paid by the thermal power or not. Similarly, it should also indicate whether fly ash has been given free or it has been

charged. If it has been charged then the rate should also be indicated for each consumer

- Balance stock of fly ash available in the ash ponds for the month ending April,2017

Accordingly, a web-based monitoring system and a mobile application (ASH TRACK) was developed by CEA in collaboration with M/s NTPC Limited on behalf of the Ministry of Power. Login ID and password have been issued to those Power Utilities / Thermal Power Stations who had approached CEA for uploading the monthly data of fly ash generation and its utilization.

7.19.7 Recommendation of Niti Aayog constituted Expert Committee

NITI Aayog vide O.M. No. 25(11)/2014-Minerals dated 12.06.2018 has constituted an Expert Committee under the chairmanship of Joint Secretary, MoEF&CC and represented by various concerned Ministries for developing a focus strategy for best utilization of fly ash to manufacture end products.

Expert Committee held two meetings on 5th September and 1st October, 2018 and finalized its recommendations. An inter-ministerial consultation meeting was also held on 21st January, 2018 under the chairmanship of Secretary, MoEF&CC to review the recommendations of the Expert Committee for effective utilization of fly ash, wherein the recommendations of the Committee were accepted.

The expert Committee had recommended following recommendations for implementation by all Thermal Power Plants for effective utilization of fly ash:

i. Tender/auction for sale of fly ash should be done by TPPs initially for end user/industry and not for traders. If fly ash is not taken by the end user/industry, then it could be given to traders. TPPs should also consider entering into longer term contracts with end users.

ii. TPPs may explore the possibility that once a tender for utilization of fly ash is allotted to a company, any unit/plant of the same company should be allowed to purchase and utilize the fly ash and TPPs can also directly raised the invoice to such Unit/Plant.

iii. Creation of fly ash parks/hubs on public-private-partnership mode. Such parks will act as facilities for enabling quality control of fly ash made products, generate employment and act as models which will promote use of innovative fly ash products which can be replicated at other locations.

iv. TPPs should give incentive to entities which can (through R&D) come up with fly ash products with ash content of at least 75% and established sustainable application of those fly ash products in the industry. The incentive could be given from the money available with the TPPs from auctioning of fly ash.

v. Ministry of Power should come up with awards/incentives for TPPs that innovate new methodology in fly ash disposal keeping all the environment and pollution norms in Consideration.

7.19.8 Action taken report on recommendation of the Expert Committee for effective utilization of fly ash

1. All Thermal Power Stations were requested to provide revised implementation status on above recommendation of the Expert Committee for effective utilization of fly ash by TCD Division, CEA. In response, the summary as well as the detailed responses received from

TPSs/utilities along with a list of defaulters was forwarded to MoP.

2. A draft awards/incentives scheme for TPPs that innovate new methodology in fly ash disposal keeping all the environment and pollution norms in Consideration sent to Ministry of Power by TCD Division, CEA.

7.19.9 Task Force constituted to review and recommend a list of abandoned mines/quarries in the country for mine backfilling purpose

1. Ministry of Power vide OM dated 14-03-2019 re-constituted a Task Force to identify, review and recommend the list of mines for ash back-filling. It has representatives from CEA, MoEF & CC, Ministry of Mines, CIL, CIMFR (Dhanbad), CMPDIL, DGMS (Dhanbad), CPCB & NTPC.

2. 8th Meeting of Task force held on 12.01.2021 through MS teams. During the meeting, 21 numbers of abandoned mines have been identified for backfilling purpose which are to be notified by CPCB now.

7.20.1 PERFORMANCE AWARDS IN POWER SECTOR

Comprehensive Award Scheme for Power Sector

An award scheme was introduced by the Ministry of Power in 1983 for recognizing the meritorious performance of thermal power stations. The scheme was modified over the years in view of evolving requirements. In 2004-05, Comprehensive Award Scheme was introduced by the Ministry of Power covering various facets of power sector with the objective of developing a spirit of competitiveness among the generating stations in thermal, hydro & nuclear generation, transmission & distribution utilities in operation & maintenance and early completion of thermal, hydro & transmission projects. Further, to promote, encourage and recognize the efforts of rural distribution franchisees, an award was introduced in 2007-08. Similarly, to promote the environment protection measures, a category of award was introduced in 2008-09, for the best performing coal/lignite- based thermal power station for environment management.The award scheme for the year 2014-15 envisaged a total of 38 awards in 10 categories and in the year 2015-16, 40 awards were envisaged in the same 10 categories.For the year 2016-17, the number of awards was increased to 43 distributed in 11 categories including additional 3 awards by bifurcation of a category i.e Rf- 1(Award Scheme for Performance of Distribution Companies) into Rf-1 (Award Scheme for Performance of Govt. Owned Distribution Companies) and Rf-2 (Award Scheme for Performance of Private Distribution Companies). Further, same numbers of awards were envisaged for the year 2017-18.For the FY 2018-19 and onwards, Thirty Eight (38) Meritorious Awards along with one (1) consolation award for one of the 11 categories were to be envisaged to the power sector, as per details given below:

Scheme	Name of Award Scheme	No. of Awards
Th-1	Award Scheme for Performance of Thermal Power Stations	8
Th-2	Award Scheme for Early Completion of Thermal Power Projects	3
Hy-1	Awards Scheme for Performance of Hydro Power Stations	3

Hy-2	Awards Scheme for Expeditious Completion of Hydro Power Projects	2
Tr-1	Award Scheme for Transmission system Availability.	3
Tr-2	Award Scheme for Early Completion of Transmission Projects	6
Nu-1	Award Scheme for Performance of Nuclear Power Stations	1+1*
Rf-1	Award Scheme for Performance of Govt. Owned Distribution Companies	3
Rf-2	Award Scheme for Performance of Private Distribution Companies	3
Rf-2	Award Scheme for Performance of Rural Distribution Franchises	3
En-1	Award Scheme for Environment Management for Coal based Thermal Power Stations	3
	Total Awards	**38+1***

*

One (1) Consolation Award

Further, MHA vide D.O. No. 5/50/2020-Public dated 20.10.2020 has suggested MoP that "the categories of the awards are too many and the Ministry may consider modifying them. It should not be necessary that awards in each category are given every year. The Granting of awards should be restrictive and the number of awardees may be rationalized/ reduced."

Keeping in view the MHA suggestion, the rationalization of Meritorious Performance Awards is under process.

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CHAPTER-8

DISTRIBUTION SCHEMES AND INITIATIVES

8.1 Preparation and Monitoring of 24 X7-Power for All (PFA) Documents:

Government of India had taken up a joint initiative with all States/UTs and prepared States/UTs specific documents for providing 24x7 power supply to all households/homes, industrial & commercial consumers and adequate supply of power to agricultural consumers as per State policy. This initiative aimed at ensuring uninterrupted supply of quality power to existing consumers and providing access to electricity to all unconnected consumers by 2019 in a phased manner except in Bihar and Assam, in which access to unconnected households have been proposed beyond Financial Year 2019. The identified action plans are under implementation by the respective states and UTs through the ongoing flagship schemes of Govt of India such as DDUGJY, SAUBHAGYA and IPDS as detailed in para 8.26.2 and 8.26.3, 8.28 and 8.9 as given below repesctively.

The Status of 24x7 Power supply, average hours of Power supply across the country as available on NPP portal also shown at para 8.31 below.

1) **Household Electrification:** Govern- ment of India launched Pradhan Mantri Sahaj Bijli Har Ghar Yojana–Saubhagya on 11th October,2017 to achieve universal household electrification (providing electricity connections to all household in rural and all poor households in urban areas across the country) by March 2019. REC ltd is the Nodal agency for implementation of this scheme. All households have been reported electrified by the States on Saubhagya portal, except 18,734 households in Left Wing Extremists (LWE) affected areas of Chhattisgarh as on 31.03.2019. Subsequently, seven States namely Assam, Chhattisgarh, Jharkhand, Karnataka, Manipur, Rajasthan and Uttar Pradesh had reported that around 19.09 lakh un-electrified households, identified before 31.03.2019, which were unwilling earlier but have expressed willingness to get electricity connection. All these seven States has reported 100% household's electrification as on 31.03.2021. As reported by the States, 2.817 crore households have been electrified since the launch of Saubhagya, up to 31.03.2021.

Distribution network: The role of distribution Network is very significant in respect of achieving the goal of 24x7 Power for All (PFA) as it is the back bone for providing connectivity to the end user. The main scope under PFA for distribution network includes formulation and implementation of perspective distribution plan envisaging substantial distribution capacity as well as expansion and provision of last-mile connectivity. This would include augmentation of the existing network to cater to un-electrified areas. To address some of the challenges faced in distribution such as last-mile connectivity, illegal of supply, an effort has been made by the utilities in various areas of connections, high losses and quality distribution system such as strengthening and augmentation of system, feeder separation, metering of unmetered connections, smart meter installation, installation of capacitor banks to improve the voltage profile and reduce line losses etc. under the sanctioned components of DDUGJY scheme, IPDS scheme, and Saubhagya scheme which are given in details in the paragraphs No. 8.9, 8.26.2 and 8.28.

8.2 Development of Smart Grid in the

Country

- National Smart Grid Mission (NSM) was established in 2015 to plan and monitor the implementation of policies and programmes related to Smart Grid in India. National Smart Grid Mission envisages transformation of last mile connectivity ecosystems i.e. distribution through advanced metering infrastructure, micro grids, distributed generation, outage management, power quality improvement, peak load management and EV charging infrastructure etc. The mission encourages DISCOMs for self-sustenance of Smart Grid interventions by adopting innovative financing models. This year has seen widespread acceptance of AMI deployment on opex model amongst utility, funding agency and Smart Grid Implementation Agencies. NSGM is also the Nodal point for international collaboration with International Smart Grid Action Network (ISGAN) activities for Indian side.

- NSGM has a three-tier structure i.e. Governing Council, headed by the Hon'ble Minister of Power at first level, Empowered Committee, headed by the Secretary (Power) & supported by Technical Committee headed by the Chairperson, CEA at second level and NSGM Project Monitoring Unit (NPMU) at third level.

- DP&T Division is the nodal division in CEA dealing with development of smart grid in distribution sector in the country and assisting the Technical Committee of NSGM in technical examination of Smart Grid Projects, benchmarking of cost of Smart Meter, development of standards etc. DP&T Division has also assisted NSGM for development of model DPR and SBD for smart grid projects along with all the technical matters related to Smart Grid.

- Ministry of Power have issued an advisory to all DISCOMs to draw up a road map for switching over to Smart meters in prepaid mode/simple prepaid meters over a period of next three years. To assist the MoP for the smart meter roll out in the country, various CEA committees have submitted the following reports to MoP.

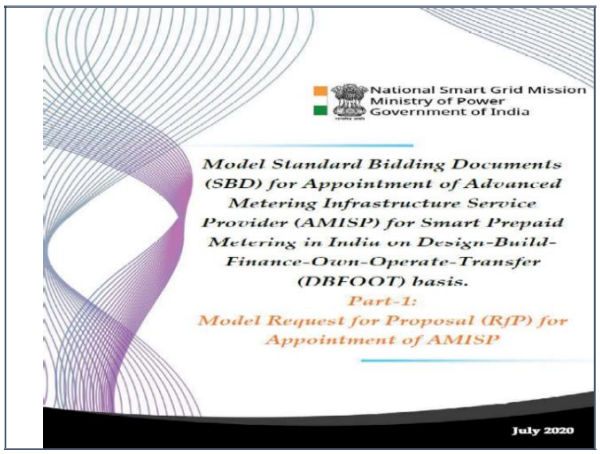
  - Report on Development and implementation of Smart Grid in the Country
  - Report on Smart Meter Rollout Plan with various financial models in the Country including OPEX model.
  - Report on use of Cloud Services in Smart Metering Projects under Govt. funded Schemes.
  - Report on continuation of National Smart Grid Mission beyond March 2020.

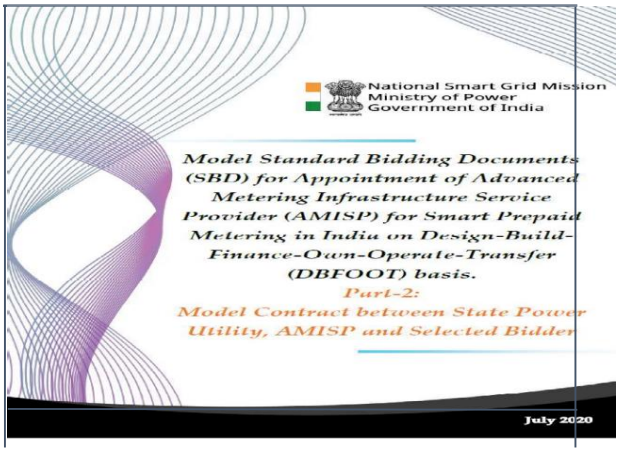
8.3 Status of Smart Grid Projects under NSGM

NSGM has sanctioned five projects with total outlay of Rs.683.16 Cr. viz. two in Chandigarh (Sub Division No. 5 and complete city), one each at Rourkela city, Ranchi city and one integrated project in 6-towns in Rajasthan. These projects cover about 8.1 lakh consumers. The projects at Sub Division 5 in Chandigarh and Rajasthan are under implementation while other three Projects are under various stages of tendering.

8.4 Model Standard Bidding Documents

NSGM in consultation with stakeholders (CEA, MoP, EESL and Industry) had prepared Model Standard Bidding Documents for appointment of Advanced Metering Infrastructure Service Provider (AMISP) on design-build-finance-own-operate-transfer (DBFOOT) basis. These documents enable the DISCOMs to take up smart metering projects on operational expenditure (OPEX) model.





8.5 Smart Grid Knowledge Centre (SGKC)

Smart Grid Knowledge Center at Manesar, Haryana was established in September 2018, with 100% funding by GOI, for providing technical support for capacity building & development of technical manpower in the State. Smart Grid Knowledge Centre (SGKC) is being developed as one of the leading Centers of Excellence (CoE) to foster partnership, innovation and entrepreneurship in Smart Grid technologies and create capacities in the power sector. A Strategic Roadmap document to establish Innovation Park and Technology Incubation Hub was released in June 2020.

8.6 Reports/Tools developed for Distribution Utilities

The following Reports/Tools were developed in consultation with CEA during this year for development of Smart Grid in the country: -

i. **Customer Centricity Report:** A report has been developed under USAID SPARC programme on enhancing customer centricity in the electricity distribution sector for providing guidance to DISCOMs and other stakeholders on how to enhance customer experience. USAID in future will be partnering with DISCOMs in field to apply and test ways in which the proposed interventions can be achieved vis-à-vis existing system, processes and resources within DISCOMs.

ii. **Smart Grid Readiness – Self Assessment Tool (SGRSAT):** A Smart Grid Readiness – Self Assessment Tool (online) has been by developed by DFID under PSR program in consultation with NSGM/CEA. The tool enables utilities to self-assess their readiness and set targets for Smart Grid deployments. The tool also helps in providing inter-se peer learning between the utilities.

iii. **Investment Analysis Tool for Utility Modernization Projects:** An Investment Analysis Tool (online) for Utility Modernization Projects has been developed under USAID SPARC programme in consultation with NSGM/CEA. This tool enables holistic assessment of financial, environmental and social benefits in utility modernization projects. The tool helps to evaluate the feasibility of the smart grid projects and prioritize investment decisions based on the value proposition accruing to DISCOMs or larger Society.

iv. DP&T Division in consultation with DISCOMs, Smart Meter manufacturer and other stakeholders developed Technical Specification of single phase & three phase Smart Meters to help the Utilities to use the technical specification in their Smart Grid Projects.

v. Attended various meetings organized by MoP regarding Common Backhand Infrastructure Facility (CBIF)) for Smart Grid Projects and related comments furnished.

8.7 Research & Development Projects in the Distribution Sector

CE(DP&R) is a member of a Technical Committee consisting of Members from IIT, CEA,BEE, MNRE, CPRI etc. for Review of the ongoing R & D projects and approval of new R&D Projects under IHRD (in house R&D proposals of CPRI), RSOP (Research Scheme on Power for R&D projects less than Rs 50 lakhs) and NPP (National Perspective Plan for R&D Projects more than 50 lakhs) in the Grid, Distribution & Energy Conservation Research area. The Committee meets every 3-4 months for reviewing the Projects and assessing the progress of on-going projects. Meets are organized by CPRI. CPRI also disburses the funds to approved Projects on behalf of MoP.

NaMPET-III: CE(DP&R) is a part of the Sub-Committee for evaluation of project proposals in Application Oriented Research, Development and Deployment categories under NaMPETIII(National Mission on Power Electronics Technology Phase-III) in area of New Research proposals based on Power Electronics with special consideration to the fact that the proposal should have some industry partner so that ultimately the project becomes field deployable.

Last meeting of the sub-committee was held in December, 2020.

8.8 Integrated Power Development Scheme (IPDS):

Integrated Power Development Scheme (IPDS) was launched by MoP on 3rd December 2014 with the following scope of components in Urban Areas:

(i) Strengthening of sub-transmission and distribution networks;
(ii) Metering of distribution transformers / feeders / consumers;
(iii) IT enablement of distribution sector and strengthening of distribution network for completion of the targets laid down under erstwhile Restructured Accelerated Power Development & Reforms Programme (R-APDRP) for 12th and 13th Plans.

The components at (i) and (ii) above have an estimated outlay of Rs. 32,612 crore including a budgetary support of Rs. 25,354 crores from Government of India during the entire implementation period.

The component at (iii) above is a component of R-APDRP, which was approved by Govt. of India for continuation in 12th and 13th Plans amounting to Rs. 44,011 crore including a budgetary support of Rs. 22,727 Crores has been subsumed in this scheme This outlay will be carried forward to the new scheme of IPDS in addition to the outlay indicated above.

The scheme of R-APDRP programme is to facilitate State Power Utilities to reduce the level of AT&C losses to 15%. The programme has two major components under which the investments through this scheme will lead to reduction in loss level. **Part–A(IT enablement and SCADA)** includes projects for establishment of Information Technology based energy accounting and audit system leading to finalization of verifiable base line AT&C loss levels in the project areas, and **Part-B** (**network strengthening)** for strengthening of distribution networks. The total outlay for the programme is Rs 51,577 crore, out of which the major outlay is Rs. 10,000 Crores for **Part-A** and Rs. 40,000 Crores for **Part-B** of the scheme.

PFC Ltd. is the nodal agency for implementation of this scheme and as a member of monitoring committee of this scheme, as a member of Monitoring committee of this scheme, CEA has been attending meeting of monitoring committee at MOP and providing requisite inputs and technical support for

implementation. The achievement/ Progress of the schemes is 91%. as on 31.03.2021

8.9 Association with the Central Team constituted by MHA for on-the-spot assessment of damage caused by Natural Disasters in various States.

As a nodal division for matters related to disaster management, DP&R division nominated officers from this divisions well as other divisions of CEA to be part of the Central Team constituted by Ministry of Home Affairs/Ministry of Agriculture for on the-spot assessment of Damages caused to Power Sector by natural calamities in the States of Arunachal Pradesh, Andhra Pradesh, Tamil Nadu, Assam and West Bengal. Based on the assessment made by the concerned officers, the recommendations of the Central Team for various States as regards the damages pertaining to Power Sector were finalized.

8.10 Amendment in CEA Regulations

DP&R Division took up the work regarding review of the following Regulations of CEA during this period:

a) 4th Amendment of Central Electricity Authority (Installation & Operation of Meters) Regulations, 2006

Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 were taken up for review. Draft 4th amendment as approved by Authority was pre-published in March, 2021 for comments of stakeholders.

b) 2nd Amendment of Central Electricity Authority (Technical Standards for construction of Electrical plants and Electric lines) Regulations, 2010

The 2nd draft Amendment of Central Electricity Authority (Technical Standards for construction of Electrical plants and Electric lines) Regulations, 2010 pertaining to distribution sector has been sent to TE&TD Division after approval from Member (GO&D).

8.11 Work regarding Power Quality

A Panel was constituted under the convenorship of Chief Engineer (DP&R, CEA) by ETD 01 Sectional Committee of Bureau of Indian Standards for developing an Indian Standard on 'Power Quality Measurement and Monitoring methods'. In this regard, the Panel held last meeting on September 28, 2020 and finalized the Draft Standard which was submitted to ETD 01.

8.12 Work regarding Low Voltage Direct Current (LVDC)

A Panel was constituted under the convenorship of Chief Engineer(DP&R), CEA by ETD 50 Sectional Committee of Bureau of Indian Standards working in the area of LVDC for developing an Installation Standard on 'DC Grid for medium power applications' in line with 48V ELVDC standard and IEC TS 61200-102 draft standard. The Panel has held two meetings in this regard and the draft is under discussion.

8.13 Formulation of Electricity (Rights of Consumers) Rules, 2020

The draft Electricity (Rights of Consumers) Rules, 2020 were formulated by DP&R Division, which were notified in Gazette of India dated 31.12.2020 by Ministry of Power.
The key highlights of these rules are:

• Emphasis on the right of consumers to have minimum standards of service.

• Mandates provisions for online access to various services.

• Requirement of documents is reduced- Only two documents required for new connections up to a load of 10 kW or such higher load as may be specified by the Commission.

• Maximum time for new connection/ modification- Urban- 7 days, rural- 30 days.

• Mandatory smart pre-payment meter or pre-payment meter for all new connections (unless exceptional approvals have been received).

• Transparency in tariff and billing mandated.

• Provision of not more than two provisional bills for a consumer during one financial year and rebate of two to five percent, if any bill is served with a delay of such period as specified by the Commission, not exceeding sixty days.

• 24x7 power to all consumers. However, the Commission may specify lower hours of supply for some categories of consumers like agriculture.

• Net metering for up to 10 kW load and gross metering for loads above 10kW.

• Automatic compensation for breach of standard of performance, for parameters that can be remotely monitored.

• Services such as application submission, payment of bills etc., to senior citizens at their doorsteps.

• Mandatory 24x7 call centre.

• Establishment of Consumer Grievance Redressal Forum (CGRF) at different levels to cater the needs of the sub- division, division, circle, zone, company level with appropriate members from consumer and prosumer representatives.

• Provision of all services through a common Customer Relation Manager (CRM) System to get a unified view of all the services requested, attended and pending, at the backend for better monitoring and analytics.

8.14 Uniformity in Supply Voltage

It was observed in the Committee meetings of ETD 01 of BIS that the ambiguity regarding the standard voltages (230 V or 240 V) is profound and decided that these shall be discussed with CEA so as to revise the standard voltages as needed in IS 12360. In this regard, a Working Group was constituted by the BIS Committee to study and identify the changes and subsequent course of action for IS 12360. It was also decided to request CEA to organize the Working Group meetings with the following composition: 1. CEA 2. Secure Meters 3. Lab 4. Utilities- DMRC/TATA Power The first meeting of the Working Group was held on 24.07.2019 and the matter is under discussion.

8.15 Public Procurement (Make in India)

Public Procurement (Make in India) order was notified to promote manufacturing and production of goods and services in India with a view to enhance income and employment. All procuring entities shall abide by the aforesaid order in respect to the procurement in the Power Distribution Sector.

In order to protect the security, integrity and reliability of the strategically important and critical Power Supply System & Network in the country, Order dated 02.07.2020 mandated that any import of equipment/components/parts from "prior reference" countries as specified or by persons owned by, controlled by, or subject to the jurisdiction or the directions of these "prior reference" countries will require prior permission of the Government of lndia. Further, an Order dated 23.07.2020 was also issued regarding measures for contributing towards ‘Atmanirbhar Bharat' and ‘Make in India’ through phased indigenization in Power Sector.

8.16 Works related to Union Territories (UTs)

Technical clearance/ comments was accorded/ furnished to the following schemes/ references for UTs:

▪ UT of Dadra & Nagar Haveli and Daman & Diu

- Technical clearance accorded to Scheme for 1 MW (4 MWH) Energy Storage System (ESS) at Fudam, Diu.
- Reference received from UT of Dadra & Nagar Haveli and Daman & Diu regarding unified CGRF was examined and comments furnished.

▪ UT of A&N Island

- Matter regarding 50 MW RLNG based Power Project at Hopetown, Andaman & Nicobar Islands regarding use of single fuel engine over dual fuel engine was examined and comments furnished.

▪ Delhi

- Comprehensive Feasibility Study for conversion of existing Overhead Electrical Network to Underground Electrical Network of BSES Rajdhani power Ltd. And BSES Yamuna Power Ltd is being taken up.

▪ UT of J&K and UT of Ladakh

- Rollout plan for Distribution sector in Union Territory of Jammu & Kashmir and UT of Ladakh was prepared and submitted to the committee constituted by MoP.
- The following three distribution projects identified under Special Development package of Ministry of Home Affairs (MHA) for Union Territory of Ladakh were examined and comments furnished.

1. Implementation of smart grid and smart metering in UT.
2. Development of Ring network at 66kV & 11kV level for Leh and Kargil District.
3. Proposal for construction of 66kV transmission line, substations and HT/LT network (Changthang region.

- Standing Finance Committee (SFC) memo for appraisal of the projects for setting up solar PV capacity of 20 MWac/ 50 MWp with battery storage of 50 MWh at Phyang, Leh and 1 MW solar-wind hybrid plant with battery storage of 1 MWh at Nyoma under J&K Prime Minister Development Package (PMDP) was examined and comments furnished.
- The Vision Document for a Carbon-Neutral Ladakh is being taken up.

8.17 Works completed related to Ministry of DONER/NEC for North Eastern States: -
M/o DONER:

- M/o DONER EFC Note for appraisal of Central Sector scheme of M/o DONER (NESIDS, etc.) for continuance in the period of (2021-22 to 2025-26) was examined and comments furnished.
- IMC/NESIDS Committee meeting - circulation of Draft Agenda Notes on project proposals received from NE States was examined and comments furnished.

Arunachal Pradesh

- The reference received from Govt. of Arunachal Pradesh regarding pending sanctions of some major schemes under NESIDS and shifting of DMS was examined and comments furnished.

Sikkim

- Project proposals submitted by Government of Sikkim for funding under North East Special Infrastructure Development Scheme (NESIDS) for FY 2020-21 – Upgradation and Re-modelling and Strengthening of existing Transmission & Distribution System of Soreng, Daramdin and its surrounding areas in West Sikkim was examined and comments furnished.

Nagaland

- Technical clearance accorded to Project Proposals under NESIDS and HADP and Special Packages - Proposal of Govt. of Nagaland for construction of 66/11 kV, 20 MVA S/S at Mon District along with associated works (Est. Cost Rs. 20.96 Crores).
- Report of the Multi-Disciplinary Committee (MDC) to look into developmental issues and special needs of Eastern Nagaland was examined and comments furnished.
- DPR for installation of smart prepaid meters in 19 urban towns of Nagaland was examined and comments furnished.

8.18 Examination of Preliminary Project Report (PPRs)/Detail Project Reports (DPRs)of various States/ BEE/EESL/ MNRE under External Assistance from ADB/World Bank/ MDB etc.: -

- DPR for Reliability Improvement component of the project titled "Tripura Power Generation Upgradation & Distribution Reliability Improvement" under external finance from ADB was examined and comments furnished.

- PPR for Artificial Intelligence powered Interactive Conversational bot (Text & voice) for consumer services in BESCOM with external assistance from ADB was examined and comments furnished.

- DPR (PPR ID: 10738) of Government of Himachal Pradesh for Distribution Section under the Project, "Himachal Hydropower and Renewable Power Sector Development Program" by HPSEBL with external assistance from World Bank- IBRD" was examined and comments furnished.

- PPR regarding enhancing the Livelihood of Rural Community of Meghalaya through Use of Renewable Energy Systems with ADB funding (PPRID-10882) was examined and comments furnished.
- Preliminary Project Proposal of MoP (PPRID: 11031) on Revitalizing India's Electricity Distribution Sector was examined and comments furnished.
- Preliminary Project Proposal of EESL (PPRID: 10804) on Energy Efficiency Scale-up Program (Additional Financing) with external funding of USD 300 Million from World Bank – IBRD was examined and comments furnished.
- MNRE PPR (PPRID-10844) - Providing financial support for Component-C of PM-KUSUM Scheme was examined and comments furnished.
- PPR (PPR ID: 11283) for Uttarakhand Transmission Strengthening & Distribution Improvement Programme (UTSDIP) reg. distribution portion was examined and comments furnished.
- Voluntary star labelling program for induction hobs circulated by BEE was examined and comments furnished.

8.19 Examination of Distribution Scheme received from Ministry of External Affairs for providing Line of Credit to Foreign Countries: -

- Technical clearance accorded to Proposal of Govt. of Bangladesh for "Modernization of City street light system at different area under Chattogram City Corporation" under the GoI line of Credit of US $4.5 Billion extended to Bangladesh".
- Appraisal Report for the Electrification of resettlement sites under the resettlement action plan-second phase (PAR2) of the Kandadji Dam and upgrading of the power distribution network project in the Dam Area, Republic of Niger was examined and comments furnished.

8.20 Committee constituted by MoP for

Examination of 308 DPRs of Border Out Posts (BOP)/Border Intelligence Post (BIP)/Collated Operating Base (COB) received from MHA:

A committee has been constituted by MoP under Chief Engineer DP&T, CEA with members from PFC/REC/PGCIL to examine the 308 nos. of Detailed Project Reports (DPRs) of Border Outposts (BOPs) and Border Intelligence Points (BIPs) of about Rs. 1309 Cr. for providing electricity connections to the BOPs and BIPs. An interim report has been submitted to MoP. The examination of DPRs is under progress by the committee.

8.21 Conduction of Mock Test Exercise at Parliament House:

To ensure reliability of power supply to Parliament house before onset of each Parliament session a Mock test exercises at CPWD 11 KV Parliament House S/S were organized by CPWD in presence of officers of CEA, CPWD & NDMC before the Monsoon, Winter and Budget Sessions of Parliament this year and the reports of the Mock Test Exercise were sent to MOP, CPWD & NDMC.

8.22 CERT-Distribution:

With the rapid implementation of IT enabled support and services in electricity distribution sector, the sector is becoming more & more prone to various types of cyber-attacks and information security issues. In view of this, Ministry of Power constituted CERT-Distribution (CERT-D) under Chief Engineer (DP&T), CEA. CERT-D coordinates with all DISCOMs, NCIIPC, MoP, CERT-MoP and CERT-In for disseminating information and advisory to DISCOMs on cyber security issues received from NCIIPC, CERT-In & CERT-MoP. The following actions were taken by CERT-D during 2020-21: -

- The Cyber Crisis Management Plan (CCMP) for Distribution Sector was circulated to all Distribution Utilities (DISCOMs) for adoption and preparing their own CCMP for implementation in their utilities. 18 DISCOMs have intimated that they have prepared their CCMP.
- All 82 Major DISCOMs have nominated their Chief Information Security Officer (CISOs). .
- 55 Major DISCOMs have on boarded Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) being operated by the Indian Computer Emergency Response Team (CERT-In). Vulnerability of DISCOMs reported in every fortnightly Power Sector Situational Report of CSK, is taken up by CERT-D to concerned DISCOMs for closer/necessary action and closer reports are submitted to MoP/CERT-In.
- DISCOMs have been advised regularly to take necessary actions as per CCMP like quarterly review of their Cyber Security Measures and to conduct regular security audits of their IT Infrastructure through CERT-IN empaneled agencies, implementation of ISO 27001 in their respective organizations.
- The Advisories on vulnerability and threat assessment of SCADA System and CII Identification, Advisories on IT security auditing requirement of Government organization and critical sectors, Guidelines for setting up of CSIRT and Guidelines issued by NCIIPC for Mitigation of Cyber Security Threats in Power Sector were issued to all DISCOMs for their compliance.
- Attended various meetings convened by MoP/CERT-In/NCIIPC/CISO-MoP on the Cyber Security issues.
- Template & guidelines issued by NCIIPC for identifying the Critical Information Infrastructure (CII) in Distribution sector was circulated to all DISCOMs.
- Furnished status of cyber security measures taken by DISCOMs to MoP/CISO-MoP.
- Circulated Cyber Security Audit - Baseline Requirements (CSA.BR) to all DISCOMs.

- CERT-D along with Sectoral CERTs participated in Cyber Crisis Table Top Exercises on countering cyber-attacks emerged due to COVID-19 Pandemic conducted by CERT-In. All the Utilities under purview of CERT-D were requested to attend "Cybersecurity Breach Exercise: Black Swan" conducted by CERT-In.
- An Empowered Committee under Secretary, MoP and Standing Committee under Additional Secretary, MoP have been constituted to monitor the cyber security measures taken by Power Utilities. CERT-D is regularly participates in the meeting of Empowered Committee & Standing Committee.

8.23 Report of the Status of Feeder, Distribution Transformer and consumer metering

As directed by MoP the report on the status of Feeders, DTs and Consumers metering in the country is regularly being updated and submitted to MoP during this year.

8.24. VIP/MoP References/Misc.

- Material for Standing Committee on Energy 2019-20 regarding smart metering was furnished.
- Material for Consultative Committee on "Reforming Discoms are giving better standards of service" was furnished to MoP.
- VIP Reference from Shri Dibya Shankar Mishra, MoS(IC), Orissa, regarding the ambit of the Reforms Linked New Distribution Schemes was examined and comments furnished.
- VIP Reference from Shri Rahul Gandhi, Hon'ble MP (Lok Sabha) regarding transmission and distribution infrastructure in Kalpetta Circle, Wayanad District of Kerala was examined and comments furnished.
- VIP reference from Shri Radha Krishna Mathur, Hon'ble Lt. Governor of UT of Ladakh was examined and comments furnished.
- EFC proposal in respect of "Revamped Distribution Sector Scheme" was examined and comments furnished.
- Request for guidance on Zero Effect Concept on Enclosures for Meter Boxes –Reference received from SMC Manufacturer was examined and comments furnished.
- Reference on Development of State Energy Index by NITI Aayog was examined and comments furnished.
- Inputs given for meeting of the Core Group of Secretaries on Indo-Japan investment Promotion partnership.
- Inputs given for preparation of report of Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution infrastructure in the Coastal areas.
- Inputs has been provided for preparation of Disaster & Crisis Management Plan for disaster resilient Distribution System.

8.25 Rural Electrification

8.25.1 Status of Rural Electrification in the Country:

All the 18,452 balance un-electrified villages of Census-2011 (as on 01.04.2015) in the country have already been electrified (including 1,271 uninhabited villages) by 28-04-2018 under Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY). Therefore, 100% electrification of villages has been achieved in the country.

As per the data furnished by State Govts, 1,26,094 number of pumpsets/tubewells energized during 2020-21 and cumulatively, 2,20,54,603 pump sets/tube wells have been energized at the end of March 2021 in the Country.

8.25.2 Deendayal Upadhyaya Gram Jyoti Yojna (DDUGJY):

Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) was launched by MoP on 3rd December 2014 with the following components in Rural Areas:

(i) Separation of agriculture and non-agriculture feeders facilitating judicious rostering of supply to agricultural & non-agricultural consumers; and
(ii) Strengthening and augmentation of sub-transmission & distribution infrastructure in rural areas, including metering of distribution transformers/ feeders/consumers;
(iii) Rural Electrification for completion of the targets laid down under the erstwhile Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) for 12th and13th Plans.

The components at (i) and (ii) of the above scheme have an estimated outlay of Rs. 43,033 crore including a budgetary support of Rs. 33,453 crores from Government of India during the entire implementation period. The scheme of RGGVY will get subsumed in this scheme as a separate Rural Electrification component {component (iii) above}, for which Government has already approved the scheme cost of Rs. 39,275 crore including a budgetary support of Rs. 35447 crores. This outlay will be carried forward to the new scheme of DDUGJY in addition to the outlay indicated as above.

Under the new scheme, 60% of the Project cost will be extended by Govt. of India as Grant in respect of States other than special category (85% for the Special Category States i.e. all North Eastern States including Sikkim, J&K, Himachal Pradesh, Uttarakhand). Minimum 10% (5% for Special Category States) shall be contributed through own sources by the State Govt./ State Power Utility and the balance 30% (10% for Special Category States) may be arranged through Loan or own sources by the Sate Govt./ State Power Utility. Additional grant upto 15% (5% in case of Special Category States) by conversion of 50% of loan component will be provided by Govt. of India on achievement of prescribed milestones such as timely completion, reduction in AT&C losses & upfront release of revenue subsidy by State Govt.

REC Ltd. is the nodal agency of monitoring committee for implementation of this scheme and as a member of Monitoring committee of this scheme, CEA has been attending meeting at MOP and providing requisite inputs and technical support for implementation. Financial progress of the scheme (based on MIS of DDUGJY as on March-21) is 74.5%.

8.25.3 Decentralized Distributed Gene-ration (DDG) Projects under RE component of DDUGJY (RGGVY)

Under RGGVY, there was a provision for Rs.540 crores during 11th plan for Decentralized Distributed Generation (DDG) which has been revised to Rs.1000 crores for implementation during 12th and 13th plan by extending scope of DDG to grid connected areas to supplement the availability of Power in areas where power supply is less than six hours a day. The Decentralized Distribution Generation is being provided from conventional or renewable sources such as Biomass, Biofuels, Biogas, Mini Hydro, Solar etc. for villages/habitations where grid connectivity is either not feasible or not cost effective.

Status of DDG projects sanctioned under RGGVY/DDUGJY as on 31.03.2020:

Under DDG, 4,151 projects covering 2,29,367 Nos. of Households (including BPL Household of 2,24,073) in 3402 un electrified villages/hamlets in 17 States/UTs (Andhra Pradesh, Assam, Arunachal Pradesh, Chhattisgarh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Odisha,

Rajasthan, Telangana, Uttar Pradesh, Uttarakhand, Manipur, J&K and Ladakh) at an approved cost of Rs.1,334.37 crores have been sanctioned by the Monitoring Committee, and out of which Rs.797.63 crores have been released and 3,405 (82.03%) project been completed.

8.26 Publication of Distribution Data regarding Reliability Index:

As per the mandates available in clause 5.13.1 of National Electricity Policy (NEP), the Appropriate Commission to regulate the utilities based on pre-determined indices on quality of power supply w.r.t. many parameters including frequency and duration of interruption of feeders. The clause 5.13.2 of NEP stipulates that Reliability Index (RI) of supply of power to consumers should be indicated by the distribution licensee. A road map for declaration of RI for all cities and towns upto the District Headquarter towns as also for rural areas, is required to be drawn by up SERCs. The data of RI should be compiled and published by CEA". Accordingly, based on the data furnished by Discoms/Licensees, the data of RI in the proforma prescribed by CEA covering all cities and towns and also for rural areas has been compiled for 2017-18 and published on website of CEA.

Further, to align with the Standards of Performance (SOPs) of SERCs, the formats for collection of RI data has been modified to accommodate the parameters, methods of calculations etc. of SOPs and circulated to all Discoms/Power departments to be effective from 2018-19 and onwards. Accordingly, based on the data furnished by Discoms/SERCs, the data of RIs, viz System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI) etc. covering all cities and towns and also for rural areas has been compiled for 2018-19 and the data collection for 2019-20 is under progress.

8.27 Saubhagya scheme:

Government of India has launched Pradhan Mantri Sahaj Bijli Har Ghar Yojana – "Saubhagya" on 11th October, 2017 with the objective to achieve universal household electrification by providing last mile connectivity and electricity connections to all households in rural and urban areas by March 2019. This scheme has the fund outlay of Rs. 16,320 crore including a Gross Budgetary Support (GBS) of Rs. 12,320.00 crores from Government of India.
As a member of Monitoring committee of this scheme, CEA has been attending meeting at MOP and providing requisite inputs and technical support for implementation. The achievement/ Progress of the schemes is given as below:

All households have been reported electrified by the States on Saubhagya portal, except 18,734 households in Left Wing Extremists (LWE) affected areas of Chhattisgarh as on 31.03.2019. Subsequently, seven States namely Assam, Chhattisgarh, Jharkhand, Karnataka, Manipur, Rajasthan and Uttar Pradesh had reported that around 19.09 lakh un-electrified households, identified before 31.03.2019, which were unwilling earlier but have expressed willingness to get electricity connection. All these seven States has reported 100% household's electrification as on 31.03.2021. As reported by the States, 2.817 crore households have been electrified since the launch of Saubhagya, up to 31.03.2021.

8.28 Monitoring Prime Ministers development (PMDP) 2015 in J&K for Distribution Projects:

Hon'ble Prime Minister on 07.11.2015 announced a Rs 80,000 crore development

package for Jammu and Kashmir, which includes 11708 Crore package for augmentation of power infrastructure and distribution systems; solar power; small hydro projects. Out of this package, the amount sanctioned for Strengthening of Distribution system and new technologies in the state of J&K is Rs 2570.14 Crores. The details of the distribution projects sanctioned on 9th Nov, 2016 by MOP, Government of India are as below:

Rural Area: Projects in 21 districts amounting to Rs 1157.75 Crores including PMA charges, for strengthening the rural distribution area also includes electrification in shrines, Underground cable laying in Tourist Place, and electrical infrastructure in Industrial Area has been sanctioned. JPDCL, KPDCL& PGCIL are nominated as Project implementing Agency (PIA) by JKPDD. Region and PIA wise Financial progress vis-à-vis surveyed and approved projects as provided by respective PIAs under the PMDP-Rural is as below:-

Region	PIA	Progress
Jammu	JPDCL	55%
	PGCIL	82%
Kashmir	KPDCL	52%
	PGCIL	86%
Ladakh	PGCIL	43%

Urban Area: Project in 12 circles amounting to Rs 1144.59 Crores including PMA charges for strengthening the urban distribution area which includes establishment of meter testing labs has been sanctioned. JPDCL, KPDCL& RECPDCL are the PIAs. Region and PIA wise Financial progress vis-à-vis surveyed and approved projects as provided by respective PIAs under the PMDP-Urban is as below:-

Region	PIA	Progress
Jammu	JPDCL	40%
	RECPDCL	52%
Kashmir	KPDCL	73%
	RECPDCL	38%
Ladakh	RECPDCL	18%

Smart metering projects: Projects for providing smart meters to 2 lakh consumers at the cost of 126.54 Crores including PMA charges has been sanctioned, for which RECPDCL is the nominated PIA. The work is under progress.

Smart Grid projects: Projects worth Rs 141.26 Crores including PMA charges has been sanctioned and PGCIL is the PIA. But due to no response from JKPDD the said package has been Annulled by PGCIL.

In consultation with Ministry of Power in the month of Dec-2020, Monitoring formats and mechanism has been thoroughly modified and presently progress under PMPD-2015 is updated by PIAs on monthly basis in online file shared with PIAs through Google-Drive.

8.29 Additional fund for PMDP 2015:

i) JKPDD has submitted additional 18 DPRs for Rs. 562.22 cr. during January 2019 and a Committee headed by CE(DM); and having members from REC, PFC and PGCIL; has apprised these DPRs (subsequently revised to Rs. 819.11 crs.) for Rs. 711.89 crs., and recommended the same to MoP for funding to J&K on 29th Nov, 2019.

ii) JKPDD has also demanded additional fund to complete the full scope of work under the PMDP-2015. CEA apprised the additional fund requirements of Rs. 4076.00 crs and submitted the report to MoP on 20th June, 2019 for consideration. Further, a committee comprising of members from CEA, REC and PFC is constituted by MoP to assess the possible justification of this additional demand for the projects sanctioned under PMDP-2015. This committee prepared report providing justification for Rs. 4738.88 crs, which has been submitted to MoP on 7th Oct, 2019 for its consideration and sanction to J&K.

iii) The cost escalation/additional fund requirement was reviewed in Mop in Dec,2020 and MoP has desired to revise the same considering following:-

a) Nil PIA charges to Utilities of J&K and Ladakh,

b) Reduction of PIA charges to 5% from 8.5% for CPUSs (RECPDCL and PGCIL)

c) Nil cost escalation for project components like consumer metering in Rural and Urban area, Meter test lab in urban area and in New Technology.

iv) Based on the above, additional fund requirement of Rs.1401.69 cr was estimated by CEA for Urban, Rural and New Technology Schemes and this was further reviewed and deliberated in MoP on 15th January, 2020. After detailed deliberations Monitoring committee approved the following:-

a) cost escalation for system strengthening projects under implementation (excluding cost escalation in consumer meters & Meter testing Labs yet to be awarded) amounting to Rs.426.30 cr and sanction of (i) additional GoI Grant of Rs.383.67 cr @90% on cost escalation (ii) additional PMA charges amounting Rs.2.13 cr @0.5% on additional cost and (iii) sanction of additional GoI grant amounting to Rs.58.42 Cr towards PIA charges @5% +GST on project cost assigned to CPSUs i.e. RECPDCL and PGCIL as PIAs. No PIA charges considered for projects being implemented by JKPDD as PIA.

b) New Technology (smart Grid /smart Metering projects): GoI grant of Rs.15.71 Cr payable to CPSUs engaged as PIA charges @5%+GST on sanctioned project cost of Rs.266.46 cr sanctioned for smart Grid and smart metering projects. No project cost escalation considered for these projects.

c) PIA charges over and above 5% to be funded by respective urs from own sources.

8.30 Integration of Distribution Sector data with National Power Portal (NPP):

NPP, launched on 14th Nov, 2017, is a centralized system which facilitates online data capture/ input (daily, monthly, and annually) and to disseminate related information (operational, capacity, demand, supply, consumption etc.) through various analyzed reports, graphs, statistics etc for Indian Power Sector. The Nodal Agency for implementation of NPP and its operational control is CEA. The system has been conceptualized, designed and developed by National Informatics Centre (NIC).

In Distribution Sector, NPP captures both operational and commercial data at feeder-level for rural as well as urban areas. Operational data includes power supply position, outage data, consumer reliability data etc. and commercial data includes AT&C losses, Billing efficiency, collection efficiency for A&TC loss etc. This Division of CEA is Updating/restructuring the formats for data capturing and its presentation in NPP, in consultation with NIC and IT Division of CEA.

By end of March, 2021 data of 40,733 urban feeders in 55 Discoms and data of 1, 23,190 rural feeders in 41 Discoms have already been integrated in NPP.As monitored in NPP, the status of duration of power supply in feeders is as below:

S.No.	FY19	FY20	FY21
Avg. Supply Hours in (HH:MM)			
Urban	21:43	22:23	23:35
Rural	20:41	20:50	21:09

The details are at Annexure-8.

CHAPTER – 9

DESIGN & ENGINEERING SERVICES

9.1 Design & Engineering of Hydro Electric Projects

Central Electricity Authority (CEA) renders design & engineering services for Hydro Electric Projects under execution in the Country in Central / State Sectors and neighbouring countries. CEA provides consultancy for conventional type hydro generating units, bulb/tubular type units, pumped storage schemes with a underground/surface power stations. Design & Engineering includes complete design, techno-economic analysis, preparation of Technical Specifications, tender evaluation, selection and sizing of equipments, detailed layout and schematic drawings for hydro turbine, generator, transformer, GIS, switchyard equipment and other auxiliaries.

9.2 Programme and Achievement during 2020-21

During 2020-21, CEA continued consultancy services for design and engineering of electrical and mechanical works of nine (9) nos. hydroelectric projects. Out of these, seven (7) projects are in India and two (2) projects are in Bhutan. The Projects for which design & engineering services were rendered by CEA are as given below: -

S.No.	Project	State/Executive Agency	Capacity Addition
Main Consultancy			
1.	Lakhwar MPP	Uttarakhand / UJVNL	3x100
2.	Ganol SHEP	Meghalaya/ MePGCL	3x7.5
Overview Consultancy			
3.	THDC HEPs (5 nos. HEPs)	Uttarakhand / THDC	2868
Neighbouring Countries			
4	Punatsangchhu St.I	Bhutan/ PHPA-I	6x200
5.	Punatsangchhu St.II	Bhutan/ PHPA-II	6x170

9.3 Scrutiny/Examination/Preparation of DPRs of HE Projects

a) Chapters on Electro-Mechanical equipment, related drawings, bill of quantities, Memorandum of Changes, etc. of 08 nos. of DPR of HEPs aggregating to 2967 MW including clarifications/ drawings/ documents etc. as received from time to time were examined and commented upon.

b) General layout Plan/Salient features of 15 nos. of HEPs under Survey & Investigation (S&I) at pre-DPR stage aggregating to about 7544 MW were examined and commented upon. Revised Cost Estimates received for 05 nos. (04 nos. in India & 01 no. in Bhutan) of HEPs aggregating to 7220 MW were examined and commented upon.

The list of above projects is as given below:

A. List of DPRs of HEPs examined for E&M aspects during the year:

S. No.	Name of the Project	State	Installed Capacity (MW)
1.	Thana Plaun HEP	Himachal Pradesh	191
2.	Sunni Dam	Himachal Pradesh	382
3.	Kirthai-I	Jammu & Kashmir	390
4.	Singoli-Bhatwari HEP	Uttarakhand	99
5.	Vyasi HEP	Uttarakhand	120
6.	Pinnapuram Pumped Storage HEP	Andhra Pradesh	1200
7.	Wah Umiam Stage-III HEP (Formerly known as Mawphu HEP, Stage-II)	Meghalaya	85
8.	Dugar HEP	Himachal Pradesh	500

B. List of HEPs under S&I stage which were examined for E&M aspects during the year:

S. No.	Name of the Project	State	Installed Capacity (MW)
1.	Saundatti Pumped Storage HEP	Karnataka	1260
2.	Upper Indravati HEP	Odisha	600
3.	Upper Kolab	Odisha	320
4.	Khandong Power House	Assam	46
5.	Devsari HEP	Uttarakhand	162
6.	Luhri Stage.II HEP	Himachal Pradesh	172
7.	Reoli Dugli HEP	Himachal Pradesh	476
8.	Dugar HEP	Himachal Pradesh	449
9.	Purthi HEP	Himachal Pradesh	232
10.	Bardang HEP	Himachal Pradesh	175
11.	Upper Sileru PSP	Andhra Pradesh	1350

12.	Jangi Thopan Powari HEP	Himachal Pradesh	804
13.	Sillahalla PSP St. I HEP	Tamilnadu	1000
14.	Dulhasti Stage II HEP	J & K	258
15.	Uri-I Stage-II HEP	J & K	240

C. List of HEPs which were examined for Revised Cost Estimates for E&M aspects during the year:

S. No.	Name of the Project	State	Installed Capacity (MW)
1.	Parbati-II HEP	Himachal Pradesh	800
2.	Teesta–IV HE Project	Sikkim	520
3.	Subansari Lower HE Project	Arunachal Pradesh	2000
4.	Dibang Multi-Purpose Project	Arunachal Pradesh	2880
Project abroad			
1.	Punatsangchhu-II HEP	**Bhutan**	1020

9.4 Proposals for Foreign Assistance/Bilateral Co-operation

Relevant material/inputs were provided for the proposal of bilateral co-operation with different countries in the field of hydro power development as and when received from various ministries as detailed below:

Russia, US, Japan, China, Kenya, Switzerland, Czech Republic, Germany, Norway, Nigeria, Finland, Kazakhstan, Denmark, SASEC(South Asia Sub-regional Economic Cooperation), Israel, Australia, Portugal, BRICS (Brazil, Russia, India, China and South Africa) etc.

9.5. Review of Technical Standards/Regulations:

i) Took up revision/modification of CEA regulations entitled Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations.

ii) Participated in panel meetings of BIS for preparation of /amendments in draft Indian standards as and when required.

9.6. R&D Activities:

i) Participated in meetings and provided recommendations for the R&D proposals received in CPRI's Standing Committee on Research Development (SCRD).

ii) Provided inputs on R&D references received from various ministries and organizations e.g. Comments on World Bank India Development Update (IDU) Report.

iii) Contributed in various workshops, conferences and trainings conducted by CBIP, CWC, etc. pertaining to developments in Hydro Power Sector.

9.7. Examination of Innovative Proposals:

i) Examination/scrutiny of 06 nos. of Innovative Proposals on generation of electricity from

renewable and other sources of energy. The list is as given below:

List of Innovative Proposals:

i. Proposal received from Sh. Dhananjay Kumar Chaturvedi regarding implementation of Synchronous Condenser.
ii. Proposal received from Sh. S.L. Chhabra regarding Single turbine twin generator.
iii. Proposal received from Sh. Venkata Vamshi Krishna of Koppa Karnataka regarding project on electric power generation from canal
iv. Proposal received from Sh. Padmanabham Kyama of Telangana regarding his invention for storage of power using rubber belt method from stored water of Dams.
v. Proposal received from Sh. Binod Kumar Gope of RanchiJharkhand regarding new research in Source of Renewable Energy Production from Hydro power plant sector.
vi. Scrutiny of Proposal received from MoP regarding Hydro Kinetic Turbine developed by M/s MACLEC.

9.8. Miscellaneous Works:

i) Contributed in the meetings of Technical Coordination Committee (TCC) of Punatsangchhu-I (6x200 MW) and Punatsangchhu-II (6x170 MW) HEP, Bhutan.
ii) Contributed in other project related meetings like Project Level Tender Evaluation Committee (PLTEC), Pre-Bid Meetings, Tender-Evaluation Committee(TEC), etc. of Punatsangchhu-I (6x200 MW) and Punatsangchhu-II (6x170 MW) HEP, Bhutan.
iii) Conducted inspections and prepared reports thereof for various Electro-Mechanical equipment of Punatsangchhu- (6x200 MW), Punatsangchhu-II (6x170 MW) HEP, etc.
iv) Inputs, from time to time, were provided to finalize the minimum local content in electro-mechanical equipment being used in Hydro Power Sector for the draft PPP-MII Order to be issued by MoP.
v) Prepared report of the committee to broadly review NHPC's proposal for construction of barrage in place of concrete Dam for Punatsangchhu-I (6x200 MW) HEP, Bhutan.
vii. Analysed the issues arising due to base year changes in Wholesale Price Index(WPI) in Punatsangchhu-I (6x200 MW) HEP, Punatsangchhu-II (6x170 MW) HEP and Mangdhechu (4x180 MW) HEP, Bhutan, and submitted the report thereon to MoP
viii. Provided inputs on the E&M issues faced in Mangdechhu (4x180 MW) HEP, Bhutan.

9.9 Design and Consultancy Assignments (Civil Aspects) for Thermal/Hydro/ Power Transmission Projects during 2020-21

TCD Division of CEA carried out the following specific works in respect of thermal/hydro/power trans-missi on projects during 2020-21:

9.9.1 Thermal Power Projects:

TCD Division of CEA is providing consultancy services to power utilities for thermal power projects as and when referred by Competent Authority.

9.9.2 Hydro Power Projects:

(a) Punatsangchhu-I HEP (6 X 200 MW), Bhutan

- Designs/Drawings of support structure and foundation of Potheadyard Equipments 400KV CVT/ 400kW SA/ 400kV Pi/ 400kV WTV/ 220 V CVT/ for 220kV SA/ 220kV WT/, Support Structure Analysis of IPBD, Pothead Yard related to 400kV ISO support structure and foundation, Design of RCC and RCC details of yard cable trenches of 400/220kv pothead yard, RCC details of equipment foundation for 400kv

CT, design and drawings of 220kv and 400kv Tower Support Structure and its foundation, Loading conditions for Pothead yard structures were examined and necessary advice was communicated to Project Authorities.

(b) Punatsangchhu-II HEP (6 X 170 MW), Bhutan

Designs/drawings of Towers, Equipment Support Structures and their foundations at pothead yard and Cable Support Structure at pothead yard, GIS and CAT areas, IPBD support structure, drawing of EOT 10T Crane for GIS hall were examined and necessary advice was communicated to Project Authorities.

CHAPTER-10

ECONOMIC AND COMMERCIAL ASPECTS OF POWER INDUSTRY

As per the Electricity Act, 2003, CEA has, inter-alia, been entrusted with duties and functions relating to collection/recording of data/information relating to generation, transmission, distribution, trading and utilization of electricity and to carry out studies relating to cost, efficiency, competitiveness etc. to evaluate the financial performance of the power sector.

10.1Performance of State Power Utilities

10.1.1 Financial health

The gap between average revenue realization and average cost of supply remained constantly high over the years, causing erosion in the volume of internal resources generation by the Distribution Companies (DISCOMs) and led many of them to virtual bankruptcy. The level of commercial losses of the DISCOMs/ utilities depend, inter-alia, on the unaccounted electricity losses, subsidies received towards sales to agriculture and domestic sectors, revenue generation through cross-subsidization etc. The Gross Subsidy on energy sales has been increasing over the years as an outcome of the policy of some of the States to provide electricity at subsidized rates to agriculture and domestic consumers.

Consequently, DISCOMs were unable to make complete payments to Central Power Sector Utilities (CPSUs) for purchase of power and coal, resulting in accumulation of huge outstanding amount. This has adversely affected the growth and performance of CPSUs. The payment deficit continues to rise and threaten the viability of the CPSUs. Further, the poor credit worthiness of DISCOMs has effectively blocked investments by the Private Sector despite the enabling and encouraging framework laid down by the Central Government.

10.1.2 Trend in Outstanding Dues Payable to CPSUs

CEA has been monitoring the status of the outstanding dues payable by the DISCOMs to CPSUs. Based on the information / data received in CEA from the CPSUs, the total outstanding dues (more than 45 days) payable by various power utilities to CPSUs, is Rs.27237.21 Crore as on 31st March 2021. The details of outstanding dues payable by power utilities to CPSUs is given as **Annexure- 10A**.

10.2 Electricity Tariff & Duty and Average Rates of Electricity Supply in India

In-fulfillment of its obligation under section 73(i) & (j) of the Electricity Act, 2003, CEA brings out a publication titled "Electricity Tariff & Duty and Average Rates of Electricity Supply in India". The latest edition (March 2020) contains information on retail electricity tariff applicable in various States / Utilities effective during the year 2019-20.

The publication provides assimilation of

regulatory data on notified tariffs of various States/UTs, the estimated data on average rates of electricity supply & electricity duty for different categories of consumers, along with the summarized data on power supply schemes for special categories of consumers. It also provides the details of subsidy support given by the government to various categories of consumers. The estimated average rates of electricity published herein have been computed on the basis of tariff orders received from various Electricity Regulatory Commissions.

The effective rates for different consumer categories have been worked out assuming different energy consumption for various sanctioned load keeping in view the urbanization, increase in usage of electricity appliances and improvement in the standard of living. In the March 2020 edition, tariff revisions subsequent to the last edition of the publication have been incorporated and tariff applicable in 46 Distribution Utilities have been indicated.

The sanctioned load and monthly energy consumption have been assumed for each category of consumer and considering the tariff notified by the respective Regulatory Commissions, the total amount payable by a particular category of consumer is worked out for the assumed load and monthly energy consumption. The Taxes and Duties are then added to arrive at the average estimated rate of electricity supply in terms of Paise / kWh.

A statement indicating category-wise estimated average rates of electricity for various Distribution Utilities in the country is given as **Annexure-10B.**

10.3 References on techno financial matters in power sector.

During the year, the comments/recommendations furnished by CEA on various important references, especially in regard to financial/commercial matters of power sector, are as under:

(i) Examination of Detailed Project Report (DPR) & Revised Cost Estimates (RCE) -

- Draft PFR of Integration of Parbati - Kuno - Sindh (modified PKC) link with Eastern Rajasthan Canal Project (ERCP) of Govt. of Rajasthan
- Goriganga-III-A HEP (150 MW) in Uttarakhand by NHPC
- Pinnapuram Pumped Storage HEP (1200 MW) in Andhra Pradesh by Greenko Energies Private Limited (GEPL)
- RCE proposal in respect of Parbati-II HE Project by NHPC
- RCE of Omkareshwar Project (520MW) by NHDC Ltd. in Madhya Pradesh
- RCE of Indira Sagar HEP (1000 MW) in Madhya Pradesh by NHDC

(ii) **Examination of PIB Proposals-**

- Rangit St.-IV HEP acquire through NCLT" by NHPC
- Dhaulasidh HEP in the State of Himachal Pradesh by SJVNL
- Luhri HEP Stage-I (210 MW) in Himachal Pradesh" by SJVNL
- Kwar HE Project of M/s CVPPPL in J&K
- Loktak Downstream HE Project" of M/s LDHCL

(iii) Cost Updation of Dibang Multi-Purpose Project (2880 MW) in Arunachal Pradesh" by NHPC Ltd.

(iv) Approval of R&M proposal of DVC's Panchet (Unit 1) Power station (1x40 MW) for life extension and uprating.

(v) Preliminary Project Proposal Report (PPR) in respect of EESL for additional financing of USD 300 million under the existing Program for Results (P for R) IBRD loan.
(vi) Reference of Department of Economic Affairs (Ministry of Finance) OM dated 27.10.2020 regarding establishment of India – UK Sustainable Finance Forum.
(vii) Standing Finance Committee (SFC) Memo for Appraisal of the Projects for setting up solar PV capacity of 20 MWac/ 50 MWp with battery storage of 50 MWh at Phyang, Leh and 1 MW solar-wind hybrid plant with battery storage of 1 MWh at Nyoma under J&K Prime Minister Development Package (PMDP).
(viii) Reference from Department of Commerce seeking comments on proposed Amendments in Guidelines for power Generation, Transmission and Distribution in Special Economic Zones (SEZs).
(ix) Reference from Govt. of Andhra for Central Financial Assistance (CFA) for Pump Storage Project.
(x) Reference from Odisha Government "Regarding easing of terms of liquidity infusion in DISCOMs due to COVID-19 and the ambit of the Reforms Linked New Distribution Scheme.
(xi) Reference from Govt. of Rajasthan regarding issues pending for resolution with various ministry of Government of India with power sector companies in state of Rajasthan.
(xii) Reference of Non-utilization compensation on KfW assisted Karcham HEP (450 MW) in Himachal Pradesh.
(xiii) Reference related to Tariff under head "Review of HEPs in Arunachal Pradesh Review of HEPs in Arunachal Pradesh"

10.4(a) Report on changes required in existing provisions of connectivity regulations to facilitate sale of power in Real-Time/ Wholesale power market.

In order to facilitate sale of power from all generators including RE generators in the near future through a "Real time/Whole-sale power market via Power Exchanges", the Ministry of Power (MoP) had constituted a committee under the Chairmanship of Chief Engineer (F&CA), CEA with representatives from CERC, POSOCO and CTU to make recommendations on Connectivity for Generators including RE Generators so as to facilitate their sale of power in the near future through a Real-time/Whole-sale power market via Power Exchanges. The report was submitted by April 2020.

(b) Report of Expert Group on Tariff issues of Bongaigaon TPS.

Bongaigaon TPS (3 x 250 MW) is located in Bongaigaon, Assam and its last units was commissioned on 26.03.2019. Beneficiaries of North-Eastern region have expressed reluctance to procure power from Bongaigaon TPS due to high cost of power. In order to analyze various options available to reduce the burden of high cost of power to beneficiary states of NE Region, an expert group with Additional Secretary (Thermal) as Chairman and Members drawn from MoP, CEA, CERC, NTPC and North-Eastern states was constituted. A sub-group was constituted under Chief Engineer (F&CA) to carry out financial analysis of various options to assist the Expert Group. The Expert Group had submitted its report in January 2021. Implementations of the recommendations has led to significant reduction in tariff of this generating station.

10.5 Policy Issues

Section 3 (3) of the Electricity Act enables the Central Government to review or revise the National Electricity Policy from time to time. The

National Electricity Policy was first notified in February 2005. Based on advice received from the Ministry of Power, revised draft for National Electricity Policy was prepared and submitted in January 2021. This draft was later circulated to stakeholders for consultation and compilation of their views was made available to an Expert Committee constituted by MoP for this purpose.

10.5.1 Economic Analysis of Policy Issues

Economic Policy Division has been regularly providing inputs/comments on various issues referred by the Ministry of Power to CEA such as Inputs on Finance Commission matters, Economic Survey , India's 7th Trade Policy Review , WTO related matters, inputs on Draft Cabinet Notes, matters concerning Revision in WPI, India's Domestic Support Agriculture(direct electricity subsidy) ,VIP references and so forth.

10.6 Compilation of Information on Power Purchase Agreement wrt. to IPPs

The information on Power Purchase Agreement (PPA) of Independent Power Producers (IPPs) with their tied and untied capacity, has been compiled based on the information supplied by IPPs. The compiled information is being updated regularly. During the year 2020-21 (up to 31.03.2021), the information for 123 IPPs with an installed capacity of 87770.81 MW, having tied and untied capacity of 63713.15 MW & 19417.42 MW respectively has been compiled.

10.7 Reforms Monitoring Unit

A 'Reforms Monitoring Unit' has been set up in the Economic Policy Division under the direction of Ministry of Power to monitor the status of implementation of various provisions of the Electricity Act, 2003, the National Electricity Policy, 2005 and the Tariff Policy, 2016.

10.8 The Electricity Act, 2003

10.8.1 Framing and Amendments of the CEA Regulations framed and notified under the Electricity Act, 2003

The Central Electricity Authority has been vested with the powers to make Regulations under Section 177 of the Electricity Act, 2003. The status of the notification of principle regulations and their subsequent amendments since the enactment of the Electricity Act, 2003, is as under:

A. Notified Principal Regulations:

The following are the principle regulations already been framed and notified by the Authority during previous years since the enactment of the Electricity Act, 2003:

Sl. No.	Regulation	Notified on
1	CEA (Installation & Operation of Meters), Regulations 2006	22.03.2006
2	Central Electricity Authority (Procedure for Transaction of Business) Regulations, 2006	22.8.2006
3	Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulation, 2007	09.03.2007
4	Central Electricity Authority (Furnishing of Statistics, Returns & Information) Regulation, 2007	19.04.2007
5	Central Electricity Authority (Grid Standards) Regulation, 2010	26.06.2010

6	Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2010	24.09.2010
7	Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010	20.08.2010 (English Version) & 07.09.2010 (Hindi Version)
8	Central Electricity Authority (Safety requirements for construction, operation and maintenance of electrical plants and electric lines) Regulations, 2011	14.02.2011
9	Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013	07.10.2013
10	Central Electricity Authority (Technical Standards for Communication Systems in Power Systems) Regulations, 2020	27.02.2020

B. Notified amendments in the Principal Regulations:

The regulations are regularly reviewed and amended by the Authority as per the requirements of various stakeholders in the power sector including general public at large. The amendments notified by the Authority during previous years since the enactment of the Electricity Act, 2003 are as under:

Sl. No.	Regulation	Notified on
1	Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations 2010	26.06.2010
2	Central Electricity Authority (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013	15.10.2013
3	Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations 2014	03.12.2014
4	Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Amendment Regulations, 2015	07.04.2015
5	1st Amendment to Central Electricity Authority (Measures relating to Safety and Electricity Supply) Amendment Regulations, 2015	13.04.2015
6	2nd Amendment to Central Electricity Authority (Measures relating to Safety and Electric Supply) Amendment Regulations, 2018	01.03.2018
7	Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2019	06.02.2019
8	Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019	08.02.2019
9	3rd Amendment to Central Electricity Authority (Measures relating to Safety and Electric Supply) (Amendment) Regulations, 2019.	28.06.2019
10	3rd Amendment to the Central Electricity	23.12.2019

	Authority (Installation and Operation of Meters) (Amendment) Regulations, 2019	

10.9 Court Cases

Legal Division of CEA is dealing Court Cases filed in the Hon'ble Supreme Court, High Courts, NGTs and District Courts/Lower Courts across the Country on behalf of Government of India, Ministry of Power and Central Electricity Authority.

Presently, Legal Division is dealing with more than 100 court cases which are ongoing/ pending at various courts in which Central Electricity Authority or Ministry of Power is/are have been impleaded as respondent (s).

10.10 Assistance to Ministry of Power

Regulatory Affairs Division of CEA provided comments/ inputs on the following important references /issues such as proposal for considering power generated from Waste Heat Recovery Boiler as Renewable Energy Source and bring the same under REC mechanism, Grant of Open Access to Indian Railways as Deemed Licensee, Banking & Wheeling arrangement of States, permission of merger of Solar and Non-Solar RPOs and Net-Metering Provisions, Purchase of Electricity by various DISCOMs of the State through Power Exchanges, Standing Committee on Energy (2020-21)'s references received on various Regulatory matters, reference on Sitting of the Committee on the Subordinate Legislation (2020-21) on various Regulations framed under the Electricity Act, 2003 etc.

Comments/ inputs furnished to the Ministry of Power on the following important references/issues:

1. On reference from UT of Dadra & Nagar Haveli and Daman & Diu regarding unified CGRF.

2. On VIP reference received from Sh. Naranbhai J. Rathwa, Hon'ble MP(RS) dated 03.06.2020 regarding action taken by TNPCB against Vedanta's Sterlite Copper Plant by disconnecting power supply to their thermal power plant situated at Thoothukudi, Tamil Nadu.

3. On VIP reference received from Sh. N.K. Premachandran, Hon'ble MP on the subject of Captive Power Plants.

4. On VIP reference received from Sh. Parbatbhai Savabhai Patel, Hon'ble MP regarding compensation for affected land under the transmission lines (RoW).

5. On the reference received regarding external directions under Section 5 of the Environment (Protection) Act, 1986 regarding compliance of emission limit notified vide notification No. S.O. 3305 (E) dated 07.12.2015.

6. On the reference received regarding appointment of Chief Electrical Inspector to Government for Mumbai Metro Lines u/s 162 of EA, 2003

7. On the reference regarding decriminalization of minor offences under various Acts.

8. On the reference received on the petroleum and minerals pipelines (acquisition of right of user in land) amendment act, 2020.

10.11 Legal Assistance/Advice to Utilities

Comments/ inputs furnished to the stakeholder

/utilities on the following important references/issues-

1. Reference from Vice President-Project Development & Regulatory Affairs (Sun Source Energy Pvt. Ltd.) regarding Clarification/Interpretation on provisions for setting up captive power plants as per Electricity Rules, 2005 and the Electricity Act, 2003.

2. Draft MoU between IIT Delhi and CEA regarding "Study to assess the compliance of new SO_2 emission norms by the thermal power plants in India" for legal vetting and advice.

3. Comments on the Andhra Pradesh Electricity Duty (Amendment) Bill, 2020.

4. Legal opinion on exit of Govt. of Jharkhand from Tripartite Agreement (TPA) signed amongst GoI, Govt. of Jharkhand and RBI for recovery of outstanding dues of DVC from Jharkhand Bijli Vitaran Nigam Ltd.

5. Comments on "how a deemed licensee status could be awarded to Special Purpose Vehicle (SPVs) formed for undertaking the activities pertaining to the manufacturing hub in the country".

6. Comments on Amendment in Power Guidelines dated 16.02.2016 w.r.t. issues raised by SEZ unit for installation of Solar Plant at roof top units in SEZ for exclusive captive consumption without availing any duty/tax benefits.

10.12 References on Policy and Regulatory aspects in the Power Sector

Regulatory Affairs Division of CEA provided comments/ inputs on the following important references /issues such as Draft CERC(Power Market) Regulations,2020, Draft Electricity (Rights of Consumers) Rules, 2020 and Draft Electricity (Amendment) Bill, 2020 issued by Ministry of Power, Draft National Electricity Policy, Draft Discussion paper on Data Centre Policy, 2020, Draft document on "India Vision @ 2035, Energy Sector" brought out by NITI Aayog, Draft Science Technology Innovation Policy(STIP)-2020, reference from Ministry of Power-on-Power Markets Stability updates in India for G20 Energy Ministerial meeting and representations received from various Induatry Association on various CEA's Regulations etc.

10.13 Implementation issues related to Regulations/Standards of CEA/ CERC/SERCs

Comments/ inputs furnished on following implementation/ regulatory issues raised in various Writ petitions filed by the utilities /persons before Hon'ble High Courts/ Supreme Courts etc.

1. Civil Writ Petition no. 4650 of 2019 filed by M/S Astron Polymers Pvt. Ltd. V/s Union of India & Ors, before the Hon'ble High Court of Punjab & Haryana at Chandigarh for issuance of Writ in respect of certain sections of the Electricity act, 2003 and Electricity Supply Code, 2014 issued by HERC.

2. Civil Writ Jurisdiction Case (CWJC) No. 5702 of 2020 filed by M/s Dina Metals Limited Vs the State of Bihar and others before Hon'ble High Court of Judicature at Patna for quashing the Electricity bill dated 04.05.2020 raised by the South Bihar Power Distribution Company Limited (SBPDCL),whereby and where under,

the maximum demand Charge (Fixed Charge) for the month of April, 2020 was raised without considering the fact that the industrial unit of the petitioner did not operate on account of Government instruction, arising out of Covid-19 pandemic.

3. Civil Writ Petition no. 5682 of 2020, filed by M/s Dadiji Steels Pvt. Ltd. Vs State of Bihar and others before Hon'ble High Court of Judicature at Patna, Bihar for quashing of the bill for April, 2020 and revising the Bill for March, 2020 raised by South Bihar Power Distribution Company Limited (SBPDCL) by granting proportionate reduction in the Demand Charges considering the fact that their manufacturing unit could not run on account of Government instruction, arising out of Covid-19 pandemic..

4. Civil Writ Jurisdiction Case (CWJC) No. 6153 of 2020 filed by M/s Patwari Steels Pvt. Ltd Vs the State of Bihar and others before Hon'ble High Court of Judicature at Patna for quashing the Electricity bill, dated 04.05.2020 raised by South Bihar Power Distribution Company Ltd(SBPDCL) for the month of April, 2020 considering the fact that the electricity was not consumed due to non-operation of their factory since 23.03.2020 on account of lockdown announced by the State of Bihar to prevent the spread of COVID 19 pandemic.

5. Writ Appeal (W. A.) (MD) No.970 of 2020 in W.P. (MD) No. 6319 of 2020 filed by the Collector, Karur District, Tamil Nadu Vs M/s K.S. Wind and Renewables India Pvt. Ltd. and others before the Madurai Bench of Hon'ble High Court of Judicature at Madras to set aside the order dated 07-08-2020-2020 passed by Hon'ble Court of Judicature at Madras in W.P.(MD). No. 6319 of 2020. In the above Writ Appeal , the Appellant had contended that M/s. K.S. Wind & Renewables India Private Ltd., Chennai ,who are Respondent No.1 in this case has no locus standi to file the above writ petition for the sole reason that they are the sub -contractor engaged by the Respondent No.6 i.e M/s Nordex India Pvt Ltd, who is not the icensee/successful tenderer of the Government

6. Writ Petition No. 6755 of 2020 filed by Sh. Muthusamy and 20 others before Hon'ble High Court of Judicature at Madras challenging the Min. of Power's guidelines dated 15.10.2015, which inter -alia deals with payment of compensation towards damages in regard to Right of Way for transmission Lines along with subsequent "GOs" of Govt. of Tamil Nadu.

7. Civil Writ Petition No. NIL of 2021 filed by Faridabad Industries Association Vs CERC and other before Hon'ble High Court of Punjab and Haryana at Chandigarh seeking quashing of certain portions of CERC (Sharing of IST charges & Losses.) Regulations, 2020, affecting the Association members.

8. PIL (ST) /1355/2021 filed by Shri Satish Banwarilal Sharma Vs Govt. of India & others regarding privatization of Power Departments /Utilities in UT of Dadra and Nagar Haveli (DNH) & Daman and Diu (DD).

9. Civil W.P No. 1462/2021 filed by MP Power Management Company Ltd. v/s Ministry. of Power, Govt. of India and others before the Hon'ble High Court of Delhi challenging the legal validity of Note 2 of Regulation 55 of CERC (Terms and Conditions of Tariff Regulation), 2019

10. Transfer Petition (Civil) No. 1385 of 2020 filed by M/s Walwahan Renewable Energy

Limited Vs the State of Andhra Pradesh & Others before Hon'ble Supreme Court of India for adjudicating the Writ Appeal No. 383 of 2019 filed by the Petitioner before the Hon'ble High Court of Andhra Pradesh. The core issue raised in this said petition is whether the State Govt. or DISCOM can unilaterally change the terms and conditions of a PPA by reducing the Tariff for Solar Power Generators and Wind Power Generators of the State and also whether the Electricity Regulatory Commission of State can decide on Tariff for projects established under Section 63 of the Electricity Act, 2003.

10.14 Nomination of officers to the following Committees

(i) MoP constituted a group for deepening of Power Market in India in which Chief Engineer (F&CA) was one of the member.

(ii) MoP constituted a Committee for drafting Guidelines & Standard bidding documents for Transmission in which Member (E&C) was Chairman of the committee and Chief Engineer (F&CA) was also member of this Committee.

(iii) CEA constituted a committee to do a detailed field level analysis of the impact of the decision to do away with the requirement of washing of coal wherein Director (F&CA) was one of the member.

(iv) CEA constituted a committee for 'Benchmarking the cost of Tertiary Treatment Plant for STP discharge water and associated pipeline' wherein Director (F&CA) was one of the member.

CHAPTER – 11

POWER DEVELOPMENT IN NORTH-EASTERN REGION

11.1 Hydro-electric Potential in N.E. Region

As per Re-assessment studies carried out by CEA, hydro potential of the North Eastern Region in terms of installed capacity has been estimated as 58971 MW (58356 MW- above 25 MW capacity). Out of the above, 2027 MW (above 25 MW capacity) has been harnessed so far while projects with aggregate capacity of 2000 MW (above 25 MW capacity) are under construction. State-wise identified hydro-electric potential (above 25 MW) of North-Eastern Region and its status of development is given below:

Region / State	Identified potential as per Re-assessment Study (MW)		H. E. Schemes Developed (Above 25 MW)	H.E. Schemes Under Construction (Above 25 MW)
	Total	(Above 25 MW)		
Meghalaya	2394	2298	322	0
Tripura	15	0	0	0
Manipur	1784	1761	105	0
Assam	680	650	350	0
Nagaland	1574	1452	75	0
Ar. Pradesh	50,328	50,064	1115	2000
Mizoram	2196	2131	60	0
Total(NER):	**58,971**	**58,356**	**2027**	**2000**

Region / State	H. E. Schemes Concurred by CEA (MW)	H. E. Schemes Under Examination in CEA (MW)	H. E. Schemes Returned to Project authorities (MW)	H. E. Schemes under S&I (MW)	H. E. Schemes for which S&I is held up (MW)	H. E. Schemes Dropped due to basin study/ other reasons (MW)	H. E. Schemes yet to be allotted for development (MW)
Meghalaya	270	85	0	210	620	210	1312
Tripura	0	0	0	0	0	0	0
Manipur	66	0	0	0	0	1500	936
Assam	120	0	60	0	0	0	185
Nagaland	186	0	0	0	0	0	1272
Ar. Pradesh	15,978	0	6403	588	9980	3998	14999

Mizoram	0	0	0	0	0	460	2076
Total(NER)	**16,620**	**85**	**6463**	**798**	**10600**	**6168**	**20,780**

11.2 Survey & Investigation of Hydro Projects

A Consultation Process has been evolved for Fast Tracking of S&I activities and preparation of Quality DPRs. DPRs of 11 nos. of HEPs with aggregate installed capacity of **5628** MW have so far been prepared in consultation with appraising agencies viz. CEA, CWC, CSMRS and GSI. During the year, DPR of 2 No. of projects with capacity of 1700 MW has been prepared. As on 31.03.2021, 21 No. of schemes aggregating to 10971 MW are under Survey and Investigation in the Country which include 8 Nos. of Pumped Storage Projects (7530 MW).

11.3 Status of development

Hydro Electric Projects being planned in the North Eastern Region are as under:

S. No	Name of Project	Agency	State	Present Status
1	Demwe Lower (1750 MW)	Athena Energy Venture (P) Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 20.11.2009.
2	Dibbin (120 MW)	KSK Dibbin Hydro Power Limited	Arunachal Pradesh	Concurrence accorded by CEA on 04.12.2009.
3	Lower Siang (2700 MW)	Jaiprakash Associates Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 16.02.2010.
4	Nafra (120 MW)	Sew Nafra Power Corporation Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 11.02.11.
5	Nyamjang Chhu (780 MW)	Nyamjang chhu Hydro Power Limited	Arunachal Pradesh	Concurrence accorded by CEA on 24.03.2011.
6	Tawang-I (600 MW)	NHPC Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 10.10.2011.
7	Tawang-II (800 MW)	NHPC Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 22.09.2011.
8	Hirong (500 MW)	Jaiprakash Associates Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 10.04.2013.
9	Etalin (3097 MW)	Etalin H.E. Power Co. Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 12.07.2013.
10	Talong Londa (225 MW)	GMR	Arunachal Pradesh	Concurrence accorded by CEA on 16.08.2013.
11	Naying (1000 MW)	D.S. Construction Ltd	Arunachal Pradesh	Concurrence accorded by CEA on 11.09.2013.
12	Siyom (1000 MW)	Siyota Hydro power Pvt. Ltd	Arunachal Pradesh	Concurrence accorded by CEA on 17.12.13.
13	Dikhu (186 MW)	Naga Manu Power Private Ltd.	Nagaland	Concurrence accorded by CEA on 31.03.14.
14	Kalai-II	Kalai Power Pvt. Ltd.	Arunachal	Concurrence accorded by CEA on

	(1200 MW)		Pradesh	27.03.2015.
15	Kynshi – I (270 MW)	Athena Kynshi power Pvt.Ltd.	Meghalaya	Concurrence accorded by CEA on 31.3.2015.
16	Heo (240 MW)	Heo Hydro Power Pvt. Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 28.07.15.
17	Tato-I (186 MW)	Siyota Hydro Power Pvt. Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 28.10.15.
18	Lower Kopili (120 MW)	Assam Power Generation Corporation Ltd.	Assam	Concurrence accorded by CEA on 24.05.2016.
19	Loktak Downstream (66 MW)	Loktak Downstream Hydroelectric corporation limited	Manipur	Concurrence accorded by CEA on 05.05.2017.
20	Dibang (2880MW)	NHPC Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 18.09.2017.
21	Attunli (680 MW)	Attunli H.E. Power Co. Ltd.	Arunachal Pradesh	Concurrence accorded by CEA on 15.03.2018.
22	Wah-Umiam Stage-III (85 MW)	NEEPCO	Meghalaya	DPR is under examination in CEA.
23	Ranganadi St-II 130MW)	NEEPCO	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
24	Karbi Langpi (U. Borpani) (60 MW)	Assam State Electricity Board	Assam	DPR was returned to developer for re-submission after tying-up of requisite inputs.
25	Yamne St-II (84 MW)	SS Yamne Energy Ventures Private Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
26	Pemashelphu (90 MW)	Mechuka Hydro Power pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
27	Sissiri (100 MW)	Soma Sissiri Hydro Pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
28	Gimliang (80 MW)	SKI Pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
29	Raigam (141 MW)	SKI Pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
30	Kangtang Shiri (80 MW)	Kangtang Shiri Hydro Project Pvt. Ltd	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
31	Nyukcharang Chu (96 MW)	Sew Energy Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
32	Magochu (96 MW)	Sew MagoChu Power Corporation Limited	Arunachal Pradesh	DPR was returned and all the partial clearances issued till date were rescinded as no progress has been made by the Developer towards resolving the issues pending with various appraising groups.
33	Subansiri	Kamala HECL	Arunachal	DPR was returned and all the partial

	Middle (Kamala) (1800 MW)	(Jindal Power Ltd.)	Pradesh	clearances issued till date were rescinded as no progress has been made by the Developer towards resolving the issues pending with various appraising groups.
34	Hutong- II (1200 MW)	Mountain Fall India Pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
35	Kalai-I (1352 MW)	Mountain Fall India Pvt. Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
36	Demwe (Upper) (1080 MW)	Athena Energy Venture (P) Ltd.	Arunachal Pradesh	DPR was returned to developer for re-submission after tying-up of requisite inputs.
37	Tagurshit (74 MW)	Larsen & Toubro Arunachal Hydro power Ltd.	Arunachal Pradesh	Developer vide letter dated 28.08.2018 informed that the company has decided not to go ahead with implementation of the project. In view of this, CEA returned the DPR vide its letter dated 20.06.2019 as the scheme is no more under consideration for CEA's concurrence

11.4 Status of Under Construction Hydro Power Projects in North Eastern Region including Sikkim:

11.4.1 Central Sector Projects

NEEPCO Project (Hydro)

Kameng HEP (4 x 150 = 600 MW), Arunachal Pradesh

Kameng H.E. Project is located in West Kameng District of Arunachal Pradesh with an installed capacity of 4x150 MW. The project is being executed by NEEPCO Ltd. The project envisages utilization of flows of Bichom & Tenga rivers (both tributaries of river Kameng) at a head of about 500 m available in an U – bend of the river, downstream of confluence of river Bichom with Kameng. The TEC was accorded by CEA on 11.10.1991 & revised TEC in 31.10.2003. The CCEA clearance was accorded on 02.12.2004. The approved cost of the project is Rs. 2496.90 crores (March, 2003 price level). The design annual energy is 3353 GWh in a 90% dependable year. The environmental and forest clearance was obtained on 29.03.2001 & 03.8.2000 respectively. The proposed revised cost of the project is Rs. 6179.96 crores (Sept. 2018 price level).

The project envisages construction of 2 nos. concrete gravity dams i.e. Bichom Dam and Tenga Dam, Head Race Tunnel, surge shaft, and surface power house having vertical Francis Turbines for 4 units of 150 MW each.

All major civil works related to commissioning of project completed. Erection of Radial Gates of Bichom Dam completed. All Units Boxed up. Leakage observed in penstocks during water filling in March'18. Rectification Work in Penstock-I and II is complete.

Unit-I & II were commissioned in Feb 2020. Unit-III & IV were commissioned in January 2021 and February 2021 respectively.

NHPC Projects (Hydro)

(i) Subansiri Lower HEP (8x250 = 2000 MW), Arunachal Pradesh

The project is located in the districts Lower Subansiri/Dhemaji in Arunachal Pradesh/Assam on river Subansiri. The project was Techno-Economically cleared by CEA on 13.01.2003. The CCEA clearance was accorded on 09.09.2003 for an estimated cost of Rs. 6285.33 crores with the schedule commissioning of the project in September, 2010. The design energy is 7421.59 Gwh. The anticipated cost of the project is Rs. 19992.43 crores at January-2020 price level.

The Project envisages construction of concrete gravity dam, horse shoe type head race tunnels, circular steel lined pressure shaft and surface power house having Francis turbine driven 8 nos. generating sets of 250 MW each.

Major civil works have been awarded to M/s. BGS-SGS-Soma Joint Venture and Larsen & Toubro Ltd. Chennai on 19.12.2003. E&M works has been awarded to Consortium of M/s Alstom Power Hydraulique, France and Alstom Projects India Ltd. New Delhi on 11.02.2005. Hydro-Mechanical Package awarded to Texmaco on 19.06.2006.

River diverted on 25.12.2007. Civil works of Dam, HRT, surge tunnel, pressure shaft, Power House etc. were in progress. All work except safety works were stalled from December, 2011 to September, 2019 due to agitation launched by various activists against construction of Subansiri Lower HE Project and as per directions of NGT. Works restarted w.e.f. 15.10.

2019 after clearance from NGT. However, work initially remained suspended w.e.f. 24.03.2020 to 20.04.2020 due to COVID -19 lockdown and further got affected due to Monsoon Period from May 2020.

Power House Civil works package has been awarded to M/s Patel Engineering Ltd on 01.09.2020.The project is planned to be commissioned in FY 2023-24

(ii) Teesta-VI HEP (4x125=500 MW), Sikkim

The project is located in South Sikkim district of Sikkim state on river Teesta. The project was Techno-Economically cleared by CEA on 27.12.2006 to M/s Lanco Teesta Hydro Power Ltd (LTHPL), at an estimated cost of Rs 3283.08 Crs. The project envisages construction of 23.5m high Barrage, 2 nos. of HRT of 9.5m diameter and 11.8 Km long, 4 nos. Pressure shaft each of 5.40m dia and Power House to generate 2441 MU.

Major Civil works were awarded to M/s Lanco Infrastructure Ltd in March, 2007 and E&M works to M/s Alstom Projects, India in April, 2009. About 50% projects works were completed till March, 2014. Since April 2014, project was stalled due to financial crunched with the developer.

Accordingly, the Corporate Insolvency Resolution Process (CIRP) was initiated vide order dated 16.03.2018 of Hon'ble NCLT, Hyderabad Bench. In the Bidding process, NHPC emerged as successful bidder for acquisition of LTHPL. Subsequently, the investment proposal for an estimated cost of Rs 5748.04 crore (Jul'18 PL), which includes Bid amount of Rs 907 crore for acquisition of LTHPL; was approved by the CCEA on 08.03.2019 for investment, acquisition of M/s LTHPL and execution of balance works of Teesta-VI HE Project by NHPC.

Regarding, tendering, LOT-I (Civil works of Barrage, Desilting Basins, SFT, Intake, Part of HRT-I & HRT-II and other associated structure) awarded to M/s. Jaypee Associate Ltd on 31.03.2020 and LOT-II (Civil works of Part of HRT-I & HRT-II, Surge shaft, Pressure shaft, Powerhouse, TRT & other associated structure) awarded to M/s. Gammon Engineers on 15.03.2020. HM and E&M works were awarded on 27.10.2020 and 14.12.2020 respectively. The Project is expected to be commissioned by March 2024.

(iii) Rangit-IV HEP (3x40=120 MW), Sikkim

The project is located in West Sikkim district of Sikkim state on river Rangit. The project was Techno-Economically cleared by CEA on 06.07.2007 to M/s Jal Power Corp. Ltd (JPCL), at an estimated cost of Rs 726.16 Crs with the schedule commissioning of the project in January, 2012. The design energy is 513 Gwh. The revised cost of the project is Rs. 1692.60 crores at Jun-2016 price level. The project envisages construction of 44m high and 112.95m long Dam, 1 no. of HRT of 6.40m diameter and 6.453 Km long, Surge Shaft 16m dia and 57m height,1 no. Pressure shaft of 5.50m dia and 241m long.

Major Civil works were awarded to M/s Coastal Project Pvt. Ltd in Nov, 2007 and E&M works to M/s Andritz, India in Aug, 2009. About 50% projects works were completed till Oct, 2013. Since Nov. 2013, project was stalled due to financial crunched with the developer. The project Lenders file application in court of Hon'ble National Company Law Tribunal (NCLT), on 24th April, 2018. Last hearing of NCLT held on 29.03.2019 and order pronounced on 9.04.2019. As per the order, IRP has been appointed. NHPC Ltd. submitted EOI on dated 08.07.2019 and was shortlisted under final list of Prospective Resolution Applicants

on dated 23.08.2019. The Resolution Plan submitted by NHPC on 04.12.2019.

The Resolution Plan Approval Application was listed for hearing on 17.02.2020 before NCLT, Hyderabad ("Tribunal"). Final hearing was held on 31.07.2020. Investment approval for acquisition of M/s Jal Power Corporation Ltd. and construction of balance works of Rangit-IV by NHPC was conveyed to NHPC by MoP on 30.03.2021. The project has been awarded to NHPC. Award of works is under process.

11.4.2 Private Sector Projects

i) Bhasmey HEP (3x17=51 MW), Sikkim

The project is located in East Sikkim district of Sikkim state on river Rangpo/Teesta. The project was Techno-Economically cleared by CEA on 24.12.2008 to M/s Gati Infrastructure Pvt. Ltd (GIPL), at an estimated cost of Rs 408.50 Crs with the schedule commissioning of the project in June, 2012. The design energy is 244.10 Gwh. The revised cost of the project is Rs. 746.01 crores at Mar.-2018 price level. The project envisages construction of 42m high and 150m long Barrage, 1 no. of HRT of 5.0m diameter and 5.463 Km long, Surge Shaft 13m dia and 97.5m height, Pressure shaft of 3.4m dia and 465m length.

Major Civil works were awarded to M/s Simplex Infrastructure Ltd in April, 2010. About 30% projects works were completed till Aug., 2016. Since September, 2016, project was stalled due to financial crunched with the developer.

ii) Rangit-II HEP (2x33=66 MW), Sikkim

The project is located in West Sikkim district of Sikkim state on river Rimbi. The project was approved by State Govt. on 15.04.2008 to M/s Sikkim Hydro Power Ventures Ltd (SHPVL), at an estimated cost of Rs 496.44 Crs with the schedule commissioning of the project in the year 2017-18. The design energy is 272 Gwh. The project envisages construction of 47m high and 145m long Dam, 1 no. of HRT of 2.9m diameter and 4.745 Km long, Surge Shaft 10m dia and 65.5m height,1 no. Pressure shaft of 1.7m dia and 592m long.

Major Civil works were awarded to M/s Coastal Project Pvt. Ltd in Dec, 2011 and E&M works to M/s Gammon India Ltd. in Mar., 2012. About 30% projects works were completed till Nov, 2017. Since Dec. 2017, project was stalled due to financial crunched with the developer. The project is in NCLT since 30th July, 2020.

iii) Rongnichu HEP (2x48=96 MW), Sikkim

The project is located in East Sikkim district of Sikkim state on river Rongnichu. The project was Techno-Economically cleared by State Govt. on 01.10.2008 to M/s Madhya Bharat Power Corp. Ltd (MBPCL), at an estimated cost of Rs 491.32 Crs with the schedule commissioning of the project in the year 2015-16. The design energy is 383.87 Gwh. The revised cost of the project is Rs. 1453.34 crores at Mar.-2019 price level. The project envisages construction of 14m high and 120m long Barrage, 1 no. of HRT of 4.0m diameter and 12.3 Km long, Surge Shaft 10m dia and 85m height,1 no. Pressure shaft of 3m dia and 415m long.

Major Civil works were awarded to M/s Sew Infrastructure Ltd. in April, 2010 and re-awarded to M/s Moshvaraya Infrastructure Ltd. in Sept.,14 & Jan.,15. E&M works to M/s Voith Hydro Power Pvt. Ltd. in Sept, 2011 and re-awarded to M/s Litostroj Power (Turbine & Auxiliaries) & M/s Electric System Hungary Zrt. (Generator & Auxiliaries) in Feb., 2017. Project works are going smoothly & overall

about 97% project works were completed till Oct, 2020. Rongnichu HEP, which was programmed to be commissioned in 2020-21 has been slipped to 2021-22 and the project is likely to be completed by May, 2021.

Further, the capacity of Ronginichu HEP has been enhanced from 96 MW to 113 MW.

iv) Panan HEP (4x75=300 MW), Sikkim

The project is located in North Sikkim district of Sikkim state on river Toling Chu/Rangyong Chu. The project was Techno-Economically cleared by CEA on 07.03.2011 to M/s Himgiri Hydro Energy Pvt. Ltd (HHEPL), at an estimated cost of Rs 1833.05 Crs with the schedule commissioning of the project in July, 2015. The design energy is 1147.82 Gwh. The revised cost of the project is Rs. 2615.00 crores at 2018 price level. The project envisages construction of 115m high and 126m long Dam, 1 no. of HRT of 6.0m diameter and 9.549 Km long, Surge Shaft 15m dia and 102m height,2 nos. Pressure shaft of 3.4/2.4m dia and 707.40241m long.

Major Civil works were awarded to M/s Essar Project (India) Ltd in Feb, 2014 and E&M works yet to be awarded. About 5% projects works were completed till date.

Starting of civil construction works is held up for want of the National Board of Wild Life (NBWL) clearance. On dismissal of the case in NGT on 21.08.17, the developer has made an application to PCCF cum-Secretary, Forests, Environment & Wild Life Management Department for grant of NOC, in National Board for Wildlife (NBWL) angle. Review petition is filed against the final judgement. NOC is awaited, once the review petition is adjudicated. In view of the new hydro policy announced by Ministry of Power, GOI, which will help in convincing the investors to release the funds to start the project works wherever possible once GoS takes a decision on issuance of NBWL clearance and draining of Mantham Lake or alternative road to the Upper Dzongu/ Dam site. About 48 months will be required for completion of the project after restart of works.

11.5 Status of Various Hydro Power Projects in North-Eastern Region Appraised by CEA

11.5.1 DPR appraisal/ Concurrence

(i) Attunli HE Project (4x170 = 680MW) in Ar. Pradesh by M/s AHPCL

The project is proposed as a RoR scheme on Tangon river located in Dibang Valley district of Arunachal Pradesh having an underground powerhouse 4x170 MW units driven by Francis type turbine. The project is envisaged to generate 2796 MU annually. Attunli H.E. Project was accorded concurrence by CEA on 15.03.2018 at an estimated completed cost of ₹6111.28 crores.

11.5.2 Revised Cost Estimates

(i) Tuirial HEP (2x30=60 MW), Mizoram, NEEPCO

The project was cleared by CEA in July, 1998 at an estimated cost of ₹368.72 crores with likely completion by 2006-07. Project was to be financed substantially under Loan assistance of 11,695 Million Japanese Yen from Japan Bank of International Co-operation (JICA). This project was under execution and subsequently put on hold since June, 2004 due to poor law & order conditions and agitation by claimants of crop compensation.

Continuation or otherwise of the project was reviewed due to increase in the project cost and resumption of work was dependent upon viability of the project. CEA on 3.11.05 informed MOP that the present day cost of the project at October 2004 price level was likely to

be ₹687.80 crores (including IDC of ₹ 40.05 crores and financing charges ₹ 0.16 crores). The first year tariff at this cost being ₹ 3.69/Kwh., project at this cost/tariff appeared unviable. In the meantime, JICA discontinued loan and requested for prepayment of entire outstanding amount.

Efforts were made to revive the project and the revised cost estimates were vetted by CEA a number of times and lastly vetted on 26.4.10 for the Hard cost of ₹ 877.06 crores at March, 10 P.L. PIB meeting was held on 4th June 2010 which recommended the project for CCEA approval.

CCEA approval was accorded to the project on 14.01.2011 for ₹913.63 crores including IDC of ₹36.57 crores at March, 2010 Price Level. The financial pattern of ₹913.63 crores comprises of (i) Equity of ₹ 137.04 Crs. (ii) Loan from financial institutions amounting to ₹ 184.63 crores (iii) Subordinate loan from Govt. of India amounting to ₹ 291.96 crores and (iv) Grant from DoNER amounting to ₹300 crores.

Cost estimates at completion level, submitted by NEEPCO, was vetted by CEA amounting to ₹1244.15 crores (Total project Cost) vide CEA letter dated 08.04.2019.

(ii) Pare HEP (2x55=110 MW), Arunachal Pradesh, NEEPCO

Pare HEP was accorded concurrence by CEA on 24th Sept. 2007 for an estimated cost of ₹553.25 crores including IDC & FC of ₹49.26 crores at June 2007 Price Level.

CCEA approval was accorded to the project on 04.12.2008 for ₹573.99 crores including IDC of ₹67.66 crores and FC of ₹0.40 crores at June, 2007 Price Level. The completion cost considering 44 months as construction period is estimated as ₹674.45 crores including IDC as ₹76.52 crores and FC as ₹0.47 crores.

Cost estimates at completion level, submitted by NEEPCO, was vetted by CEA amounting to ₹1640.31 crores (Total project Cost) vide CEA letter dated 25.02.2019.

(iii) Subansiri Lower (8x250=2000 MW), Arunachal Pradesh, NHPC

Subansiri Lower HE Project located in Lower Subansiri District of Arunachal Pradesh was accorded concurrence of CEA on 13.01.2003 for an estimated cost of ₹ 6608.68 Crores including IDC and FC of Rs705.58 Crores at December, 2002 price level.

CCEA approval was accorded to the project on 9.09.2003 for ₹6285.33 Crores including IDC and FC of ₹ 670.92 Crores at December, 2002 price level.

Memorandum of Changes (MoC) has been approved by CEA vide letter dated 15.03.2018. Revised cost estimates at April, 2017 price level, submitted by NHPC, was vetted by CEA amounting to ₹10601.16 crores (Total Hard Cost) vide CEA letter dated 18.07.2019.

(iv) Dibang (12x240=2880 MW), Arunachal Pradesh, NHPC

Dibang HE Project located in Lower Dibang Valley District of Arunachal Pradesh was accorded concurrence of CEA on 18.09.2017 for an estimated cost of ₹ 25732.79 Crores (including IDC and FC) at July, 2016 price level.

Revised cost estimates at October, 2019 price level, submitted by NHPC, was vetted by CEA amounting to ₹29839.34 crores (including IDC & FC) vide CEA letter dated 22.05.2020.

(v) Loktak Downstream (2x33= 66 MW), Manipur, LDHCL

Loktak Downstream HE Project located in Tamenglong District of Manipur was accorded

concurrence of CEA on 05.05.2017 for an estimated cost of ₹ 1352.77 Crores (including IDC and FC) at February, 2015 price level.

Revised cost estimates at July, 2020 price level, submitted by LDHCL, was vetted by CEA amounting to ₹1311.05 crores (including IDC & FC) vide CEA letter dated 28.12.2020.

11.5.3 CEA concurred Projects, yet to be taken under construction.

(A) Central Sector Projects

(i) Loktak Down Stream (66 MW), Manipur, LDHCL

The project to be executed by NHPC, was cleared by CEA for an Installed Capacity of (3x30=90 MW) on 31.12.1999.

The project is now proposed to be executed by a Joint Venture between NHPC and Government of Manipur with revised capacity of 66 MW. CEA accorded concurrence on 15.11.2006 to the revised proposal with reduced capacity of 66MW. MoU and Promoters' Agreement for implementation of the project on joint venture basis were signed by Govt. of Manipur with NHPC on 14.9.2007 and 26.9.2008 respectively. Concurrence was transferred from NHPC to LHDC on 06.08.2012.

Environment clearance was accorded by MoEF&CC on 16.01.2013. In- principle forest clearance stage-I was accorded by MOEF&CC on dated 03.03.11 and Forest clearance Stage–II accorded on 22.12.2014.

The revised DPR submitted by NHPC for fresh concurrence has been concurred by CEA on 05.05.2017 at estimated present day cost of ₹1352.77 crores (including IDC&FC) at February, 2015 price level.

(ii) Tawang H.E Project St-I (3x200= 600 MW) in Ar. Pradesh by NHPC Ltd.

Project was accorded concurrence by CEA on 10.10.2011 at an estimated cost of ₹4824.01 Crores (including IDC & FC) at May, 2010 price level.

Environment clearance was accorded on 10.06.2011. Forest clearance Stage-I & II yet to be obtained.

(iii) Tawang H.E Project St.-II (4x200=800 MW) in Ar. Pradesh by NHPC Ltd.

The project was concurred by CEA on 22.9.2011 at an estimated cost of ₹ 6112.3 crores (including IDC & FC) at May, 2010 price level.

Project was accorded environment clearance on 10.06.2011. MoEF&CC vide letter dated 08.01.2014 has accorded Forest Clearance (Stage- I) for diversion of 116.62 ha forest land for the project. Forest clearance stage-II yet to be obtained.

(iv) Dibang Multipurpose Project (12x240= 2880MW)-Arunachal Pradesh

Dibang MPP was accorded concurrence by CEA with IC of 3000 MW on 23.1.2008.

Environment clearance was accorded on 19.05.2015. MoEF&CC accorded Forest Clearance Stage – I on 15.4.2015 with a condition to reduce Dam height by 10 m in order to reduce the submergence area necessitating fresh DPR to be prepared by developer. FC-II accorded on 12.03.2020.

The fresh DPR submitted by NHPC (with 10m reduction in height of Dam) was concurred by CEA on 18.09.2017 at estimated cost of ₹25732.79crores (July, 2016 price level) including Power Component of ₹17510.84 crores, Flood Moderation component ₹4627.8 crores.

(B) State Sector Projects

(i) Lower Kopili HE Project (2x55+1x5+2x2.5 = 120MW) in Assam by M/s APGCL

Lower Kopili H.E. Project was accorded concurrence by CEA on 24.5.2016 at an estimated completed cost of ₹ 1115.91 Crores.

Project was accorded environment clearance on 04.09.2019. FC- I accorded on 05.02.2019 and Fc-II yet to be obtained.

(C) Private Sector Projects

i) Demwe Lower HE Project (5x342 + 1x40=1750 MW), Arunachal Pradesh by M/s ADPL

Demwe Lower HE Project was accorded concurrence by CEA on 20.11.2009 for an estimated cost of ₹ 13144.91 Crores (Completion Cost).

MoEF&CC has accorded Environmental clearance to the project on 12.2.10. Forest clearances stage-II has been accorded on 03.05.2013. As per NGT order dated 24.10.2017, NBWL issue to be reconsidered by MoEF&CC.

ii) Lower Siang HE Project (9x300=2700 MW), Ar. Pradesh by M/s JAPL

Lower Siang HE Project was accorded concurrence by CEA on 15.02.2010 for an estimated cost of ₹ 19990.74 Crores (Completion Cost).

Environment clearance & Forest clearance are yet to be obtained.

iii) Nafra H.E. Project (2x60=120 MW) - Arunachal Pradesh by M/s SEW Nafra Power Corporation Private Limited

Nafra H.E. Project was accorded concurrence by CEA on 11th Febuary, 2011 at an Estimated completed cost of 848.22 Crores including IDC & FC of 106.60 Crores and 5.94 Crores.

Project was accorded environmental clearance by MOE&F on 17.01.2011 and Forest clearance in June, 2012. PPA yet to be signed. Thereafter Financial agreement to be made to resume works.

iv) Hirong HE Project (4x125 =500MW) in Arunachal Pradesh by M/s JAPL

Hirong H.E. Project was accorded concurrence by CEA on 10th April, 2013 at an estimated completed cost of ₹ 5532.63 Crores.

Environment clearance and Forest clearance are yet to be obtained. EIA/EMP report being revised as per Siang BSR. However, as per MoEF&CC, matter of FC is closed vide letter dated 02.12.2015**.**

v) Etalin HE Project (10x307+ 1x9.6+ 1x7.4 = 3097MW) in Arunachal Pradesh By M/s EHEPCL

Etalin H.E. Project was accorded concurrence by CEA on 12th July, 2013 at an Estimated completed cost of ₹ 25296.95 Crores.

Environment clearance recommended by EAC on 31.01.17. Letter will be issued after Forest clearance stage-I.

Forest clearance stage-I & II are yet to be obtained.

vi) Talong Londa HE Project (3x75 = 225MW) in Arunachal Pradesh By GMR

Talong Londa H.E. Project was accorded concurrence by CEA on 16th Aug, 2013 at an estimated completed cost of ₹2172.88 Crores.

Environment clearance accorded on 07.08.15.

Forest clearance stage-I& II are yet to be obtained.

vii) Naying HE Project (4x250 =1000MW) in Arunachal Pradesh By NDSCPL

Naying H.E. Project was accorded concurrence by CEA on 11th Sept, 2013 at an estimated completed cost of ₹ 9301.11 Crores.

Environment clearance and Forest clearance are yet to be obtained. Environment clearance is linked with Siang Basin Study Report. MoEF&CC stated that developer needs to apply afresh for EC online as old proposal is not valid anymore

viii) Kalai – II HE Project (6x200 = 1200MW) in Arunachal Pradesh By KPPL

Kalai – II H.E. Project was accorded concurrence by CEA on 27th March, 2015 at an estimated completed cost of ₹ 14199.64 Crores.

Environment clearance has been accorded on 20.05.2015. Forest clearance Stage -I&II are yet to be obtained.

ix) Kynshi-I HE Project (2x135 = 270 MW) in Meghalya by M/s AKPPL

Kynshi-I H.E. Project was accorded concurrence by CEA on 31st March, 2015 at an estimated completed cost of ₹3154.37 Crores.

Environment clearance and Forest clearance are yet to be obtained.

x) Heo HE Project (3x80 = 240MW) in Ar. Pradesh by M/s HHPPL

Heo H.E. Project was accorded concurrence by CEA on 28.07.2015 at an estimated completed cost of ₹ 1614.35 Crores.

Environmental Clearance accorded on 10.11.15. Forest clearance stage-I accorded on 27.10.15. Forest clearance stage-II yet to be obtained.

xi) Tato – I HE Project (3x62 = 186MW) in Ar. Pradesh by M/s SHPPL

Tato – I H.E. Project was accorded concurrence by CEA on 28.10.2015 at an estimated completed cost of ₹1493.55 Crores.

Environmental Clearance accorded on 10.11.15. Forest clearance stage-I accorded on 27.10.15. Forest clearance stage-II yet to be obtained.

xii) Attunli HE Project (4x170 = 680MW) in Ar. Pradesh by M/s AHPCL

Attunli H.E. Project was accorded concurrence by CEA on 15.03.2018 at an estimated completed cost of ₹ 6111.28 Crores.

Environmental Clearance and Forest clearance are yet to be obtained.

xiii) Dikhu HE Project (3x62= 186 MW) in Nagaland by M/s NMPPL

Dikhu H.E. Project was accorded concurrence by CEA on 31.03.2014 at an estimated completed cost of ₹1994.74 Crores.

Environmental Clearance yet to be obtained. FC not applicable as forest land is not involved.

Note: Umngot H.E. Project has been removed from the list under the point no. 11.3 as the State Government cancelled Memorandum of Understanding signed b/w Govt. of Meghalaya and M/s. JP Power Ventures Limited for implementation of Umngot HE Project because of unexplained delay in execution by the developer.

11.6 Development of Transmission System in N.E. Region

11.6.1 Examination of Detailed Project Reports (DPRs) for transmission system of Hydro Power Projects as part of concurrence by CEA

Following DPRs of hydropower projects examined as part of concurrence by CEA

i) Examination and vetting of revised updated cost estimates of Dibang Multi-Purpose Project (2880 MW) in Arunachal Pradesh by M/s. NHPC Ltd

11.6.2 Examination of DPR/FR of Transmission Works for processing of clearance by CEA

NIL

11.7 Grant of prior approval of Government to transmission proposals under Section 68 of Electricity Act, 2003 during 2020-21.

(a) To M/s POWERGRID for "LILO of Palatana - Surajmaninagar (ISTS) 400kV D/c line at 400/132kSurajmaninagar (TSECL) S/s" on 27.10.2020

11.8 Grant of authorization to transmission proposals for Section 164 of Electricity Act, 2003 during 2020-21

NIL

Standing Committee/ NERPC (TP) meetings held during 2020-21:

2nd meeting of North Eastern Region Power Committee (Transmission Planning) (NERPCTP) held on 25th September 2020.

The transmission systems discussed in the meeting are given in **Annexure – 11(A)**

11.9 Hydro Power Generation Performance

Hydro Power generation during the year 2020-21 (as on 31.03.2021) in the North Eastern Region was 5.85 BU against a target of 6.37 BU, which is about 8.16 % less.

11.10 R&M Schemes (Hydro) of North Eastern Region

Thirteen (14) existing hydro schemes of North Eastern Region with an aggregate installed capacity of 849 MW have been identified for R&M works to accrue a benefit of 542 MW. The R&M activities of eight (8) schemes have already been completed at an actual expenditure of about Rs. 259 Crores to accrue a benefit of 121 MW. The remaining six (6) schemes having an aggregate installed capacity of 490 MW are under various stages of implementation and are likely to accrue a benefit of 421 MW at an estimated cost of about Rs. 1975 Crores. The scheme-wise status of the R&M works of the hydro schemes of North Eastern Region **as on 31.03.2021** is given hereunder:

A. Schemes Completed

S. No.	Name of Scheme, Agency, State	Installed Cap. (MW)	Actual cost (Rs. Crs.)	Benefits (MW)	Status
1.	Khandong, U-1, NEEPCO, Meghalaya	1x25	0.62	25 (Res.)	U-1 Restoration works completed in 1991-92
2.	Gumti, TPGL, Tripura	3x5	17.50	-	R&M works completed in 1994-95
3.	Khandong, NEEPCO, Meghalaya	2x25	3.35	-	R&M works completed in 2003-04
4.	Umium St.I, MePGCL, Meghalaya	4x9	84.21	36 (LE)	RM&LE works completed in 2002-03
5.	Loktak, NHPC, Manipur	3x30 (Derated)	17.88	15(Res.)	R&M works completed in 2011-12
6.	Umium St.II, MePGCL, Meghalaya	2x9	55.67	18(LE) + 2 (U)	R&M works completed in 2011-12
7.	Kopili, NEEPCO, Assam	2x50	50.92	-	R&M works completed in 2014-15
8.	Khandong, NEEPCO, Assam	1x25	29.18	25(LE)	R&M works completed in 2014-15
	Sub Total(A)	**359**	**259.33**	**121**	

B.Ongoing–Under Implementation

S. No	Name of Scheme, Agency, State	Installed Cap. (MW)	Est. cost (Rs. Crs.)	Benefits (MW)	Status
9	Khandong Power Station, NEEPCO, Meghalaya	2x25	196.7	50(LE)	Detailed engineering on the finalized scope of works the works is in progress. R&M works planned for completion in 2024-25. 6. Petition to CERC submitted in the month of August 2020 for obtaining approval for R&M proposal.
10	Kopili Power Station, NEEPCO, Meghalaya	4x50	1117	200(LE)	DPR under preparation.
11	Kyrdemkulai (Umium St.III), MePGCL, Meghalaya	2x30	408	60(LE) + 6(U)	Bids have been opened and approval from the concerned authority is awaited.
12	Gumti, TPGL, Tripura	3x5	17.50*	-	DPR for life extension is under preparation.
13	Loktak, NHPC, Manipur	3x35	236.07	105 (LE)	CERC has approved the proposal of R&M works.. R&M works planned for completion in 2022-23. E&M, H&M and Civil packages under tender evaluation.
14	Umiam-Umtru Stage-IV, MePGCL, Meghalaya	2x30	-	-	RLA studies to be taken up. R&M works planned for completion in 2022-27 period.
	Sub Total(B)	**490**	**1975.27**	**421**	
	Total(A+B)	**849**	**2,234.6**	**542**	

*Tentative

Abbreviations: MW – Mega Watt; Res. – Restoration; U – Uprating; LE – Life Extension

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CHAPTER-12

HUMAN RESOURCE DEVELOPMENT

12.1 Training of Manpower in CEA

Human Resource is essential for carrying out any business or service by an organization and the same is required to be developed through technical, managerial and behavioral training. Keeping this in view, HRD Division of CEA has been organizing various training programmes in technical, managerial, IT, health and other areas to keep officers abreast of the latest technological developments as well as to bring about attitudinal changes. HRD Division has also been making efforts to keep stock of the infrastructure available for the development of human resources in the Power Sector. To fulfill its statutory duty under Central Electricity Authority (measures relating to safety and electric Supply) Regulations 2010, CEA has been assessing the Power Sector training institutes for their evaluation in terms of infrastructure, utilization and quality of training programmes and facilitate CEA's accreditation for them in line with the CEA Guidelines for Recognition for Training Institutes for Power Sector. CEA has been advising /recommending various measures to the training institutes/Power Sector organizations for improvement in the training infrastructure and methodologies for enhancing the skills and productivity of the personnel.

12.2 Training Policy for Central Power Engineering Service (CPES) officers of CEA

Training Policy for technical Group A & B officers of CEA has been prepared and approved by CEA. The same has been sent to Ministry of Power. This policy broadly covers the various training needs for officers of all levels in CEA. The broad objectives of the Training Policy are as under: -

- To enable CPES officers of CEA to discharge their functions effectively.

- To provide practical exposure to the CPES officers in the area of construction and Operation & Maintenance (O&M) of various types of Power Plants as well as Transmission & Distribution facilities, Grid Operation, Tariff related issues, Power Market etc. which would enhance their technical competencies.

- To enable the officers to draw plans, advise and monitor Power Sector projects with the strong background knowledge/experience of the sector.

- To familiarize the officers with the best practices in the application of advanced technologies in Power Sector.

- To develop and enhance the capabilities in the CPES officers to deal with rapid developments and challenges encountered by the Power Sector from time to time.
- To enhance the managerial competencies of the officers to enable them to play a leading role in the Power Sector so that the management can channelize the expertise of CEA officers in an effective manner.

12.3 Induction Training programme

Induction Training programme is being organized for newly recruited Assistant Directors of the CEA. Induction Training of 5th Batch comprising of 25 nos. of Assistant Directors of CEA for a duration of 26 weeks started from 15th February, 2021. Under this training programme the officers have under gone classroom training at National Power Training Institute (Faridabad), Plant visits and On-Job Training at various generation, transmission and distribution facilities in Power Sector This training is intended to give the officers an immense theoretical and practical exposure to the latest technology and trends in the Power Sector. Ministry vide letter 31-7/9/2019-T&R dated 10.06.2019 has proposed to develop NPTI as Cadre Training Institute for training of Engineers/Officers of CEA.

12.4 Refresher Training Programmes in India

Various refresher training programmes for CEA officers were conducted at professional institutes of national and international repute like CBIP, ISTM, CIGRE, FICCI and IEEE. The officers/officials were deputed for various in-service refresher/Domestic training programmes, technical courses, workshops, seminars, conferences etc. at above institutes. The Man-days for all refresher training programmes conducted during the financial year 2020-21 are 40.

12.5 Foreign Visits/Training programmes for CEA Officers

The CEA officers were deputed to the Foreign visits/ training programmes to give them exposure to technological trends in the developed countries. During the period of 2020-21, a total of 02 nos. officers of CEA at various levels visited foreign nations under 01 programme. The details of the foreign visits undertaken by the CEA officers is as follows:-

Sl. No	Purpose of the Visit	Name & Designation of the Officer	Country	Duration of Visit
1.	Renewable Energy Integration in Power Systems arranged by DTU (Technical University of Denmark) Electrical Engineering, Elektrove, Lyngby, Denmark	1. Shri Awdesh Kumar Yadav Director, PSP&A-I 2. Shri Saurabh Mishra Deputy Director, NPC	Denmark	26.10.2020 To 27.11.2020

12.6 Training under Apprentice Act, 1961(Amendment rules 2015)

As per Apprentice Act 1961, (amendment rules 2015), Apprenticeship Training is being imparted at CEA to Graduate/Diploma Engineers. As per the requirement of the Board of Apprentice Training (BOAT), six modules namely Planning of Power sector, Thermal Power Projects, Hydroelectric Power Project, Power System Planning, Power Grid Operation and Power Distribution System were developed and the Apprenticeship Training is being imparted as per these modules. During the year 2020-21, due to COVID-19, no apprentice trainee has joined under the Apprentice Act 1961.

12.7 Summer Training/ Winter Training

During the financial year 2020-21, summer and winter training were given to 23 number students from reputed institutes in CEA.

12.8 In-house Presentations

In house presentations are arranged by various industries/organizations in CEA to keep CEA officers abreast of the latest technologies. During the year 2020-21, no technical presentations were arranged due to Covid-19.

12.9 Recognition of Training Institutes

To fulfill its statutory duty under Central Electricity Authority (measures relating to safety and electric Supply) Regulations 2010, CEA has been assessing the Power Sector training institutes for their evaluation in terms of infrastructure, utilization and quality of training programmes and facilitate CEA's accreditation for them in line with the CEA Guidelines for Recognition for Training Institutes for Power Sector. CEA has been advising /recommending various measures to the training institutes/Power Sector organizations for improvement in the training infrastructure and methodologies for enhancing the skills and productivity of the personnel.

During the period 2020-21, the following 06 nos. training institutes/Centers were visited and assessed for recognition: -

S.No	Name of the Institute
1	Engineering Staff College of India (ESCI), Hyderabad 19.09.2020
2	EDC- PGCIL Hyderabad 20.09.2020
3	L&T Power Training Institute (LT-PTI), Vadodara Gujarat 26.11.2020
4	Training Centre, Torrent Power Ltd, Ahmedabad Gujarat 15-16.02.2021
5	PSTI/NPTI Bengaluru 25-26.03.2021
6	JSW Energy Centre of Excellence, Bellary, Karnataka 27-28.03.2021

12.10 Sub-Committee on Human Resource Requirement under National Electricity Plan 2022-27

Trained Manpower is an essential prerequisite for the rapid development of all areas of the power sector. The trained manpower comprises of skilled engineers, supervisors, managers, technicians and operators. Power sector is poised for massive growth in generation and commensurate with transmission and distribution infrastructure. Manpower development including training facilities shall commensurate with this capacity addition requirement. The technical knowledge acquired needs to be supplemented with applied engineering in various fields of power generation, transmission and distribution. All these skills need to be regularly updated to cope with rapidly advancing technology. HRD Division, CEA has conducted meetings under this sub-committee and was involved in the process of calculation of Human Resources that will be required during 2022-27 and 2027-32.

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ANNEXURE

Annexure-2A

(Item No. 2.2)

Revised Power Supply Position for 2020-21

State / System / Region	ENERGY				PEAK			
	April, 2020 - March,2021				April, 2020 - March,2021			
	Energy Requirement	Energy Supplied	Energy not Supplied		Peak Demand	Peak Met	Demand not Met	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Chandigarh	1,523	1,523	0	0.0	383	383	0	0.0
Delhi	29,560	29,555	4	0.0	6,314	6,314	0	0.0
Haryana	53,161	53,108	53	0.1	10,982	10,982	0	0.0
Himachal Pradesh	10,186	10,130	56	0.5	1,932	1,932	0	0.0
UT of J&K and Ladakh	19,773	17,222	2,551	12.9	3,280	2,680	600	18.3
Punjab	58,445	58,377	67	0.1	13,148	13,148	0	0.0
Rajasthan	85,311	85,205	106	0.1	14,441	14,441	0	0.0
Uttar Pradesh	124,367	123,383	984	0.8	23,797	23,747	50	0.2
Uttarakhand	13,827	13,818	8	0.1	2,372	2,372	0	0.0
Northern Region	**396,151**	**392,323**	**3,829**	**1.0**	**68,288**	**67,806**	**482**	**0.7**
Chattisgarh	30,472	30,449	22	0.1	4,682	4,682	0	0.0
Gujarat	111,622	111,622	0	0.0	18,528	18,483	45	0.2
Madhya Pradesh	83,437	83,437	0	0.0	15,756	15,668	88	0.6
Maharashtra	150,679	150,663	16	0.0	25,576	25,513	63	0.2
Daman & Diu	2,223	2,223	0	0.0	356	355	1	0.4
Dadar Nagar Haveli	5,497	5,497	0	0.0	889	888	1	0.1
Goa	4,083	4,083	0	0.0	612	612	0	0.1
Western Region	**388,013**	**387,975**	**38**	**0.0**	**61,778**	**61,692**	**86**	**0.1**
Andhra Pradesh	62,080	62,076	4	0.0	11,193	11,193	0	0.0
Telangana	66,998	66,994	4	0.0	13,688	13,688	0	0.0
Karnataka	68,851	68,831	19	0.0	14,367	14,367	0	0.0
Kerala	25,118	25,102	16	0.1	4,275	4,269	6	0.1
Tamil Nadu	101,194	101,189	5	0.0	16,263	16,263	0	0.0
Puducherry	2,644	2,644	0	0.0	429	429	0	0.0
Lakshadweep#	56	56	0	0.0	11	11	0	0.0
Southern Region	**326,885**	**326,836**	**48**	**0.0**	**58,395**	**58,395**	**0**	**0.0**
Bihar	34,171	34,018	153	0.4	5,995	5,938	58	1.0
DVC	21,368	21,368	0	0.0	3,173	3,173	0	0.0
Jharkhand	9,953	9,675	278	2.8	1,651	1,527	124	7.5
Odisha	29,848	29,848	0	0.0	4,984	4,984	1	0.0
West Bengal	51,644	51,543	100	0.2	8,846	8,846	0	0.0
Sikkim	546	546	0	0.0	120	120	0	0.0
Andaman- Nicobar #	346	323	23	6.7	58	54	4	6.9
Eastern Region	**147,530**	**146,999**	**531**	**0.4**	**24,016**	**24,016**	**0**	**0.0**
Arunachal Pradesh	719	714	5	0.7	158	149	9	5.6
Assam	10,192	9,815	377	3.7	2,072	1,987	85	4.1
Manipur	974	969	5	0.5	252	249	3	1.1
Meghalaya	2,031	2,005	26	1.3	384	384	0	0.0
Mizoram	728	723	4	0.6	132	132	0	0.0
Nagaland	826	822	4	0.5	160	155	5	2.9
Tripura *	1,484	1,481	3	0.2	317	315	2	0.5
NE Region	**16,955**	**16,531**	**424**	**2.5**	**3,294**	**3,107**	**187**	**5.7**
All India	**1,275,534**	**1,270,663**	**4,871**	**0.4**	**190,198**	**189,395**	**802**	**0.4**

 # Lakshadweep and Andaman & Nicobar Islands are stand- alone systems, power supply position of these doesn't form part of regional requirement and availability.

*** Excludes the supply to Bangladesh.**

Note: Power Supply Position Report has been compiled based on the data furnished by State Utilities/ Electricity Departments.

Annexure-2B
(Item No. 2.2)

Allocation from Conventional Central Generating Stations as on 31.03.2021

Note : The following Allocation is for Evening Peak Hours only.
Allocation during Off-Peak Hours may vary.

S.No.	Region / State	Firm Share						Dedicated Power	Un-Allocated Power							Total Share from C.G.S.		
		Firm Power from Regional Pool	Firm from Other Regions	Non Firm	Total Firm Power				Unallocated Power from Regional Pool			Allocation from other Region / Bhutan	Total Allocation of Un-Allocated Power					
		MW	MW	MW	MW	% Regional Total	% of All India Total	MW	MW	% Regional Total	% of All India Total	MW	MW	% Regional Total	% of All India Total	MW	% Regional Total	% of All India Total
		1	2	3	4=1+2+3	5	6	7	8	9	10	11	12=8+11	13	14	15=4+7+12	16	17
1	Chandigarh	164.0	3.0	0.0	167.0	0.7	0.2	0.0	76.0	3.0	0.9	0.0	76.0	2.7	0.8	243.0	0.9	0.3
2	Delhi	3820.0	741.7	0.0	4561.7	19.2	6.0	0.0	0.0	0.0	0.0	30.0	30.0	1.1	0.3	4591.6	16.3	4.9
3	Haryana	1975.6	418.3	48.0	2441.9	10.3	3.2	431.0	0.0	0.0	0.0	15.0	15.0	0.5	0.2	2887.9	10.3	3.1
4	Himachal Pradesh	1443.6	23.0	0.0	1466.5	6.2	1.9	0.0	15.0	0.6	0.2	0.0	15.0	0.5	0.2	1481.5	5.3	1.6
5	Jammu & Kashmir	1579.4	127.9	35.0	1742.3	7.3	2.3	89.0	1067.0	42.6	12.1	118.1	1185.0	42.3	12.1	3016.3	10.7	3.2
6	Punjab	1903.8	820.3	100.0	2824.2	11.9	3.7	0.0	37.0	1.5	0.4	30.0	67.0	2.4	0.7	2891.1	10.3	3.1
7	Rajasthan	1968.9	143.2	125.0	2237.1	9.4	3.0	550.0	672.0	26.8	7.6	15.0	687.0	24.5	7.0	3474.1	12.4	3.7
8	Uttar Pradesh	6635.7	485.5	66.0	7187.2	30.2	9.5	440.0	450.0	18.0	5.1	90.6	540.7	19.3	5.5	8167.8	29.0	8.8
9	Uttarakhand	922.0	28.1	0.0	950.1	4.0	1.3	0.0	185.5	7.4	2.1	0.0	185.5	6.6	1.9	1135.6	4.0	1.2
10	PowerGrid	6.3	0.0	0.0	6.3	0.0	0.0	0.0	3.3	0.1	0.0	0.0	3.3	0.1	0.0	9.6	0.0	0.0
11	Railways NR	0.0	226.8	0.0	226.8	1.0	0.3	0.0	0.0			0.0				226.8		0.2
12	BTPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Northern Region	**20419.3**	**3017.7**	**374.0**	**23811.0**	**100.0**	**31.5**	**1510.0**	**2505.8**	**100.0**	**28.5**	**298.7**	**2804.5**	**100.0**	**28.6**	**28125.5**	**100.0**	**30.2**
13	Chhattisgarh	2402.3	143.0	0.0	2545.3	13.0	3.4	50.0	25.0	1.0	0.3	0.0	25.0	1.0	0.3	2620.3	10.0	2.8
14	Gujarat	4798.6	304.1	0.0	5102.6	26.0	6.8	160.0	50.4	2.0	0.6	0.0	50.4	2.0	0.5	5313.0	20.3	5.7
15	Madhya Pradesh	4564.5	574.0	0.0	5138.4	26.2	6.8	1520.0	532.7	21.3	6.1	40.0	572.7	22.5	5.8	7231.1	27.6	7.8
16	Maharashtra	5643.9	148.1	0.0	5792.0	29.5	7.7	2028.7	659.6	26.3	7.5	0.0	659.6	25.9	6.7	8480.3	32.4	9.1
17	Daman & Diu	103.9	2.0	0.0	105.8	0.5	0.1	109.3	164.0	6.5	1.9	0.0	164.0	6.4	1.7	379.2	1.4	0.4
18	D.N.Haveli	155.6	3.0	0.0	158.6	0.8	0.2	139.3	942.6	37.6	10.7	0.0	942.6	37.0	9.6	1240.5	4.7	1.3
19	Goa	418.3	102.0	0.0	520.3	2.7	0.7	19.7	102.0	4.1	1.2	0.0	102.0	4.0	1.0	641.9	2.5	0.7
20	PowerGrid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	0.2	0.1	0.0	6.3	0.2	0.1	6.3	0.0	0.0
21	HWP of DAE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	0.6	0.2	0.0	14.0	0.5	0.1	14.0	0.1	0.0
22	BARC Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.4	0.1	0.0	10.0	0.4	0.1	10.0	0.0	0.0
23	Railways WR	0.0	248.6	0.0	248.6	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.6	0.9	0.3
	Western Region	**18087.0**	**1524.6**	**0.0**	**19611.6**	**100.0**	**26.0**	**4027.1**	**2506.6**	**100.0**	**28.5**	**40.0**	**2546.6**	**100.0**	**25.9**	**26185.2**	**100.0**	**28.1**
24	Andhra Pradesh	1854.3	0.0	0.0	1854.3	11.4	2.5	0.0	113.5	4.9	1.3	0.0	113.5	4.1	1.2	1967.9	9.9	2.1
25	Telangana	2166.3	0.0	0.0	2166.3	13.3	2.9	0.0	264.5	11.5	3.0	200.0	464.5	16.6	4.7	2630.8	13.2	2.8
26	Karnataka	3597.7	450.0	0.0	4047.7	24.9	5.4	0.0	799.0	34.8	9.1	300.0	1099.0	39.3	11.2	5146.7	25.8	5.5
27	Kerala	1537.5	150.0	0.0	1687.5	10.4	2.2	360.0	236.9	10.3	2.7	0.0	236.9	8.5	2.4	2284.4	11.5	2.5
28	Tamil Nadu	5955.6	35.0	0.0	5990.6	36.8	7.9	500.0	621.0	27.1	7.1	0.0	621.0	22.2	6.3	7111.5	35.7	7.6
29	Puducherry	338.6	0.0	0.0	338.6	2.1	0.4	0.0	252.3	11.0	2.9	0.0	252.3	9.0	2.6	590.9	3.0	0.6
30	NLC	166.0	0.0	0.0	166.0	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	166.0	0.8	0.2
31	PowerGrid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.3	0.1	0.0	6.9	0.2	0.1	6.9	0.0	0.0
32	Railways	0.0	9.1	0.0	9.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	0.0
	Southern Region	**15616.0**	**644.1**	**0.0**	**16260.1**	**100.0**	**21.5**	**860.0**	**2294.0**	**100.0**	**26.1**	**500.0**	**2794.0**	**100.0**	**28.4**	**19914.1**	**100.0**	**21.4**
33	Bihar	3697.0	0.0	0.0	3697.0	28.7	4.9	690.0	689.9	58.7	7.8	0.0	689.9	58.7	7.0	5076.9	32.8	5.5
34	DVC	3734.2	0.0	0.0	3734.2	29.0	4.9	0.0	15.0	1.3	0.2	0.0	15.0	1.3	0.2	3749.2	24.2	4.0
35	Jharkhand	1428.5	50.0	0.0	1478.5	11.5	2.0	0.0	156.3	13.3	1.8	0.0	156.3	13.3	1.6	1634.7	10.5	1.8
36	Odisha	1442.1	200.0	0.0	1642.1	12.7	2.2	460.0	137.7	11.7	1.6	0.0	137.7	11.7	1.4	2239.9	14.5	2.4
37	West Bengal	2048.3	0.0	0.0	2048.3	15.9	2.7	292.0	158.6	13.5	1.8	0.0	158.6	13.5	1.6	2498.9	16.1	2.7
38	Sikkim	91.3	0.0	0.0	91.3	0.7	0.1	0.0	14.9	1.3	0.2	0.0	14.9	1.3	0.2	106.3	0.7	0.1
39	PowerGrid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.3	0.0	0.0	3.8	0.3	0.0	3.8	0.0	0.0
40	Railways	190.5	0.0	0.0	190.5			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	190.5	1.2	0.2
	Eastern Region	**12632.0**	**250.0**	**0.0**	**12882.0**	**100.0**	**17.1**	**1442.0**	**1176.1**	**100.0**	**13.4**	**0.0**	**1176.1**	**100.0**	**12.0**	**15500.2**	**100.0**	**16.6**
41	Arunachal Pradesh	284.5	0.0	0.0	284.5	9.7	0.4	0.0	8.6	2.7	0.1	9.4	18.0	3.6	0.2	302.5	8.8	0.3
42	Assam	1248.0	142.5	0.0	1390.5	47.5	1.8	0.0	119.0	37.3	1.4	164.9	283.9	56.6	2.9	1674.5	48.9	1.8
43	Manipur	215.0	0.0	0.0	215.0	7.4	0.3	0.0	33.8	10.6	0.4	0.0	33.8	6.7	0.3	248.8	7.3	0.3
44	Meghalaya	250.3	0.0	0.0	250.3	8.6	0.3	0.0	101.9	31.9	1.2	0.0	101.9	20.3	1.0	352.2	10.3	0.4
45	Mizoram	170.4	0.0	0.0	170.4	5.8	0.2	0.0	27.1	8.5	0.3	7.5	34.6	6.9	0.4	205.0	6.0	0.2
46	Nagaland	148.3	0.0	0.0	148.3	5.1	0.2	0.0	11.2	3.5	0.1	0.8	11.9	2.4	0.1	160.3	4.7	0.2
47	Tripura	464.8	0.0	0.0	464.8	15.9	0.6	0.0	17.6	5.5	0.2	0.0	17.6	3.5	0.2	482.3	14.1	0.5
48	PowerGrid	1.5	0.0	0.0	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
	North-Eastern	**2782.8**	**142.5**	**0.0**	**2925.4**	**100.0**	**3.9**	**0.0**	**319.2**	**100.0**	**3.6**	**182.5**	**501.7**	**100.0**	**5.1**	**3427.1**	**100.0**	**3.7**
	All India	**69,537**	**5,579**	**374**	**75,490**	**100**	**100**	**7,839**	**8,802**	**100**	**100**	**1,021**	**9,823**	**100**	**100**	**93,152**	**100**	**100**

Note :
1. Firm share includes merchant power (50 MW each in ER and WR) and capacity allocated / diverted from other stations located within / outside the region.
2. Above allocation is for evening peak hours only (18-22 hrs for WR, SR and NER, 19-22 hrs for ER and 18-23 hrs for NR). Allocation during off-peak hours may vary.
3. Grand Total power does not include power allocated to Bangladesh. Total Power allocated to Bangladesh = 250 MW (100 MW each from NR and WR and 50 MW from ER NTPC stations' unallocated power).
4. Excludes capacity of central sector units which have been commissioned but yet to be declared under commercial operation.

Annexure-3A (Item 3.2)

All India Sector wise/Organisation wise Target, Actual Generation & PLF (%) for the year 2020-21

Fuel, Sector/Organisation	Target (MU)	Actual (MU)	PLF (%)
THERMAL			
CENTRAL SECTOR			
APCPL	6000	3654.73	27.81
BRBCL	4150	4264.52	64.91
DVC	38600	38038.9	62.39
K.B.U.N.L	3000	2468.93	46.20
MUNPL	4000	4054.65	58.37
NEEPCO.	2827	2982.84	**
NLC	21086	17171.49	56.88
NPGCL	3800	4734.79	81.89
NSPCL	3600	3209.98	73.29
NTECL	7950	4369	33.25
NTPC Ltd.	259166	265461.25	66.25
NTPL	6100	5290.62	60.40
ONGC	4759	5090.23	**
RGPPL	4505	2573.86	**
TOTAL CENTRAL SECTOR	**369543**	**363365.79**	**63.40**
STATE SECTOR			
HPGCL	10600	5466.82	24.86
IPGCL	630	458.58	**
PPCL	5199	4845.43	**
PSPCL	6200	1789.28	11.61
RRVUNL	40317	28801.89	46.81
UPRVUNL	33100	25797.94	53.85
BECL	1000	1201.05	27.42
CSPGCL	20650	18234.01	68.44
GMDCL	1270	435.05	19.87
GPPCL	600	2713.89	**
GSECL	22528	18528.75	36.13
GSEGL	460	1701.19	**
MAHAGENCO	55950	45781.6	51.25
MPPGCL	26500	20682.94	43.72
APEPDCL	798	652.17	**
APGENCO	21800	10704.83	35.84
APPDCL	8500	7228.27	51.57
KPCL	17150	7022.53	23.44
KSEB	0	7.83	#
P&ED, Pudu.	225	232.15	#
RPCL	5600	3379.79	24.11

SCCL	8800	7344.3	69.87
TANGEDCO	27694	17333.03	41.10
TSGENCO	21240	20704.91	73.35
A&N ADM	150	118.48	#
DPL	2800	2787.96	57.87
OPGC	9000	8643.13	56.70
TVNL	2300	2237.96	60.83
WBPDC	23250	23875.83	57.50
APGCL	1019	1151.28	**
TSECL	570	540.26	**
TOTAL STATE SECTOR	**375900**	**290403.13**	**46.23**
PVT. SEC. UTILITY			
AEML	4000	3206.13	73.20
CESC	6227	5512.58	55.94
TATA PCL	5925	4967.9	54.59
TOR. POW. (UNOSUGEN)	2600	1403.8	44.27
TOTAL PVT. UTILITY SECTOR	**18752**	**15090.41**	**57.18**
PVT. SEC. IPP			
ABAN POWR	550	270.45	**
ACB	2035	1608.93	56.51
ADHUNIK	3400	3113.78	65.82
APGPCL	700	1260.3	**
APL	59000	52304.97	64.62
BALCO	3000	3781.65	71.95
BEPL	1000	1071.05	27.17
BLAPPL	250	170.23	21.59
CEPL	4000	2297.1	21.85
CGPL	26700	26208.53	74.80
DBPCL	7000	8073.35	76.80
DIL	2200	4228.79	80.46
EPGL	3000	4048.87	38.52
ESSARPMPL	4000	2889.61	27.49
GCEL	4000	6540.99	54.50
GIPCL	3400	2989.86	67.94
GIPL	350	229.91	**
GMR ENERG	11500	11036.01	76.35
GPGSL (GVK)	2600	1282.71	27.12
HEL	4300	4224.94	80.38
HMEL	1000	433.86	16.51
HNPC	2500	1143.82	12.56
ITPCL	6500	4819.06	45.84
JHAPL	3000	3677.23	69.96
JhPL(HR)	7000	4873.03	42.14
JITPL	4000	5936.33	56.47
JPL	9400	13065.67	43.87
JPPVL	8500	9792.79	61.42

JSWEL	11700	8596.5	47.64
KONDAPALI	780	991.49	**
LANCO	3800	4568.84	86.93
LAPPL	8600	8666.5	82.44
LPGCL	10500	7289.49	42.03
MBPMPL	7000	6654.31	63.30
MCCPL	2200	2090.95	79.56
MEL	0	126.83	4.83
MPL	7400	6383.36	69.40
NPL	8231	7951.49	64.84
PENNA	340	212.87	**
PPGCL (Jaypee)	9000	10751.13	61.98
PPNPGCL	0	2.01	0.00
RATTANINDIA	4500	2835.89	23.98
REGL	1000	2877.03	54.74
RKMPPL	3000	4820.53	38.21
RPSCL	7000	6751.18	64.22
RWPL (JSW)	7200	7026.83	74.27
SCPL	700	483.68	55.21
SEIL	19300	18262.96	78.97
SEL	100	3033.78	28.86
SKS	2500	1866.84	35.52
SPGL	1178	419.28	**
SPL	31000	33387.69	96.25
SrEPL	700	492.06	**
ST-CMSECP	1294	886.12	40.46
SVPPL	200	0	0.00
TATA PCL	1500	1417.27	67.41
TOR. POW. (SUGEN)	6000	5986.87	**
TOR. POW. (UNOSUGEN)	1500	2987.94	**
TRNE	3400	1963.01	37.35
TSPL	12000	6971.31	40.19
UPCL	4000	2350.12	22.36
VIP	2000	0	0.00
WPCL	9400	12553.89	61.24
Total PVT. SEC. IPP	**373908**	**363033.87**	**54.57**
PVT. SEC. IMP			
GIPCL	180	206.84	
ICCL	150	235.75	
NALCO	100	177.75	
Total PVT. SEC. IMP	**430**	**620.34**	
Total IPP & Import	**374338**	**363654.21**	**54.57**
Total PVT. Sector	**393090**	**378744.62**	**54.66**
THERMAL Total	**1138533**	**1032513.54**	**54.51**
NUCLEAR			
CENTRAL			

DAE	0	0	0.00
NPCIL	43880	43029.08	73.53
CENTRAL Total	**43880**	**43029.08**	**72.45**
NUCLEAR Total	**43880**	**43029.08**	**72.45**
HYDRO			
CENTRAL			
BBMB	9600	11478	
DVC	206	365.47	
NEEPCO.	4472	3881.89	
NHDC	2700	4236.17	
NHPC	24542	24084.69	
NTPC Ltd.	3482	3221.41	
SJVNL	8678	9094.35	
THDC	4160	4261.72	
CENTRAL Total	**57840**	**60623.7**	
STATE			
HPPCL	805	437.76	
HPSEBL	1874	1564.35	
JKSPDC	4915	4940.83	
PSPCL	3805	3951	
RRVUNL	340	469.63	
UJVNL	4410	4487.97	
UPJVNL	1115	1572.35	
CSPGCL	250	419.19	
GSECL	754	988.12	
MAHAGENCO	3755	3574.57	
MPPGCL	2092	2656.06	
SSNNL	3200	3245.24	
APGENCO	3174	4129.94	
KPCL	11468	12403.59	
KSEB	5900	6628.39	
TANGEDCO	4040	5212.71	
TSGENCO	3211	3645.38	
JUUNL	110	50	
OHPC	5372	6193.91	
TUL	5300	6043.98	
WBSEDCL	1578	1759.64	
APGCL	380	203.03	
MeECL	920	1151.99	
STATE Total	**68768**	**75729.63**	
PVT SEC. UTL			
HYDRO			
BHIRA HPS	452	358.87	
BHIRA PSS HPS	448	585.97	
BHIVPURI HPS	285	299.7	
KHOPOLI HPS	285	280.16	

TOTAL PVT SEC. UTL	**1470**	**1524.7**	
PVT SEC. IPP			
HYDRO			
ALLAIN DUHANGAN	692	640.53	
BAJOLI HOLI HPS	273	0	
BASPA HPS	1276	1311.17	
BHANDARDHARA HPS	36	34.29	
BUDHIL HPS	260	275.95	
CHANJU-I HPS	157	159.35	
CHUZACHEN HPS	500	488.37	
DIKCHU HPS	460	458.95	
JORETHANG LOOP	408	399.92	
KARCHAM WANGTOO	4131	4361.44	
MALANA HPS	344	334.88	
MALANA-II HPS	367	370.47	
RONGNICHU HPS	22	0	
SHRINAGAR HPS	1310	1438	
SINGOLI BHATWARI	145	0	
SORANG HPS	39	0	
TASHIDING HPS	421	369.75	
VISHNU PRAYAG HPS	1438	1778.42	
TOTAL PVT SEC. IPP	**12279**	**12421.49**	
TOTAL PVT. SEC.	**13749**	**13946.19**	
HYDRO Total	**140357**	**150299.52**	

- PLF is calculated for Coal & Lignite based power station only.
- ** Gas Based Station
- # diesel Based Station

Annexure-3B

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS (Item 3.4)

(As on 31.03.2021)

(UTILITIES)

Region	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES * (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
Northern Region	State	16659.00	250.00	2879.20	0.00	19788.20	0.00	5888.25	725.51	26401.96
	Private	22425.83	1080.00	558.00	0.00	24063.83	0.00	2916.00	17487.12	44466.95
	Central	15742.56	250.00	2344.06	0.00	18336.62	1620.00	11484.52	379.00	31820.14
	Sub Total	**54827.39**	**1580.00**	**5781.26**	**0.00**	**62188.65**	**1620.00**	**20288.77**	**18591.63**	**102689.05**
Western Region	State	21500.00	900.00	2849.82	0.00	25249.82	0.00	5446.50	569.28	31265.60
	Private	32847.17	500.00	4676.00	0.00	38023.17	0.00	481.00	28016.71	66520.88
	Central	19972.95	0.00	3280.67	0.00	23253.62	1840.00	1635.00	666.30	27394.92
	Sub Total	**74320.12**	**1400.00**	**10806.49**	**0.00**	**86526.61**	**1840.00**	**7562.50**	**29252.29**	**125181.40**
Southern Region	State	20322.50	0.00	791.98	159.96	21274.44	0.00	11774.83	586.88	33636.15
	Private	12747.00	250.00	5340.24	273.70	18610.95	0.00	0.00	43471.37	62082.32
	Central	11835.02	3390.00	359.58	0.00	15584.60	3320.00	0.00	541.90	19446.50
	Sub Total	**44904.52**	**3640.00**	**6491.80**	**433.66**	**55469.99**	**3320.00**	**11774.83**	**44600.15**	**115164.97**
Eastern Region	State	7450.00	0.00	100.00	0.00	7550.00	0.00	3537.92	275.11	11363.03
	Private	6153.00	0.00	0.00	0.00	6153.00	0.00	96.00	1300.22	7549.22
	Central	14249.45	0.00	0.00	0.00	14249.45	0.00	1005.20	10.00	15264.65
	Sub Total	**27852.45**	**0.00**	**100.00**	**0.00**	**27952.45**	**0.00**	**4639.12**	**1585.33**	**34176.90**
North Eastern Region	State	0.00	0.00	466.36	36.00	502.36	0.00	422.00	233.25	1157.60
	Private	0.00	0.00	24.50	0.00	24.50	0.00	0.00	105.92	130.42
	Central	770.02	0.00	1253.60	0.00	2023.62	0.00	1522.00	30.00	3575.62
	Sub Total	**770.02**	**0.00**	**1744.46**	**36.00**	**2550.48**	**0.00**	**1944.00**	**369.17**	**4863.64**
Islands	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.87	24.87
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10
	Sub Total	**0.00**	**0.00**	**0.00**	**40.05**	**40.05**	**0.00**	**0.00**	**35.22**	**75.27**
All India	State	65931.50	1150.00	7087.36	236.01	74404.86	0.00	27069.50	2395.27	103869.64
	Private	74173.00	1830.00	10598.74	273.70	86875.45	0.00	3493.00	90406.21	180774.66
	Central	62570.00	3640.00	7237.91	0.00	73447.91	6780.00	15646.72	1632.30	97506.93
	Total	**202674.50**	**6620.00**	**24924.01**	**509.71**	**234728.22**	**6780.00**	**46209.22**	**94433.79**	**382151.22**

Figures at decimal may not tally due to rounding off

Abbreviation:-Note : - SHP=Small Hydro Project (≤ 25 MW), BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

1. RES include SHP, BP, U&I, Solar and Wind Energy. Installed capacity in respect of RES (MNRE) as on 31.03.2021 (As per latest information available with MNRE)

***Break up of RES all India as on 31.03.2021 is given below (in MW) :**

Small Hydro Power	Wind Power	Bio-Power		Solar Power	Total Capacity
		BM Power/Cogen.	Waste to Energy		
4786.81	39247.05	10145.92	168.64	40085.37	94433.79

A. **Capacity Added during March., 2021 — 1590 MW**

1. Unit-3 (270 MW) of BHADRADRI TPP has been commissioned and added to state sector of Telangana.
2. Unit-2 (660 MW) of NABINAGAR STPP has been commissioned and added to central sector of ER & NR states as per their allocation.
3. Unit-6 (660 MW) of TANDA TPS has been commissioned and added to central sector of NR states as per their allocation.

B. **Capacity Retired during March., 2021 — 32.5 MW**

1. Unit-1,2&3 (2*5 + 1*6.5 = 16.5 MW) of BARAMURA GT has been retired from state sector of Tripura.
2. Unit-1&2 (2x8 = 16 MW) of ROKHIA GT has been retired from state sector of Tripura.

C. **Capacity removed due to change from Conventional to RES during March., 2021 — 0 MW**

D. **Net Conv. Capacity Added during March., 2021 A-B+C — 1557.5 MW**

***** Sector wise breakup of RES capacity as shown is provisional.

Allocation from central sector stations has been updated till 28.02.2021.

Share of Railway (750 MW) from NABI NAGAR TPP (750 MW) is included in central sector of Bihar.**Share from private sector generating stations has been updated as per latest information available.**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN

NORTHERN REGION

(As on 31.03.2021)

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
	State	0.00	0.00	1800.40	0.00	1800.40	0.00	0.00	0.00	1800.40
Delhi	Private	878.22	0.00	108.00	0.00	986.22	0.00	0.00	244.97	1231.19
	Central	3525.34	0.00	207.01	0.00	3732.36	102.83	723.09	0.00	4558.28
	Sub-Total	**4403.56**	**0.00**	**2115.41**	**0.00**	**6518.98**	**102.83**	**723.09**	**244.97**	**7589.87**
	State	2510.00	0.00	150.00	0.00	2660.00	0.00	200.00	69.30	2929.30
Haryana	Private	4561.78	0.00	0.00	0.00	4561.78	0.00	539.00	618.89	5719.67
	Central	1610.83	0.00	535.61	0.00	2146.45	100.94	1579.52	5.00	3831.90
	Sub-Total	**8682.61**	**0.00**	**685.61**	**0.00**	**9368.23**	**100.94**	**2318.52**	**693.19**	**12480.87**
	State	0.00	0.00	0.00	0.00	0.00	0.00	805.60	256.61	1062.21
Himachal Pradesh	Private	0.00	0.00	0.00	0.00	0.00	0.00	894.40	731.43	1625.83
	Central	151.69	0.00	62.01	0.00	213.70	28.95	1223.88	0.00	1466.53
	Sub-Total	**151.69**	**0.00**	**62.01**	**0.00**	**213.70**	**28.95**	**2923.88**	**988.04**	**4154.57**
	State	0.00	0.00	175.00	0.00	175.00	0.00	1230.00	130.98	1535.98
Jammu & Kashmir	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.73	75.73
Ladakh	Central	577.14	0.00	129.07	0.00	706.22	67.98	1091.88	0.00	1866.08
	Sub-Total	**577.14**	**0.00**	**304.07**	**0.00**	**881.22**	**67.98**	**2321.88**	**206.71**	**3477.79**
	State	1760.00	0.00	150.00	0.00	1910.00	0.00	1243.40	127.80	3281.20
Punjab	Private	5115.50	0.00	0.00	0.00	5115.50	0.00	288.00	1489.45	6892.95
	Central	1476.00	0.00	264.01	0.00	1740.01	196.81	2277.72	0.00	4214.54
	Sub-Total	**8351.50**	**0.00**	**414.01**	**0.00**	**8765.51**	**196.81**	**3809.12**	**1617.25**	**14388.69**
	State	6920.00	250.00	603.80	0.00	7773.80	0.00	433.00	23.85	8230.65
Rajasthan	Private	2957.00	1080.00	0.00	0.00	4037.00	0.00	104.00	9836.65	13977.65
	Central	1062.59	250.00	221.10	0.00	1533.69	556.74	1402.19	344.00	3836.62
	Sub-Total	**10939.59**	**1580.00**	**824.90**	**0.00**	**13344.49**	**556.74**	**1939.19**	**10204.50**	**26044.92**
	State	5469.00	0.00	0.00	0.00	5469.00	0.00	724.10	49.10	6242.20
Uttar Pradesh	Private	8814.33	0.00	0.00	0.00	8814.33	0.00	842.40	3799.76	13456.49
	Central	5470.51	0.00	549.49	0.00	6020.00	289.48	1857.53	30.00	8197.01
	Sub-Total	**19753.84**	**0.00**	**549.49**	**0.00**	**20303.33**	**289.48**	**3424.03**	**3878.86**	**27895.70**
	State	0.00	0.00	0.00	0.00	0.00	0.00	1252.15	67.87	1320.02
Uttarakhand	Private	99.00	0.00	450.00	0.00	549.00	0.00	248.20	645.08	1442.28
	Central	392.60	0.00	69.66	0.00	462.26	31.24	475.54	0.00	969.04
	Sub-Total	**491.60**	**0.00**	**519.66**	**0.00**	**1011.26**	**31.24**	**1975.89**	**712.95**	**3731.34**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chandigarh	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.16	45.16
	Central	44.83	0.00	15.03	0.00	59.86	8.01	101.71	0.00	169.57
	Sub-Total	**44.83**	**0.00**	**15.03**	**0.00**	**59.86**	**8.01**	**101.71**	**45.16**	**214.73**
Central - Unallocated		1431.03	0.00	291.05	0.00	1722.08	237.03	751.45	0.00	2710.57
	State	16659.00	250.00	2879.20	0.00	19788.20	0.00	5888.25	725.51	26401.96
Total (Northern	Private	22425.83	1080.00	558.00	0.00	24063.83	0.00	2916.00	17487.12	44466.95
Region)	Central	15742.56	250.00	2344.06	0.00	18336.62	1620.00	11484.52	379.00	31820.14
	Grand Total	**54827.39**	**1580.00**	**5781.26**	**0.00**	**62188.65**	**1620.00**	**20288.77**	**18591.63**	**102689.05**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN WESTERN REGION

(As on 31.03.2021)

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
Goa	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	Private	0.00	0.00	48.00	0.00	48.00	0.00	0.00	7.78	55.78
	Central	492.27	0.00	19.67	0.00	511.94	26.00	2.00	0.00	539.94
	Sub-Total	**492.27**	**0.00**	**67.67**	**0.00**	**559.94**	**26.00**	**2.00**	**7.83**	**595.77**
Daman & Diu	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.55	40.55
	Central	164.74	0.00	43.34	0.00	208.08	7.00	0.00	0.00	215.08
	Sub-Total	**164.74**	**0.00**	**43.34**	**0.00**	**208.08**	**7.00**	**0.00**	**40.55**	**255.63**
Gujarat	State	4510.00	900.00	2177.82	0.00	7587.82	0.00	772.00	86.09	8445.91
	Private	7144.67	500.00	3985.00	0.00	11629.67	0.00	0.00	12823.24	24452.91
	Central	3768.29	0.00	424.00	0.00	4192.29	559.00	0.00	243.30	4994.59
	Sub-Total	**15422.96**	**1400.00**	**6586.82**	**0.00**	**23409.78**	**559.00**	**772.00**	**13152.63**	**37893.41**
Madhya Pradesh	State	5400.00	0.00	0.00	0.00	5400.00	0.00	1703.66	83.96	7187.62
	Private	6079.00	0.00	75.00	0.00	6154.00	0.00	0.00	4821.61	10975.61
	Central	4976.09	0.00	257.00	0.00	5233.09	273.00	1520.00	300.00	7326.09
	Sub-Total	**16455.09**	**0.00**	**332.00**	**0.00**	**16787.09**	**273.00**	**3223.66**	**5205.57**	**25489.32**
Chhattisgarh	State	1840.00	0.00	0.00	0.00	1840.00	0.00	120.00	11.05	1971.05
	Private	7667.50	0.00	0.00	0.00	7667.50	0.00	0.00	562.33	8229.83
	Central	2714.39	0.00	0.00	0.00	2714.39	48.00	113.00	0.00	2875.39
	Sub-Total	**12221.89**	**0.00**	**0.00**	**0.00**	**12221.89**	**48.00**	**233.00**	**573.38**	**13076.27**
Maharashtra	State	9750.00	0.00	672.00	0.00	10422.00	0.00	2850.84	388.13	13660.97
	Private	11756.00	0.00	568.00	0.00	12324.00	0.00	481.00	9755.74	22560.74
	Central	4858.18	0.00	2272.73	0.00	7130.91	690.00	0.00	123.00	7943.91
	Sub-Total	**26364.18**	**0.00**	**3512.73**	**0.00**	**29876.91**	**690.00**	**3331.84**	**10266.87**	**44165.62**
Dadra & Nagar Naveli	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	200.00	0.00	0.00	0.00	200.00	0.00	0.00	5.46	205.46
	Central	227.99	0.00	66.34	0.00	294.33	9.00	0.00	0.00	303.33
	Sub-Total	**427.99**	**0.00**	**66.34**	**0.00**	**494.33**	**9.00**	**0.00**	**5.46**	**508.79**
Central - Unallocated		2771.00	0.00	197.59	0.00	2968.59	228.00	0.00	0.00	3196.59
Total (Western Region)	State	21500.00	900.00	2849.82	0.00	25249.82	0.00	5446.50	569.28	31265.60
	Private	32847.17	500.00	4676.00	0.00	38023.17	0.00	481.00	28016.71	66520.88
	Central	19972.95	0.00	3280.67	0.00	23253.62	1840.00	1635.00	666.30	27394.92
	Grand Total	**74320.12**	**1400.00**	**10806.49**	**0.00**	**86526.61**	**1840.00**	**7562.50**	**29252.29**	**125181.40**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN SOUTHERN REGION

(As on 31.03.2021)

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
	State	5010.00	0.00	235.40	0.00	5245.40	0.00	1673.60	56.18	6975.18
Andhra Pradesh	Private	3873.88	0.00	3831.32	36.80	7742.00	0.00	0.00	8662.41	16404.42
	Central	1546.83	180.23	0.00	0.00	1727.06	127.27	0.00	250.00	2104.33
	Sub-Total	**10430.71**	**180.23**	**4066.72**	**36.80**	**14714.46**	**127.27**	**1673.60**	**8968.59**	**25483.92**
	State	5972.50	0.00	0.00	0.00	5972.50	0.00	2479.93	41.22	8493.65
Telangana	Private	1389.45	0.00	831.82	0.00	2221.27	0.00	0.00	4326.77	6548.04
	Central	1806.85	210.57	0.00	0.00	2017.42	148.73	0.00	10.00	2176.15
	Sub-Total	**9168.80**	**210.57**	**831.82**	**0.00**	**10211.19**	**148.73**	**2479.93**	**4377.99**	**17217.84**
	State	5020.00	0.00	0.00	0.00	5020.00	0.00	3586.60	193.89	8800.49
Karnataka	Private	1948.50	0.00	0.00	25.20	1973.70	0.00	0.00	15268.92	17242.62
	Central	2877.80	471.90	0.00	0.00	3349.70	698.00	0.00	0.00	4047.70
	Sub-Total	**9846.30**	**471.90**	**0.00**	**25.20**	**10343.40**	**698.00**	**3586.60**	**15462.80**	**30090.80**
	State	0.00	0.00	0.00	159.96	159.96	0.00	1856.50	172.90	2189.36
Kerala	Private	1047.50	0.00	174.00	0.00	1221.50	0.00	0.00	328.89	1550.39
	Central	1011.42	314.20	359.58	0.00	1685.20	362.00	0.00	50.00	2097.20
	Sub-Total	**2058.92**	**314.20**	**533.58**	**159.96**	**3066.66**	**362.00**	**1856.50**	**551.79**	**5836.95**
	State	4320.00	0.00	524.08	0.00	4844.08	0.00	2178.20	122.70	7144.98
Tamil Nadu	Private	4487.67	250.00	503.10	211.70	5452.47	0.00	0.00	14875.05	20327.52
	Central	3025.32	1517.30	0.00	0.00	4542.62	1448.00	0.00	231.90	6222.52
	Sub-Total	**11832.99**	**1767.30**	**1027.18**	**211.70**	**14839.17**	**1448.00**	**2178.20**	**15229.65**	**33695.02**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NLC	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	166.00	0.00	0.00	166.00	0.00	0.00	0.00	166.00
	Sub-Total	**0.00**	**166.00**	**0.00**	**0.00**	**166.00**	**0.00**	**0.00**	**0.00**	**166.00**
	State	0.00	0.00	32.50	0.00	32.50	0.00	0.00	0.00	32.50
Puducherry	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.33	9.33
	Central	140.80	111.80	0.00	0.00	252.60	86.00	0.00	0.00	338.60
	Sub-Total	**140.80**	**111.80**	**32.50**	**0.00**	**285.10**	**86.00**	**0.00**	**9.33**	**380.43**
Central - Unallocated		1426.00	418.00	0.00	0.00	1844.00	450.00	0.00	0.00	2294.00
	State	20322.50	0.00	791.98	159.96	21274.44	0.00	11774.83	586.88	33636.15
Total (Southern	Private	12747.00	250.00	5340.24	273.70	18610.95	0.00	0.00	43471.37	62082.32
Region)	Central	11835.02	3390.00	359.58	0.00	15584.60	3320.00	0.00	541.90	19446.50
	Grand Total	**44904.52**	**3640.00**	**6491.80**	**433.66**	**55469.99**	**3320.00**	**11774.83**	**44600.15**	**115164.97**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN EASTERN REGION

(As on 31.03.2021)

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.70	70.70
Bihar	Private	700.00	0.00	0.00	0.00	700.00	0.00	0.00	284.21	984.21
	Central	5155.89	0.00	0.00	0.00	5155.89	0.00	110.00	0.00	5265.89
	Sub-Total	**5855.89**	**0.00**	**0.00**	**0.00**	**5855.89**	**0.00**	**110.00**	**354.91**	**6320.80**
	State	420.00	0.00	0.00	0.00	420.00	0.00	130.00	4.05	554.05
Jharkhand	Private	580.00	0.00	0.00	0.00	580.00	0.00	0.00	56.36	636.36
	Central	1296.46	0.00	0.00	0.00	1296.46	0.00	61.00	0.00	1357.46
	Sub-Total	**2296.46**	**0.00**	**0.00**	**0.00**	**2296.46**	**0.00**	**191.00**	**60.41**	**2547.87**
	State	5290.00	0.00	100.00	0.00	5390.00	0.00	986.00	121.95	6497.95
West Bengal	Private	2437.00	0.00	0.00	0.00	2437.00	0.00	0.00	446.31	2883.31
	Central	1245.62	0.00	0.00	0.00	1245.62	0.00	410.00	0.00	1655.62
	Sub-Total	**8972.62**	**0.00**	**100.00**	**0.00**	**9072.62**	**0.00**	**1396.00**	**568.26**	**11036.88**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DVC	Private	150.00	0.00	0.00	0.00	150.00	0.00	0.00	0.00	150.00
	Central	3307.02	0.00	0.00	0.00	3307.02	0.00	186.20	0.00	3493.21
	Sub-Total	**3457.02**	**0.00**	**0.00**	**0.00**	**3457.02**	**0.00**	**186.20**	**0.00**	**3643.21**
	State	1740.00	0.00	0.00	0.00	1740.00	0.00	2061.92	26.30	3828.22
Odisha	Private	2286.00	0.00	0.00	0.00	2286.00	0.00	0.00	513.27	2799.27
	Central	1867.98	0.00	0.00	0.00	1867.98	0.00	89.00	10.00	1966.98
	Sub-Total	**5893.98**	**0.00**	**0.00**	**0.00**	**5893.98**	**0.00**	**2150.92**	**549.57**	**8594.47**
	State	0.00	0.00	0.00	0.00	0.00	0.00	360.00	52.11	412.11
Sikkim	Private	0.00	0.00	0.00	0.00	0.00	0.00	96.00	0.07	96.07
	Central	105.65	0.00	0.00	0.00	105.65	0.00	64.00	0.00	169.65
	Sub-Total	**105.65**	**0.00**	**0.00**	**0.00**	**105.65**	**0.00**	**520.00**	**52.18**	**677.83**
Central - Unallocated		1270.83	0.00	0.00	0.00	1270.83	0.00	85.01	0.00	1355.84
	State	7450.00	0.00	100.00	0.00	7550.00	0.00	3537.92	275.11	11363.03
Total (Eastern	Private	6153.00	0.00	0.00	0.00	6153.00	0.00	96.00	1300.22	7549.22
Region)	Central	14249.45	0.00	0.00	0.00	14249.45	0.00	1005.20	10.00	15264.65
	Grand Total	**27852.45**	**0.00**	**100.00**	**0.00**	**27952.45**	**0.00**	**4639.12**	**1585.33**	**34176.90**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTH-EASTERN REGION

(As on 31.03.2021)

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
	State	0.00	0.00	329.36	0.00	329.36	0.00	100.00	5.01	434.37
Assam	Private	0.00	0.00	24.50	0.00	24.50	0.00	0.00	49.09	73.59
	Central	403.50	0.00	435.56	0.00	839.06	0.00	422.08	25.00	1286.14
	Sub-Total	**403.50**	**0.00**	**789.42**	**0.00**	**1192.92**	**0.00**	**522.08**	**79.10**	**1794.10**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.11	107.11
Arunachal Pradesh	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.61	29.61
	Central	37.05	0.00	46.82	0.00	83.87	0.00	544.55	0.00	628.42
	Sub-Total	**37.05**	**0.00**	**46.82**	**0.00**	**83.87**	**0.00**	**544.55**	**136.72**	**765.14**
	State	0.00	0.00	0.00	0.00	0.00	0.00	322.00	32.53	354.53
Meghalaya	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.92	13.92
	Central	50.62	0.00	109.69	0.00	160.31	0.00	87.27	0.00	247.58
	Sub-Total	**50.62**	**0.00**	**109.69**	**0.00**	**160.31**	**0.00**	**409.27**	**46.45**	**616.03**
	State	0.00	0.00	137.00	0.00	137.00	0.00	0.00	16.01	153.01
Tripura	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.41	4.41
	Central	56.10	0.00	436.95	0.00	493.05	0.00	68.49	5.00	566.54
	Sub-Total	**56.10**	**0.00**	**573.95**	**0.00**	**630.05**	**0.00**	**68.49**	**25.42**	**723.96**
	State	0.00	0.00	0.00	36.00	36.00	0.00	0.00	5.45	41.45
Manipur	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.36	6.36
	Central	47.10	0.00	71.57	0.00	118.67	0.00	95.34	0.00	214.01
	Sub-Total	**47.10**	**0.00**	**71.57**	**36.00**	**154.67**	**0.00**	**95.34**	**11.81**	**261.82**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.67	30.67
Nagaland	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
	Central	32.10	0.00	48.93	0.00	81.03	0.00	66.33	0.00	147.36
	Sub-Total	**32.10**	**0.00**	**48.93**	**0.00**	**81.03**	**0.00**	**66.33**	**31.67**	**179.03**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.47	36.47
Mizoram	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.53	1.53
	Central	31.05	0.00	40.46	0.00	71.51	0.00	97.94	0.00	169.45
	Sub-Total	**31.05**	**0.00**	**40.46**	**0.00**	**71.51**	**0.00**	**97.94**	**38.00**	**207.45**
Central - Unallocated		112.50	0.00	63.62	0.00	176.12	0.00	140.00	0.00	316.12
	State	0.00	0.00	466.36	36.00	502.36	0.00	422.00	233.25	1157.60
Total (North- Eastern	Private	0.00	0.00	24.50	0.00	24.50	0.00	0.00	105.92	130.42
Region)	Central	770.02	0.00	1253.60	0.00	2023.62	0.00	1522.00	30.00	3575.62
	Grand Total	**770.02**	**0.00**	**1744.46**	**36.00**	**2550.48**	**0.00**	**1944.00**	**369.17**	**4863.64**

ISTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN ISLANDS

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES (As on 31.03.2021)

State	Ownership/ Sector	Mode wise breakup								Grand Total
		Thermal					Nuclear	Hydro	RES (MNRE)	
		Coal	Lignite	Gas	Diesel	Total				
	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
Andaman & Nicobar	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.12	24.12
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10
	Sub-Total	**0.00**	**0.00**	**0.00**	**40.05**	**40.05**	**0.00**	**0.00**	**34.47**	**74.52**
	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakshadweep	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.75**	**0.75**
	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	45.30
Total (Islands)	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.87	24.87
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10
	Grand Total	**0.00**	**0.00**	**0.00**	**40.05**	**40.05**	**0.00**	**0.00**	**35.22**	**75.27**

Annexure-4A

(Item No. 4.14.2.2)

PLANT-WISE COAL RECEIPT AND CONSUMPTION 2020-21

Figures in Thousand Tonnes

S.No	Name of TPS	Capacity (MW)	Receipt			Consum-ption
			Indigeneo...	Import	Total	
1	PANIPAT TPS	710	522	0	522	847
2	RAJIV GANDHI TPS	1200	790	0	790	1162
3	YAMUNA NAGAR TPS	600	1406	0	1406	1823
4	INDIRA GANDHI STPP	1500	1970	0	1970	2450
5	MAHATMA GANDHI TPS	1320	2814	0	2814	2862
6	GH TPS (LEH.MOH.)	920	341	0	341	605
7	ROPAR TPS	840	402	0	402	533
8	RAJPURA TPP	1400	4185	0	4185	4237
9	TALWANDI SABO TPP	1980	4498	0	4498	4884
10	GOINDWAL SAHIB TPP	540	753	0	753	853
11	KOTA TPS	1240	3311	0	3311	3674
12	SURATGARH TPS	2160	684	0	684	846
13	CHHABRA TPP	2320	8383	0	8383	8493
14	KALISINDH TPS	1200	3517	0	3517	3540
15	KAWAI TPS	1320	4460	0	4460	4847
16	ANPARA TPS	2630	9823	0	9823	9907
17	HARDUAGANJ TPS	605	1491	0	1491	1534
18	OBRA TPS	1094	3357	0	3357	3477
19	PARICHHA TPS	1140	2395	0	2395	2500
20	DADRI (NCTPP)	1820	1997	35	2033	2663
21	RIHAND STPS	3000	14382	0	14382	14008
22	SINGRAULI STPS	2000	9545	0	9545	9463
23	TANDA TPS	1760	3550	0	3550	4231
24	UNCHAHAR TPS	1550	4884	20	4904	5116
25	ROSA TPP Ph-I	1200	3399	0	3399	3948
26	ANPARA C TPS	1200	5106	0	5106	5436
27	MAQSOODPUR TPS	90	161	0	161	145
28	KHAMBARKHERA TPS	90	153	0	153	140
29	BARKHERA TPS	90	157	0	157	140
30	KUNDARKI TPS	90	184	0	184	181
31	UTRAULA TPS	90	199	0	199	197
32	PRAYAGRAJ TPP	1980	6052	0	6052	6384
33	LALITPUR TPS	1980	4004	0	4004	4221
34	MEJA STPP	1320	2923	0	2923	2762
35	DSPM TPS	500	2543	0	2543	2306
36	KORBA-III	0	858	0	858	898
37	KORBA-WEST TPS	1340	6678	0	6678	6791
38	KORBA STPS	2600	13812	0	13812	13988
39	SIPAT STPS	2980	15228	0	15228	15048
40	PATHADI TPP	600	3300	0	3300	3041

41	BHILAI TPS	500	2301	0	2301	2435
42	BALCO TPS	600	2734	41	2776	2569
43	MARWA TPS	1000	3709	0	3709	3536
44	AKALTARA TPS	1800	6635	0	6635	6744
45	BARADARHA TPS	1200	5658	0	5658	5818
46	BELA TPS	270	0	0	0	0
47	AVANTHA BHANDAR	600	2322	0	2322	2255
48	TAMNAR TPP	2400	6781	0	6781	6799
49	BANDAKHAR TPP	300	1276	12	1288	1401
50	NAWAPARA TPP	600	1631	0	1631	1586
51	OP JINDAL TPS	1000	3472	0	3472	3498
52	BINJKOTE TPP	600	1336	0	1336	1342
53	LARA TPP	1600	4144	0	4144	3931
54	RAIKHEDA TPP	1370	5471	0	5471	5557
55	UCHPINDA TPP	1440	3376	0	3376	3245
56	SABARMATI (D-F STATIONS)	362	654	106	760	782
57	SIKKA REP. TPS	500	0	896	896	911
58	GANDHI NAGAR TPS	630	839	0	839	1012
59	UKAI TPS	1110	2662	0	2662	3095
60	WANAKBORI TPS	2270	3450	0	3450	4266
61	MUNDRA UMTPP	4000	0	9819	9819	10304
62	SALAYA TPP	1200	0	2227	2227	2227
63	MUNDRA TPS	4620	0	13811	13811	13960
64	AMARKANTAK EXT TPS	210	949	0	949	999
65	SANJAY GANDHI TPS	1340	5800	0	5800	5813
66	SATPURA TPS	1330	2573	0	2573	3178
67	SHREE SINGAJI TPP	2520	3768	0	3768	4049
68	VINDHYACHAL STPS	4760	24884	0	24884	25063
69	GADARWARA TPP	1600	2794	0	2794	2581
70	KHARGONE STPP	1320	2641	0	2641	2538
71	BINA TPS	500	1082	0	1082	1316
72	ANUPPUR TPP	1200	4637	0	4637	4510
73	SASAN UMTPP	3960	17832	0	17832	18218
74	NIGRI TPP	1320	4252	0	4252	4512
75	MAHAN TPP	1200	1969	0	1969	2217
76	SEIONI TPP	600	2588	0	2588	2597
77	BHUSAWAL TPS	1210	3365	0	3365	3746
78	CHANDRAPUR(MAHARA-SHTRA) STPS	2920	12338	0	12338	12628
79	KHAPARKHEDA TPS	1340	6479	1	6479	6878
80	KORADI TPS	2400	6308	0	6308	6634
81	NASIK TPS	630	416	0	416	593
82	NASIK (P) TPS	1350	0	0	0	0
83	PARLI TPS	750	1629	0	1629	1786
84	PARAS TPS	500	2439	0	2439	2627
85	SALORA TPP	135	0	0	0	0
86	SHIRPUR TPP	150	0	0	0	0

87	TIRORA TPS	3300	11334	0	11334	11470
88	DAHANU TPS	500	1029	404	1432	1781
89	BUTIBORI TPP	600	0	0	0	0
90	AMRAVATI TPS	1350	1208	0	1208	1701
91	GMR WARORA TPS	600	2324	0	2324	2500
92	MAUDA TPS	2320	3960	309	4270	4521
93	MIHAN TPS	246	0	0	0	0
94	JSW RATNAGIRI TPP	1200	0	1278	1278	1589
95	WARDHA WARORA TPP	540	1358	0	1358	1361
96	DHARIWAL TPP	600	2496	0	2496	2745
97	TROMBAY TPS	750	0	1688	1688	1673
98	SOLAPUR STPS	1320	2235	0	2235	2340
99	Dr. N.TATA RAO TPS	1760	6176	0	6176	6650
100	RAYALASEEMA TPS	1650	1304	0	1304	1665
101	SIMHADRI	2000	5906	142	6048	6365
102	DAMODARAM SANJEEVAIAH TPS	1600	2964	819	3783	4028
103	SIMHAPURI TPS	600	0	0	0	0
104	THAMMINAPATNAM TPS	300	0	0	0	0
105	VIZAG TPP	1040	965	0	965	821
106	PAINAMPURAM TPP	1320	2957	2205	5161	5263
107	SGPL TPP	1320	0	4523	4523	4726
108	RAICHUR TPS	1720	2127	0	2127	2646
109	BELLARY TPS	1700	1487	0	1487	1993
110	UDUPI TPP	1200	0	852	852	988
111	TORANGALLU TPS(SBU-II)	600	0	590	590	582
112	TORANGALLU TPS(SBU-I)	260	0	239	239	239
113	KUDGI STPP	2400	3078	128	3206	2883
114	YERMARUS TPP	1600	1847	0	1847	1981
115	METTUR TPS	840	2447	202	2649	2760
116	NORTH CHENNAI TPS	1830	6057	483	6540	6538
117	TUTICORIN TPS	1050	3076	235	3310	3439
118	METTUR TPS - II	600	784	208	992	1077
119	VALLUR TPP	1500	3232	0	3232	3226
120	MUTHIARA TPP	1200	0	1509	1509	1464
121	TUTICORIN (JV) TPP	1000	3215	72	3287	3476
122	TUTICORIN (P) TPP	300	0	0	0	0
123	ITPCL TPP	1200	0	2169	2169	2378
124	BHADRADRI TPP	810	1135	0	1135	1133
125	RAMAGUNDEM STPS	2600	10103	0	10103	10516
126	KAKATIYA TPS	1100	3348	0	3348	3384
127	RAMAGUNDEM-B TPS	62.5	206	0	206	210
128	KOTHAGUDEM TPS (NEW)	1000	3832	0	3832	4109
129	KOTHAGUDEM TPS (STAGE-7)	800	2719	0	2719	2794
130	SINGARENI TPP	1200	4216	0	4216	4329
131	MUZAFFARPUR TPS	610	1928	0	1928	1885
132	KAHALGAON TPS	2340	10886	0	10886	10643

133	BARH II	1320	5110	0	5110	5362
134	BARAUNI TPS	710	841	0	841	877
135	NABINAGAR TPP	750	3059	0	3059	3086
136	NABINAGAR STPP	1320	3025	0	3025	2793
137	CHANDRAPURA(DVC) TPS	500	1831	0	1831	1972
138	TENUGHAT TPS	420	1654	0	1654	1592
139	BOKARO `B` TPS	210	0	0	0	14
140	BOKARO TPS `A` EXP	500	1842	0	1842	1854
141	MAITHON RB TPP	1050	3920	0	3920	3993
142	KODARMA TPP	1000	4457	0	4457	4403
143	MAHADEV PRASAD STPP	540	1955	0	1955	2043
144	JOJOBERA TPS	240	887	0	887	881
145	IB VALLEY TPS	1740	7137	0	7137	7221
146	DARLIPALI STPS	800	3528	0	3528	3376
147	TALCHER (OLD) TPS	460	2864	0	2864	3105
148	TALCHER STPS	3000	16182	447	16629	16693
149	UTKAL TPP (IND BARATH)	350	0	0	0	0
150	STERLITE TPP	1200	2342	0	2342	2356
151	KAMALANGA TPS	1050	5273	0	5273	5167
152	DERANG TPP	1200	4462	0	4462	4193
153	DURGAPUR TPS	210	7	0	7	109
154	BAKRESWAR TPS	1050	4559	0	4559	4686
155	MEJIA TPS	2340	8383	0	8383	8463
156	BANDEL TPS	330	762	0	762	807
157	D.P.L. TPS	550	1690	0	1690	1788
158	HIRANMAYE TPP	300	90	0	90	90
159	KOLAGHAT TPS	1260	1266	0	1266	1385
160	SAGARDIGHI TPS	1600	5925	0	5925	6066
161	SANTALDIH TPS	500	2302	0	2302	2293
162	BUDGE BUDGE TPS	750	3111	12	3123	3178
163	SOUTHERN REPL. TPS	135	59	0	59	64
164	TITAGARH TPS	240	0	0	0	0
165	FARAKKA STPS	2100	8043	0	8043	8184
166	DURGAPUR STEEL TPS	1000	3647	0	3647	3744
167	HALDIA TPP	600	2708	0	2708	2811
168	RAGHUNATHPUR TPP	1200	3093	0	3093	3284
169	BONGAIGAON TPP	750	1427	0	1427	1706
TOTAL ALL INDIA		**201929.5**	**550795**	**45481**	**596276**	**615444**

Annexure-4B

(Item-4.14.5)

FUEL SUPPLY/CONSUMPTION REPORT FOR GAS BASED POWER STATIONS (2020-21)

S. No	Name of Power Station	Installed Capacity (MW)	Name of the State	P/ I	Domestic Gas Allotted (MMSCMD)			RLNG (Imported)- Long Term Contracts	Gas Consumed/Supplied (MMSCMD)					
									Domestic			RLNG (Imported)		TOTAL
					APM /Non-APM/ PMT	KGD-6 (Firm)	Total		APM /Non APM/ PMT	KGD-6	Total	Long Term	SPOT	
(A) CENTRAL SECTOR														
1	NTPC, FARIDABAD CCPP	431.59	HARYANA	P	1.46	0.35	1.81	0.20	0.16	0.00	0.16	0.01	0.37	**0.55**
2	NTPC, ANTA CCPP	419.33	RAJASTHAN	P	1.31	0.24	1.55	0.50	0.15	0.00	0.15	0.09	0.00	**0.24**
3	NTPC, AURAIYA CCPP	663.36	UTTAR PRADESH	P	2.17	0.30	2.47	1.00	0.32	0.00	0.32	0.13	0.02	**0.47**
4	NTPC, DADRI CCPP	829.78	UTTAR PRADESH	P	2.39	0.86	3.25	0.30	0.78	0.00	0.78	0.19	0.14	**1.11**
	Sub Total (NR)	**2344.06**			**7.33**	**1.75**	**9.08**	**2.00**	**1.41**	**0.00**	**1.41**	**0.42**	**0.53**	**2.36**
5	NTPC, GANDHAR(JHANORE) CCPP	657.39	GUJARAT	P	2.56	0.63	3.19	0.00	0.49	0.00	0.49	0.01	0.00	**0.51**
6	NTPC, KAWAS CCPP	656.20	GUJARAT	P	3.64	2.08	5.72	0.00	0.59	0.00	0.59	0.00	0.02	**0.61**
7	RATNAGIRI (RGPPL-DHABHOL)	1967.00	MAHARASHTRA	P	0.90	7.60	8.50	1.75	0.77	0.00	0.77	0.52	0.07	**1.36**
	Sub Total (WR)	**3280.59**			**7.10**	**10.31**	**17.41**	**1.75**	**1.85**	**0.00**	**1.85**	**0.53**	**0.09**	**2.47**
8	KATHALGURI (NEEPCO)	291.00	ASSAM	I	1.40	0.00	1.40	0.00	1.26	0.00	1.26	0.00	0.00	**1.26**
9	AGARTALA GT+ST (NEEPCO)	135.00	TRIPURA	I	0.75	0.00	0.75	0.00	0.69	0.00	0.69	0.00	0.00	**0.69**
10	MONARCHAK(NEEPCO)	101.00	TRIPURA	I	0.50	0.00	0.50	0.00	0.37	0.00	0.37	0.00	0.00	**0.37**
11	TRIPURA CCPP (ONGC)	726.60	TRIPURA	I	2.65	0.00	2.65	0.00	2.68	0.00	2.68	0.00	0.00	**2.68**
	Sub Total (NER)	**1253.60**			**5.30**	**0.00**	**5.30**	**0.00**	**5.00**	**0.00**	**5.00**	**0.00**	**0.00**	**5.00**
	Total (CS)=A	**6878.25**			**19.73**	**12.06**	**31.79**	**3.75**	**8.26**	**0.00**	**8.26**	**0.95**	**0.62**	**9.83**
(B) STATE SECTOR														
12	I.P.CCPP	270.00	DELHI	P	0.95	0.00	0.95	0.60	0.27	0.00	0.27	0.06	0.00	**0.33**
13	PRAGATI CCGT-III	1500.00	DELHI	P	1.56	0.93	2.49	0.00	1.41	0.00	1.41	0.35	0.00	**1.77**
14	PRAGATI CCPP	330.40	DELHI	P	2.05	0.00	2.05	0.20	0.32	0.00	0.32	0.57	0.00	**0.89**
15	DHOLPUR CCPP	330.00	RAJASTHAN	P	1.50	0.10	1.60	0.00	0.00	0.00	0.00	0.00	0.08	**0.08**
16	RAMGARH (RRVUNL,Jaisalmer)	273.80	RAJASTHAN	I	1.65	0.00	1.65	0.00	0.65	0.00	0.65	0.00	0.00	**0.65**
	Sub Total (NR)	**2704.20**			**7.71**	**1.03**	**8.74**	**0.80**	**2.65**	**0.00**	**2.65**	**0.98**	**0.08**	**3.71**
17	DHUVARAN CCPP(GSECL)	594.72	GUJARAT	P	0.25	0.44	0.69	0.25	0.09	0.00	0.09	0.11	0.68	**0.88**
18	HAZIRA CCPP(GSEG)	156.10	GUJARAT	P	0.80	0.01	0.81	0.00	0.00	0.00	0.00	0.00	0.24	**0.24**
19	HAZIRA CCPP EXT	351.00	GUJARAT	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	**0.72**
20	PIPAVAV CCPP	702.00	GUJARAT	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	**1.39**
21	UTRAN CCPP (GSECL)	374.00	GUJARAT	P	0.00	1.45	1.45	0.24	0.00	0.00	0.00	0.10	0.84	**0.93**
22	URAN CCPP (MAHAGENCO)	672.00	**MAHARASHTRA**	P	3.50	1.40	4.90	0.00	1.35	0.00	1.35	0.00	0.00	**1.35**
	Sub Total (WR)	**2849.82**			**4.55**	**3.30**	**7.85**	**0.49**	**1.43**	**0.00**	**1.43**	**0.21**	**3.86**	**5.50**
23	GODAVARI (JEGURUPADU)	235.40	ANDHRA PRADESH	P	1.10	0.21	1.31	0.00	0.42	0.00	0.42	0.00	0.00	**0.42**
24	KARAIKAL CCPP (PPCL)	32.50	PUDUCHERRY	I	0.20	0.00	0.20	0.00	0.17	0.00	0.17	0.00	0.00	**0.17**
25	KOVIKALPAL (THIRUMAKOTTAI)	107.00	TAMIL NADU	I	0.45	0.00	0.45	0.00	0.20	0.00	0.20	0.00	0.00	**0.20**
26	KUTTALAM (TANGEDCO)	100.00	TAMIL NADU	I	0.45	0.00	0.45	0.00	0.30	0.00	0.30	0.00	0.00	**0.30**
27	VALUTHUR CCPP	186.20	TAMIL NADU	I	0.89	0.00	0.89	0.00	0.59	0.00	0.59	0.00	0.00	**0.59**
	Sub Total (SR)	**661.10**			**3.09**	**0.21**	**3.30**	**0.00**	**1.68**	**0.00**	**1.68**	**0.00**	**0.00**	**1.68**
28	LAKWA GT (ASEB,Maibella)	97.20	ASSAM	I	0.50	0.00	0.50	0.00	0.33	0.00	0.33	0.00	0.00	**0.33**
29	LAKWA Replacement CCPP***	69.76	ASSAM	I	0.40	0.00	0.40	0.00	0.30	0.00	0.30	0.00	0.00	**0.30**
30	**NAMRUP CCPP + ST (APGCL)**	162.40	ASSAM	I	0.66	0.00	0.66	0.00	0.30	0.00	0.30	0.00	0.00	**0.30**
31	BARAMURA GT (TSECL)	58.50	TRIPURA	I	0.40	0.00	0.40	0.00	0.23	0.00	0.23	0.00	0.00	**0.23**
32	ROKHIA GT (TSECL)	111.00	TRIPURA	I	0.50	0.00	0.50	0.00	0.43	0.00	0.43	0.00	0.00	**0.43**

	Sub Total (NER)	**498.86**			**2.46**	**0.00**	**2.46**	**0.00**	**1.60**	**0.00**	**1.60**	**0.00**	**0.00**	**1.60**
	Total (SS)=B	**6713.98**			**17.81**	**4.54**	**22.35**	**1.29**	**7.36**	**0.00**	**7.36**	**1.19**	**3.94**	**12.49**
(C) PVT/IPP SECTOR														
33	RITHALA CCPP (NDPL)	108.00	DELHI	P	0.00	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
34	GAMA CCPP	225.00	UTTARAKHAND	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	**0.13**
35	KASHIPUR CCPP(Sravanthi)	225.00	UTTARAKHAND	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	**0.28**
	Sub Total (NR)	**558.00**			**0.00**	**0.40**	**0.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.28**	**0.13**	**0.41**
36	BARODA CCPP (GIPCL)	160.00	GUJARAT	P	0.36	0.09	0.45	0.30	0.01	0.00	0.01	0.00	0.00	**0.01**
37	ESSAR CCPP	300.00	GUJARAT	P	0.00	1.17	1.17	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
38	PAGUTHAN CCPP (CLP)	655.00	GUJARAT	P	0.13	1.30	1.43	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
39	SUGEN CCPP (TORRENT)	1147.50	GUJARAT	P	0.90	3.31	4.21	1.14	0.00	0.00	0.00	1.09	1.90	**2.99**
40	UNOSUGEN CCPP	382.50	GUJARAT	P	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.00	1.02	**1.06**
41	DGEN Mega CCPP	1200.00	GUJARAT	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	**0.54**
42	TROMBAY CCPP (TPC)	180.00	MAHARASHTRA	P	1.50	0.00	1.50	1.00	0.79	0.00	0.79	0.00	0.04	**0.83**
43	MANGAON CCPP	388.00	MAHARASHTRA	p	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Sub Total (WR)	**4413.00**			**2.89**	**5.87**	**8.76**	**2.44**	**0.84**	**0.00**	**0.84**	**1.09**	**3.49**	**5.42**
44	GAUTAMI CCPP	464.00	ANDHRA PRADESH	P	1.96	1.86	3.82	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
45	GMR - KAKINADA (Tanirvavi)	220.00	ANDHRA PRADESH	P	0.00	0.88	0.88	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
46	GMR-Rajamundry Energy Ltd.	768.00	ANDHRA PRADESH	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
47	GODAVARI (SPECTRUM)	208.00	ANDHRA PRADESH	P	1.04	0.00	1.04	0.00	0.24	0.00	0.24	0.00	0.00	**0.24**
48	JEGURUPADU CCPP (GVK) PHASE- II	220.00	ANDHRA PRADESH	P	1.34	0.88	2.22	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
49	KONASEEMA CCPP	445.00	ANDHRA PRADESH	P	0.00	1.78	1.78	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
50	KONDAPALLI EXTN CCPP .	366.00	ANDHRA PRADESH	P	0.00	1.46	1.46	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
51	KONDAPALLI ST-3 CCPP (LANCO)	742.00	ANDHRA PRADESH	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
52	KONDAPALLI CCPP (LANCO)	368.14	ANDHRA PRADESH	P	1.46	0.36	1.82	0.00	0.61	0.00	0.61	0.00	0.00	**0.61**
53	PEDDAPURAM (BSES)	220.00	ANDHRA PRADESH	P	0.84	0.25	1.09	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
54	VEMAGIRI CCPP	370.00	ANDHRA PRADESH	P	1.64	1.48	3.12	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
55	VIJESWARAN CCPP	272.00	ANDHRA PRADESH	P	1.32	0.00	1.32	0.00	0.76	0.00	0.76	0.00	0.00	**0.76**
56	PCIL POWER AND HOLDINGS Ltd*	30.00	ANDHRA PRADESH	P	0.00	0.12	0.12	0.00	-	-	-	-	-	-
57	RVK ENERGY*	28.00	ANDHRA PRADESH	P	0.00	0.11	0.11	0.00	-	-	-	-	-	-
58	SILK ROAD SUGAR*	35.00	ANDHRA PRADESH	P	0.00	0.10	0.10	0.00	-	-	-	-	-	-
59	LVS POWER*	55.00	ANDHRA PRADESH	P	0.00	0.22	0.22	0.00	-	-	-	-	-	-
60	KARUPPUR CCPP (LANCO TANJORE)	119.80	TAMIL NADU	I	0.50	0.00	0.50	0.00	0.17	0.00	0.17	0.00	0.00	**0.17**
61	P.NALLUR CCPP (PPN)	330.50	TAMIL NADU	I	1.50	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
62	VALANTARVY CCPP	52.80	TAMIL NADU	I	0.38	0.00	0.38	0.00	0.15	0.00	0.15	0.00	0.00	**0.15**
	Sub Total (SR)	**5314.24**			**11.98**	**9.50**	**21.48**	**0.00**	**1.93**	**0.00**	**1.93**	**0.00**	**0.00**	**1.93**
63	DLF ASSAM GT*	24.50	ASSAM	I	0.10	0.00	0.10	0.00	-	-	0.00	-	-	-
	Sub Total (NER)	**24.50**			**0.10**	**0.00**	**0.10**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	Total (PVT/ IPP S)=C	**10309.74**			**14.97**	**15.77**	**30.74**	**2.44**	**2.77**	**0.00**	**2.77**	**1.37**	**3.62**	**7.76**
	GRAND TOTAL=A+B+C	**23901.97**			**52.51**	**32.37**	**84.89**	**7.48**	**18.38**	**0.00**	**18.38**	**3.52**	**8.18**	**30.08**

APM:Administerd price mechanism, RLNG:Regasified liquefied natural gas, LT:Long term, DNR=Data not received;
MMSCM- Million Metric Standard Cubic Meters, MMSCMD - Million Metric Standard Cubic Metres/day=MMSCM/(No. of Days in a month)
P=Supply through Pipe Line, I=Isolated, MU -- Million Unit, KL-- Kilo Litre, (KL=1.35*MT),

HSD -- High Speed Diesel, *PLANTS UNDER SHUTDOWN

Annexure-5A
(Item no. 5.2)

Details of Inter-regional Transmission lines as on 31.03.2021

Details of Inter-regional transmission lines	Transmission Capacity in MW (As on 31.03.2021)
EAST-NORTH	
Dehri-Sahupuri 220 kV S/c	130
Muzaffarpur-Gorakhpur 400 kV D/c (with Series Cap+TCSC)	2,000
Patna – Balia 400kV D/c (Quad)	1,600
Biharshariff – Balia 400kV D/c(Quad)	1,600
Barh – Balia 400kV D/c (Quad)	1,600
Gaya - Balia 765kV S/c	2,100
Sasaram-Allahabad/Varanasi 400kV D/C line (Sasaram HVDC back to back has been bypassed)	1,000
Sasaram - Fatehpur 765kV2x S/c	4,200
Barh-II-Gorakhpur 400kV D/c (Quad) line	1,600
Gaya-Varanasi 765 kV S/c line	2,100
LILO of Biswanath Chariali - Agra +/- 800 kV, 3000 MW HVDC Bi-pole at new pooling station in Alipurduar and addition of second 3000 MW module	3,000
Biharsharif-Varanasi 400kV D/c line (Quad)	1,600
Sub-total	**22,530**
EAST-WEST	
Budhipadar-Korba 220 kV 3 ckts.	390
Rourkela-Raipur 400 kV D/c with series comp.+TCSC	1,400
Ranchi –Sipat 400 kV D/c with series comp.	1,200
Rourkela-Raipur 400 kV D/c (2^{nd}) with series comp.	1,400
Ranchi - Dharamjayagarh - WR Pooiling Station 765kV S/c line	2,100
Ranchi - Dharamjaygarh 765kV 2nd S/c	2,100
Jharsuguda-Dharamjaygarh 765kV D/c line	4,200
Jharsuguda-Dharamjaygarh 765kV 2nd D/c line	4,200
Jharsuguda- Raipur 765kV D/c line	4,200
Sub-total	**21,190**
WEST- NORTH	
Auriya-Malanpur 220 KV D/c	260
Kota - Ujjain 220 KV D/c	260
Vindhyachal HVDC back-to-back	500

Gwalier-Agra 765 kV 2 x S/c	4,200
Zerda-Kankroli 400kV D/c	1,000
Champa Pool- Kurukshetra HVDC Bipole	3,000
Gwalior-Jaipur 765kV 2xS/c lines	4,200
RAPP-Sujalpur 400kV D/c	1,000
Adani(Mundra) - Mahendranagar HVDC bipole	2,500
Upgradation of Champa Pool- Kurukshetra HVDC Bipole	3,000
Jabalpur - Orai 765kV D/c line	4,200
LILO of Satna - Gwalior 765kV 2xS/c line at Orai	4,200
Banaskantha-Chittorgarh 765kV D/c line	4,200
Sub-total	**32,520**
EAST- SOUTH	
Balimela-Upper Sileru 220kV S/c	130
Gazuwaka HVDC back-to-back	1,000
Talcher-Kolar HVDC bipole	2,000
Upgradation of Talcher-Kolar HVDC Bipole	500
Angul - Srikakulum	4,200
Sub-total	**7,830**
WEST- SOUTH	
Chandrapur HVDC back-to-back	1,000
Kolhapur-Belgaum 220kV D/c	260
Ponda – Nagajhari 220kV D/c	260
Raichur - Sholapur 765kV S/c line (PG)	2,100
Raichur - Sholapur 765kV S/c line (Pvt. Sector)	2,100
Narendra - Kolhapur 765kV D/c (ch at 400kV)	2,200
Wardha - Hyderabad 765kV D/c line(Part of Wardha – Nizamabad line)	4,200
Raigarh –Pugalur HVDC line with with Raigarh and Pugalur Station HVDC Terminal (Pole-I & Pole-II , each 1500 MW charged)	3,000
Sub-total	**15,120**
EAST- NORTH EAST	
Birpara-Salakati 220kV D/c	260
Malda - Bongaigaon 400 kV D/c	1,000
Siliguri - Bongaigaon 400 kV D/c (Quad) line	1,600
Sub-total	**2,860**
NORTH EAST-NORTH	
Biswanath Chariali - Agra +/- 800 kV, 3000 MW HVDC Bi-pole$	3,000
Sub-total	**3,000**
TOTAL (CUMULATIVE)	**105,050**

Annexure-5B

(Item no. 5.3.2)

ISSUES PERTAINING TO TRANSMISSION SYSTEM PLANNING TAKEN UP DURING 2020-21

A. 2nd Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP)

1. Creation of 400/220 kV, 2x315 MVA S/S at Akhnoor/Rajouri as ISTS.
2. Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs.
3. Implementation of 400/132kV transformer at Kishtwar Pooling Station.
4. Transmission works to be implemented in Jammu and Kashmir Region under Intra – State transmission system.
5. Establishment of 400kV substations (Jhatikara & TikriKhurd) and Interstate 220/66- 33kV substation at Maharani Bagh under 13th Business Plan of DTL.
6. Transmission System requirement for additional 20GW REZ in Northern Region (Phase-III).
7. Transmission system for evacuation of power from Khurja STPP (2x660 MW) of THDCIL.
8. Up-gradation of Tehri Pooling Station–Meerut 765kV 2xS/c lines (operated at 400 kV) at its rated voltage.
9. Evacuation system for Singrauli STPP Stage III (2x800 MW).
10. Change in location in the earlier agreed transmission schemes: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A.
11. Power Evacuation for various HEPs in the Chenab and Satluj Basin of Himachal Pradesh.
12. Evacuation arrangement of Tidong-I HEP in DisttKinnaur (HP).
13. Issue regarding 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line.
14. Grant of 400kV bays to RE generators at Bhadla-II PS, Fatehgarh-II, & Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS.
15. 2 nos. of 765kV GIS line bays Modules at Aligarh S/s.
16. Phasing of Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II.
17. Spare Reactor at Narela.
18. Additional 80 MVAR, 765kV Spare Reactor at Bhadla-II S/s.
19. Additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station.
20. Connectivity & LTA Status for Rajasthan SEZ Phase-I & II.
21. Time frame of 1 no. of 220kV bays at Shahjahanpur (PG) under ISTS.
22. LILO of both circuits of Fatehgarh -I– Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II – Conductor for LILO in Portion.
23. Transmission works proposed by HVPNL.
24. Down Stream network by State utilities from ISTS Station.
25. Status of signing of LTA/TA agreements for the generation projects in Uttarakhand.
26. Intra-State Transmission schemes proposed by UPPTCL.
27. Transmission System for upcoming hydro generators in Yamuna Basin.

B. 3rd Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP)

1. Transmission System requirement for additional 20 GW REZ in Northern Region (Phase-III)
2. Creation of 400/220 kV, 2x315 MVA S/S at Siot (earlierAkhnoor/Rajouri) as ISTS
3. Handing over of 400 kV D/c Khandukhal-Rampura line and 220 kV D/c Mori-Dehradun line of PTCUL under UITP scheme (deemed ISTS) to Central Sector
4. Transmission Scheme for evacuation of power from hydro projects in Yamuna Basin

5. Transmission system strengthening scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part G1-Modification
6. Reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c line
7. Underground Cabling works (220kV) in 220 kV Pithoragarh-Jauljivi D/c line
8. Proposal for reactive compensation on 400 kV transmission lines (ISTS)
9. Transmission works to be implemented in Jammu and Kashmir Region under Intra –State transmission system
10. Power evacuation scheme of 66 MW Dhaulasidh HEP of SJVN Limited in Himachal Pradesh
11. Establishment of 400/220 kV Nange Pooling Station for proposed SJVN Hydro Power Plant Luhri Stage-I, II & Sunni Dam
12. Construction of 220/33 kV, 31.5 MVA Substation in AD Hydro Switchyard at Prini by HPPTCL
13. Construction of 220/132 kV, 2x100 MVA Substation at Paonta Sahib by D/C LILO of 220 kV Khodri-Mazri Line
14. Intra State Transmission works proposed by RVPN
15. Intra State Transmission works proposed by HVPN
16. LILO of one ckt 132kV D/C line Rihand Hydro(Pipari-UP)-Sonenager (Bihar) at 220/132/33kV S/S Myorpur (UPPTCL)
17. LILO of 220kV Phulpur- Jhusi line at 400kV S/S Machhalishahr (Jaunpur)
18. Increasing capacity of 400kV Agra PG, Allahabad PG, Kanpur PG, Lucknow PG and Meerut PG Substations
19. Interim arrangement for charging of 220 kV Shahjahanpur PG(400)- Shahjahanpur (UPPTCL) S/c line
20. Augmentation of transformation capacity at 400kV Nakodar sub-station of PSTCL
21. Grant of Connectivity to Kutehr HEP (240 MW) by S/C LILO of 400 kV D/C (Twin Moose) line from 400/220 kV, 2 x 315 MVA, Lahal Sub-Station to 400/220 kV Chamera P.S. of PGCIL at Rajera.
22. 2nd Circuit stringing of 220 kV Karian - Rajera line & construction of 220/132 kV, 100 MVA Substation at Mazra by S/C LILO of 220 kV Karian to 400/220 kV Chamera Pooling station at Rajera.
23. Intra state strengthening system by UPPTCL

C. 2nd meeting of Western Regional Power Committee (Transmission Planning) (WRPCTP)

1. Modification of the Transmission Scheme for evacuation of 10 GW RE power from potential RE zones in Khavda region by National Committee on Transmission.
2. Modification in future space provision at Kallam PS under the transmission scheme "Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra."
3. Evacuation system for Singrauli STPP Stage III (2x800 MW) of M/s NTPC.
4. Phasing of RajgarhTransmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh.
5. Evacuation system from the RE potential areas in Madhya Pradesh after the Reassessment of RE potential by MNRE.
6. High fault level at substations in Gujarat-Vadodara (PGCIL), Dehgam (PGCIL), Ranchodpura (GETCO) and Asoj (GETCO).
7. Transmission system strengthening associated with Review of Transmission System for REZ in Gujarat.
8. Connectivity to 325 MW Wind Project of M/s SBESS Services Projectco Pvt Ltd at 220 kV level of existing Indore (PG) S/s.
9. Intra-state proposal received from MPPTCL:
   (i) LILO of both circuit of Itarsi (PGCIL) to Bhopal (MPPTCL) 400kV D/C line (on Twin Moose) at Mandideep 400kV GIS Substation (Distt-Bhopal) to be constructed under TBCB process.
   (ii) LILO of Auriya (UP) – Mehgaon 220kV line at Bhind (TBCB) 220kV substation.
   (iii) LILO of Gwalior (Mahalgaon) - Datiya 220kV line at Gwalior (PGCIL) 765kV Substation.
   (iv) Conversion of 400kV fixed line reactors as switchable line reactors installed on 400kV lines of PGCIL.
   (v) Proposed intra-state 220 kV Substations alongwith associated transmission line in Madhya Pradesh through TBCB process.

(vi) Installation of additional 1x100MVA, 400/132kV Transformer (3rd ICT) and 1x125MVAR Bus Reactor at Kirnapur 400/132kV Substation of MPPTCL.

10. Creation of 220 kV level at 765/400 kV Shikrapur (PGCIL) Substation– proposal from MSETCL.
11. Progress of downstream network whose terminating bays are under construction by PGCIL.
12. Implementation issues associated with the scheme "Measures to control fault level at Wardha Substation".
13. Additional feed to BALCO through LILO of 2ndcircuit of Korba - Birsinghpur 400kV D/c line at BALCO along with bypass arrangement at BALCO switchyard.
14. Permission for Charging of 125MVAR switchable bus cum line reactor at Sagar 400kV substation of MPPTCL- Agenda by MPPTCL.

A. 2nd meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP).

1. Review of Transmission system by system operator
2. Modification in construction of 220 kV D/C Barjora-Burdwan line of DVC.
3. Interim connectivity to generation projects in ER through LILO arrangement.
4. Uprating of bay equipment at Kahalgaon switchyard matching with capacity of Kahalgaon-Patna 400kV (Quad) D/C line- by POWERGRID.
5. Drawal of Power from 132kV Rihand (Pipri) (UPPTCL) – Sone Nagar (BSPTCL) at Nagaruntari TSS by LILO arrangement.
6. Augmentation of transformation capacity at 400/220kV Ranchi (POWERGRID) S/s.
7. Connectivity application for Teesta IV HEP (520 MW).
8. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations.
9. Status of 400kV substations being implemented by STUs in ER under intra-state schemes.
10. Post-facto approval of LILO of 220 kV Purnea (PG)- Begusarai DCDS line at Khagaria (New)
11. Feeding 132 kV Power to 132/33 kV GSS Barsoi (BSPTCL) from 440/220/132 kV GSS Purnea (PGCIL) through jumpering of 132 kV Purnea (PG)- Kishanganj (Old) T/L to 132 kV Kishanganj (New)-Barsoi T/L at the point of overcrossing site.
12. Creation of 220 kV bus at Banka (PG) and Lakhisarai (PG).
13. Re-conductoring of Siliguri-Bongaigaon 400kV D/c Twin Moose line with Twin HTLS conductor, reconductoring of Alipurduar – Salakati (Bongaigaon) 220kV D/c line with Single HTLS
14. Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line.
15. LILO of one ckt 132kV DC line Rihand Hydro (Pipri-UP)-Sonenagar (Bihar) at 220/132/33kV S/S Myorpur UPPTCL) – Agenda by UPPTCL.
16. Breakdown of FSTPS-N. PURNEA & GOKARNA-N. PURNEA lines and reconfiguration of the lines to supply Gokarna – Agenda by ERPC.
17. Nabinagar (BRBCL) TPP, 1000 MW (4x250MW unit) Power evacuation plan.

B. 3rd meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP).

1. Review of Transmission system by system operator
2. Non-compliance of N-1 contingency criteria on 220 kV Maithon-Dhanbad D/C and 220 kV Maithon-Kalyaneshwari D/C line.
3. Augmentation of transformation capacity at 400/220kV Ranchi (POWERGRID) S/s
4. First time charging (FTC) request of 315MVA 400/220KV/33KV ICT#1 and associated 400KV bay of DSTPS, DVC at 400KV level.
5. Connectivity/Access application
6. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations
7. Status of 400kV substations being implemented by STUs in ER under intra-state schemes

8. Creation of 220 kV bus at Banka (PG)
9. Re-conductoring of Siliguri-Bongaigaon 400kV D/c Twin Moose line with Twin HTLS conductor, reconductoring of Alipurduar – Salakati (Bongaigaon) 220kV D/c line with Single HTLS
10. Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line.

C. 02nd meeting of North Eastern Region Power Committee – Transmission Planning (NERPC-TP)

- Confirmation of minutes of the 1st meeting of North Eastern Region Power Committee-Transmission Planning (NERPCTP)
- Quarterly Review of transmission line and substation
- Assessment of growth in generation capacity and demand in the region
- Requirement for strengthening of Inter-regional transmission system
- Review of Transmission system from operational considerations
- Subsystems not fulfilling N-1 – Agenda by NERLDC
- Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighbouring substations in Arunachal Pradesh
- 400kV Connectivity of 400/132kV Surajmaninagar (TSECL)S/s
- Three Phase Auto-reclosure for 400kV lines-Agenda from NERPC
- Connectivity and LTA applications agreed in Connectivity & LTA meetings held after 1st meeting of NERPC-TP
- Installation of 125MVAR Bus Reactor at Subansiri Lower HE Project (2000 MW)
- Downstream system development by STUs from the various commissioned and on-going ISTS substations
- Status of 400kV substations and other important elements being implemented by STUs in NER under intra-state schemes
- Utilisation of spare 132kV ISTS bays at Silchar (POWERGRID), P.K.Bari (TSECL), Palatana (OTPC), and Surajmaninagar (TSECL) and Misa (POWERGRID)
- Intra state scheme of Assam for the year 2030
- 132kV Connectivity of 400/132kV Surajmaninagar (ISTS) S/s
- 132kV Connectivity of 400/132kV P.K. Bari (ISTS) S/s
- Re-conductoring and strengthening of aged 132 kV lines in Manipur with HTLS
- N-1 reliability issue for meeting power requirement in the south of Manipur
- N-1 reliability requirement at Ranganadi, Arunachal Pradesh
- N-1 reliability requirement at Mawlai, Meghalaya
- N-1 reliability requirement at Zuangtui, Mizoram
- Under construction inter-regional transmission schemes with NER
- Conversion of 132kV bus bar at Imphal & Nirjuli substations and North Eastern Region Strengthening Scheme-IX (NERSS-IX)
- Surajmaninagar (India) – Comilla (Bangladesh) 400kV cross border link:
- Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line
- Under-utilization of 2x160MVA, 220/132kV ICTs at Balipara
- Bay rearrangement at 132/33kV Sihhmui S/s
- Restoration of Kopili Substation
- Special Protection Scheme in NER
- LILO of 400 kV D/C Silchar-Byrnihat along with 400/220 kV 2x315 MVA, 220/132 kV 2x160 MVA substation at Mynkre, Meghalaya
- LILO of 400 kV D/C Silchar -Byrnihat along with 400/220kV 2x315 MVA, substation at New Shillong, Meghalaya
- Charging of elements under NER System Strengthening Scheme-II (PartB) and V being executed in the state of Tripura
- Connectivity application for Dibang HEP (12x240MW) of M/s NHPC Ltd.

D. 2nd meeting of Southern Regional Power Committee (Transmission Planning) [SRPC(TP)]

1. Modifications in 220 kV transmission system proposed by KPTCL at Yalwar (associated transmission lines of 400/220 kV Yalwar Substation).
2. Establishing 2x500 MVA, 400/220 kV GIS A-Station at Anand Rao circle (adjacent to existing 220/66/11 kV A Station) in Bengaluru.
3. Proposal for grant of connectivity to NLC India Ltd for TPS-II 2nd Expansion (2x660 MW) in Cuddalore, Tamil Nadu, and to control high short circuit fault level in Neyveli Generation complex.
4. Overloading of 400 kV NP Kunta-Kolar S/C line.
5. Short Circuit studies and Over/Under Voltage studies for Southern Region.
6. Augmentation of Transformer capacity in Southern Region (including augmentation of transformation capacity with 1x500 MVA, 400/220 kV ICT each at Kochi and Hiriyur 400 kV substations).
7. Evacuation of power from Telangana Ph-I (2x800 MW) Power Project of NTPC – provision of adequate margin in transmission system for evacuation of 15% unallocated quota (transmission system already agreed in 41st SCPSPSR meeting as intra-state system).
8. Provision of 4th ICT of 500 MVA capacity at existing 400/220 kV Vemagiri substation.
9. Erection of 400 kV Quad Moose DC line from 400 kV Kalpaka SS to 400 kV Garividi (Mardam) SS-replacement of existing Twin Moose Conductor with Twin Moose Invar conductor from location No. 1 to location No. 14.
10. Evacuation of 6,100 MW (AC) of Solar Power proposed by Andhra Pradesh Green Energy Corporation Limited (APGECL) from various Pooling Stations under Phase-I out of 10,000 MW (AC) of Solar power.
11. Proposal for new 220 kV substation at Chandanvally along with modification in earlier approved 220 kV D/C line from 400/220/132 kV Kethireddypalli (Manikonda) SS to proposed 220 kV KP Laxmidevipally LI SS.
12. Proposal for extending power supply to meet the load requirement for lifting additional 1 TMC of water from Godavari Basin in Link-I, Link-II & Link-IV of Kaleshwaram Lift Irrigation Scheme.
13. Establishment of S. P. Koil 400/230-110 kV SS by upgrading the existing S. P. Koil 230/110 kV SS.
14. Revised ATS for Mangalapuram 400/230 kV S/S.
15. Establishment of Kalvadagam 400/110 kV substation.
16. Neyveli TS-II to Neyveli (TANTRANSCO) 230 kV substation-230 kV line 1 & 2 - Ratification for the usage of Twin Moose conductor instead of the approved HTLS conductor.
17. Proposal to drop the 230 kV connectivity to NTPL for power evacuation during contingent conditions.
18. ATS for Manalmedu 400/230-110 kV substation.
19. Green Energy Corridor Projects in Kerala.
20. Installation of Shunt Reactor at the proposed 400 kV Kottayam substation.
21. Modification in connectivity of 400 kV Edamon substation.
22. Change in location of 220 kV Eramallur substation.
23. Restoring of one circuit of Kudankulam – Tuticorin PS 400 kV (quad) D/c line at Tirunelveli to control loadings/un-balancing on Kudankulam – Tirunelveli 400 kV (quad) lines.
24. Transmission system for grant of connectivity to NPCIL for expansion of Kudankulam NPP Unit 3&4 (2x1000 MW).
25. Assessment of online Dynamic Line Rating.
26. Requirement of 765 kV spare (1-Ph) Reactors unit.
27. Connectivity transmission system agreed in connectivity/LTA meetings of Southern Region.
28. Status of Implementation of downstream network by State utilities associated with ISTS substation of POWERGRID.
29. Phase-I & Phase-II Solar & Wind Energy Zone Transmission Schemes.
30. Establishing of 3x500 MVA, 400/220kV Devanahalli substation in Bengaluru.

E. 2nd meeting of North Eastern Regional Power Committee (Transmission Planning) (NERPCTP)

1. Confirmation of minutes of the 1st meeting of North Eastern Region Power Committee-Transmission Planning (NERPCTP)
2. Quarterly Review of transmission line and substation
3. Assessment of growth in generation capacity and demand in the region

4. Requirement for strengthening of Inter-regional transmission system
5. Review of Transmission system from operational considerations
6. Subsystems not fulfilling N-1 – Agenda by NERLDC
7. Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighbouring substations in Arunachal Pradesh
8. 400kV Connectivity of 400/132kV Surajmaninagar (TSECL)S/s
9. Three Phase Auto-reclosure for 400kV lines-Agenda from NERPC
10. Connectivity and LTA applications agreed in Connectivity & LTA meetings held after 1st meeting of NERPC-TP
11. Installation of 125MVAR Bus Reactor at Subansiri Lower HE Project (2000 MW)
12. Downstream system development by STUs from the various commissioned and on-going ISTS substations
13. Status of 400kV substations and other important elements being implemented by STUs in NER under intra-state schemes
14. Utilisation of spare 132kV ISTS bays at Silchar (POWERGRID), P.K.Bari (TSECL), Palatana (OTPC), and Surajmaninagar (TSECL) and Misa (POWERGRID)
15. Intra state scheme of Assam for the year 2030
16. 132kV Connectivity of 400/132kV Surajmaninagar (ISTS) S/s
17. 132kV Connectivity of 400/132kV P.K. Bari (ISTS) S/s
18. Re-conductoring and strengthening of aged 132 kV lines in Manipur with HTLS
19. N-1 reliability issue for meeting power requirement in the south of Manipur
20. N-1 reliability requirement at Ranganadi, Arunachal Pradesh
21. N-1 reliability requirement at Mawlai, Meghalaya
22. N-1 reliability requirement at Zuangtui, Mizoram
23. Under construction inter-regional transmission schemes with NER
24. Conversion of 132kV bus bar at Imphal & Nirjuli substations and North Eastern Region Strengthening Scheme-IX (NERSS-IX)
25. Surajmaninagar (India) – Comilla (Bangladesh) 400kV cross border link:
26. Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line
27. Under-utilization of 2x160MVA, 220/132kV ICTs at Balipara
28. Bay rearrangement at 132/33kV Sihhmui S/s
29. Restoration of Kopili Substation
30. Special Protection Scheme in NER
31. LILO of 400 kV D/C Silchar-Byrnihat along with 400/220 kV 2x315 MVA, 220/132 kV 2x160 MVA substation at Mynkre, Meghalaya
32. LILO of 400 kV D/C Silchar -Byrnihat along with 400/220kV 2x315 MVA, substation at New Shillong, Meghalaya
33. Charging of elements under NER System Strengthening Scheme-II (PartB) and V being executed in the state of Tripura
34. Connectivity application for Dibang HEP (12x240MW) of M/s NHPC Ltd.

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Annexure – 5C

(Item 5.4.2)

Details of the Schemes notified through Tariff Based Competitive Bidding (TBCB) during 2020-21

a) Schemes already commissioned/ready for commissioning by Transmission Service Providers: (30 Nos.)

1. Transmission system associated with IPPs of Nagapattinam / Cuddalore Area – Package - A
2. Transmission system for Strengthening in SR for Import of Power from ER.
3. ATS of Unchahar TPS
4. Northern Region System Strengthening Scheme, NRSS-XXXI (Part-A)
5. Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC Part-A
6. Transmission system associated with Gadarwara STPS (2x800 MW) of NTPC (Part – B)
7. Transmission System Strengthening associated with Vindhyachal - V
8. System strengthening for WR
9. System strengthening common for WR and NR
10. Scheme for enabling import of NER/ER surplus by NR
11. Part ATS for RAPP U-7&8 in Rajasthan
12. Eastern Region System Strengthening Scheme-VII
13. Northern Region System Strengthening Scheme, NRSS-XXIX
14. Connectivity Lines for Maheshwaram (Hyderabad) 765/400 kV Pooling S/s
15. Eastern Region Strengthening Scheme –VI (ERSS-VI)
16. Northern Region System Strengthening Scheme, NRSS-XXXI (Part-B)
17. Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Ltd.
18. Transmission System for Patran 400kV S/S
19. Transmission System Associated with Krishnapattnam UMPP- Synchronous interconnection between SR and WR (Part-B)
20. Common Transmission System for Phase-II Generation Projects in Odisha(Orissa) and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha
21. Additional System Strengthening for Sipat STPS
22. Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B
23. System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region
24. Western Region System Strengthening – II under Project – B (Maharashtra)
25. Western Region System Strengthening – II under Project – C (Gujarat)
26. Transmission System Strengthening in India System for transfer of power from new HEPs in Bhutan
27. Creation of new 400kV GIS Substations in Gurgaon and Palwal area as a part of ISTS
28. Strengthening of Transmission System beyond Vemagiri
29. North Eastern Region System Strengthening Scheme – VI (NERSS – VI)
30. Transmission system for NERSS-II Part B and NERSS-V

b) Schemes under implementation by the Transmission Service Providers: (22 Nos.)

1. System Strengthening Scheme in Northern Region (NRSS-XXXVI)" along with LILO of Sikar-Neemrana 400kV D/C line at Babai (RRVPNL)
2. Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link
3. Transmission System Strengthening in WR associated with Khargone TPP (1320 MW)
4. 765 kV System Strengthening Scheme in Eastern Region (ERSS-XVIII)
5. Additional 400 kV feed to Goa (ii) Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool
6. New WR- NR 765 kV Inter-regional corridor

7. Transmission system for Ultra Mega Solar Park in Fatehgarh,distt. Jaisalmer Rajasthan
8. Eastern Region Strengthening Scheme –XXI (ERSS-XXI)
9. Immediate evacuation for North Karanpura (3X660 MW) generation project of NTPC Creation of 400/220 kV sub-station at Dhanbad-Proposal of JUSNL (ERSS-XIX)
10. Transmission system associated with LTA applications from Rajasthan SEZ Part-C
11. Transmission system associated with LTA applications from Rajasthan SEZ Part-A (Construction of Ajmer (PG)-Phagi 765 kV D/c line along with associated bays for Rajasthan SEZ)
12. Transmission system associated with LTA applications from Rajasthan SEZ Part-B
13. Transmission System for 400 kV Udupi (UPCL) – Kasargode D/C Line
14. WRSS-21 Part-B- Transmission System strengthening for relieving over loadings observed in Gujarat Intra-state system due to RE injections in Bhuj PS
15. Transmission system associated with RE generations at Bhuj –II, Dwarka & Lakadia
16. Jam Khambaliya Pooling Station and Interconnection of Jam Khambaliya Pooling Station for providing connectivity to RE projects (1500 MW) in Dwarka (Gujarat) & Installation of 400/220 kV ICT along with associated bays at M/s CGPL Switchyard
17. Transmission System Associated with LTA applications from Rajasthan SEZ Part-D
18. Transmission System for Western Region Strengthening Scheme – 21 (WRSS – 21) Part – A – Trasnsmission System Strengthening for Relieving Over Loadings Observed in Gujarat Intra-State System Due to Re-injections in Bhuj PS
19. Transmission System for providing connectivity to RE Projects at Bhuj-II (2000 MW) in Gujarat
20. Western Region Strengthening Scheme- XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme- IX (NERSS-IX)
21. Transmission System Strengthening Scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II – Part - A
22. Transmission System Strengthening Scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II – Part - F

c) Schemes under bidding process by Bid Process Coordinators: (14 Nos.)

1. Evacuation of power from RE sources in Karur / Tiruppur Wind Energy Zone (Tamil Nadu)(2500MW)
2. Evacuation of power from RE sources in Koppal Wind Energy Zone (Karnataka)(2500MW)
3. Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh
4. Transmission system for evacuation for power from RE projects in Osmanabad area (1 GW) in Maharashtra
5. Transmission system for evacuation for power from RE projects in Rajgarh (2500 MW) in Madhya Pradesh
6. Transmission system for solar energy zone in Gadag (2500 MW), Karnataka- Part A
7. Transmission system for solar energy zone in Bidar (2500 MW), Karnataka
8. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II- Part B
9. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II- Part C
10. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II Part-D
11. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II Part-E
12. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II Part-G.
13. Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley HEPs - Connectivity System.
14. Establishment of new 220/132 kV substation at Nangalbibra

Annexure – 5D
(Item 5.4.3)

Issues Pertaining to Transmission System Planning taken up in National Committee on Transmission during 2020-21

3rd meeting of National Committee on Transmission (NCT) held on 26th and 28th May, 2020

1. Change in location in the earlier agreed transmission schemes associated with RE potential in Ramgarh (1.9 GW), Rajgarh (2.5 GW) and Koppal (2.5 GW).
2. ICT augmentation at 400/220 kV Patran S/s of M/s Patran Transmission Company Limited (a subsidiary of Techno Electric and Engineering Company Limited) associated with LTA to Nuclear Power Plant (4X700 MW) of M/s NPCIL in Haryana
3. Evacuation system for Singrauli STPP Stage III (2x800 MW) of M/s NTPC
4. Establishment of 400 kV switching station at Kishtwar (GIS) under ISTS
5. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II-Part B1 and Part G1
6. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II-Part D
7. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part G
8. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part F
9. Transmission system for evacuation of 10 GW RE power from potential RE zones in Khavda region
10. Augmentation of ICTs at Western Region (WR) **(**operational feedback report of NLDC)
11. Conversion of 50MVAr fixed line reactor at Bina (PG) end of Sagar (MP)- Bina(PG) 400kV line into switchable line reactor
12. Transmission system for connectivity to NLC India Ltd for TPS-II 2nd Expansion (2x660 MW) in Cuddalore, Tamil Nadu, and to control high short circuit fault level in Neyveli Generation complex.
13. Additional system strengthening for control of short circuit levels in Neyveli generation complex and re-arrangement of network configuration to control overloading of ICTs /230 kV lines from Neyveli generation complex
14. Transmission system for grant of connectivity and LTA to NPCIL for Kaiga APP expansion Unit 5&6 (2x700 MW).
15. Transmission system for grant of connectivity to NPCIL for Kudankulam NPP Unit 3&4 (2x1000 MW).
16. Development of common facilities at Tuticorin-II GIS for RE Integration
17. Transmission system for power evacuation from Arun-3 (900 MW) HEP, Nepal of M/s SAPDC – Indian Portion.
18. Modification in Transmission schemes of Eastern Region agreed in 6th meeting of erstwhile NCT held on 30.09.2019.
19. Shifting of 400/220kV ICT from section A to section B at Durgapur (POWERGRID) S/s
20. Establishment of new 220/132kV substation at Nangalbibra
21. Installation of line reactor at Imphal (POWERGRID) S/s
22. Augmentation of transformation capacity at Salakati (POWERGRID) S/s
23. Reconductoring of ISTS lines of POWERGRID
24. Upgradation of switching scheme at POWERGRID substations at Nirjuli and Imphal
25. 400kV connectivity to Surajmaninagar (TSECL) 400/132 kV S/s

4th meeting of National Committee on Transmission (NCT) held on 20th and 28th January, 2021

1. Evacuation system from the RE potential areas in Madhya Pradesh after the Reassessment of RE potential by MNRE
2. System Strengthening at Shujalpur on account of operational constraints ((n-1) non-compliance)
3. Connectivity to 325 MW Wind Project of M/s SBESS Services Projectco Pvt Ltd at 220 kV level of existing Indore (PG) S/s
4. Overloading of 400 kV NP Kunta-Kolar S/C line
5. Augmentation of transformation capacity at Hiriyur by 1x500 MVA, 400/220 kV ICT
6. Augmentation of transformation capacity at Kochi by 1x500 MVA, 400/220 kV ICT
7. Restoring of one circuit of Kudankulam – Tuticorin PS 400 kV (quad) D/c line at Tirunelveli to control loadings/un-balancing on Kudankulam – Tirunelveli 400 kV (quad) lines
8. Upgradation of Narendra New to its rated voltage of 765 kV level under the scheme Gadag Solar Energy Zone, Karnataka (2500 MW) Part – B
9. Implementation of 1 no. of 230 kV bay at Tuticorin-II GIS PS under ISTS
10. Implementation of 400/132kV transformer at Kishtwar Pooling Station
11. Grant of 400kV bays to RE generators at Bhadla-II PS, Fatehgarh-II, & Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS
12. 1 no. of 220kV bay at Shahjahanpur (PG) under ISTS
13. Additional 80 MVAR, 765kV Spare Reactor at Bhadla-II S/s
14. Additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station
15. Addition in the scope of the transmission scheme "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part C" to be taken up through Tariff Based Competitive Bidding (TBCB)
16. Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighboring substations in Arunachal Pradesh
17. Surajmaninagar (India) – Comilla (Bangladesh) 400kV cross border link
18. Conversion of 132kV bus bar at Nirjuli substations and North Eastern Region Strengthening Scheme-IX (NERSS-IX)
19. Transmission system for connectivity to Teesta-IV HEP (520MW)
20. Eastern Region Strengthening Scheme-XXV (ERSS-XXV)

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Annexure – 5E
(Item 5.10.1)

Progress under Green Energy Corridor during 2020-21

A. Status of Inter - State Schemes under Green Energy Corridor - I (upto Mar' 2021)

Sl. No.	GEC ISTS Scheme	Estimated Cost (Rs. Crore)	NIT Status	Target comm. Schedule
1	GEC- Part A (KfW Tranche-I)	1479 (9 packages)	All Awarded	Commissioned
2	GEC- Part B (KfW Tranche-II)	3705 (22 Packages)		commissioned
3	GEC- Part C (KfW Tranche-III)	2247 (16 Packages)		commissioned
4	GEC- Part D (ADB)	3938 (24 Packages)		Commissioned
5	REMC (in 11 locations)	409 (Revised) [Rs. 138 Cr- awarded cost of REMC in 11 locations including PMC @ Rs 8.3 Cr. plus taxes]	All awarded	Commissioned

B. Status of Intra- state Schemes under Green Energy Corridor-I (upto March 2021)

Sl. No.	Name of the State	NIT Status	Award Status
1	Tamil Nadu (for tranche –I)	Done for all 5 packages (Rs. 1462.69 Cr)	Done for all 5 packages DPR Cost: Rs. 1462.69 Cr. Award Cost : Rs 1733.83 Cr
2	Rajasthan (for tranche –I) (Package 5-11 (revised) & Package 8 & 10))	NIT published for 11 packages (Rs 800.49 Cr.)	Done for 11 packages. DPR Cost: Rs. 800.49 Cr Award Cost: Rs. 661.23 Cr.
3	Andhra Pradesh	NIT for 8 packages (Rs 1147.58 Cr)and 2 additional elements published	Done for 7 packages and 2 additional elements DPR Cost: Rs. 1192.16 Cr. Award Cost: Rs. 927.39 Cr.
4	Himachal Pradesh	Done for all 17 packages (Rs 909.86)	Done for 10 packages. (HPPTCL) and sub-packages of 4 packages by HPSEBL. DPR Cost: Rs. 730.66 Cr. Award Cost: Rs. 671.9 Cr.

5	Gujarat	NIT for 28 packages done. (Rs. 2106.51)	Done for 28 packages DPR Cost: Rs. 2106.51Cr. Award Cost: Rs. 1643.91 Cr.
6	Karnataka	NIT for all 7 packages (Rs. 898.1Cr.)	Done for all 7 packages DPR Cost: Rs. 898.1 Cr. Award Cost: Rs1036.2 Cr.
7	Madhya Pradesh	NIT for 8 packages issued out of 8 packages (Rs. 2026.92 cr.)	Done for 8 packages DPR Cost: Rs.2026.92Cr Award Cost : Rs 1543.06 Cr.
8	Maharashtra	NIT for 17 Packages done (Rs, 240.13 Cr.)	Done for 17 packages DPR Cost :Rs. 240.13 Cr. Award Cost: 148.83

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(Item No. 5.16)

Transmission Lines Completed During FY- 2020-21

As on 31-Mar-2021

Voltage Level (kV)	Name of Transmission Lines	Circuit Type	Executing Agency	Line Length (cKM)	Month of Completion
1.	**2.**	**3.**	**4.**	**5.**	**6.**
800 kV					
CENTRAL SECTOR					
1	Raigarh (HVDC stn) - Pugalur (HVDC stn) HVDC Bipole Link	BIPOLE	PGCIL	3531	SEP-20
Total of CENTRAL SECTOR				**3531**	
Total of 800 kV				**3531**	
765 kV					
CENTRAL SECTOR					
2	Tehri Pooling Station - Meerut (Remaining part)	S/C	PGCIL	1	APR-20
3	Charging of Tehri Pooling - Meerut line (2nd Ckt.)	S/C	PGCIL	1	JUN-20
4	Ranchi - Medinipur line (PM-JTL-TBCB)	D/C	PGCIL	538	FEB-21
Total of CENTRAL SECTOR				**540**	
PRIVATE SECTOR					
5	Agra (UP)-Greater Noida (WUPPTCL)(GTL-TBCB)	S/C	APL	159	MAR-21
6	Fatehgarh PS/S - Bhadla (PG) (initially to be operated at 400 kV) (F-BTL-TBCB)	D/C	APL	292	MAR-21
7	Ghatampur TPS-Agra (UP) (GTL-TBCB)	S/C	APL	229	MAR-21
8	LILO of 765kV Anpara D - Unnao SC (Quad) line at Obra - CTPS	D/C	APL	17	MAR-21
Total of PRIVATE SECTOR				**697**	
Total of 765 kV				**1237**	
400 kV					
CENTRAL SECTOR					
9	Hiriyur - Mysore line (Ckt.-II)	D/C	PGCIL	206	APR-20
10	Baharampur (PG) -Bheramerar (Bangladesh) line (2nd Ckt.) - India Portion	D/C	PGCIL	172	MAY-20
11	NNTPS Sw. Yd. - Ariyalur (Villupuram) Line	D/C	PGCIL	147	JUL-20
12	Rajarhat - Purnea line (Triple Snowbird) (Balance Portion)	D/C	PGCIL	420	JUL-20
13	Banaskantha PS - Banaskantha (PG) line	D/C	PGCIL	132	AUG-20
14	Pugalur HVDC - Arasur line (Q)	D/C	PGCIL	118	SEP-

					20
15	Pugalur HVDC - Pugalur line (Q)	D/C	PGCIL	100	SEP-20
16	Tehri Gen. - Tehri Pooling Station	S/C	PGCIL	13	JAN-21
17	LILO of both ckts. of Chandithala - Kharagpur at Medinipur (PM-JTL-TBCB)	D/C	PGCIL	148	FEB-21
18	Tumkur (Pavagada) PS - Devanahally (KPTCL) line - (Q)	D/C	PGCIL	312	FEB-21
19	Additional 400KV D/C line at P.K.Bari s/s and Silchar S/S end for termination of P.K. Bari - Silchar 400KV D/C line	D/C	PGCIL	22	MAR-21
20	Darbhanga - Sitamarhi (New) line (Ckt.-I) (Triple Snowbird) (ERSS XXITL - TBCB)	D/C	PGCIL	80	MAR-21
21	LILO of both Ckts. of Nabinagar-II - Gaya (Q) line at Chandauti (ERSS XXITL- TBCB)	D/C	PGCIL	6	MAR-21
22	LILO of North Trichur - Cochin line at North Trichur HDVC Station (Q)	D/C	PGCIL	1	MAR-21
23	Re-Conducting of Rangpo -New Siliguri line	D/C	PGCIL	220	MAR-21
24	Wardha - Aurangabad line (up-gradable on 1200 kV)	D/C	PGCIL	696	MAR-21
Total of CENTRAL SECTOR				**2793**	
STATE SECTOR					
25	LILO of chittoor - Krishnapatnam at Rachagunneri S/S	D/C	APTRANSCO	127	SEP-20
26	LILO of both ckt. Jhakri Abdullapur at (Gumma) Pragati Nagar	D/C	HPPTCL	3	OCT-20
27	LILO of one circuit of Akal - Jodhpur (new) line at Jaisalmer-2 (GEC-I)	D/C	RVPNL	14	OCT-20
28	Thennampatty - SEPC IPP	D/C	TANTRANSCO	104	OCT-20
29	Sagardighi TPS - Gokarna line	D/C	WBSETCL	89	OCT-20
30	Ramgarh - Bhadla line (Ckt-I)	D/C	RVPNL	160	DEC-20
31	Ramgarh - Bhadla line (Ckt-II)	D/C	RVPNL	160	JAN-21
32	Madakkathara - Areekode line	D/C	KSEB	176	FEB-21
33	Nagda - Ujjain line (GEC-I)	DCDS	MPPTCL	53	FEB-21
34	LILO of both Ckts. of Mamidipalli- Dindi TMDC line to Maheshwaram S/S on M/C	M/C	TSTRANSCO	13	FEB-21
35	Yurembam - Thoubal via Nambol	D/C	ED, Manipur	90	MAR-21
36	LILO of Somanahalli - Kolar SC line to Mylasandra (New Electric City)	S/C	KPTCL	2	MAR-21
37	LILO of one ckt. of Satna (PGCIL) - Bina (PGCIL) at Sagar (GEC-I)	DCDS	MPPTCL	50	MAR-21
38	Nagda (400kV) S/S - Ujjain (400kV) S/S (Ckt-II)	DCDS	MPPTCL	53	MAR-21
39	Nagda - Mandsaur (GEC-I)	DCDS	MPPTCL	137	MAR-21
40	LILO Agra(South)-Fahtehabad(Agra) at Firozabad	D/C	UPPTCL	26	MAR-

					21
41	LILO of Gorakhpur (PG) - Lucknow (PG) line Ckt.-IV at Basti	D/C	UPPTCL	60	MAR-21
42	Tanda (TPS) - Bhaukhari (Basti) line	D/C	UPPTCL	88	MAR-21
Total of STATE SECTOR				**1405**	
PRIVATE SECTOR					
43	New Kohima -New Mariani (Twin Moose ACSR) (K-MTL - TBCB)	D/C	KPTL	236	JUL-20
44	Imphal - New Kohima (Twin Moose ACSR) (K-MTL - TBCB)	D/C	KPTL	272	DEC-20
45	Surajmaninagar - P. K. Bari line (NER-II TL-TBCB)	D/C	SGL	155	JAN-21
46	Silchar (PG) - Misa (PG) (Q) line (NER-II TL-TBCB)	D/C	SGL	357	FEB-21
47	Roza - Badaun	D/C	APL	171	MAR-21
Total of PRIVATE SECTOR				**1191**	
Total of 400 kV				**5389**	
320 kV					
CENTRAL SECTOR					
48	Pugalur - North Trichur (Kerala) HVDC Bipole Link	HVDC	PGCIL	288	MAR-21
Total of CENTRAL SECTOR				**288**	
Total of 320 kV				**288**	
230 kV					
STATE SECTOR					
49	Neyveli - Kadalangudi line	S/C	TANTRANSCO	77	APR-20
50	LILO in 230 kV Othakalmandapam - Palladam at the proposed Edayarpalayam 400 kV SS	D/C	TANTRANSCO	4	JUL-20
51	LILO in the existing 230 kV Neyveli TS-I Tiruvannamalai at Sankarapuram 230 kV SS	D/C	TANTRANSCO	64	JUL-20
52	Neyveli 230/110 kV SS to the existing Thiruvannamalai and Cuddalore feeders	D/C	TANTRANSCO	6	SEP-20
53	LILO in the existing 230 kV Pasumalai - Alagarkoil at the proposed Samayanallur 230 kV SS	D/C	TANTRANSCO	9	OCT-20
54	Cuddalore - Veerapuram (SP Koil) Via Neyveli	D/C	TANTRANSCO	348	JAN-21
55	LILO of existing 230 kV Shoolagiri - Vinnamangalam line at the proposed Tirupattur 230 kV SS	D/C	TANTRANSCO	12	JAN-21
56	LILO of Thingalur - Ingur 230kV line at the proposed Erode GIS S/S	D/C	TANTRANSCO	28	FEB-21
Total of STATE SECTOR				**548**	
Total of 230 kV				**548**	
220 kV					
CENTRAL SECTOR					
57	LILO of Parulia - Dtps at Durgapur steel TPS	D/C	DVC	14	NOV-20

Total of CENTRAL SECTOR				**14**	
STATE SECTOR					
58	Jagalur (Hiremallanahole) - Kudligi	D/C	KPTCL	83	APR-20
59	Kothipura (Ramanagara) - Tubinakere	D/C	KPTCL	142	APR-20
60	LILO of one Ckt. of Bhopal - Hoshangabad at Adampur	D/C	MPPTCL	6	MAY-20
61	LILO of Meramundali - Duburi Ckt-I at Goda	S/C	OPTCL	12	MAY-20
62	PGCIL Bhadson - Salempur	D/C	HVPNL	13	JUN-20
63	LILO of 220 kV Sarni - Pandhurna line at Betul (PGCIL)	D/C	MPPTCL	78	JUN-20
64	LILO of both ckt. Nagda - Neemuch at Mandsaur (LILO from loc.No. 211) S/s (GEC-I)	DCDS	MPPTCL	56	JUN-20
65	LILO of Ratlam - Daloda 220kV line at Jaora (2nd Ckt.)	D/C	MPPTCL	4	JUN-20
66	LILO of 2nd Ckt. of PGCIL Jalandhar - Kotla Jangan (nakodar) line at Kartarpur	D/C	PSTCL	1	JUN-20
67	Rudrapur (Brahmwari) - Ghansali (Srinagar) line	D/C	PTCUL	150	JUN-20
68	LILO of one Ckt. of 220kV KTS-Lower Sileru-I line - 400/220kV Asupaka S/S	D/C	TSTRANSCO	1	JUN-20
69	LILO of Sikandararao - Jawaharpur TPSat Kashganj	D/C	UPPTCL	88	JUN-20
70	Dwarka - Pappan Kalan-I (underground XLPE Cable)	D/C	DTL	3	JUL-20
71	Termination of one d/c of Achhalia- Jambuva line at Vyankatpura s/s	D/C	GETCO	72	JUL-20
72	Lahal - bhudhil line	S/C	HPPTCL	2	JUL-20
73	LILO of both Ckts. of Badshahpur - Sector -77 at Sohna Road Gurugram	D/C	HVPNL	3	JUL-20
74	LILO of Kadakola - Chamarajanagara line to the proposed line at Begur	M/C	KPTCL	100	JUL-20
75	LILO of one Ckt of Ashta- Dewas line at 220 kV S/S Chapda S/S	D/C	MPPTCL	68	JUL-20
76	LILO of Pandharpur - Malinagar at Bhalwani S/S	D/C	MSETCL	20	JUL-20
77	Upgradation of 132kV Malegaon - Manmad SCSC line to 220kV line using same corridor/ROW	D/C	MSETCL	65	JUL-20
78	Bolangir (OPTCL) - Bolangir (PGCIL)	D/C	OPTCL	3	JUL-20
79	Gonda - Sohawal (PG)	D/C	UPPTCL	41	JUL-20
80	Kaithal (PGCIL) - Neemwala	D/C	HVPNL	64	AUG-20
81	Daltonganj (PG)- Garhwa	D/C	JUSNL	183	AUG-20
82	Godda - Dumka line	D/C	JUSNL	142	AUG-20
83	Godda - Lalmatia	D/C	JUSNL	44	AUG-20
84	Jasidih - Dumka	D/C	JUSNL	149	AUG-

					20
85	Jasidih - Giridih line	D/C	JUSNL	154	AUG-20
86	LILO of both ckt of Nagda - Neemuch 220 KV line at Mandsore(Sitamau) 400 kV S/s (Ckt II)	DCDS	MPPTCL	47	AUG-20
87	Mandsaur (Sitamau) - Marut Shakti Pool (GEC-I)	DCDS	MPPTCL	93	AUG-20
88	LILO of one Ckt of existing STPS - Ratangarh line at 220kV GSS Rawatsar	D/C	RVPNL	85	AUG-20
89	Chhata- Vrindawan Line	S/C	UPPTCL	35	AUG-20
90	Maath(400)- Vrindawan Line	S/C	UPPTCL	44	AUG-20
91	Shalimarbagh - Sanjay Gandhi Transport Nagar	M/C	DTL	8	SEP-20
92	Asoj - IOCL line with ACSR Zebra conductor	D/C	GETCO	66	SEP-20
93	LILO of Wanakbori - Asoj and Wanakbori - Vyankatpura line on M/C tower with ACSR Zebra conductor and OPGW at Selvaliya S/S	D/C	GETCO	23	SEP-20
94	LILO of FGPP - BBMB Samaypur line at Sector58 S/s	D/C	HVPNL	5	SEP-20
95	LILO of one ckt. Nuna Majra - Daultabad at Sec.-107 Gurugram	D/C	HVPNL	4	SEP-20
96	Madakkathara - Malaparamba line	D/C	KSEB	97	SEP-20
97	Shujalpur - Narsinghgarh Line	DCDS	MPPTCL	51	SEP-20
98	Kamalapuram LISS - V.K.Ramavaram line	D/C	TSTRANSCO	28	SEP-20
99	Baghpat (220) - Baghpat (400) (2nd line)	D/C	UPPTCL	15	SEP-20
100	LILO of Ataur - Muradnagar-II line at Madhuban Bapudham	D/C	UPPTCL	24	SEP-20
101	Kanwan - Dhar line (GEC-I)	DCDS	MPPTCL	63	OCT-20
102	LILO of Jhalawar - Chhabra line at 220 KV GSS Aklera	D/C	RVPNL	98	OCT-20
103	LILO of both Purnea (PG) - Begusarai at Khagaria (New)	D/C	BSPTCL	14	NOV-20
104	Bemetara - Mungeli line 2nd circuit	S/C	CSPTCL	40	NOV-20
105	Gurur - Kurud (Bangoli)	D/C	CSPTCL	74	NOV-20
106	Jambuva - Waghodia (PGCIL) line with AL-59 Conductor	D/C	GETCO	68	NOV-20
107	LILO of Vallabhipur - Vartej line at Maglana S/s	D/C	GETCO	9	NOV-20
108	Palanpur - Amarigadh (DFCC) line	D/C	GETCO	80	NOV-20
109	Snail -Hatkoti	D/C	HPPTCL	13	NOV-20
110	Konnakuzhy - Chalakudy line	D/C	KSEB	22	NOV-20
111	LILO of Jadla - Jamsher at 220 KV S/S Banga	D/C	PSTCL	11	NOV-20

112	Bhatia - Bhogat line (AL-59)	D/C	GETCO	26	DEC-20
113	LILO of one Ckt. of Ukai - Achhaliya line no.3 at Virpor (Package -2)	D/C	GETCO	27	DEC-20
114	Devanahalli Hardware park - Devanahali HW park S/S	M/C	KPTCL	12	DEC-20
115	LILO of Second Ckts. from BAIL (Begur - Hoskote at Devanahlli H/W Park	S/C	KPTCL	18	DEC-20
116	Brahmapuram - Thuthiyoor line	M/C	KSEB	8	DEC-20
117	Thuthiyoor - Kaloor (UG Cable)	D/C	KSEB	14	DEC-20
118	Badod - Nalkheda (Susner) (GEC)	DCDS	MPPTCL	105	DEC-20
119	Shirsuphal - Shirsai line	S/C	MSETCL	3	DEC-20
120	LILO of Muzaffarnagar - Nanauta line at Badhaikalan	D/C	UPPTCL	10	DEC-20
121	Chelari - Nallalam	M/C	KSEB	25	JAN-21
122	LILO on 220 kV Deoli (PG) - Ghatodi line for 220kV Yavatmal	D/C	MSETCL	21	JAN-21
123	Subashgram (PG) - Baruipur	D/C	WBSETCL	64	JAN-21
124	LILO of 220kV Kalapaka - Dairyfarm to proposed 220/132/33kV S/S Simhachalam on MC Towers	D/C	APTRANSCO	24	FEB-21
125	Rachagunneru - Naidupeta line	D/C	APTRANSCO	30	FEB-21
126	LILO of one Ckt. of 220kV Ukai- Achhaliya line no. 2 at 220kV Virpor s/s on D/C and M/C Tower (Package-1) with AL-59 Condu. and OPGW	D/C	GETCO	42	FEB-21
127	LILO of 220kV Narwana - Mund line at 400kV PGCIL Jind	D/C	HVPNL	168	FEB-21
128	Aluva - Kothamangalam line	D/C	KSEB	68	FEB-21
129	2nd Ckt. Stringing of 220kV Tlwani - Miraj line (Balance work)	S/C + D/C	MSETCL	9	FEB-21
130	Georai - Thapti Tanda s/s	D/C	MSETCL	110	FEB-21
131	LILO of Himmatpura - jagraon at Ajitwal	D/C	PSTCL	3	FEB-21
132	Makhu - Algaon	D/C	PSTCL	101	FEB-21
133	Gajner - Chhatargarh line (GEC-I)	D/C	RVPNL	166	FEB-21
134	Bahraich - Sohawal 400 (PG) line	S/C	UPPTCL	109	FEB-21
135	LILO of Firozabad (220) -Agra(PG) at Firozabad(400)	D/C	UPPTCL	22	FEB-21
136	Jammalamadugu - Chakrayapet	D/C	APTRANSCO	172	MAR-21
137	Jammalamadugu - Tirumalayapalli	D/C	APTRANSCO	34	MAR-21
138	Kalikiri - Kalikiri line	D/C	APTRANSCO	8	MAR-21
139	Kamavarapukota - Nuziveedu	D/C	APTRAN	90	MAR-

			SCO		21
140	LILO of Both ckt Pulivendula - Hindupur at Gollapuram	D/C	APTRANSCO	156	MAR-21
141	LILO of Pendurthy - Garividi at Garividi	D/C	APTRANSCO	120	MAR-21
142	LILO of Podili - Nellore at Atmakur	D/C	APTRANSCO	80	MAR-21
143	LILO to Existing 220kV Podili - Nellore line at Prakasam District	M/C	APTRANSCO	20	MAR-21
144	Dwarka - Budella	D/C	DTL	12	MAR-21
145	R.K. Puram- Ridge Valley Ckt-I	S/C	DTL	5	MAR-21
146	R.K. Puram - Ridge Valley Ckt-II	S/C	DTL	5	MAR-21
147	R.K. Puram-Trauma Centre Ckt-I	S/C	DTL	5	MAR-21
148	R.K. Puram- Trauma Centre Ckt-II	S/C	DTL	5	MAR-21
149	Deroli Ahir - Narnaul	D/C	HVPNL	26	MAR-21
150	LILO of Chormar - Fathebad line at Hukmawali	S/C	HVPNL	41	MAR-21
151	(PMDP - Kashmir) New Wanpoh - Mir Bazar line	D/C	JKPDD	8	MAR-21
152	HDVC Kolar - T. Gollahali (Thimmasandra) line	D/C	KPTCL	58	MAR-21
153	Kudagi - Tapping point of NTPC (part of Kudagi-Vajramatti line)	D/C	KPTCL	153	MAR-21
154	LILO of Chikkodi - Ghataprabha at Mughalkod	D/C	KPTCL	12	MAR-21
155	Brahmapuram - Kaloor line	D/C	KSEB	23	MAR-21
156	Pallikkara - Aluva line	D/C	KSEB	23	MAR-21
157	Chichali - Udaipura	S/C	MPPTCL	47	MAR-21
158	LILO of Bina - Gwalior at Pichhore	S/C	MPPTCL	1	MAR-21
159	LILO of Both ckt. of Badod - Ujjain at Ujjain	DCDS	MPPTCL	24	MAR-21
160	LILO of both ckts. Nagda - Ujjain at Ujjain	DCDS	MPPTCL	43	MAR-21
161	Pithampur -Depalpur	DCDS	MPPTCL	75	MAR-21
162	Kumbhargaon - Krishnoor line (Ckt-I)	D/C	MSETCL	16	MAR-21
163	LILO of Pandharpur - Malinagar line at 220 kV Bhalawani S/S (Ckt-II)	D/C	MSETCL	20	MAR-21
164	LILO of Kashipur - Pantnagar line at 220kV S/S Jafarpur	D/C	PTCUL	8	MAR-21
165	Akal- Jaisalmer-2 line (GEC-I)	D/C	RVPNL	114	MAR-21
166	Dichpally 400kV - Banswada 220kV	D/C	TSTRANSCO	168	MAR-21

167	LILO of Baraut (220)- Shamli at Nirpura line	D/C	UPPTCL	26	MAR-21
168	LILO of Rasra (220)- Gazipur at Rasra	D/C	UPPTCL	26	MAR-21
169	LILO of Arambag - Rishra at N. Chanditala	D/C	WBSETCL	31	MAR-21
Total of STATE SECTOR				**5704**	
PRIVATE SECTOR					
170	LILO of C.B.Ganj - Badaun at Badaun (OBTL-TBCB)	S/C	APL	2	MAR-21
171	LILO of Chandausi - Badaun at Badaun (OBTL-TBCB)	S/C	APL	37	MAR-21
Total of PRIVATE SECTOR				**39**	
Total of 220 kV				**5757**	
Grand Total				**16750**	

Annexure-5G
(Item No.5.16)

Sub-Stations Completed During FY - 2020-21

As on 31-Mar-2021

Sl No	Name of Sub Stations	Voltage Ratio (kV/kV)	Executing Agency	Capacity (MW/MVA)	Month of Completion
1.	**2.**	**3.**	**4.**	**5.**	**6.**
		800 kV			
CENTRAL SECTOR					
1	Raigarh and Pugalur Station with 6000 MW HVDC Terminal (Pole-II)	800	PGCIL	1500	MAR-21
2	Raigarh and Pugalur Station with 6000 MW HVDC Terminal (Pole-I)	800	PGCIL	1500	SEP-20
	TOTAL CENTRAL SECTOR			**3000**	
	TOTAL 800 kV			**3000**	
		765 kV			
CENTRAL SECTOR					
3	Tehri PS (GIS) (3 ICTs)	765/400	PGCIL	2400	APR-20
4	Medinipur S/s (PM-JTL -TBCB)	765/400	PGCIL	3000	FEB-21
5	Tehri Pooling Station (GIS) (4th ICT)	765/400	PGCIL	800	JAN-21
6	Extn at Meerut substation	765/400	PGCIL	1500	JUN-20
	TOTAL CENTRAL SECTOR			**7700**	
	TOTAL 765 kV			**7700**	
		400 kV			
CENTRAL SECTOR					
7	Extn. at Bhadla S/s (ICT-I)	400/220	PGCIL	500	DEC-20
8	Extn. at Rourkela S/s (ICT-I)	400/220	PGCIL	315	DEC-20
9	New Mariani S/s (ICT-I)	400/220	PGCIL	500	DEC-20
10	DSTPS ICT-II S/s	400/220	DVC	315	FEB-21
11	Extn. at Rourkela S/stn. (ICT-II)	400/220	PGCIL	315	FEB-21
12	Extan. at Maithon	400/220	PGCIL	500	JUL-20
13	North Trichur Substation	400/220	PGCIL	630	MAR-21
14	Aug. at Gajuwaka (T/F)	400/220	PGCIL	500	MAR-21
15	Repl of 400/220kV Malda S/s (3x315-2x500)	400/220	PGCIL	185	MAR-21
16	Chandauti S/S (ERSS-XXITL-TBCB)	400/220	PGCIL	1500	MAR-21
17	Extn. at Fatehpur S/S	400/220	PGCIL	500	MAR-21
18	Extn. at Saharanpur S/S	400/220	PGCIL	500	MAR-21

19	Mariani New (ICT-II) extn	400/220	PGCIL	500	MAR-21
20	Extension at Amritsar (Balachak) PG Substation	400/220	PGCIL	500	OCT-20
21	Banaskantha s/s	400/220	PGCIL	1000	SEP-20
22	Augmentation at Bhuj S/S (3rd ICT)	400/220	PGCIL	500	SEP-20
	TOTAL CENTRAL SECTOR			**8760**	
	TOTAL 400 kV			**8760**	
		320 kV			
CENTRAL SECTOR					
23	Pugalur (2000 MW) and Terminal at North Trichur (2000 MW) VSC based HVDC Station (Monopole-II)	320	PGCIL	1000	MAR-21
	TOTAL CENTRAL SECTOR			**1000**	
	TOTAL 320 kV			**1000**	
		220 kV			
CENTRAL SECTOR					
24	Repl. of 1x50 MVA to 1x160 MVA at Balipara S/stn.(ICT-II)	220/132	PGCIL	110	APR-20
25	DSTPS	220/132	DVC	160	FEB-21
26	Chandauti Substation (ERSS-XXITL-TBCB)	220/132	PGCIL	600	MAR-21
	TOTAL CENTRAL SECTOR			**870**	
	TOTAL 220 kV			**870**	
		400 kV			
STATE SECTOR					
27	Podili (3rd ICT))	400/220	APTRANSCO	315	DEC-20
28	Kurud (Dhamtari) (T/F-II)	400/220	CSPTCL	315	DEC-20
29	Rachaganneri (T/F-II)	400/220/132	APTRANSCO	315	DEC-20
30	Muzaffarnagar (Additional T/F)	400/220	UPPTCL	500	DEC-20
31	Ujjain 400 KV sub-station (T/F-I)	400/220	MPPTCL	315	FEB-21
32	Firozabad S/s	400/220	UPPTCL	1000	FEB-21
33	Maradam (Addl ICT)	400/220	APTRANSCO	500	JAN-21
34	Gr. Noida G.B. Nagar (Additional T/F)	400/132	UPPTCL	200	JUL-20
35	Bhachunda GIS (Dist. Kutch) (T/F-I)	400/220	GETCO	500	MAR-21
36	Thoubal S/S	400/132	ED, Manipur	315	MAR-21
37	Chakan (Addl-ICT)	400/220	MSETCL	315	MAR-21
38	Pithampur 400kV S/S (Addl. X-mer)	400/220	MPPTCL	315	MAR-21
39	Mandsaur (Sitamau) (GEC-I)	400/220	MPPTCL	630	MAR-21
40	Mandsaur (Addl T/F)	400/220	MPPTCL	160	MAR-21
41	Mylasandra GIS (Near Electronic city)	400/220	KPTCL	1500	MAR-21
42	Pachcham (Transformer-I)	400/220	GETCO	500	MAR-21
43	Gumma S/S	400/220	HPPTCL	315	NOV-20
44	Rachaganneri (T/F-I)	400/220/132	APTRANSCO	315	NOV-20

45	Podili (2nd ICT))	400/220	APTRANSCO	315	NOV-20
46	Kurud (Dhamtari) (T/F-I)	400/220	CSPTCL	315	NOV-20
47	Lahal S/S	400/220	HPPTCL	630	NOV-20
48	Sector-123 Noida New T/F- I and II	400/132	UPPTCL	400	OCT-20
49	Devanahalli (Hardware Park)	400/220	KPTCL	1000	SEP-20
	TOTAL STATE SECTOR			**10985**	
	TOTAL 400 kV			**10985**	
		230 kV			
STATE SECTOR					
50	Karamadai (3rd Auto T/F)	230/110	TANTRANSCO	100	AUG-20
51	Singarapet	230/110	TANTRANSCO	100	FEB-21
52	Shenbagapudur	230/110	TANTRANSCO	200	FEB-21
53	Karaikudi (Enhancement from 50 MVA to 100 MVA)	230/110	TANTRANSCO	50	JAN-21
54	Sankarapuram S/S	230/110	TANTRANSCO	100	JUL-20
55	Tirupur (JICA)	230/110	TANTRANSCO	100	JUN-20
56	Villupuram (2x100 to 2x160) (GEC-I)	230/110	TANTRANSCO	60	MAR-21
57	Samayanallur S/S	230/110	TANTRANSCO	200	OCT-20
	TOTAL STATE SECTOR			**910**	
	TOTAL 230 kV			**910**	
		220 kV			
STATE SECTOR					
58	Sultanpur Lodhi (T/F)	220/66	PSTCL	100	APR-20
59	Neemwala S/s	220/132	HVPNL	100	AUG-20
60	Bagalkot (Addl T/F)	220/110	KPTCL	100	AUG-20
61	Vrindawan Mathura (New) T/F-I	220/132	UPPTCL	160	AUG-20
62	Mehna Khera (T/F-II)	220/132	HVPNL	100	AUG-20
63	Mehna Khera (T/F-III)	220/132	HVPNL	100	AUG-20
64	Neemwala	220/33	HVPNL	100	AUG-20
65	Partapur Meerut (Aug) T/F-III	220/132	UPPTCL	160	AUG-20
66	Madhuvan Bapudham Ghaziabad (Aug) T/F-II	220/132	UPPTCL	160	AUG-20
67	Sheopur (2nd T/F)	220/132	MPPTCL	160	AUG-20
68	Jasidih S/S	220/132	JUSNL	300	AUG-20
69	Godda GSS	220/132	JUSNL	300	AUG-20
70	Giridih S/S	220/132	JUSNL	300	AUG-20
71	Garhwa	220/132	JUSNL	300	AUG-20
72	Ratangarh (T/F-II)	220/132	MPPTCL	160	DEC-20
73	Chalakudy S/S	220/110	KSEB	200	DEC-20
74	Kaloor (T/F-I)	220/110	KSEB	160	DEC-20
75	Badhaikala Muzaffarnagar (New) T/F- I	220/132	UPPTCL	160	DEC-20
76	Charla Meerut (Additional T/F)	220/132	UPPTCL	100	DEC-20
77	Madhuvan Bapudham Ghaziabad (New)	220/132	UPPTCL	60	DEC-20

	T/F-II				
78	Motigop S/S	220/66	GETCO	160	DEC-20
79	Virpore S/s	220/66	GETCO	160	DEC-20
80	Simhachalam	220/132	APTRANSCO	200	FEB-21
81	RS Gooty at Anantapuram District (Aug.)	220/132	APTRANSCO	60	FEB-21
82	Nuziveedu at Guntur Dist. (Aug)	220/132	APTRANSCO	60	FEB-21
83	Kamavarapukota at West Godavarai District (Aug.)	220/132	APTRANSCO	160	FEB-21
84	Bhenda S/s (Addl T/F) (220/132/33kV)	220/33	MSETCL	50	FEB-21
85	Selavadar (Talaja)	220/66	GETCO	160	FEB-21
86	Delina (Augmentation)	220/132	JKPDD	160	FEB-21
87	Aluva	220/110	KSEB	400	FEB-21
88	Tadikonda at (Guntur District (Aug))	220/132	APTRANSCO	50	FEB-21
89	Kaloor (T/F-II)	220/110	KSEB	160	JAN-21
90	Sukha (Jabalpur) (Addl. T/F-I)	220/33	MPPTCL	50	JAN-21
91	Somanahalli T/F-II Aug (1x150 - 1x100)	220/66	KPTCL	50	JAN-21
92	Thallak (Aug)	220/66	KPTCL	100	JAN-21
93	Batta (Aug)	220/33	HVPNL	100	JAN-21
94	Chikkodi (Aug)	220/110	KPTCL	100	JAN-21
95	Manmad Sub-Station (Up-Gradation)	220/132	MSETCL	200	JUL-20
96	Rupkheda (Zalod)	220/132	GETCO	300	JUL-20
97	Upgradation of Chapda 132Kv S/s to 220kv with 1x160MVA	220/132	MPPTCL	160	JUL-20
98	Maath (Aug) T/F-II	220/132	UPPTCL	160	JUL-20
99	Madhuvan Bapudham (New) T/F-I	220/132	UPPTCL	160	JUL-20
100	Sarsawa (Saharanpur) (ICT-II) S/S	220/132	UPPTCL	160	JUL-20
101	Sultanpur (Aug) (Additional T/F)	220/132	UPPTCL	160	JUL-20
102	Joda S/S	220/132/33	OPTCL	160	JUL-20
103	Barejdi S/s	220/66	GETCO	160	JUL-20
104	Rupkheda (Zalod) S/s	220/66	GETCO	160	JUL-20
105	Begur	220/66	KPTCL	200	JUL-20
106	Adampur	220/33	MPPTCL	50	JUN-20
107	Sarita Vihar (Replacement) (160-100)	220/66	DTL	60	JUN-20
108	Temghar Replacement T/F (50 MVA replaced by 80 MVA)	220/22	MSETCL	30	JUN-20
109	Bahraich T/F-II (Aug.)	220/132	UPPTCL	160	JUN-20
110	IMT Manesar Gurugram Sector -1	220/66	HVPNL	100	JUN-20
111	Barahua T/F-I (Aug.) (200-100)	220/132	UPPTCL	100	JUN-20
112	Noida Sector-148 T/F-II (Aug.)	220/132	UPPTCL	100	JUN-20
113	Pratap Vihar T/F (Aug.)	220/132	UPPTCL	100	JUN-20
114	Upgration of Depalpur 132 Kv S/s 220kv with 1x160MVA	220/132	MPPTCL	160	JUN-20
115	Nanauta T/F (Aug.)	220/33	UPPTCL	60	JUN-20
116	Pandharpur Replacement ICT T/F	220/33	MSETCL	50	MAR-21
117	Pydibhimavaram S/S	220/132	APTRANSCO	300	MAR-21
118	Tirumalayapalli	220/132	APTRANSCO	300	MAR-21

119	Dumraon (GIS) ICT-I and II	220/132	BSPTCL	320	MAR-21
120	Khagaria New ICT-I	220/132	BSPTCL	160	MAR-21
121	DSIIDC Bawana	220/66	DTL	160	MAR-21
122	Pachcham (T/F-I)	220/66	GETCO	160	MAR-21
123	Wankaner S/S (Dist. Rajkot) (GEC-I) (3x160 MVA)	220/66	GETCO	480	MAR-21
124	T. Gollahalli (Thimmansandra) S/S	220/66	KPTCL	200	MAR-21
125	Upgradation of the existing 220/11KV Lift Irrigation S/S to Ramavaram at East Godavari District	220/132/33	APTRANSCO	200	MAR-21
126	Rania Kanpur (T/F aug)	220/132	UPPTCL	100	MAR-21
127	Nirpura S/s Baghpat	220/132	UPPTCL	160	MAR-21
128	Banswada	220/132	TSTRANSCO	200	MAR-21
129	Indore S/s (Addl T/F)	220/132	MPPTCL	160	MAR-21
130	Sikarai (Aug)	220/132	RVPNL	100	MAR-21
131	Nalkheda (T/F-I) (Susner) (GEC)	220/132	MPPTCL	160	MAR-21
132	Kanasar ICT-II	220/132	RVPNL	160	MAR-21
133	Chhatargarh GSS (Upgradation) (GEC-I)	220/132	RVPNL	160	MAR-21
134	Akal (Aug)	220/132	RVPNL	500	MAR-21
135	Panagar (Addl T/F)	220/132	MPPTCL	160	MAR-21
136	Jaffarpur S/S	220/33	PTCUL	100	MAR-21
137	Heggunje (Mandarthi) S/S	220/110	KPTCL	200	MAR-21
138	Mughalkod S/S (GEC-I)	220/110	KPTCL	200	MAR-21
139	Chakrayapet	220/132	APTRANSCO	200	MAR-21
140	Gollapuram	220/132	APTRANSCO	200	MAR-21
141	Baja Khanna (Aug. of 100 MVA T/F with 160 MVA	220/66	PSTCL	60	MAY-20
	T/F)				
142	Ferozepur road Ludhiana (Aug. of 100 MVA T/F with 160 MVA T/F)	220/66	PSTCL	60	MAY-20
143	Maur (Addl. T/F)	220/66	PSTCL	100	MAY-20
144	Gurugram Sector-95 (T/F-II)	220/33	HVPNL	100	MAY-20
145	Goda S/S	220/132/33	OPTCL	320	MAY-20
146	Shahjahanpur (T/F-II)	220/132	UPPTCL	160	MAY-20
147	Ratangarh (GEC-I)	220/132	MPPTCL	160	MAY-20
148	Kudligi (Badeladaku) S/S	220/66	KPTCL	200	MAY-20
149	Bangan (Addl. T/F)	220/66	PSTCL	100	MAY-20
150	Govindpalli	220/33	OPTCL	40	NOV-20
151	Rajokheri (T/F-I)	220/66	HVPNL	160	NOV-20
152	Babara (Dist. Amreli) S/S	220/66	GETCO	320	NOV-20
153	Bakana (T/F-I)	220/66	HVPNL	160	NOV-20
154	Kasganj (New) T/F- I	220/132	UPPTCL	160	NOV-20
155	Hata Kushinagar T/F- II (Augmentation)	220/132	UPPTCL	100	NOV-20
156	Aklera (Dist. Jhalawar)	220/132	RVPNL	160	NOV-20
157	Kesinga (2nd Auto T/F)	220/132	OPTCL	160	NOV-20
158	Chitegaon (Repl ICT)	220/132	MSETCL	100	NOV-20

159	Vidisha (Addl. T/F)	220/132	MPPTCL	160	NOV-20
160	Kothamangalam (T/F-II)	220/110	KSEB	100	NOV-20
161	Sanjay Gandhi Transport Nagar (SGTN) GIS	220/66	DTL	320	NOV-20
162	Udaipura S/S (Upgradation)	220/132	MPPTCL	160	NOV-20
163	Pipariya (Addl T/F)	220/132	MPPTCL	160	NOV-20
164	Narsinghpur (Addl T/F)	220/132	MPPTCL	160	NOV-20
165	Ashoknagar (Addl T/F)	220/132	MPPTCL	160	NOV-20
166	Deroli Ahir (T/F-II)	220/132	HVPNL	160	NOV-20
167	Babara (Dist. Amreli) S/S	220/132	GETCO	300	NOV-20
168	Mokama S/S	220/132	BSPTCL	420	NOV-20
169	Patparganj (Addl.)	220/33	DTL	100	NOV-20
170	Neebkarori T/F- II (Capacity Augmentation)	220/132	UPPTCL	100	OCT-20
171	Hoshangabad S/S	220/132	MPPTCL	160	OCT-20
172	Gorabazar S/S	220/132	MPPTCL	160	OCT-20
173	Somanahalli T/F-I Aug (1x150 - 1x100)	220/66	KPTCL	50	OCT-20
174	Asoj (Aug.) (1x160)	220/66	GETCO	160	OCT-20
175	Kothamangalam (T/F-I)	220/110	KSEB	100	OCT-20
176	Neemwala (3rd T/F)	220/132	HVPNL	100	SEP-20
177	RGEC Sonipat (2nd T/F)	220/33	HVPNL	100	SEP-20
178	Manjeri s/s	220/110	KSEB	200	SEP-20
179	Rawatsar	220/132	RVPNL	160	SEP-20
180	Kesinga (1st Auto T/F)	220/132	OPTCL	160	SEP-20
181	New Tanda Ambedkar Nagar (Aug) T/F-III	220/132	UPPTCL	160	SEP-20
182	Deroli Ahir S/s	220/33	HVPNL	100	SEP-20
183	Mesanka	220/66	GETCO	160	SEP-20
	TOTAL STATE SECTOR			**20140**	
	TOTAL 220 kV			**20140**	
		400 kV			
PRIVATE SECTOR					
184	Sohna Road (Gurgaon) (GIS) (GPTL - TBCB)	400/220	SGL	1000	APR-20
185	P.K. Bari S/S (NER-II TL- TBCB)	400/132	SGL	630	JAN-21
186	Surajmaninagar (NER-II TL -TBCB)	400/132	SGL	630	JAN-21
187	New Kohima S/s (K-MTL-TBCB)	400/220	KPTL	1000	JUL-20
188	Badaun GIS (OBTL)	400/220/132	APL	950	MAR-21
	TOTAL PRIVATE SECTOR			**4210**	
	TOTAL 400 kV			**4210**	
	GRAND TOTAL			**57575**	

Annexure-6A

PFRS under 50000 MW Hydroelectric Initiative

Statewise List of Schemes

	Scheme	Consultant	Installed Capacity			Head (m)	Annual Energy (GWh)	Tariff (Rs/kWh)
			Nos of Units	Size (MW)	Total (MW)			
Andhra Pradesh								
1	Pondugala	WAPCOS	3	27	81	18.67	399.36	3.48
	Total (Andhra Pradesh) 1 schemes		3		81			
Arunachal Pradesh								
2	Agoline	NHPC	3	125	375	163.00	1267.38	3.51
3	Amulin	NHPC	3	140	420	132.00	1716.40	3.37
4	Ashupani	NHPC	2	15	30	395.00	126.45	8.75
5	Attunli	NHPC	4	125	500	264.00	2247.32	2.35
6	Badao	NEEPCO	4	30	120	154.50	441.00	2.32
7	Bhareli-I	NEEPCO	8	140	1120	97.00	4112.40	1.85
8	Bhareli-II	NEEPCO	5	120	600	51.00	2345.00	1.67
9	Chanda	NEEPCO	4	27.5	110	175.67	401.91	2.67
10	Demwe	NHPC	12	250	3000	138.00	10823.82	1.97
11	Dengser	NHPC	4	138	552	120.00	2666.71	3.26
12	Dibbin	NEEPCO	2	50	100	151.24	335.72	2.23
13	Duimukh	NHPC	3	50	150	65.00	551.48	8.50
14	Elango	NHPC	3	50	150	363.00	583.14	5.00
15	Emini	NHPC	4	125	500	125.00	1695.45	3.51
16	Emra-II	NHPC	3	130	390	278.00	1648.09	3.02
17	Etabue	NHPC	3	55	165	378.00	683.66	3.43
18	Etalin	NHPC	16	250	4000	385.00	16071.60	1.70
19	Hirong	NHPC	4	125	500	285.00	2535.80	1.62
20	Hutong	WAPCOS	12	250	3000	166.77	9901.00	1.28
21	Kalai	WAPCOS	10	260	2600	193.21	10608.64	1.01
22	Kameng Dam	NEEPCO	5	120	600	65.00	2345.55	2.29
23	Kapakleyak	NEEPCO	4	40	160	245.00	627.95	1.74
24	KurungI&II	NHPC	3	110	330	151.00	1435.40	4.04
25	Mihumdon	NHPC	4	100	400	286.00	1451.75	3.60
26	Mirak	NHPC	3	47	141	136.40	748.44	3.42
27	Naba	NHPC	4	250	1000	221.00	3995.25	2.14
28	Nalo	NHPC	4	90	360	221.00	1733.00	3.27
29	Naying	NHPC	4	250	1000	245.00	5077.15	1.18
30	Niare	NHPC	4	200	800	205.00	3356.62	2.02

31	Oju-I	NHPC	4	175	700	257.00	3291.58	2.08
32	Oju-II	NHPC	4	250	1000	322.00	4629.93	1.46
33	Pakke	NEEPCO	2	55	110	452.50	335.26	3.33
34	Papu	NEEPCO	2	100	200	238.00	505.00	2.94
35	Phanchung	NEEPCO	2	30	60	157.13	174.83	3.24
36	Ringong	NHPC	3	50	150	166.50	659.07	3.61
37	Sebu	NEEPCO	2	40	80	123.00	227.53	3.71
38	Simang	NHPC	3	30	90	125.00	417.82	5.43
39	Talong	NEEPCO	3	100	300	171.67	915.50	2.24
40	Tarangwarang	NEEPCO	2	15	30	185.55	93.81	2.88
41	Tato-II	NHPC	4	175	700	168.00	3465.90	1.48
42	Tenga	NEEPCO	4	150	600	875.00	1046.50	3.52
43	Utung	NEEPCO	3	33.3	100	291.00	359.13	3.10
	Total (Arunachal Pr.) 42 schemes		**182**		**27293**			
Chhattisgarh								
44	Kotri	WAPCOS	3	50	150	36.99	330.95	5.48
45	Nugur-I	WAPCOS	5	34	170	24.54	316.13	4.89
46	Nugur-II	WAPCOS	5	42	210	16.66	787.78	4.16
47	Rehar-I	WAPCOS	3	57	171	46.84	264.38	8.70
48	Rehar-II	WAPCOS	3	49	147	38.17	290.32	5.16
	Total (Chhattisgarh) - 5 schemes		**19**		**848**			
Himachal Pradesh								
49	Bajoli Holi	HPSEB	3	60	180	278.00	762.98	2.03
50	Bardang	HPSEB	*3*	*38*	114	55.00	438.41	2.91
51	Chamba	HPSEB	3	42	126	110.00	646.82	1.48
52	Chhatru	HPSEB	3	36	108	160.00	455.72	2.89
53	Gharopa	HPSEB	3	38	114	169.00	534.25	2.09
54	Gondhala	HPSEB	3	48	144	134.00	586.08	1.92
55	Jangi Thopan	HPSEB	3	160	480	174.14	1779.45	2.00
56	Khab-I	SJVNL	3	150	450	170.00	1551.00	2.24
57	Khab-II	SJVNL	3	62	186	70.00	640.00	3.04
58	Khoksar	HPSEB	3	30	90	99.00	351.91	2.46
59	Luhri	HPSEB	3	155	465	88.00	1825.13	2.41
60	Thopan Powari	HPSEB	3	160	480	161.14	1786.26	1.81
61	Tidong-I	HPSEB	2	30	60	511.50	211.65	2.71
62	Tidong-II	HPSEB	2	35	70	575.00	256.18	2.02
63	Yangthang	HPSEB	3	87	261	186.45	938.02	2.08
	Total (Himachal Pr.) 15 schemes		**43**		**3328**			
Jammu & Kashmir								

64	Barinium	WAPCOS	2	120	240	117.77	1170.34	2.54
65	Bichlari	WAPCOS	2	17.5	35	462.60	148.29	1.11
66	Dumkhar	NHPC	3	15	45	27.80	219.18	4.66
67	Kanyunch e	NHPC	3	15	45	28.76	223.02	4.71
68	Karkit	NHPC	3	10	30	26.90	153.11	5.40
69	Kawar	WAPCOS	4	80	320	74.00	1426.56	1.09
70	Khalsi	NHPC	3	20	60	33.00	272.60	4.10
71	Kiru	WAPCOS	4	107.5	430	105.33	1935.77	0.77
72	Ratle	WAPCOS	4	140	560	92.33	2483.37	1.40
73	Shamnot	WAPCOS	4	92.5	370	56.33	1650.19	1.69
74	Shuas	WAPCOS	2	115	230	115.70	1117.87	2.94
75	Takmachi ng	NHPC	3	10	30	18.53	145.52	5.54
76	Ujh	WAPCOS	4	70	280	143.33	465.06	5.06
	Total (J & K) - 13 schemes		**41**		**2675**			
Karnataka								
77	Agnashini	KPCL	4	150	600	427.00	1431.00	1.07
78	Gangavali	KPCL	2	200	400	378.30	759.00	1.46
79	Gundia	KPCL	2	150	300	600.00	616.00	1.41
80	Kalinadi Stage-III	KPCL	2	150	300	407.67	610.00	1.67
81	Tamankal	KPCL	2	150	300	87.29	401.00	3.32
	Total (Karnatak a) - 5 schemes		**12**		**1900**			
Kerala								
82		WAPCOS	2 2	18 15	66	390.00 307.00	126.10	7.88
83	Perianjak ully	WAPCOS	2	30	60	282.90	86.30	6.25
	Total (Kerala)-2 schemes		**6**		**126**			
Madhya Pradesh								
84	Basania	NHPC	3	30	90	38.00	240.00	17.23
85	Bauras	NHPC	3	18.33	55	17.50	248.43	3.96
86	Hoshanga bad	NHPC	3	20	60	16.50	288.21	4.10
	Total (Madhya Pradesh) -3 schemes		**9**		**205**			
Maharashtra								
87	Ghargaon	WAPCOS	4	13	52	9.84	74.47	15.50
88	Hiranyake shi	WAPCOS	2	9	18	36.10	23.76	20.26
89	Kadvi	WAPCOS	2	11	22	36.30	29.59	34.03
90	Kasari	WAPCOS	2	12.5	25	40.67	33.32	18.16
91	Kumbhi	WAPCOS	2	8.5	17	37.48	22.93	35.19

92	Kunghara	WAPCOS	4	18	72	12.77	133.40	11.34
93	Pranhita	WAPCOS	2	24	48	25.30	135.96	10.32
94	Samda	WAPCOS	4	13	52	10.64	83.40	14.11
95	Waingang a	WAPCOS	5	21	105	19.74	246.15	3.86
	Total (Maharas htra) - 9 schemes		**27**		**411**			
Manipur								
96	Khongnu m Chakka st.-II	WAPCOS	2	33.5	67	281.25	192.84	4.59
97	Nunglieba n	WAPCOS	2	52.5	105	82.42	268.93	5.16
98	Pabaram	WAPCOS	2	95	190	116.67	474.77	4.33
	Total(Ma nipur) - 3 Nos. schemes		**6**		**362**			
Meghalaya								
99	Mawblei	WAPCOS	2	70	140	400.33	303.66	4.44
100	Mawhu	WAPCOS	3	40	120	438.15	482.96	1.40
101	Mawput	WAPCOS	3	7	21	93.42	83.95	4.07
102	Nongkolai t	WAPCOS	2	60	120	463	332.87	1.97
103	Nongnam	WAPCOS	2	25	50	215.17	212.59	2.44
104	Rangmaw	WAPCOS	2	32.5	65	321.00	229.60	2.32
105	Selim	WAPCOS	2	85	170	433.67	534.68	2.02
106	Sushen	WAPCOS	2	32.5	65	114.58	220.6	3.85
107	Umduna	WAPCOS	3	19	57	253.17	231.24	1.68
108	Umjaut	WAPCOS	3	23	69	375.20	276.70	1.51
109	Umngi	WAPCOS	2	27	54	304.75	89.65	2.86
	Total (Meghala ya) - 11 Nos. schemes		**26**		**931**			
Mizoram								
110	Boinu	WAPCOS	4	160	640	158.67	1118.93	4.83
111	Lungleng	WAPCOS	5	163	815	219.67	1169.06	4.17
112	Tlawng	WAPCOS	2	22.5	45	123.67	151.67	5.84
	Total(Miz oram) - 3 Nos. schemes		**11**		**1500**			
Nagaland								
113	Dikhu	NEEPCO	4	35	140	79.44	513.41	2.8
114	Tizu	NEEPCO	3	50	150	64.19	568.41	2.56
115	Yangnyu	NEEPCO	2	20	40	115	176.45	4.48
	Total (Nagaland) - 3 Nos. schemes		**9**		**330**			
Orissa								

116	Baljori	WAPCOS	2	89	178	165.75	479.8	5.9
117	Lower Kolab	WAPCOS	3	155	465	196.9	845.86	7.1
118	Naraj	WAPCOS	7	41	287	16.14	759.31	4.92
119	Tikarpara	WAPCOS	7	37	259	16.97	828.37	3.69
	Total (Orissa) - 4 Nos. schemes		**19**		**1189**			
Sikkim								
120	Dikchu	NHPC	3	35	105	352	469	2.15
121	Lachen	NHPC	3	70	210	350	865.94	2.35
122	Lingza	NHPC	3	40	120	736	477.51	2.85
123	Panan	NHPC	4	50	200	312	762	2.15
124	Rangyong	NHPC	3	47	141	723.18	639.52	2.7
125	Ringpi	NHPC	2	35	70	1106.4	317.41	3.17
126	Rongni Storage	NHPC	3	65	195	442	**510.35**	8.6
127	Rukel	NHPC	3	11	33	537.1	149.41	5.48
128	Talem	NHPC	3	25	75	393.19	305.48	4.34
129	Teesta-I	NHPC	4	80	320	576.85	1298.12	1.8
	Total (Sikkim) - 10 Nos. schemes		**31**		**1469**			
Uttaranchal								
130	Arakot Tiuni	UJVNL	3	24	72	250.2	382.9	1
131	Badrinath	WAPCOS	2	70	140	459.67	702.7	0.81
132	Bagoli Dam	UJVNL	3	24	72	139.5	340.7	4.1
133	Bhairongh ati	WAPCOS	2	32.5	65	108.9	293.18	1.8
134	Bogudiyar - Sirkari Bhyal	WAPCOS	2	85	170	344.47	744	1.99
135	Bokang Baling	WAPCOS	3	110	330	455.2	1124.62	1.68
136	Chhunger - Chal	WAPCOS	2	120	240	292.83	853.28	1.13
137	Deodi	WAPCOS	2	30	60	560.3	296.76	1.37
138	Devsari	WAPCOS	3	100	300	227.5	878.5	2.77
139	Gangotri	WAPCOS	1	55	55	336.33	264.76	1.62
140	Garba Tawaghat	WAPCOS	3	210	630	470.97	2483.11	0.9
141	Gohana Tal	WAPCOS	2	30	60	584.52	269.35	1.64
142	Harsil	WAPCOS	3	70	210	281.33	920.57	1.1
143	Jadh Ganga	WAPCOS	2	25	50	142.6	220.88	2.19
144	Jakhol Sankri	UJVNL	3	11	33	364	**144.24**	1.71
145	Jelam Tamak	WAPCOS	2	30	60	195.58	268.12	1.71
146	Kalika Dantu	WAPCOS	2	115	230	**99.75**	1067.3	2.95
147	Karmoli	WAPCOS	2	70	140	**419.7**	**621.31**	1.3
148	Khartoi Lumti Talli	WAPCOS	2	27.5	55	56.6	241.51	3

149	Lata Tapovan	UJVNL	4	77.5	310	265	1123	2.21
150	Maleri Jelam	WAPCOS	2	27.5	55	200.33	243.07	1.8
151	Mapang - Bogidiyar	WAPCOS	2	100	200	465.07	882.04	1.3
152	Naitwar-Mori	UJVNL	3	11	33	76	151	1.85
153	Nand Prayag	UJVNL	3	47	141	72	794	2.05
154	Ramganga	UJVNL	3	22	66	100.1	327	3.25
155	Rishi Ganga - 1	WAPCOS	2	35	70	536.17	327.3	1.18
156	Rishi Ganga - II	WAPCOS	1	35	35	236.96	164.64	2.22
157	Rupsiabagar Khasiyabara	WAPCOS	2	130	260	449.47	1195.63	1.59
158	Sela Urthing	WAPCOS	2	115	230	255.5	816.73	1.4
159	Sirkari Bhyol Rupsiabagar	WAPCOS	3	70	210	388.97	967.97	1.55
160	Taluka Sankri	UJVNL	2	70	140	564.9	559.47	1.33
161	Tamak Lata	UJVNL	4	70	280	291.4	1040.7	2.3
162	Urthing Sobla	UJVNL	4	70	280	414.96	**1360.2**	1.49
	Total (Uttaranchal) - 33 Nos. schemes		**81**		**5282**			
	Grand Total - 162 Nos. schemes		**525**		**47930**			

Annexure-6B

Actual Hydro Capacity Addition vis-à-vis Target during the Year 2019-20

Sl. No.	Particular	Unit Nos.	Capacity (MW)		Commissioning		Remarks / Critical Issues
			Target	Actual	As Programmed	Actual (A)/ Anticipated	
A.	**Central Sector**						
1	**Kameng** NEEPCO, Arunachal Pradesh 4x150=600 MW	Unit # 1 Unit # 2 Unit # 3 Unit # 4	150 150 150 150	150 150	Aug'19 Aug'19 Aug'19 Aug'19	**10.02.2020** **03.02.2020** Slipped Slipped	-Seepage of water during welding affecting progress of works and causing delays. -Difficult approach and working condition. -Ventilation constrains - Works effected due to heavy rains this monsoon.
	Sub- total (A):		**600**	**300**			
B.	**State Sector**						
2.	**Uhl - III** BVPCL, H.P. 3x33.33=100	Unit #1 Unit # 2 Unit # 3	33.33 33.33 33.33		Oct,19 Nov,19 Dec,19	Slipped Slipped Slipped	-Difficult approach -Delay in welding of liner in bend. - Rupture in Penstock in May,2020
3	**Sawra Kuddu** HPPCL, H.P. 3x37=111 MW	Unit #1 Unit # 2 Unit # 3	37 37 37		Sep,19 Oct,19 Nov,19	Slipped Slipped Slipped	- Delay in completion of HRT works & associated transmission line. - During filling of water conductor system in May,20, leakage is observed in adit to HRT.
	Sub- total (B):		**211**				
C.	**Private Sector**						
4.	**Bajoli Holi** GMR,H.P. 3x60=180 MW	Unit #1 Unit # 2 Unit # 3	60 60 60		Jan.,20 Feb.,20 Mar.,20	Slipped Slipped Slipped	-Works affected due to heavy rainfall in August,19 and inclement weather from early Dec,19. to end of Jan,20 -Poor financial health of civil contractor.
5.	**Singoli Bhatwari** L&T, Uttarakhand 2x33=99 MW	Unit #1 Unit # 2 Unit # 3	33 33 33		Mar.,20 Mar.,20 Mar.,20	Slipped Slipped Slipped	
6.	**Sorang** HSPCL Uttarakhand 2x50=100 MW	Unit #1 Unit # 2	50 50		Nov,19 Dec.,19	Slipped Slipped	- Poor planning of re-erection of penstock works - Weather constraints.
	Sub- total (C):		**379**				
	Total (A+B+C)		**1190**	**300**			

Annexure-6C

Hydro Capacity addition Programme for 2020-21

Sl. No.	Particular	Unit Nos.	Cap. (MW)	Capacity Addition as Programmed	Capacity Addition Actual	Remarks
A.	**Central Sector**					
1	**Kameng** NEEPCO, Arunachal Pradesh 4x150=600 MW	Unit # 3 Unit # 4	150 150	December'20 December'20	**21.01.2021** **11.02.2021**	**Commissioned**
	Sub- total (A):		**300 MW**		**300 MW**	
B.	**State Sector**					
2	**Sawra Kuddu** HPPCL, H.P. 3x37=111 MW	Unit #1 Unit # 2 Unit # 3	37 37 37	December'20 December'20 December'20	**12.11.2020** **05.12.2020** **16.12.2020**	**Commissioned**
	Sub- total (B):		**111 MW**		**111 MW**	
C.	**Private Sector**					
3	**Singoli Bhatwari** L&T, Uttarakhand 2x33=99 MW	Unit #1 Unit # 2 Unit # 3	33 33 33	December'20 December'20 December'20	**19.11.2020** **18.12.2020** **25.12.2020**	**Commissioned**
4	**Rongnichu** Madhya Bharat Power Corporation, Sikkim 2x48=96 MW	Unit#1 Unit#2	48 48	March'21 March'21	-	**Slipped to 1st Quarter of 2021-22**
	Sub- total (C):		**195 MW**		**99 MW**	
	Total (A+B+C)		**606 MW**		**510 MW**	

Annexure-6D

Hydro Capacity Addition Programme for 2021-22

Sl. No.	Name of Project	Unit No.	State/ Implem. Agency	Capacity (MW)
	State Sector			
1.	Thottiyar 1x30 + 1x10= 40 MW	U-1 to U-2	Kerala/ KSEB	40
2.	Pallivasal 2x30= 60 MW	U-1 to U-2	Kerala/ KSEB Ltd.	60
			Sub- total (State):	**100**
	Private Sector			
3.	Bajoli Holi 3x60= 180 MW	U-1 to U-3	Himachal Pradesh / GMR Bajoli Holi Hydro Power Pvt. Ltd.	180
4	Sorang 2x50= 100 MW	U-1 & U-2	Himachal Pradesh/ Himachal Sorang Power	100
5.	Rongnichu* 2x56.5= 113 MW	U-1 to U-2	Sikkim/ Madhya Bharat Power Corporation Ltd.	113
			Sub- total (Private):	**393**
			Total (CS. +SS.+PS.)	**493**

* Rongnichu HEP, which was programmed to be commissioned in 2020-21 has been slipped to 2021-22. Further, the capacity of Ronginichu HEP has been enhanced from 96 MW to 113 MW.

Annexure-6(E)

State-wise list of Hydro RMU&LE schemes programmed for completion during 2017-22

S. No.	Name of Project, Agency Inst. Cap. (No. x MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost	Actual Exp.	Benefits (MW)	Capacity Covered Under RMU&LE (No.x MW)	Category	Year of Completion ---------- Original	Anticipated
A. Completed Schemes										
Himachal Pradesh										
1.	Ganguwal (1x29.25+2x24.2) & Kotla (1x29.25+2x24.2), BBMB	CS	1x24.2 (U-2) 1x24.2 (U-3)	14.19	9.58	48.4(LE)	48.4	RML&E	Completed in 2017-18	
2.	Dehar Power House (Unit-6), BBMB (6x165)	CS	1x165	19.87	16.00	-	165	R&M	Completed in 2017-18	
3.	Salal, NHPC (6x115)	CS	5x115	58.01	51.08	-	575	RMU&LE	Completed in 2019-20	
Tamil Nadu										
4.	Salal, NHPC (6x115)	SS	2x35	90.44	66.94	Salal, NHPC (6x115)	84	RMU&LE	Completed in 2019-20	
Karnataka										
5.	Bhadra River Bed units, KPCL (2x12)	SS	2x12	23.55	20.12	-	24	R&M	Completed in 2019-20	
Kerala										
6.	Sholayar, KSEB (3x18)	SS	3x18	199.55	84.26	54(LE)	54	RM&LE	Completed in 2020-21	
7.	Idukki 1st stage, KSEB (3x130)	SS	3x130	89.90	44.14	-	390	R&M	Completed in 2020-21	
Sub Total (A)			**1326.40**	**495.51**	**292.12**	**186.40 (172.40(LE)+14(U)**	**1340.40**			
B. On going Schemes – Under Implementation										
Himachal Pradesh										
8.	Ganguwal & Kotla Power House, BBMB (4x24.2)	CS	4x24.2	3.12	-`	-	96.8	R&M	2020-21	2021-22
9.	Bhakra LB, BBMB (5x108)	CS	5x108	489.77	547.65	540.00(LE)+ 90.00 (U)	630	RMU&LE	2016-17	2021-22
10	Bhakra RB, BBMB (5x157)	CS	5x157	20.8	-	-	785	R&M	2021-22	2021-22
11	Baira Siul, NHPC (3x60)	CS	3x60	341.41	153.89	180 (LE)	180	RM&LE	2020-21	2021-22
12	Bhabha Power House, HPSEB (3x40)	SS	3x40	76.03	81.13	120 (LE)	120	RM&LE	2017-18	2021-22
13	Dehar Power House (Unit-3), BBMB (1x165)	CS	1x165	23.00	8.67	-	165	R&M	2019-20	2021-22
Jammu & Kashmir										
14.	Chenani, J&KSPDC (5x4.66)	SS	5x4.66	39.60	26.22	23.30 (LE)	23.3	RM&LE	2015-16	2021-22
15.	Ganderbal, J&KSPDC (2x3+2x4.5)	SS	2x4.5	31.57	11.33	9.00 (LE)	9	RM&LE	2016-17	2021-22

Punjab										
16.	Mukerian St.I, St.II, St.III & St.IV, PSPCL (3x15, 3x15, 3x19.5 & 3x19.5)	SS	3x15, 3x15, 3x19.5& 3x19.5	136.07	47.46	-	207	R&M	2019-20	2021-22
17	Shanan HEP, PSPCL (1x50+4x15)	SS	1x50+ 4x15	37.81	20.16	-	110	R&M	2019-20	2021-22
Uttar Pradesh										
18.	Rihand, UPJVNL (6x50)	SS	6x50	132.20	105.65	300 (LE)	300	RM&LE	2017-18	2021-22
19.	Obra, UPJVNL (3x33)	SS	3x33	58.80	43.23	99 (LE)	99	RM&LE	2017-18	2021-22
Guarat										
20.	Ukai, GSECL (4x75)	SS	3x75 (U-1,2,&4)	7.30	4.48	-	225	R&M	2021-22	2021-22
21	Kadana PSS, GSECL (4x60)	SS	4x60	11.26	6.18	-	240	R&M	2021-22	2021-22
Telangana										
22.	Nagarjuna Sagar Ph-II works, TSGENCO (1x110+7x100.8)	SS	1x110+7x 100.8	22.17	14.34	-	815.6	R&M	2018-19	2021-22
23.	Nagarjuna Sagar Left Canal Power House, TSGENCO (2x30.6)	SS	2x30.6	30.99	2.00	-	61.2	R&M	2018-19	2021-22
Karnataka										
24.	Munirabad Dam Power House, KPCL (2x9 + 1x10)	SS	2x9+1x10	4.60	2.2	-	28	R&M	2018-19	2021-22
Kerala										
25.	Kuttiyadi, KSEB (3x25)	SS	3x25	377.41	-	75. + 7.5 (U)00 (LE)	82.5	RMU& LE	2021-22	2021-22
Madhya Pradesh										
26.	Bargi, MPPGCL (2x45)	SS	2x45	7.98	2.42	-	90	R&M	2020-21	2021-22
27.	Pench, MPPGCL (2x80)	SS	2x80	13.36	0.36	-	160	R&M	2021-22	2021-22
28.	Bansagar Ton-I, MPPGCL (3x105)	SS	3x105	14.16	9.77	-	315	R&M	2021-22	2021-22
Odisha										
29.	Hirakud-I OHPC (2x37.5)	SS	2x37.5 (U5&6)	158.77	96.68	75.00 (LE)+12.2 (U)	87.2	RMU& LE	2017-18	2021-22
30.	Hirakud-II (Chiplima), OHPC (3x24)	SS	1x24 (U-3)	65.51	46.51	24.00 (LE)	24	RM&LE	2017-18	2021-22
31.	Balimela, OHPC (6x60)	SS	6x60	382.91	73.13	360(LE)	360	RM&LE	2019-20	2021-22
Sub Total (B)			**5103.90**	**2486.76**	**1303.46**	**1915 [1805.30(LE)+123. 7 (U)]**	**5213.60**			
Total (A&B)			**6430.30**	**2982.27**	**1595.58**	**2101.40 [1977.70(LE)+123. 7(U)]**	**6554.00**			

Annexure-6(F)

State-wise List of Hydro RMU&LE schemes programmed for completion during 2022-27

Sl. No	Name of Project, Agency Inst. Cap. (No.X MW)	CS/ SS	Capacity Covered Under RMU&LE (No.x MW)	Est. Cost (Rs. in Crs.)	Actual Exp. (Rs. in Crs.)	Benefits (MW)	Capacity after RMU&LE	Category	Year of Completion
A. Ongoing Schemes – Under Implementation									
Himachal Pradesh									
1	Pong Power House, BBMB (6x66)	CS	6x66	142.25	-	396 (LE)	396	RM&LE	2022-23
Madhya Pradesh									
2	Gandhi Sagar, MPPGCL (5x23)	SS	5x23	200	4.97	-	115	R&M	2022-23
Punjab									
3	Ranjit Sagar Dam, PSPCL (4x150)	SS	4x150	82.16	0.93	-	600	R&M	2022-23
4	UBDC St.I & St.II, PSPCL (3x15+3x15.45)	SS	3x15+ 3x15.45	23.55	1.6	-	91.35	R&M	2022-23
5	Anandpur Sahib Hydel Project, PSPCL (4x33.5)	SS	4x33.5	31.65	0.85	-	134	R&M	2022-23
Uttarakhand									
6	Chilla Ph B UJVNL (4x36)	SS	4x36	490.56	-	144(LE)+ 12(U)	156	RMU&LE	2024-25
7	Tiloth, UJVNL (3x30)	SS	3x30	162.9	112.82	90 (LE)	90	RM&LE	2022-23
8	Dhalipur, UJVNL (3x17)	SS	3x17	152.65	43.98	51 (LE)	51	RM&LE	2022-23
Tamil Nadu									
9	Moyar PH, TANGEDCO (3x12)	SS	3x12	67.05	-	36(LE)+ 6(U)	42	RMU&LE	2023-24

10	Kodayar PH-I, TANGEDCO (1x60)	SS	1x60	88.48	-	60 (LE)+ 10 (U)	70	RMU&LE	2023-24
11	Nagjhari KPCL (3x150)	SS	3x150 (U-1 to 3)	222.00	13.108	-	450	R&M	2023-24
12	Shivasamudram, KPCL (6x3+4x6)	SS	6x3+4x6	169.18	14.01	42 (LE)	42	RM&LE	2023-24
Sub Total(A)			**2209.35**	**1832.43**	**192.27**	**847 [819(LE) +28(U)]**	**2237.35**		
B. Ongoing Schemes – Under Tendering									
Himachal Pradesh									
13	Giri, HPSEB (2x30)	SS	2x30	139.80	-	60.00 (LE)	60	RM&LE	2023-24
Uttarakhand									
14	Ramganaga, UJVNL (3x66)	SS	3x66	455.20	-	198(LE)	198	RM&LE	2022-27
15	Dhakrani, UJVNL (3x11.25)	SS	3x11.25	137.31	-	33.75 (LE)	33.75	RM&LE	2025-26
Manipur									
16	Loktak, NHPC (3x35)	CS	3x35	273.59	-	105 (LE)	105	RM&LE	2023-24
Meghalaya									
17	Umium St.III, (Kyrdemkulai) MePGCL (2x30)	SS	2x30	408.00	-	60(LE) + 6(U)	66	RMU&LE	2022-27
Jharkhand									
18	Panchet, DVC (2x40)	CS	1x40 (U-1)	48.92	2.19	40(LE)+ 6(U)	46	RMU&LE	2023-24
Karnataka									
19	Kadra Dam Power House, KPCL (3x50)	SS	3x50	44.47	1.72	150 (LE)	150	RM&LE	2022-23

20	Kodasalli Dam Power House, KPCL (3x40)	SS	3x40	50.60	1.47	120 (LE)	120	RM&LE	2022-23
21	Gerusoppa Dam Power House (Sharavathy Tail Race), KPCL (4x60)	SS	4x60	59.66	2.21	240 (LE)	240	RM&LE	2023-24
22	Linganamakki Dam Power House, KPCL (2x27.5)	SS	2x27.5	56.20	1.85	55 (LE)	55	RM&LE	2023-24
Sub Total(B)			**1061.75**	**1673.75**	**9.44**	**1073.75 [1061.75 LE)+ 12(U)]**	**1073.75**		
C. Ongoing Schemes – Under DPR Preparation/ Finalisation/ Approval									
Jammu & Kashmir									
23	Lower Jehlum HEP, J&KSPDC (3x35)	SS	3x35	-	-	105 (LE)+ 27 (U)	132	RMU&LE	2022-27
Uttarakhand									
24	Kulhal, UJVNL (3x10)	SS	3x10	115.24	-	30(LE)	30	RM&LE	2022-27
Tamil Nadu									
25	Kodayar PH-II, TANGEDCO (1x40)	SS	1x40	-	-	40.0(LE) + 6(U)	46	RMU&LE	2026-27
Karnataka									
26	MGHE, KPCL (4x21.6+4x13.2)	SS	4x21.6+ 4x13.2	97.00	7.75	139.2 (LE)	139.2	RM&LE	2023-24
27	Supa Dam Power House, KPCL (2x50)	SS	2x50	47.91	2.2	100 (LE)	100	RM&LE	2023-24
28	Sharavathy Generating Station, KPCL (10x103.5)	SS	10x103.5	196.56	11.07	1035 (LE)	1035	RM&LE	2023-24
West Bengal									
29	Maithon, DVC (2x20+1x23.2)	CS	2x20 (U-1&3)	56.03	7.76	40.00 (LE)	40	RM&LE	2024-25
Assam									

30	Khandong Power Station, NEEPCO (2x25)	CS	2x25	207.00	21.43	50 (LE)	50	RM&LE	2024-25
31	Kopili Power Station, NEEPCO (4x50)	CS	4x50	1117.00	48.54	200(LE)	200	RM&LE	2023-24
Sub Total(C)			**1739.20**	**1836.74**	**98.75**	**1772.20 1739.20(LE)+ 33(U)]**	**1772.20**		
D. Ongoing Schemes – Under RLA Studies									
Jharkhand									
32	Subernrekha, JUUNL (2x65)	SS	2x65	-	-	130(LE)	130	RM&LE	2022-27
33	Kundah-I, TANGEDCO (3x20)	SS	3x20	-	-	60 (LE)	60	RM&LE	2022-27
34	Kundah-II, TANGEDCO (5x35)	SS	5x35	-	-	175 (LE)	175	RM&LE	2022-27
35	Kundah-III, TANGEDCO (3x60)	SS	3x60	-	-	180 (LE)	180	RM&LE	2022-27
36	Kundah-IV, TANGEDCO (2x50)	SS	2x50	-	-	100 (LE)	100	RM&LE	2022-27
37	Kundah-V, TANGEDCO (2x20)	SS	2x20	-	-	40 (LE)	40	RM&LE	2022-27
38	Mettur Tunnel, TANGEDCO (4x50)	SS	4x50	-	-	200 (LE)	200	RM&LE	2022-27
39	Sarkarpathy, TANGEDCO (1x30)	SS	1x30	-	-	30 (LE)	30	RM&LE	2022-27
40	Sholayar-II, TANGEDCO (1x25)	SS	1x25	-	-	25 (LE)	25	RM&LE	2022-27
41	Suruliyar, TANGEDCO (1x35)	SS	1x35	-	-	35 (LE)	35	RM&LE	2022-27
42	Kadamparai, PH TANGEDCO (4x100)	SS	4x100	-	-	400 (LE)	400	RM&LE	2022-27
43	Aliyar, TANGEDCO (1x60)	SS	1x60	-	-	60 (LE)	60	RM&LE	2022-27
Kerala									

44	Idukki 2nd stage, KSEB (3x130)	SS	3x130	-	-	390 (LE)	390	RM&LE	2022-27
Andhra Pradesh									
45	Tungabhadra Dam, APGENCO (4x9)	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
46	Hampi Canal PH, APGENCO (4x9)	SS	4x9	175.00	-	36 (LE)	36	RM&LE	2025-26
47	Machkund St.I & St.II, APGENCO (3x17+3x23)	SS	3x17+ 3x23	500.00	-	120 (LE) +9 (U)	129	RMU&LE	2025-26
48	Lower Sileru, APGENCO (4x115 MW)	SS	4x115	1.80	-	460(LE)	460	RMU&LE	2022-27
Meghalaya									
49	Umiam-umtru Stage-IV, MePGCL (2x30)	SS	2x30	-	-	-	60	R&M	2022-27
Sub Total(D)			**2537.00**	**851.80**	**0.00**	**2486 [2477(LE)+9(U)]**	**2546.00**		
Total (A+B+C+D)			**7547.30**	**6194.72**	**300.46**	**6178.95 [6096.95(LE)+ 82(U)]**	**7629.30**		

Abbreviations: R&M – Renovation & Modernisation;. U – Uprating; LE – Life Extension; Res – Restoration;

MW – Mega Watt; CS-Central Sector: SS- State Sector

Annexure-7A

Thermal Capacity Addition Programme (RFD) for the year 2019-20

Sl. No.	Project Name	LOA Date	Unit No	Fuel	Targeted Cap. (MW)	Comm. Sched.	Ant. Trial Run/ COD at the Beginning of the year	Achieved Cap. (MW)	Actual. Date of Cap. Addition
	CENTRAL SECTOR								
1	Nabi Nagar STPP	Jan-13	U-1	Coal	660	Jan-17	May-19	660	12.07.19(A)
2	Lara STPP	Dec-12	U-2	Coal	800	May-17	Dec-19		Slipped due to Lockdown
3	Gadarwara STPP	Mar-13	U-2	Coal	800	Sep-17	Dec-19		Slipped due to Lockdown
4	Khargone STPP St-I	Mar-15	U-1	Coal	660	Mar-19	Aug-19	660	29.09.19(A)
		Mar-15	U-2	Coal	660	Sep-19	Feb-20	660	24.03.20(A)
5	Darlipalli STPP St-I	Feb-14	U-1	Coal	800	Feb-18	Aug-19	800	30.12.19(A)
6	Tanda TPP St-II	Sep-14	U-5	Coal	660	Sep-17	Sep-19	660	28.09.19(A)
7	Neyveli New TPP	Jun-11	U-1	Lignite	500	Mar-18	Apr-19	500	20.12.19(A)
		Jun-11	U-2	Lignite	500	Sep-18	Oct-19		Slipped due to Lockdown
	Total Central Sector				***6040***			**3940**	
	STATE SECTOR								
1	Dr.Narla Tata Rao TPS Stage-V	Dec-15	U-8	Coal	800	Jun-19	Feb-20		Slipped due to Slow Progress
2	Namrup CCGT	Feb-09	ST	Gas	36.15	Jan-12	Nov-19		Slipped due to Lockdown
3	Wanakbori TPS Extn.	Oct-14	U-8	Coal	800	Oct-18	Nov-19	800	12.10.19(A)
4	Yelahanka CCPP	Nov-15	GT+	Gas	370	Mar-18	Nov-19		Slipped due to Lockdown
5	Ib Valley TPP	Mar-14	U-3	Coal	660	Aug-17	Apr-19	660	01.07.19(A)
		Mar-14	U-4	Coal	660	Aug-17	Jul-19	660	17.08.19(A)
6	Suratgarh SCTPP	Mar-13	U-7	Coal	660	Jul-16	Nov-19	660	15.03.20 (A)
7	Bhadradri TPP	Mar-15	U-1	Coal	270	Mar-17	Jan-20		Slipped due to Lockdown
	Total State Sector				**4256.15**			**2780**	
	TOTAL THERMAL CAPACITY ADDITION				**10296.15**			**6720**	
	ADDITIONAL PROJECTS								
	PRIVATE SECTOR								
1	BLA Power Pvt. Ltd(Niwari) TPP	Apr-11	U-2	Coal				45	06.06.19(A)
	Total Private Sector							**45**	
	Total Additional Capacity							**45**	
	TOTAL GRAND THERMAL CAPACITY ADDITION							**6765**	

Annexure 7B

Thermal Capacity Addition Programme (RFD) for the year 2020-21

Sl. No.	Project	Unit	Capacity (MW)	Developer / Imp. Agency	State	Ant. Trial Run/ COD at the Beginning of the year	Achieved Capacity (MW)	Actual Date of Cap. Addition
CENTRAL SECTOR								
1	Lara STPP	2	800	NTPC	Chhattisgarh	Aug-20	800	12.07.20(A)
2	Gadarwara STPP	2	800	NTPC	Madhya Pradesh	Sep-20	800	16.02.21(A)
3	Meja STPP	2	660	JV of NTPC & UPRVUNL	Uttar Pradesh	Oct-20	660	12.01.21(A)
4	Neyveli New TPP-Lignite	2	500	NLC	Tamil Nadu	Oct-20	500	03.02.21(A)
5	Darlipalli STPP St-I	2	800	NTPC	Odisha	Nov-20		Slipped due to Covid pandemic
6	Barh STPP Stage I	1	660	NTPC	Bihar	Nov-20		Slipped due to Covid pandemic
7	Tanda TPP St-II	6	660	NTPC	Uttar Pradesh	Dec-20	660	31.03.21(A)
8	Nabi Nagar STPP	2	660	JV of NTPC & BSPGCL	Bihar	Jan-21	660	31.03.21(A)
9	Nabi Nagar TPP	4	250	JV of NTPC & Rly	Bihar	Feb-21		Slipped due to Covid pandemic
Total Central Sector			**5790**				**4080**	
STATE SECTOR								
1	Namrup CCGT-Gas	ST	36.15	APGCL	Assam	Jun'20	36.15	17.05.20(A)

2	Bhadradri TPP	1	270	TSGENCO	Telangana	Jun'20	270	05.06.20(A)
3	Bhadradri TPP	2	270	TSGENCO	Telangana	Aug'20	270	07.12.20(A)
4	Yelahanka CCPP-Gas	GT+ST	370	KPCL	Karnataka	Nov'20		Slipped due to Fire incident & Covid pandemic
5	Dr. Narla Tata Rao TPS St-V	8	800	APGENCO	Andhra Pradesh	Nov'20		Slipped due to Covid pandemic
6	Sri Damodaram TPS St-II	8	800	APGENCO	Andhra Pradesh	Dec'20		Slipped due to Covid pandemic
7	Suratgarh SCTPP	8	660	RRVUNL	Rajasthan	Dec'20		Slipped due to Covid pandemic
8	North-Chennai TPP, ST-III	1	800	TANGEDCO	Tamil Nadu	Jan-21		Slipped due to Covid pandemic
9	Bhadradri TPP	3	270	TSGENCO	Telangana	Jan-21	270	26.03.21(A)
Total State Sector			**4276.15**				**846.15**	
PRIVATE SECTOR								
1	Tuticorin Stage-IV	1	525	SEPC Power Pvt. Ltd.	Tamil Nadu	Jan'21		Slipped due to Covid pandemic
Total Private Sector			**525**				**0**	
Total Thermal Sector			**10591.15**				**4926.15**	

Annexure- 8A

State-wise Average hours of Power Supply (HH:MM) in as Day for Last Three Years as available on NPP.

Sl. No.	State Name	2018-19		2019-20		2020-21	
		RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
1	Andhra Pradesh	22:07	23:58	23:38	23:55	23:40	23:54
2	Arunachal Pradesh						22:44
3	Assam		23:44		23:48		
4	Bihar	21:13		21:51	23:08	21:53	23:23
5	Chhattisgarh		23:46		23:59		23:59
6	Goa				22:45		23:44
7	Gujarat	23:47	23:57	23:07	23:57	23:44	23:57
8	Haryana	19:37	23:17	19:14	23:16	19:57	23:24
9	Himachal Pradesh	15:49		15:39	23:51	15:50	23:51
10	Jammu & Kashmir						21:59
11	Jharkhand				23:33		
12	Karnataka	17:38	23:56	17:13	23:50	19:11	23:51
13	Kerala	21:13	24:00	21:58	23:59	21:00	23:55
14	Madhya Pradesh	23:20	23:42	23:02	23:51	22:39	23:56
15	Maharashtra		23:57	20:27	23:58	20:58	23:59
16	Meghalaya		23:57		23:59		23:56
17	Mizoram		23:44		23:40		23:48
18	Nagaland				23:30		22:44
19	Odisha	20:08		20:01	23:39	21:16	23:51
20	Puducherry	22:06		20:27		23:09	
21	Punjab	23:16	23:47	23:10	23:43	22:36	23:46
22	Rajasthan	21:18	23:55	21:18	23:53	21:22	23:59
23	Tamil Nadu	20:46		20:58	23:58	21:31	
24	Telangana	22:03		22:13	23:55	22:09	23:55
25	Tripura	19:41	24:00	19:33	24:00	19:33	23:59
26	Uttar Pradesh	19:06	23:09	17:02	23:34	16:26	23:45
27	Uttarakhand	21:24	23:28	21:40	23:24	21:58	23:39
28	West Bengal	18:11	23:58	23:04	23:58	23:04	23:59
	National Average	**20:41**	**21:43**	**20:50**	**22:23**	**21:09**	**23:35**

*Average is calculated by considering only those states whose data is available for the relevant FY

Information of only those States is available whose feeders have been on-boarded on NPP
Blank cell implies feeders of the State either not on-boarded on NPP or not communicated for that period

Outstanding Dues (More than 45 days) Of Power Utilities (Principal and Surcharge) Payable to Central Public Sector Undertakings (CPSU)

Based upon the information received from CPSUs upto 31st Mar 2021

All Figures in Rs Crores

STATE / UTILITY	NTPC		NHPC		PGCIL		NEEPCO		NPCIL*		DVC		NLC		SJVNL*		BBMB		THDC		NHDC		NTPL		TOTAL
	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	
2	3		4		5		6		7		8		9		10		11		12		13		14		15
NORTHERN REGION																									
HARYANA																									
UHBVN																									**0.00**
DHBVN																									**0.00**
HPPC			0.00	1.23																					**1.23**
HPGCL									25.53	0.74															
TOTAL (Haryana)	**0.00**	**0.00**	**0.00**	**1.23**	**0.00**	**0.00**	**0.00**	**0.00**	**25.53**	**0.74**	**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**		**27.50**
HIMACHAL																									
HPSEB			0.00						0.00	1.78								0.28							**331.26**
Govt.of HP															46.62	282.58									**0.00**
TOTAL (Himachal)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.78**			**0.00**	**0.00**	**46.62**	**282.58**	**0.00**	**0.28**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**331.26**
DELHI																									
DTL /NDMC					5.10											14.31									**19.41**
TPDDL			0.00						0.55										0.00	0.00					**0.55**
BYPL /BSES YAMUNA			0.00	0.10	7.50				133.52	219.07	500.85								87.09	136.19					**1084.32**
BRPL/BSES RAJDHANI									0.00	53.95									142.92	15.47					**212.34**
TOTAL (Delhi)	**0.00**	**0.00**	**0.00**	**0.10**	**12.60**	**0.00**	**0.00**	**0.00**	**134.07**	**273.02**	**500.85**	**0.00**	**0.00**	**0.00**	**0.00**	**14.31**	**0.00**	**0.00**	**230.01**	**151.66**	**0.00**	**0.00**	**0.00**		**1316.62**
JAMMU & KASHMIR										.															
J&K PDD			2.36	133.99					7.34	98.42					365.57	98.12			12.82	39.17					**4500.32**
J&K PDCL/JKPCL	3121.00		767.44	134.69	567.40	53.90												0.23	249.24	6.50					**1157.87**
J&K SPTCL									468.06	23.22															**491.28**
TOTAL (J&K)	**3121.00**	**0.00**	**769.80**	**268.68**	**567.40**	**53.90**	**0.00**	**0.00**	**475.40**	**121.64**	**0.00**	**0.00**	**0.00**	**0.00**	**365.57**	**98.12**	**0.00**	**0.23**	**262.06**	**45.67**	**0.00**	**0.00**	**0.00**	**0.00**	**6149.47**
PUNJAB																									
PSEB									16.20	4.57															**101.29**
PSPCL			82.48	15.60	3.70						76.18	0.64							1.67						**99.75**
TOTAL (Punjab)	**0.00**	**0.00**	**82.48**	**15.60**	**3.70**	**0.00**	**0.00**	**0.00**	**16.20**	**4.57**	**76.18**	**0.64**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.67**	**0.00**	**0.00**	**0.00**	**0.00**		**201.04**
RAJASTHAN																									
RRVUNL /RSEB																	17.33	11.60							**54.13**
JVVNL			0.10	0.67					16.95	3.20						0.00			0.01						**169.29**
AVVNL			8.97	0.86					31.80	11.60						0.88			0.19	0.00					**54.30**
JDVVNL			36.44	5.40	25.00	0.20			36.75	22.05			147.16	1.20					6.48	0.00					**107.12**
TOTAL (Rajasthan)	**0.00**	**0.00**	**45.51**	**6.93**	**25.00**	**0.20**	**0.00**	**0.00**	**85.50**	**36.85**			**147.16**	**1.20**	**0.00**	**0.88**	**17.33**	**11.60**	**6.68**	**0.00**	**0.00**	**0.00**	**0.00**		**384.84**
OTHERS																									
HWB (KOTA)									11.49	0.00															**11.49**
UTTAR PRADESH																									
UPPCL			0.00	171.40	0.00	20.60	0.00		0.00	356.26									447.90	0.00					**996.16**
TOTAL (Uttar Pradesh)	**0.00**	**0.00**	**0.00**	**171.40**	**0.00**	**20.60**	**0.00**	**0.00**	**0.00**	**356.26**			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**447.90**	**0.00**	**0.00**	**0.00**	**0.00**		**996.16**
UTTARAKHAND																									
UPCL			0.00		0.00				0.45	0.29					0.00	0.00									**0.74**
CHANDIGARH																									
CPDD				0.17					0.12								65.66	8.68							**74.63**
OTHERS																									
M/s N.F.L. Nangal																	0.06								**0.06**
B.S.L. Project S/Nagar																									**0.00**
Beas Project talwara																									**0.00**
Irrigation Wing, Nangal																									**0.00**
TOTAL (Others)	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	0.06	0.00	0.00	0.00	0.00	0.00	0.00		**0.06**
TOTAL (Northern Region)	**3121.00**	**0.00**	**897.79**	**464.11**	**608.70**	**74.70**	**0.00**	**0.00**	**748.76**	**795.15**	**577.03**	**0.64**	**147.16**	**1.20**	**412.19**	**395.89**	**83.05**	**20.79**	**948.32**	**197.33**	**0.00**	**0.00**	**0.00**		**9493.81**

STATE / UTILITY	NTPC		NHPC		PGCIL		NEEPCO		NPCIL*		DVC		NLC		SJVNL*		BBMB		THDC		NHDC		NTPL		TOTAL
	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	
2	3		4		5		6		7		8		9		10		11		12		13		14		15
WESTERN REGION																									
GUJARAT																									
GUVNL									4.58	0.88															**5.46**
HWB (Gujarat)																									**0.00**
GOA																									**0.00**
GOA ED																									**0.00**
MADHYA PRADESH																									**0.00**
MPPCL / MPPTCL									46.60	4.67															**51.57**
MPPMCL			0.35	0.01	0.30											0.00					121.92	0.00			**122.28**
TOTAL (Madhya Pradesh)	**0.00**	**0.00**	**0.35**	**0.01**	**0.30**	**0.00**	**0.00**	**0.00**	**46.60**	**4.67**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**121.92**	**0.00**	**0.00**		**173.85**
CHHATTISGARH																									
CSEB/CSPDCL			0.67	0.18					-0.09	0.00															**0.76**
TOTAL(CHHATTISGARH)	**0.00**	**0.00**	**0.67**	**0.18**	**0.00**				**-0.09**	**0.00**													**0.00**		**0.76**
MAHARASHTRA																									
MSEDCL					0.30				107.72	67.22					2.65	17.02									**194.91**
DADRA NAGAR & SILVASA																									**0.00**
Electricity Department					0.70				0.01	0.11															**0.82**
DAMAN & DIU																									**0.00**
Electricity Department					0.20																				**0.20**
BARC																									**0.00**
IGCAR									2.86																**2.86**
TOTAL (Western Region)	**0.00**	**0.00**	**1.02**	**0.19**	**1.50**	**0.00**	**0.00**	**0.00**	**161.68**	**72.88**	**0.00**	**0.00**	**0.00**	**0.00**	**2.65**	**17.02**	**0.00**	**0.00**	**0.00**	**0.00**	**121.92**	**0.00**	**0.00**		**378.86**
SOUTHERN REGION																									
ANDHRA PRADESH																									
APEPDCL/APNPDCL /APTRANS	48.00				68.90		0.80	0.00	193.35	56.33			291.43	36.28									353.81		**1048.90**
TOTAL (Andhra Pradesh)	**48.00**				**68.90**				**193.35**	**56.33**			**291.43**	**36.28**									**353.81**	**0.00**	**1048.10**
KARNATAKA																									**0.00**
BESCOM									5.79	2.41	6.45	0.00	233.60	0.60									5.24		**270.39**
MESCOM									0.13				27.89	0.00											**28.02**
CESCOM	147.00								52.71	31.73	40.20		59.91	2.74									15.28		**349.57**
HESCOM	512.00								172.28	217.77	30.61		141.92	9.01									27.31		**1110.90**
GESCOM	137.00								75.79	42.10	1.72		108.44	2.22									33.01		**400.28**
ESCOMS					16.30	0.00																			**0.00**
TOTAL (Karnataka)	**796.00**			**0.00**	**16.30**	**0.00**			**306.70**	**294.01**	**78.98**	**0.00**	**571.76**	**14.57**									**80.84**	**0.00**	**2159.16**
TELANGANA																									
TSNPDCL/TSSPDCL	203.00				2.60				94.13	63.74			289.52	21.64									390.95		**1065.58**
Kerala																									
KSEB					0.80				16.00	3.38			201.67	1.08									0.00		**222.93**
TAMILNADU																									**0.00**
TNEB/TANGEDCO	155.00		20.59	7.37	23.20				1363.14	709.75			3104.81	55.30									1044.42		**6483.58**
Puducherry																									**0.00**
PED									12.63	9.44			241.44	3.26									3.91		**270.68**
Others																									**0.00**
BHAVINI									30.03	6.72															**36.75**
AUGF																									**0.00**
TOTAL (Southern Region)	**1202.00**	**0.00**	**20.59**	**7.37**	**111.80**	**0.00**	**0.00**	**0.00**	**2015.98**	**1143.37**	**78.98**	**0.00**	**4700.63**	**132.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1873.93**	**0.00**	**11286.78**
EASTERN REGION																									**0.00**
DVC																									**0.00**
BIHAR																									**0.00**
BIHAR(NBPDCL/SBPCL/BSEB)			0.00	0.00	9.70						11.53	0.00													**21.23**
SIKKIM																									**0.00**
Electricity Department	83.00		5.79	0.83	2.40	0.20																			**92.22**
WEST BENGAL																									**0.00**
WBSEB			48.99	10.60							20.70	0.00													**80.29**
JHARKHAND																									
JBVNL/JUVNL	51.00		2.57	0.77	13.60						3705.27	972.96													**4746.17**
ODISHA																									**0.00**
GRIDCO						19.80																			**19.80**
OTHERS																									**0.00**
MEA (Power to Nepal)			5.39																						**5.39**

STATE / UTILITY	NTPC		NHPC		PGCIL		NEEPCO		NPCIL*		DVC		NLC		SJVNL*		BBMB		THDC		NHDC		NTPL		TOTAL
	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	PRIN	SUR	
2	3		4		5		6		7		8		9		10		11		12		13		14		15
PTC (Regulated Power)																									0.00
TOTAL (Others)																									0.00
TOTAL (Eastern Region)	**134.00**	**0.00**	**62.74**	**12.20**	**25.70**	**20.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3737.50**	**972.96**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**4965.10**
NORTH EASTERN REGION																									**0.00**
ARUNACHAL PRADESH																									
Department of Power																									**0.00**
ASSAM																									
APDCL					0.00		0.80	0.00																	**0.80**
MANIPUR																									**0.00**
Electricity Department	29.00		21.21	0.97	11.80	0.30	20.57	0.00																	**83.85**
MEGHALAYA																									**0.00**
MeEcl/MeSEB	388.00		0.00	15.88	36.60	1.40	156.71	214.67																	**813.26**
MIZORAM																									**0.00**
Electricity Department	20.00		1.42	0.05	6.20		24.52	0.00																	**52.19**
NAGALAND																									**0.00**
Department of Power					0.00		0.00	0.00																	**0.00**
TRIPURA																									**0.00**
TSECL	3.00						122.44	31.41																	**156.85**
TOTAL (NE Region)	**440.00**	**0.00**	**22.63**	**16.90**	**54.60**	**1.70**	**325.04**	**246.08**	**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**	**0.00**		**1106.95**
Andaman&Nicobar																									
Electricity Deptt	3.00												1.69												**4.69**
PGCIL	1.00																								
NVVN							**0.01**																		
GRAND-TOTAL	**4901.00**	**0.00**	**1004.77**	**500.77**	**802.30**	**96.40**	**325.05**	**246.08**	**2926.42**	**2011.40**	**4393.51**	**973.60**	**4849.48**	**133.33**	**414.84**	**412.91**	**83.05**	**20.79**	**948.32**	**197.33**	**121.92**	**0.00**	**1873.93**	**0.00**	**27237.21**

Note * :Rebates availed by utilities are taken into considertion in Realization of outstanding dues at the end of the month.

Utilities

APCPDCL	**Andhra Pradesh Central Power Distribution Company Ltd.**
APEPDCL	**Andhra Pradesh Eastern Power Distribution Co. Ltd.**
APGCL	**Assam Power Generation Corporation Ltd.**
APNPDCL	**Andhra Pradesh Northern Power Distribution Co. Ltd.**
APSPDCL	**Andhra Pradesh Southern Power Distribution Co. Ltd.**
APTRANSCO	**Andhra Pradesh Transmission Corporation Ltd.**
AVVNL	**Ajmer Vidyut Vitran Nigam Ltd.**
BBMB	**Bhakra Beas Management Board**
BESCOM	**Bangalore Electricity Supply Company Ltd.**
BRPL	**BSES Rajdhani Power Ltd.**
BYPL	**BSES Yamuna Power Ltd.**
CESCOM	**Chamundeshwari Electricity Supply Company Ltd.**
CPDD	**Chandigarh Power Development Department.**
DHBVN	**Dakshin Haryana Bijli Vitran Nigam**
DPCL	**Delhi Power Company Ltd.**
DTL	**Delhi Transco Ltd.**
DESU	**Delhi Electric Supply Undertaking**
DVC	**Damodar Valley Corporation**
ESCOMS	**Electricity Supply Company (Karnataka)**
GESCOM	**Gulbarga Electricity Supply Company Ltd.**
GOAED	**Goa Electricity Department**
GUVNL	**Gujarat Urja Vikas Nigam Limited**
HESCOM	**Hubli Electricity Supply Company Ltd.**
HPGCL	**Haryana Power Generation Corporation Ltd.**
HVPNL	**Haryana Vidyut Prasaran Nigam Ltd.**
UHBVN	**Uttar haryana Bijli Vitran Niagam**
HPSEB	**Himachal Pradesh State Electricity Board**
HWB(Gujarat)	**Heavy Water Board**
HPPC	**Haryana Power Purchase Centre**
HWB(Kota)	**Heavy Water Board (Kota)**
J&K PDCL	**Jammu & Kashmir Power Development Corporation Ltd.**
J&K PDD	**Jammu & Kashmir Power Development Department**
JDVVNL	**Jodhpur Vidyut Vitran Nigam Ltd.**
JVVNL	**Jaipur Vidyut Vitran Nigam Ltd.**

36 MEA	**Ministry of External Affairs**
37 MESCOM	**Mangalore Electricity Supply Company Ltd.**
38 MPPGCL	**Madya Pradesh Power Generation Co. Ltd.**
39 MPPTCL	**Madya Pradesh Power Transmission company Ltd.**
40 MPPMCL	**Madya Pradesh Power Management company Ltd.**
41 MSEDCL	**Maharashtra State Electricity Distribution Co. Ltd.**
42 TPDDL	**Tata Power Delhi Distribution Limited**
43 NEEPCO	**North Eastern Electric Power Corporation Ltd.**
44 NHDC	**Narmada Hydro Development Corporation**
45 NHPC	**National Hydro Power Corporation**
46 NLC	**Nyveli Lignite Corporation**
47 NPCIL	**Nuclear Power Corporation of India Ltd.**
48 NTPC	**National Thermal Power Corporation**
49 PED	**Pondicherry Electricity Department**
50 PGCIL	**Power Grid Corporation of India Ltd.**
51 PSPCL	**Punjab State Power Corporation Ltd.**
52 RRVPNL	**Rajasthan Rajya Vidyut Prasaran Nigam Ltd.**
53 RRVUNL	**Rajasthan Rajya Vidyut Utpadan Nigam Ltd.**
54 SJVNL	**Satluj Jal Vidyut Nigam Ltd.**
55 THDC	**Tehri Hydro Development Corporation**
56 TSECL	**Tripura State Electricity Corp. Ltd.**
57 UHBV	**Uttar Haryana Bijli Vitran Nigam**
58 UPCL	**Uttarakhand Power Corporation Ltd.**
59 UPJVNL	**Uttar Pradesh Jal Vidyut Nigam Ltd.**
60 UPPCL	**Uttar Pradesh Power Corporation Ltd.**
61 UPRVUNL	**Uttar Pradesh Rajya Vidyut Utpadan Nigam Ltd.**
62 PTC	**Power Trading Corporation**
63 NTPL	**NLC Tamilnadu Power Ltd.**
64 NVVN	**NTPC Vidyut Vyapar Nigam Limited**

STATEMENT SHOWING ESTIMATED AVERAGE RATES OF ELECTRICITY (FY 2019-20)

Annexure 10B

(As on 31.03.2021)

S. No.	Name of State/Utility	Tariff effective from	Domestic						Commercial						Agriculture						Small Industry 10KW (1500 KWh/ Month)		Medium Industry 50KW (7500 KWh/ Month)		Large Industry (11KV) 1000KW 60%L.F. (438000 KWh/ Month)		Heavy Industry (11KV) 10000KW 60%L.F. (4380000 KWh/ Month)		Heavy Industry (33KV) 20000KW 60%L.F. (8760000 KWh/ Month)		Railway Traction 12500KW (25000000 KWh/ Month)	
			1KW (100 KWh/ Month)		4KW (400 KWh/ Month)		10KW (1000 KWh/ Month)		2KW (300 KWh/ Month)		10KW (1500 KWh/ Month)		30KW (4500 KWh/ Month)		50KW (7500 KWh/ Month)		2HP (400 KWh/ Month)		5HP (1000 KWh/ Month)		10HP (2000 KWh/ Month)											
1	Andaman & Nicobar Islands	01.06.2019	225.00		541.25		663.50		816.67		1090.00		1163.33		1178.00		160.00		160.00		160.00		733.33		786.67		-		-		-		-	
2	Andhra Pradesh	01.04.2019	208.50		491.63		679.50		901.83		1029.83		1057.28		1062.77		250.00	#	250.00	#	250.00	#	726.00		726.00		783.31		783.31		735.94		578.95	
3	Arunachal Pradesh	01.06.2018	400.00		400.00		400.00		500.00		500.00		500.00		500.00		310.00		310.00		310.00		430.00		430.00		385.00		385.00		350.00		-	
4	Assam	01.04.2019	609.00		742.88		804.30		798.00		798.00		929.76		929.76		498.67		498.67		498.67		602.00	U	787.29		761.86		761.86		761.86		862.54	
																							568.75	R										
5	Bihar	01.04.2019	694.30	U	824.15		902.06		863.90	U	910.54		918.31		919.87		609.50		609.50		609.50		878.62		906.89		863.89		-		852.11	at 132kV	911.11	at 132KV
			686.35	R					736.70	R																						
6	Chandigarh	01.06.2019	294.00		422.13		492.25		592.67		626.67		634.00		635.47		290.00		290.00		290.00		511.00		614.33		556.66		556.66		556.66		-	
7	Chhattishgarh	01.04.2019	367.20		494.10		732.24		724.27		924.37		946.40		946.40		480.00		480.00		480.00		557.92		648.27		1001.21		1001.21		954.54		661.11	
8	Dadra & Nagar Haveli	01.06.2019	170.00		217.50		273.00		356.67		383.33		387.78		388.67		70.00		70.00		70.00		403.94		454.68		500.68		500.68		-		-	
9	Daman & Diu	01.06.2019	145.00		183.75		220.50		310.00		334.00		338.00		338.80		65.00		65.00		65.00		366.79		366.79		460.88		460.88		-		-	
10	Delhi (BYPL/BRPL/NDPL)	01.08.2019	336.00		446.25		682.50		894.44		1186.11		1186.11		1186.11		206.46		206.46		206.46		1098.61		1098.61		943.63		943.63		934.59		877.45	
11	Delhi (NDMC)	01.08.2019	336.00		446.25		682.50		894.44		894.44		894.44		894.44		206.46		206.46		206.46		1098.61		1098.61		943.63		943.63		934.59		877.45	at 33KV
12	Goa	01.06.2019	185.00		266.25		358.50		490.00		551.33		563.89		566.33		147.50		147.50		147.50		464.61		477.94		583.42		583.42		583.42		-	
13	Gujarat	01.05.2019	393.88	U	504.56	U	565.80	U	585.42		585.42		642.36		700.00		160.00		160.00		160.00		579.33		588.46		550.68		625.98		629.53		600.00	at 132KV
			325.19	R	432.69	R	493.96	R																										
14	Haryana	01.05.2019	370.00		546.25		720.00		645.00		715.00		893.14		893.14		10.00		10.00		10.00		757.06		869.61		838.02		838.02		826.25		874.71	at 11KV

15	Himachal Pradesh	01.07.2019	478.95		504.06		538.43		597.60		560.16		670.00		670.00		431.75		416.90		411.95		494.02		642.00		649.13		649.13		637.67		826.33	
16	Jammu & Kashmir*	01.10.2016	191.40		293.98		353.21		401.50		627.73		627.73		627.73		80.85		80.85		80.85		399.67		397.47		422.10		422.10		410.45		-	
17	Jharkhand	01.04.2019	720.00	U	665.25	U	655.50	U	700.00	U	664.00	U	658.00	U	656.80	U	512.00		512.00		512.00		759.90		759.90		746.07		746.07		731.25		867.94	at 25 kV
			615.00	R	601.50	R	600.00	R	638.33	R	631.67	R	630.56	R	630.33	R																		
18	Karnataka	01.04.2019	584.79	D	812.46	D	880.58	D	1020.97	D	1035.50	D	1037.92	D	1038.41	D	0.00		0.00		0.00		768.76	D	884.48	D	859.97	D	866.69	D	867.06	D	742.22	
			542.28	F	758.23	F	819.95	F	959.20	F	973.73	F	976.16	F	976.64	F							716.66	F	829.90	F	837.89	F	842.37	F	842.62	F		
19	Kerala	08.07.2019	421.75		879.00		1019.00		860.67		1069.67		1116.33		1116.33		256.73		256.73		256.73		629.50		758.43		671.25		671.25		671.25		676.67	at 110KV
20	Lakshadweep	01.06.2019	155.00		417.50		578.00		791.67		918.33		939.44		943.67		-		-		-		687.04		687.04		958.05		958.05		-		-	
21	Madhya Pradesh	17.08.2019	599.50	U	693.23	U	747.55	U	832.20	U	838.04	U	930.96	U	931.18	U	512.50		566.25		590.63		951.93	U	951.93	U	789.19		789.19		841.87		762.22	at 132/220KV
			577.70	R	688.78	R	743.08	R	809.40	R	815.08	R	900.31	R	900.52	R							868.37	R	868.37	R								
22	Maharashtra	01.04.2019	606.68		953.23		1252.22		1196.77		1273.89		1649.67		1649.67		357.00		357.00		357.00		716.81		1019.99		983.27	B	983.27	B	916.60		917.22	
																											1012.78	C	1012.78	C				
23	Manipur	01.04.2019	450.00		587.50		631.00		705.00		795.67		810.78		813.80		412.38		412.38		412.38		453.33		662.96		758.70		758.70		-		-	
24	Meghalaya	01.04.2018	425.00		537.50		590.00		769.33		801.33		806.67		807.73		343.30		343.30		343.30		678.33		678.33		713.89		713.75		673.74		-	
25	Mizoram	01.04.2019	360.00		497.50		535.00		534.17		576.17		583.17		584.57		288.65		288.65		288.65		508.00		522.93		554.10		554.10		-		-	
26	Nagaland	01.04.2019	513.00		615.75		666.30		809.00		893.80		907.93		910.76		310.00		310.00		310.00		623.33		665.67		719.07		719.91		-		-	
27	Odisha	01.06.2019	373.60		495.80		566.00		657.87		738.29		751.70		754.38		160.50		158.00		157.50		624.83		669.20		665.24		665.23		639.84		670.88	
28	Puducherry	01.06.2019	190.00		358.75		479.50		668.33		709.67		716.56		717.93								588.00		581.60		636.47		-		636.47		-	
29	Punjab	01.06.2019	603.42		767.55		843.21		834.32		858.72		877.21		877.21		528.00	WS	528.00	WS	528.00	WS	741.20		828.67		809.04		825.35		825.35		891.11	
30	Rajasthan	01.02.2020	832.50		830.00		844.50		1021.67		1045.67		1155.22		1157.13		574.00		574.00		574.00		793.30		867.77		763.49		-		744.59		710.00	
31	Sikkim*	01.04.2018	172.00		362.75		440.90		535.00		616.33		632.11		635.27		-		-		-		621.67	U	506.86		659.07		659.07		-		-	
																							456.67	R										
32	Tamil Nadu	11.08.2017	85.00		470.00		584.00		840.88		883.58		890.69		892.12		0.00		0.00		0.00		685.13		685.13		759.98		759.98		759.98		841.75	

33	Telangana	01.04.2018	238.50		668.50		821.00		911.00		1011.00		1034.33		1039.00		257.50	#	253.00	#	251.50	#	721.00		731.00		800.11		799.77		747.12		631.65	at 33 kV
34	Tripura*	01.11.2014	521.50		755.00		755.00		691.50		768.33		768.33		768.33		366.19		366.19		477.38		740.00		764.00		-		-		-		-	
35	Uttar Pradesh*	12.09.2019	619.50	U	673.31	U	738.68	U	967.50	U	1157.42	U	1186.08	U	1191.82	U	655.75	U	655.75	U	655.75	U	987.21	U	1014.08	U	913.22	U	913.22	U	872.39		1150.00	Below 132KV
			367.50	R	517.13	R	598.50	R	605.58	R	605.58	R	605.58	R	605.58	R	220.38	R	220.38	R	220.38	R	913.17	R	938.03	R	844.72	R	844.72	R			1114.71	132KV & above
36	Uttarakhand	01.04.2019	345.00		453.75		538.00		635.00		635.00		725.00		725.00		195.00		195.00		195.00		561.67		614.31		668.46		668.46		668.46		664.71	
37	West Bengal	01.04.2019	653.89	U	869.24	U	967.22	U	906.09	U	1053.54	U	1071.25	U	1074.79	U	510.43		510.43		510.43		782.45	U	921.04	U	964.17		964.17		958.42		936.00	at 25KV
			640.07	R	856.09	R	961.96	R	905.36	R	1053.39	R	1071.20	R	1074.76	R							762.64	R	893.67	R							618.00	at 132KV
38	Torrent Power Ltd. (Ahmedabad)	01.05.2019	437.00		503.13		543.95		620.83		637.50		733.33		733.33		330.00		330.00		330.00		561.00		645.33		588.22		588.21		-		-	
39	Torrent Power Ltd. (Surat)	01.05.2019	422.63		506.72		555.74		602.08		602.08		749.77		749.77		70.00		70.00		70.00		529.83		659.80		623.65		623.64		-		-	
40	CESC Ltd. (Kolkata)	01.04.2017	584.32		820.55		927.94		850.72		1019.47		1041.15		1045.49		-		-		-		750.00		889.17		853.77		853.77		826.17		746.33	
41	DPSC Ltd. (West Bengal)	01.04.2019	444.21		591.03		629.55		582.73		656.57		651.16		651.16		241.95	^	241.95	^	241.95	^	512.39		618.25		626.07		626.07		451.27	^	661.33	
42	Durgapur Projects Ltd. (W Bengal)	01.04.2019	425.42		530.04		552.36		549.29		599.90		604.17		605.02		179.29	^	179.29	^	179.29	^	533.38		588.72		592.45		592.45		574.05		647.78	at 25KV
																																	642.78	at 132KV
43	D.V.C.(A) Jharkhand Area	01.06.2019	520.00		465.25		455.50		495.00		459.00		453.00		451.80		317.00		317.00		317.00		616.76		616.76		513.22		513.22		503.05			
	(B) West Bengal Area	01.04.2016	-		-		-		-		-		-		-		-		-		-		-		-		-		-		616.56		645.88	at 132KV
44	Mumbai (B.E.S.T)	01.04.2019	441.32		667.81		909.61		976.23		858.45		1101.17		1101.17		418.00		418.00		418.00		736.11		953.17		886.99		886.99		-		724.44	
45	Mumbai(Reliance Energy)	01.04.2019	654.76		916.92		1124.56		1241.22		1123.44		1380.68		1380.68		525.00		525.00		525.00		990.78		1238.45		1132.91		1132.91		-		-	at 100/33/22/11/6.6kV
46	Mumbai (TATA'S)	01.04.2019	628.08		985.94		1408.99		1368.27		1250.49		1213.70		1213.70		502.00		502.00		502.00		1114.29		1119.31		1107.77		1107.77		-		737.44	at 33/22kV

^ TOD tariff from 23:00 hrs to 06:00 hrs for DPSC Ltd. & Durgapur Projects Ltd. respectively in West Bengal.

Note: Electricity duty is of the year 2018-19.

Tariff B : General Industry C : Seasonal Industry D : Bangalore, Devangere & Other City Municipal Corp. F : Areas under Village Panchayats U : Urban R : Rural O : Other Areas WS: Without Subsidy # For corporate farmers

Tariffs notified have varying parameters for various categories of consumers. The above comparison is based on certain assumed loads and electricity consumption levels in a month.

Annex-11(A)
Item- 11.9

2nd meeting of North Eastern Region Power Committee
[Transmission Planning (NERPC-TP)]

- Confirmation of minutes of the 1st meeting of North Eastern Region Power Committee-Transmission Planning (NERPCTP)
- Quarterly Review of transmission line and substation
- Assessment of growth in generation capacity and demand in the region
- Requirement for strengthening of Inter-regional transmission system
- Review of Transmission system from operational considerations
- Subsystems not fulfilling N-1 – Agenda by NERLDC
- Interconnection of 132kV substations in upper Assam (below Brahmaputra) with neighbouring substations in Arunachal Pradesh
- 400kV Connectivity of 400/132kV Surajmaninagar (TSECL)S/s
- Three Phase Auto-reclosure for 400kV lines-Agenda from NERPC
- Connectivity and LTA applications agreed in Connectivity & LTA meetings held after 1st meeting of NERPC-TP
- Installation of 125MVAR Bus Reactor at Subansiri Lower HE Project (2000 MW)
- Downstream system development by STUs from the various commissioned and on-going ISTS substations
- Status of 400kV substations and other important elements being implemented by STUs in NER under intra-state schemes
- Utilisation of spare 132kV ISTS bays at Silchar (POWERGRID), P.K.Bari (TSECL), Palatana (OTPC), and Surajmaninagar (TSECL) and Misa (POWERGRID)
- Intra state scheme of Assam for the year 2030
- 132kV Connectivity of 400/132kV Surajmaninagar (ISTS) S/s
- 132kV Connectivity of 400/132kV P.K. Bari (ISTS) S/s
- Re-conductoring and strengthening of aged 132 kV lines in Manipur with HTLS
- N-1 reliability issue for meeting power requirement in the south of Manipur
- N-1 reliability requirement at Ranganadi, Arunachal Pradesh
- N-1 reliability requirement at Mawlai, Meghalaya
- N-1 reliability requirement at Zuangtui, Mizoram
- Under construction inter-regional transmission schemes with NER
- Conversion of 132kV bus bar at Imphal & Nirjuli substations and North Eastern Region Strengthening Scheme-IX (NERSS-IX)
- Surajmaninagar (India) – Comilla (Bangladesh) 400kV cross border link:
- Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line
- Under-utilization of 2x160MVA, 220/132kV ICTs at Balipara
- Bay rearrangement at 132/33kV Sihhmui S/s
- Restoration of Kopili Substation
- Special Protection Scheme in NER
- LILO of 400 kV D/C Silchar-Byrnihat along with 400/220 kV 2x315 MVA, 220/132 kV 2x160 MVA substation at Mynkre, Meghalaya
- LILO of 400 kV D/C Silchar -Byrnihat along with 400/220kV 2x315 MVA, substation at New Shillong, Meghalaya
- Charging of elements under NER System Strengthening Scheme-II (PartB) and V being executed in the state of Tripura
- Connectivity application for Dibang HEP (12x240MW) of M/s NHPC Ltd.