

ANNUAL REPORT

2021-22



सत्यमेव जयते

Ministry of Power

Government of India
www.powermin.nic.in

MAP OF INDIA

SHOWING

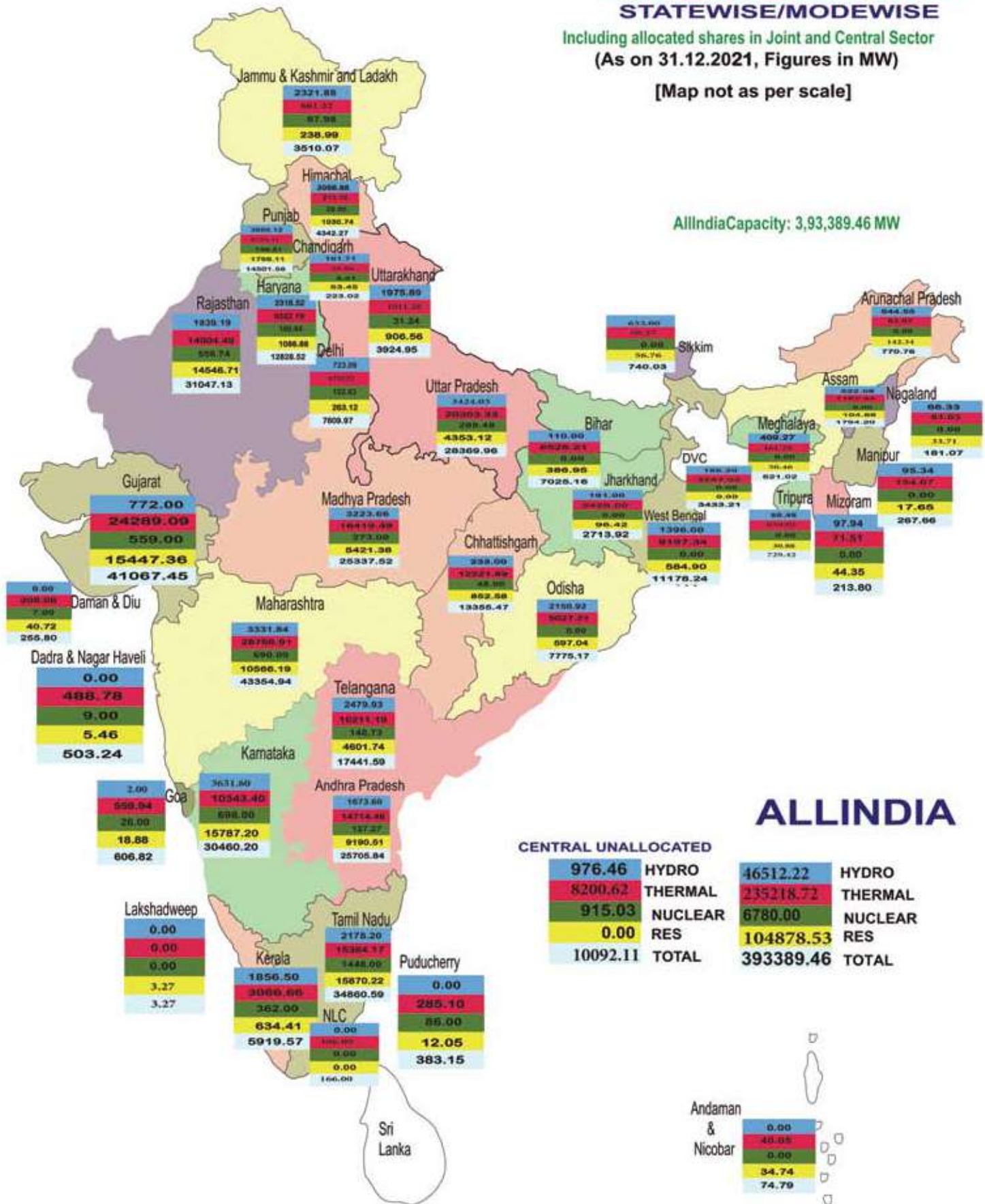
INSTALLED GENERATING CAPACITY STATEWISE/MODEWISE

Including allocated shares in Joint and Central Sector

(As on 31.12.2021, Figures in MW)

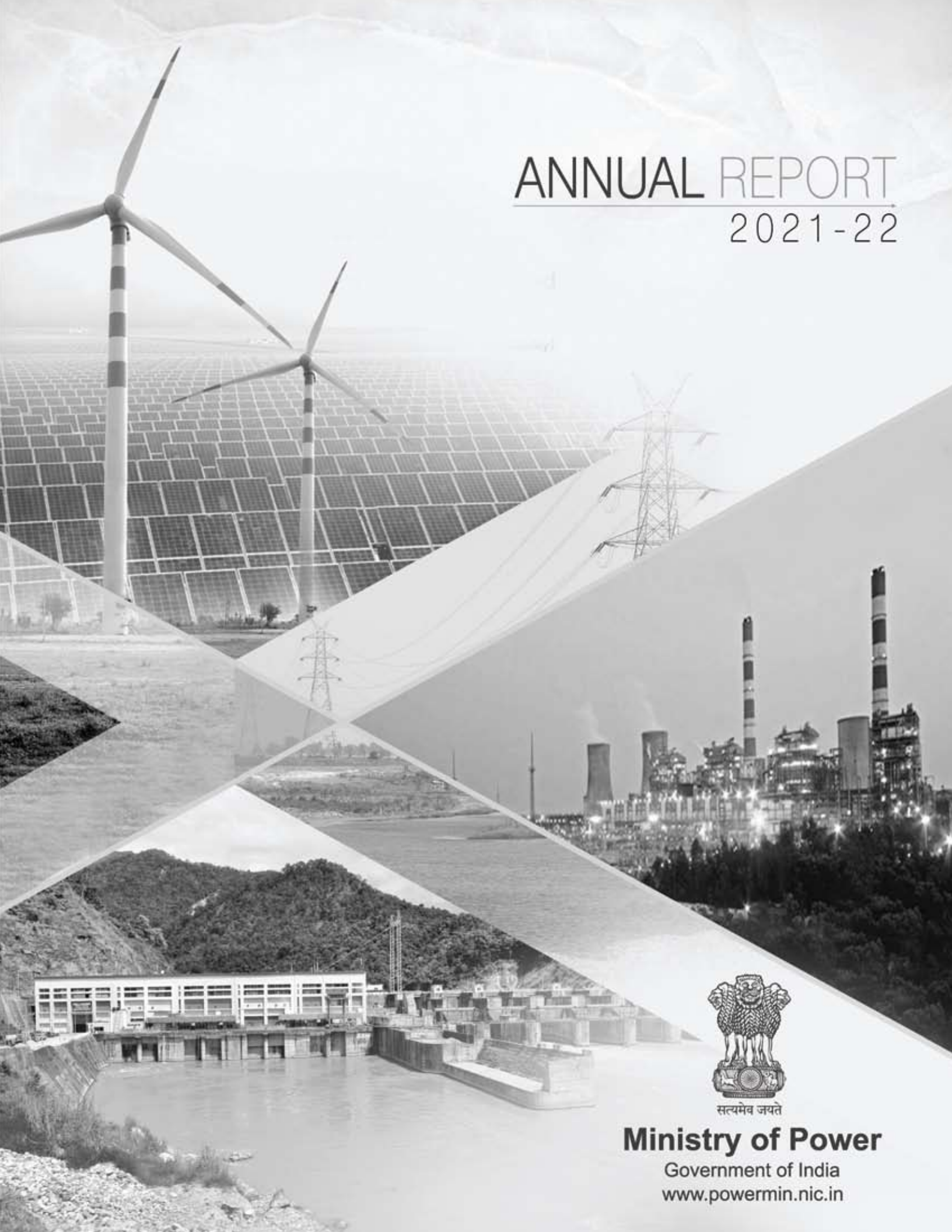
[Map not as per scale]

AllIndiaCapacity: 3,93,389.46 MW



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CHAPTER 01

PERFORMANCE HIGHLIGHTS

PERFORMANCE HIGHLIGHTS

The year 2021 has seen India's power sector move further along the path of meeting and inspiring the aspirations of our rapidly developing nation. Universal access to affordable power in a sustainable manner has been the guiding principle for the Power sector. The sector is fully geared to address the challenges related to climate change through energy transition initiatives which aligns itself with the commitments made by the nation on the global stage. Therefore, India has twin goals, to ensure 24x7 adequate and reliable energy access and simultaneously, accelerate clean energy transition by reducing the country's reliance on fossil based energy and shifting to cleaner and renewable energy sources.

Energy sector forms one of the critical elements of any nation's economic development. Ministry of Power, in past years had taken massive initiatives to transform the country from power deficit to power surplus nation, connecting the whole nation into one grid, strengthening the distribution system and achieving universal household electrification. Our continued endeavor through implementation of energy efficiency programmes has resulted in reduction of energy intensity and avoidance of CO2 emission. The performance highlights in achieving a sustainable energy framework, which fosters India's growth, are as below:

1. Power Deficit to power surplus nation:

- We have transformed our country from power deficit to power surplus. From 2014 to date (November, 2021), we have added power generation capacity of 160.8 GW consisting of 83,920 MW from Fossil Fuel and 76,900 MW from Non-Fossil Fuel Capacity making India power surplus.
- The total installed capacity was 395 GW as on 31.01.2022, out of which 235.9 GW is fossil fuel based (Coal/gas etc.) and 159.1 GW is non-fossil fuel (Renewable Energy + Nuclear) based. The installed capacity is now close to double the peak demand and India is exporting power to Nepal, Bangladesh and Myanmar.

During the current year 2021-22 (Upto January 2022), total electricity generation including generation from renewable sources in the country was 1234.298 BU as against the generation of 1137.850 BU during the corresponding period last year, showing a growth of 8.5%.

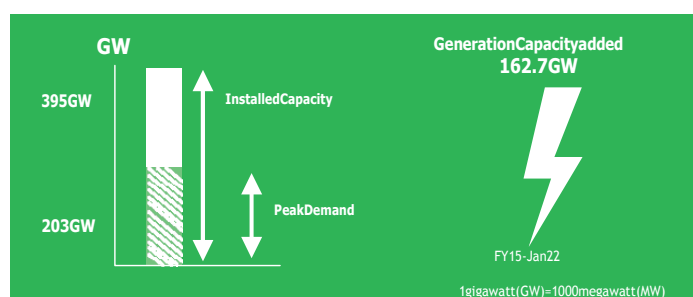
The electricity energy generation from Renewable Energy Sources (Solar, Wind, Hydro & Bio Power) has increased from 193.5 Billion Units during 2013-14 to 306.3 Billion Units during 2020-21 showing the CAGR of 6.8%. Share of generation from renewable sources (including Hydro) in total Generation has been increased to 22.2% during 2020-21 from 19.0% during

2013-14. During current year 2021-22 (Upto January 2022), Share of Renewable Energy Sources (RES) Generation has further increased to 22.9%.

Share of Generation from Non-Fossil Fuel (Renewable Energy + Nuclear) in Total Generation has been increased to 25.3% during 2020-21. During current year 2021-22 (Upto January, 2022), Share of Non-Fossil Generation has further increased to 26.0%.

The total generation (excluding Bhutan import) during the year 2021-22 (Upto January 2022) was 1227.0 BU as compared to actual generation of 1129.3 BU during the same period last year.

We have presently 41123.5 MW under construction out of which 28460 MW is Thermal, and 12663.5 MW is Hydro. Thermal capacity is held up due to various reasons. Our Renewable installed capacity is now over 152 GW and further we have 78 GW under installation and 25 GW under bid.



2. March towards 24x7 Power Supply:

- Our target is 24x7 power supply without interruption. All States and Union Territories (UTs) have signed MoUs with the Central Government to ensure 24x7 power supply to all households, industrial & commercial consumers and adequate supply of power to agricultural consumers
- In order to achieve this, we have installed more than adequate power generation capacity to meet peak demand as well as a robust National Grid enabling seamless transfer of power from resource centric regions to load centric regions. The Distribution Systems have been strengthened to ensure reliable and uninterrupted power supply
- On account of the above, availability of power in rural areas which was about 12:30 hours in 2015 has gone up to 21:09 hours and in the urban areas it has gone upto 23:41 hours. This has also significantly reduced consumption of kerosene from 892 crore litres in 2014-15 to 204 crore litres in 2020-21.

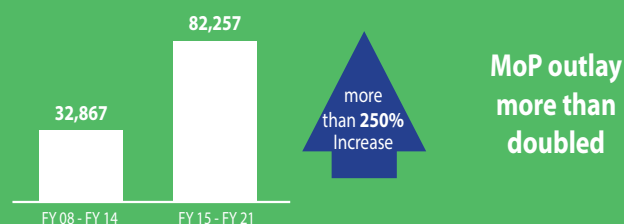


The last village in India to get access to electricity: Leisang, Manipur

- We took this up as a challenge and achieved this feat in 987 days, 13 days ahead of the target set by Hon'ble Prime Minister. The International Energy Agency (IEA) called this the most seminal development in the energy sector in the world in 2018.
- Our goal was not only electrifying every village, but electrifying every household. The Hon'ble Prime Minister launched the Pradhan Mantri Sahaj Bijli Har Ghar Yojana – SAUBHAGYA in October 2017 with the objective to achieve universal household electrification.
- This was an even bigger challenge. We put our heart and soul into achieving this. We teamed up with the states and the distribution companies and the whole power system in the country worked as one to achieve this. The states reported all households to have been electrified by March 2019, except some households in the Naxalite affected areas of Chhattisgarh.
- As on March 2021, all willing households were electrified in the country. We asked the states to ensure that no hamlets or willing households which were existing when we launched the programme are left out. Some states reported that some of the hamlets and households which were unwilling earlier are now willing to take electricity connections. These have also been sanctioned.
- A total of 2.817 crore households have been electrified since the launch of SAUBHAGYA. IEA called this fastest expansion of access anywhere in the world in the history of the power sector.

Universal Access made possible with increased thrust to the Power Sector

Expenditure by MoP (₹ in Crore)



3. Universal Access

- In 2014, thousands of villages and lakhs of hamlets did not have access to electricity. On our Independence Day in 2015, Hon'ble Prime Minister gave a call from the ramparts of Red Fort to provide electricity access to every inhabited village in 1000 days.



4. Affordable Power

We have taken a number of steps to keep the price of power down. We have put in place flexibility in the use of coal so as to permit the generation companies to switch coal from less efficient units to more efficient units, leading to lower generation costs and ultimately lesser cost of electricity for the consumers. This has resulted in a saving of at least ₹ 1,400 crore per annum.

- A pan India merit order dispatch system has been instituted, under which power from more efficient plants is scheduled first. This has led to a saving of about ₹ 1,200 crore per annum in power costs for the people.
- We have permitted the generation companies to bundle Renewable Energy with Thermal Energy and supply power under the existing PPA. As renewable energy is cheaper, this reduces the power costs. The resulting saving in cost will be shared between GENCOs and DISCOMS / consumers.
- Distribution Companies have been provided an opportunity to exit from Power Purchase Agreement with Thermal Power Plants after 25 years so that they are not tied to high cost of power indefinitely.
- Tariff Based Competitive Bidding is increasingly being adopted for new projects in Transmission Sector instead of Regulated Tariff. This has reduced transmission tariff by 30-40%.

The net result of all this has been that the price of coal and the railway freight went up cumulatively by 45% in the past seven years but the increase in price of power from NTPC Stations has only risen by 2 paise from 2014-15.

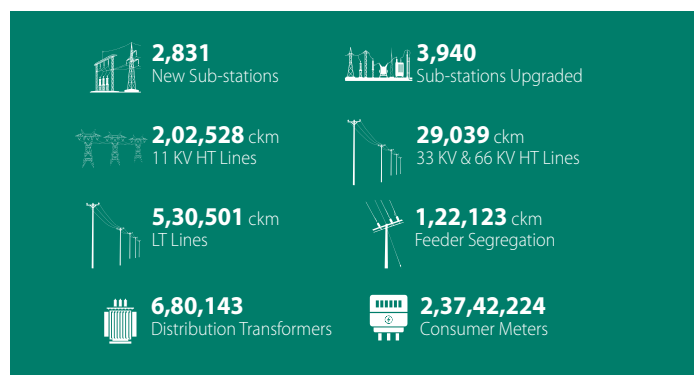
Another major step which we have taken is to strengthen the power exchanges so that competition takes place. The volume of electricity traded at power exchanges has gone up from 30,670 Million Units (MU) in 2013-14 to 79,542 Million Units in 2021.

- The volume in Day Ahead Market (where trade happens 12-36 hours prior to requirement) has gone up from 50.2 MU per day in 2018-19 to 60.6 MU per day in 2020-21 and the prices have come down from ₹ 3.86 per unit to ₹ 2.82 per unit during this period
- Two new products have been launched in Power Exchanges - Real Time Market (RTM) and Green Term Ahead Market (GTAM)
- The Real Time Market (RTM) enables DISCOMs to buy power at the last moment and avoid load shedding. It also helps manage the variability of RE. Since June 2020 till November 2021, the volume of electricity traded in RTM was 22,713 MU.

- The Green Term Ahead Market (GTAM) enables procurement of renewable power from the Power Exchanges and will facilitate achievement of green energy targets in a most efficient and cost optimized manner. Since August 2020 till November 2021, the volume of renewable energy traded in GTAM was 4,375 MU.

5. Strengthening the Distribution Sector:

- In 2014, the distribution system was very weak. We launched Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) for strengthening the distribution system in rural areas and Integrated Power Development Scheme (IPDS) for strengthening the distribution system in urban areas. Any gaps which were left in the distribution system were addressed under SAUBHAGYA.
- Under these schemes, from 2014 to 2021, we have added the following infrastructure to the distribution system of the states:



The total outlay for the strengthening was Rs. 2.02 Lakh Crore. This was the largest distribution system strengthening programme taken up after independence. This made it possible for us to tackle our next target, which was universal access.

We have launched a scheme for modernizing our distribution system to make it future ready and taking it upto world standards.

- The Scheme, launched in July 2021 with an outlay of Rs. 3,03,758 crore, seeks to improve the operational efficiencies and financial sustainability of all DISCOMs/ Power Departments by providing financial assistance for strengthening and modernizing the system, making it digital and reducing interruption.
- The objective is to reduce AT&C losses to pan-India levels of 12-15% and ACS-ARR gap to zero by 2024-25.
- Assistance to be based on meeting pre-qualifying criteria as well as upon achievement of basic minimum benchmarks by the DISCOM evaluated on the basis of agreed evaluation framework tied to financial improvements.



Power Distribution remains the most critical link in the power sector value chain. It generates cash that feeds to the entire value chain right upto power generation and fuel supply. The impact of any inefficiency or financial mismanagement within power distribution flows to all upstream players in the value chain which adversely affects their operations and financial viability. Government of India has launched multiple schemes in the past to support States/Discoms to improve operational and financial efficiency viz. DDUGJY, IPDS and Saubhagya.

These Central Sector Schemes have helped Discoms in strengthening and augmenting of sub-transmission and Distribution network and IT enablement. As a result, the country achieved universal electricity access for the households with significant improvement in availability of Power supply in both rural and urban areas.

As per an independent agency survey, an average Indian household receives 20.6 hours of power supply from the grid. The average daily supply in rural areas has increased to 20 hours in last 5-7 years.

In the last 7 years, under these schemes, large scale Distribution infrastructure has been created apart from achieving major milestones such as complete Village Electrification by 2018 and universal household electrification by 2019. Following Infrastructure has been created under these Schemes.

Sr. No.	Particulars	Units	Achievement
1	33/11 KV Substation New	Nos.	2858
2	33/11 KV Substation Augmentation	Nos.	3912
3	HT Lines	CKm	244377
4	LT Lines	CKm	542673
5	Aerial Bunch Cables	CKm	62810
6	UG Cable	CKm	20590
7	Distribution Transformers	Nos	684761
8	Consumer Meters	Nos	23929804
9	DT Meters	Nos	354902
10	Feeder Meters	Nos	17379
11	Feeder Separation (11 KV Line)	CKm	121609

These schemes have enabled Discoms in improving their operational efficiency parameters such as billing efficiency, collection efficiency, AT&C losses and also the financial performance to some extent. The following table provides an overview of key financial and operational performance indicators for DISCOMs at aggregate level:

Parameter	Units	FY 2014-15	FY 2019-20
Financial Performance			
Annual Losses	Rs Cr	(54,558)	(31,672)
ACS-ARR Gap (Subsidy Received basis)	Rs/kWh	0.58	0.30
Operational Performance			
Billing Efficiency	%	79.02	85.36
Collection Efficiency	%	94.00	92.64
AT&C Loss	%	25.72	20.93

With these significant achievements, the focus of the Government has shifted to two major outstanding challenges in the Distribution Sector (i) Addressing Financial sustainability of the Distribution Sector; and, (ii) Increasing consumer centricity in the Distribution Sector. Ministry of Power (MoP) has therefore initiated multiple initiatives to improve the financial and operational performance of DISCOMs.

Initiatives have been designed to tackle the longstanding financial and operational issues of Discoms relating to AT&C losses, ACS-ARR gap, corporate governance and financial liquidity; and changing their orientation to a service centered approach, with the consumer as the focus. At the same time, equal emphasis has been given to modernize the Discoms with the use of technology like pre-paid smart metering, SCADA, billing solutions, digital payments and CRM systems. Further, GoI has taken multiple steps to create a conducive environment around ailing Discoms with the initiatives like introducing corporate governance in the day-to-day operations of the companies; laying down prudential norms for funding agencies to be followed before sanction of working capital loans to power distribution companies; and bringing focus on segregation and solarization of agriculture feeders to minimize state government subsidy burden as well as reducing dependence of DISCOMs on subsidy receivables.

A few of such initiatives undertaken are as under:

a) Revamped Distribution Sector Scheme (RDSS)

MoP has launched RDSS to provide reform-based result-linked financial assistance to DISCOMs to strengthen the supply infrastructure. This is a conditional scheme where funds will be released on meeting pre-qualifying criteria and achieving basic minimum benchmarks. RDSS has an outlay of Rs 3,03,758 Crore over 5 years i.e. FY 2021-22 to FY 2025-26. The outlay includes an estimated Government Budgetary Support (GBS) of Rs 97,631 Crore. The main objectives of RDSS are:

- Reduction of AT&C losses to pan-India levels of 12-15% by FY 2024-25.
- Reduction of ACS-ARR gap to zero by FY 2024-25.
- Improvement in the quality, reliability and affordability of power supply to consumers through a financially

sustainable and operationally efficient distribution sector.

- iv. Modernization of the Discoms through technology enhancement in the areas of asset management, customer experience and business operations.

Learning from the experience of previous schemes, RDSS has been developed to address state-specific needs. Each applicant DISCOM is required to prepare an Action Plan for strengthening its distribution system and improving its performance by way of various reform measures, which would result in improvement in their operational efficiency and financial viability as well as improve the quality and reliability of power supply to the consumers.

b) Additional Financial Accommodation

In line with the recommendations of the Fifteenth Finance Commission, Ministry of Finance (GOI) has launched a program in June 2021 to allow additional borrowing space to State Governments, over and above their revised RBN limits, provided specific reforms are undertaken and sustained by the State in the power sector. The extent of additional borrowing allowed to a State will be based on its performance against the defined eligibility conditions and the evaluation criteria. Additional borrowing upto 0.50% of GSDP will be allowed based on their score against the performance evaluation criteria, provided entry level conditions are met. The entry conditions and the evaluation criteria are related to the steps to be taken to make the DISCOMs viable. It is expected that the scheme will help in improving the financial performance of DISCOMs which will enable them to settle outstanding liabilities including GENCO dues.

c) PRAAPTI Portal for Monitoring of GENCO Dues

MoP launched a web-portal called PRAAPTI (Payment Ratification and Analysis in Power procurement for bringing Transparency in Invoicing of generators) for transparency in monitoring of dues to GENCOs at the national level. The portal provides updated monthly information to all stakeholders regarding power purchase dues of DISCOMs towards Central Generation Stations, IPPs and RE providers. The PRAAPTI portal is immensely helpful for all stakeholders and also for monitoring performance on DISCOMs.

d) Additional Prudential Norms for Working Capital Loan to DISCOMs/ TRANSCOs/ GENCOs

Additional prudential norms have been laid down for sanctioning of working capital loans to DISCOMs/ TRANSCOs/ GENCOs. These essentially entail that loans to DISCOMs and other state owned utilities would be contingent on their taking steps to reduce their loans. This Ministry has also requested all other FIs/ Banks to adopt and implement the Revised Additional Prudential Norms for working capital loan to DISCOMs/ TRANSCOs/ GENCOs. It is expected that such prudent lending practices will encourage states to come out of the vicious debt-trap and undertake reform measures required for achieving financial sustainability by its power utilities.

e) Corporate Governance Guidelines

'Guidelines for Corporate Governance of State Power Distribution Utilities (DISCOMs)', to enable mechanisms for performance improvement and accountability. The guidelines have been prepared based on provisions of Companies Act 2013, DPE Guidelines, SEBI Regulations and best practices followed by private DISCOMs. It is anticipated that implementation of these Guidelines will result in better governance of DISCOMs leading to overall improvement in their operational and financial performance.

f) PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) Scheme

PM KUSUM Scheme aims to provide energy security to consumers. This scheme provides funding support to promote installation of solar energy installations for provision of electricity to Agriculture Pump-sets. With solarization, while the electricity to farmers would be available free of cost/at very low cost during the day time, savings would accrue to the State Government on account of subsidy being paid to the DISCOMs for electricity supply to farmers at subsidized tariff. Such savings can be utilized by the State to pay off the loans to be availed from FIs/Banks/NABARD and once repayment is done, the State Government would be free of the burden of this subsidy and deploy this resource for other developmental activities.

g) Privatization of power distribution in Union Territories

As part of the Aatma Nirbhar Bharat Abhiyaan, the Government of India announced privatization of power departments & power distribution utilities in Union Territories. The main objectives behind privatization are to improve the quality, reliability of power supply, providing better services to consumers and to achieve global benchmarks in operational and financial efficiencies.

h) Liquidity Infusion Scheme

COVID-19 was a major disruptor in the smooth functioning of various Sectors including the Power Sector. To mitigate the liquidity concerns in the power sector value chain arising out of the COVID lockdowns, and the consequent inability of consumers to pay for their electricity dues, the Ministry of Power introduced a Liquidity Infusion Scheme to bridge the liquidity gaps. Under the Scheme, the Power Finance Corporation (PFC) Ltd. and REC Ltd have provided long term concessional transition financing to the Distribution Utilities to clear the dues of Central Gencos, Transcos, IPPs and RE Gencos. As on 10.2.2022 loans worth Rs 1,03,809 crores have been disbursed to various Utilities.

i) Smart Metering

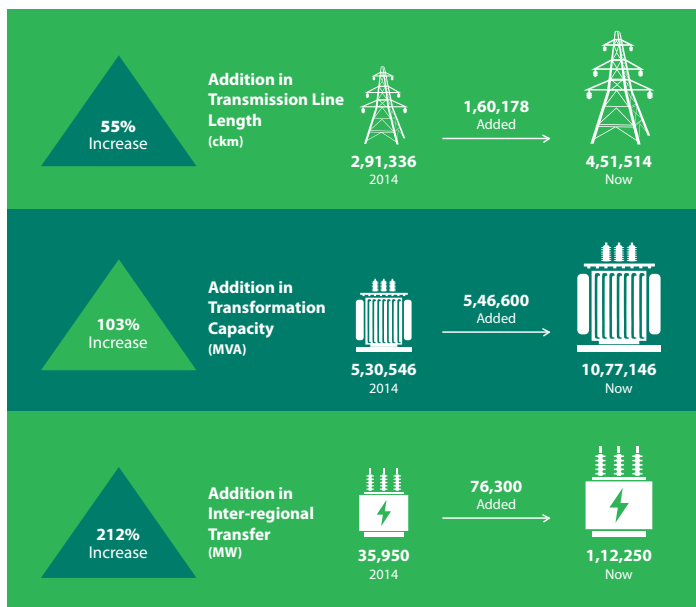
Ministry of Power vide letter dated 26.02.2021 has requested all the States to prepare a road map for shifting over to smart pre-payment meters/ pre-payment meters.

The Electricity (Rights of Consumers) Rules, 2020 was notified on 31.12.2020 and as per this Rule, no connection shall be



given without a meter and such meter shall be the Smart pre-payment meter or pre-payment meter.

Also, Ministry of Power vide notification dated 17.08.2021 has issued timelines for the replacement of existing meters with smart meters.



6. One Nation – One Grid:

- After 2014, we have added 1,60,178 circuit kilometer (ckm) of transmission lines and connected the whole country into one grid running on one frequency with the capability of transferring 1,12,250 MW from one corner of the country to another. Our grid has emerged as one of the largest unified grids in the world.
- Connecting the whole country into one grid has transformed the country into one unified power market. Distribution Companies can buy power at cheapest available rates from any generator in any corner of the country.
- National Smart Grid Mission was launched to accelerate Smart Grid (Electrical Grid with IT based monitoring) deployment in India.

The energy resources like coal, hydro and renewables are unevenly distributed in India. Coal reserves are mainly available in Central and Eastern part of the country, whereas hydro energy resources are primarily available in Himalayan Range in the Northern and North-Eastern parts. Renewable resources like wind and solar potential are also mainly concentrated in few states viz. Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, Maharastra, Gujarat & Ladakh etc. The major load centres of the country are located in central part including Northern, Western and Southern regions. This skewed distribution of resources necessitated development of inter-regional corridors for seamless transfer of power from surplus to deficit regions.

The progressive integration of regional grids started in 1992, and on 31st December 2013, we achieved 'ONE NATION'-'ONE GRID'-'ONE FREQUENCY' with synchronous interconnection of Southern Region Grid with rest of the Indian Grid with the commissioning of 765kV Raichur-Solapur Transmission line. However, there was constraint in market operation due to transmission congestion resulting into market splitting and different market prices in different regions. During 2013-14, about 16% of electricity transacted through power exchanges was constrained due to transmission congestion. Further, strategically important Ladakh region was not interconnected with national electricity grid.

Therefore, in preceding years, emphasis was given to have congestion free transmission network, so that there is no constraint in flow of power from surplus region to deficit region. Accordingly, transmission system in the country has been continuously strengthened with addition of transmission lines and inter-regional capacity.

With the commissioning of 220 kV Srinagar-Leh line in January 2019, Ladakh areas got interconnected with national electricity grid, and thus, people of Ladakh got access to 24x7 quality power from electricity from the Grid. Further, with approval for implementation of North Eastern Regional Power System Improvement Project (NERPSIP) and Comprehensive Scheme for strengthening of Transmission & Distribution in Arunachal Pradesh and Sikkim, reliability of State Grids of North Eastern Region is being enhanced to enable the end consumer to draw 24x7 power from the Grid.

Transmission capacity addition since 01.04.2014 is as under:

	Capacity Addition during last 7 years	% addition in comparison to capacity as on 01.04.2014
Transmission line (ckm)	1,61,104	55.30
Transformation capacity (MVA)	5,49,220	103.52
Inter-regional Capacity (MW)	76,300	212.24

Today, the country has one of the largest synchronous grids in the world. As on 31st December 2021, the status of national grid is as given below:

- Transmission line (ckm) : 4,52,440
- Transformation capacity (MVA) : 10,79,766
- Inter-regional capacity (MW) : 1,12,250

The above transmission network expansion reduced transmission congestion considerably and market splitting has become a rarity resulting into discovery of single price in the market. It also facilitated seamless transfer of power from power surplus regions to power deficit regions and thus optimizing the use of generation resources as well as meeting the demands of end consumers without any transmission

constraints. It has also assisted growth of renewable energy based capacity.

Major reforms done in Transmission Sector done during 2021-22

i. Separation of CTU from POWERGRID

Section 38 of the Electricity Act, 2003 provides the Central Government may notify a Government Company as Central Transmission Utility (CTU) to discharge all functions of planning and co-ordination relating to Inter State transmission System (ISTS) and other functions assigned in the Act. POWERGRID, a CPSE under Ministry of Power, was notified as CTU on 27.11.2003.

Over a period of time, many private transmission developers also emerged in the Transmission Sector. As CTU, POWERGRID was engaged in transmission planning. Further, POWERGRID, as developer was engaged in implementation and participating in bidding process for development of transmission system. Therefore, conflict of interest in twin roles of POWERGRID as planner and developer was flagged.

In order to bring transparency and make level playing field for all the transmission developers, it was decided to separate CTU functions from POWERGRID. In the first stage, CTU India Ltd, 100% subsidiary of POWERGRID was notified as CTU vide gazette notification dated 09.03.2021. Accordingly, CTU India Ltd started functioning as CTU w.e.f. 01.04.2021. Further, creation of CTU as an independent Government Company is in advanced stage.

Separation of CTU from POWERGRID will bring transparency in planning of transmission sector and encourage investment in transmission sector.

ii. Revamping transmission planning process to facilitate Renewable Energy

In order to take leadership role in Climate Change Adaptation, the Hon'ble Prime Minister of India, in the COP-26 Summit at Glasgow in November 2021, announced that India will bring its non-fossil energy capacity to 500 GW by 2030.

In order to align with the above objective, Ministry of Power has taken following reform measures to simplify and fast-track the planning and approval process of Inter State Transmission System (ISTS) required for connecting non-fossil fuel capacity including Renewable Energy capacity in the National Grid:-

- (i) Electricity (Transmission System Planning, Development and Recovery of Inter-State Transmission Charges) Rules 2021 were promulgated paving the way for complete overhauling of transmission system planning to give power sector utilities easier access to electricity transmission network across the country. The rules underpin a system of transmission access which is termed as a General Network Access (GNA) in the inter-state transmission system. This provides flexibility to the States as well as the generating stations to acquire, hold and transfer transmission capacity as per their requirements.

Thus, the rules will bring in rationality, responsibility and fairness in the process of transmission planning as well as its costs. In a major change from the present system of taking transmission access, power plants will not have to specify their target beneficiaries. The rules will also empower state power distribution and transmission companies to determine their transmission requirements and build them. Also, States will be able to purchase electricity from short term and medium term contracts and optimize their power purchase costs.

- (ii) Regional Power Committees (Transmission Planning) have been dissolved to obviate the need of dual consultation at regional level in transmission planning process and expediting planning and approval process.
- (iii) Terms of reference of National Committee on Transmission (NCT) have been modified and Central Transmission Utility and National Committee on Transmission have been delegated powers to approve Inter State Transmission System upto Rs. 500 crore. This will enable faster implementation of such works.

All these measures would facilitate in timely development of the required ISTS system for having 500 GW of Renewable Energy by 2030.

iii. Revised Standard Bidding Documents (SBDs) for award of Transmission service on competitive bidding basis

In order to encourage private sector participation in transmission sector, Ministry of Power had notified "Tariff Based Competitive Bidding (TBCB) Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" in April 2006. Subsequently, Ministry notified the SBDs comprising Request for Qualification (RfQ), Request for Proposal (RfP) and Transmission Service Agreement (TSA) in the year 2008.

As the SBDs and the Guidelines were issued long back, requests were received to align them with other infrastructure SBDs to attract more private investment in transmission sector. Based on request received from stakeholders, revised Standard Bidding Documents and "Tariff Based Competitive Bidding (TBCB) Guidelines for Transmission Service" and "Guidelines for Encouraging Competition in Development of Transmission Projects" have been revised and issued on 06.08.2021.

The major changes in the revised SBD include reduction in Equity Lock in period (from earlier 51% for period of 2 years from Date of Commissioning (COD) and 26 % for period of 3 years thereafter to 51% for a period of 1 year from COD), signing of Transmission Service Agreement by CTU, provision for quoting of single tariff in the bid, changing from Build Own Operate Maintain (BOOM) model to Build Own Operate Transfer (BOOT) model, provision of Independent Engineer during construction phase for monitoring, quality assurance and quantification of cost/time related issues, etc.



Revised SBD and revised Guidelines would promote ease of doing business for private developers in transmission sector, address concerns of developers on risk sharing, encourage competition in transmission, and facilitate timely completion of transmission lines. All these provisions would bring in more private investment in transmission sector.

iv. Bringing 33 kV system under Transmission for performance improvement of sub-transmission system

Sub-transmission System plays important role to feeding quality power to the consumers on 24x7 basis. However, sub-transmission system is often plagued with higher technical losses and more outages. Considering the importance of sub-transmission system, Ministry of Power had constituted a Committee to suggest measures for reduction of losses in the sub-transmission system & for ensuring reliability and efficient performance and to make recommendation for promoting investment in sub-transmission system.

The Committee observed that losses at 33 kV is about 4.8%, while the loss in 66 kV-220 kV level is only 1.72-2.39%. Besides, yearly availability at 33 kV is about 96.3%, while the same in 66 kV -220 kV level is 98.5-99.4%. The Committee inter-alia recommended to bring 33 kV system under State Transmission Utility (STU) for improvement in performance of 33 kV system.

After examining the report of the Committee, the 33 kV system has been declared as Transmission element and the same was communicated to State/UTs vide letter dated 01.09.2021. This will lead to better planning, loss reduction and increased supply reliability. Assets in 33 kV network and existing overloaded assets/assets can be handed over to STUs.

v. Disaster Resilient Infrastructure

Considering the recurrent damages caused by cyclones on transmission and distribution (T&D) infrastructures in coastal areas of the country, a Task Force was constituted by this Ministry to recommend preventive and mitigation measures for minimizing the damages to transmission and distribution infrastructures due to Cyclone in coastal areas of the country.

The task force suggested a multi-pronged approach, which encompasses change in the design philosophy, better planning and adoption of modern technological solutions required to safeguard the T&D infrastructure from natural disasters and to increase resilience, reliability and availability of the system.

Based on the report, guidelines were issued to coastal States and UTs vide MoP's letter dated 10 June 2021 directing that each Coastal States/UTs may mark out areas prone to cyclones within 20-30 Kms of Coast line and any new construction / reconstruction of Power systems in these areas will follow the design parameters laid down in this report. Adoption of these guidelines would reduce the recurrent damages caused by cyclones in transmission and distribution infrastructures in the country.

vi. Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV) and above voltage class

Earlier, the specification of each Transformer and Reactor was unique and Manufacturers used to take inordinate time to design them. Accordingly, the manual to adopt country wide standard designs of Power Transformers and Reactors was prepared and the same was approved by Ministry of Power 16.04.2021. By standardizing the design parameters of transformers and reactors for specific voltage class, the execution time of transmission projects will reduce considerably.

7. Promoting Aatma Nirbhar Bharat

- In supersession of all earlier Orders, Ministry of Power issued revised order on 16.11.2021 regarding Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content).
- The above order is in compliance to Department for Promotion of Industry and Internal Trade (DPIIT) Public Procurement (Preference to Make in India), Order 2017 and subsequent modifications from time to time for encouraging 'Make in India' and promoting manufacturing and production of goods and services in India with a view to enhancing income and employment.
- As per the Order, in procurement of all goods and services or works in respect of which there is sufficient local capacity and local competition (with specified Minimum Local Content i.e. MLC given at Annexure-I), only "Class-I local supplier" shall be eligible to bid irrespective of purchase value. There are number of items where the minimum local content has been increased beyond 50%.

8. Securing Energy Supply:

Coal stock position for thermal power plants (180 nos.) is monitored in Central Electricity Authority on daily basis for regular/smooth supply of coal. With regular monitoring and follow up with coal companies and Railways, the coal stock position has become comfortable. As on 31.12.2021, total coal stock position reported by power utilities was 23.42 Million Tonnes (MT).

An overview of source wise coal received in coal based thermal power stations during 2021 (Jan-Dec) is given below -

Source	Coal Receipt in Million Tonnes
Coal India Ltd. (CIL)	484.5
Singareni Collieries Co. Ltd. (SCCL)	55.8
Captive Mines	64.5
E-auction	40.4
Import (Blending purposes)	8.4
Import (Import coal based)	23.3
Total Receipt	676.8

As reported by the power utilities, the total coal consumption by the power plants monitored in CEA, during 2021 (Jan-Dec) was about 690.3 MT.

Revised Coal Stocking Norms in Coal Based Thermal Power Plants

Central Electricity Authority (CEA), monitors the coal stocks being maintained at the power stations along with their daily coal consumption requirements. The earlier coal stocking norms were advisory in nature, at times, power plants do not maintain coal stock as per the norms, which is not desirable for a sustained plant operation. In view of this, the existing coal stocking norms have been revised and issued by Central Electricity Authority (CEA) on 06.12.2021 to ensure more fuel security to the power plants, reflect true picture of the stocks being maintained at each power stations and ensure sufficient coal stock even during the period of less supply by CIL/SCCL during the month of July to September.

The revised norms mandates 12 to 17 days of coal stock at pit head stations and 20 to 26 days coal stock at non-pit head stations with month-wise variation based on coal despatch/ coal consumption pattern during the year corresponding to 85% PLF, and prescribes the coal stocks to be mandatorily maintained by the power plants and penalty mechanism for not maintaining the stocking norms. The coal stock for 17 days at pit head plants and 26 days stocks at non-pit head power plants have been made mandatory during February to June every year.

The power plants are graded as red, yellow and green for not maintaining the coal stocks; and would be penalized for not maintaining their normative availability due to reduced coal stocks and their fixed charges shall be reduced in a graded manner.

9. Empowering Consumers:

Uptill now the rights of consumers were not defined. As a result, they had to run from pillar to post for getting connections, for enhancement or reduction of load, getting defective bills corrected, getting defective meters replaced etc. Ministry of Power promulgated the Electricity (Rights of Consumers) Rules, 2020 on 31.12.2020 under section 176 of the Electricity Act, 2003. The rules provide as below:

(a) Rights and Obligations

- It is the duty of every distribution licensee to supply electricity on request made by an owner or occupier of any premises in line with the provisions of Act.
- It is the right of a consumer to have minimum standards of service for supply of electricity from the distribution licensee.

(b) Release of new connection and modification in existing connection

- The process has to be transparent, simple and time bound.
- Applicant has the option of online application.

- The time limit to provide a new connection or modify an existing connection is a maximum of 7 days in metro cities, 15 days in other municipal areas and 30 days in rural areas.

(c) Metering

- No connection shall be given without a meter.
- Meter shall be a smart prepaid meter or prepaid meter.
- Provision of testing of meters.
- Timelines specified for replacement of defective, burnt or stolen meters.

(d) Billing and payment

- Transparency in applicable consumer tariff and bill.
- Consumer shall have the option to pay bills online or offline.
- Provision for advance payment of bill with applicable discount.

(e) Disconnection and reconnection provisions

(f) Reliability of supply

- The distribution licensee shall supply 24x7 power to all consumers. However, the Commission may specify lower hours of supply in some areas.
- The distribution licensee shall put in place a mechanism, preferably with automated tools to the extent possible, for monitoring and restoring outages.

(g) Consumer as prosumer

- While the prosumers will maintain consumer status and have the same rights as the general consumer, they will also have right to set up Renewable Energy (RE) generation units including Roof Top Solar Photo Voltaic (PV) systems – either by himself or through a service provider.
- Net metering for loads up to 500 kW and for gross metering for loads above 500 kW.

(h) Standards of performance.

- The Commission shall notify the standards of performance for the distribution licensees.
- Compensation amount to be paid to the consumers by the distribution licensees for violation of standards of performance.

(i) Compensation mechanism

- Automatic compensation shall be paid to consumers for which parameters on standards of performance can be monitored remotely.
- The standards of performance lays down the benchmark in service and compensation is required to be paid by the distribution licensees for service below the benchmark for example, compensation will need to be paid for:



- (i) no supply to a consumer beyond a particular duration (to be specified by the Commission)
- (ii) number of interruptions in supply beyond the limits as specified by the Commission
- (iii) time taken for connection, disconnection, reconnection, shifting beyond the laid down timeline
- (iv) time taken for change in consumer category and load beyond the norms laid down
- (v) time taken for change in consumer details beyond the norm
- (vi) time taken for replacement of defective meters beyond the norm
- (vii) time period within which bills are to be served being violated
- (viii) time period of resolving voltage related complaints and bill related complaints being violated

(j) Call Centre for Consumer Services

- Distribution licensee shall establish a centralised 24x7 toll-free call centre
- Licensees shall endeavour to provide all services through a common Customer Relationship Manager (CRM) System to get a unified view

(k) Grievance redressal mechanism

- Consumer Grievance Redressal Forum (CGRF) to include consumer and prosumer representatives.
- The consumer grievance redressal has been made easy by making it multi-layered and the number of consumer representatives have been increased upto four.
- The licensee shall specify the time within which grievances shall be resolved at various levels. Maximum timeline of 45 days specified for grievance redressal.

(l) General Provisions

- Use of online access for various services such as submission of application, monitoring status of application, payment of bills, status of complaints raised etc. to consumers through its website, web portal, mobile app and its various area-wise designated offices.
- The distribution licensee shall provide all services such as submission of application, payment of bills etc. to senior citizens at their door-steps.
- The details of scheduled power outages shall be informed to the consumers. In case of an unplanned outage or fault, immediate intimation shall be given to the consumers through SMS or by any other electronic mode along with estimated time for restoration.

- Guidelines issued to all States to convert all existing consumer meters into Smart meters in prepaid mode. This would allow consumers to pay as per their own financial convenience and electricity consumption requirements.
- Consistent efforts in simplification of business processes in the sector have been aptly reflected in improvement of India's rank from 137 in 2015 to currently 22 in World Bank's Ease of Doing Business in so far as getting electricity connection is concerned.

10. Project Monitoring speedy completion of projects:

- Intensive reviews are held by the Ministry of Power to review the critical milestones associated with each ongoing project. Meetings with the leading equipment manufacturers, especially, QPRs are also organized separately for each CPSU to review the status of the Central Sector projects. The Capacity Addition Programme is also monitored by the PMO and the Cabinet Secretariat as well.
- Issues are raised on PRAGATI for proactive governance and timely implementation, as and when required.
- The bottlenecks in projects, both in the public and private sector, for all large projects are being removed by the Project Monitoring Group (PMG), DPIIT on a fast-track basis. This Cell pro-actively pursues stalled projects involving the investment of Rs. 500 crore or more so that the projects are commissioned on time.
- The project Implementation parameters/milestones are incorporated in the annual Memorandum of Understanding (MoU) signed between respective power CPSU and MOP and the same is monitored during the quarterly performance review meeting of CPSU besides other meetings held in MOP/CEA.
- Matters are taken up with State Government/District Administration for extending help to the project implementing agencies in resolving Right of Way (ROW) issues.

11. Energy Transition: Energy security and cleaner environment:

Promoting Renewable Energy

The world is increasingly concerned about the deteriorating environment, climate change and global warming. All the countries have been gathering annually in the Conference of Parties in order to deliberate on the steps to be taken for reducing emissions and the resultant global warming and climate change. In COP21 in Paris, India pledged as its NDC (Nationally Determined Contribution) that it will achieve 40 % of its installed power generation capacity from non-fossil fuel sources by 2030. We achieved this milestone in 2021- the first country to have achieved its NDC 9 years in advance. Our Non-fossil fuel installed capacity is now over 159 GW and further we have 78 GW under installation and 25

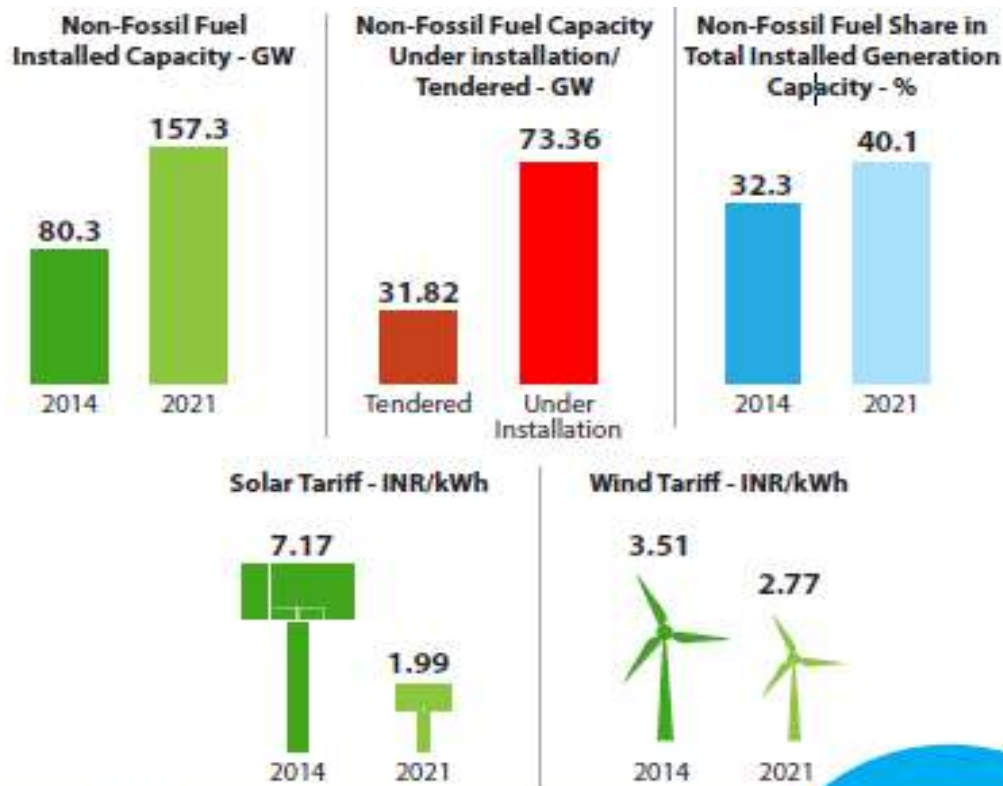
GW under bid. During the year 2021-22 (Upto Jan, 2022), about 10,266 MW of Renewable Capacity, consisting of 9,068 MW from Solar, 854 MW from Wind, 55 MW from Small Hydro, 77 MW from Bio Power and 213 MW from Hydro based capacity has been added.

- We have taken up a Solar City Scheme under which we plan to convert one city in each state into a Green City. 29 Cities from 24 states have been selected. Modhera in Gujarat has already been converted to a Green City.

Reduction in CO₂ Emission and Energy Savings

Hon'ble Prime Minister of India has announced five ambitions in Conference of Parties (COP -26) at Glasgow, UK i.e. *Panchamrit* as given below:

- India's non-fossil energy capacity to reach 500 GW by 2030.
- India will meet 50 per cent of its energy requirements with renewable energy by 2030.





- India will reduce its total projected carbon emissions by one billion tonnes from now to 2030
- By 2030, India will reduce the carbon intensity of its economy to less than 45 per cent.
- By 2070, India will achieve the target of net zero emissions.

To achieve the above mentioned goals, it is estimated that adoption of energy efficiency measures should result in reduction of 890 million tonnes CO₂ by 2030. The maximum potential for emissions reduction lies in the industrial sector followed by transport, domestic, commercial, agricultural and municipal sectors. To achieve this emissions reduction target, a revised mission on enhanced energy efficiency named "Roadmap of Sustainable and Holistic Approach to National Energy Efficiency" (ROSHANEE) has been launched.

- Our Perform, Achieve & Trade (PAT) Scheme – an Energy Intensity reduction programme for industries has resulted in a reduction of emissions by 103 Million Tons of CO₂ per annum by 2020. As of now, it covers more than 50% of industrial energy consumption and over 1000 large units of implementing measures to achieve energy reduction targets.
- Our programme for energy efficient appliances, the Standards & Labelling Programme for appliances has improved appliance/equipment energy efficiency and lowered energy costs to the consumers. This has resulted in reduction of CO₂ emission by 53 million tons per annum.

Under our UJALA program, over 36.74 crore LED bulbs, 72.14 lakh LED Tube lights and 23.44 lakh energy efficient fans were distributed across India. In addition, 163.42 crore LED bulbs have been sold. These endeavours have resulted in estimated energy savings of 129.87 billion kWh per year, reduction of CO₂ emissions by 106.5 million tons per annum and estimated annual monetary savings of ₹51,945 crore in consumer electricity bills.

LED bulk procurement cost has also reduced by 90% in 3 years (₹310 in 2014 to ₹39 in 2017)

Under the Street Lighting National Programme (SLNP), over 1.21 crore street lights were replaced with LED street lights. This has resulted in estimated energy savings of 8.14 billion kWh per year, CO₂ reduction of 5.61 Million Tons per annum and estimated annual monetary savings of ₹5,688 crore in electricity bills of municipalities.

a) **Deepening of Spot Markets: Introduction of Green Day Ahead Market (GDAM) in Power Exchanges**

Further to the development of Green Term Ahead Market (G-TAM) and Real Time market (RTM) in the year 2010, Green Day Ahead Market (GDAM) was introduced from 26.10.2021 in Power Exchange and it will operate in an integrated way with the conventional Day Ahead Market (DAM) with separate price formation for RE Power and Conventional Power. This facilitates a marketplace

for trading of RE Power on a day-ahead basis for accomplishment of green targets as well as support integration of Green energy. This, will also deepen the green market and will provide competitive price signals, besides offering an opportunity to the market participants to trade in green energy, in the most transparent, flexible, competitive, and efficient manner.

b) **Achievements of initiatives for cleaner environment**

Annual Impact of Energy Efficiency Schemes / Programmes is as follows:

- Electrical energy savings of 159.24 Billion Units, worth INR 95,544 Crores and resulted in reduction of 130 Million tonne of CO₂ emissions.
- Thermal energy savings of 15.59 Million Tonnes of oil Equivalent, worth INR 28,683 Crores and resulted in reduction of 58.675 Million tonne of CO₂ emission.
- Total energy savings of 29.28 Million Tonnes of oil Equivalent i.e. 3.15% of total primary energy supply of the country.
- Total cost savings worth INR 1,24,227 crores.
- Total reduction in CO₂ emission is around 273 Million Tonnes, including LED bulbs sold by private industry

c) **Energy Efficiency in Appliance Sector:**

- Existing energy consumption standards for Chillers, Washing Machines, Microwave Ovens has been extended by a period of 1 year starting from 1st January, 2022 to 31st December, 2022.
- As on December 2021, 30 appliances are covered under the ambit of Standards and Labelling program. Out of which, 10 appliances are under mandatory regime and remaining 20 appliances are under voluntary regime. The recently added 2 appliances namely Batteries and Tyres have been launched on 14th December, 2021 on the occasion of National Energy Conservation Day.

d) **Energy Efficiency in Building Sector:**

- As on December 2021, 18 States and 2 Union Territories have notified ECBC for implementation in their respective states.
- As on December, 2021, more than 264 buildings have been rated under various categories.

e) **Enhancing energy efficiency in Large Industries and Establishments**

- Perform, Achieve and Trade (PAT) Cycle II resulted in the total energy savings of about 14.08 MTOE, translating into 66.01 million tonne of CO₂ avoidance. The total monetary savings estimated is approximately INR 31,445 Crores and Designated Consumers (DCs) have made total investments of about INR 43,721 Crores. Ministry of Power issued 57 lakh Energy Saving Certificates (ESCerts) to 349 Designated Consumers (DCs) and directed 193 DCs to purchase 36.68 lakh ESCerts.

- PAT cycle –VII has been notified in October 2021 for the period 2022-23 to 2024-25 wherein 509 DCs have been notified with overall energy saving target of 6.627 MTOE.
- With a view to widen the application of EC Act, 2001 new sectors like Sugar, Chemicals, Ceramic, Glass, Zinc, Copper, and Mines have been included.

f) Energy Efficiency in Small and Medium Enterprises (SMEs)

- Energy and Resource mapping of Micro Small and Medium Enterprise (MSME) clusters is underway for 9 energy intensive MSME sectors. Energy Audits are being carried out in 45 identified cluster (total 45 clusters). More than 400 energy audit reports have been received. Sectoral stakeholders' consultation meets were organised and draft policy recommendation reports for 7 sectors are in process.
- BEE has developed Energy Conservation guidelines for more than 25 energy intensive SME sectors.

g) Energy Efficiency in Transport Sector:

- The Union Minister for Road Transport & Highways in presence of the Union Minister for Power and New & Renewable Energy launched the "Go Electric" Campaign on 19th February, 2021 to spread awareness on the benefits of e-mobility and EV Charging Infrastructure as well as electric cooking in India.
- Revised consolidated guidelines and standards for charging infrastructure for electric vehicles published on 14th January, 2022.
- Correction Factor from BS IV to BS VI finalized for fuel efficiency norms.

h) Energy Accounting in DISCOMS

- Ministry of Power issued a notification issued to include all the Electricity Distribution Companies (DISCOMs) under the preview of EC Act.
- Regulations for Energy Accounting and Auditing in DISCOMs notified

i) Go- Electric Campaign

- BEE, MoP has launched the "Go Electric" Campaign to spread awareness on the benefits of e-mobility and EV Charging Infrastructure as well as electric cooking in India. Key points about the campaign:
- To push the country towards 100% e-mobility and clean and safe e-cooking.
- To create awareness at PAN-India level and reduce the import dependence of the country.
- To move ahead on the path of a low carbon economy, thereby saving the country and the planet from the adverse impact of climate change.
- Bureau of Energy Efficiency(BEE), under the aegis of the Ministry of Power has been mandated to undertake an awareness drive for promoting public charging, e-mobility & its ecosystem.

j) Under Energy Efficiency in Municipal Sector

Street Lighting National Programme (SLNP):

- In the Financial year 2021-22, Energy Efficiency Services Limited(EESL) has installed 4.87 lakh LED street lights in Urban Local Bodies (ULBs) and Gram Panchayats across India. This has resulted in estimated energy savings of 327 million kWh per year with avoided peak demand of 54 MW, estimated Green House Gases (GHG) emission reduction of 0.22 million t CO₂ per year and estimated monetary savings of INR 228 crore in electricity bills of municipalities. EESL is also implementing LED Street lighting projects in Gram Panchayats on the same service model as the SLNP for municipalities with the objective to promote the use of efficient lighting in rural areas. The anticipated target for January 2022 to March 2022 is 3.13 Lakh installation of LED street-lights.
- Further, to strengthen the Street Light National Programme, 3 Business Models viz. a) Supply model, b) Supply, Installation with/without O&M and 3) ESCO have been introduced. Clients are free to choose business model of their choice and associated terms and conditions.
- It is planned to install 1.6 Cr LED lights under the new business models by FY 2023-24.
- Letter from Ministry of Power have been issued to all States/ UTs to implement the SLNP programme. Revised scheme modalities and procedure for participation has been shared to all states/ UTs by EESL.

k) Gram UJALA program

Achievement & Projection:

- Till date more than 70.21 lakh LED bulbs have already been distributed. The program has resulted in energy saving of 1019 MU of electricity per year, peak demand reduction of 280 MW and 9,37,975 tonnes of CO₂ emission reduction per year. It may be noted that Carbon financing is being used for funding of this program
- It is Planned to distribute 1 Cr LED bulbs by March 31, 2022.

l) E-mobility program

e-Mobility Programme, with the objective to reduce dependence on oil imports and to provide an impetus for domestic electric vehicle manufacturers, charging infrastructure companies, fleet operators, service providers, etc. to gain efficiencies of scale and drive down costs, create local manufacturing facilities, grow technical competencies for the long-term growth of the electric vehicle (EV) industry in India and to enable Indian EV manufacturers to emerge as major global players. EESL through its wholly owned subsidiary Convergence Energy Services Limited (CESL) is working on all segments of EVs viz. 2-Wheelers, 3-Wheelers, E-cars and E-buses.



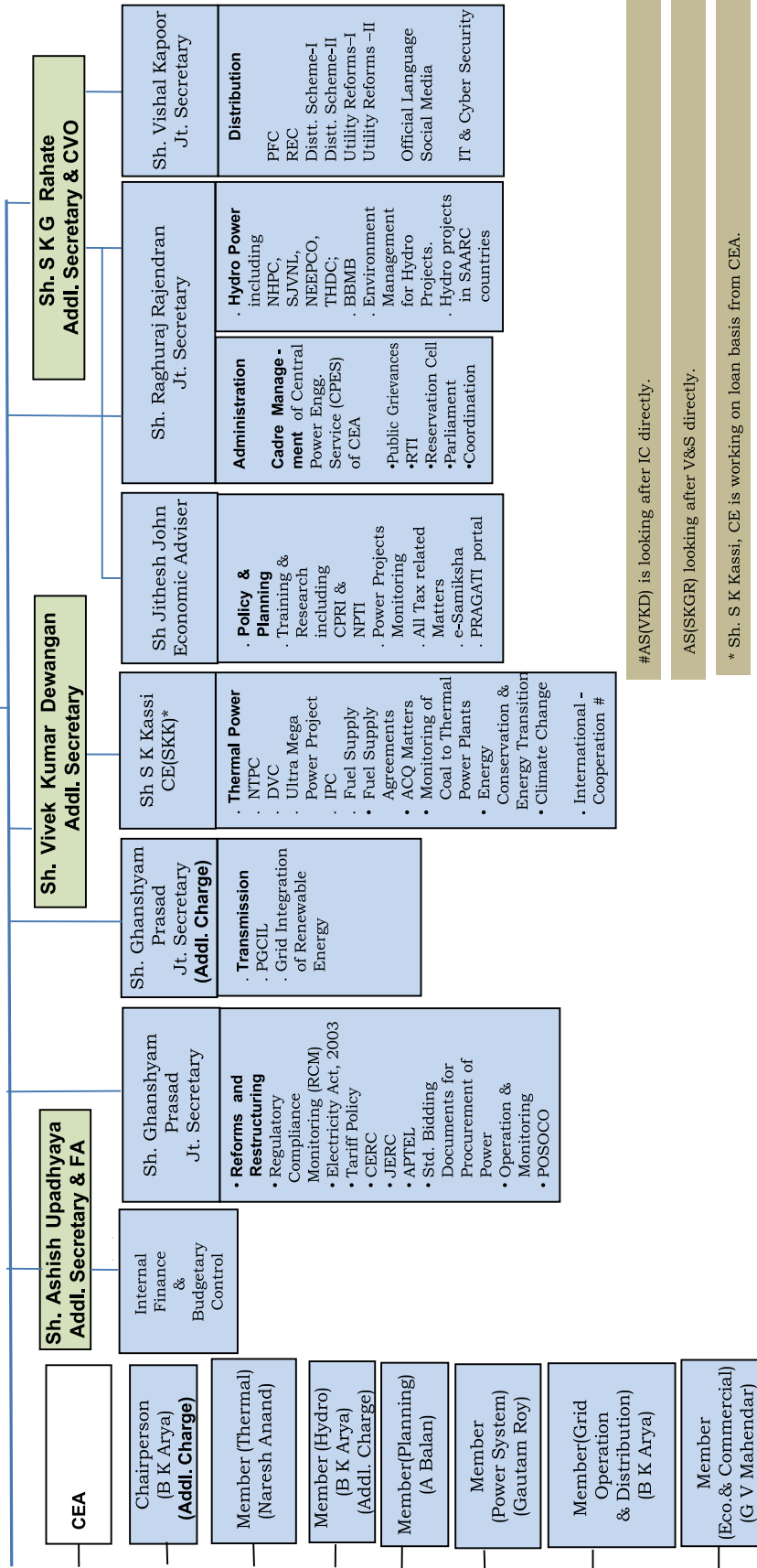
As on 17.02.2022

ORGANISATION STRUCTURE OF THE MINISTRY OF POWER

**SHRI RAJ KUMAR SINGH,
MINISTER OF POWER**

**SHRI KRISHAN PAL
MINISTER OF STATE FOR POWER**

**SHRI ALOK KUMAR
SECRETARY (POWER)**



#AS(VKD) is looking after IC directly.

AS(SKGR) looking after V&S directly.

* Sh. S K Kassi, CE is working on loan basis from CEA.

CHAPTER 02

ORGANISATIONAL SET-UP

The Ministry of Power started functioning independently with effect from 2nd July, 1992. Earlier it was known as the Ministry of Energy comprising the Departments of Power, Coal and Non-Conventional Energy Sources.

Electricity is a concurrent subject at entry number 38 in the list-III of the Seventh Schedule of the Constitution of India. The Ministry of Power is primarily responsible for the development of electrical energy in the country. The Ministry is concerned with perspective planning policy formulation, processing of projects for investment decisions, monitoring of the implementation of power projects, training and manpower development and the administration and enactment of legislation in regard to thermal, hydro power generation, transmission and distribution.

The main items of work dealt with by the Ministry of Power are as given below:

- General Policy in the electric power sector and issues relating to energy policy and coordination thereof. (Details of short, medium and long-term policies in terms of formulation, acceptance, implementation and review of such policies, cutting across sectors, fuels, regions and intra-country and inter-country flows);
- All matters relating to hydro-electric power (except small/mini/micro hydel projects of and below 25 MW capacity) and thermal power and transmission & distribution system network;
- Research, development and technical assistance relating to hydro-electric and thermal power, transmission system network and distribution systems in the States/UTs;
- Administration of the Electricity Act, 2003, (36 of 2003), the Energy Conservation Act, 2001 (52 of 2001), the Damodar Valley Corporation Act, 1947 (14 of 1948) and Bhakra Beas Management Board as provided in the Punjab Reorganisation Act, 1966 (31 of 1966);
- All matters relating to Central Electricity Authority, Central Electricity Regulatory Commission and appellate Tribunal for Electricity;
- Rural Electrification;
- Power scheme and issues relating to power supply/development schemes/ programmes/ decentralized and distributed generation in the States and Union Territories;
- Matter relating to the following Undertaking/Organizations;
 - a. Damodar Valley Corporation;
 - b. Bhakra Beas Management Board (except matters relating to irrigation);

- c. National Thermal Power Corporation Limited;
- d. National Hydroelectric Power Corporation Limited;
- e. Rural Electrification Corporation Limited;
- f. North Eastern Electric Power Corporation Limited;
- g. Power Grid Corporation of India Limited;
- h. Power Finance Corporation Limited;
- i. Tehri Hydro Development Corporation;
- j. Satluj Jal Vidyut Nigam Limited;
- k. Central Power Research Institute;
- l. National Power Training Institute;
- m. Bureau of Energy Efficiency;

- All matters concerning energy conservation and energy efficiency pertaining to Power Sector.

Shri R.K. Singh assumed charge as the Minister of State (Independent charge) for Power with effect from the 5th September, 2017 to 6th July, 2021 and as Minister of Power from the 7th July, 2021.

Shri Krishan Pal assumed charge as the Minister of State for Power with effect from the 7th July, 2021.

Shri Alok Kumar assumed charge as Secretary in the Ministry of Power with effect from the 31st January, 2021. The Ministry has sanctioned strength of two Additional Secretaries, one Financial Adviser, four Joint Secretaries and one Senior Adviser/Economic Adviser (Indian Economic Service). Presently two posts of Additional Secretaries, one post of Additional Secretary and Financial Adviser (AS& FA), three posts of Joint Secretaries and one Senior Adviser are filled up.

Shri S.K.G. Rahate, Additional Secretary, oversees the Policy & Planning; Training & Research including CPRI & NPTI; Power Projects; Monitoring Panel; All Tax related Matters; e-Samiksha; PRAGATI portal; Hydro matters including CPSUs namely NHPC, SJVNL, NEEPCO, THDC, BBMB; Hydro Projects in SAARC countries; Environment Management for Hydro Projects; Distribution; PFC; REC; Distt. Scheme-I; Distt. Scheme-II; Utility Reforms-I; Utility Reforms-II; Official Language; Social Media; IT & Cyber Security.

Shri Vivek Kumar Devangnan, Additional Secretary, oversees the Thermal Power; National Thermal Power Corporation; Damodar Valley Corporation; Ultra-Mega Power Projects; Investment Promotion Cell (IPC); Fuel Supply Agreements; Matters pertaining to ACQ; Monitoring the supplies of coal to Thermal Power Plants; Energy Conservation & Energy Transition; Climate Change; International Cooperation.



Shri Ashish Upadhyaya, Additional Secretary and Financial Adviser, oversees the Internal Finance and Budgetary Control of this Ministry.

The allocation of work amongst the Joint Secretaries and Financial Adviser in the Ministry of Power is as under:

Shri Raghuraj Rajendran, Joint Secretary looks after the work of Hydro matters including CPSUs namely NHPC, SJVNL, NEEPCO, THDC, BBMB; Hydro Projects in SAARC countries; Environment Management for Hydro Projects and Administration including General Administration; Cadre Management of Central Power Engg. Service (CPES) of CEA, Public Grievances; RTI; Reservation Cell; Parliament; Coordination.

Shri Vishal Kapoor, Joint Secretary looks after the work of Distribution; PFC; REC; Distt. Scheme-I; Distt. Scheme-II; Utility Reforms-I; Utility Reforms-II; Official Language; Social Media; IT & Cyber Security.

Shri Ghanshyam Prasad, Joint Secretary looks after the work of Reforms & Restructuring; Regulatory Compliance Monitoring (RCM); Tariff Policy; CERC; JERC; APTEL; and Standard Bidding Documents for Procurement of Power; Electricity Act, 2003 and Operation & Monitoring; Documents for Procurement of Power;

POSOCO; Transmission; PGCIL; Grid Integration of Renewable Energy.

Shri Jithesh John, Economic Advisor oversees the Policy & Planning; Training & Research including CPRI & NPTI; Power Projects Monitoring; All Tax related Matters; e-Samiksha; PRAGATI portal.

A Chief Engineer from Central Electricity Authority is taken on loan basis, against the vacant post of Joint Secretary, to assist the work relating Thermal Power; National Thermal Power Corporation; Damodar Valley Corporation; Ultra-Mega Power Projects; Investment Promotion Cell (IPC); Fuel Supply Agreements; Matters pertaining to ACQ; Monitoring the supplies of coal to Thermal Power Plants; Energy Conservation & Energy Transition; Climate Change; International Cooperation.

Further, there is a Principal Accounts Office headed by the Chief Controller of Accounts who in turn reports to the Financial Adviser in the Ministry of Power. Matters relating to reservations for SC/ST, Physically disabled and Ex-Servicemen in the Ministry including PSUs under its administrative control are dealt with by the Deputy Secretary Level Officer who is also the Liaison Officer for SC/ST and another Deputy Secretary level officer is the Liaison officer for OBCs.

CHAPTER 03

CAPACITY ADDITION PROGRAMME

1. The National Electricity Policy (NEP) entailed provision of adequate reliable power access to all citizens. Electricity is in the Concurrent List in the Constitution and the primary responsibility of ensuring its availability and distribution is that of the States. However, both the Centre and the States have to play a decisive and positive role.
2. The installed power generation capacity in the country at the end of 11th Plan was about 2,00,000 MW. The capacity addition programme during the 12th Plan period was targeted at 88,537 MW comprising 72,340 MW in the Thermal Sector, 10, 897 MW in the Hydro Sector and 5,300 MW in the Nuclear Sector.

3. Capacity addition

During the five years of 12th Plan period, the following new capacities have been added:

(In MW)

Year	Central	State	Private	Total
2012-13	5397.3	3977	11257.5	20631.8
2013-14	2574.1	3367	11884	17825.1
2014-15	4395.2	4886.1	13285	22566.3
2015-16	3775.6	7070	13131	23976.6
2016-17	4310.5	5177.3	4722	14209.8

4. For the year 2015-16, against the capacity addition target of 20,037.1 MW including 1,000 MW of nuclear power, capacity addition of 23,976.6 MW was achieved. **This exceeds the highest capacity addition ever in a single year.** Sector-wise and Fuel-wise summary of the capacity addition for the year 2015-16 is given in the following table:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	2106.1	3295.6	590	480	1000	0	3696.1	3775.6
State	8120	6460	575	610	-	-	8695	7070.0
Private	7120	12705	526	426	-	-	7646	13131.0
Total	17346.1	22460.6	1691	1516	1000	0	20037.1	23976.6

5. For the year 2016-17 a capacity addition target of 16,654.5 MW including 1,500 MW of nuclear power was fixed. A capacity of 14,209.8 MW was achieved. The Sector-wise Fuel-wise break up is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	2731	3230.5	490	80.0	1500	1000	4720.5	4310.5
State	3910	3622.3	995	1555	-	-	4905	5177.3
Private	6800	4698	229	24	-	-	7029	4722.0
Total	13441	11551	1714	1659.0	1500	1000	16654.5	14209.8



6. Sector-wise Breakup of Capacity Addition during XII Plan

A capacity addition target of 88,537 MW excluding 30,000 MW of RES, was fixed for 12th Plan period. The Twelfth Plans cumulative capacity addition of 99,209 MW was achieved. **This is first time in the History of Five year Plan that the Capacity Addition target has been overachieved.** The details are as under:

(In MW)

Sector	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	14878	15,868.60	6004	2584.02	5300	2000	26182	20,452.62
State	13922	22,201.35	1608	2276	-	-	15530	24,477.35
Private	43540	53,660.50	3285	619	-	-	46825	54,279.50
All India	72340	91,730.45	10897	5479.02	5300	2000	88537	99,209.47

Capacity Addition Programme - Beyond XII plan:

7. For the year 2017-18 a capacity addition target of 13,171.15 MW including 500 MW of nuclear power was fixed. A capacity of 9,505 MW was achieved. The Sector-wise Fuel-wise break up is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	4880	3170	800	390	500	0	6180	3560
State	3546.15	1760	300	200	-	-	3846.15	1960
Private	2940	3780	205	205	-	-	3145	3985
Total	11366.15	8710	1305	795	500	0	13171.15	9505

8. For the year 2018-19 a capacity addition target of 8106.15 MW was finalised. A capacity of 5921.755 MW was achieved. The Sector-wise and Fuel-wise break up is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	2760	1960	710	110	-	-	3470	2070
State	4506.15	2849.755	130	30	-	-	4636.15	2879.755
Private	0	972	0	0	-	-	0	972
Total	7266.15	5781.755	840	140	-	-	8106.15	5921.755

9. For the year 2019-20 a capacity addition target of 12,186.14 MW was finalised. A capacity of 7,065 MW was achieved. The Sector-wise Fuel-wise break up is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Target	Ach	Target	Ach	Target	Ach.	Target	Ach.
Central	6040	3940	600	300	700	-	7340	4240
State	4256.15	2780	210.99	-	-	-	4467.14	2780
Private	0	45	379	-	-	-	379	45
Total	10296.15	6765	1189.99	300	700	0	12186.14	7065

10. From the FY 2020-21 onwards, the term "Proposed Targets for Capacity Addition" has been replaced with "Tentative Schedule of Generation Capacity Addition". The tentative schedule of Generation Capacity Addition for FY 2020-21 was 11,197.2 MW. A Capacity Addition of 5,436 MW was achieved. The Sector-wise Fuel-wise break-up of the same is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Tentative Schedule	Ach	Tentative Schedule	Ach	Tentative Schedule	Ach.	Tentative Schedule	Ach.
Central	5790	4080	300	300	-	-	6090	4380
State	4276.15	846	111	111	-	-	4387.15	957
Private	525	0	195	99	-	-	720	99
Total	10591	4926	606	510	-	-	11197	5436

11. From the FY 2021-22 the tentative schedule of Generation Capacity Addition is 11,478 MW. A Capacity Addition of 3108 MW has been achieved till 31.12.2021. The Sector-wise Fuel-wise break-up of the same is as under:

(In MW)

	Thermal		Hydro		Nuclear		Total	
	Tentative Schedule	Ach	Tentative Schedule	Ach	Tentative Schedule	Ach.	Tentative Schedule	Ach.
Central	5400	1710	0	0	700	0	6100	1710
State	4360	660	100	0	-	-	4460	660
Private	525	525	393	213	-	-	918	738
Total	10285	2895	493	213	700	0	11478	3108

The list of projects commissioned during 2017-18 to 2021-22 (till December, 2021) is given at **Annex**.

Monitoring Mechanism

12. The Ministry of Power has adopted a robust monitoring system for the capacity addition programme so as to see that the projects are executed in time. The monitoring mechanism comprises two broad levels at which monitoring of power projects is carried out by the Central Electricity Authority and by the Ministry of Power.

13. Monitoring by the Central Electricity Authority

The Central Electricity Authority (CEA) has a nodal officer associated with each ongoing project who continuously monitors the progress at site through frequent visits and continuous interaction with the developers, equipment suppliers & other stakeholders. The respective nodal officer is responsible for submitting a report on the progress of each of the ongoing power project on monthly basis highlighting the critical areas where corrective actions are required. The Chairperson, CEA reviews progress of the ongoing projects with the nodal officers. The CEA also holds quarterly review meetings with the developers and other stakeholders. Moreover, time bound appraisal norms have been developed in CEA for examination of DPRs of Hydroelectric projects.

14. Monitoring by the Ministry of Power

- Intensive reviews are held by the Ministry of Power to review the critical milestones associated with each ongoing project. Meetings with the leading equipment manufacturers, especially, QPRs are also organized separately for each CPSU to review the status of the Central Sector projects. The Capacity Addition Programme is also monitored by the PMO and the Cabinet Secretariat as well.
- Issues are raised on PRAGATI for proactive governance and timely implementation, as and when required.
- The bottlenecks in projects, both in the public and private sector, for all large projects are being removed by the Project Monitoring Group (PMG), DPIIT on a fast-track basis. This Cell pro-actively pursues stalled projects involving the investment of Rs. 500 crore or more so that the projects are commissioned on time.
- The project Implementation parameters/milestones are incorporated in the annual Memorandum of Understanding (MoU) signed between respective power CPSU and MOP and the same is monitored during the quarterly performance review meeting of CPSU besides other meetings held in MOP/CEA.
- Matters are taken up with State Government/District Administration for extending help to the project implementing agencies in resolving Right of Way (ROW) issues.



PROJECTS COMMISSIONED DURING THE YEAR 2017-18

Project Name	Region	Sector	State	Developer	Type	Capacity (In MW)
Nabi Nagar TPP U-2	ER	Central	BIHAR	JV OF NTPC & RAILWAYS	Thermal	250
Solapur STPP U-1	WR	Central	MAHARASHTRA	NTPC	Thermal	660
Chhabra STPP U-5	WR	Sector	RAJASTHAN	RRVUNL	Thermal	660
Binjkote TPP U-1	WR	Private	CHHATTISGARH	SKS POWER GENERATION (CHHATTISGARH) LTD	Thermal	300
Nawapara TPP U-2	WR	Private	CHHATTISGARH	TRN ENERGY	Thermal	300
Nasik TPP Ph-I U-3	WR	Private	MAHARASHTRA	RATTAN INDIA NASIK POWER LTD	Thermal	270
Nasik TPP Ph-I U-4	WR	Private	MAHARASHTRA	RATTAN INDIA NASIK POWER LTD	Thermal	270
Nasik TPP Ph-I U-5	WR	Private	MAHARASHTRA	RATTAN INDIA NASIK POWER LTD	Thermal	270
Bara TPP U-3	NR	Private	UTTAR PRADESH	PRAYAGRAJ POWER GENERATION CO.LTD.	Thermal	660
India Power TPP (Haldia) U-1	ER	Private	WEST BENGAL	INDIAN ENERGY LTD (HALDIA)	Thermal	150
Uchpinda TPP U-3	WR	Private	CHHATTISGARH	RKM POWER GEN PVT. LTD.	Thermal	360
Shirpur TPP U-1	WR	Private	MAHARASHTRA	SHIRPUR POWER PVT. LTD.	Thermal	150
Haldia, IPCL Unit-2	ER	Private	WEST BENGAL	INDIAN ENERGY LTD (HALDIA)	Thermal	150
BTPS Extn Unit-8	ER	Sector	BIHAR	BSEB	Thermal	250
Akaltara (Nariyara)	WR	Private	CHATISHGARH	K.S.K MAHANADI POWER COMPANY LIMITED	Thermal	600
Kudgi STPP Ph-I, Unit-3	SR	Central	KARNATAKA	NTPC	Thermal	800
Royal Seema TPP Unit-6	SR	Sector	AP	APGENCO	Thermal	600
Barauni Ext. TPP Unit-9	ER	Sector	BIHAR	BSPGCL	Thermal	250
Meja STPP Unit-1	NR	Central	UTTAR PRADESH	JV OF NTPC & UPRVUNL	Thermal	660
Lara TPP Unit-1	WR	Central	CHHATTISGARH	NTPC	Thermal	800
Binjkote TPP Unit-2	WR	Private	CHHATTISGARH	SKS POWER GENERATION LTD	Thermal	300
TOTAL (THERMAL)						8710
New Umtru U-1	NER	Sector	MEGHALAYA	MEPGCL	Hydro	20
Dikchu U-1	ER	Private	SIKKIM	SIKKIM/SNEHA KINETIC POWER PROJECTS PVT. LTD.	Hydro	48
Dikchu U-2	ER	Private	SIKKIM	SIKKIM/SNEHA KINETIC POWER PROJECTS PVT. LTD.	Hydro	48
Chanju-I U-3	NR	Private	HIMACHAL PRADESH	IA ENERGY	Hydro	12
Tuirial HEP U-1	NER	Central	MIZORAM	NEEPCO	Hydro	30
Sainj HEP U-1	NR	Sector	HIMACHAL PRADESH	HPPCL	Hydro	50
Sainj HEP U-2	NR	Sector	HIMACHAL PRADESH	HPPCL	Hydro	50

Pulichintala U-2	SR	Sector	TELANGANA	TSGENCO	Hydro	30
Pulichintala U-3	SR	Sector	TELANGANA	TSGENCO	Hydro	30
Tashiding U-1	ER	Private	SIKKIM	SNEHA KINETIC POWER PROJECTS PVT. LTD.	Hydro	48.5
Tashiding U-2	ER	Private	SIKKIM	SNEHA KINETIC POWER PROJECTS PVT. LTD.	Hydro	48.5
Tuirial HEP U-2	NER	Central	MIZORAM	NEEPCO	Hydro	30
New Umtru U-2	NER	Sector	MEGHALAYA	MEPGCL	Hydro	20
Kishan Ganga HEP Unit-1	NR	Central	J&K	NHPC	Hydro	110
Kishan Ganga HEP Unit-2	NR	Central	J&K	NHPC	Hydro	110
Kishan Ganga HEP Unit-3	NR	Central	J&K	NHPC	Hydro	110
Total (hydro)						795
Total (Nuclear)						0
Total (Thermal+Hydro+Nuclear)						9505

LIST OF POWER PLANTS COMMISSIONED DURING 2018-19

PROJECT NAME	SECTOR	STATE	DEVELOPER	CAPACITY (MW)
THERMAL PROJECTS				
Bongaigon TPP, U-3	Central	Assam	NTPC	250
Nabinagar TPP, U-3	Central	Bihar	JV of NTPC & Rly.	250
Gadarwara TPP, U-1	Central	Madhya Pradesh	NTPC	800
Solapur STPP Unit-2	Central	Maharashtra	NTPC	660
Shri Singhaji TPP St-II, Unit-3	State	Madhya Pradesh	MPGENCO	660
Shri Singhaji TPP St-II, Unit-4	State	Madhya Pradesh	MPGENCO	660
Chhabra TPP Extn, Unit-6	State	Rajasthan	RRVUNL	660
Kothagudem TPS St-VII, Unit-1	State	Telangana	TSGENCO	800
Lakwa Replacement Power Project	State	Assam	APGCL/Wartsila India Pvt Ltd	69.755
Mahan TPP	Private	Madhya Pradesh	Essar Power M.P Ltd.	600
Uchpinda TPP	Private	Chhattisgarh	R.K.M Powergen Pvt. Ltd	360
Dishergarh TPS	Private	West Bengal	M/s IPCL	12
A. Total (Thermal)				5781.755
HYDRO PROJECTS				
PARE, UNIT-1	Central	ARUNACHAL PRADESH	NEEPCO	55
PARE, UNIT-2	Central		NEEPCO	55
PULICHINTALA, UNIT-4	State	TELANGANA	TSGENCO	30
B. TOTAL (HYDRO)				140
C. Total (Nuclear)				0
Total Commissioned				5921.755



LIST OF POWER PLANTS COMMISSIONED DURING 2019-20

NAME OF PROJECT	SECTOR	STATE	DEVELOPER	CAPACITY (MW)
THERMAL PROJECTS				
Nabi Nagar STPP, U-1	Central	Bihar	JV of NTPC & BSPGCL	660
Khargone STPP St-I, U-1	Central	Madhya Pradesh	NTPC	660
Khargone STPP St-I, U-2	Central	Madhya Pradesh	NTPC	660
Tanda TPP St-II	Central	Uttar Pradesh	NTPC	660
Neyveli New TPP, U-1	Central	Tamilnadu	NLC	500
Darlipalli STPP St-I	Central	Odisha	NTPC	800
Ib Valley TPP, U-3	State	Odisha	OPGCL	660
Ib Valley TPP, U-4	State	Odisha	OPGCL	660
Wanakbori TPS Extn.	State	Gujarat	GSECL	800
Suratgarh SCTPP	State	Rajasthan	RRVUNL	660
BLA Power Pvt Ltd (Niwari)TPP	Private	M.P	BLA Power Pvt. Ltd	45
A. Total (Thermal)				6765
HYDRO PROJECTS				
Kameng, U-1	Central	Arunachal Pradesh	NEEPCO	150
Kameng, U-2	Central	Arunachal Pradesh	NEEPCO	150
			B. Total (Hydro)	300
			C. Total (Nuclear)	0
Total Commissioned				7065

LIST OF POWER PLANTS COMMISSIONED DURING 2020-21

NAME OF PROJECT	SECTOR	STATE	DEVELOPER	CAPACITY (MW)
THERMAL PROJECTS				
Lara STPP, U-2	Central	Chhatisgarh	NTPC	800
Gadarwara STPP, U-2	Central	Madhya Pradesh	NTPC	800
Mejia STPP, U-2	Central	Uttar Pradesh	JV of NTPC & UPRVUNL	660
Neyveli New TPP-Lignite, U-2	Central	Tamil Nadu	NLC	500
Tanda TPP St-II, U-6	Central	Uttar Pradesh	NTPC	660
New Nabi Nagar STPP	Central	Bihar	JV of NTPC & BSPGCL	660
Namrup CCGT-Gas, ST	State	Assam	APGCL	36.15
Bhadradi TPP, U-1 to U-3	State	Telangana	TSGENCO	810
A. Total (Thermal)				6765
HYDRO PROJECTS				
Kameng, U-3 & U-4	Central	Arunachal Pradesh	NEEPCO	300
Sawara Kuddu, U-1 to U-3	State	Himachal Pradesh	HPPCL	111
Singoli Bhatwari HEP, U-1 to U-3	Private	Uttarakhand	L&T Uttaranchal Hydro power Limited	99
			B. Total (Hydro)	510
			C. Total (Nuclear)	0
Total Commissioned				5436.15

LIST OF POWER PLANTS COMMISSIONED DURING 2021-22 (31.12.2021)

NAME OF PROJECT	SECTOR	STATE	DEVELOPER	CAPACITY (MW)
THERMAL PROJECTS				
Barh STPP-I U-1	Central	Bihar	NTPC	660
Darlipalli STPP St-I, U-2	Central	Odisha	NTPC	800
Nabi Nagar TPP	Central	Bihar	BRBCL (JV of NTPC & Rly)	250
Suralgarh SCTPP U-8	State	Rajasthan	RRVUNL	660
Tuticorin TPP Stage-IV	Private	Tamil Nadu	SEPC	525
A. Total (Thermal)				2895
HYDRO PROJECTS				
Sorang U-1 & U-2	Private	Himachal	Sorang Power	100
Rongnichu U-1 & U-2	Private	Madhya Bharat Power Corporation	Sikkim	113
B. Total (Hydro)				213
C. Total (Nuclear)				0
Total Commissioned (A+B+C)				3108



Side view of Bichom Dam, 600 MW Kameng Hydro Power Station, Arunachal Pradesh

CHAPTER 04

GENERATION & POWER SUPPLY POSITION

1. GENERATION

Total Electricity generation including from Renewable Sources during the current year 2021-22 (Upto January 2022) is about **1234.298 BU** as against 1137.851 BU during the same period last year showing a **growth of 8.5%**.

- The electricity generation from **Fossil Fuel Sources** in the country during 2021-22 (Upto January 2022) is **913.193 BU** as against the generation of **834.109 BU** during corresponding period previous year showing the **growth of 9.5%**. **Coal based** power generation during 2021-22 (Upto January 2022) is **850.845 BU** showing **growth of 11.2%** over the previous year same period.
- Electricity generation **from Renewable Sources (Non-Hydro)** during 2021-22 (Upto January 2022) is **141.280 BU** as against the generation of 123.428 BU during corresponding period previous year showing **growth of 14.5%**. **Wind based** generation is **61.400 BU** showing **growth of 14.2%** and Solar based generation is 57.394 BU showing **growth of 19.0%**.
- Share of RE Generation (Including Hydro)** in Total Generation has been **increased to around 22.9%** during 2021-22 (Upto January 2022) and Share of **Non-Fossil Generation** in Total Generation has been **around 26.0%**.

The total electricity generation in the country increased from 624.2 Billion Unit (BU) during 2005-06 to 1234.3 BU during the year 2021-22 (Upto January 2022). The overall electricity generation in power utilities in the country including import from Bhutan since 2005-06 is as under:

(in Billion Unit)

Year	Generation from Fossil Fuel	Generation from Non-Fossil Fuel	Total Generation
2005-06	497.2	126.9	624.2
2006-07	527.5	144.8	672.4
2007-08	559.0	170.7	729.7
2008-09	590.1	161.6	751.7
2009-10	640.9	167.6	808.5
2010-11	665.0	185.4	850.4
2011-12	708.8	219.3	928.1
2012-13	760.7	208.8	969.5
2013-14	792.5	227.7	1020.2
2014-15	878.3	232.1	1110.4
2015-16	943.8	229.8	1173.6

2016-17	994.2	247.5	1241.7
2017-18	1037.1	271.1	1308.1
2018-19	1072.2	303.9	1376.1
2019-20	1042.7	346.4	1389.1
2020-21	1032.5	349.3	1381.9
2021-22 (Upto Jan.)	913.2	321.1	1234.3

2. PLANT LOAD FACTOR (PLF)

The Plant Load Factor (PLF) of Thermal Power Stations (TPSs) is an index of utilization of the installed capacity. The average PLF of TPSs of Power Utilities during the year 2021-22 (upto January 2022) was 57.5%. The sector-wise and overall PLF since beginning of 9th Plan was as under:

Year	Central	State	Private	Overall
1997-98	64.7	70.4	60.9	71.2
1998-99	64.6	64.6	60.7	68.0
1999-00	67.3	67.3	63.7	68.9
2000-01	74.3	65.6	73.1	69.0
2001-02	74.3	67.0	74.7	69.9
2002-03	77.1	68.7	78.9	72.1
2003-04	78.7	68.4	80.5	72.7
2004-05	81.7	69.6	85.1	74.8
2005-06	82.1	67.1	85.4	73.6
2006-07	84.8	70.6	86.3	76.8
2007-08	86.7	71.9	90.8	78.6
2008-09	84.3	71.2	91.0	77.2
2009-10	85.5	70.9	82.4	77.5
2010-11	85.1	66.7	76.7	75.1
2011-12	82.1	68.0	76.2	73.3
2012-13	79.2	65.6	64.1	69.9
2013-14	76.1	59.1	62.1	65.6
2014-15	74.0	59.8	60.6	64.5
2015-16	72.5	55.4	60.5	62.3



2016-17	72.0	54.3	55.7	59.9
2017-18	71.4	55.1	55.2	59.8
2018-19	72.6	57.8	55.2	61.1
2019-20	64.2	50.2	54.6	56.0
2020-21	63.4	46.2	54.7	54.5
2021-22 (Upto Jan.)	68.2	52.3	53.1	57.5

3. Power Supply Position:

The Energy Availability in the country has increased from 390330 Million Unit (MU) during 1997-98 to 1025706 MU during the current year 2021-22 (Upto December 2021). During the year 2021-22 (Upto December 2021), Energy Shortage has been 0.4%.

The Peak Demand Met in the country has been increased from 58042 MW during 1997-98 to 203014 MW during the current year 2021-22 (Upto December 2021). During the year 2021-22 (Upto December 2021), Peak Shortage has been 1.2%.

The power supply position since beginning of 9th Plan was as under.

- Energy Requirement and Availability – Over the years :

Year	Energy Requirement	Energy Availability	Energy Shortage	
	(MU)	(MU)	(MU)	(%)
1997-98	424505	390330	34175	8.1
1998-99	446584	420235	26349	5.9
1999-00	480430	450594	29836	6.2
2000-01	507216	467400	39816	7.8
2001-02	522537	483350	39187	7.5
2002-03	545983	497890	48093	8.8
2003-04	559264	519398	39866	7.1
2004-05	591373	548115	43258	7.3
2005-06	631554	578819	52735	8.4
2006-07	690587	624495	66092	9.6
2007-08	737052	664660	72392	9.8
2008-09	777039	691038	86001	11.1
2009-10	830594	746644	83950	10.1
2010-11	861591	788355	73236	8.5
2011-12	937199	857886	79313	8.5
2012-13	995557	908652	86905	8.7
2013-14	1002257	959829	42428	4.2

2014-15	1068923	1030785	38138	3.6
2015-16	1114408	1090850	23558	2.1
2016-17	1142929	1135334	7595	0.7
2017-18	1213326	1204697	8629	0.7
2018-19	1274595	1267526	7070	0.6
2019-20	1291010	1284444	6566	0.5
2020-21	1275534	1270663	4871	0.4
2021-22 (Upto Dec.)	1030128	1025706	4423	0.4

- Peak Demand and Peak Met – Over the years :

Year	Peak Demand	Peak Met	Peak Shortage	
	(MW)	(MW)	(MW)	(%)
1997-98	65435	58042	7393	11.3
1998-99	67905	58445	9460	13.9
1999-00	72669	63691	8978	12.4
2000-01	78037	67880	10157	13.0
2001-02	78441	69189	9252	11.8
2002-03	81492	71547	9945	12.2
2003-04	84574	75066	9508	11.2
2004-05	87906	77652	10254	11.7
2005-06	93255	81792	11463	12.3
2006-07	100715	86818	13897	13.8
2007-08	108866	90793	18073	16.6
2008-09	109809	96785	13024	11.9
2009-10	119166	104009	15157	12.7
2010-11	122287	110256	12031	9.8
2011-12	130006	116191	13815	10.6
2012-13	135453	123294	12159	9.0
2013-14	135918	129815	6103	4.5
2014-15	148166	141160	7006	4.7
2015-16	153366	148463	4903	3.2
2016-17	159542	156934	2608	1.6
2017-18	164066	160752	3314	2.0
2018-19	177022	175528	1494	0.8
2019-20	183804	182533	1271	0.7
2020-21	190198	189395	802	-0.4
2021-22 (Upto Dec.)	203014	200539	2475	-1.2

CHAPTER 05

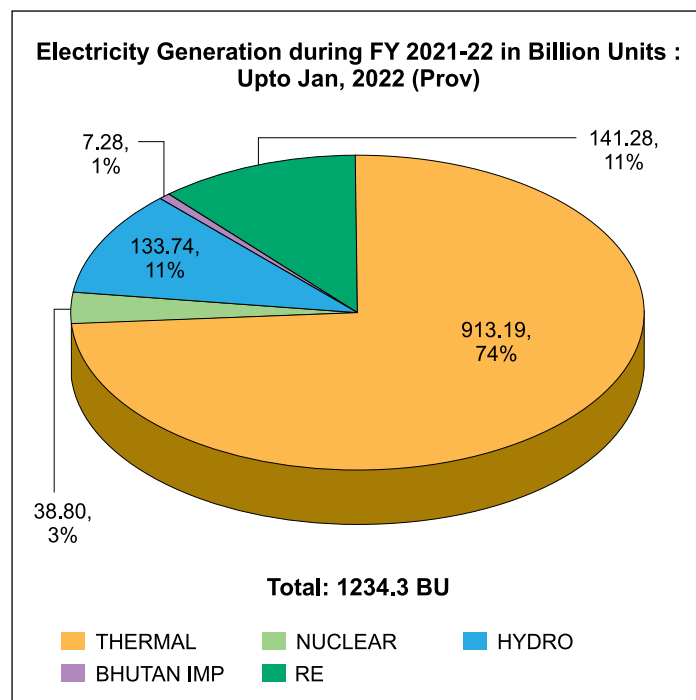
THERMAL POWER

Thermal Power Generation:

While India is committed to its goal for energy transition, in medium term transition phase thermal generation would play a great supportive role in achieving the goal in most reliable and economic way. The goal toward energy transition needs to be achieved by following a Just transition path with thermal power generation contribution in achieving affordable energy access for the general public along with secure and reliable operation of integrated National grid.

During Financial Year 2021-22, the power demand in the country crossed 200 GW and thermal generation enabled the country to meet the increased electricity requirement in post Covid recovery phase. Policy of Ministry of Power Government of India to keep a diversified portfolio of generating resources rather than depending upon on single technology or source helped the country in meeting demand of Electricity.

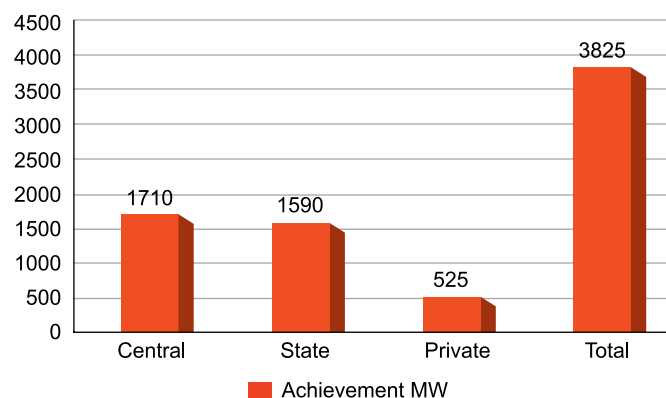
During 2021-22 (upto January, 2022) the contribution of Thermal Generation was 74%. Out of total Electricity Generation of 1234.3 BU, thermal power contributed 913.19 BU.



Thermal Capacity Addition during FY 2021-22:

During FY 2021-22 till 31.1.2022, Thermal Capacity addition of 3825 MW was achieved and seven Thermal power generation units were added.

Thermal capacity Achievement in FY 2021-22 (As on 31.01.2022) in MW



Following Units have been commissioned during this year :

S. No.	Generating Station/ Unit	Sector	MW	Date of Commissioning
1.	Darlipalli U#2	Central	800	21.7.2021
2.	Barh St I U#1	Central	660	30.10.2021
3.	Nabi Nagar U#4	Central	250	10.11.2021
4.	Suratgarh U#8	State	660	6.10.2021
5.	Tuticorin St IV U#1	Private	525	30.11.2021
6.	Bhadradi U#4	State	275	9.1.2022
7.	Harduaganj Exp U#1	State	660	29.1.2022
			3825	

CENTRAL SECTOR THERMAL POWER PROJECTS

NTPC Barh St-I (3x660 MW)





PRIVATE SECTOR THERMAL POWER PROJECT
Tuticorin TPP (1x525 MW)



STATE SECTOR THERMAL POWER PROJECTS

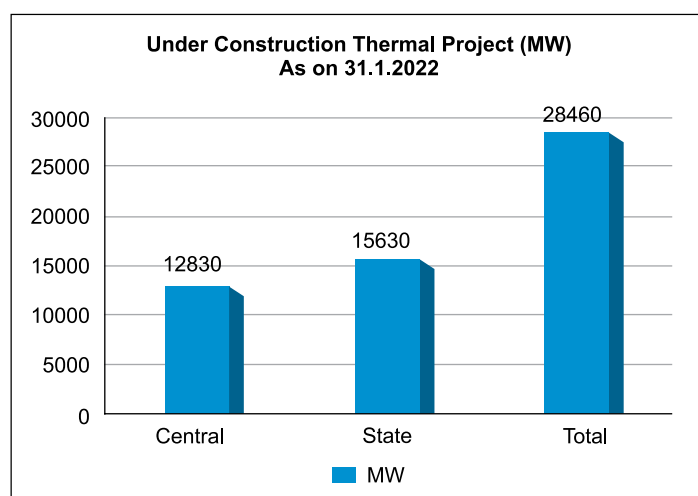
Harduaganj TPP Extn II (1x660 MW)-UP





Under-construction Thermal capacity:

As on 31.1.2022, about 28460 MW capacity is under construction on which work is under progress and which is likely to be commissioned during next few years.



The list of under construction thermal projects and anticipated date of their trial run (Commissioning) is enclosed as Annexure.

Future Planning of Thermal Generation Capacity:

Central Electricity Authority during Feb, 2020 published a report on the Generation Capacity Mix for 2029-30. As per that for meeting an estimated demand of 340 GW during 2030, total thermal generation capacity of 266911 MW would be required which would be about 32.7 out of total generation capacity of 817254 MW.

Keeping in view the requirement of future, the draft National Electricity Plan for 2022-27 and 2027-32, based on the decision taken in the meeting held in MOP on 22.11.2021 that **peak demand of 325 GW** would be considered for the year 2030, a study under finalization by committee for preparation of National Electricity plan indicated that, there would be requirement of 252911 MW of thermal capacity by 2031-32 which would be about 28% of total generation capacity of 897499 MW.

Environmental Initiative by Thermal Power Sector in India:

To reduce the carbon footprint and to support clean environment various proactive actions has been taken by thermal power

generation sector. These includes use of Agricultural Biomass pellets in Thermal generation, Utilization of Gypsum (a by-product of usage of FGD Technology), Installation of FGD in thermal plants and utilization of Ash generated in construction activities and other industries. Brief discussion of each initiative is given in following paras:

Use of Biomass in Thermal Power Plants

India generates lot of agro waste every year, out of which large part remains unutilized. Large quantity of agro-residue is generally burnt in the fields especially in the northern region of the country. Biomass co-firing along with coal is a method of generating carbon neutral electricity utilising India's existing coal based power infrastructure. This also has the possibility to create a substantial demand for agro-residue/ stubble thus discouraging farm burning, which is considered the major factor for air quality deterioration during winter months in north India. The biomass cofiring in TPPs would also help in reducing the carbon footprint in Electricity production from coal based power plants.

Several steps have been taken by MoP towards carbon neutral power generation from the coal based thermal power plants through biomass co-firing:

- i. In November, 2017, MoP issued policy "Biomass Utilization for Power Generation through co-firing in Coal-based power plants" wherein all fluidized bed and pulverized coal units (coal based thermal power plants) located in India were advised to endeavor to use 5-10% blend of biomass pellets made, primarily, of agro residue along-with coal after assessing the technical feasibility, viz. safety aspects etc.
- ii. A National Mission on Use of Biomass in Thermal Power Plants (NMBTPP) was established in July 2021 to expedite the utilization of biomass in thermal power plants.
- iii. In order to further promote use of biomass pellets in coal based thermal power plants, MoP revised the above policy in Oct 2021 to mandatorily co-fire suitable biomass pellets in the range of 5% to 7% in all coal based power plants depending upon their type of milling system.
- iv. To expedite the co-firing of Biomass in TPPs five specialized Sub-Groups were constituted under the aegis of NMBTPP to deal with various issues related to co-firing of biomass. These Sub-Groups have members from various Govt. institutions including academia to deal with specific issues, i.e. R&D on Characteristics of Biomass, R&D on Boiler design for biomass co-firing & safety aspects, resolution of issues related to Supply chain & Business Development, selection of designated Labs and certification bodies for testing of Agro based biomass pellets & MSW pellets, look into Regulatory framework & Economics of biomass co-firing in coal based Thermal power plants.

The co-firing of biomass pellets started at NTPC's Dadri power station in November 2019 and as on 31-01-2022 biomass co-firing has been started in 17 no of power stations (Installed capacity 25590 MW) of central, state and private utilities. The cumulative co-firing in these power stations till 31-01-2022



has been to the tune of 60545 MT. NTPC has also awarded the Long-term contract (04 years) for 4,08,800 MT supply of biomass pellets for Dadri power. Long-term contract (04 years) for several other power stations of NTPC is also under tendering stage. In total NTPC has awarded 12.35 lac MT of Biomass pellets for 20 NTPC stations and as of now total receipt of Biomass pellets at NTPC stations is 59505 MT.

Feasibility and acceptability for usage of Gypsum as a byproduct of Installation of Flue Gas Desulphurization (FGD) in Thermal Power Plants

MoEF&CC on 7th December 2015 notified new environmental norms for TPPs including SO₂ emissions. This necessitated the need for the installation of the FGDs in the TPPs. FGD Gypsum is a by-product of the operation of wet limestone based FGD systems in TPPs. About 169 GW capacity of TPPs has been identified for installation of FGD in a phased manner by 2024. Most of the capacity would be installing a wet limestone based FGD system. FGD Gypsum production will be between to the tune of 10 million TPA to 14 million TPA from 2024 onwards depending on the PLF of the TPPs. This huge quantity of FGD Gypsum which is similar to natural gypsum in its characteristics is required to be utilized in a gainful manner.

Keeping in view of the same, a Task Force has been constituted by MoP in June, 2021 for "Standards for usage of FGD Gypsum having acceptability to various end users, regulators and also evaluate hazardous nature of FGD gypsum". This Task Force comprised members from CEA, NTPC, DVC, CPRI, NCCBM, CPCB, BIS, CMA, IIT Bombay, Knauf India (erstwhile USG Boral), Saint Gobain and IIT Madras. The comprehensive testing of FGD Gypsum collected from all the available operating FGD plants of the country was conducted in the CPRI, IITB and CPCB for finalizing the standards for usage of FGD Gypsum & its hazardous nature. The sampling plan was spread over 15 days with different shifts of power plant operation. The samples were collected from available FGD operating power plants for 15 days & from different shifts to cover a large spectrum of samples. The testing's were carried out over the period up to 90 days from the receipt of the samples at various labs. ICAR-Central soil Salinity Research Institute, Karnal and NTPC Vindhyachal is also conducting a three year collaborative study to explore the reclamation potential of FGDG for rehabilitation of sodic soils.

The results of the above tests and studies conducted are encouraging and it has emerged that FGD Gypsum is a Non-Hazardous By-product and can be safely used in applications like cement manufacturing, building materials, wallboards, building plaster, reclamation of sodic soil etc. where natural gypsum is being used presently. It has been further recommended that with the increase in production of FGD Gypsum over a period of time it can gradually reduce the dependence of various industries on imported gypsum and thus would preserve Forex. CEA has also taken up with BIS to issue suitable Indian Standards in regard to usage of Gypsum in the cement manufacturing, building materials, wallboards, building plaster, reclamation of sodic soil etc. "A web portal for information on data related to production/availability of FGD Gypsum at various thermal power plants has been designed by NTPC in consultation with CEA for potential users."



NTPC Vindhyachal Power Station



Soil reclamation

Implementation of FGD in Thermal Power Stations

On December 7, 2015, the Ministry of Environment, Forest and Climate Change (MoEF&CC) introduced stricter environmental standards for coal-based TPPs under the Environment (Protection) Act, 1986. Further, MOEF&CC vide gazette notification dated 31.03.2021 categorized thermal power plants in three categories having different timelines along with the environment compensation for non-compliance as follows:

- i. **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.
- ii. **Category B** - Within 10 km radius of critically polluted areas or Non-Attainment cities as defined by CPCB. Completion timeline 31.12.2023.
- iii. **Category C** - Other than those included in category A and B. Completion timeline 31.12.2024.

Based on the 31st March 2021 notification, MoEF&CC constituted a task force comprising of representative from MoEF&CC, MOP, CEA and CPCB to categorize the thermal power plants. The taskforce has finalized the categorisation for 596 TPP units on 13.12.2021. The brief summary of aforementioned categorization along with present status of 439 thermal units till 31st January, 2022 where FGD system is being implemented and monitored by CEA/ MoP (unit-wise) has been given in table below.

Cat-egory	TOTAL No. (MW)	FGD not planned No. (MW)	FGD installed before no-tification* No. (MW)	FGD planned No. (MW)	Feasibility study not started No. (MW)	Feasibil-ity study started No. (MW)	Feasibil-ity study complet-ed No. (MW)	Tender specifica-tion done No. (MW)	NIT issued No. (MW)	Bid opened No. (MW)	Bid awarded No. (MW)	FGD commis-sioned* No. (MW)
A	79 (22949)	19 (2692)	2 (750)	58 (19507)	2 (540)	2 (1200)	16 (3985)	3 (600)	6 (1460)	7 (2842)	16 (6720)	6 (2160)
B	68 (23020)	18 (4500) \$	0	50 (18520)	0	2 (300)	4 (1620)	2 (1200)	13 (3360)	13 (5180)	16 (6860)	0
C	449 (163560.5)	106 (27295.5) \$	12 (5380)	331 (130885)	2 (1370)	8 (2780)	48 (15030)	25 (8120)	49 (20015)	61 (24750)	123 (55520)	0
TOTAL	596 (209529.5)	143 (34487.5)	14 (6130)	439 (168912)	4 (1910)	12 (4280)	68 (20635)	30 (9920)	83 (28135)	81 (32772)	155 (69100)	6 (2160)

* Commissioned but not meeting Norms

Assuming FGD Commissioning takes 36 months from Bid Award date

\$ 2 units (300 MW) having CFBC boiler, \$\$ 48 units (5524 MW) having CFBC boiler

There are few available FGD technology like, Dry Sorbent Injection, Semi Dry, Sea Water, Wet lime stone for controlling SO₂ in flue gas of thermal power plant. The FGD technology is being selected by Generating utilities for a particular unit on the basis of life cycle cost analysis. About 90 percent of thermal units are implementing Wet Lime Stone Based FGD (WLF GD) as it is economical. The construction time of WLF GD is about 30 -36 months, however orders placed by a major central power utility as early as in 2018 for 26 FGD units for a total capacity of 15 GW have on an average completed a time period of over 40 months, and some units have completed 47 months since the award, but no FGD unit has been commissioned so far due to the pandemic Covid-19. The project cost for wet lime based FGD technology is varying between rupees 0.39 crore to 1.10 crore per MW, which is quite high, around 2.8 times presumably due to demand supply gap in FGD market.



FGD system installed at NTPC Vindhyachal TPS

Utilisation of Fly Ash :

Coal/Lignite based Thermal Power Generation has been the backbone of power capacity addition in the country. Indian coal is of low grade with ash content of the order of 30-45 % in comparison to imported coals which have a low ash content of the order of 2-15 %. A large quantity of ash is, thus being generated at Coal/Lignite based Thermal Power Stations in the country, which not only requires a large area of precious land for its disposal but is also one of the sources of pollution of both air and water.

In order to reduce the requirement of land, for the disposal of fly ash in the ash ponds, and to address the problem of pollution caused by flyash, the Ministry of Environment, Forests (MoEF) has issued various Notifications on fly ash utilization. The First Notification was issued on 14th September 1999 which was subsequently amended in the years 2003, 2009, and 2016 vide Notifications dated 27th August 2003, 3rd November 2009, and 25th January 2016 respectively. These notification prescribes the targets of Fly Ash utilization in a phased manner for all Coal/Lignite based Thermal Power Stations in the country so as to achieve 100% utilization of fly ash. Ministry of Environment, Forest and Climate Change (MoEF&CC) has now issued a revised Notification on 31st December 2021 in supersession of earlier Notifications in order to widen the scope of ash utilization.

Ash utilisation during Year 2020-21

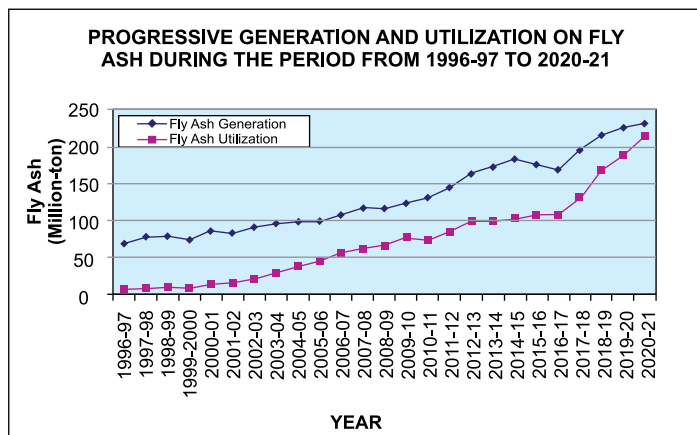
No. of Thermal Power Stations from which data was received	202
Installed capacity (MW)	209990.50
Coal consumed (Million tonnes)	686.34
Fly Ash Generation (Million tonnes)	232.56



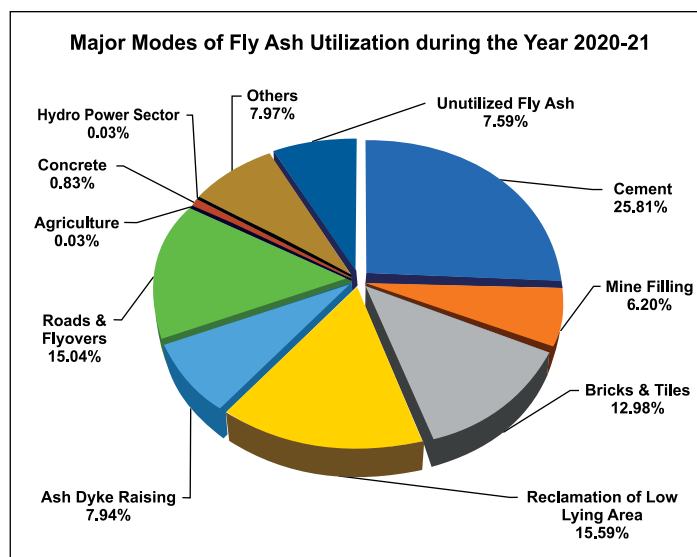
Fly Ash Utilization (Million tonnes)	214.91
Percentage Utilization	92.41
Percentage Average Ash Content (%)	33.88

The data of fly ash generation and utilization for the year 2020-21 was received from 102 Power Utilities out of which 60 Power Utilities have achieved fly ash utilization level of 100% or more. Further, 9 Power Utilities have achieved fly ash utilization level in the range of 90% to less than 100%. The information of ash utilisation is made available in public domain so as to help industry and other user to know source and quantum of ash available for disposal.

The progressive utilisation of Fly Ash since 1996-97 is showing an increasing trend and it is expected that in near future it would reach 100%.



The usage of Ash in various industries during 2020-21 is given below:



Bulk transportation of Fly Ash through Railway: To start bulk transportation of Fly Ash in closed and environment friendly manner through Railway wagons, NTPC has signed an agreement

with Indian Railway under SFTO (Special Freight Train Operator) scheme and purchased three BTAP wagon rakes. Fly ash will be transported by Bogey Tank For Alumina Powder (BTAP) rakes, which are leak proof wagons with special air fluidizing system. BOXN wagon are also being used for ash transportation in an environment friendly manner.



Fly Ash in BTAP wagnos at Rihand



Fly Ash in BOXN wagnos from Rihand



Fly Ash from Ramagundam



Fly Ash in bags from Kahalgaon

Source: NTPC website

Flexible Operation of Thermal Power Stations

Flexible operation at 55% MTL (Minimum Technical Load)

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). 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%, 45%, 50% and 60% of the total fleet compliant of 55% MTL from year 2020 to 2024.

KPI (Key Performance Indicators) Targets vis-à-vis Achievement as on 21.1.2022

S. N.	Initiative	Scheme / Program	Parameters	Requires change in law (yes/no)	Unit of measurement	Key Performance Indicators (KPI)					
						2020	2021	2022	2023	2024	
						20%	30%	45%	50%	60%	Target
1	Flexible Generation: Reduction in Technical minimum limits and improvement in Ramp rates	Flexibilisation of Thermal Power Plants by CEA	Modifications in Thermal Power Plants to achieve Technical minimum up to 55% and Ramp rates	Yes, the CERC regulation need changes to reimburse the additional costs to generators for flexible operations	% fleet of installed capacity	20%	30.4%	42.51% (Upto 21.01.2022)			Achievement

Flexible operation at 40% MTL

To oversee the implementation of flexibilisation and guide the utilities, a committee of the leading stakeholders in power sector has been constituted under the aegis of CEA for lowering the technical minimum load about 40% (without oil support) of thermal generating units to facilitate smooth integration of intermittent RES generation. The committee is also finalising a Guidelines for low load operation and analysing the impact of flexibilisation on tariff. The study/test of low load operation has been conducted/being carried out on the following units till 2021-22.

S. No.	Plant	Size	Unit No.	Utility	Agency involved	Status
1	Dadri	500	2	NTPC	IGEF, BHEL, NTPC, CEA	Conducted in June 2018. Achieved 40% load & 3% ramp rate.
2	Mouda	500	2	NTPC	BHEL, NTPC, CEA	Conducted in Sept 2019. Achieved 40% load & 1.1% ramp rate.
3	Vindhyachal	500	11	NTPC	JCOAL, NTPC, CEA	Conducted on March 2019. Achieved 55% load & 1.6% ramp rate.
4	Sagardighi	500	3	WBPDC	BHEL, WBPDC, CEA	Conducted in June 2019. Achieved 40% load & 2.6% ramp rate.
5	Ukai	500	6	GSECL	USAID, GSECL, BHEL, CEA	Conducted in March 2020. Achieved 40% load & 3% ramp rate.
6	MRB TPS	525	1	MPL	IGEF, BHEL, MPL, CEA	Conducted in July, 2021. Achieved 36% load & 1.5% ramp rate.
7	DSTPS	500	1	DVC	IGEF, BHEL, DVC, CEA	Data/ design parameter study is under process before actual test at site.
8	Raichur TPS	210	3	KPCL	Denmark, KPCL, CEA	Data/ design parameter study is under process before actual test at site.
9	Ramagundam TPS	500	7	NTPC	Denmark, NTPC, CEA	Data/ design parameter study is under process before actual test at site.



As on 31.01.2022

Details of Active Under Construction Thermal Power Projects in the Country

S. No.	Project Name	State	Implementing Agency	Unit No	Cap. (MW)	Ant Trial Run
CENTRAL SECTOR						
1	Barh STPP-I	Bihar	NTPC	U-2	660	Oct-22
				U-3	660	Jul-23
2	Nabi Nagar STPP	Bihar	NPGCL (Subsidiary of NTPC)	U-3	660	Feb-22
3	Buxar TPP	Bihar	SJVN	U-1	660	Jun-23
				U-2	660	Dec-23
4	North Karanpura STPP	Jharkhand	NTPC	U-1	660	Apr-22
				U-2	660	May-23
				U-3	660	Jan-24
5	Patratu STPP	Jharkhand	PVUNL(JV of NTPC & Jharkhand Bidyut Vitran Nigam Ltd.)	U-1	800	Feb-24
				U-2	800	Aug-24
				U-3	800	Feb-25
6	Rourkela PP-II Expansion	Odisha	NSPCL(JV of NTPC & SAIL)	U-1	250	Jan-22
7	Ghatampur TPP	Uttar Pradesh	NUPPL (JV of NLC and UPRVUNL)	U-1	660	Aug-22
				U-2	660	Feb-23
				U-3	660	Jun-23
8	Khurja SCTPP	Uttar Pradesh	THDC	U-1	660	Jan-24
				U-2	660	Jul-24
9	Telangana STPP St- I	Telangana	NTPC	U-1	800	Jul-22
				U-2	800	Oct-22
Total Central Sector					12830	
STATE SECTOR						
1	Dr. Narla Tata Rao TPS St-V	AP	APGENCO	U-1	800	Apr-22
2	Sri Damodaram Sanjeevaiah TPP St-II	AP	APPDCL (JV of APGENCO & ILFS)	U-1	800	Jan-22
3	Jawaharpur STPP	Uttar Pradesh	UPRVUNL	U-1	660	Apr-23
				U-2	660	Oct-23
4	Obra-C STPP	Uttar Pradesh	UPRVUNL	U-1	660	Oct-22
				U-2	660	May-23
5	Panki TPS Extn.	Uttar Pradesh	UPRVUNL	U-1	660	May-23
6	Ennore SCTPP	TN	TANGEDCO	U-1	660	Mar-23
				U-2	660	Apr-23
7	North Chennai TPP St-III	TN	TANGEDCO	U-1	800	Oct-22

8	Uppur Super Critical TPP *	TN	TANGEDCO	U-1	800	On hold *
				U-2	800	On hold *
9	Udangudi STPP Stage I	TN	TANGEDCO	U-1	660	May-23
				U-2	660	Jul-23
10	Yadadri TPS	Telangana	TSGENCO	U-1	800	Feb-23
				U-2	800	Mar-23
				U-3	800	Apr-23
				U-4	800	May-23
				U-5	800	Jun-23
11	Yelahanka CCPP	Karnataka	KPCL	GT+ST	370	Mar-22
12	Bhusawal TPS	Maharashtra	MAHAGENCO	U-6	660	Dec-22
13	Sagardighi Thermal Power Plant Ph-III	West bengal	WBPDL	U-1	660	Jan-24
Total State Sector					15630	
Grand Total					28460	



2000 MW Subansiri Lower Project (Arunachal Pradesh) - Dam Under Construction

CHAPTER 06

HYDRO POWER

Hydro Power has been a mainstay of the Indian Power sector for long. However, the importance of hydro power has a renewed emphasis due to the changing energy mix of India. Hydro power is critical in India's response to the challenge of meeting the energy needs of an aspiring population even as climate change issues are also addressed.

Government of India has set an ambitious target for enhancement of non-fossil fuel Energy capacity to 500 GW by 2030 (as announced in the COP26 Summit in Glasgow by the Hon'ble Prime Minister of India). The commitment regarding non-fossil fuel capacity is proposed to be met mainly from installation of Solar and Wind power capacities, which are infirm sources of power, i.e. the generation from these sources varies significantly with the change in the weather conditions (availability of wind and sunshine). With the increased share of intermittent Renewables in the energy mix of the country, the existing flexibility in Generation of power may not be sufficient to meet the balancing requirement in the electricity grid and the stable operation of Grid for ensuring 24x7 Power-for-All will be definitely more challenging than ever before. Thus, Hydro Power, which has unique features like quick ramping, black start capability etc. can play a very useful role in complementing renewable source of power and in stabilizing/ balancing the grid.

In light of the above, development of Hydro Power and the Hydro Pumped Storage projects is of paramount importance and is aptly suited for achieving above goals, as it is clean, green, sustainable, renewable, non-polluting and environmental friendly. Hydro projects improve quality of life in remote hilly and backward areas by accruing incidental benefits of electrification, industrialization & road/rail communication development. It promotes conservation

of fossil fuel and provides escalation free & cheapest energy in long run. It has the ability for instantaneous starting, stopping and load variation, thereby ideally suited for peaking and balancing operation and improves reliability of power system.

Storage projects increase lean season flows, provide flood control, navigation, irrigation and drinking water supply benefits etc. and thus help in the maximum utilization of scarce water resources. Projects like Hirakund & Bhakra Dam have added to increased Agriculture Productivity and have been behind the success of Green Revolution in India while the role of Tehri Dam in mitigating the 2013 Uttarakhand disaster floods is well known.

Hydro projects also have a long useful life. Some projects like Bhakra are in operation for last 50 years, while some others like Pykara (59.2 MW) & Mettur Dam (50 MW) in Tamil Nadu, Pallivasal (37.5 MW) in Kerala and Sivasamudram (42 MW) in Karnataka etc., are in existence for more than 70-80 years now.

Installed Capacity and Generation Performance of Hydro-Electric Stations:

Installed Capacity – Sector-wise

Sector	Total	
	No.	MW
Central	42	15646.7
State	146	27114.5
Private	21	3751
Total	209	46512.20

Installed Capacity – Operational category-wise

Sector	RoR		RoR (P)		Storage (S)						Total	
	No.	MW	No.	MW	S(P)		S(MPP)		PSS		No.	MW
					No.	MW	No.	MW	No.	MW		
Central	8	2115.50	19	7263.0	6	1765.00	9	4543.2	0	40.0	42	15646.7
State	15	892.15	50	7590.0	32	6479.65	43	7557.1	7	4595.6	147	27114.5
Private	4	712.00	13	2592.0	3	297.00	0	0.0	1	150.0	21	3751
Total	27	3719.65	82	17445.0	41	8501.65	52	12100.3	8	4745.6	209*	46512.20

* - Total No. of HE Stations are 209 as Nagarjuna Sagar has 1 conventional and remaining 7 PSS units.

Abbreviations: RoR - Run of River, RoR(P) – Run of River with Pondage, S(P) – Storage (Purely Power), S(MPP) – Storage (Multipurpose Project), PSS – Pumped Storage Scheme

Generation (BU)

	Actual Generation in BU (% of Target)							
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
All India	129.24 (103.98 %)	121.37 (94.83 %)	122.37 (91.33 %)	126.12 (89.20%)	134.89 (103.76%)	155.77 (113.7%)	150.30 (107.1%)	126.39* (101.58%)

* As on 31st Dec, 2021 (tentative).



Hydro Capacity Addition:

Sector-wise Hydro Capacity Addition in the last few years is as under:-

S. No.	Year	Central Sector (MW)	State Sector (MW)	Private Sector (MW)	Total (MW)
1	2015-16	480	610	426	1516
2	2016-17	80	1555	24	1659
3	2017-18	390	200	205	795
4	2018-19	110	30	-	140
5	2019-20	300	-	-	300
6	2020-21	300	111	99	510
7	2021-22	-	-	213	213
Grand Total		1660	2506	967	5133

Year-wise anticipated commissioning schedule of Hydro projects presently under construction is as under:-

Year	2021-22	2022-23	2023-24	2024-25	2025-26	Total
Capacity Under Construction (MW)	300*	2060	4057.5	2961	3285	12663.5

* Rongnichu HEP (113 MW) & Sorang HEP (100 MW) have already been commissioned in 2021-22 till 31.12.2021.

A few of the salient features of Hydro Power in India is as follows:

- Out of total Installed Capacity of the country ~ 393 GW, share of hydro power ~ 11.8%
- Generation from hydro power plants during 2020-21 ~ 150 BU.
- Hydro Capacity addition beyond in the recent years- 795 MW during 2017-18, 140 MW in 2018-19, 300 MW in 2019-20 and 510 MW in 2020-21.
- Capacity under construction – 12663.5 MW which is likely to be commissioned by 2025-26.

Hydro Capacity Addition by 2030:

Considering the unique advantages of hydropower (including Pump Storage Projects) and the increasing need of hydropower for grid stability/balancing, the Government has targeted to add 73 no. of hydro schemes with an aggregate Installed capacity of around 30,000 MW (including 13 no. of Pumped Storage Schemes of 12730 MW) which also includes 12663.5 MW of Hydro Electric projects under construction for providing benefits during the period 2019-20 to 2029-30.

Reforms in Hydro Power Sector:

Government Policy Measures to promote Hydro Power Sector - March 2019

Govt. of India in March 2019 approved number of measures for promoting hydro power sector, which are as under:

- Declaring Large Hydro Power (LHPs) (> 25 MW projects) as Renewable Energy source.
- Hydro Purchase Obligation (HPO) as a separate entity within Non-solar Renewable Purchase Obligation (RPO).
- Tariff rationalization measures for bringing down hydro power tariff.
- Budgetary Support for Flood Moderation/Storage Hydro Electric Projects (HEPs).
- Budgetary Support to Cost of Enabling Infrastructure, i.e. roads/bridges.
 - Rs. 1.5 crore per MW for projects upto 200 MW.
 - Rs. 1.0 crore per MW for projects above 200 MW.

As a result of these measures, the capital cost as well as the project tariff would be reduced in initial years which would improve project viability & saleability.

Guidelines to reduce the incidence of time and cost overruns in Hydro Power Projects

Construction of Hydro Electric Projects usually gets delayed on account of various reasons resulting in Time and Cost overrun. Guidelines to reduce the incidence of time and cost overruns in hydro power projects were issued on 08.11.2019 for strict compliance by CPSUs. These guidelines covered various aspects viz. realistic scheduling, usage of software tools, concept of sunset date, listing critical/ non critical works, delegation of power, timely settlement of claims, adoption of international best practices, resource mobilization, dispute resolution, incentivizing labour on achieving project milestones in time, etc.

Dispute Avoidance Mechanism through 'Independent Engineer'

A Dispute Avoidance Mechanism through 'Independent Engineer' has been put in place for avoidance of contractual disputes in hydro projects executed by CPSUs under MoP at the inception stage itself. Ministry has prepared a panel of domain experts with high level of integrity and proven track record. The CPSE & Contractor shall jointly select one Member from the panel of experts for each package of works. The Expert would be designated as 'Independent Engineer' (IE) for each contract.

Dispute Resolution through Conciliation - Constitution of Conciliation Committee of Independent Experts (CCIE)

Government has decided to constitute three (3) Conciliation Committees of Independent Experts (CCIE), for settlement of disputes through Conciliation for Contractual Disputes in Projects implemented by CPSUs / Statutory Bodies under the administrative control of Ministry of Power. Each CCIE shall have three members having high level of integrity and proven track record.

Other recent Policy Measures by GoI:

- Hydropower Purchase Obligation (HPO) trajectory has been notified on 29.01.2021 and varies from 0.18% to 2.82% for the period of 2021-22 to 2029-30 respectively. The above HPO trajectory shall be trued up based on annual basis depending upon the revised commissioning schedule of hydro Projects.
- Guidelines for Budgetary Support for Flood Moderation/Storage Hydro Electric Projects (HEPs) and towards Cost of Enabling Infrastructure, i.e. roads/bridges have also been notified on 28.09.2021.
- Waiver/ reduction in transmission charges for PSPs commissioned up to 30.06.2025 have been notified by Govt. vide MoP order dated 21.06.2021.
- Scheme for bundling of Hydro Power with Renewable Energy has been notified vide MoP order dated 15.11.2021.
- MoP vide order dated 22.12.2021 has done the basin wise allocation of Hydro Electric Projects in Arunachal Pradesh to the Hydro CPSUs [NHPC, SJVN, THDC & NEEPCO] for carrying out suitable analysis and preparing evaluation reports on the projects indicated. Besides, following regions have also been identified to be pursued for Hydro Projects by the respective CPSUs:-

Uttarakhand	- THDCIL
Himachal Pradesh	- SJVNL
UT of Jammu & Kashmir and Ladakh	- NHPC, except Ujh HEP by NEEPCO
- An Evaluation Committee for facilitating takeover of Stalled Hydro Projects has been constituted on 04.01.2022 under the chairmanship of CMD, PFC to ensure appropriate valuation of the Hydro projects stalled at initial stage and sought to be taken over by CPSUs.



Arun-3 HEP (900 MW) - Coffer Dam Area Construct

Revival of Hydro Sector:

Through untiring efforts of the Government, a number of stalled projects have been revived. Further, few other projects have taken off due to the persistence efforts of the Government in this regard. List of such hydro projects is as under:

- Teesta III (1200 MW)** in Sikkim- The works on the project were held up since September, 2014 due to funds constraints. Works re-started in October, 2015 and the project was commissioned in 2017.
- Subansiri Lower (2000 MW)** of NHPC in Arunachal Pradesh was stalled since 2011. Works restarted after NGT case was dismissed on 31.07.2019. The project is likely to be commissioned during 2023-24. Two units of project (250 MW each) are likely to be commissioned by August 2022.
- Teesta VI (500 MW)** in Sikkim was allotted to LANCO but was stalled since 2012. It has been revived through NHPC's bid in NCLT in 2019. CCEA has approved the investment of Rs. 5748.04 crore. The project is under construction.
- Rangit IV (120 MW)** in Sikkim was originally allotted to Jal Power Corporation Ltd (Private Sector) and was stalled since October, 2013. The project has been revived through NHPC's bid in NCLT and NHPC has taken over Jal Power Corporation Ltd. on 31.03.2021. The project is under construction.
- Ratle HEP (850 MW)** in J&K, was originally allotted to GVK and was stalled since 2014. It was revived after an MoU was signed amongst NHPC, JKSPDC and PDD, J&K. CCEA clearance for the project was accorded in Jan' 2021.

It can be seen that the hydro power is being given its due importance given its niche role in the energy mix. The right framework in which viable projects required from the perspective of maintaining a stable grid and providing power at the time of the day it is required get selected for execution is being promoted.



Luhri Stage-1 HEP (210 MW) - Diversion Tunnel Construction



220 kV Transmission system from Srinagar to Leh

CHAPTER 07

TRANSMISSION

Transmission system plays an important role in supply of power to the consumers through the vital link between the generating stations and the distribution system. The energy resources like coal, hydro and renewable are unevenly distributed in India. Coal reserves are mainly available in Central and Eastern part of the country, whereas hydro energy resources are primarily available in Himalayan Range in the Northern and North-Eastern parts. Renewable resources like wind and solar potential are also mainly concentrated in states like Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, Maharashtra, Gujarat & Ladakh etc. The major load centres of the country are located in central part including Northern, Western and Southern regions. This skewed distribution of resources necessitated development of robust transmission system including establishment of inter-regional corridors for seamless transfer of power from surplus to deficit regions/areas. In this process, it enables access to power generation from anywhere in the country to various consumer spread throughout the country.

The transmission system has expanded over the years for evacuation of power for evacuation of power from generating stations to load centre through Intra State and Inter State Transmission System. The progressive integration of regional grids started in 1992, and on 31st December 2013, our country achieved 'ONE NATION'- 'ONE GRID'- 'ONE FREQUENCY' with synchronous interconnection of Southern Region Grid with rest of the Indian Grid with the commissioning of 765kV Raichur-Solapur Transmission line. However, there were constraints in market operation due to transmission congestion resulting into market splitting and different market prices in different regions. During 2013-14, about 16% of electricity transacted through power exchanges was constrained due to transmission congestion. Further, strategically important Ladakh region was not interconnected with national electricity grid.

The present Government after assuming power in 2014, has given emphasis to have congestion free transmission network, so that there is no constraint in flow of power from surplus region to deficit region. Accordingly, transmission system in the country has been continuously strengthened with addition of transmission lines and inter-regional capacity as under:

	Addition in Transmission line (ckm)	Addition in Transformation capacity (MVA)
FY 2014-15	22,101	65,554
FY 2015-16	28,114	62,849
FY 2016-17	26,300	81,816
FY 2017-18	23,119	86,193
FY 2018-19	22,437	72,705

FY 2019-20	11,664	68,230
FY 2020-21	16,750	57,575
FY 2021-22 (till Dec 21)	10,619	54,298
Total	1,61,104	5,49,220

With the above transmission capacity addition, the country has become one of the largest synchronous interconnected electricity grids in the world with 4,52,440 ckm of transmission line and 10,79,766 MVA of transformation capacity. Besides, our inter-regional capacity increased by whopping 212% to 1,12,250 MW since 2014.

The above transmission capacity addition has benefitted in development of power sector in the country. Some of the major ones are as under:-

- Transmission Congestion, experienced earlier in 2014, along with market splitting has become a rarity now, resulting into discovery of single price across the power market. Volume of electricity that can not be cleared in Power Exchanges as percentage of Unconstrained Clear Volume has reduced to only 0.06% in 2020-21 as compared to 16% in 2013-14.
- High Altitude border areas of Ladakh got interconnected with national electricity grid in January 2019 with the commissioning of 220 kV Srinagar-Leh line. This helped the people of Ladakh to get access to 24x7 quality power from the national Grid.
- Transmission and Distribution infrastructure of our North Eastern States including Sikkim are strengthened with implementation of two Central Sector Schemes namely, North Eastern Regional Power System Improvement Project (NERPSIP) and Comprehensive Scheme for strengthening of Transmission & Distribution in Arunachal Pradesh and Sikkim. Implementation of these Schemes would improve the reliability of State Electricity Grids of North Eastern Region and enable the end-consumers to draw 24x7 power from the Grid.
- Transmission System is playing a catalyst role in energy transition of our country, by extending the grid to renewable rich areas and facilitating the Renewable Energy projects to connect into the grid. Continuing transmission capacity addition has helped in increase of Renewable Energy (excluding hydro) by three times from 35.52 GW in 2014-15 to 104.88 GW in 2021-22.
- This huge transmission capacity has facilitated seamless transfer of power from power surplus regions/areas to power deficit regions/areas and thus optimizing the use of generation resources as well as meeting the demands of end consumers



without any transmission constraints. Peak and Energy Deficit have reduced to 0.4% in 2020-21 in comparison to more than 4% in 2013-14.

Transmission Planning

Planning of Inter State Transmission System (ISTS) is done by Central Transmission Utility (CTU) and Central Electricity Authority (CEA) in consultation with stakeholders including State Transmission Utility (STU), while planning of Intra-State Transmission System is carried out by STU in consultation with stakeholders with CTU and CEA. The major inputs for ISTS planning are demand projection by CEA in the form of Electric Power Survey (EPS), capacity addition program, National Electricity Plan of CEA, Open Access applications, Operational feedback etc. The process followed for ISTS planning consists of various steps as given below:

- a) Exhaustive System Studies & Component Modelling for evolution of Transmission System;
- b) Assessment based on Transmission Planning Criteria of CEA;
- c) Consultation of scheme with stakeholders in the Regional Power Committee (RPC) and Connectivity/ LTA meeting of respective region;
- d) Recommendation of the ISTS scheme in the National Committee on Transmission (NCT) meeting and approval of the ISTS scheme by Ministry of Power (MoP)/ NCT/ CTU based on the cost of the project along with mode of implementation.

Transmission Planning for 500 MW of non-fossil fuel by 2030

Continuing to take leadership role in climate change adaption, our Hon'ble Prime Minister of India, in the COP-26 Summit at Glassgo in November 2021, announced that India will bring its non-fossil energy capacity to 500 GW by 2030.

Renewable Energy Projects have short gestation period compared to that of transmission system. Therefore, required transmission system need to be put in place in advance, so that target of 500 GW by 2030 is achieved.

Presently, the installed capacity from Renewable Energy Resource including large hydro is 150 GW. Therefore, we need to add about 350 GW of capacity by 2030 and associated transmission system. Transmission Planning for 132.4 GW of non-fossil fuel has already been done, and there is margin in existing Inter State Transmission System due to which 33.87 MW of non-fossil fuel capacity can be set up in different States. Therefore, transmission systems for balance 183.65 GW need to be planned for achieving 500 GW target.

Ministry of New & Renewable Energy in consultation with States and based on assessment of land availability, have identified 181.5 GW of potential Renewable Capacity to be developed in 8 RE rich States to achieve 500 GW of non-fossil capacity by 2030.

A high level committee under Chairperson, Central Electricity Authority, and heads of Power Grid Corporation of India Ltd, Solar Energy Corporation of India, Central Transmission Utility of India Ltd, National Institute of Wind Energy and National Institute

of Solar Energy have been constituted to plan for requisite transmission system. The Committee is shortly going to finalise the transmission planning.

Steps taken for integration of Renewable energy

To facilitate integration of Renewable Energy capacity, following initiatives have been taken:

1. Establishment of Green Energy Corridors (GEC) and Renewable Energy Management Centres (REMCs)

To facilitate integration of large-scale envisaged renewable generation capacity addition in RE resource rich states viz. Rajasthan, Gujarat, Tamil Nadu, Maharashtra, Karnataka, Andhra Pradesh, Himachal Pradesh and Madhya Pradesh, a comprehensive plan comprising transmission as well as control infrastructure was identified as a part of "Green Energy Corridors".

It includes strengthening of Transmission infrastructure at Intra-state and Inter-state level for integration of RE sources to the grid, control infrastructure i.e. Renewable Energy Management centers (REMC) comprising of forecasting and scheduling of renewable generation to address intermittency and invariability of RE capacity at SLDC/RLDC/ NLDC level.

Inter State transmission system (ISTS) has been implemented by POWERGRID comprises about 3200 ckm high capacity lines and 6 nos. of substations (765/400/220kV- 1nos, 765/400kV-4 nos, 400/230kV- 1no.)with transformation capacity of about 17,000 MVA. The Inter state transmission scheme has been commissioned. Intra State Transmission system is being implemented by the respective state transmission utilities (STUs).

11 REMCs comprising RE forecasting & RE scheduling systems, integrated with existing SCADA co-located at SLDC/ RLDC/NLDC [Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat, Maharashtra, Madhya Pradesh & Rajasthan, SRLDC, WRLDC & NRLDC & NLDC] and one EMC at South Andaman have been completed by POWERGRID. Further, one new REMC at Telangana is under advance stage of commissioning.

2. Implementation of Transmission scheme for Ultra Mega Solar Power Parks

A comprehensive transmission scheme for evacuation of about 20,000 MW envisaged ultra mega solar power parks has been evolved. Transmission system for seven (7) solar parks (about 6500 MW) viz. Ananthapur (1500 MW), Pavagada (2050 MW), Rewa (750 MW), Bhadla-III (500 MW), Bhadla-IV (250 MW), Essel (750 MW), Banaskantha (700MW) has been implemented by POWERGRID. It comprises about 1,870 ckm transmission lines and 5 pooling stations with transformation capacity of about 13,500 MVA.

3. Transmission Scheme for Potential Renewable Energy Zones (REZs)

MNRE/SECI has identified potential wind/solar energy zones of 66.5 GWs in various RE rich states. Details are as below:

State	Type		Total (GW)
	Wind (GW)	Solar (GW)	
Rajasthan		20	20
Gujarat	6	10	16
Maharashtra	2	5	7
Madhya Pradesh		5	5
Karnataka	2.5	5	7.5
Andhra Pradesh	3	5	8
Tamil Nadu	3		3
Total	16.5	50	66.5

A comprehensive transmission scheme has been evolved to integrate above potential REZs which comprises about 14,300 ckm transmission line and 25 sub-stations with transformation capacity of about 119,500 MVA. The scheme is being implemented in a phased manner.

4. Transmission System for evacuation of power from Ladakh (10 GW):

During his speech on 15.08.2020, the Hon'ble Prime Minister gave a mission for setting up of 7,500 MW solar parks in Ladakh. Taking this forward, the Ministry of New and Renewable Energy (MNRE) has decided to set up RE projects (solar & wind power) of total 10,000 MW capacity in Ladakh. The Ladakh region is a cold desert with abundant land availability and solar irradiation (one of the highest in the country). Upon MNRE's request, the UT Administration of Ladakh has identified the land for the RE projects. However, there is no transmission infrastructure in the region for evacuating power from large scale RE power projects.

Subsequently, upon the directions of Ministry of Power (MoP), POWERGRID has prepared a Detailed Project Report (DPR) for power evacuation and grid integration of the proposed 10 GW RE projects in Ladakh. After detailed deliberations, it has been observed that 5 GW transmission link from Pang to Kaithal along with 12 GWh of Battery Energy Storage System (BESS) will be able to evacuate 13 GW of Renewable Energy (9 GW of Solar and 4 GW of Wind) power from Ladakh and also lead to optimum utilisation of transmission capacity.

An interconnection has been planned from Pang RE project (in Leh) with existing Ladakh grid so as to ensure reliable power supply to the Ladakh region as well as Jammu & Kashmir. In view of the complex terrain and adverse climatic conditions, state-of-the-art Voltage Source Converter (VSC) based High Voltage Direct Current (HVDC) system and Extra High Voltage Alternating Current (EHVAC) system are proposed to be set up under the scheme. Further, in order to take care of 24x7 power supply to VSC terminal in Ladakh as well as to ensure some power flow over HVDC corridor to avoid icing on line and to keep the line charged during the period of no generation, a battery energy storage system of 1 GWh capacity will be developed as part of transmission project.

The total estimated cost of transmission project along with 1 GWh of BESS is Rs. 24,659.20 crore (excluding IDC). The transmission system will be implemented over a period of approx. 5 years, due to extreme climatic conditions & limited working time in Ladakh. Central Government is considering a proposal to provide central grant amounting to 40% of the project cost to reduce the burden of transmission charges on the user of this RE power.

Interconnection with Neighbouring Countries

India, being centrally placed in South Asian region and sharing political boundaries with SAARC and BIMSTEC countries namely, Nepal, Bhutan, Bangladesh, Sri Lanka, Afghanistan, Pakistan and Myanmar, has been playing a major role in facilitating planning of interconnections with many of these countries for effective utilization of regional energy resources in South-Asian region. This shall give rise to mutual cooperation amongst neighbouring nations and resource sharing in the region. This will also ensure Energy Security of the entire region.

The cumulative power transfer capacity through cross-border interconnections with neighbouring countries is about 4,230 MW, the same would be enhanced by about 4020 MW resulting in total of about 8250 MW as per the details given below:

Interconnections	Present Capacity (MW)	Future Capacity (MW)
India – Bhutan	2070	4290
India – Bangladesh	1160	1160
India – Nepal	1000	2800
India – Myanmar	3	3
Total (approx.)	4233	8253

In addition to above, various high capacity 400 kV and 765 kV cross-border interconnections are under implementation and planning stages, which would facilitate additional power transfer capacity with neighbouring countries. Interconnections with neighbouring countries are briefly given herein below.

A. India - Nepal

Nepal has been interconnected with India at various places through 11 kV, 33 kV and 132 kV lines radially, importing power from India to the tune of 350 MW. Further, transfer of bulk power, interconnection between India and Nepal 400 kV Dhalkebar (in Nepal) – Muzaffarpur (in India) D/C transmission line has been established at its rated voltage in Nov, 2020.

In order to facilitate reliable transfer of power between the two countries, a second high capacity 400 kV Gorakhpur (India) – New Butwal (Nepal) D/c (Quad) line is being taken up for implementation. Further, for evacuating power from Arun-3 (900MW) HEP in Nepal and other hydro projects in vicinity in future, Arun-3 HEP (Nepal) – Dhalkebar (Nepal) – Sitamarhi (India) 400 kV D/c (Quad) line is also being taken up for implementation.

B. India -Bhutan

India and Bhutan already have existing arrangements mainly for import of about 4290 MW power from Tala HEP (1020 MW), Chukha



HEP (336 MW), Kurichu HEP (60 MW), Mangdhechu HEP (720 MW) and upcoming Punatsangchu-I (1200 MW) and Punatsangchu-II (1020 MW) in Bhutan to India through various EHV lines upto 400 kV level.

Power from these HEPs in Bhutan along with other hydro project in Sikkim and NER can be transferred to other parts of India through high capacity multi terminal ± 800 kV, 6000 MW Biswanath Chariali-Alipurduar – Agra HVDC bipole line.

C. India – Bangladesh

A high capacity interconnection between India & Bangladesh exist through Baharampur (India) – Bheramara (Bangladesh) 400 kV D/c line along with 2x500 MW HVDC back-to-back terminal at Bheramara, which facilitates transfer of power of the order of 1000 MW to Bangladesh. Additional radial interconnection from Surajmaninagar in Tripura (India) to Comilla in Bangladesh has been implemented for 160 MW power transfer to Bangladesh. Thus, total power transfer capacity between the two countries is about 1160 MW.

Further, Baharampur (India) – Bheramara (Bangladesh) 400 kV D/c 2nd line for reliable supply of power through Bheramara 1000 MW HVDC link have been commissioned in 26th October, 2021. For synchronous interconnection and additional power transfer between the two countries, Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) 765 kV D/c line has been agreed.

D. India – Sri Lanka

DPR for Cross border interconnection between India and Sri Lanka through HVDC bi-pole line has been prepared and is under discussion with Srilankan side.

E. India – Myanmar

About 3 MW power is being supplied to Tamu (Myanmar) from Moreh (Manipur) through 11 kV line between the two countries. Additional low voltage interconnections from Arunachal Pradesh, Manipur, Mizoram and Nagaland to neighbouring villages of Myanmar are under discussion.

Further, India – Myanmar high capacity interconnection through HVDC Back-to-Back is also under discussion.



220 kV Drass, Ladakh Substation

Progress in Technology

Towards establishment of efficient, reliable and secure transmission system in the country, while addressing Right-of-Way (ROW) & land acquisition issues, latest technologies viz. High Voltage Direct Current (HVDC) system, Voltage Source Converter HVDC, Gas Insulated Switchgear (GIS) substations, Flexible AC Transmission System (FACTS) devices like STATCOM, SVC etc, and high temperature low sag conductors are being adopted on a large scale. India has achieved some landmarks technological feats like having the Asia's first multi-terminal ± 800 kV 6000 MW HVDC to harness renewable power from the North-East and Bhutan and for the first time in the country, +320 kV 2000 MW VSC HVDC system has been commissioned between Tamil Nadu and Kerala.

Some of the technology developments are enumerated below:

a) Ultra High Voltage AC system

Transmission licensees have designed, developed and tested pole type tower structures for 220 kV, ± 320 kV HVDC, 400 kV and 765 kV voltage levels for use in areas having severe Right-of-Way constraints. Further, compact towers like delta configuration towers and narrow based towers, which reduce the space occupied by the tower base, were developed. Tall towers and multi-circuit towers were also developed for conservation of scarce right-of-way. Application for patent of 'High Power Transmission Suspension Towers' has also been filed.

b) Tower Designs to reduce Right of Way (RoW)

Transmission licensees have designed, developed and tested pole type tower structures for 220 kV, ± 320 kV HVDC, 400 kV and 765 kV voltage levels for use in areas having severe Right-of-Way constraints. Further, compact towers like delta configuration towers and narrow based towers, which reduce the space occupied by the tower base, were developed. Tall towers and multi-circuit towers were also developed for conservation of scarce right-of-way. Application for patent of 'High Power Transmission Suspension Towers' has also been filed.



Fondation works in 400 kV Jigmeling - Alipurduar transmission line

c) Development & operationalization of condition monitoring and health assessment software tools

In the recent past, transmission licensee like POWERGRID have developed several condition monitoring and health assessment software tools in-house for effective monitoring of costly equipment and for ranking the large fleet of equipment, based on health thereby helping in efficient maintenance and procurement planning. Copyright has been granted for two of such software tools, Transformer Online Condition Monitoring System (TOCMS) and POWERGRID Asset Life Management System (PALMS). Application has also been filed for patent of 'System and Method for Health Assessment of Transformer and Reactors.'

d) Battery Energy Storage Systems

Grid scale battery energy storage systems will be the need of the hour considering the integration of large renewable energy, which has its inherent intermittency and variability. Company has carried out pilot projects on two different technologies, Advanced Lead Acid and Lithium Iron Phosphate, to evaluate the functions of Frequency Regulation and Energy Time Shift. Further, additional functionalities of Dynamic Frequency Regulation, Voltage Regulation, Renewable Power Firming etc. are also being carried out under USAID-RISE initiative.

e) Implementation of Series Reactor

Increase in interconnections and concentration of generation / loads have caused increase in short circuit level. In certain areas, these short circuit levels are reaching to the maximum capability of equipment which is in operation and it is expected to go beyond the present capability in future. To overcome this situation, POWERGRID has installed Series Reactor upto 12 ohms at Ballabgarh, Mandola and for other locations. It is in the process of installation.

f) Introduction of 800 kV Resin Impregnated paper (RIP) bushings

To prevent failure of transformers & reactors on account of bushing failures, POWERGRID has adopted 400 kV Resin Impregnated Paper (RIP) bushings instead of Oil Impregnated Paper (OIP) bushings, which resulted in significant reduction in failure of transformers & reactors. Considering the benefits accrued and feedback received on adoption and operation of RIP bushings at 400 kV voltage level Transformers and Reactors, POWERGRID has facilitated development of 800 kV RIP bushings for introduction in 800 kV Transformers and Reactors too. These bushings reduce consequential damages in an unlikely event of failure.

g) Online Transient Monitoring Systems

Online transient Monitoring Systems are being introduced at 765 kV and 400 kV substations to monitor switching and

lightning surges. This would help in analyzing condition of the substation equipment as well as investigating the causes of failures.

h) Digital Sub-stations

Moving towards complete digitalization of the Substation Automation System, POWERGRID has designed, engineered and implemented process bus based Digital Substation as a retrofitting project, in Malerkotla, a very old substation, replacing the conventional control and protection system. This helped in reducing environmental footprint with a reduction in requirement of copper cables and civil works apart from a plethora advantages during commissioning and operation.

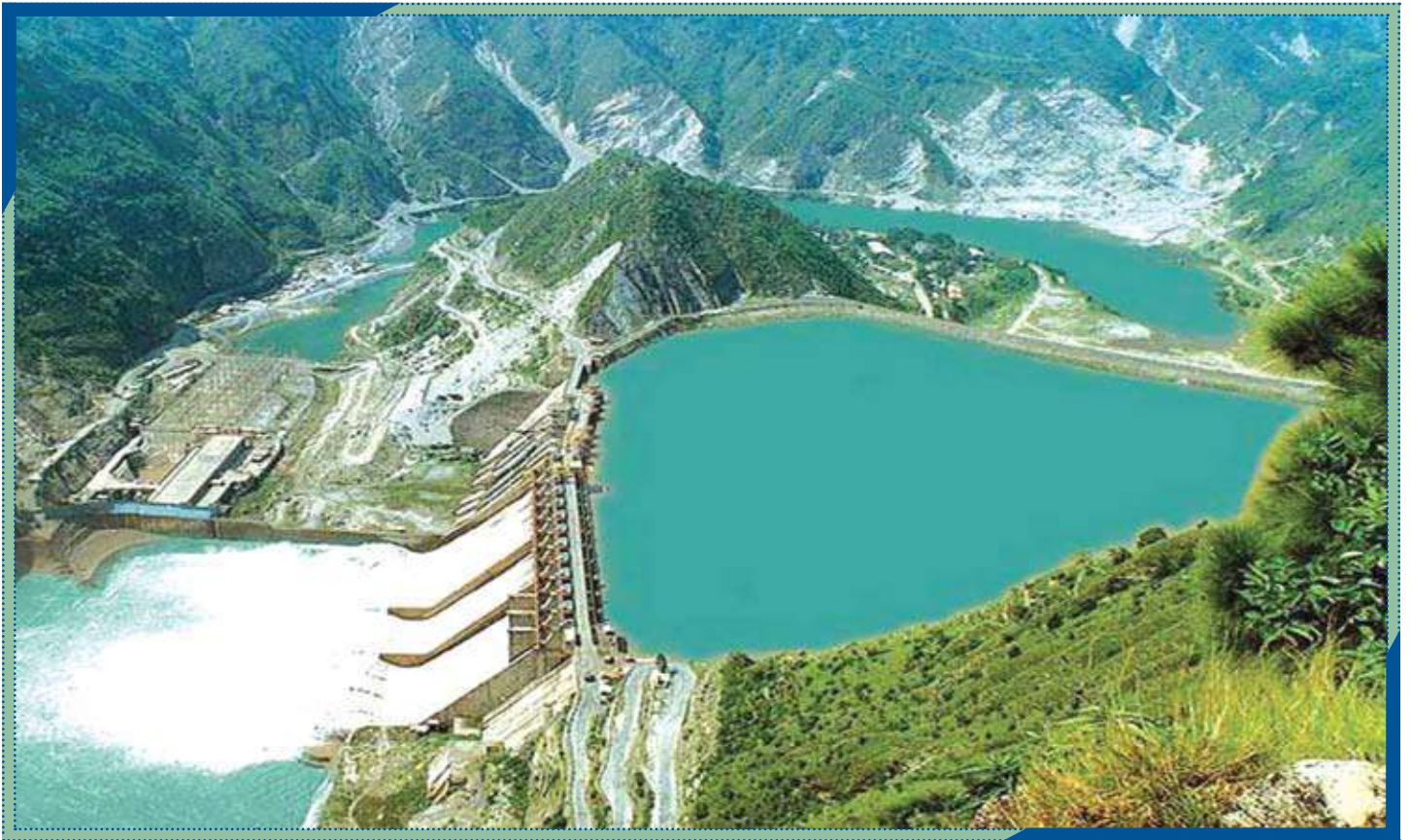
POWERGRID in collaboration with BHEL, has successfully commissioned India's first indigenously developed BHEL make 400kV Optical Current Transformer & Digital Substation components at Bhiwadi, Rajasthan.

i) Flexible AC Transmission Systems (FACTS)

Transmission licensee like POWERGRID has installed a number of state-of-the art Static Synchronous Compensators (STATCOMs) in the 400 kV grid to improve the grid reliability and voltage stability limit. POWERGRID has commissioned STATCOMs at Solapur, Aurangabad, Satna & Gwalior in Western Region; Lucknow & Nalagarh in Northern Region; Ranchi, Rourkela, Jeypore & Kishanganj in Eastern Region; and Udumalpet, Trichi, Hyderabad & NP Kunta in Southern Region. Further one Thyristor Controller Reactor (500 MVAR) in Kurukshetra is also being implemented to improve the static as well as dynamic voltage profile of Kurukshetra HVDC station.



220 kV Phyang, Leh substation



690 MW Salal Power Station

CHAPTER 08

POWER SECTOR REFORMS

1. Electricity (Rights of Consumers) Rules, 2020

The Ministry of Power notified the Electricity (Rights of Consumers) Rules, 2020 on 31.12.2020 under section 176 of the Electricity Act, 2003. These Rules shall empower the consumers of electricity and emanate from the conviction that the power systems exist to serve the consumers and the consumers have rights to get the reliable services and quality electricity.

Implementation of these Rules shall ensure that new electricity connections, refunds and other services are given in a time bound manner. Wilful disregard to consumer rights will result in levying penalties on service providers.

An amendment to Electricity (Rights of Consumers) Rules, 2020 was also notified on 29.09.2021 wherein the limit for net metering was increased to 500KW from 10KW. Further amendments to the Electricity (Rights of Consumers) Rules, 2020 regarding provisions on DG sets are under finalization.

2. Waiver of ISTS Transmission Charges and Losses for Solar & Wind Power

In order to avoid the difficulty of Renewable generators due to delay in Commissioning on account of force measure or delay on 15th January, 2021, the Ministry advised CERC under section 107 of the Electricity Act, 2003, for making suitable provisions in the Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2020 for extension of waiver of inter-state transmission charges for the electricity generated from solar and wind projects, whose date of Commissioning had been extended by the competent authority.

In continuation to the aforesaid, this Ministry has also issued an order dated 21.06.2021, to extend the waiver of ISTS charges on transmission of electricity generated from solar and wind sources for projects to be commissioned up to 30th June 2025. With a view to encourage the capacity addition in solar, wind, battery storage and pumped storage projects, it was also advised that waiver of ISTS charges shall also be allowed for Hydro Pumped Storage Plant (PSP) and Battery Energy Storage System (BESS) projects with certain conditions. In order to have long-term visibility and certainty in renewable power generation, the Ministry of Power vide order dated 23.11.2021 provided that the inter-state transmission charges shall be levied gradually w.e.f. July, 2025.

3. Issuance of Renewable Purchase Obligations (RPO) Trajectory

Long term RPO growth trajectory for the period 2016-17 to 2018-19 has been notified by Ministry of Power on 22.7.2016.

An order on RPO Trajectory for a further period of three years i.e. from 2019-20 to 2021-22 under the provisions of Tariff Policy has been issued by Ministry of Power on 14.06.2018. In super-session of orders dt 22.7.2016 and 14.06.2018, Ministry of Power has specified new RPO trajectory vide order dated 29.01.2021. Trajectory for HPO has also been issued through this order.

This would help in meeting the renewable energy generation targets set by the Central Government.

4. Electricity (Timely Recovery of Costs due to Change in Law) Rules, 2021

Timely recovery of the costs due to change in law is having importance as the investment in the power sector largely depends upon the timely payments. At present the pass through under change of law is taking a lot of time, leading to the drying up of the investment in the power sector. If payment is not made in time, it impacts the viability of the sector and the developers get financially stressed. If this is not addressed now, the investment will not come and the electricity consumers may face shortages of power once again. In order to address this issue, Ministry of Power has notified Electricity (Timely Recovery of Costs due to Change in Law) Rules, 2021 on 22.10.2021.

5. Electricity (Promotion of generation of Electricity from Must-Run Power Plant) Rules, 2021

Ministry of Power has notified Electricity (Promotion of generation of Electricity from Must-Run Power Plant) Rules, 2021 on 22.10.2021. This rule ensures that no RE capacity is backed down. This will ensure that the consumers get green and clean power and secure a healthy environment for the future generation.

6. Initiatives taken for Smart prepaid meters/prepaid meters

Ministry of Power vide letter dated 26.02.2021(copy enclosed) has requested all the States to prepare a road map for shifting over to smart pre-payment meters/ pre-payment meters.

The Electricity (Rights of Consumers) Rules, 2020 was notified on 31.12.2020 and as per this Rule, no connection shall be given without a meter and such meter shall be the Smart pre-payment meter or pre-payment meter.

Also, Ministry of Power vide notification dated 17.08.2021 has issued timelines for the replacement of existing meters with smart meters.



7. Electricity (Late Payment Surcharge) Rules, 2021

The Ministry of Power has notified these Rules with the objective to take measures to provide conducive environment for development of the electricity industry and protecting the interest of the consumers. Recognizing the financial burden caused on the DISCOMs and ultimately on consumers, due to high rate of Late Payment Surcharge (LPS) as fixed by the Regulatory Commissions (@18%), these Rules fixed the base rate of Late Payment Surcharge at SBI's marginal cost of funds based lending for 1 year plus 5%. To ensure timely payments by the DISCOMs, the Rules also provided for a staggered increase in the rate of LPS at 0.5% per month of delay, subject to a limit of 3% over the base rate or the rate specified in the PPA. Further, the Rule also clarified that all payments received from a DISCOM would be first adjusted against LPS and then against monthly energy bills. If the Bill is not paid within 25 days the access to the Grid will be curtailed.

8. Regional Power Committees under sub-section 55 of section 2 of the Electricity Act, 2003

The Central Government had established Regional Power Committees under sub-section 55 of section 2 of the Electricity Act, 2003 vide resolution dated 25th May, 2005 for all the five regions. This Resolution has been amended twice i.e. on 29th November, 2005 and 9th May, 2008.

- I. Further, the Resolution pertaining to SRPC was amended on 5th May, 2017 for inclusion of the State of Telangana. Thereafter, the resolutions for all the five regions were amended on 21.12.2017 for inserting the clause regarding cross border power transactions viz. "A representative each of every Nodal Agency appointed by the Government of India for coordinating cross-border power transactions with the countries having electrical inter-connection with the region."
- II. RPC Resolution incorporating all the amendments mentioned above has been notified on 03.12.2021 wherein, it has been added that the RPCs will also have a representation from the Central Government owned Transmission Company and a private transmission licensee, nominated by Central Government, operating the Inter State Transmission System, by alphabetical rotation out of such Transmission Licensee operating in the region. Further, RPCs shall meet at least once in every month.

9. Reform in RE Sector:- Redesigning the Renewable Energy Certificate(REC) Mechanism

Pan-India market-based Renewable Energy Certificate (REC) Mechanism was introduced in the year 2010, to promote renewable energy and to address mismatch between availability of RE sources and the requirement of the obligated entities to meet their renewable purchase obligation (RPO). In order to align the present REC mechanism with the changes in the power scenario and also to promote new

renewable technologies a communication was sent to CERC in September, 2021, to consider amendment in the existing Renewable Energy Certificate (REC) mechanism, to provide flexibility to players, additional avenues, rationalisation and to make clarity in validity period of RECs.

10. Advise to Regulatory Commissions regarding Exemption of charges under Intra State Open Access and Relaxation of Deviation Settlement Mechanism to Waste to Energy (WTE) project.

With the aim of economic viability, competitiveness, socio-economic and environmental benefits the Electricity Regulatory Commissions were advised, in July, 2021, to give exemption to these projects, on all applicable charges (except wheeling and the transmission charges) under intra-state Open Access sale of power and Relaxation in the Deviation Settlement Mechanism (DSM). This will facilitate in development of WTE projects.

11. Allowing Pass Through for Additional Cost for implementation of new emission standards in Thermal Power Plants:-

In view of the revised timelines for compliance to new emission standards by Thermal Power Plants along with penalty provisions as environment compensation for non-compliance through "Environment (Protection) Amendment Rules, 2021" notified by MoEF& CC on 31-03-2021, Ministry of Power vide letter dated 30.07.2021 has issued necessary directions to CERC under Section 107 of the Electricity Act 2003 (and request to States for issuing similar advise to State ERCs under Section 108 of the Electricity Act 2003) that the impact of Operating cost incurred in the implementation of new Environmental Norms shall not be considered for Merit Order Despatch of coal based Thermal power Stations till the time as mentioned in MoEF&CC Notification dated 31.03.2021. Further, those TPP units not complying with new emission norms (who would not be required to pay penalty in addition), may be kept in the merit order despatch below with those units complying with the norms. Penalty shall be counted in Energy Charge for the purpose of merit Order Despatch.

12. Guidelines for operationalizing optimum utilization of generating stations as per requirement in the Electricity Grid

With the objective of optimum utilization of generating stations and increasing availability of power in the country, a guidelines were issued in October, 2021, in accordance with the provisions of the Tariff Policy, 2016. Under these Guidelines, in case the procurer having Power Purchase Agreement (PPA) intimates the generating stations, in advance, about non-utilisation of the capacity, fully/partly, the generating station can sell this un-requisitioned power in market and the gain would be shared with the procurer having PPA. These guidelines will not only benefit the original beneficiary in terms of sharing of gain but also the other load bearing entities with more availability of power in the market.

13. Amendments to the Guidelines for Procurement of Electricity for Medium Term from Power Stations set up on Finance, Own and Operate (FOO) basis

In order to facilitate use of linkage coal in Medium term PPA, the revised Medium term Power Procurement Bidding Guidelines/MBDs were issued in January, 2019. To remove the barriers of participation of (i) linkage Coal and (ii) Coal Mine/ Blocks allocated through auction by Governmental Instrumentality in Lumpsum Category fuel option in Medium Term Bidding Documents, an amendment was issued in August, 2021.

14. Amendments to the Guidelines for Procurement of Round The Clock (RTC) Power from Renewable Projects through Tariff Based Competitive Bidding

With the aim of promoting RE power and to facilitate supply of Round-The-Clock (RTC) power to the DISCOMs from renewable energy sources, Ministry of Power issued RTC Power Guidelines vide notification dtd. 22-07-2020. To facilitate use of complementary power from any fuel sources or storage and to shift from composite tariff to weighted average levelised tariff as the bidding parameter, some amendments were issued on 03-11-2020. Subsequently, amendments in the Guidelines were made in February, 2021 to clarify the term "RE power" and to amend the clauses related to Force Majeure and the compensation due to reduced off-take.

15. Deepening of spot markets: Introduction of Green Day Ahead Market (GDAM) in Power Exchanges

Further to the development of Green Term Ahead Market (G-TAM) and Real Time market(RTM) in the year 2010, Green Day Ahead Market (GDAM) was introduced from 26.10.2021 in Power Exchange and it will operate in an integrated way with the conventional Day Ahead Market (DAM) with separate price formation for RE Power and Conventional Power. This facilitates a marketplace for trading of RE Power on a day-ahead basis for accomplishment of green targets as well as support integration of Green energy. This, will also deepen the green market and will provide competitive price signals, besides offering an opportunity to the market participants to trade in green energy, in the most transparent, flexible, competitive, and efficient manner.

16. Redesigning of present market mechanism:- Implementation of Phase-1 of Market Based Economic Despatch (MBED)

With the objective of Redesigning of present market mechanism for lowering the cost of power purchase to Consumers, Framework for Implementation of Phase-1 of Market Based Economic Despatch (MBED) wherein mandatory participation by ISGS plants and voluntary participation by other generators, was communicated to CERC for implementation from 1st April, 2022.

17. Scheme for flexibility in Generation and Scheduling of Thermal/ Hydro Power Stations through bundling with Renewable Energy and Storage Power

Ministry of Power vide letter dated 15th November 2021 has revised the scheme for flexibility in generation and scheduling of Thermal/Hydro power station through bundling with Renewable Energy and storage power. The objective of the mechanism is to promote bundling of cheaper Renewable Energy (RE) with costlier Thermal Power. The renewable energy can now be dispatched under the existing PPAs. The bundling will result in the cost of power for the DISCOMs to come down. The gains are to be shared between the generators and the DISCOM. The renewable energy consumed shall count for metering. The scheme is a very significant step towards achieving the goal of 500 GW of non-fossil fuel capacity by 2030 and will lead to a faster energy transition in the country.

18. Ease of Doing Business- Reducing Compliance Burden

Under Ease of Doing Business (EoDB) - Reducing Compliance Burden (RCB), a total of 79 nos. of burdensome compliances have been reduced/ identified to be reduced on the portal. Ministry of Power has formed a committee to expedite simplification of rules, regulations, and policies for improving the services to both business and consumers. The committee co-ordinated with Central Electricity Authority, Central Electricity Regulatory Commission and few SERCs to ease their procedures.

Altogether action has been taken on 936 nos. of issues identified as burdensome by Industry Associations and others under Phase-II of the programme (upto 15th Aug, 2021)



The last village in India to get access to electricity: Leisang, Manipur

CHAPTER 09

RURAL ELECTRIFICATION INITIATIVES

Deen Dayal Upadhyaya Gram JyotiYojana (DDUGJY)

1. Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) is an integrated scheme covering all aspects of rural power distribution which was conveyed by the Ministry of Power on December 3, 2014. Under the scheme, 60% of the project cost (85% for special States) is provided as grant by Government of India and additional grant upto 15% (5% for Special Category States) is provided by Government of India on achievement of prescribed milestones. All erstwhile RE schemes (including Rajiv Gandhi Grameen Vidyutikaran Yojana) have been subsumed into DDUGJY. REC Limited was designated as the Nodal Agency for operationalization of DDUGJY.

1.1 Objectives

The main objectives of the scheme are-

- 1) To provide separation of agriculture and non-agriculture feeders facilitating judicious rostering of supply to agriculture and non-agriculture consumers in the rural area; and
- 2) Strengthening and augmentation of Sub-Transmission & Distribution (ST&D) infrastructures in rural area, including metering at distribution transformers, feeders and consumers end.

The scheme also covers electricity access to all rural households and reduction of AT&C losses as per trajectory (DISCOMs-wise) finalized in consultation with States by the Ministry of Power, so as to facilitate to 24x7 power supply for non-agricultural consumers and adequate power supply for agricultural consumers through following project components:

- i. Segregation of agricultural feeder from the combined/common 11 KV feeders in rural areas facilitating improved quality power supply to non-agricultural consumers and adequate power supply to agricultural consumers through the dedicated agricultural feeders in the rural areas.
- ii. Strengthening and augmentation of sub-transmission & distribution infrastructure in rural areas
- iii. Metering of distribution transformers/feeders/consumers; and
- iv. Rural electrification works under the erstwhile RGGVY scheme which have been subsumed into DDUGJY

In DDUGJY, the earlier population criteria for eligibility of villages/hamlets has been annulled and all villages/habitations are eligible without any population restrictions.

In order to realize the objectives of the scheme, participation of all the stakeholders, particularly public representatives have been institutionalized through constitution of District

Electricity Committees (now DISHA) under the Chairmanship of the senior most Member of Parliament. DISHA has also been empowered to monitor and review the implementation of DDUGJY.

1.2 Sanction of projects**1.2.1 DDUGJY (RE component):**

Under erstwhile Rural Electrification (RE) programme, as on December 31, 2021, cumulatively 1,365 nos. of Projects with total outlay of Rs. 66,380 crore has been sanctioned.

1.2.2 DDUGJY (New):

As on December 31, 2021, cumulatively 4,404 projects with total outlay of Rs. 47,972 crore have been sanctioned.

1.2.3 DDUGJY (Addl. Infra Projects)

An amount of Rs. 14,179 crore has been sanctioned to 20 States for creation of additional infrastructure, exclusively for Households covered under Saubhagya on the requests of State.

1.3 Cumulative Achievement (as on December 31, 2021)**1.3.1 DDUGJY (RE component):**

As on December 31, 2021, cumulatively Government of India grant of Rs. 53,414 crore has been released to the States. The physical progress is as below:

- 2,993 Sub-stations (Incl. augmentation of 2,101 Sub-Stations) commissioned.
- 10.14 Lakh Distribution Transformers commissioned.
- 7.83 Lakh CKm of LT Lines erected.
- 4.73 Lakh CKm 11KV Lines erected.
- 0.15 Lakh Ckm 33 & 66 KV HT Lines erected.

1.3.2 DDUGJY (New):

As on December 31, 2021, cumulatively Government of India Grant of Rs. 22,755 crore has been released to the States. The physical progress is as below:

- 3,958 Sub-stations (including augmentation of 2,093 Sub-stations) commissioned.
- 3.95 Lakh Distribution Transformers commissioned.
- 1.23 Lakh CKms of new 11 KV line erected.
- 2.96 Lakh CKms of LT Lines erected.
- 0.28 Lakh CKms of HT Lines (33 & 66 KV Lines) erected.



- 1.22 Lakh CKms of 11 KV Feeders segregated.
- Energy Meters in 153.80 Lakh consumer premises, 2.53 Lakh Distribution Transformers & 0.13 Lakh 11 KV Feeders installed.

1.3.3 DDUGJY (Additional infrastructure):

As on December 31, 2021, cumulatively Government of India Grant of Rs. 7,165.52 crore has been released to the States. The physical progress is as below:

- 228 Sub-stations (including augmentation of 220 Sub-stations) commissioned.
- 2.19 Lakh Distribution Transformers commissioned.
- 0.66 Lakh CKms of new 11 KV line erected.
- 1.96 Lakh CKms of LT Lines erected.

1.4 Achievement during April 1, 2021 to December 31, 2021 under DDUGJY (RE, New & Addl. Infra Projects):

- 123 Sub-stations (including Augmentation of 58 Sub-stations) commissioned.
- 0.18 Lakh Distribution Transformers commissioned.
- 0.08 Lakh CKms of new 11 KV line erected.
- 0.20 Lakh CKms of LT Lines erected.
- 0.06 Lakh CKms of HT Lines (33 & 66 KV Lines) erected.
- Energy Meters in 0.22 Distribution Transformers installed.

- Rs. 2,030 crore Government of India grant released by Ministry of Power to REC Limited.

1.5 Anticipated achievement during the remaining period of the year i.e., from January 1, 2022 to March 31, 2022

The following achievements are expected for the remaining period of FY 2021-22:

- 73 Sub-stations (including Augmentation of 14 Sub-stations) commissioned.
- 7,164 Distribution Transformers commissioned.
- 2,218 Ckm LT Lines erected.
- Segregation of 2,849 CKms of Feeder (including New 11 KV lines).
- 694 Ckm HT Lines (33kV & 66 kV).
- Metering of 1,69,628 consumer premises.
- Metering of 967 Distribution transformers.
- Metering of 71 Feeders.

The time extension granted by Ministry of Power for completion of works under DDUGJY projects was up to December 31, 2021. Works in most of the projects have been completed. DISCOMs are in process of preparation of closure as directed by Ministry of Power. In view of this, the anticipated achievement may change based on reconciliation of completion of projects.

CHAPTER 10

IPDS, NEF AND REVAMPED SCHEMES

To facilitate state utilities to ensure quality and reliable 24x7 power supply in the urban areas, Government approved the "Integrated Power Development Scheme" (IPDS) on 20.11.2014 with a total outlay of Rs. 32,612 Crore which includes a budgetary support of Rs. 25,354 Crore from Government of India. The main components of the scheme are:

- 1) Strengthening of sub-transmission and distribution networks in the urban areas;
- 2) Metering of distribution transformers / feeders / consumers in the urban areas
- 3) IT enablement of distribution sector and strengthening of distribution network under R-APDRP for 12th and 13th Plans by carrying forward the approved outlay for R-APDRP to IPDS
- 4) Schemes for Enterprise Resource Planning (ERP) and IT enablement of balance urban towns
- 5) Smart metering solution and Solar panels on Govt. buildings with net-metering
- 6) Gas Insulated Sub-stations (GIS) at locations where space constraint exists
- 7) Real Time-Data Acquisition System (RT-DAS) projects for accurate measurement of power interruption parameters like SAIDI/SAIFI at 11KV feeder level are also covered under the scheme

Erstwhile R-APDRP has been subsumed in IPDS and CCEA-approved R-APDRP outlay of Rs. 44,011 crore including a budgetary support of Rs. 22,727 crore for 12th & 13th Plan carried forward to the new scheme of IPDS.

The adoption of IT and technical intervention by way of network strengthening envisaged in the scheme will not only ensure 24x7 power supply in urban area but will also help in reduction in Aggregate Technical and Commercial (AT&C) losses.

Government support for the scheme is up-to the tune of 60% (85% for special category states) of the project cost. To support the state utilities in preparation of DPRs and project execution, provision of financial assistance to the tune of 0.5% of the project cost for hiring Project Monitoring Agencies (PMA) by state utilities is also envisaged in the scheme.

Power Finance Corporation is designated as Nodal Agency for operationalization of the scheme.

Projects worth Rs. 30,834 Crore [with Gol Grant: Rs 19,350 Cr] were sanctioned under IPDS covering various project components like **System Strengthening & Distribution Infrastructure upgradation, IT projects, GIS substations, Smart Meters etc.**

Physical progress of IPDS as on 31.12.2021:

- Distribution System strengthening works have been completed in over 3500+ towns. The salient achievements are as under -
 - o 985 New 33/11KV substations have been commissioned including indoor Substations
 - o Augmentation of as many as 1599 No.s existing 33/11 KV substations have been completed by providing additional power transformers or capacity enhancement.
 - o More than 86,000 Distribution transformers have been installed/augmented
 - o Aerial Bunched cables of more than 62,000ckm and UG cables of more than 20,000ckm laid
 - o More than 23,000ckm HT lines and 10,000 ckm LT lines completed
 - o Solar rooftops of more than 45,000 KWp installed
- Over 1000 smaller towns under IT phase- II have been IT enabled for better consumer services and Digital payments
- ERP works have been completed for 30 Utilities for improving Operational efficiencies
- 60+ Gas Insulated [GIS] Substations have been established in towns with less space requirement and for the first time in Bihar, Goa, Haryana, NER, UP etc.
- Around 12 lakhs Smart / Pre-paid Meters have already been installed in States/UTs of AN Islands, Bihar, MP, Punjab, Rajasthan
- Rs. 16,697 Crore as Grant has been released by MoP /PFC to States under IPDS as per scheme guidelines.



First GIS Substation of Goa (Davorlim-Navelim) virtually inaugurated by Hon'ble PM on GOA Liberation Day, 19 December 2021



AB Cabling works in Palasbari Town, Assam along the Brahmaputra river



New 33 KV line in Devprayag, Uttarakhand with the Himalayas in the background



Distribution Infrastructure upgradation work in Beerwah Town of J&K



New 2x8 MVA 33/11 KV GIS Substation Mantesh Nagar, HESCOM, Karnataka

Online Capacity Building Programs

Understanding the requirement of continuous capacity building even during the COVID-19 pandemic, Capacity Building Webinars on various matters like AT&C Loss Reduction and Revenue Management & Smart Metering, Power Quality Improvement in Distribution Sector, Advance O&M Practices in Power Distribution, Planning for a Reliable Distribution Network have been organised with healthy participation from over 760 officials of different Power Distribution Companies.

R-APDRP Component of IPDS:

Projects under the scheme are taken up in two parts. Part-A aims to establish IT enabled system with Data Centre, Customer Care Centre etc for energy accounting/auditing and SCADA for bigger

towns (population:4 lacs and Annual Energy Input:350 MU) where as Part-B is for up-gradation & strengthening of electrical networks in these towns. The projects under RAPDRP under the sanctioned as GoI loans and convertible to grants based on timely completion and achievements of AT&C loss targets.

Projects worth Rs.31,505 crore (Part-A: Rs.5,313 crore covering 1,260 towns and 59 SCADA projects; Part-B: Rs.26,192 crore covering 1227 towns) are under implementation.

As on 31.12.2021, 20 out of 20 Data Centre have been commissioned and 1,260 towns have been declared "Go-Live" under Part-A of the programme. Part-B Projects have been completed in all 1,227 towns.

Go-Live towns are towns where IT work is completed, and town energy data has start flowing to Data Centre for energy accounting and auditing. Utilities have started using this data for energy accounting/auditing and to take administrative measures for controlling AT&C losses.

Rs.13,440 Crore has been released as loan to state utilities under R-APDRP against Part-A and Part-B projects.

	Town covered (Nos.)	No. of Towns Completed	Approved Project Cost (in Rs. crore)	GoI fund released (in Rs. crore)
Part-A (IT)	1260	1260	4,487	4,302
Part-A (SCADA)	59	57	826	757
Part-B	1227	1227	26,192	8,380
TOTAL			31,505	13,440

Nodal Agency is also in the process of conversion of loan to grant upon compliance of conditions by the States.



Review of IPDS during RPM meeting of Ministry of Power with States in Dec 2021



Third Party Concurrent Evaluation Agency (TPCEA)

The IPDS envisages concurrent and post implementation evaluation of scheme by way of monitoring quality of works on sample basis by separate agency called Third Party Concurrent Evaluation Agency (TPCEA) for effective implementation in terms of Quality and Project Outcomes.

TPCEA is required to verify compliances by Utility:

- Manufacturing Quality Plan (MQP) – for quality materials
- Field Quality Plan (FQP) – for quality works (erection and process)
- Safety standards and relevant statutory clearances like – safety, fire etc.
- Compliance of gaps/shortcomings/defects reported in previous inspections
- Project timelines and IPDS guidelines

Inauguration of major events under Azaadi ka Amrut Mahotsav [AKAM] carried out in recent past after completion of milestones by Utilities under IPDS

SL. No.	Particulars of event/activity	Date
1	Inauguration of GIS substation at Ramganj, Rajasthan	30th Nov 2021
2	GIS substations at Wangoi and Yairipok, Manipur	31st Oct 2021
3	GIS substation at Jaipur, Rajasthan	30th Oct 2021
4	RT-DAS System at Visakhapatnam, Andhra Pradesh	29th Oct 2021
5	GIS substation and RT-DAS control system in Dehradun, Uttarakhand	02nd Oct 2021
6	New 33/11Kv substations at Dharamanagar and Kumaraghat, Tripura	21st Aug 2021
7	New 33/11 Kv substation at Rajouri, Jammu	05th Aug 2021
8	New 33/11 Kv substation at Bandipora, Kashmir	24th Jul 2021
9	50 Kwp Solar Roof Top Plant at Solan, Himachal Pradesh	19th Jun 2021
10	GIS substation at Bhagalpur, Bihar	09th Apr 2021
11	GIS substation at Purnia, Bihar	08th Apr 2021
12	Underground Cabling project at Kumbh area in Haridwar, Uttarakhand	31st Mar 2021

NATIONAL ELECTRICITY FUND

1. Government of India had approved setting up of the National Electricity Fund in 2012 at an outlay of Rs.25,000 Crores to provide interest subsidy on loans disbursed to the State

Power Utilities over a period of 14 years for augmenting and strengthening the Distribution Sector Infrastructure. Under the scheme, interest subsidies were made available on loans taken for infrastructure sector projects in areas not served by the erstwhile Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY) and Restructured Accelerated Power Development and Reforms Programme (R-APDRP) schemes.

2. The pre-conditions for eligibility are linked to reform measures taken by the States and the amount of interest subsidy is subject to the progress achieved in reform linked parameters. The preconditions for eligibility were operationalization of State Electricity Regulatory Commission (SERC), formulation of business plan for turnaround of utilities, re-organization of State Electricity Boards (SEBs), release of subsidy by State Government to DISCOMs, submission of audited annual accounts, and timely filing of tariff petition.
3. Subsidies were admissible on the interests accrued on the basis of achievements against specific reform measures, i.e. reduction in AT&C losses; reduction in revenue gap (Average Cost of Supply (ACS) - Average Revenue Realized on subsidy received basis); and return on equity and multiyear tariff (MYT). Based on the consolidated score achieved on achievement against these parameters, the utilities are eligible for subsidy in interest rates ranging from 3% to 5% in States that are other than Special category and focused states and 5% to 7% in Special Category and focused states.
4. NEF provides interest subsidy spread over 14 years, for loan approved during financial years 2012-13 & 2013-14 against the projects. Against the sanction of 920 NEF projects with loan component of Rs.23,973 crore for 24 DISCOMs in 14 States, till December 2020, Rs.19,772 crore loan has been released. Based on interest subsidy evaluation i.e. Reduction of AT&C losses and Revenue Gap as carried out by Independent Evaluator and Nodal Agency, Ministry of Power during financial year 2021-22 has released Rs.199.45 crores as Interest Subsidy to the State Power Utilities and Rs.0.55 crores towards payment to Independent Evaluators, till December 2021. The entire budgetary provisions for FY 2021-22 have been fully utilized. During the current financial year 2021-22 the Steering Committee of NEF has approved Interest Subsidy of Rs.720 crores to be released to the eligible Utilities. It is also targeted to release Interest Subsidy of Rs.800 crores by before the end of the current financial year subject to funds being made available in RE 2021-22.

Liquidity infusion package announced under Atma Nirbhar Bharat for the power sector

The finances of most of the distribution companies (DISCOMs) in the country have been under stress for some time. The outbreak of the global pandemic COVID-19 in the country and the consequent nationwide lockdown has exacerbated the liquidity problems for the power sector further as revenues of the power distribution companies have nosedived as people were unable to pay for the electricity consumed while power supply, being an essential service, had been maintained.

- To alleviate the immediate problems in the sector, under the Atma Nirbhar Bharat announcements, the Government announced a liquidity infusion package for the power sector under which the DISCOMs would be able to discharge their dues to the CPSU Gencos & Transcos; IPPs, and RE Gencos by availing concessional loans from PFC and REC against State guarantees.
- Under the Atma Nirbhar Bharat liquidity infusion package, the Ministry of Power has issued guidelines to the States for availing the benefits of concessional loans from PFC and REC on 14th May, 2020. PFC and REC have advised their loan scheme to States on 16th May, 2020.
- Against the liquidity infusion package, Rs.1.35 Lakh Cr worth of loans have been sanctioned and Rs. Rs.103671 Cr has already been disbursed/ released till 13-01-2022.
- While there are no financial implications to the Government of India arising out of this scheme, it would allow continuation of employment of power sector personnel, thereby minimizing the negative impact of COVID on employment in the power sector.

Revamped Distribution Sector Scheme Bharat - A Reform-based and Results-linked Scheme

1. The Cabinet Committee on Economic Affairs in its meeting held on 30-06-2021 approved the Revamped Distribution Sector Scheme-A Reforms-based and Results-linked Scheme with an outlay of Rs.3,03,758 crore and a Gross Budgetary Support of Rs.97,631 crore from Government of India over a period of five years from 2021-22 to FY 2025-26.
2. The Office Memorandum of Reforms-based and Results-linked Scheme, Revamped Distribution Sector Scheme has been issued on 20-07-2021 and 1st Monitoring Committee Meeting of the scheme was held on 23-07-2021 under the chairmanship of Secretary (Power) for finalization of guidelines of the scheme. After detailed discussion in the Monitoring Committee Meeting, the Guidelines of the scheme have been issued on 27-07-2021. Further, 2nd, 3rd and 4th Monitoring Committee Meetings of the scheme were held on 13-10-2021, 18-11-2021 and 10.01.2022 respectively.



45 MW Nimoo Bazgo Power Station

CHAPTER 11

NATIONAL SMART GRID MISSION

National Smart Grid Mission (NSGM) was established in 2015 to plan and monitor 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 AMI, 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.

The focus is on sustainable deployment of Smart Grids and the years 2020 and 2021 have seen widespread acceptance of AMI deployment on OPEX model amongst utilities, funding agency and Smart Grid Implementation Agencies.

➤ Smart Grid Projects under NSGM

Currently, under NSGM, three (3) projects with of worth Rs.247.15 Cr. viz. two in Chandigarh (Sub Division No. 5 and Complete city), and one integrated project in 6-towns in Rajasthan for 3.64 lakh consumers are under various stages of implementation. Till December 2021, about 1 lakh smart meters have been installed at field in Chandigarh Sub Division 5 and Rajasthan projects while Chandigarh Complete City project proposal has undergone revisions and revised sanction issued for deployment of AMI / Smart Metering including billing system to CED and the award for the same in process.

➤ Third Party Evaluation of NSGM

The proposal for NSGM extension has been put up to MoP and as per the direction of Empowered Committee of NSGM, the scheme has also been got evaluated by IIT Bombay, the Third-Party Independent Agency (TPIA). The evaluation report has been submitted to MoP in December 2021 for necessary consideration.

➤ Model Standard Bidding Documents for AMISP

NSGM has finalised and published Model Standard Bidding Documents for appointment of Advanced Metering Infrastructure Service Provider (AMISP) on design-build-finance-own-operate-transfer (DBFOOT) basis. Utilities have started adopting AMISP SBD for Smart Prepaid Metering projects in States like Andhra Pradesh, Maharashtra, Assam, Punjab, Madhya Pradesh, West Bengal, Jharkhand, Tripura, Bihar, Puducherry. These documents have now been considered for Revamped Distribution Sector Scheme after suitable modifications. The same can be accessed from <https://recindia.nic.in/amisp>.

➤ Smart Meter Statistics Dashboards

NPMU has in-house developed multiple dashboards on Smart Meters deployment statistics and hosted on NSGM website. The dashboards are being updated on regular basis with inputs from multiple stakeholders viz. Utilities, implementation agencies, and manufacturers. These dashboards are regularly updated by NPMU and shared with MoP on weekly basis. The scheme-wise status on overall progress of smart metering as on 31.12.2021 is as under:

Scheme	Sanctioned	Awarded	Installed Till Date	Prepaid Till Date	Meters in Stock	Meters in Stock Past Month Target (Nov' 2021)	Past Month Progress (Nov' 2021)	Target (December 2021)	Achievement In December 2021 (till 31.12.2021)
IPDS	36,80,180	36,80,180	10,50,645	3,98,064	2,29,079	1,59,800	1,18,831	1,86,800	1,30,311
NSGM	7,23,433	1,79,433	97,328	0	76,157	23,500	12,252	23,500	11,764
PMDP	1,15,500	1,15,500	14,248	0	6,352	10,000	4,931	6,500	417
SG Pilot	1,56,533	1,56,533	1,56,533	0	0	0	0	0	0
Utility Owned	64,86,898	58,66,798	21,62,716	71,412	1,77,376	53,500	49,160	66,548	52,715
Total	1,11,62,544	99,98,444	34,81,470	4,69,476	4,88,964	2,46,800	1,85,174	2,83,348	1,95,207

➤ Smart Grid Knowledge Centre

The Smart Grid Knowledge Centre (SGKC) is a state-of-the-art platform for demonstration and outreach of smart grid technologies. Established by the POWERGRID, with support from the Ministry of Power (MOP) and the National Smart Grid Mission (NSGM), the SGKC showcases smart grid technologies through demonstrations and provides training and capacity building support to power distribution companies.

Now, SGKC is being developed as one of the leading Centres of Excellence (CoE) under MoP guidance to foster partnerships, innovation and entrepreneurship in Smart Grid technologies and create capacities in the power sector.



Expression of Interest (Eoi) for selection of technology solutions for demonstration at Digital Innovation Park at SGKC has been evaluated by committee members of SGKC expert panel. Around 40 innovative solutions are selected for hosting on digital platform, which is ready to be launched by MoP.

For setting up the Technology Incubation Hub at SGKC, series of meetings were held with StartupIndia & InvestIndia team. Team of POWERGRID (NSGM-PMU, SGKC and CMD Coordination Cell) visited Pusa Krishi, ICAR-IARI and interacted with CEO, Pusa Krishi on know-how to set up Incubation centre at SGKC.

➤ **Consumer Engagement**

The following documents were prepared for creating awareness about smart metering (focused outreach for wider acceptance) by NSGM with support of USAID and feedback from State DISCOMs:

1. **Compendium of Consumer Engagement Activities:** Adopted by Indian Utilities during Deployment of Smart Metering Projects.
2. **Smart Metering Factsheet for Utility Employees** to introduce smart meters to utility officials and to make them aware of the smart meter deployment initiative. It provides details on what is smart metering, how it differs from conventional meters, its benefits to utility and other stakeholders
3. **Media outreach and communication plan:** Plan, pointers and activities for consumer awareness for smart metering.
4. **Standard Operating Procedures for Installation of Smart Meters:** This document includes meter installation SOPs (pre-installation, during, and post-installation), designed to standardize the meter installation activities and to enhance consumer satisfaction during the installation process.
5. **Smart Metering FAQs** - A list of questions also covering myth busters that any consumer engagement strategy should address.

➤ **Smart Grid Readiness – Self Assessment Tool (SGR-SAT)**

NSGM in association with DFID under PSR program has developed a Smart Grid Readiness – Self Assessment Tool (online). The tool is intended to be used by utilities in drafting their smart grid journey by taking self-assessments and setting targets by learning from peers. This tool has been hosted on POWERGRID server till the NSGM website is redesigned and is ready for launch and use by targeted utilities.

➤ **Investment Analysis Tool for Utility Modernization Projects**

NSGM in association with USAID SPARC team has developed an Investment Analysis Tool (online) for Utility Modernization Projects.

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. This tool has been hosted on POWERGRID server till the NSGM website is redesigned and is ready for launch and use by targeted utilities.

➤ **Standardized API Development for Energy Data Sharing**

An R&D project was taken up with IIT Hyderabad in June 2021 for development of standardized API as a unique way of sharing energy data with end consumer applications. The project aims to develop standardized APIs for data extraction from utility MDMs and integrate with third party mobile applications. The uniqueness of the project is that only the formats shall be communicated to the third-party app developer without any consumer data thereby adhering to the highest standards of privacy and protection. The project is in the advanced stage of completion and the successful results shall be published after testing with some utilities.

➤ **General Requirements of Pluggable Communication Module for Smart Meters**

During the course of implementation of AMI / Smart Meters, it is often felt that there is need for interchangeable communication module in the smart meter so that the system is not dependent on one communication technology with lock-in mechanism. In order to overcome this and a way to achieve interoperability, requirements of pluggable communication module for Smart Meters were drafted and incorporated in the AMISP SBD. These requirements were generalized after multiple deliberations with the stakeholders. The finalized general requirements have been submitted to BIS ETD-13 Sectional Committee in July 2021 for necessary deliberations and a panel constituted by BIS to discuss the same w.r.t. smart meter standard.

➤ **Domestic and International Collaboration, Training and Capacity Building**

NSGM has been actively engaging with multiple stakeholders for bringing out best practices and solutions for deployment of Smart Grids. The COVID-19 pandemic interrupted residential training program in year 2021-22.

The international collaboration i.e International Smart Grid Action Network (ISGAN) activities have also been held virtually throughout the year. A new annex titled- Annex IX: 'Flexibility Markets' was introduced by ISGAN this year. The scope of this Annex encompasses all aspects of market design for power system flexibility. India is actively participating in the above Annex through National Smart Grid Mission – Project Management Unit (NSGM-PMU) and Central Electricity Regulatory Commission (CERC).

CHAPTER 12

ENERGY CONSERVATION

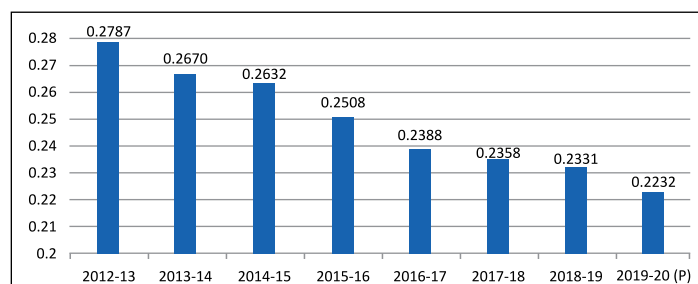
India has been witnessing a significant rise in the demand for energy across all the sectors with rapid increase in access, affordability and urbanization. India's development path focusses on the need for rapid economic growth which is an essential precondition to poverty eradication and improved standards for living while at the same time focusing on sustainable growth for maintaining ecological balance. Energy Efficiency is a key element that can contribute towards reducing the energy requirements and the associated environmental implications.

The institutional framework in place for pursuing this agenda includes the Energy Conservation Act 2001 (EC Act) and the Bureau of Energy Efficiency (BEE) which is the nodal central statutory body to assist the Government in implementing the provisions of the EC Act. As a regulatory and policy advisory body, the Bureau helps in developing policies and strategies that emphasize self-regulation and market principles to achieve the primary objective of reducing the energy intensity of the Indian Economy. The EC Act also empowers the State Government to facilitate and enforce the efficient use of energy through their respective State Designated Agencies in consultation with BEE. It also empowers the Central Government to specify energy performance standards.

India ratified the Paris Agreement on Climate Change in 2016 under which its member countries have given commitments to keep global average temperatures rise below 2-degree C by the end of century. India in its Nationally Determined Contributions (NDCs) has committed that it will reduce the emission intensity of its GDP by 33% to 35% by 2030 from 2005 level.

In the recent Conference of Parties (COP -26) at Glasgow, UK, India pleaded that its non-fossil energy capacity will reach 500 GW by 2030, and that it will reduce its total projected carbon emissions by one billion tonnes from now to 2030. It also pleaded that by 2030, India will reduce the carbon intensity of its economy to less than 45 per cent, and by 2070, India will achieve the target of net zero emissions.

To achieve these enhanced targets, it would be necessary to continue aggressively with its ongoing interventions and also enhance the existing policy coverage. Ministry of Power and Bureau of Energy Efficiency has been taking various steps for conserving energy through various flagship programmes in the areas of industries, appliances, buildings, transport, agriculture and demand side management etc. in order to fulfil the goals committed in the NDC and foster long term sustainable development. Owing to the various energy efficiency measures taken so far, energy intensity of the country has declined from 0.2787MJ/rupee in 2012 to 0.2232MJ/rupee by 2019-20 indicating an efficiency increase of 19%.



Energy Intensity of India in Mega Joule / rupee

Source: Energy Statistics, 2021-(MOSPI)

Energy Efficiency Initiatives Launched under the Bharat ka Azadi Ka Amrit Mahotsav in FY 2021-22 by Hon'ble Union Minister of Power and NRE

- With an objective to accelerate Energy Transition in Industrial Sectors, "User Manuals" for different stakeholders of PAT scheme such as BEE, CERC, POSOCO etc. was released through Video Conferencing in March, 2021.
- The detailed outcome of PAT Cycle-II including energy savings, investment reported, technology up gradation as well as reduction in CO2 emission was documented by BEE as "Pathways for Accelerated Transformation in Industry Sector" and was released in March, 2021.
- Under the vision for 'Aatmanirbhar Bharat' launched "Energy Efficiency Enterprise (E3) Certifications Programme for Brick manufacturing Sector" in March, 2021.
- "Aiming for Sustainable Habitat: New Initiatives in Building Energy Efficiency 2021" various initiatives being undertaken by Government of India were announced towards energy efficiency in the building sector on 16th July, 2021. The initiatives included:
 - Specifying code compliance approaches and minimum energy performance requirements for building services, and verification framework with Eco Niwas Samhita 2021.
 - The web-based platform 'The Handbook of Replicable Designs for Energy Efficient Residential Buildings' as a learning tool, which can be used to create a pool of ready-to-use resources of replicable designs to construct energy-efficient homes in India.
 - Creating an Online Directory of Building Materials that would envisage the process of establishing Standards for energy efficient building materials.
 - Announcement of NEERMAN Awards, (National Energy Efficiency Roadmap for Movement towards Affordable



& Natural Habitat), with the goal of encouraging exceptionally efficient building designs complying with BEE's Energy Conservation Building Codes.

- Online Star Rating tool for Energy Efficient Homes created to improve energy-efficiency and reduce energy consumption in individual homes. It provides performance analysis to help professionals decide the best options to pick for energy-efficiency of their homes.
- Training of over 15,000 Architects, Engineers and Government officials on Energy Conservation Building Code (ECBC) 2017 and Eco Niwas Samhita (ENS) 2021).

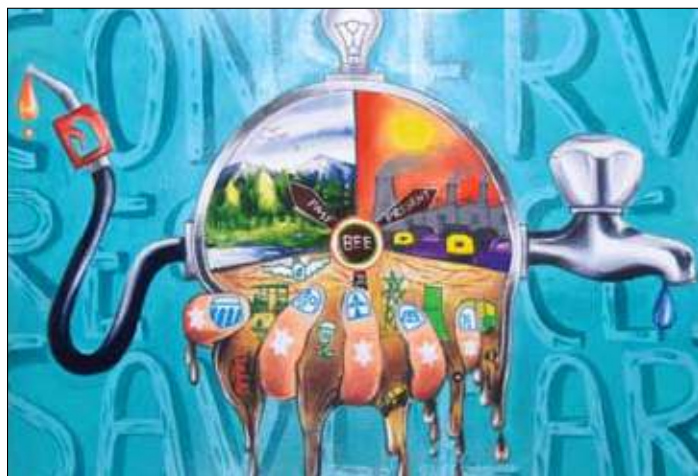
Bureau, under "Azadi ka Amrit Mohotsav" organised National Level Events on daily basis during the Iconic Week from 8th to 14th December, 2021 involving Stakeholders for Industries, Institutions, Academic, State Govts etc. The week-long celebration took place as daily events as per below:

S No	Date	Activity
1	8th December	Virtual launch of Certificate Course on Home Energy Audit Program
2	9th December	Webinar on Technology Transfer for Decarbonization of Industry
3	10th December	National Workshop on Energy Efficiency in the Indian Residential Sector
4	10th December	National Workshop on the Role of Energy Efficient Appliances in Market transformation
5	11th December	National Workshop Event on Energy Efficiency Plans for the MSME Sector
6	12th December	National Level Painting Competition on Energy Conservation 2021
7	13th December	Amrit Utsav Celebration for Designated Consumers (DCs) under PAT Cycle II –Interaction with DCs
8	14th December	National Energy Conservation Day 2021

The events scheduled during the week were aimed at promoting energy conservation among all sectors of the economy and followed by an award distribution ceremony for the winners, industrial units and other establishments on National Energy Conservation Day i.e 14th December, 2021 at Vigyan Bhawan, New Delhi.

NATIONAL LEVEL PAINTING COMPETITION

BEE with support from CPSUs organised a State Level Painting Competitions between 1st to 10th December 2021 across the country. More than 81,500 school children participated at 293 locations. The paintings were evaluated by the committee of State level Experts/Jury for two groups separately i.e. Group A (5th to 7th Standard) and Group B (8th to 10th Standard). The 1st, 2nd and 3rd prize of state level painting competitions were evaluated by a panel of juries for National level painting prizes.



NATIONAL ENERGY CONSERVATION AWARD

The National Energy Conservation Awards are presented to industry and other establishments every year by the Ministry of Power with the objective of promoting energy conservation among all sectors of economy. These awards recognize and encourage endeavours of industrial units, institutions and establishments in reducing energy consumption by felicitating them with Energy Conservation Awards on the occasion of National Energy Conservation Day, celebrated on 14th December every year.

BEE celebrated the National Energy Conservation Day on 14th December, 2021 at Vigyan Bhawan under Azadi Ka Amrit Mahotsav. On this occasion Union Minister of Power and NRE presented 31st National Energy Conservation Awards (NECA), 1st National Energy Efficiency Innovation Awards (NEEIA) and prizes to the winners of National Level Painting Competition on Energy Conservation. The following documents were released during the event:

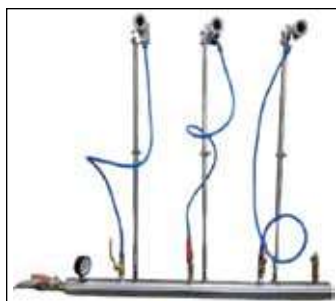
- Standard and Labelling Programme for High-Energy Lithium-Ion Traction Battery Packs and Systems
- Standard and Labelling Programme for Tyres
- 'Shunya' Labelling Programme Promoting Net Zero Energy Buildings
- Guidebook on "Awareness Generation on Energy Efficient & Thermally Comfort Buildings"
- Cloud Based Data Analytical Tool for SMEs
- 1 million LED bulb distribution

NATIONAL ENERGY EFFICIENCY INNOVATION AWARDS (NEEIA)

BEE under the Ministry of Power has initiated National Energy Efficiency Innovation Award (NEEIA). It is to recognize "Innovative Energy Efficiency Technologies" and instill a sense of competition to motivate industries & sectors to develop innovative energy efficiency efforts in their units. The online applications were invited from 3 categories; ie: Category A (Industry, Transport, Building) & Category B (Students & Research Scholars). A total of 149 applicants participated for NEEIA 2021. The Energy Efficiency Innovation Award is the need of the hour to promote newer technologies, ideas, and pave way for adoption of these innovations by the larger groups.



Energy Savings for a leading QSR chain in India



Compressed Air Saving Device For Cooling Applications



Recycling of Plastics in Electric Arc Furnace



Passive Solar Heated (PSH) Buildings of HIAL



Hybrid Treadmill Electric-Scooter



IOT based automation, in Integration with NTES



Low Temperature Evaporation Technology

A brief of all the schemes being implemented by BEE is as follows:

I. Standards & Labelling

This scheme entails laying down minimum energy performance norms for appliances / equipment, rating the energy performance on a scale of 1 to 5, 5 star being the most energy efficient one. As on December 2021, 30 appliances are covered under the ambit of Standards and Labelling program. Out of which, 10 appliances are under mandatory regime and remaining 20 appliances are under voluntary regime. The recently added 2 appliances namely Batteries and Tyres have been launched on 14th December, 2021 on the occasion of National Energy Conservation Day. List of 30 appliances under S&L are given below:

S. No.	Mandatory Appliances	S. No.	Voluntary Appliances
1.	Room Air Conditioners	1.	Induction Motors
2.	Frost Free Refrigerator	2.	Agricultural Pump Sets
3.	Tubular Florescent Lamp	3.	Ceiling Fans
4.	Distribution Transformer	4.	LPG-Stoves
5.	Room Air Conditioner (Cassette, Floor Standing)	5.	Washing Machine
6.	Direct Cool Refrigerator	6.	Computer (Notebook/ Laptops)
7.	Colour TV	7.	Ballast (Electronic/ Magnetic)
8.	Electric Geysers	8.	Office Equipment (Printer, Copier, Scanner, Multifunctional Display)
9.	Variable Capacity Inverter Air Conditioners	9.	Diesel Engine Driven Mono-set Pumps, submersible and open-well
10.	LED Lamps	10.	Solid State Inverter
		11.	DG Sets
		12.	Chillers
		13.	Microwave oven
		14.	Solar Water Heater
		16.	Deep Freezers
		16.	Light Commercial Air Conditioners (LCAC)
		17.	Air Compressor
		18.	Ultra-High-Definition Television
		19.	Li-ion traction batteries and Systems
		20.	Tyres



II. Energy Conservation Building Code (ECBC)

The Energy Conservation Building Code (ECBC) of BEE sets minimum energy performance standards for commercial buildings having a connected load of 100kW or contract demand of 120 KVA and above. While the Central Government has powers under the EC Act, the State Governments have the flexibility to modify the code to suit local or regional needs and notify them.

In June 2017, BEE published the updated version of ECBC which provides current as well as futuristic advancements in building technology to further reduce building energy consumption and promote low-carbon growth. ECBC 2017 sets parameters for builders, designers and architects to integrate renewable energy sources in building design with the inclusion of passive design strategies. The code aims to optimise energy savings with the comfort levels for occupants, and prefers life-cycle cost effectiveness to achieve energy neutrality in commercial buildings.

As on December 2021, 18 States and 2 Union Territories namely, Andaman & Nicobar, Andhra Pradesh, Assam, Arunachal Pradesh, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Mizoram, Odisha, Punjab, Puducherry, Rajasthan, Sikkim, Telangana, Tripura, Uttarakhand, Uttar Pradesh and West Bengal have notified ECBC for implementation in their respective states. Further, among the above 20 states and UTs, 8 States namely, Andaman & Nicobar Island, Andhra Pradesh, Telangana, Punjab, Uttarakhand, West Bengal, Rajasthan, Haryana, Uttar Pradesh have incorporated ECBC in Municipal Bye-laws. About 50 ULBs have been covered under these states for compliance.

BEE developed the residential building energy conservation code and labeling program for residential building. In order to promote energy efficiency in residential building sector, BEE has developed "ECO-NIWAS" Portal (www.econiwass.com). The scope for energy efficiency improvements in existing buildings is immense. Energy Audit Studies have revealed a savings potential to the extent of 40% in end use such as lighting, cooling, ventilation, refrigeration etc.

In order to promote energy efficient buildings, BEE developed a voluntary Star Rating Programme for commercial buildings which is based on the actual performance of a building, in terms of energy usage in the building over its area expressed in kWh/sq. m/year. This Programme rates buildings on a 1-5 star scale, with 5-Star labeled buildings being the most energy efficient. As on December, 2021, more than 264 buildings have been rated under various categories.

It is estimated that, India will be adding about 1 billion m² of new commercial buildings by 2030 (study conducted by USAID) with increased demands of Air conditioning and lighting in the buildings. Based on the anticipated growth it is projected that if the future building stock is made in compliance with Energy Conservation Building Code (ECBC), about 300BU electricity will be saved by 2030 cumulative. It will translate to peak demand reduction of 15 GW and about 250 mtCO₂e abatement. With the construction of efficient building it is estimated that Rs. 35,000 crores will be saved.

III. Enhancing energy efficiency in Industries – Implementation of Perform Achieve and Trade (PAT)

One of the flagship schemes under NMEEE, the Perform, Achieve and Trade (PAT) scheme is a mechanism designed to achieve emissions reduction in energy intensive industries and it is designed on the concept of reduction in Specific Energy Consumption (SEC). It involves assessment of SEC in the baseline year and projected SEC in the target year covering different forms of net energy going into the boundary of the plant and the products leaving out of it over a particular cycle.

The implementation of PAT cycle-I that completed in the year 2015 has led to energy saving of 8.67 MTOE which is about 30% more than the notified targets, which translates into avoiding of 31 million tonne of CO₂ emission. The excess energy savings have been converted to Energy Saving Certificates (ESCs) tradable at the Power Exchanges. The total volume of ESCs traded is about 12.98 lakhs resulting into a business of about INR 100 crores.

Subsequently, the second cycle of PAT (2016-19) was notified in March, 2016 covering 621 DCs from 11 sectors which include eight existing sectors and three new sectors viz. Railways, Refineries and DISCOMs. This cycle resulted in the total savings of about 14.08 MTOE savings, translating into 66.01 million tonne of CO₂. The total monetary savings estimated from PAT cycle-II is approximately INR 31,445 Crores and the DCs have made total investments of about INR 43,721 Crores approximately to achieve the energy savings. The energy savings achieved by DCs in PAT cycle-I was translated into Energy Saving Certificates (ESCs). Thus, Ministry of Power issued 57 lakh ESCs to 349 DCs and 193 DCs have been directed to purchase 36.68 lakh ESCs under PAT cycle-II.

PAT cycle-III was notified with effect from 1st April, 2017. PAT scheme in its third cycle seeks to achieve an overall energy saving target of 1.06 MTOE for which SEC reduction targets have been assigned to 116 DCs from six energy intensive sectors. PAT cycle III was completed on the 31st of March 2020 and monitoring & verification for the same is at advanced stage of finalization. Subsequently, PAT cycle-IV has commenced with effect from 1st April 2018 in which 109 Designated Consumers have been notified from the existing sectors and two new sectors i.e. Petrochemicals and Commercial Buildings (Hotels).

PAT cycle-V has commenced with effect from 1st April 2019. Under PAT cycle -V, 110 DCs from the existing sectors of PAT i.e. Aluminum, Cement, Chlor-Alkali, Commercial Buildings (Hotels), Iron & Steel, Pulp & Paper, Textile and Thermal Power Plant have been notified. The total energy consumption of these DCs comes out to be 15.244 million toe and it is expected to get a total energy savings of 0.5130 million toe through the implementation of PAT cycle-V.

Under PAT Cycle VI 135 DCs have been given targets to reduce their specific energy consumptions through deepening and widening under the PAT scheme. Recently, PAT cycle -VII has been notified in October 2021 for the period 2022-23 to 2024-25 wherein 509 DCs have been notified with overall energy saving target of 6.627 MTOE.

As per Gazette Notification issued by MoP vide S.O.09(E) dated 3rd January, 2022 new sectors namely "Sugar, Chemical, Ceramic, Glass, Zinc, Copper, and Mines" included in Schedule of EC Act 2001.

IV. Demand Side Management (DSM)

Demand Side Management (DSM) has been traditionally recognized as one of the major interventions to achieve reduction in energy demands while ensuring continuous development. In recent past, DSM has gained unprecedented importance and has become an integral part of almost all the central and state missions on promotion of Energy Efficiency. DSM interventions have helped utilities not only to reduce the peak electricity demands and but also defer high investments in generation, transmission and distribution networks.

a. Agriculture DSM

In order to tap the energy saving potential, Agriculture Demand Side Management (Ag DSM) program was initiated by BEE with an objective to induce energy efficiency in agriculture sector by creating market-based framework for implementation of few pilot projects and create awareness among end users & other stakeholders for adoption of energy efficient pump sets (EEPS).

MOU was signed between BEE and Indian Council for Agricultural Research (ICAR). 508 awareness programmes conducted by KVKs and SDAs with 11,000 farmers trained.

b. Municipal DSM

Identifying the immense energy saving potential in municipal sector, BEE initiated Municipal Demand Side Management (MuDSM). The basic objective of the project was to improve the overall energy efficiency of the Urban Local Bodies (ULBs), which could lead to substantial savings in the electricity consumption, thereby resulting in cost reduction/savings for the ULBs. 34 capacity building programmes on EE and O&M measures conducted by SDAs with 2024 no. of officials from ULBs, UDDs and MCs trained in 10 states.

V. Energy Efficiency in Small and Medium Enterprises (SMEs)

With Climate Change, transition towards an energy efficient economy is highly imperative for the manufacturing sector, including Micro, Small and Medium Enterprises (MSMEs), which account for a large part of the world's consumption of resources. The MSME sector occupies a position of prominence in the Indian economy, contributing to more than 45% of the industrial output and 40% of the country's exports in value addition terms.

MSMEs, the critical growth driver of the Indian economy, play an important role in the context of energy-intensive industries. Although their individual energy consumption is rather low, their collective use is considerable. Lack of access to latest technologies make this sector vulnerable to energy security and competitiveness in global market. The poor energy and environmental performance are directly related to the lack of technical capacity in these enterprises to identify, access, adapt and adopt better technologies and operating practices.

Further, for bringing more competitiveness and making this sector more energy efficient, it is quintessential to understand the consumption of energy and its flow within the facility along with the classification of energy usage and its relationship to processes and production outputs in present scenario. Thus, Bureau is conducting energy mapping of 9 sectors which will cover energy usage pattern, detailed analysis and technology gap analysis.

Energy and Resource mapping of MSME clusters is underway for 9 energy intensive MSME sectors. Energy Audits being carried out in 45 identified cluster (total 45 clusters) followed by survey data collection which are likely to be completed by October, 2021. More than 400 energy audit reports has been received. Sectoral stakeholders consultation meets were organised and draft policy recommendation reports for 7 sectors are in process.

Bureau of Energy Efficiency is also implementing Energy Efficiency technologies in many energy intensive clusters of India with the support from Global Environment Facility through UNIDO and World Bank towards common goal of facilitating the development of the SME sector in India through the promotion and adoption of clean, energy efficient technologies and practices.

BEE has developed Energy Conservation guidelines for more than 25 energy intensive SME sectors. A knowledge portal namely Simplified Digital Hands-on Information on Energy Efficiency in MSMEs (SIDHIEE) was developed. The portal hosts variety of knowledge resources like case studies, best operating practices, details of latest energy efficient technologies etc.

Bureau has also developed more than fifty (50) multimedia tutorials on energy efficient technologies for more than twenty (20) sectors for knowledge transfer and thereby easy adoption of these technologies.

VI. Improving Energy Efficiency in Transport Sector

The Government of India, Ministry of Power, issued average fuel consumption standards for cars on 23rd April 2015. The fuel consumption standards are under implementation from April'2017 onwards, and a second set of standards would come into force from 2022-23.

Fuel economy norms for Heavy Duty Vehicles have been notified. These norms are applicable for M3 and N3 category vehicles complying with BS IV norms with gross vehicle weight exceeding 12 tonnes.





Fuel Economy norms for Light Commercial Vehicles notified. These norms shall apply on the vehicles being sold or manufactured in India and having gross vehicle weight ranging between 3.5 tonnes and 12 tonnes

The Union Minister for Road Transport & Highways in presence of the Union Minister for Power and New & Renewable Energy launched the “Go Electric” Campaign on 19th February, 2021 to spread awareness on the benefits of e-mobility and EV Charging Infrastructure as well as electric cooking in India.

VII. Energy Accounting in DISCOMS

Amendment in exiting Notification: Ministry of Power issued a notification to include all the Electricity Distribution Companies (DISCOMs) under the preview of EC Act. As per the notification (S.O. 3445(E) dated 28th September, 2020), which was formulated in consultation with BEE “All entities have been issued distribution license by State/Joint Electricity Regulatory Commission under the Electricity Act, 2003 (36 of 2003)” are notified as Designated Consumers (DCs). Earlier, the DISCOMs whose annual energy losses were equal to or above 1000 MU were only covered as Designated Consumers.

Regulations for Energy Accounting and Auditing in DISCOMs: Regulations notified by BEE on 6th October, 2021 with the approval of Ministry of Power, under the provisions of Energy Conservation (EC) Act, 2001 for Energy Audit in DISCOMs.

VIII. Strengthening of State Designated Agencies (SDA) To Promote Efficient Use of Energy and its Conservation

The EC Act mandates creation of a two-tier organization structure to promote the efficient use of energy and its conservation in the country with BEE as the nodal agency at central level and State Designated Agencies (SDAs) as nodal agencies at State / Union Territory (UT) level. Section 15(d) of the EC Act stipulated that the State Government/ UT Administration may designate any agency at the State level to co-ordinate, regulate and enforce the provisions of the Act within the State/UT.

Till date, 36 States/UTs have nominated a SDA in their respective State/UT. These agencies differ from State to State with Renewable Energy Development Agency comprising 44%, Power Department comprising 22%, Electrical Inspectorate comprising 17%, Distribution Companies comprising 17%, and Stand-Alone SDA comprising 6%. Only two States – Kerala and Andhra Pradesh have established Stand-Alone SDA.

About 20 demonstration projects mainly in areas of street lighting, water pumping, buildings’ retrofitting, and waste heat recovery have been successfully implemented by the SDAs. 28 SDAs have initiated implementation of EE measures as pilot projects in total 205 Government Hospitals across the country out of which actions have been completed in 90 hospitals.

BEE has shared a Handbook on Best Operating Practices of SDAs highlighting Success Stories to facilitate cross learning among States.

BEE launched the “Certification Course on Home Energy Assessment” initiative on December 8, 2021.

A review meeting was held on 22nd October 2021 under chairmanship of Hon’ble Union Minister of Power with senior officers of State/ UTs, wherein the matter regarding establishment of a dedicated State Energy Efficiency Agency (SEEA) was discussed. During the meeting, a model organizational structure was shared with States for reference. Amendment in the EC Act giving power to State Governments for establishing an agency (instead of designating an existing agency) to develop, facilitate, promote, coordinate, regulate and enforce provisions of this Act within the State, has been proposed.

State Energy Efficiency Index – 2020 was released on 22nd October, 2021 by Hon’ble Union Minister of Power and NRE. The report of State Energy Efficiency Index - 2020 to help the states in monitoring their programmes by contributing for National Climate Action Goals. During the event, e-Book on Best Operating Practices by SDAs to facilitate the coordination of peer groups and adoption of best practices by other states was also released.

IX. Financing Initiatives

Energy Efficiency Financing Platform (EEFP)

The objective of EEFP is to upscale energy efficiency financing in India by providing a platform where Financial Institutions (FIs) can interact with industries for financing and implementation of energy efficiency projects, technologies and appliances.

BEE has launched one day conferences named as “Investment Bazaar for Energy Efficiency” to accelerate and facilitate financing of EE projects/technologies through SDAs. These ‘investment bazaars’ shall showcase viable EE projects/technologies in presence of representatives of FIs and industries, with an objective of bringing convincing deals for financing those EE projects.

The component FEEED is for development of fiscal instruments to promote energy efficiency. The existing programmes under FEEED are:

i. Partial Risk Sharing Facility:

Partial Risk Sharing Facility (PRSF) has been established by Clean Technology Fund (USD 25m) and Global Environment Fund (USD 12m) funds to provide partial credit guarantees to cover a share of the default risk that participating financial institutions face in extending loans to eligible Energy Efficiency sub-projects. Till date, 35 projects are guaranteed amounting to USD 22.06 million and 16 PFIs are empanelled under this programme.

ii. Energy Efficiency Financing Facility (EEFF)

BEE has proposed a dedicated financing facility anchored by PFC and IREDA for taking care of financing requirements of large industries, project aggregation approach covering MSME clusters/ ESCO projects, re-financing to Banks who have lent for Energy Efficiency projects, upcoming energy efficiency areas such as smart grids, electric vehicles, and charging infrastructure. Till date, IREDA has sanctioned two Energy Efficiency (EE) loans under EEFF amounting to Rs. 5 crore and Rs. 9.91 crore.

A proposal for creation of Assistance in Deploying Energy Efficient Technologies in Industries & Establishments (ADEETIE) has also been envisaged by BEE. ADEETIE aims to facilitate the financing support in developing energy efficient technologies in key sector of economy by creating conducive policy regime. This shall be attained by operating a dedicated Energy Efficiency Financing Department (EEFD) and Appraisal Unit in Power Finance Corporation (PFC). This facility shall run various energy efficiency financing initiatives such as – interest subvention, credit guarantee, in co-ordination with energy efficiency financing platform for capacity building of Financial Institutions and other activities to promote EE financing. It is estimated Rs. 15,000 crore of energy efficiency investment may be targeted in next 5 years. Total government budgetary support of Rs. 2,177 crore is estimated to run these schemes to accelerate the uptake of energy efficiency in India.

X. Revision of National Mission on Enhanced Energy Efficiency (NMEEE) – ROSHANEE

NMEEE has been revised to Road Map of sustainable and Holistic Approach to National Energy Efficiency (ROSHANEE). ROSHANEE has a broader vision and takes into account all the potential areas of energy efficiency in each sector, covering the macro level in policy and further delineating the respective schemes.

The ROSHANEE document also includes all existing activities of BEE that have contributed significantly towards enhancing energy efficiency and consequent CO₂ mitigation and the activities proposed in future, some of which have been identified and others which need to be explored. The proposed programme will also have a dedicated component for the financing of energy efficiency activities in India. It shares its objective from the earlier mission with enhancements.

Through the ROSHANEE document, NMEEE is being strengthened with a review of existing approaches and planning a new portfolio of strategies to strengthen energy efficiency across all sectors in the country till 2030.

ROSHANEE will help in consolidation of all activities and their consequent contribution towards meeting the NDC goals. The activities proposed to be undertaken under ROSHANEE are estimated to lead to a savings of 887 million tonnes of CO₂ savings by 2030. The estimated expenditure for implementation of activities under ROSHANEE is Rs. 10,370.37 Crores.

The ROSHANEE document was released on 14th May 2019 by Secretary (MoP) and has been approved from Executive Committee on Climate Change. Ministry of Environment, Forest and Climate Change (MoEFCC) has also approved in-principle the ROSHANEE document.

During a virtual meeting chaired by Union Minister of Power and NRE on 16.06.2021 regarding the Roadmap for Energy efficiency, and preparedness for Climate Change Actions in relation to India's Nationally Determined Contribution (NDCs), it was directed to "A Suitable mechanism for Carbon Market may be developed by BEE in collaboration with MoEF&CC to encourage Private Sector involvement in the de-carbonisation efforts" and to setup an inter-

Ministerial Committee/ Group having members from relevant Ministries for implementation of roadmap on energy efficiency with due focus on sectors with high emissions intensity.

Thus, in order to ensure timely implementation of various initiatives on energy efficiency with due focus on sectors with high emissions intensity, an Inter-Ministerial Committee (IMC) has been constituted.

The first meeting of the Inter-Ministerial Committee for Implementation of roadmap on energy efficiency with due focus on sectors with high emissions intensity was held on 14th September 2021.

Carbon Market

In order to move towards a greener economy, Hon'ble Union Minister of Power and NRE on 22nd October, 2021 announced proposal for National Carbon Market with an objective to involve corporate and private sectors towards energy saving and carbon emission reductions. The draft blue print was released on this occasion for "National Carbon Market for Stakeholder Consultation". This carbon market will pave the way for a large-scale promotion of clean energy technologies in India leading to de-carbonization of Indian economy through active participation by various stakeholders. BEE has been mandated by the government to develop such market which would be functional in the coming years.

XI. Impact of Energy Efficiency Schemes / Programmes is as follows:

- ❖ Electrical energy savings of 159.24 Billion Units, worth INR 95,544 Crores and resulted in reduction of 130 Million tonne of CO₂ emissions.
- ❖ Thermal energy savings of 15.59 Million Tonnes of oil Equivalent, worth INR 28,683 Crores and resulted in reduction of 58.675 Million tonne of CO₂ emission.
- ❖ Total energy savings of 29.28 Million Tonnes of oil Equivalent i.e. 3.15% of total primary energy supply of the country.
- ❖ Total cost savings worth INR 1,24,227 crores.
- ❖ Total reduction in CO₂ emission is around 188.6 Million Tonnes
- ❖ Total CO₂ reduction including LED bulbs sold by private industry is 320 Million Tonnes.

XII. Other Activities

Promoting Energy Efficiency in Cold Chain Sector

India's cooling needs are expected to grow significantly over the next decades, driven by space cooling, cold chain, refrigeration and transport air-conditioning. The development of an integrated cold chain is key for the sustainability of the agricultural value chain from production to the consumer, reducing post-harvest losses and waste in view of the strategic significance of the cold chain sector, and the anticipated capacity additions in the coming years, which is expected to lead to substantial additional energy needs, BEE is considering approaches to promoting energy efficiency (EE) in the cold chain.



In this context, BEE with support of World Bank Group, Energy Sector Management Assistance Program (ESMAP) has taken up the project titled "Cold Chain Energy Efficiency in India: Analysis of Energy Efficiency opportunities in Packhouses". The project has analysed the energy efficiency potential for promoting Energy Efficiency in pack-houses in India. The report of the study incorporated comments of the stakeholders such as M/o Agriculture and Farmers Welfare, M/o Food Processing, MOEFCC, NITI Aayog, M/o Power, Department of Commerce and APEDA.

BEE has established a technical committee for "Promoting Energy Efficiency in Cold-chain Sector" comprising members from different ministries, academia, think tanks, Manufacturers / Industry Association etc. The first meeting of the technical committee was held in July 2021 and the guidelines for operation & maintenance and design are under finalization.

Adoption & implementation of District Cooling Systems (DCS) in India

In March 2019, India escalated the opportunities and challenges in cooling to a national priority level through the India Cooling Action Plan (ICAP) developed under the aegis of the Ministry of Environment, Forest & Climate Change (MoEF&CC) with support from the BEE and other line ministries. MoEF&CC has also formed a steering committee and thematic groups on space cooling for the implementation of ICAP. One of ICAPs recommendation for the buildings sector is to promote the use of not-in-kind technologies such as trigeneration system, district cooling, thermal energy storage etc.

A Technical Committee for Adoption & implementation of District Cooling Systems in India has been established for enhanced coverage and deployment of energy efficiency and conservation measures in the country comprising members from different ministries, academia, think tanks, Manufacturers / Industry Association etc. under the able Chairmanship of DG, BEE. The first technical committee meeting was held on 3rd December, 2021.

Energy Efficiency Stimulus Report - An Energy Efficient Economic Recovery for India: a discussion paper

- Bureau of Energy Efficiency (BEE) has prepared a discussion paper in collaboration with the International Energy Agency. The discussion paper is designed to help inform discussions with the Bureau of Energy Efficiency on the potential role of energy efficiency in supporting the economic recovery. This discussion paper explores a number of opportunities in the sectors of industry and SMEs, buildings and construction, appliances and clean cooking, and transport. This includes an examination of the job creation potential, examples of key policy options and considerations for implementation in India.

Waste Heat Recovery (WHR)

Waste Heat Recovery (WHR) is a method of recycling and re-using the heat that is escaping the industrial processes after useful work is accomplished. A committee under the chairmanship of Additional Secretary (Power) suggested to formulate recommendation including the appropriate policy measures to

promote adoption of WHR system in the country. Committee after detailed discussion through various meetings and interactions with the key organizations like, CEA, NTPC, BEE, etc along with Industry Representatives analysed the case studies on following 4 applications to enhance viability of WHR system :-

1. Use in TPP to meet plant's inhouse cooling demand
2. District Cooling systems
3. Cold Storage applications
4. Milk Chilling Plants

The recommendation of the committee is currently under examination in the Ministry and the cooling applications based on WHR system mentioned above are currently being explored.

Activities under International Cooperation

Section 13 (Powers and Functions of Bureau) Clause(t) states "Implement international co-operation programmes relating to efficient use of energy and its conservation as may be assigned to it by the Central Government"

BEE has Bilateral Cooperation programmes focussing on energy efficiency with Germany, Japan, USA, UK, Switzerland, France, Russia and EU among others. BEE is also actively supporting the Ministry in several international fora like Clean Energy Ministerial (CEM), BRICS, G20 (Group-20), IEA (International Energy Agency), Global Cooling Prize.

Highlights of major Achievements during the FY 2021-22

- BEE represented India as one of the Observers in the First UK G7 Climate and Environment Senior Officials working group meeting held on 26-27th January, 2021. The First G7 Senior Officials Working Group Meeting-Climate and Environment was held virtually on 26-27 January 2021 under the UK G7 Presidency.
- The 3rd Session of Committee on Energy of UNESCAP was held from 24 to 26 February 2021. Additional Secretary, Ministry of Power, Government of India and DG, BEE participated in the meeting.
- The Clean Energy Ministerial Industrial Deep Decarbonization Initiative (IDDI) was launched on June 1, 2021. IDDI is a global coalition of governmental and business sector organizations working to stimulate demand for low-carbon industrial materials. The initiative is co-led by India and the UK. Secretary, M/o Power delivered the keynote address during the virtual launch event.
- G20 ETWG-CSWG Extraordinary Session on Draft Joint Ministerial Communique Discussion was held on July 9, 14, 15 and 19, 2021. DG, BEE participated in the above sessions to finalize the communique for the G20 Energy Ministerial.
- 4th G20 Energy Transitions Working Group (ETWG) and Climate Sustainability Working Group (CSWG) Meeting held on 22 July 2021. AS(MoP) and DG, BEE led the delegation from India in the ETWG meetings.
- BEE under the aegis of Ministry of Power organized the BRICS Energy Ministerial which was held on 2nd September 2021

under the chairship of Hon'ble MoSP. The Energy Minister's Communique, BRICS Energy Report 2021, BRICS Energy Technology Report 2021 and BRICS Energy Research Directory 2021 was adopted during the event.

- DG, BEE participated in COP-26 as official negotiator on technology and capacity building agenda as part of official delegation from Indian side led by MoEFCC during-COP 26 held in Glasgow from 31st October, 2021 to 13th November, 2021.

NEEPCO

NEEPCO has taken several initiatives to conserve energy in its power stations and offices by adopting energy conservation

measures such as changeover to Energy efficient LED luminaries for better illumination and less energy consumption at lower rating, installation of BEE star rated equipment/appliances, chemical treatment of Cooling (circulating) Water to enhance efficiency of Steam Turbine, installation of Occupancy Sensors, Timer Switches, improving overall efficiency of Machines/Turbines etc.

Besides, NEEPCO has installed Rooftop Solar Plant, Solar Tracker Plant and Solar Water Heaters across various locations to reduce dependence on conventional electrical energy.

Energy audit of all the plants under operations is carried out at a regular interval. Recently energy audit has been conducted in the 60 MW (2 x 30 MW) Tuirial HP Station, Mizoram, through M/s CPRI, Bangalore.



Electric Vehicle Charging Station, Haridwar (Uttarakhand) by THDCIL on 06.01.2022 for public convenience under CSR

CHAPTER 13

CHARGING INFRASTRUCTURE FOR ELECTRIC VEHICLES

For the promotion of electric vehicles/clean mobility solutions Government of India identified the need for creating charging infrastructure as a critical area to push the plan to promote Electric Vehicles in the country and assigned the role of facilitating the establishment of Charging Infrastructure to Ministry of Power. In this regard, NITI Aayog constituted a committee under the chairmanship of Secretary (Power) for finalization of details for Charging Infrastructure for Electric Mobility.

Actions taken by Ministry of Power

To facilitate the establishment of Charging Infrastructure for Electric Vehicles following actions have been taken by the Ministry of Power:

i. Clarification on Charging Infrastructure for Electric Vehicles:

Ministry of Power on 13.04.2018 has issued clarification on Charging Infrastructure for Electric Vehicles with reference to the provisions of the Electricity Act, 2003. It has been clarified that during the activity of charging of battery for use in electric vehicles, the charging station does not perform any of the activities namely transmission, distribution or trading of electricity, which require license under the provisions of the Act (vis-à-vis Section 12 of Electricity Act, 2003), hence the charging of batteries of electric vehicles through charging station does not require any license under the provisions of Electricity Act, 2003.

ii. Grid Connectivity and Safety regulations:

Regarding Grid Connectivity and Safety of supply for Charging Stations, CEA has issued amendments to following regulations of Central Electricity Authority (CEA):

a. Central Electricity Authority (Technical Standards for connectivity of the Distributed Generation Resources) Regulations 2019.

b. Central Electricity Authority (measures relating to the Safety and Electric Supply) Regulations 2019.

iii. Shift from of Internal Combustion Engine (ICE) based petrol/diesel vehicles to Electric Vehicles:

Hon'ble Minister of Power and New & Renewable Energy has written to all the Union Ministers including the Minister of States (Independent Charge) and Chief Ministers of all the States/UTs with request to join the Government of India's initiative on transformative mobility and advice their respective Ministries/Departments to shift their fleet of official vehicles from present Internal Combustion Engine (ICE)/Petrol/Diesel Vehicles with Electric Vehicles for all official purposes.

iv. Go Electric Campaign:

Ministry of Power along with Ministry of Road Transport and Highways, Ministry of Heavy Industries and NITI Aayog has launched a nationwide "Go Electric" Campaign on 19.02.2021 to educate the general public on the benefits of e-mobility, inform the potential EV owners about the Government incentives for EV adoption, generate curiosity and transform the same into demand, discredit misinformation against Electric Vehicles and bring together multiple stakeholders under single platform.

v. Guidelines and Standards:

The "Charging Infrastructure for Electric Vehicles - Guidelines and Standards" were issued by the Ministry of Power on 14.12.2018 which were subsequently revised on 01.10.2019 and an Amendment thereof was issued on 08.06.2020. After careful consideration of progress made and suggestions received from various stakeholders, consolidated revised guidelines have been issued by the Ministry of Power on 14.01.2022 to accelerate the E-Mobility transition in the country. The key features of the "Charging Infrastructure for Electric Vehicles – the revised consolidated Guidelines and Standards" are as below:

Issue	Provisions in Guidelines and Standards
Charger Types	The guidelines have been made further technology agnostic by providing for not only the prevailing international charging standards available in the market but also the new Indian charging standards notified by the Bureau of Indian Standards.
Central Nodal Agency	Bureau of Energy Efficiency (BEE)
State Nodal Agencies (SNAs)	28 State Governments have nominated SNAs for their respective States.
Tariff for supply of Electricity to Charging Stations	- The tariff for supply of electricity to Public EV Charging Stations shall be a single part tariff and shall not exceed the "Average Cost of Supply" till 31st March, 2025. The same tariff shall be applicable for Battery Charging Station (BCS). - The tariff applicable for domestic consumption shall be applicable for domestic charging.



	The separate metering arrangement shall be made for PCS so that consumption may be recorded and billed as per applicable tariff for EV charging stations.
Service Charges to EV Owners	As electricity is being provided at concessional rates and also considering the fact that subsidy is being provided by the Central/State Governments in many cases for setting up Public Charging Stations, the State Government shall fix the ceiling of Service Charges to be charged by such PCS/FCS.
Range Anxiety	- At least one Charging Station should be available in a grid of 3 Km X 3 Km in the cities and at every 25 KM on Highway/Roads. - Private charging at residences/offices shall be permitted and DISCOMs may facilitate the same.
Phase wise Installation	- Phase I (1-3 years) – To target 4 million plus cities and connected Expressways/ important Highways - Phase II (3-5 years) – To target State Capitals, UT headquarters & important connected Highways.
Land at concessional rates for installation of PCS	To provide for land at promotional rates for setting up the Public Charging Stations, a Revenue Sharing Model has been provided in the guidelines. The revenue sharing model fixes a promotional rate for sharing of revenue between PCS and the Government/Public - Land Owning Agency.
Open Access	Any Public Charging Station/ Chain of Charging Stations may obtain electricity from any generation company through open access. Open Access shall be provided for this purpose within 15 days of receipt of the application complete in all respect. Further, the charges for supply of electricity through open access have been fixed under the guidelines.
Timelines for providing the connection to PCS	Distribution Company licensee shall release connection for EV Public charging station (PCS) in accordance with the timelines stated in section 4 sub. (11) of the Electricity (Rights of Consumers) Rules 2020. The timelines have been specified under the guidelines.
Database of Public Charging Stations (PCS) in the country	Bureau of Energy Efficiency shall create and maintain a national online database through a Web-Portal/Software/Mobile Application for the database of Public Charging Stations throughout the country Stations in consultation with State Nodal Agencies (SNAs).

vi. Details of PCS installed till December 2021:

As per the information received from Bureau of Energy Efficiency (BEE), a total of 1020 Public Charging Stations (PCS) have been installed till December 2021 in the country.

Initiatives taken by Ministry of Heavy Industries (MHI)

- i. **FAME India Scheme:** FAME India (Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India) Scheme was launched on 1st April 2015, wherein it is intended to support the hybrid / electric vehicle market development and its manufacturing ecosystem to achieve self-sustenance.

Phase 1 of the scheme was launched on 1st April 2015 and was extended from time to time, with the last extension allowed for a period up to 31st March 2019. A total of 520 PCS were sanctioned under the scheme out of which 447 PCS have been installed.

Under Phase II of scheme a total of 2877 Public Charging Stations have been sanctioned for installation in various cities. Further, MHI has also sanctioned 1576 PCS across 16 expressways and 9 highways under the scheme.

Initiatives taken by Ministry of Housing and Urban Affairs (MoHUA)

- i. **Amendments issued by Ministry of Housing and Urban Affairs:** Ministry of Housing and Urban Affairs has issued amendments in Model Building By-Laws and Urban and Regional Development Plans Formulation and Implementation Guidelines regarding Charging Infrastructure for Electric Vehicles.

CHAPTER 14

INTERNATIONAL CO-OPERATION

Ministry of Power

International Cooperation Division works for enhancing Cooperation with various countries in the Power Sector. Active interest has been taken in enhancement of Bilateral Cooperation with Bangladesh, Bhutan, Nepal, Sri Lanka, Myanmar, Australia, Japan, Germany, UK, USA, Denmark, etc. Multilateral engagements under the umbrellas of Clean Energy Ministerial (CEM), International Energy Agency (IEA), the European Union, G20 and BRICS were also undertaken.

BILATERAL COOPERATION

COOPERATION WITH NEIGHBOURING COUNTRIES

Bilateral Cooperation with neighbouring countries in Power Sector is implemented through the Bilateral Mechanism of Joint Working Group (JWG) and Joint Steering Committee (JSC). JWG is co-chaired by Additional Secretary/Joint Secretary of Ministry of Power of respective countries, whereas JSC is co-chaired by Secretary of administrative Ministry of respective countries.

19th Meeting of JWG and JSC with Bangladesh on Cooperation in Power Sector was held on 21st and 23rd January' 2021 in Dhaka.

4rd Meeting of JWG with Myanmar on Cooperation in Power Sector was held on 26th November'2021 through VC.

India, being centrally placed in South Asian region and sharing political boundaries with SAARC countries, namely, Nepal, Bhutan, Bangladesh, Myanmar & Sri Lanka, is playing a major role in promoting and maintaining energy security with these countries for effective utilization of regional resources. This shall give rise to mutual cooperation amongst neighboring nations and resource sharing in the region.

- **Present:** The existing cross-border interconnections facilitate power transfer of about 4230MW (2070MW: Bhutan, 1160MW: Bangladesh, 1000MW: Nepal and 3MW: Myanmar) with the neighbouring countries.
- **Under Construction:** With the commissioning of under-construction cross-border interconnections which are expected in 2-3 years, the power transfer would enhance by about 4020MW resulting in total of about 8250MW (4290MW: Bhutan, 1160MW: Bangladesh, 2800MW: Nepal and 3MW: Myanmar).
- **Planned:** Various high capacity 400kV and 765kV cross-border interconnections are also in planning stages which would facilitate additional power transfer capacity with neighbouring countries. India – Sri Lanka interconnection through HVDC link is also under discussions.

Country-wise brief status is below:

INDIA – NEPAL

An Agreement on 'Electric Power Trade, Cross-border Transmission Interconnection and Grid Connectivity' between India and Nepal was signed in 2014. Two mechanisms – JWG and JSC have been set up to take the cooperation forward. The 8th JWG/ JSC meetings were held on 10th-11th Dec 2020. Dates for holding the next JWG/ JSC meetings are being finalized.

"Further, Lower Arun Hydro Electric Project (669 MW) has been allotted to SJVN Ltd by Government of Nepal through International competitive bidding. The concessional period of project is 25 years, excluding 5 years for construction and 2 years for pre-construction investigations, land acquisition, EIA study, etc. DPR for the project is under finalization."

- ❖ **Present Power Transfer:** About 1000MW (can be transferred)
 - About 350MW through 132kV & below radial lines
 - About 650MW of power through the first high-capacity link i.e., 400kV D/c Dhalkebar (Nepal) – Muzaffarpur (India) line.
- ❖ **Under-Construction Interconnections:** Additional about 1800MW (total about 2800MW)
 - Sitamarhi (POWERGRID) – Dhalkebar (Nepal) 400kV D/c (Quad) line (associated with Arun-3 HEP, Nepal): Nepal portion by M/s SAPDC (developer of Arun-3 HEP) and Indian portion by POWERGRID for M/s SAPDC. Expected by Apr 2023.
 - Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line: Requisite approvals being obtained to take up implementation
- ❖ **Future Interconnections:**
 - During the 8th JWG/ JSC meetings held on 10th-11th Dec 2020 discussions were held on the following projects:
 - Gorakhpur (India) – New Butwal (Nepal) 400kV D/c (Quad) line
 - 2nd circuit of Kataiya-Kusaha and Raxaul-Parwanipur 132kV lines
 - New 132kV radial lines from Uttar Pradesh to Nepal
 - Transmission system of Arun-III HEP
 - Requirement of New Lumki (Nepal) - Bareilly (India) and New Duhabi (Nepal) - New Purnea (India) 400kV interconnections and status of associated hydro generation projects in Nepal
 - India – Nepal Interconnection Master Plan



NVVN has been designated as the nodal agency for cross border trading of electricity with Nepal. In line with the PPA signed between NVVN and Nepal Electricity Authority (NEA), NVVN is supplying up to 350 MW power to Nepal through 400 kV Muzaffarpur-Dhalkebar transmission line. NVVN has also been accorded approvals for purchase and sale of power of NEA in Indian Power Exchange.

Accordingly, NEA has started procuring power from power exchange in Day Ahead Market from April 2021 and commenced sale of surplus power through NVVN in Power exchange from November, 2021. NVVN has signed Settlement Nodal Agency (SNA) Agreement with NEA on 05th Oct, 2020.

During the current Financial Year, NVVN has supplied 357 MUs (Provisional) to Nepal up-to 31st Dec 2021.

INDIA – BHUTAN

There are four major river systems in Bhutan namely Torsa, Wangchu (known as Raidak in India), Sankosh and Manas. All these rivers having large snow fed perennial flows, afford attractive possibilities of hydro-electric development. The demand for electricity in Bhutan is expected to be meager in the near foreseeable future as compared to the hydro-electric potential. The hydro-electric potential of Bhutan could be harnessed for the mutual benefits of both India and Bhutan.

Bhutan has a feasible hydro potential of 23,760 MW from 76 hydro schemes (> 10 MW capacity). The present hydro installed capacity in Bhutan is about 2326 MW (9.78%). Out of this 2136 MW has been developed with Indian technical and financial assistance. Further, 2820 MW (11.86%) is under construction and 7285 MW (30.66%) is under various stages of development with Indian technical and financial assistance.

An agreement concerning co-operation in the field of hydroelectric power was signed between Government of India (GoI) and Royal Government of Bhutan (RGoB) on 28.07.2006.

- (i) update the capacity of Punatsangchhu-II to **1020 MW**.
- (ii) **Kholongchhu HEP (600 MW) under construction by Joint Venture (JV) of SJVN & DGPC**, may also be included under the major upcoming projects alongwith Punatsangchhu-I (1200 MW) and Punatsangchhu-II (1020 MW) HEPs.

❖ **Present Power Transfer:** About 2070 MW (power allocated to India)

Generation Project	Inst. Cap. (MW)	Power supplied by
Tala	1020	Bhutan (Druk Green Power Corporation) to India
Chukha	336	
Kurichu	60	
Dagachu	126	JV of Tata & Bhutan. Power being sold through trader.
Mangdechhu	720	Mangdechhu Hydroelectric Project Authority (MHPA)
Total	2262	

Present Interconnections:

- Kurichu HEP – Geylephu (Bhutan) – Salakati 132kV S/c
- Deothang/Motonga – Rangia 132kV S/c
- Chukha HEP – Birpara 220kV (3 circuits)
- Tala HEP – Siliguri 400kV 2xD/c
- Mangdechhu HEP – Alipurduar (via Punatsangchhu) 400kV D/c (Quad) line
- Jigmeling (Bhutan) – Alipurduar 400kV D/c (Quad) line
- ❖ The total hydro power projects expected to be commissioned in Bhutan by 2025, 2030 and 2040 conditions are 10000MW, 14000MW and 23500MW respectively. The corresponding demand of Bhutan is expected to be about 800MW, 1400MW and 3000MW respectively.

❖ **Future Power Transfer:** Total about 4290MW

Generation Project	Inst. Cap. (MW)	Comm. Schedule
Punatsangchhu-I	1200	2024-25
Punatsangchhu-II	1020	2022-23
Total	2220	

INDIA – BANGLADESH

A MoU between the Govt. of the Republic of India and the Government of the People's Republic of Bangladesh on Cooperation in Power Sector was signed on 11th January, 2010. A Joint Working Group (JWG) and a Joint Steering Committee (JSC), have been established.

The 19th meeting of Joint Working Group (JWG) and Joint Steering Committee (JSC) between India and Bangladesh on power sector cooperation was held on 21st and 23rd January, 2021 respectively in Dhaka, Bangladesh. The next meeting JWG/JSC could not be held due to COVID-19 pandemic. Mutually convenient dates are being finalized.

❖ **Present Power Transfer Capacity:** About 1160MW

- **1000MW** through Baharampur (India) – Bheramara (Bangladesh) 400kV 2xD/c line along with 2x500MW HVDC Back-to-Back terminal at Bheramara.

2nd Baharampur – Bheramara 400kV D/c line has been charged (1st circuit in June 2021 & 2nd circuit in Oct 2021)

- **160MW** through Surajmaninagar (Tripura) – North Comilla (Bangladesh) – South Comilla 400kV D/c radial interconnection (operated at 132kV).

Note: M/s Adani, India is establishing a 1600MW generation plant in India at Godda, Jharkhand for dedicated power supply to Bangladesh (in radial mode without interconnection with Indian grid), which is expected in 2022-23.

❖ Future Interconnections:

Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line

In the 18th meeting of JSC, Indian side mentioned that in the spirit of bilateral cooperation, India would like to go ahead with the financing and construction of the entire 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link. The Bangladesh side may synchronize through this link at Parbotipur at an appropriate time for drawal of power. Bangladesh side had welcomed the proposal of India's financing and construction of the 765kV D/c lines.

Major Scope of works:

- (a) Katihar (ER) – Parbotipur (Bangladesh) – Bornagar (NER) 765kV D/c line
[Katihar – Parbotipur: 177km, Indian part: 127km; Bangladesh part: 50km
Parbotipur – Bornagar: 238km, Indian part: 135km, Bangladesh part: 103km]
- (b) New 765/400kV substations at Bornagar (Assam) and Katihar (Bihar)
- (c) 765kV switching station at Parbotipur (Bangladesh)

Bangladesh India Friendship Power Company Limited (BIFPCL), a 50:50 Joint Venture company of NTPC and Bangladesh Power Development Board (BPDB) is setting up a coal-based power plant of 1,320 MW capacity. The project is located in Rampal (Khulna) and has been christened as 'Maitree Super Thermal Power Plant'. BHEL is executing this project on turnkey basis, financed by Indian EXIM Bank for USD 1.6 Billion. Project construction work is in progress.

NTPC Vidyut Vyapar Nigam (NVVN), NTPC's 100% owned subsidiary company, has been designated as the nodal agency by the Government of India (GoI) for cross border power trading with Bangladesh. Power Purchase Agreement (PPA) has been signed between NVVN and Bangladesh Power Development Board (BPDB) for supply of 250 MW power for 25 years from NTPC stations. Under this agreement power is being supplied to Bangladesh since October 2013.

Further two PPAs were signed between BPDB and NVVN for supply of 100 MW and 60 MW power from Tripura in March, 2016 and April, 2017 respectively. Both the agreements have been extended on 02nd Dec, 2021 for 5 years from their earlier validity (15th March 2021) to supply 160 MW + 20% (i.e. up to 192 MW) power through Tripura Cumilla link.

NVVN has won the international contract for supply of 300 MW Round the Clock (RTC) power to BPDB for 15 years in February, 2018. Accordingly, NVVN signed PPA with BPDB for supply of 300 MW power from DVC and supply commenced on 10th September, 2018. Settlement Nodal Agency (SNA) agreement between NVVN and BPDB is likely to be signed shortly.

During the current Financial Year, NVVN has supplied 3962 MUs (Provisional) to Bangladesh up to 31st December, 2021.

INDIA – SRI LANKA

- ❖ The present installed capacity of Sri Lanka grid is about 4GW and the peak demand is about 2.5GW. The annual energy demand on the country is about 14.5BU (Billion Units). The installed capacity and peak demand of Sri Lanka grid are expected to reach about 6GW and 3.4GW respectively in next 3-4 years.

❖ Future Interconnections:

Decision in the 4th JWG meeting:

- During the 4th JWG meeting held on 27-06-2019, it was decided that the Joint Technical Team (JTT) may prepare the Detail Project Report (DPR) for New Madurai to New Habarana 2x500MW VSC based overhead HVDC line.

Broad Scope of Works

- Phase-1: 1000MW Madurai-New (India) to New Habarana (Sri Lanka) HVDC (overhead) line (about 397km) along with 500MW VSC based HVDC terminals at both ends: by 2025
- Phase-2: 2nd 500MW VSC based HVDC terminals at Madurai-New and New Habarana: by 2030.

➤ Tentative Cost:

- **Phase-1 (1st 500MW):** Rs. 3318.81 Cr. at Sept 2019 price level (as per draft DPR)
- **Phase-2 (2nd 500MW):** additional about Rs. 900 Cr. (tentative)

Trincomalee Power Company Ltd. (TPCL) is a joint venture Company between NTPC Ltd. and Ceylon Electricity Board, Sri Lanka (CEB) incorporated in Sri Lanka on 26th September, 2011. NTPC and CEB each hold 50% equity share capital of the Company. TPCL shall develop 50MW solar power project at Sampur.

Further, a Joint Venture & Shareholders' Agreement (JVSHA) for incorporating a new JV company in Sri Lanka has been signed between NTPC and CEB on 25th October, 2019, with an objective to develop 300 MW LNG Power Project at Kerawalapitiya. Project Agreements, in this regard, are under finalization.

INDIA – MYANMAR

An MoU between the Government of the Republic of India and the Government of the Republic of the Union of Myanmar on Cooperation in the field of Power Sector was signed on 19th Oct, 2016. Cooperation between India and Myanmar is steered by Working Group on Power and Electricity Generation. The last JWG/JSC meeting was held in September, 2020.

❖ Present Power Transfer:

- About 3MW power is being supplied to Tamu (Myanmar) from Moreh (Manipur) through 11kV radial line.
- ❖ The hydro potential in Myanmar is about 108GW with exploitable capacity of about 43GW. However, presently only 3-4GW has been tapped



❖ Future interconnections:

Following has been decided with regard to future interconnections in 3rd meeting of JWG & JSC held on 03rd Sept 2020:

- Low voltage radial interconnection between Indian side and neighbouring villages on Myanmar side.
- High Capacity High Voltage Grid Interconnection.

COOPERATION WITH OTHER COUNTRIES

AUSTRALIA

The collaboration with Australia in the energy sector is under the India – Australia Energy Dialogue. There are the following five Joint Working Groups (JWGs) under the Dialogue:

- Power - led by Ministry of Power.
- Renewable Energy - led by MNRE.
- Coal and Mines - led by Ministry of Coal.
- Critical Minerals - led by Ministry of Mines.
- Oil and Gas - led by MoPNG.

All the JWGs have met in 2021 and will present their reports to Hon'ble Ministers during the India – Australia Energy Dialogue. Mutually convenient dates for holding the Dialogue are being finalized in consultation with MEA and the Australian side.

The JWG on Power was held on 5th October, 2021 by VC. The following forward action plan was agreed to during the meeting:

- Promote opportunities for two-way investment in grid infrastructure and the energy sectors, including in large scale generation, storage, hydrogen and critical minerals/battery supply chain investment and research and development.
- Collaborate and share knowledge on a range of areas: energy efficiency technologies, including on digitalisation and dynamic energy management systems for buildings; grid management, including modelling and simulation tools, imbalance pricing and settlement rules.
- Seek opportunities for R & D collaboration on flue gas desulphurisation, biomass or hydrogen co-firing, water cycle optimisation, renewables integration, batteries and electric mobility.

Further, a meeting was also held between the Hon Mr. Tony Abbott, Special Envoy of PM and former PM of Australia and Hon'ble Minister for Power and NRE on 5th August, 2021. During the discussions, Mr. Abbott handed over a report titled "Unlocking Australia – India Critical Minerals Partnership Potential". The Report brings out potential of India companies acquiring mineral resources in Australia including the minerals of strategic value from the perspective of manufacturing of batteries for electric vehicles and battery energy storage systems. The report has been shared with NITI Aayog, Mo Mines and DHI for considering the potential of cooperation with Australia in the critical minerals sector.

DENMARK

India and Denmark signed a MoU for cooperation in the power sector on 5th June, 2020. The third meeting of the JWG under the

MoU was held on 8th September, 2021. Both sides took stock of the ongoing collaboration and agreed to a detailed forward action plan for the ten areas of cooperation which are as below:

- Area of cooperation #1: Energy Planning Modelling and forecasting scenarios in respect of power sector
- Area of cooperation #2: Integration of variable renewable energy, including e.g. forecasting
- Area of cooperation #3: Power markets including monitoring tools, etc
- Area of cooperation #4: Optimizing flexibility of electrical power systems
- Area of cooperation #5: Consolidation of Grid Codes to integrate and operate efficiently variable generation
- Area of cooperation #6: Ancillary Services
- Area of cooperation #7: Cross Border Trading of Electricity
- Area of cooperation #8: Transfer of technology for emission control from Thermal power plants
- Area of cooperation #9: Monetization of waste steam from thermal power plants
- Area of cooperation #10: Flexibility in operation of power plants for RE integration

GERMANY

The Indo-German Energy Forum (IGEF) was established in 2006 as an institutionalized energy dialogue with the aim of promoting Indo-German co-operation in the areas of energy security, energy efficiency including energy conservation, renewable energy, investment in energy projects and collaborative research and development considering the environmental challenges of sustainable development.

The last meeting of the IGEF was held on 1st November, 2019 in New Delhi. The Forum finalized the roadmap for future collaboration between the two countries which, inter-alia, include Flexibilisation of existing coal fired power plants, promoting niche markets for Solar Energy, promotion of energy efficiency in buildings through ECBC, building materials and credit lines for financing corresponding measures and RE evacuation through state-of-the-art intra-state and inter-state transmission grid infrastructure.

Four Sub-Groups namely – Efficiency Enhancement in Fossil Fuel based Power Plants; Renewable Energies; Demand side energy efficiency and low carbon growth strategies; and Green Energy Corridors, have been constituted under the Forum.

Out of these, the Sub-Group - I and III are handled by Ministry of Power/ BEE. The last meeting of the Sub Group I and III were held in Aug and Oct, 2020 respectively.

JAPAN

The cooperation with Japan in the energy sector is steered under the Indo – Japan Energy Dialogue. There are five Working Groups under the India – Japan Energy Dialogue namely,

- Electricity & Power Generation
- Energy Efficiency

- Coal
- Renewable Energy and Hydrogen
- Petroleum and Natural Gas

The last (10th) India – Japan Energy Dialogue was held on 10th December, 2019 in New Delhi. Minister of State (IC) for Power, NRE and Skill Development & Entrepreneurship, Shri R.K. Singh, and Minister of Economy, Trade and Industry (METI), Mr. Kajiyama Hiroshi signed a Joint Statement at the conclusion of the meeting.

Both Ministers took stock of the work done under the different Working Groups. Both the countries endorsed the importance of working towards sustainable growth for preserving our environment. In addition to following the practices like flexibilization of coal fired thermal plants and ramping up RE sources, the countries agreed to work towards utilizing non-conventional sources like Hydrogen.

The last meeting of the working group on Electricity & Power Generation (led by MoP) was held on 5th March, 2020 in New Delhi. Discussions were held on the following points:

a. Technical cooperation

- Promoting the deployment of Automatic Generation Control (AGC)
- Strengthening renewable energy forecasting
- Introduction of reactive power control for voltage (VQC)

b. Personnel cooperation

It was mutually agreed to depute a long term JICA expert (Energy Advisor) to CEA to advice on India's energy policy, especially in grid stability including pumped storage hydro power. The Expert has joined CEA.

Further, Ministry of Economy, Trade and Industry (METI), Japan held the first Asia Green Growth Partnership Ministerial Meeting (AGGPM) in virtual format on 4th October, 2021. India was represented at the meeting by Chargé d' affaires, Mr. Mayank Joshi who read a speech on behalf of Minister of Power and Minister of New and Renewable Energy, H.E. Shri Raj Kumar Singh.

UNITED KINGDOM

The Indian – UK Energy Dialogue was established in 2017. An MoU between the Government of the Republic of India and the Government of the United Kingdom of Great Britain and Northern Ireland on "Co-operation in the Energy Sector" was signed on 11th November, 2015. There are two Joint Working Groups under this MoU - Working Group on Power and Working Group on Renewable Energy.

The third India-UK Ministerial Energy Dialogue was held on 8th October, 2021. The Indian side was led by Hon'ble Minister of Power and New and Renewable Energy, Mr. RK Singh and the UK side was led by Hon Secretary of State for Business, Energy and Industrial Strategy, Mr. Kwasi Kwarteng.

Both sides reviewed the progress on UK-India collaboration and set out a forward action plan on areas such as offshore wind and Green Hydrogen, to take the cooperation forward.

UNITED STATES OF AMERICA

The cooperation between India and the US in the Power sector is under the umbrella of US – India Strategic Clean Energy Partnership (SCEP). The SCEP has four pillars viz., Oil & Gas; Power & Energy Efficiency; Clean & Renewable Energy; and Sustainable Growth. The pillar on "Power & Energy Efficiency" is led by Ministry of Power.

Secretary of Energy Jennifer Granholm and Indian Minister of Petroleum and Natural Gas Hardeep Singh Puri, held the first ministerial meeting of the newly revitalized U.S.-India Strategic Clean Energy Partnership (SCEP) on 9th September, 2021. The SCEP will enhance its focus on clean energy and decarbonization while strengthening work streams on energy security and access.

The "Power and Energy Efficiency" pillar (led by MoP) is tasked with work to improve reliability, resilience, flexibility, affordability, and sustainability of the power system. The last meeting of the pillar was held on 13th July, 2021 by video conference.

The final reports for the national study and resource adequacy recommendations under the Flexible Resources Initiative (FRI) were presented on 9th December, 2021. The study assesses a least-cost, operationally feasible investment pathway for achieving Prime Minister Modi's target of 500 GW of installed non-fossil fuel-based capacity by 2030 of the U.S.-India Clean Energy Finance Task Force (Task Force).

MULTILATERAL COOPERATION:

INTERNATIONAL ENERGY AGENCY (IEA)

The International Energy Agency (IEA) is an autonomous organization which was set up in response to the 1973-74 oil crisis. The oil crisis was the result of an embargo imposed on the USA by OPEC in retaliation for the US decision to support Israel during the Arab-Israel war. The nodal Ministry dealing with IEA in the Government of India is the Ministry of Power.

India became a partner country of IEA in November, 2013. India has been a partner country until March 30, 2017 and cooperation with IEA has been through the Joint Statement and joint schedule of actions, agreed during the IEA Ministerial every two years. On 30th March 2017, India announced the activation of "Association" status with the International Energy Agency (IEA).

A Declaration of Strategic Partnership is under finalization between IEA Members and Gol. The areas of collaboration will be on the following themes:

- Energy security, including on strategic petroleum reserves
- Governance, engagement, institutional roles
- Transparency and data
- Substantive cooperation across the full spectrum of IEA activities, including clean and sustainable energy, energy efficiency, and gas security.

Also, a Work Programme 2021-23 is in advanced stages of finalization based on consultation among different Ministries of Gol. The Joint Work Programme for 2021-2023 will build on the existing collaboration between India and IEA as both work together to develop the content of a Strategic Partnership to deepen the substantive cooperation and institutional relations.



BRICS

A Memorandum of Mutual Understanding in energy saving and energy efficiency among the ministries and governmental agencies of BRICS, responsible for energy and energy efficiency was signed in November, 2015.

India has assumed the BRICS presidency for the year 2021. The Meeting of BRICS Ministers of Energy was held on 2nd September, 2021 by VC. Hon'ble Minister of State for Power and Heavy Industries, Shri Krishan Pal Gurjar participated in the Energy Minister's Summit of BRICS member countries. Emphases were laid on the need for promoting energy efficiency and renewables to combat adverse effect of climate change.

The BRICS Energy Ministers agreed for pragmatic, equitable and economically viable approach towards reaching energy and climate goals including Paris Agreement temperature goals through building cleaner sustainable low-GHG emission energy systems. They reiterated their commitment to make efforts to foster open, fair, and non-discriminatory trade environment, ensure greater participation in global value chains, promote digital inclusion, assess the implications, and encourage the progressive, safe, equitable, and sustainable use of disruptive technologies for advancing growth.

The Energy Ministers' Summit of BRICS countries was the concluding event as part of energy dialogue between member countries started since April 2021. As part of various events like hydrogen webinar, building energy efficiency and battery storage were conducted and saw participation of large number of experts from these countries. Under the prominent efforts under India's presidency include publishing of BRICS Energy Report, BRICS Energy Technology report and BRICS Research Directory containing valuable information of the member countries.

THE EUROPEAN UNION

The cooperation with EU in the Energy Sector is under the India – EU Energy Panel (led by MEA). There are four JWG's under the Panel viz Energy Security; Renewable Energy; Energy Efficiency, Smart Grids, and Electricity Markets; and Clean Coal.

The JWG on "Energy Efficiency, Smart Grids, and Electricity Markets" is led by Ministry of Power. The third meeting of Joint Working Group on "Energy Efficiency, Smart Grids and Electricity Markets" with the EU was held virtually on 27.06.2021. Discussions were held on Energy Efficiency, Smart Grids and Storage, and Electricity Market and Regulation, offshore wind, Electric Vehicles and cross-border trade of electricity.

The following areas of cooperation were identified during the meeting:

- A dedicated discussion between experts from DG ENER and the BEE on the energy efficiency first principle and sharing results of EU study.
- Generate ideas/concepts around the principle how it can be aligned with India policy context.
- Conduct a feasibility for net/nearly zero tourist locations.
- Develop standard design for Energy-efficient climate friendly and low-cost cold storage (new proposed activity).

- Launch of the Electrification Strategy document.
- One knowledge exchange event (possible webinar) between EU banks/FIs and Indian banks/FIs on energy efficiency financing.
- Carry out a detailed assessment of the finalized technologies - technology cost, payback period, degree of innovation, replication potential, energy saving potential etc.

G20

G20 is a leading forum of the world's major economies that seeks to develop global policies to address today's most pressing challenges. The G-20 member countries account for 80% of current renewable electricity capacity in the world, and hold 75% of the total global potential for renewables, making them key players in mitigating climate change.

The G20 Italy presidency organized the Ministerial Meeting on 30-31 October, 2021. The countries reaffirmed their commitment to the full and effective implementation of the UNFCCC and of the Paris Agreement, taking action across mitigation, adaptation and finance during this critical decade, on the basis of the best available scientific knowledge, reflecting the principle of common but differentiated responsibilities and respective capabilities, in light of different national circumstances. They also committed to significantly reduce collective greenhouse gas emissions, taking into account national circumstances and respecting NDCs.

CLEAN ENERGY MINISTERIAL (CEM)

Clean Energy Ministerial (CEM) is a high-level global forum created since 2009, to share lessons learnt and best practices, and to encourage the transition to a global clean energy economy. There are 26 participating members in the CEM. Poland and New Zealand are currently in the process of joining the CEM.

The CEM is focused on three global climate and energy policy goals:

- Improve energy efficiency worldwide.
- Enhance clean energy supply.
- Expand clean energy access.

India is a founding member of the CEM, and hosted the Ministerial meeting in 2013 and co-leads and participates across several work-streams. India currently leads on five CEM work-streams as follows:

- 21st Century Power Partnership (21CPP) Initiative
- International Smart Grid Action Network (ISGAN) Initiative
- Super-efficient Equipment and Appliance Deployment (SEAD) Initiative
- Advanced Cooling Challenge (ACC)
- Power System Flexibility Campaign (PSF)

Also, India is part of following initiatives and campaigns of CEM:

- Multi-lateral Solar and Wind Working Group Initiative
- Electric Vehicles Initiative (EVI)

- Energy Management Working Group (EMWG) Initiative
- Carbon Capture, Utilization and Storage Initiative (CCUS)
- Hydrogen Initiative (H2I)
- Clean Energy Solutions Center Initiative
- Accelerating the adoption of Distributed Generation in Strategic Regions Campaign
- Long-term Energy Scenarios for the Clean Energy Transition (LTES) campaign
- EV30@30 Campaign
- Energy Management Campaign

The 12th Clean Energy Ministerial (CEM12) was hosted by the government of Chile on 3rd June, 2021. The side events were held from 31st May – 5th June, 2021. The event was held virtually owing to the COVID-19 pandemic. CEM12 focused on the theme of “ambition into action – turning a year of clean energy ambition into a decade of delivery”. It brought the global clean energy community together to show leadership through insight, inspiration, and impact.

Members announced a new, more ambitious phase of the CEM, welcomed Poland and Portugal as new members, and confirmed the United States was as CEM13 host in 2022 and, India as the hosts for the 14th Clean Energy Ministerial (CEM14) in 2023.

INTERNATIONAL FUNDING

List of projects approved by Ministry of Power for foreign funding [loan/grant/Technical Assistance(TA)] in FY 2021-22:

Sr. No.	Project Name	State Govt/ Implementing Agency	Financial Body	Total Project Cost in Crores	Loan Amount Crores
1.	Sikkim Power Sector Development Project	Govt. of Sikkim	ADB	Loan	1112.77
2.	Lower Tizu Hydro Electric Project (3X14 MW)	Govt. of Nagaland	ADB	Loan	432.90
3.	Policy Based Loan (PBL) to support Power Sector Reforms	RECL/PFC	ADB	Loan	3700
4.	Technical Assistance (TA) to support Power Sector Reforms	RECL	ADB	TA	–
5.	Revitalizing India's Electricity Distribution Sector	PFC	World Bank	Loan	7500
6.	Solar Projects Financing Facility	RECL	KfW	Loan	1321
7.	Accompanying measures for Solar Projects Financing Facility	RECL	KfW	TA	–
8.	Implementation Agreement for the project "Indo-German Energy Programme-Energy Transition with DISCOMs"	MoP	GIZ	TA	–

WORLD ENERGY COUNCIL (WEC)

World Energy Council (WEC) is a global body promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all. Established in 1923, with over 90 country members, WEC is a global and inclusive body existing for thought leadership and tangible engagement in the pursuit of sustainable supply and use of energy.

World Energy Council (WEC) India is the country member of World energy Council (WEC) and functions under the patronage of Ministry of Power and Secretary (Power) as Chairman.

Present engagements of WEC India cover Energy dialogue platforms (India Energy Congress, Energy Dialogues), participation in global studies, Information dissemination through daily energy news bulletin, on line energy portal etc. At the global level, WEC India participated in the World Energy Council global platforms of World Energy Week LIVE 2020 and World Energy Leaders' Summit (WELS).

The World Energy Leaders' Summit (WELS) was held digitally on 6th October 2021. This event was part of the annual World Energy Week LIVE (WEW),

hosted from Kazakhstan, under the theme of “Energy for Better Lives”. It was an important milestone in shaping the global energy leadership agenda for the 25th World Energy Congress proposed to be held in St Petersburg, in October 2022.



View of Dam & Power House of 75 MW Doyang Hydro Power Station, Nagaland

CHAPTER 15

POWER DEVELOPMENT ACTIVITIES IN NORTH EASTERN REGION

TRANSMISSION

In order to strengthen transmission, sub-transmission and distribution system of North Eastern Region and Sikkim, following two Schemes had been approved by the Government of India:

- (i) **'North Eastern Region Power System Improvement Project (NERPSIP):** 'North Eastern Region Power System Improvement Project (NERPSIP) for Six (6) States (Assam, Manipur, Meghalaya, Mizoram, Tripura and Nagaland) for strengthening of the Intra-State Transmission and Distribution Systems (33kV and above)' was approved by Government of India in December 2014 at an estimated cost of Rs. 5111.33 crore with estimated completion time of December 2018. The cost was subsequently revised to Rs. 6700 crore with revised completion time of December 2021. The scheme is funded by Government of India with 50% of project cost funded by loan from World Bank. The project is implemented by POWERGRID.

During the year 2021-22 (till December 2021), total 94 nos of sanctioned elements (lines and substations) have been completed leading to completion of 339 elements out of sanctioned 446 elements. Rs. 3431.57 crore has been spent by POWERGRID in the project till December 2021.

- (ii) **Comprehensive Scheme for strengthening of Transmission & Distribution in Arunachal Pradesh and Sikkim:** Comprehensive Scheme for Strengthening of Transmission & Distribution Systems in Arunachal Pradesh and Sikkim' was approved by Government of India in October 2014 at an estimated cost of Rs.4754.42 crore with estimated completion time of December 2018. The cost has been subsequently revised to Rs.9129.32 crore, with completion time of December 2021 for awarded scope of work (204 elements) and March 2024 for unawarded packages (88 elements). The project is entirely funded by the Government of India. The project is implemented by POWERGRID.

During the year 2021-22 (till December 2021), total 12 nos of sanctioned elements (lines and substations) have been completed leading to completion of 72 elements out of sanctioned 292 elements. Rs. 3062.73 crore has been spent by POWERGRID in the project till December 2021.

The status of on-going projects which are likely to yield benefits during next five years is as under:

CENTRAL SECTOR PROJECTS

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.

Project is in advance stage of construction. Two (2) units are likely to be commissioned during 2022-23 and remaining six (6) units by 2023-24.

The project is planned to be commissioned in FY 2022-24.

- (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 till March 2020, project was stalled due to financial crunch with the developer.

During the year 2018, 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.

Taking over along with all assets and documents as 'Going concern' completed on 09.10.2019.

The remaining works of the project were re-awarded by NHPC during the year 2020 and the project is slated for completion 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 crunch with the developer. The project Lenders file application in court of Hon'ble National Company Law Tribunal (NCLT), on 24th April, 2018.

Hon'ble NCLT approved the NHPC resolution plan vide order dated 24.12.2020. MoP on 30.03.2021 conveyed investment approval for acquisition of JPCL by NHPC and construction of balance works. On 31.03.21, NHPC took over JPCL.

Status of Award of various packages:

- **HM Package:** For Execution of balance works, HM package LOT-II awarded on 28.06.2021.
- **E&M Package (7 Packages):** For execution of balance works, E&M II awarded BOP items on 08.07.2021. Balance six packages of E&M works are in various stages of tendering process.
- **Civil Package:** For execution of balance civil works, Civil Package Lot-I awarded on 27.08.2021.

The project is slated for commissioning by 2024-2025

STATE SECTOR PROJECTS

i) Lower Kopli HEP (2x55 + 2x2.5 + 1x5 = 120 MW), Assam

The project is located in Dima Hasao District in northern region of Assam State on Kopli at Longku. The project was Techno-Economically cleared by CEA on 24.05.2016 to M/s Assam Power generation Corporation Ltd. (APGCL) at an estimated cost of Rs. 1115.91 crores with the schedule commissioning in 2023-24. The revised cost of the project is Rs. 1847.07 crores with likely commissioning in 2024-25 (June 2024). The delay of the start in construction work is due to forest clearance/handing over of forest land for Package-2 of the project. The design energy of the project is 469.58 MU. The project envisages construction of concrete gravity Dam of 66 meter high and 335 meter long, one no. of HRT of 7m Dia and 3641.22 meter long, Surge Shaft of 25 m diameter and 51.5 meter height, one no. of Pressure Shaft of 6.1 m diameter and 451.20 meter long.

All civil major packages were awarded to M/s L&T on 05.08.2020 and the work has started from 1st Sep, 2021. The work of Electro-Mechanical is awarded to M/s Andritz Hydro Pvt Ltd. on 09.09.2021. Excavation works on Surge Shaft, Switchyard, Adit to HRT excavation and power House excavation are under progress and the project is slated for commissioning by June 2024.

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 is stalled due to financial crunch 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 crunch with the developer. The project is in NCLT since 30th July, 2020.

iii) 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.

Construction works is held up. Issue of construction of bridge on Mantham Lake for accessibility of site is under discussion with the State Govt. of Sikkim. About 48 months will be required for completion of the project after restart of works.

- A. Power projects being developed by NEEPCO in the NE Region are as under:

PROJECTS UNDER CONSTRUCTION:

As of now, there are no project (s) of NEEPCO under construction.

FUTURE PROJECTS PLANNED BY NEEPCO ON OWNERSHIP BASIS:

Sl. No.	Name of the Project	State	Installed Capacity (MW)
Hydro			
1.	Wah Umiam St-III HEP	Meghalaya	85
2.	Wah Umiam St-I HEP		50
3.	Wah Umiam St-II HEP		100
4.	Nafra HEP	Arunachal Pradesh	120
5.	New Melling HEP		90
TOTAL			445 MW

FUTURE PROJECTS PLANNED BY NEEPCO THROUGH JOINT VENTURE BASIS:

SL. No.	Name of the Project	State	Installed Capacity (MW)
Hydro			
1.	Kurung HEP	Arunachal Pradesh	330
3.	Siang Upper St-II HEP#	Arunachal Pradesh	3750
TOTAL			4080

Note: MoP vide Letter dated 18th Nov'15 communicated its decision to put on hold the works on Siang upper Stage II project till a decision is taken regarding implementation of Siang Upper St-I & St-II HEPs in single stage or two stages. As indicated by MoP on 22.12.2021

Siang Upper HEP is to be developed in single stage with an installed capacity of 10,000 MW in joint venture between NHPC and NEEPCO.

In order to review the stalled projects in various parts of the country, especially in Arunachal Pradesh, Hon'ble Minister of Power & NRE had approved the basin wise division of projects in Arunachal Pradesh for development by the hydro CPSUs viz., NHPC, SJVNL, THDCIL & NEEPCO. NHPC has been allocated 3 projects of aggregate capacity 6680 MW, SJVNL has been allocated 5 projects of aggregate capacity 5097 MW, THDCIL is allocated 2 projects of aggregate capacity 2950 MW, NEEPCO with 17 projects with aggregate capacity of 4988 MW. 2 projects with aggregate capacity of 12700 MW are intended to be developed by NHPC and NEEPCO in JV mode.

- B. NHPC including its subsidiaries, have been operating 24 power stations with installed capacity of 7071.2 MW. Out of these, 3 power stations with total installed capacity of 675 MW are located in North-East region. NHPC has commissioned 105 MW Loktak Power Station in the year 1983 in Manipur. Subsequently, it has commissioned 60 MW Rangit Power station in the year 2000 and 510 MW Teesta-V in the year 2008 both in Sikkim. These Power Stations have generated 62892 MU since commissioning. In addition to this, NHPC has also commissioned two Projects namely 4 MW Kambang and 6 MW Sippi HE Projects on turnkey / Deposit basis.

In addition to above, NHPC is implementing 2000 MW Subansiri Lower HE Project on Subansiri river, a tributary to Brahmaputra on the border of Arunachal Pradesh and Assam. The Project is scheduled to be commissioned in Aug' 2023 and as on 31.12.2021 70.74% of Physical work is completed and 73.70% of financial progress has been achieved. NHPC has also revived two stalled hydro Projects, 500 MW Teesta-VI and 120 MW Rangit-IV both in Sikkim by acquiring the Projects through NCLT route. With the construction of above Projects, besides power generation the surrounding area has also been benefitted by development of infrastructure, education, medical facilities and employment avenues. Further, the local population in the vicinity of Projects gets benefitted from NHPC's CSR schemes.

A brief summary of these Power Stations / Projects are as under:

NHPC POWER STATION IN OPERATION IN NORTH EAST REGION

SL. No.	POWER STATION	INSTALLED CAPACITY (MW)	ANNUAL DESIGN ENERGY (MU)	YEAR OF COMMISSIONING
MANIPUR (105 MW)				
1.	LOKTAK	105 (3X35)	448	1983
SIKKIM (570 MW)				
1.	RANGIT	60 (3X20)	338.61	2000
2.	TEESTA-V	510 (3X170)	2573	2008
POWER STATION UNDER OPERATION (03 nos.)		675	3359.61	



NHPC PROJECTS UNDER CONSTRUCTION IN NORTH EAST REGION

SL. No.	PROJECT	STATE/DISTRICT	INSTALLED CAPACITY (MW)	ANNUAL DESIGN ENERGY (MU)	LIKELY COMPLETION
UNDER CONSTRUCTION - ON ITS OWN					
1.	SUBANSIRI LOWER (NHPC OWN)	Arunachal Pradesh (Lower Subansiri) Assam (Dhimaji)	2000	7421.59	FY 2023-24
UNDER CONSTRUCTION - THROUGH SUBSIDIARIES					
1.	TEESTA-VI (through TLHCL 100% subsidiary of NHPC)	Sikkim / South Sikkim	500	2400.00	FY 2023-24
2.	Rangit-IV (through JCL 100% subsidiary of NHPC)	Sikkim / West Sikkim	120	513.00	FY 2024-25
PROJECTS UNDER CONSTRUCTION (03 nos)			2620	10334.59	

NHPC PROJECTS UNDER CONSTRUCTION IN NORTH EAST REGION

SL. No.	PROJECT	STATE/DISTRICT	INSTALLED CAPACITY (MW)	ANNUAL DESIGN ENERGY (MU)	REMARKS
1.	Dibang MPP (Completion period-108 months)	Arunachal Pradesh (Lower Dibang Valley)	2880	11222.61	Matter regarding cost of compensation for land acquisition is subjudice. Draft PIB memo at May'21 PL is under examination in Ministry of Power.
2.	Teesta-IV (Completion period-74 months)	Sikkim/ North Sikkim	520	2251.89	FC (St-II) is pending for want of Compliance under FRA 2006. PIB Memo at Apr'21 PL circulated by MoP.
UNDER CLEARANCE - THROUGH JV / SUBSIDIARY					
3.	Loktak D/S (Completion period-63 months)	Manipur/ Noney	66	333.76	PIB Meeting held on 14.07.21. MoM issued on 12.08.21. PIB will reconsider investment sanction on submission of Confirmations/ clarifications by NHPC & Govt. of Manipur.
PROJECTS UNDER CLEARANCES (03 nos)			3466	13808.26	

PROSPECTIVE PROJECTS TO BE TAKEN OVER BY NHPC IN NORTH EAST REGION

SL. No.	STATE	PROJECT	INSTALLED CAPACITY (MW)	REMARKS
1.	Arunachal Pradesh	Subansiri Middle (Kamla)	1800	Matter regarding cost of compensation for land acquisition is subjudice. Draft PIB memo at May'21 PL is under examination in Ministry of Power.
2.	Arunachal Pradesh	Subansiri Upper	2000	FC (St-II) is pending for want of Compliance under FRA 2006. PIB Memo at Apr'21 PL circulated by MoP.
3.	Arunachal Pradesh	Siang Lower (Possible JV with NEEPCO)	2700	
4.	Arunachal Pradesh	Upper Siang (Possible JV with NEEPCO)	10000	PIB Meeting held on 14.07.21. MoM issued on 12.08.21. PIB will reconsider investment sanction on submission of Confirmations/ clarifications by NHPC & Govt. of Manipur.
TOTAL			16500	

- C. SJVN is exploring opportunities in the North-Eastern region for development of hydro projects. Recently, Govt. of India vide letter dated 22.12.2021 identified SJVN for development of five hydro projects namely 3097 MW Etalin, 680 MW Attunli, 500 MW Emini, 400 MW Mihumdon and 420 MW Amulin HEPs totalling 5097 MW capacity in Dibang basin in Arunachal Pradesh. MoUs for these projects shall be signed soon with Govt. of Arunachal Pradesh.

NTPC Limited

NTPC's Bongaigaon Thermal Power Project in Assam has three

units of 250MW, each of which are under commercial operation. This station supplies power to all seven states under North Eastern Region.

SJVNL

SJVN is pursuing with Govt. of Arunachal Pradesh and exploring opportunities in the region for developing hydro projects. Recently, Govt. of India vide letter dated 22.12.2021 identified SJVN for development of five hydro projects totalling 5097 MW capacity in Dibang basin in Arunachal Pradesh.

CHAPTER 16

CENTRAL ELECTRICITY AUTHORITY (CEA)

1. Constitution of the CEA

The Central Electricity Authority (CEA) is a statutory organization constituted under Section 3(1) of the repealed Electricity (Supply) Act, 1948 and continued under 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.

As per section 70(3) of the Electricity Act, 2003, the Authority shall consist of not more than 14 members, including its Chairperson of whom not more than 8 shall be full-time Members to be appointed by the Central Government. The CEA is headed by a Chairperson who, as the Chief Executive of the Authority, oversees largely 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 Electricity Act 2003, assists the Chairperson in discharging CEA's statutory functions. The Secretary also assists him in all matters pertaining to administration and technical including Human Resource Development and Techno-Economic Appraisal and concurrence of power projects etc. Presently, there are six wings namely Planning, Hydro, Thermal, Grid Operation & Distribution, Economic & Commercial and Power System each headed by a Member of the Authority. Besides, there are also two CPES Cadre posts of Principal Chief Engineer (PCE) in the HA Grade. Under each Member, there are technical divisions, each headed by an officer of the rank of Chief Engineer. CEA has its Headquarters in New Delhi. In addition, CEA has offices located in various parts of the country. The CEA is responsible for overall power sector planning, coordination, according concurrence to hydro-electric schemes, promote & assist in timely completion of projects, specifying of technical standards, safety requirements, Grid Standards as well as conditions for installation of meters applicable to the Power Sector of the country. The CEA advises the Central Government on the National Electricity Policy and formulates the Perspective Plans for development of the electricity system. It also advises the Central and State Governments as well as the Electricity Regulatory Commissions on all technical matters relating to generation, transmission and distribution of electricity. It also has the mandate to collect, record and make public, data related to all segments of the electricity sector, carry out investigations and promote research.

2. Functions of the CEA

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

perform such functions and duties as the Central Government may prescribe or direct, and in particular to-

- a. Advise the Central Government on the matters relating to 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 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 the matters affecting 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-owing 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 section 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 the 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 suggestion 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 Central Government 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 –Electricity Generation

1. 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 coordinate their activities with the activities of the persons responsible for such scheme in so far as they are interrelated.

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 a 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) No licensee shall supply electricity, after the expiry of two years from the appointed date, except through installation of a correct meter in accordance with the regulations to be made in this behalf by the Authority;

Provided that the licensee may require the consumer to give him security for the price of meter and enter into an agreement for the hire thereof, unless the consumer elects to purchase a meter;

Provided further that the State Commission may, by notification, extend the said period of two years for a class or classes of persons or for such areas as may be specified in that notification.

- 2) 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.
- 3) If a person makes default in complying with the provisions contained in this section or the regulations made under sub-section (1), the appropriate Commission may make such orders as it thinks fit for requiring the default to be made good by the generating company or licensee or by any officer of a company or other association or any other person who is responsible for its default.

Section 177- Powers of the 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, namely:-
 - 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.

Framing and Amendments of the CEA Regulations under Section 177 of 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 System in Power System Operations) Regulations, 2020	27.02.2020



B. The 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—1st Amendment	26.06.2010
2	Central Electricity Authority (Technical Standards for Connectivity to the Grid) Amendment Regulations, 2013—1st Amendment	15.10.2013
3	Central Electricity Authority (Installation and Operation of meters) (Amendment) Regulations 2014---2nd Amendment	03.12.2014
4	Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Amendment Regulations, 2015—1st Amendment	07.04.2015
5	Central Electricity Authority (Measures relating to Safety and Electricity Supply) Amendment Regulations, 2015—1st Amendment	13.04.2015

6	Central Electricity Authority (Measures relating to Safety and Electric Supply) Amendment Regulations, 2018 - 2nd Amendment	01.03.2018
7	* Central Electricity Authority (Technical Standards for Connectivity below 33 kV) Amendment Regulations, 2019—1st Amendment	08.02.2019
8	Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019—2nd Amendment	08.02.2019
9	Central Electricity Authority (Measures relating to Safety and Electric Supply) (Amendment) Regulations, 2019- 3rd Amendment	28.06.2019

* The Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013 is titled as Central Electricity Authority (Technical Standards for Connectivity below 33 kV) Regulations, 2013 w.e.f. 08.02.2019.

Market Monitoring Cell, CEA:

A Dedicated Market Monitoring Cell has been in operation in CEA since April, 2019 for carrying out an in-depth analysis of variation of volume and price of electricity discovered under various types of contracts being executed through Power Exchanges under Short Term Power Market Segment. Market Monitoring Cell of Central Electricity Authority is preparing monthly and annual reports on power market transactions since April, 2019 and these reports are available on CEA's website.

CHAPTER 17

CENTRAL ELECTRICITY REGULATORY COMMISSION

1. INTRODUCTION

The Central Electricity Regulatory Commission (CERC), an independent statutory body with quasi-judicial powers, was constituted on 25th July, 1998 under the Electricity Regulatory Commissions Act, 1998 and has been continued under the Electricity Act, 2003. The Commission consists of a Chairperson, three full time Members and the Chairperson of the Central Electricity Authority as Ex-Officio Member.

2. FUNCTIONS OF CERC

As entrusted by the Electricity Act, 2003 the Commission has the responsibility to discharge the following functions:

- a. to regulate the tariff of generating companies owned or controlled by the Central Government;
- b. to regulate the tariff of generating companies other than those owned or controlled by the Central Government specified in clause (a), if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one State;
- c. to regulate the inter-State transmission of electricity;
- d. to determine tariff for inter-State transmission of electricity;
- e. to issue licenses to persons to function as Transmission Licensee and electricity trader with respect to their inter-State operations.
- f. to adjudicate upon disputes involving generating companies or transmission licensee in regard to matters connected with clauses (a) to (d) above and to refer any dispute for arbitration;
- g. to levy fees for the purposes of this Act;
- h. to specify Grid Code having regard to Grid Standards;
- i. to specify and enforce the standards with respect to quality, continuity and reliability of service by licensees.
- j. to fix the trading margin in the inter-State trading of electricity, if considered, necessary;
- k. to discharge such other functions as may be assigned under this Act.

Section 79 (2) of the Electricity Act, 2003 lays the onus on CERC to advise the Central Government on matters such as:

- a. formulation of National Electricity Policy and tariff policy;
- b. promotion of competition, efficiency and economy in activities of the electricity industry;

- c. promotion of investment in electricity industry;
- d. any other matter referred to the Central Commission by that Government.

3. MAJOR ACTIVITIES DURING THE YEAR 2021-22 (UPTO 31 December, 2021)

A. Major Regulations Notified

a. Central Electricity Regulatory Commission (Power Market) Regulations, 2021

The Commission, on 15th February 2021, notified the Central Electricity Regulatory Commission (Power Market) Regulations, 2021 to develop and regulate the power market, keeping pace with the developments in the power sector. The objective of the Regulations is to help in the creation of a comprehensive market structure and enable transaction, execution and contracting all types of possible products in the power markets. These Regulations made provisions for introduction of the longer duration Term Ahead physical delivery based contracts, Ancillary Services contract. The concept of OTC platform was introduced. These Regulations also provided for an enabling framework for Market Coupling among the Power Exchanges with an objective to discover the uniform market clearing price for the Day Ahead Market or Real-time Market. The Power Market Regulations have come into force from 15th August, 2021.

b. Revised Procedure for "Grant of connectivity to projects based on renewable energy sources to inter-State transmission system":

The Commission issued on 20.02.2021, the Revised Procedure for "Grant of Connectivity to projects based on renewable sources to inter-State transmission system" in pursuance of the 7th Amendment to the CERC (Grant of Connectivity, Long Term Access and Medium Term Open Access in inter-State Transmission and related matters) Regulations, 2009. Salient features of the Revised Procedure are as under :

- i. Provisions related to Bank Guarantee have been relaxed and amount of Conn-BG2 in terms of Clause 10.8(a) of this Procedure shall be forfeited and any excess amount submitted as Conn-BG under the Pre-revised Procedure shall be refunded.
- ii. CTU shall display the updated status of allocation of bay(s) (inter alia quantum of Stage- II Connectivity granted bay-wise, bay-wise balance quantum for which Stage-II Connectivity can be granted) at the



existing or the proposed ISTS sub-stations on its website on weekly basis.

- iii. Change in the location of project keeping the connectivity with ISTS substation same shall not be construed as material change in location under first proviso to Regulation 8(1) of Connectivity Regulations.
- iv. An entity implementing the Renewable Hybrid Generating Station(s) including Round the Clock Hybrid Project, shall be eligible to apply for separate Stage-II Connectivity for each location based on the same LOA or PPA, for the capacity of the project not exceeding the quantum of power for which LOA has been awarded or PPA has been signed. For this purpose, the locations and capacity at each such location, duly certified by the Renewable Energy Implementing Agency or the distribution licensee, as the case may be, shall be submitted along with the Connectivity applications.
- v. On a specific request of Stage-II Connectivity grantee(s) and for the purpose of optimal utilisation of transmission infrastructure, CTU may, after consultation with the Stage-II Connectivity grantee(s) concerned, carry out rearrangement or shifting of the Stage-II Connectivity across different bay(s) of the same ISTS sub-station.
- vi. Two or more Applicants may apply for Stage-II Connectivity at a common bay along with an agreement duly signed between such Applicants for sharing the Dedicated Transmission Line. The Stage-II Connectivity shall be granted to such Applicants subject to availability of capacity in the Dedicated Transmission Line.

B. Inter-State Trading License

By the end of 2020-21, there were 33 inter-state trading licensees. Out of these, about 25 licensees have undertaken either short-term or both short & long-term trading, while about 3 licensees have undertaken only long-term trading of electricity during 2020-21. These trading licensees undertake bilateral contracts for both buyers and sellers, separately for Round the Clock (RTC) period, peak period and other than RTC & peak periods. The volume of electricity transacted through trading licensees under bilateral trade has declined from 27.70 BU in 2010-11 to 26.67 BU in 2020-21. During the FY 2021-22 (upto November 2021), the total volume of electricity transacted through trading licensees is 26.79 BU (provisional).

C. Power Exchange Business

- a) Power Exchanges, established in 2008 and in operation for 13 years are functioning and providing trading platform for day-ahead market, term-ahead market, real-time market, Renewable Energy Certificates and Energy

Saving Certificates. The volume of electricity transacted on Power Exchanges has grown significantly from 15.52 BU in 2010-11 to 79.95 BU in 2020-21. The number of participants in Power Exchanges has also grown with over 5000 open access consumers across various states. During the FY 2021-22 (upto November 2021), the total volume of electricity transacted through Power Exchanges is 66.14 BU (provisional).

- b) The Commission in its Order dated 28.05.2020, directed the Power Exchanges to implement the Real-Time Market (RTM), designed for 15-minute delivery period in half hourly market at regular intervals throughout the day, on the exchanges. The RTM was implemented from 1st June, 2020.
- c) The Commission vide its Order dated 17.08.2020, directed the launch of Green Term-Ahead Market (GTAM) on the Power Exchanges, specific for renewable energy sources. The GTAM was introduced from 21st August, 2020.
- d) The Commission approved the introduction of Green Day Ahead Contracts in Integrated Day Ahead Market (IDAM) at the Power Exchanges vide its Order dated 17.10.2021, as an additional avenue for short-term trading of renewable energy. The IDAM was introduced from 26th October 2021.

D. Power Market Monitoring

A well-functioning electricity market requires an effective market monitoring process. As part of its market monitoring process, CERC has been preparing and publishing monthly and annual reports on short-term power market. The objectives of these reports are as under:

a. Monthly Report on Short-term Transactions of Electricity in India

is published with the objective:

The objective of the report is to:

- i. to observe the trends in volume and price of the short-term transactions (contract period of less than one year) of electricity;
- ii. to analyse competition among the market players; and
- iii. to disseminate all relevant market information.

b. Annual Report on the Short-term Power Market

in India analyses the trends in short-term transactions of electricity, provides analysis of transactions carried out by various types of participants with emphasis on open access consumers on power exchanges, effect of congestion on volume of electricity traded on power exchanges and ancillary services operations. The report also covers cross border trade of electricity between India and its neighbouring countries, tariff of long-term sources of power and analysis on transactions of Renewable Energy Certificates.

E. Regulations amended during the year

- a. Central Electricity Regulatory Commission (Recruitment, Control and Service Conditions of Staff) (Fifth Amendment) Regulations, 2021.
- b. Central Electricity Regulatory Commission (Regulation of Power Supply) (First Amendment) Regulations, 2021
- c. Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021.

F. Draft Regulations / Discussion Papers

- a. Draft Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2021
- b. Draft Central Electricity Regulatory Commission (Ancillary Services) Regulations, 2021
- c. Staff Paper on the "Methodology for computing the Escalation Factors and other parameters for the purpose of Bid Evaluation and Payment for Procurement of Power from Renewable Energy Projects Complemented with Firm Power from any other source through Competitive Bidding"



Joint Electricity Regulatory Commission

(For the State of Goa & Union Territories)

In exercise of the powers conferred by Section 83 of the Electricity Act, 2003, the Central Government constituted a two member (including Chairperson) Joint Electricity Regulatory Commission for all Union Territories except Delhi to be known as 'Joint Electricity Regulatory Commission for Union Territories' with Headquarter at Delhi as notified vide notification no. 23/52/2003 – R&R dated 2nd May, 2005. Later with the joining of the State of Goa, the Commission came to be known as 'Joint Electricity Regulatory Commission for the State of Goa and Union Territories' as notified vide notification no. 23/52/2003 – R&R (Vol. II) on 30th May, 2008. The Joint Electricity Regulatory Commission for the State of Goa and Union Territories started functioning with effect from August 2008. The office of the Commission is presently located at a rented premises in the district town of Gurgaon, Haryana.

1. As per the Electricity Act, 2003, the Commission is vested with the responsibility of discharging the following functions in respect of the territories under its jurisdiction:
 - a) Determine the tariff for generation, supply, transmission and wheeling of electricity, wholesale, bulk or retail, as the case may be;
 - b) Regulate electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements for purchase of power for distribution and supply within the State/Union Territories;
 - c) Facilitate intra-state transmission and wheeling of electricity;
 - d) Issue licenses to persons seeking to act as transmission licensees, distribution licensees and electricity traders with respect to their operations within the State/ Union Territories;
 - e) Promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person and also specify guidelines for purchase of electricity from such sources upto a minimum percentage of the total consumption of electricity in the area of a distribution licensee;
 - f) Adjudicate upon the disputes between the licensees and generating companies and to refer any dispute for arbitration;
 - g) Levy fee for the purposes specified under this Act;
 - h) Specify State Grid Code consistent with the Indian Electricity Grid Code (IEGC) specified by Central Electricity regulatory Commission;
 - i) Specify or enforce standards with respect to quality, continuity and reliability of service by licensees;
 - j) Fix the trading margin in the intra-State trading of electricity, if considered necessary;
 - k) Approval of Power Purchase Agreements, and
 - l) Discharge such other functions as may be assigned to it under the Act.
 2. The Commission shall advise the State/ Union Territory Government on all or any of the following matters, namely:-
 - a) promotion of competition, efficiency and economy in activities of the electricity industry;
 - b) promotion of investment in electricity industry;
 - c) reorganization and restructuring of electricity industry in the State/ UTs
 - d) matters concerning generation, transmission, distribution and trading of electricity or any other matter referred to the Joint Commission by that Government.
- 2.1 The Commission shall ensure transparency while exercising its powers and discharging its functions.
 - 2.2 In discharge of its functions, the Joint Commission shall be guided by the Electricity Act, 2003, the National Electricity Policy, National Electricity Plan and Tariff Policy.

The Joint Electricity Regulatory Commission is committed to fulfill its mandate for creating an efficient and economically viable electricity system in the State of Goa & the Union Territories, balance the interests of all stakeholders while fulfilling its primary responsibility to ensure reliable supply of power at affordable rates and shall be guided by the principles of transparency, accountability, equitability and participation in discharge of its functions, to safeguard the interests of the licensees and generating companies in the State of Goa & Union Territories and to give a fair deal to consumers at the same time.
 - 2.3 To achieve the above, the Commission aims to:
 - a) Promote competition, efficiency and economy in the activities of the Electricity Industry within the State of Goa & Union Territories;
 - b) Regulate effectively the power purchase and procurement process of the distribution licensees for sale, distribution and supply of electricity within the State of Goa & Union Territories;
 - c) Encourage cogeneration and use of energy generated from Renewable Sources;
 - d) Ensure Consumer satisfaction and create a mechanism to redress complaints immediately;
 - e) Introduce open-access & reduce the cross-subsidy;
 - f) Improve access to information for all Stakeholders.

CHAPTER 18

APPELLATE TRIBUNAL FOR ELECTRICITY (APTEL)

Physical and Financial Progress

1. The Appellate Tribunal for Electricity (APTEL) has been set up under the provisions of the Electricity Act, 2003 (Section 110) and was established on 13th May, 2005. The Tribunal started functioning w.e.f. 21st July, 2005. Presently, the Tribunal is located at 7th Floor, Core-4, SCOPE Complex, Lodhi Road, New Delhi-110003.
2. APTEL is headed by a Chairperson who is a retired Judge of Hon'ble Supreme Court or a retired Chief Justice of a High Court. In addition to the Chairperson, APTEL has one Judicial Member, two Technical Members Electricity and one Technical Member P&NG. The Chairperson of APTEL Hon'ble Mrs. Justice Manjula Chellur, former Hon'ble Chief Justice of High Courts of Mumbai, Karnataka and Kerala retired on 12.08.2021 after heading APTEL for three years. After the retirement of Hon'ble Mrs. Justice Manjula Chellur, Shri R.K. Verma, Member Technical Electricity being the senior-most member of APTEL was appointed as Officiating Chairperson till 28.11.2021. Currently, Hon'ble Mr. Justice R.K. Gauba, Judicial Member APTEL and a former Judge of Delhi High Court is officiating as the Chairperson, APTEL. Besides Hon'ble Mr. Justice R.K. Gauba, Dr. Ashutosh Karnatak, is Technical Member (P&NG) and Shri Sandesh Kumar Sharma is the Technical Member Electricity.
3. Besides Electricity matters, The Tribunal has also been conferred jurisdiction under the Petroleum and Natural Gas Regulatory Board Act, 2006 to hear appeals against the orders/decisions of the Petroleum and Natural Gas Regulatory Board set up under the Act.
4. Currently, Ms. Madhulika Choudhary, Additional District and Sessions Judge of Uttar Pradesh Higher Judicial Services is Head of the Department as Registrar of the Tribunal w.e.f. 27.04.2021.
5. APTEL hears and disposes of appeals filed against the orders of the Central Electricity Regulatory Commission, State Electricity Regulatory Commissions, Joint Commissions and Adjudicating Officers. Subsequent to the setting up of APTEL, the appeals on the subject pending in the High Courts of all States were also transferred to this tribunal.
6. Any person aggrieved by an order made by an adjudicating officer under the Electricity Act, 2003 (except under section 127) or an order made by the Appropriate Commission under this Act may prefer an appeal to the Appellate Tribunal for Electricity. Any person appealing against the order of the adjudicating officer levying any penalty shall, while filing the appeal, deposit the fee as prescribed by Appellate Tribunal for Electricity. Every appeal shall be filed within a period of 45 days from the date on which a copy of the order made by the adjudicating officer or the Appropriate Commission is received by the aggrieved person (Section 111).
7. Proceedings are conducted in two Courts, each Court consisting of one Judicial Member and a Technical Member.
8. As on 31st December, 2021, 19328 appeals/petitions/matters etc. have been filed. Out of which, 14507 have been disposed of. Number of pending matters as on 31.12.2021 is 4821 including Appeals, Interim Applications, Original Petitions, Review Petitions, Revision Petitions, Execution Petitions & Contempt Petitions etc.
9. Thus within a short span of its formation, APTEL has become fully operational and has been successful in disposing of a large number of matters, thus expediting justice.
10. The website of the Tribunal (www.aptel.gov.in) is providing easy access to the daily cases lists and judgments/orders.



Suzlon wind farm, Bhuj, Gujarat

CHAPTER 19

NTPC LIMITED

1. INTRODUCTION

NTPC Limited, a Maharatna Company of the Government of India, is the largest power generator in India with comprehensive in-house capabilities in project construction and operations of power stations. NTPC has an authorized share capital of Rupees 10,000 Crore, while the paid-up capital is Rupees 9,697 Crore. As on 31st December, 2021, 51.1% equity is held by the Government of India.

NTPC's Vision is "To be the world's leading power company, energizing India's growth" and Mission is to "Provide reliable power and related solutions in an economical, efficient and environment friendly manner, driven by innovation and agility".

Core Values of NTPC are as below:

- Integrity
- Customer Focus
- Organizational Pride
- Mutual Respect and Trust
- Innovation and Learning and
- Total Quality and Safety

In short, it is referred to as "ICOMIT".

Over the years, NTPC has attained a global stature. In the Platts Top 250 Global Energy Companies for 2021, NTPC has been ranked number 2 Independent Power Producer in the world.

2. OPERATIONAL PERFORMANCE HIGHLIGHTS

- 2.1. During Apr- Dec 2021, Gross generation from NTPC stations, excluding joint ventures and subsidiaries is 219 BU. During this period, NTPC coal-based stations achieved a PLF of 68.9 % with 88.1 % availability (DC %).
- 2.2. During Apr- Dec 2021, two NTPC coal stations achieved more than 85 % PLF, viz. Korba (94.0%), Vindhyachal (85.7%). During Jan-March, 2022 expected Gross generation from NTPC Stations, excluding joint ventures and subsidiaries is 80.4 BU. During this period, NTPC coal-based stations may achieve PLF of 75.8 %.
- 2.3. As on 31st Dec 2021 installed capacity of NTPC group is 67,757.4MW (including 13,455MW under JVs & Subsidiaries).
- 2.4. Tanda Unit-6 (660 MW), Barh Unit-1 (660 MW), Darlipalli Unit-2 (800 MW), Barauni Unit-9 (250 MW), Bilhaur 15 MW, Simhadri floating Solar (25 MW), Jetsar Solar 80 MW, Ramagundam Floating Solar (37.5 MW), Fatehgarh Solar (49.9 MW), BRBCL

Unit-4 (250 MW), NPGCL Unit-2 (660 MW) have started commercial operation in the current financial year.

3. COMMERCIAL PERFORMANCE

3.1. Billing and Realization: During the 2021-22, till 31st December, 2021, NTPC has realized **INR 85,550 Crores** while the billing was done for **INR 84,936 Crores**. As part of the payment security mechanism, Letter of Credit (LC) of the amount equal to 105% of the average monthly billing of beneficiaries is being maintained by most of the beneficiaries.

3.2. Customer Relationship Management: Customer focus is one of the core values of NTPC and it has been central to NTPC's commercial philosophy. Customer Relationship Management (CRM) is one of the key initiatives undertaken to strengthen the relationship with customers. Under CRM, regular structured interactions with customers take place for getting feedbacks from the customers and understanding their expectations. Based on these interactions, NTPC identifies potential areas of cooperation and provides various support services like distribution loss reduction, sharing of best practices, Power Plant performance improvement, Commercial aspects of power business etc. to the customers. Further, NTPC offers training programs to the representatives of beneficiary companies through Power Management Institute (PMI). Around 41 officials of DISCOMs have attended programs at PMI during the current Financial Year. Further, for the year 2021-22, NTPC has sponsored 10 officials of beneficiaries / DISCOMs for pursuing the PGDM program in NTPC School of Business (NSB).

3.3. Participation in Power Market: Real Time Market (RTM) has been introduced w.e.f June 01, 2020, which provides an opportunity to generators to sell the on-bar surplus power and the DISCOMs to meet any incremental power requirement.

During the period from April-December, 2021, NTPC sold around 1800 MU Un-Requisitioned Surplus (URS) Power in the Power Exchange through the Day Ahead Market (DAM) and Real Time Market (RTM). The gains from this sale have been shared with the beneficiaries in line with provisions under the Tariff Policy.

3.4. Security Constrained Economic Dispatch (SCED): NTPC stations are participating in the Security Constrained Economic Dispatch (SCED) mechanism, which is under implementation by CERC on pilot basis starting from 1st April, 2019. This pilot has been extended till 31st March, 2022. Total system saving under the mechanism in FY 2020-21 was INR 565 Cr., out of which INR 291 Cr was shared with DISCOMs. Total SCED gain shared with DISCOM in FY 2021-22 (Apr 21 to July-21) was INR. 78 Cr.



4. FINANCIAL PERFORMANCE

NTPC has been maintaining sound financial performance and audit of accounts is being done on annual basis. As per the limited review of quarterly accounts by Audit, during April-September 2021, NTPC recorded a total income of INR 56,075 Cr (Rupees Fifty Six Thousand Seventy Five Crore) (as per the limited review by audit) and Net Profit After Tax of INR 6,358 Cr (Rupees Six Thousand Three Hundred Fifty Eight Crore) (as per the limited reviewed financial results), as compared to total income of INR 50,044 Cr (Rupees Fifty Thousand Forty Four Crore) (as per the limited review by audit) and net Profit After Tax of INR 5,975 Cr (Rupees Five Thousand Nine Hundred and Seventy Five Crore) (as per the limited review by audit) during the period April-September 2020 respectively.

5. GROWTH

NTPC has prepared its long-term Corporate Plan for a time horizon till 2032, which lays the broad roadmap for NTPC's growth. Under this plan, NTPC has targeted an installed capacity of 130 GW by 2032. Renewable energy is one of the central focus areas in this roadmap and NTPC has a target to achieve 60 GW of renewable power capacity by 2032.

5.1. Capacity Addition Program: Construction work is in progress for 16,144.6 MW capacity (as on 31st Dec-,2021) in 33 projects including Joint Ventures & Subsidiaries.

5.2. Growth through Joint Ventures/ Subsidiaries: NTPC has formed Joint Venture and Subsidiaries companies for pursuing growth.

5.3. Initiatives for Capacity Addition in neighboring Countries (through JVs)

Bangladesh: NTPC has formed a joint venture company called Bangladesh India Friendship Power Company Limited (BIFPCL), which is a 50:50 Joint Venture company of NTPC and Bangladesh Power Development Board (BPDB) to set up a coal-based power plant. This JV Company is setting up a 1,320 MW coal-based power project in Bangladesh at Rampal (Khulna).



Sri Lanka: Trincomalee Power Company Ltd. (TPCL) is a joint venture Company between NTPC Ltd. and Ceylon Electricity Board, Sri Lanka (CEB) incorporated in Sri Lanka on 26th

September, 2011. NTPC and CEB each hold 50% equity share capital of the Company. TPCL shall develop 50MW solar power project at Sampur.

Further, a Joint Venture & Shareholders' Agreement (JVSHA) for incorporating a new JV company in Sri Lanka has been signed between NTPC and CEB on 25th October, 2019, with an objective to develop 300MW LNG Power Project at Kerawalapitiya. Project Agreements, in this regard, are under finalization.

NTPC is also exploring business opportunities in Myanmar, Vietnam, Cambodia, Oman, Qatar, Morocco, UAE, Mozambique, Malawi, Kenya, Uzbekistan and Israel for capacity addition.

NTPC is also executing Project Management Consultancy (PMC) assignments for setting up of solar projects totaling to 2335 MW under the aegis of ISA in Cuba (900 MW), Togo (285 MW), Mali (500 MW), Malawi (100 MW), Niger (50 MW) and Paraguay (500 MW).

Further, in pursuit for enhancing global footprints, NTPC has recently signed MoUs with EDF France, INTER RAO Russia and is actively looking for bankable opportunities abroad.

5.4. Renewable Energy: With a renewed focus on RE NTPC has made a roadmap which envisages RE capacity addition of 60 GW by 2032. 'NTPC Renewable Energy Limited' a wholly owned subsidiary of NTPC Limited was incorporated on 07th Dec, 2020, for this purpose. The brief status of NTPC's renewable initiatives, as on Dec 31, 2021 is given below:

I. NTPC Group owned Projects

- NTPC group has already commissioned 1,557 MW of solar projects under EPC mode (NTPC: 1,365 MW, THDC: 187 MW, NEEPCO: 5 MW) and 4,783 MW of Solar projects under Developer Mode.
- NTPC has won 6,312 MW RE projects, so far, under Competitive Bidding (TBCB) including 3,682 MW through Viability Gap Funding (VGF) based bidding under the CPSU Scheme.
- In addition, 3 GW RE capacity is under implementation by NTPC while another 2.9 GW is under tendering.
- Two largest floating solar projects in the country have been commissioned in 2021 (Ramagundam: 37.5 MW & Simhadri: 25 MW). Floating Solar Projects worth 179.5 MW are under implementation (Ramagundam: 62.5 MW, Kayamkulam: 92 MW & Kawas: 25 MW). Further, 1,000 MW- 1,500 MW capacity is being explored in DVC Reservoirs in Jharkhand.
- Development of UMREPP:**
 - As per new guidelines of UMREPP issued by MNRE on 15th June, 2020, NTPC is exploring tie ups with States for around 24 GW capacity.
 - The largest Solar Park of 4.75 GW under Ultra Mega Renewable Energy Power Park (UMREPP) scheme has been sanctioned by MNRE to NTPC RE Ltd.

f) **Green Hydrogen Initiatives:**

- MoU signed on 12.07.21, by NTPC RE Ltd. with Administration of UT Ladakh and LAHDC, Leh for Development of Green Hydrogen Technology Projects at Ladakh.
- NTPC has awarded India's first green hydrogen based micro-grid project of 50KW capacity to be located at SIMHADRI STPP.

In addition, NTPC has already installed Roof Top Solar projects and is planning to further install on some of its townships and office buildings wherever adequate shadow free area is available.

II. Projects under Developer Mode: 4,783 MW under operation, 790 MW under implementation and 1170 MW is under tendering.

5.5. Nuclear Power

NTPC Limited has formed a JV company with Nuclear Power Corporation of India Limited (NPCIL) with equity holding 49% and 51% respectively to set up Nuclear Power Projects. This JV Company named "Anushakti Vidyut Nigam Limited" (ASHVINI) was incorporated on 27.01.2011.

5.6. Strategic Diversification

To strengthen its competitive advantage in power generation business, NTPC has diversified its portfolio to areas such as coal mining, consultancy, power trading etc.

- **Development of Captive Coal Mines:** Coal mining is integral to NTPC's fuel security strategies. NTPC realizes that greater self-reliance on coal will go a long way in ensuring the sustained growth of generation. To achieve this objective, NTPC has planned to develop 7 coal blocks with rated annual peak production capacity of about 71 MTPA (Million Metric Tons per annum). Out of these Pakri-Barwadih, Dulanga and Talaipalli mines are operational. Cumulative coal production from these mines in the current financial years till 31st Dec, 2021 stands at 9.7 MMT. Further, Coal extraction is expected to start in Kerandari & Chatti-Bariatu coal blocks from FY 2023.
- **Consultancy:** Set up in the year 1989, NTPC Consultancy has been offering services related to power sector in India and abroad in the areas like Owner's Engineer Services, Lender's Engineer Services, Project Management & Construction Supervision, O&M, Renovation & Modernization, Quality Assurance, Inspection services, Customized Training & IT related Services, ERP, Procurement, Recruitment, FGD/ De-NOx installations, Renewable energy, coal mining etc. During the current financial year, NTPC Consultancy has secured 96 work/job orders worth Rs. 470 Crores. Further it is expected that the Consultancy may be able to further book orders worth Rs. 17 Crore during the period Jan-2022 to Mar-2022.

- **Power trading:** NTPC's 100% wholly owned subsidiary NTPC Vidyut Vyapar Nigam Limited (NVVN) is involved in power trading and in the current financial year, till 31st December 2021, it has traded 17,737 MU (provisional). This includes 3,732 MU (provisional) traded under solar & thermal bundled power, 4181 MU under bilateral trade, 5,505 MU through Power Exchange and 4,319 MU traded under Cross Border Power Trading. NVVN has also traded 4.3 MU of Renewable Energy Certificates (RECs) and 83,075 numbers of Energy Saving Certificates (ESCerts) till 31st December 2021 in Power exchange.

6. TECHNOLOGY INITIATIVES

NTPC has pioneered the adoption of several new technologies including floating solar PV, regenerative battery charger, Early Warning System for hydro stations, Geo-Polymer based construction material etc. Further, technologies like implementing Advance Process Control (APC) for flexible operation of thermal units and Supercritical technology have also been successfully implemented. To reduce water usage, Air-cooled condenser technology is under implementation at North Karanpura Super Thermal Power project and Patratu Super Thermal Power Project.

NTPC in association with BHEL and IGCAR is undertaking development of indigenous Advance Ultra Super Critical (AUSC) Technology for coal fired power station. The technology is expected to have 46% efficiency which translates to about 20% reduction in specific CO₂ emission. A technology demonstration plant of 800 MW unit size based on the AUSC technology is being planned at NTPC's Sipat plant at Chhattisgarh.

In line with the Government's National Biomass Mission, NTPC has initiated blending of biomass-based fuels with coal. This is also intended to cut down carbon emissions and discouraging crop residue burning by farmers. After successfully demonstrating biomass co-firing at Dadri, the Company has already started commercial scale biomass co-firing at Dadri and other coal-based stations.

NTPC is promoting 'Make in India' initiatives to reduce import. NTPC has taken various steps for Aatma Nirbhar Bharat and taken steps to indigenize various equipment which are being imported currently for FGD and develop Indian vendors for manufacturing these equipment.

Unit-1 of Barh STPP, which was delayed due to multiple contractual issues, has been successfully commissioned without any help from Original Equipment Manufacturer/Supplier (OEM/OES). To complete the unfinished Boilers, the procurement and installation of the Reheat pass of the Boiler was completely indigenized and approx. 25,000 MT material was directly purchased by NTPC for completing the Boiler. It is worth noting that Barh-1 Boiler is a unique Boiler (T-pass Boiler, Steam to Steam, two independent water-steam circuits).



7. NTPC ENERGY TECHNOLOGY RESEARCH ALLIANCE

NETRA (NTPC Energy Technology Research Alliance) is DSIR recognized in-house Research & Development set up of NTPC Ltd. It envisions “Delivering sustainable technology solutions thru applied research and provide advanced scientific services for power sector”. At NETRA, focus is both on in-house technology development as well as collaborative research. It has networked with various prestigious national and international institutions to harness the specialized knowledge and expertise lying with those institutes, viz. National Institutes such as IIT Delhi, Bombay, Madras, Kanpur, Kharagpur, Dhanbad, IISc-Bangalore, RGIPT-Amethi, CSIR laboratories. It has also collaborated with international institutions such as NETL-USA, Curtin University-Australia; DLR-Germany and ISE-Germany etc.

NETRA works broadly in following two verticals, with a focus on applied research delivering “either process and/or product or plant of scientific solution” as the end product.

Vertical 1: Technology Projects

- **Carbon capture and Utilization:** Increasing CO₂ emission has threatened to elevate global warming to an irreversible and catastrophic level. NETRA is working two technology projects for CO₂ capture
 - a) 10 TPD Flue Gas CO₂ to Methanol Demo Plant at NTPC, Vindhyannagar.
 - b) Indigenous catalyst development (CO₂ to Methanol) Project- with IIP Dehradun.
- **Green Hydrogen:** Presently, NETRA is undertaking following R&D projects in the domain of Hydrogen
 - a) MSW-RDF enhanced steam gasification to Green Hydrogen/ Hydrocarbon/ Power – at NETRA
 - b) H₂ generation through High Temperature Steam Electrolyzer – at NETRA
 - c) Hydrogen generation through Sea Water Electrolysis – with RGIPT, Amethi
 - d) Metal Hydride based H₂ compression and storage – with IIT Guwahati
 - e) Green Hydrogen Grid Design & development – at NETRA,
- **Water Technologies:** NETRA is working on various technologies in parallel to assess their efficacy for water purification. Running projects in this domain are as below:
 - a) Water purification using Non-Thermal Forward Osmosis (NTFO) – at Mauda
 - b) Electro Coagulation based silica reduction in water – at Solapur
 - c) Water purification through Electro Dialysis Reversal – with CSMCRI, Bhavnagar

- **Ash Technologies:** NETRA has been continuously working to convert ash as marketable asset or products and has demonstrated use of ash in Geo-polymer roads, paver blocks etc. To take the initiative forward, projects under execution, at present, are as follows:
 - a) Light Weight Aggregate (LWA) Plant – at NTPC Sipat
 - b) Project on angular coarse aggregate from fly ash – with SVNIT, Surat
- Apart from the above technology projects, NETRA works in various other fields. Few of such ongoing R&D Projects includes Solar Multi Utility Heat Pump based energy solution for International Solar Alliance (ISA) member countries and Solar PV plus Battery based micro grid project for performance assessment.

Vertical 2: Advanced Scientific Services - NETRA provides a wide range of advanced scientific services in following domains:

- **Metallurgy** - Failure analysis for identifying root cause of failure to prevent future possible occurrences.
- **Nondestructive Evaluation** – Health assessment and residual life assessment of critical components. In-situ Boiler Tube internal oxide layer detection technology is one such example.
- **Robotics & Drones** - Robotic inspection system for in accessing unreachable zones/ space such as water-wall crawler & LTSH inspection system.
- **CFD based solutions** - Computational fluid dynamics-based solutions to the flow related problems in the areas of Flue gas path, APH, ESP and CW sump and combustion modelling of boiler.
- **Chemistry** – Corrosion analysis, resin analysis, formulation of COC (cycle of concentration) improvement, TOC (Total Organic Carbon) load determination, acid cleaning of boiler tubes etc. are also offered by NETRA to support power stations across the country.

8. SUSTAINABLE DEVELOPMENT

NTPC has been pioneer in adopting technology and practices that promote environmental management, social responsibility and economic performance (triple bottom line approach). The philosophy of sustainability is embedded in all aspects of NTPC's business activities.

8.1. Efficiency management

'Center for Power Efficiency and Environmental Protection' (CenPEEP), was set up to reduce Greenhouse Gas (GHG) emissions through efficiency improvement of coal fired stations. Currently, it is working for improvement of efficiency and reliability of NTPC power stations through introduction of new technologies and practices. On-line performance monitoring tools are used for identifying the performance gaps

and planning suitable improvement actions. Implementation of action plans during unit overhauls and opportunity shutdowns is closely monitored. Parametric Optimization at part loads has been identified as a thrust area including optimization of number of running auxiliaries, sliding pressure operation, excess air optimization etc.

A dedicated group CEETEM – Centre for Energy Efficient Technology & Energy Management, conducts regular Energy audits to identify potential improvement areas and improvement actions.

8.2. Energy Conservation

In its concern for climate change and sustainable development, NTPC continued its commitment towards energy conservation through proper monitoring of power consumption of major equipment and by maintaining good operation & maintenance practices.

During the financial year 2021-22 (up to 31st Dec 2021), Mandatory Energy Audits (MEA) have been conducted at 6 stations. During Q4 FY'22, MEAs have been planned in 3 more stations.

NTPC has also taken the initiative to conduct water balance audit at the stations and has completed it in 6 stations. During Q4 FY'22 water balance audits for 2 more stations have been planned.

Under the initiative for complete replacement of existing lighting with LED light fittings at our stations, 12 lakh LED fittings (95% of population) have been replaced on Pan NTPC basis, till December 2021.

8.3. Environment Management

NTPC has been proactive in addressing environmental concerns since inception. NTPC has identified Environment Management as a thrust area to achieve excellence. NTPC has adopted sound Environment Management practices and advanced environment protection system to minimize impact of power generation on environment.

All NTPC Stations are equipped with advanced Environmental Protection and Pollution Control Systems such as High Efficiency Electrostatic Precipitators in its coal-based units. Ash Water Re-Circulation Systems (AWRS), Liquid Waste Treatment Plant (LWTP) and Sewage Treatment Plant (STP) are available in most of the Power Stations. NTPC has taken proactive approach of making all its power stations operate with ZLD (Zero Liquid Discharge) progressively in phases. By adopting above measures, NTPC has been able to conserve water while following the principle of "3 R's" (Reduce, Recycle and Reuse).

For reduction of SO_x emission, NTPC has installed & commissioned Flue Gas Desulphurization (FGD) unit at Vindhyachal Stage -V of 500 MW capacity and Dry Sorbent Injection (DSI) in Dadri Unit 1 to 4. Construction work of FGD at various stations and projects (~60 GW capacity) is in progress and at some stations it is in advance stage of completion.

Further, FGD is under award process for more than 2 GW capacity.

Keeping commitment to environment and safety, NTPC has embarked upon to the more advanced, safer and compact in-situ Chlorine-di-oxide generation system from earlier practice of Gas chlorination system through a comprehensive policy change for its entire fleet of existing as well as upcoming power stations.

Most of NTPC stations have been ISO 14001 certified by reputed National/ International certifying agencies. NTPC has installed continuous Ambient Air Quality Monitoring Systems(AAQMS) to monitor air quality ,Continuous Emission Monitoring System(CEMS) to monitor emissions of SO₂, NO_x, and PM and Effluent Quality Monitoring System(EQMS) for monitoring of treated effluents in all its stations on real time basis with online real-time basis access to the regulators.

NTPC has planted 6.96 lac saplings in FY'22 (Apr – Nov 2021) and planning a total of 10 lac saplings by March,2022,this includes 22894 samplings planted through Miyawaki plantation technology. Biomass production in Miyawaki is 16 times higher than the conventional plantation, thus it creates more efficient carbon sink. On cumulative basis, approximately 37 million trees have been planted by NTPC.

8.4. Corporate Social Responsibility (CSR)

With a view to have a greater strategic orientation with more connect with stakeholders and an outcome centric approach, NTPC has revised CSR policy in 2019 with specified focus aligned to various guidelines issued by GoI. CSR programs undertaken by Company include activities specified in Schedule VII of the Companies Act 2013 & rules made there under and any other activity for benefit of community at large.

NTPC's CSR activities benefit about 500 villages and touch the lives of about 10 lakh people every year. CSR activities taken up are mainly in the areas of education, health, sanitation and drinking water. NTPC also takes up activities in other areas such as rural infrastructure, skill development, support to physically challenged and environmental sustainability, augmenting Government efforts and schemes for inclusive growth.

NTPC is also supporting the transformation of Aspirational Districts, a flagship initiative of the GoI through its CSR initiatives by the stations located in/ near the aspirational districts of Baran, Godda, Hazaribagh, Korba, Maldah, Murshidabad, Sahebganj, Singrauli, Sonbhadra and Visakhapatnam and as part of project development in projects located in the vicinity of aspirational districts of Aurangabad, Muzaffarpur, Hazaribagh and Chatra.

NTPC has been creating a large amount of social infrastructure through construction of community centers, multipurpose halls, roads, culverts, bus stands, cremation sheds, installation of streetlights and high mast lights. NTPC is providing access to free healthcare at doorstep through medical camps, mobile



medical vans, surgical camps, eye camps etc. and preventive healthcare through fogging sanitation and awareness campaigns. Safe drinking water had been provided through installation of piped drinking schemes, hand pumps, bore wells, community RO plants, water ATMs and water filters. In addition, financial support has been provided to preserve sites of historical heritage. Apart from this, NTPC has taken initiatives for water conservation, water harvesting by deepening and revival of water bodies and waste management etc.

Some of the other major CSR initiatives undertaken are:

Health care

- Support for Cancer Screening Program to Govt. of Bihar and Tata Memorial Cancer Hospital for four Districts of Bihar.
- Support provided for Infrastructure creation and medical equipment installation at National Cancer Institute Nagpur, AIIMS Patna, AIIMS Bhubaneshwar and King George Hospital, Lucknow
- Support committed for Setting up of Tele-Recording Room at AIIMS, New Delhi.
- Establishment of Integrated Muscular Dystrophy Rehabilitation Centre "Manav Mandir" at Solan, Himachal Pradesh.
- Mobile Health Clinics (MCH) operational at various locations providing healthcare to underserved areas.

Sanitation

- Revived MSW Plant at Varanasi & Pilot Project done for Mechanized Sweeping, Collection & transportation of MSW. Varanasi jumped from 428th in 2014 to 27th in 2020 in Swachh Survekshan rankings. Varanasi is also the cleanest city along the banks of the river Ganga.

Infrastructure Development, Education and Sports

- Support of ₹ 8 Crore to Uttarakhand State Disaster Management Authority, Govt. of Uttarakhand for reconstruction of Schools and Health care infrastructure which were devastated during the floods. Support committed for Redevelopment of Kedarnath and Badrinath town.
- Facilities for tribal school in Chapaki, Distt Sonebhadra (to be run by Sewa Samarpan Sansthan, Kanpur, U.P.).
- Support to Archery Association of India for conducting National Archery Championships (NACs), National Ranking Archery Tournaments (NRATs) and to provide kits/apparels to Indian Archery teams for international participation.
- Residential workshop for girls under NTPC's flagship initiative Girl Empowerment Mission (GEM).
- Development of School infrastructure in the existing school at Govindnagar, Paliya Pipariya, Block Bankhedhi,

Hoshangabad in Madhya Pradesh and Sambalpur ODISHA.

- Setting up of Library (Pustakalaya Project) in Primary Schools at Arunachal Pradesh.
- Infrastructure augmentation by providing 2500 benches/ desks in 50 Govt. Schools at Supaul, Bihar.
- Installation of Energy Efficient Pump System in the fields of farmers in various districts of UP.
- Capacity building of farmers at Jhanor, Rihand, Kahalgaon & Ramagundam improving incomes by 30% to 300%.
- Training to 8000 numbers of youth in Leh & Ladakh and J&K UTs in association with NSDC and NSDF.
- NTPC also has a Policy on Improving Learning Outcomes & Quality of Education for children studying in Government Schools of its project-affected villages
- **COVID Relief** – CSR activities for COVID included in para (9)

Apart from this, NTPC has also set up NTPC Foundation, engaged in serving and empowering the DIVYANG and economically weaker section of the society. Current activities include providing Information and Communications Technology (ICT) education to DIVYANG (physically and visually impaired) students, establishing Disability Rehabilitation Centres (DRC). A flagship programme of foundation "NTPC Utkarsh" offers merit scholarships to encourage and motivate students who are pursuing secondary, high school, engineering, and medical science studies.

CSR efforts of NTPC has been conferred with various awards, some of the awards are as given below:

- CII-ITC Sustainability award 2021 for Excellence in Corporate Social Responsibility.
- CSR TIMES Award - 2021 awarded in the category "Swachh Bharat Initiatives".
- CSR Leadership Awards in the category Best Corporate Social Responsibility Practices by World CSR Day Organization
- Best CSR Practice Award by Asian Centre at the 8th Asia Business Responsibility e-Summit
- Greentech Foundation Winner award for outstanding achievements in Promotion of Health and Healthcare.
- Platinum Award in Apex India CSR Excellence awards for Women Empowerment.
- Platinum Award in the FAME Excellence Award 2020-21 for Best CSR Practices.
- Gold award in Environment Impact Initiative in 5th CSR Health Impact Award 2021

8.5. Rehabilitation & Resettlement (R&R)

NTPC is committed to help the families affected/ displaced

due to acquisition of required land, by respective State Govt./ Authorities. NTPC has been making efforts to improve the socio-economic status of the Project Affected Families (PAFs). In line with its social objectives, the Company has focused on effective Rehabilitation and Resettlement (R&R) of PAFs and on Community Development (CD) works, in and around its projects.

Post enactment of 'The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCT LARR Act, 2013) by the Govt. of India, NTPC revised its R&R Policy to incorporate the R&R entitlements as per The RFCT LARR Act, 2013. This R&R Policy of NTPC also have the NTPC's good practices / guidelines on facilities to be extended for Project Affected Families (PAFs).

NTPC takes measures for R&R of PAFs as per its R&R Policy/ Govt. Guidelines/ extant LA Act provisions with the objective that the PAFs will improve or at least regain their previous standards of living. As per the Policy and in line with provisions of RFCT LARR Act 2013, a Social Impact Assessment (SIA)/ Census Survey will also have to be conducted by the Appropriate Govt. to collect detailed demographic details of the area which shall form the basis for the preparation of 'Rehabilitation and Resettlement (R&R) Plan/ Scheme'. Apart from the R&R Plan formulated in line with RFCT LARR Act, need based Community Development (CD) activities are also included for contributing to socio-economic development of the people/ development of area in project vicinity.

R&R Plan expenditure is a part of capital cost of the project and the Plan is implemented in a time bound manner to complete its implementation by the time the project is commissioned. On completion of the R&R Plan implementation, a Social Impact Evaluation (SIE) is conducted by a professional agency to know the efficacy of R&R Plan implementation for future learnings and appropriate interventions.

Achievements during 2020-21:

R&R/ Community Development activities are being implemented at the new Greenfield / Brownfield Thermal projects at Darlipali, Gadarwara, Khargone, Telangana, Lara, Mouda, North-Karanpura, Solapur, Tanda-II, Barh, Barauni, Meja, Kanti, NPGC Nabinagar, BRBCL Nabinagar, Patratu, Hydro projects at Koldam, Tapovan Vishnugad, Rammam-III and Coal Mining Projects at Pakri-Barwadhi, Chatti-Bariatu, Kerendari, Dulanga and Talaipalli. These activities are taken up under the approved R&R Plans, and also on case-to-case basis requirement for specific projects to cater local requirements / stakeholders' request. The interventions are also focused on the improvement in Social Development Indicators of the project affected villages.

Areas for Community Development activities:

- 1. Drinking water** – Planning and implementation of activities for access to drinking water to ensure 100% coverage of all project-affected villages of NTPC projects is being undertaken. NTPC has formulated "NTPC Jal Jyoti Mission" – a

Policy on Drinking Water for ensuring safe drinking water and rejuvenation of ponds in its project-affected villages.

- 2. Capacity building / Skill up gradation** – Need based trainings are being conducted to enhance the skills of affected persons for increasing their employability & livelihood. Training to farmers on modern farming practices is also being imparted.

- 3. Education** – Construction activities are on the verge of completion for Medical College cum Hospital at Sundargarh District (Odisha) and one wing has been handed over to the District Administration which is being used as COVID hospital.

Construction of Engineering College at Shivpuri (Madhya Pradesh) has been completed and its Academic Sessions have already commenced. Construction of major components of Hydro Engineering College at Bilaspur (HP) is almost final while its Academic Sessions has already started at other Govt. Engineering College Campus at Nagrota Bagwan.

- 4. Health** - For the benefit of project affected families and neighboring population, 'Mobile Health Clinics', Medical camps and dispensaries are being operated for comprehensive health coverage of PAFs at various projects. NTPC has also formulated a Policy on Maternal and Child Health Care to provide 650 days of antenatal/prenatal & postnatal preventive health care to expectant & new mother and newborn babies.

9. Steps taken by NTPC against COVID Pandemic

Unarguably, the second wave of the COVID pandemic was more severe and we were faced with a daunting task of augmenting medical amenities such as oxygen and medical supplies. Low vaccination rate made the challenges even greater. Electricity being an essential service and NTPC being the largest power producers in the country, the burden of expectation was quite high on NTPC. On the one hand, NTPC was expected to ensure 24x7 power to the Nation and on the other hand, as a responsible corporate citizen, it was expected to support the local communities, Administration and Government machinery in the battle against the Pandemic.

Highlights of this extraordinary fight back by NTPC against the pandemic are given under: -

- Established COVID Care Centres with oxygen at Badarpur (50 bedded), PMI, Noida (100 bedded) and Dadri (30 bedded) along with Para-medical staff, testing and ambulance facility at war footing in April 2021.
- Established about 2000 beds (with required oxygen support) additionally, in existing NTPC Hospitals at Stations/ Projects for COVID Care across the Nation.
- Installation of PSA Type Oxygen Generation Plants at District Hospitals/CHCs at Raebareilly (1), Sonbhadra (2), Chhabra (1), Narsinghpur (1) and Ambedkarnagar (1).
- Support to DPE for procurement of items for COVID-19 Vaccination Program for the States of Bihar and Uttar Pradesh.



- Covid Care Center at Sundergarh Medical college, Odisha (200 beds) and Solanki Hospital, Bhadrak, Odisha (120 beds).
- Support to District/ State Administration for Ambulances (Bihar-4, Jharkhand-1 & Uttarakhand-5), Oxygen Concentrators, Ventilators, PPE kits, Sanitizers, Surgical Masks, Infrared Thermometers, etc.
- 15 Covid ICU beds at District Hospital Khargone & 250 Oxygen Bed set-ups in 5 Blocks of Khargone (Madhya Pradesh).
- 11 COVID care centers setup through Apollo Hospitals with about 200 beds in different NTPC units.
- Strategizing deployment of Manpower like WFH/ staggered/flexi work timings for ensuring continuity of Plant operation.
- Elaborate SOPs for plant function in consultation with experts and ensuring compliance.
- Facilitated 100% digital mode of tendering, "Procure-to-pay" process for vendor payments and online recruitment during COVID.
- 24X7 Central Control Room assisted by Doctors for coordination across sites in arrangement of hospital beds for critical patients, essential medicines, oxygen support, hospital equipment etc.
- Taking care of employees and their families by way of Policy facilitation together with providing facilities through Virtual mode like Special casual leave, flexi leave, Kawach Scheme by Apollo and similar schemes, scaling DRS to two times, e-Paramarsh – online consultation, SNEHAL – 24X7 counselling facility, and Online Yoga Session – with focus on post COVID recovery etc.
- Regular review and guidance by Special COVID Advisory Committee involving eminent medical Professionals from premier institute like AIIMS.
- Mass vaccination programs arranged at our unit hospitals. Vaccinated around 99% of our employees (minus ineligible) and 80% of our contractors' workers.

10. CORPORATE GOVERNANCE

As a good corporate citizen, NTPC is committed to sound corporate practices based on conscience, openness, fairness, professionalism and accountability besides building confidence in its various stakeholders, thereby paving the way for long term success. NTPC firmly believes that sound Corporate Governance is critical for enhancing and retaining investor trust. We are committed to meet our performance goals with ethics and good governance. NTPC is constantly striving to adopt emerging best practices in corporate governance. It is our endeavor to achieve higher standards and provide oversight and guidance to management in strategy implementation and risk management and fulfilment of stated goals and objectives. NTPC is adhering to the best

recognized corporate governance practices and continuously benchmarking itself against each such practice in our endeavor to meet the expectations of the stakeholders. The Company has complied with all the requirements of SEBI LODR, Companies Act, 2013 and Guidelines on Corporate Governance for Central Public Sector Enterprises issued by Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India, except requirement regarding requisite number of Independent director and woman Independent Director.

11. SAFETY

Safety is part of NTPC's core values. Occupational Health and safety at workplace are prime concern of NTPC Management and utmost importance is given to provide safe working environment and to inculcate safety awareness among the employees. NTPC recognizes that all accidents are preventable. Therefore, safety is always at the forefront of all the activities. The objective is to provide safe working environment and strive for zero incidents at work. The safety policy is supported by safety rules and procedures and are applicable for all business activities carried out by NTPC. NTPC also strives for setting safety standards beyond regulations and other legal requirements.

NTPC has 3-tier structure for Occupational Health and Safety management, namely at Stations/Projects, at Regional Head Quarters and at Corporate Centre. NTPC Management Information System (MIS) on safety is strengthened through continuous coordination and communication at all levels and is closely monitored by top management. At corporate level, Corporate Safety Department is headed by Executive Director (ED, SSEA) and is responsible for making Guidelines/Procedures/Standards etc. and their review and implementation.

Cross-functional safety task forces are functional at all projects/stations to monitor unsafe working conditions at site and their rectification. For strict compliance and enforcement of safety norms and practices by the contractors, safety clauses are included in General Conditions of Contract/ Erection Condition of Contract.

CLIMS (Contract Labor Information Management System) has been implemented for gate pass system for contract workers. Standardized Safety training and medical examination of contract worker has been made mandatory for processing gate pass in CLIMS. Requirement of medical examinations are made as per form-V of OSH Rules. 128 employees have undergone International General Certificate Course from NEBOSH, UK. 15 employees have qualified and certified by NOSA, South Africa as Internal auditor.

Technical documents for clearly defining roles and responsibilities are available across NTPC for Operation & Maintenance. Most of the NTPC stations are certified with OHSAS-18001/ISO-45001 and further three (03) stations are in the process for accreditation of National Occupational Safety Association (NOSA, South Africa) certification. Regular

plant inspection, external and internal audits are conducted at all NTPC stations. Apart from this random surprise checks are being conducted by senior NTPC officials to check the effectiveness of safety system implementation.

To mitigate the On-site emergencies at all operating stations, effective engineering controls are provided to indicate and handle emergency situations. Detailed emergency plans have been developed and responsibilities are assigned to each concerned to handle the emergency situations. Mock drills are regularly conducted at all plants covering scenarios like chlorine leakage, fire, terrorist attack etc. For Mock drills, agencies like NDRF and SDRF have been associated at many of the stations.

NTPC's efforts have won many safety awards and laurels to the company's units from reputed institutions, namely Ministry of Labour & Employment-Government of India, British Safety Council, National Safety Council-Mumbai, Institution of Engineers, CII as well as awards from State Governments.

12. RISK MANAGEMENT

Risk management scenario has become challenging with increasing regulatory compliance and emerging business risks. Cyber security risk and ongoing pandemic have made the business even more challenging. Therefore, to have a focused approach on risk management and to ensure decision-making is aligned with the organization's long-term objectives, your Company has an elaborate Enterprise Risk Management framework in place. Ensuring compliance with the Companies Act and SEBI (LODR) Regulations, NTPC has implemented an elaborate Enterprise Risk Management framework for following:

- To finalize risk assessment under the risk management framework,
- Monitor and review risk management plan/ framework, as approved by the Board
- Informing the Board about the risk assessed and action required to be take/ already taken for mitigating the risks on quarterly basis.
- Take up other matter, as directed by the Board from time to time.

A Functional Director level "Risk Management Committee (RMC)" has been entrusted with the responsibility to identify & review the risks and formulate action plans and strategies to mitigate them on short term as well as long term basis. The committee has been restructured to include one Independent Director as per amended SEBI (LODR) Regulations, May 2021. The RMC meets regularly to deliberate on strategies. Risks are monitored through reporting of Key Risk Indicators (KRIs). Outcomes of RMC are submitted for information to the Board of Directors.

13. BUSINESS EXCELLENCE

NTPC has developed and adopted 'NTPC Business Excellence Model' on the lines of globally accepted Performance

Excellence frameworks such as the Malcolm Baldrige Performance Excellence framework, the European Foundation for Quality Management (EFQM) Excellence Model, Deming and ITC sustainability model. To keep pace with the changes in global excellence models like EFQM-2020, NTPC has revised the model this year to incorporate changes in regulatory norms like CERC 2019-24, power sector changes like flexibilization, real time market, stringent environment norms etc. The revised model also addresses issues related to future challenges related to Governance and Sustainability.

During the current financial year assessment of 5 stations have been completed and the remaining 16 stations will be assessed by January 31, 2022.

Contemporary "Total Quality Management" (TQM) concepts and techniques like ISO, Quality Circles (QC), Professional Circles (PC), 5S, Suggestion Scheme etc. have been deployed across the organization. NTPC stations have adopted "Integrated Management System" as per ISO. NTPC Quality Circle teams have participated in Regional & National Chapters of "Quality Circle Forum of India" conventions & won many appreciations in different categories. NTPC encourages competition amongst its different Quality Circles and the best Quality Circle team is sponsored to participate in International Quality Control Circle Convention. QC Team "Lakshya" of NTPC-Barh won Par Excellence award and QC team "Urja Jyothi" from NTPC Simhadri won Excellence award in the recently concluded International QCC Convention 2021 held at Hyderabad, India.

14. USING INFORMATION AND COMMUNICATION TECHNOLOGY FOR PRODUCTIVITY ENHANCEMENT

At NTPC, Information Technology is being used as a key business driver. Enterprise Resource Planning (ERP) application integrates all its business functions. Non-ERP web and Mobile-based applications have been developed in balance areas such as Engineering Drawings approval, Quality Control Management, Hospital Management, Labour Management, Transit Camp Management, RTI, Security Control, Coal Monitoring, Ash Management etc.

As a commitment towards the environment, the company has re-engineered and redesigned the business processes to paperless mode. The digitization initiative, Project PRADIP (Pro-Active & Digital Initiative to become Paperless) has resulted in implementation of e-Office, digitization of documents and paperless processes for different functions. This has not only saved tons of paper but also resulted in faster decision making, transparency and improved efficiency for the company.

To support the business with near 100% availability of services and to facilitate seamless communication, NTPC Plants and Offices across India are connected to Corporate Office and Data Centers at Noida and Hyderabad through MPLS links. These Data centers confirm Tier 3 requirements and are ISO 27001 certified. There is also a Security Operation Center (SOC) which is operational 24x7.



Hyper Converged Infrastructure server (HCI) is hosting all the critical business non-ERP applications acting as on premises private CLOUD service by delivering Virtual Machines (VMs) of various configuration to host various applications as and when required.

NTPC Ltd managed to carry out its normal business activities during the COVID imposed lock down with the help of digital intervention in all areas. The entire office work in NTPC is being carried out in virtual mode. All reviews, meetings, interviews, seminars, trainings etc. are conducted through MS Teams. Further features of M365 such as one drive, MS exchange mail, power BI etc. have been rolled out to give a seamless connectivity with office desktop and home laptop. The entire procure to pay processes have been digitalized with no paper movement in between. All internal approvals are made through e office. All employees related processes including claims, travel booking, appraisals are done online with tracking facility. Further to facilitate Work from Home (WFH) on critical applications not hosted on intranet VPN access has been provided to all required executives.

Vendors have been given a login to our PRADIP portal to submit their digital invoice and then to track it till payment is made. Procurements are done through GEPNIC and GeM portals integrated with our ERP system. A new process for procurement budget and automatic PR creation has been put in place and new CERC tariff norms implemented. To help MSME vendors to avail advance payment from banks against delivery of items, NTPC has integrated RXIL, Invoice mart with our ERP system. With these digitalization initiatives, NTPC has shifted to Unified Shared Service model for its service functions bringing agility, transparency and speed. There is an internal dashboard for higher management to track status of files and payment against invoices.

Safety being an important area, a dedicated safety app was launched wherein anyone can report a safety incident with photograph. All internal communications are through digital mode. Samvaad and Sampark are two mobile apps which no employee can afford to skip even for a day.

All the emerging new digital technologies such as AI/ML, RPA etc. have made their footprint in NTPC. Multiple AI/ML based projects are being undertaken in the core O&M areas with the aim of improving reliability and availability of units. Repetitive and labor-intensive jobs in areas such as commercial billing and finance bill processing are automated through Robotic Process Automation.

NTPC is using a real time historian to capture real time process parameters across the board for its monitoring, analysis and alerts at multiple levels and at different locations. A centralized control room displays real time process parameters of all units and its analysis to help experts take timely technical decision. Two important digitalization projects related to our O&M, namely advance analytics and advance pattern recognition are under implementation. Cyber security is given utmost importance to ensure data security. Periodic audits of the

network are conducted through CERTIN certified agencies to identify vulnerabilities and they are plugged immediately. Interaction with IB on cyber security related matters is done and their recommendations are complied with.

Efforts are underway to upgrade SAP ERP system to the latest version and to move to cloud platform to host noncritical applications.

With the new digital initiatives underway, NTPC will emerge as a fully digitalized organization for its core and non-core functions and a role model for others in the same industry, in line with industry 4.0 in the next two years.

15. HUMAN RESOURCE DEVELOPMENT

NTPC takes pride in its highly motivated and trained Human Resource that has contributed its best to bring NTPC to its present height. The total employee strength of NTPC stands at 17,848 as on 31st December, 2021 (excluding Trainees).

15.1. Induction Plans

Several initiatives have been taken to ensure a robust talent pipeline to meet the increasing requirement of manpower for the Company's growth program. Considering the significant capacity addition plan, Executive Trainees, Experienced Engineers, Diploma & ITI Trainees are recruited as per the requirement & continuous efforts have been made to effectively utilize the manpower by rationalization.

Further, hiring is being done in diversified and niche areas such as Mining, Hydro, Safety, IT, Renewable Energy etc. to attract experienced talent depending upon the business requirement. To meet the short term and project specific manpower requirements, NTPC has also started to engage fixed term employees.

15.2. Training & Development

Learning is one of our Core-Values. Recognizing the need for capability building for current and future roles, NTPC has set up a comprehensive training infrastructure comprising Power Management Institute (PMI) at the apex level, Regional Learning Institutes, Employee Development Centers (EDCs) at the stations and simulator training facilities. NTPC also sponsors employees to external training facilities. During the year 2021, 691 employees were exposed to external training within India, mostly through online mode. The training imparted is based on Training Need Analysis (TNA) and is in tune with emerging needs and challenges.

PMI also provides training to power professionals from India and other developing countries. During the current Financial Year (up to December 2021), NTPC has logged a total of 9,91,120 man-days also considering the internal e-learning portal (E-Guru) and long duration e-learning programs, namely, Harvard Manage Mentor (HMM) and GPI-Learn.

To ensure training interventions are even more focused and targeted, the following initiatives have been taken:

- Assigning GPiLearn modules, Safety modules and Location Management Instructions (LMI) customized based on area and location to Operation and Maintenance executives (numbering around 6000).
- Imparting job-rotation facilitation training (called Samarth training) to those rotated to different areas in Maintenance and Operation and those rotated to C&M through standardized modules. 249 executives have been covered under Samarth training in 2021.
- Training to those, assessed as needing development in one or more of the pre-identified managerial competencies, in the Competency, Potential and Value assessment undertaken for them through reputed 3rd party. 239 executives have been covered under such Competency Development programs in 2021.
- Around 540 executives have been given Simulator training in 2021.
- Customized French language training program (150 hours) for executives of International Business Development function through Alliance Francaise de Delhi.
- Advanced Certificate course in Digital Marketing & Communication with Public Relations as specialization for corporate commercial executives for total duration of 6.5 months.

During 2021, 109 Executive Trainees (ETs) completed their 1-year induction training. Further, 259 ETs of different batches including 45 ETs of the special all girls batch are currently undergoing induction training. 7 weeks induction training was also provided to those promoted to Executive category and those recruited for technical domain but not under the ET scheme. Further, 10-days training was provided to 2 batches of newly recruited Corporate Communication executives. 24 executives have attended the online training programs being offered by DPE as a part of their RDC (Research, Development and Consultancies) Scheme.

Access to new age digital courses like AI, IoT, Block Chain etc. which is the future of work, on the NASSCOM-MeITY Future Skills platform has been provided to all executives. 201 executives completed Future-Skills courses in Artificial Intelligence and Internet of Things (IoT) and got certified from NASSCOM. NASSCOM appreciated NTPC for getting maximum number of certifications amongst non-IT companies. Courses on Cyber Security for certification for Chief Information Security Officer, covering different projects / stations, was completed for 4 batches (95 Nos).

Focusing on holistic well-being, besides standalone programs on Yoga, Pranayam, meditation etc., 24*7 online Employee Assistance program, named Snehal, was started for all employees and their families. This includes unlimited phone/video/chat/e-counselling.

With a view to leverage Virtual Reality (VR) immersive technology for learning, 300 minutes VR content has been

developed and Train the Trainer programs have been delivered to facilitate leveraging of VR for training.

To further promote diversity and inclusion, gender sensitization programs and special programs for women employees and spouses of male employees were delivered.

16. SUPPORT TO THE SECTOR

NTPC has extended its services for the development of Indian Power Sector in several programs of the Government of India through NSM, DDUGJY, SAUBHAGYA and NSDF. Some of the highlights of NTPC's role in India's power sector development are as below:

16.1. National Solar Mission (NSM)

NTPC had been entrusted to develop 15 GW Solar PV through NSM Phase-II in three tranches from 2014-15 to 2018-19, where NTPC would be the facilitator/ trader between DISCOMS and the project developers. NTPC would purchase power from the developers and sell it to the DISCOMS. As advised by MNRE target under National Solar Mission (NSM) Phase-II has been revised from 15 GW to 3 GW, under which 3 GW Solar PV capacity has been commissioned under Developer Mode.

16.2. DDUGJY and SAUBHAGYA

NTPC has been entrusted with Rural Electrification work under DDUGJY (Deen Dayal Upadhyay Gram Jyoti Yojana) and SAUBHAGYA (Pradhan Mantri Sahaj Bijli Har Ghar Yojana) schemes of GoI. All the districts have been saturated by providing approximately 8.6 Lakhs Household connections as per the eligible beneficiary list received from respective DISCOMs/ Government of Odisha. Till 31.12.2021, out of revised village scope of 17,301 numbers (Un-electrified & partially electrified), infrastructure work has been completed in 17297 Villages (99.9 %). Physical work has been completed in 14 out of 15 Districts. Balance work is targeted to be completed by January 2022.

16.3. National Skill Development Fund (NSDF)

NTPC is supporting the skills development initiative of the Government of India, in line with SKILL INDIA MISSION, by partnering with the Central and State governments. NTPC has entered into two tripartite MOUs with National Skill Development Fund (NSDF) and National Skill Development Corporation (NSDC) under Ministry of Skill Development & Entrepreneurship (MSDE). It will provide funds to NSDF as per provisions of the MOU and NSDC will withdraw the money from NSDF to execute these skill development programs at various locations. Under the initiative, NTPC has supported skill development programs for 30,000 youth in different market linked vocational skills for various sectors like services, manufacturing industry etc. NTPC has allocated INR 36.5 crores from its CSR fund for various skill development programs. Funds worth INR 31 Cr. have been provided to NSDF against these MoUs. Total 25,071 persons have been trained and 12,161 have been placed under above MOU.



17. AWARDS AND ACCOLADES

NTPC has been consistently recognized by local & international bodies in the fields of Productivity, Environment and Safety. Major awards and rankings received by NTPC during the period 2020-21 are as under:

- NTPC ranked 14th in the 2020 Fortune India Top 500 corporations
- NTPC awarded as Dun & Bradstreet India's Top PSU Award 2021.
- NTPC has been rated as "Excellent" by MOP, GOI at its rating for 2019-20.
- NTPC Ltd was conferred with the prestigious 'Role Model' Award at the 11th CII National HR Excellence Award 2020-21.
- NTPC has been ranked as No. 1 buyer by GeM under CPSE category.
- NTPC has been recognized as a Great Place to Work for the 15th year in a row by the Great Place to Work Institute. NTPC is the only PSU to consistently feature in India's Top 50 Best Workplaces.
- NTPC has featured among the LinkedIn Top Companies 2021 (India).
- In recognition of the digitalization efforts, NTPC has been chosen for DIGITAL PSU Award in Maharatna Category in 8th PSU Award 2021.

- NTPC has received ESG India Leadership Award 2021 for playing a key role in air-pollution management.
- NTPC received "Company with Best CSR Practice" Award in 8th Asia Business Responsibility Summit organized by Asian Centre for Corporate Governance and Sustainability on 26th Nov 2021.
- At FAME Excellence Award 2020-21, NTPC has been conferred with Platinum Award for Excellence in Best CSR Practices by Foundation for Accelerated Mass Empowerment (FAME).
- NTPC has been honoured with GOLD award in the "CSR TIMES AWARD - 2021" in the category "Swachh Bharat Initiatives" for the project "Revival & Operation of Municipal Solid Waste Management Plant, Karsada, Varanasi" at 8th National CSR Summit 2021 & CSR TIMES Awards organized by CSR TIMES.
- NTPC has been conferred prestigious SHRM Special Recognition award, for Learning and Development for the year 2021.
- For efforts and commitments to the Energy Compact process, NTPC has received a letter of appreciation from Ms. Damilola Ogunbiyi, Special Representative of the Secretary-General for Sustainable Energy for All and UN-Energy Co-Chair.



Shri R.K. Singh, Hon'ble Cabinet Minister of Power and New & Renewable Energy, Shri Nitish Kumar, Hon'ble Chief Minister of Bihar and Shri Alok Kumar, Secretary (Power) along with Shri Gurdeep Singh, CMD NTPC, dedicated BARAUNI Thermal Power to Nation on 27.11.2021



NTPC RE Limited (NTPC REL) signed PPA and other Project agreements with Indian Railways, Madhya Pradesh Power Management Company Limited (MPPMCL) and Rewa Ultra Mega Solar Limited (RUMSL) for 325 MW Shajapur Solar Park on 25.11.21, in the august presence of Shri R.K. Singh, Hon'ble Cabinet Minister of Power and New & Renewable Energy and Shri Shivraj Singh Chouhan, Hon'ble Chief Minister-Madhya Pradesh

CHAPTER 20

NHPC LIMITED

NHPC was incorporated on November 7, 1975 as a private limited company under the name "National Hydroelectric Power Corporation Ltd". It was converted to Public limited company w.e.f. April, 2, 1986. The name of the company was changed to its present name "NHPC Limited" in 2008. Its vision is to become "To be a global leading organization for sustainable development of clean power through competent, responsible and innovative values".

NHPC is a Schedule-'A' enterprise and a Mini Ratna company with 70.95% ownership of Govt of India. With an authorized share capital of ₹15,000 crore and an investment base of over ₹66302 crore (as on 31.03.21), NHPC is ranked as a premier organization in the Country for development of Hydropower. NHPC is an ISO-9001:2015, ISO-14001:2015 and ISO-45001: 2018 certified company.

NHPC is a multi-disciplinary organization and has acquired sufficient expertise and state-of-the-art technology for investigation, Planning, designing and executing large and small size hydropower projects. It has the strength of highly qualified and experienced professionals in design & engineering, geotechnical engineering, construction planning and construction Management for building hydroelectric projects. The technical & engineering proficiency and experience of NHPC places it in a leading position in the field of hydropower development in India and neighboring countries. The brief of the corporation activities / operations is as under:

PROJECT PORTFOLIO

POWER STATIONS UNDER OPERATION	24 nos.	7071.20 MW
HYDRO POWER STATIONS	22 nos.	6971.20 MW
NHPC Own	20 nos.	5451.20 MW
Joint Venture / subsidiary	02 nos.	1520 MW
RENEWAL PROJECTS	02 nos.	100 MW
Wind Power Project, Jaisalmer	01 no.	50 MW
Solar Power Project, Tamil Nadu	01 no.	50 MW
PROJECTS UNDER CONSTRUCTION	09 nos	5999 MW
NHPC Own (Hydro)	02 nos	2800 MW
NHPC Own (Solar)	01 nos	40 MW
Joint Venture / subsidiary (Hydro)	05 nos	3094 MW
Joint Venture / subsidiary (Solar)	01 no.	65 MW

PROJECTS UNDER CLEARANCES	08 nos	7342 MW
Hydro (NHPC Own)	04 nos	5756 MW
Solar (NHPC Own)	01 no.	50 MW
Hydro in Joint Venture / Subsidiary	03 nos	1536 MW
PROJECTS UNDER SURVEY & INVESTIGATION	03 nos.	1130 MW
Hydro (NHPC Own)	03 nos.	1130 MW
New Hydro Projects (indicated by MOP for allotment to NHPC)	04 nos.	16500 MW

PROGRESS DURING THE CURRENT YEAR

FINANCIAL PERFORMANCE (During 2021-22) – Up to Sep -2021

Despite unprecedented challenges due to COVID 19 pandemic and amidst all difficulties, NHPC kept on serving the Nation by running its Power Stations efficiently. NHPC has continued to deliver on commitments to its shareholders, with strong financial results. NHPC has produced sterling results during the financial year 2020-21. In the financial year, NHPC has achieved highest ever profit after tax of ₹ 3,233.37 crore registering a growth of 7.52%. During FY 2021-22, NHPC has achieved profit after tax of ₹ 2,217 crore till September 2021.

The details of financial performance of NHPC during year FY 2021-22 (Upto Sep-21)** is as under:

Particulars	Unit	2021-22 (till Sep 21)
Sale of Energy	₹ crore	4843
Profit after Tax (PAT)	₹ crore	2217
Dividend Paid	₹ crore	351.58
Net worth	₹ crore	33565

**The above financial data is based on unaudited result of 2nd Quarter of FY 2021-22

PHYSICAL PERFORMANCE (Generation upto 31.12.2021)

NHPC is operating 22 Power Stations with installed capacity of 5551.2 MW and annual design energy of 23540 MU including twenty Hydropower Stations. The Power Stations of NHPC are located across the country supplying power to 21 States, 4 UT's and Nepal through 31 number of beneficiary / distribution companies.



The list of Power Stations along with their design energy and actual generation in FY 2021-22 (till December 2021) is as under:

S. No.	Power Station	Installed Capacity (MW)	Location	Year of Commissioning	Annual Design Energy (MU)	Annual Design Energy 2021-22 (till Dec 2021)	Annual Generation (2020-21) (till Dec 2021)
1	Baira Siul	180	Himachal Pradesh	1981 / 2021	708.59	640	465
2	Loktak	105	Manipur	1983	448.00	358	327
3	Tanakpur	94.2	Uttarakhand	1993	452.19	2839	3024
4	Chamera-I	540	Himachal Pradesh	1994	1664.55	396	465
5	Salal	690	UT of J&K	1995	3082.00	1478	1653
6	Uri-I	480	UT of J&K	1997	2587.38	2108	2429
7	Rangit	60	Sikkim	2000	338.61	300	295
8	Chamera-II	300	Himachal Pradesh	2004	1499.89	1285	1216
9	Dhauliganga	280	Uttarakhand	2005	1134.69	1047	1101
10	Dulhasti	390	UT of J&K	2007	1906.80	1713	1977
11	Teesta-V	510	Sikkim	2008	2572.70	2346	2412
12	Sewa-II	120	UT of J&K	2010	533.53	427	0*
13	Chamera-III	231	Himachal Pradesh	2012	1108.17	1005	900
14	Chutak	44	UT of J&K	2013	212.93	187	159
15	Nimmo Bazgo	45	UT of J&K	2013	239.33	208	202
16	TLDP-III	132	West Bengal	2013	594.07	530	549
17	Uri-II	240	UT of J&K	2014	1123.70	835	1298
18	Parbati-III	520	Himachal Pradesh	2014	701.40	646	565
19	TLDP-IV	160	West Bengal	2016	717.72	649	687
20	Wind Power, Jaisalmer,	50	Rajasthan	2016	94.25	73	64
21	Solar Power, Tamilnadu	50	Tamilnadu	2018	105.96	75	65
22	Kishanganga	330	UT of J&K	2018	1712.96	1484	1262

Annual Design Energy - 2021-22 (till Dec 2021) : 20627 MU

Annual Generation - 2021-22 (till Dec 2021) : 21116 MU

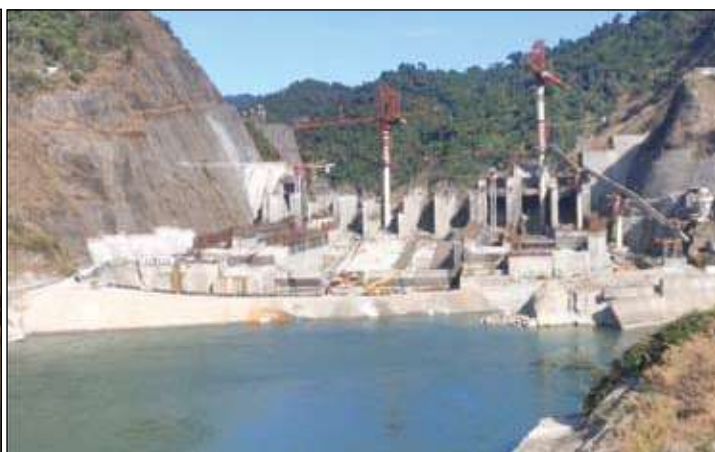
Actual Plant availability factor (PAF) : 94.86%

*Sewa Power Station is complete shutdown since 25.09.2020 due to damage in HRT

Note: Actual Generation excludes infirm power of Parbati-II HEP: 330 MU



Power Hose - Subansiri Lower



Dam – Subansiri Lower



Barrage Constuction - Teesta VI H.E. Project



River Diversion - Pakal Dul H.E. Project

PERFORMANCE OF UNDER CONSTRUCTION PROJECTS

(A) Hydro Power Projects

S. No.	Project	Generation Capacity	Physical Progress upto 31.12.21	Financial Progress upto 31.12.21	Expected Completion
1.	Subansiri Lower H.E. Project	2000MW	70.74%	73.70%	Aug-2023
2.	Parbati-II H.E. Project	800MW	94.20%	94.55%	Mar-2023
Projects under JV/Subsidiaries					
3.	Teesta Stage-VI H.E. Project	500MW	39.97%	21.15%	Mar-2024
4.	Ratle H.E. Project	850MW	2.00%	1.00%	Feb-2026
5.	Rangit IV H.E. Project	120MW	37.44%	18.02%	May-2024
6.	Pakal Dul H.E. Project	1000MW	23.34%	25.36%	July-2025
7.	Kiru H.E. Project	624MW	11.20%	14.41%	July-2025

(B) Renewable Energy Projects

S. No.	Project	Progress	Expected Completion
1.	Ganjam Solar Park Scheme (40MW)	- Survey and Land development / Leveling of project area are in progress. Soil Testing and ERT (Earth Resistivity test) completed. All the 20 nos. bore holes completed. - Drawings for Evacuation arrangement approved by OPTCL. - Boundary fencing order finalized. Switch yard and Transmission line order finalized. - Piling and inverter vendor finalized. Test pile casting work in progress. - Further detailed engineering in progress.	May-2022
2.	Kalpi Solar Power Project (65MW)	63.491 Ha land already in possession of BSUL. The Balance land of 66.928 Ha. transferred in favour of Bundelkhand Saur Urja Limited & registry deed signed on 06.12.2021. - Letter of Award for EPC Contract including O&M for 10 years issued on 17.03.2021 and work is in progress. Land / Site Development works completed. Inspection of Material / Equipment is being carried out and supply of material / equipment is in progress. Boundary Fencing, Road work and Structure piling works are in progress. Foundation work of transmission towers in progress.	May-2022



NHPC ACHEVMENTS

- Commercial operation of the 180 MW Bairasiul Power Station has started from 31.08.2021 after successfully Renovation and Modernization works. The 180 MW Power Station has been re-commissioned for the next 25 years.
- NHPC has acquired JPCL (Rangit IV HE Project) on 31.03.2021 after payment of Rs.165.00 crore. Post-acquisition "JPCL" is now a wholly owned subsidiary of NHPC Limited.
- Successfully diversion of Marusudar, a tributary of Chenab, on 01.11.2021 for construction of 1000 MW Pakaldul Hydroelectric Project in the Union Territory of Jammu and Kashmir.
- Successfully diversion of Rangit river was done on 07.11.2021 for the construction of Rangit-IV project located in Sikkim.
- NHPC has formally taken over the 1856 MW Sawalkote H E Project from JKSPDC Ltd. An agreement in this regard was signed between NHPC Ltd. and JKSPDC Ltd. on 11.12.2021 at Jammu.
- Successfully diversion of Chenab on 31.12.2021 for construction of 624 MW Kiru H E Project in the Union Territory of Jammu and Kashmir.



River Diversion - Rangit-IV H.E. Project



Hrt Excavation – Kiru H.E. Project

CHAPTER 21

POWER GRID CORPORATION OF INDIA LIMITED (POWERGRID)

POWERGRID: An Overview

Power Grid Corporation of India Limited (POWERGRID), is a Schedule 'A', 'Maharatna' Public Sector Enterprise of Govt. of India which was incorporated on 23rd Oct 1989 under the Company Act, 1956. POWERGRID is a listed Company, with 51.34% holding of Government of India and the balance is held by Institutional Investors and public.

POWERGRID is engaged in bulk transmission of Power through its (765/400/220/132kV) Extra High Voltage AC/ ($\pm 800/\pm 500$ kV) Extra High Voltage DC transmission network. POWERGRID being one of the largest transmission utility in the world is playing a strategic role in the development of Indian power sector and has proved its capabilities through timely execution of large & critical transmission projects.

POWERGRID owns & operates a transmission network of **around 1,72,192 circuit kilometer (ckm)** of transmission lines (mainly 400 kV & above AC & HVDC lines) and power transformation capacity of **4,69,607 Mega Volt Amperes (MVA)** with 264 substations as **on 31st December 2021**, spread over the length and breadth of the country. During year 2021, POWERGRID added **8,700 MW** of inter-regional capacity in National Grid and increased its total contribution to **97,290 MW** out of all India inter-regional capacity of 112,250 MW as on 31st December, 2021. POWERGRID has been rated **"Excellent"** with a score of 98.41 for FY 2020-21 for its performance in terms of MoU with Ministry of Power.

POWERGRID is certified for Integrated Management System as per Publicly Available Specification, **PAS 99:2012** integrating requirements of **ISO 9001:2015** (Quality Management System), **ISO 14001:2015** (Environment Management System) and **ISO 45001:2018** (Occupational Health & Safety Management System). All the Establishments of the POWERGRID have been audited for its Social accountability systems & certification for Social Accountability Standard, **SA 8000:2014**.

FINANCIAL PERFORMANCE

POWERGRID has demonstrated an impressive financial performance for the FY 2020-21, achieving total income of ₹ 40,824 crore and net profit of ₹ 12,036 crore on consolidated basis. Further, during FY 2021-22 also, POWERGRID maintained sound financial performance. During April - September 2021, POWERGRID recorded total income of ₹ 20,906 crore and a net profit of ₹ 9,375 crore, as compared to total income of ₹ 19,648 crore and net profit of ₹ 5,143 crore during the period April-September 2020, respectively. The gross asset base of the Company has been enhanced to ₹ 2,41,498 crore as on 31st March, 2021.

During FY 2021-22, out of targeted Capex of about ₹ 7,500 crore, capital expenditure of over ₹ 6,790 crore has been made till

31st December 2021 for implementation of various projects and anticipated to achieve target for the year.

OPERATIONAL PERFORMANCE

During FY 2021-22 (upto December, 2021), POWERGRID has once again display its capability in consistently maintaining its gigantic transmission network with an availability of 99.82%, comparable with the best international standards, through best Operation and Maintenance practices. In addition, no. of tripping per line was restricted to 0.28.

For increased efficiency and transparency in operation of POWERGRID transmission system, transmission assets are being remotely monitored & operated from "National Transmission Asset Management Centre" located at Manesar, Gurgaon. As on 31st December, 2021, POWERGRID is operating its 256 substations(>95% of total 264 substations) remotely through control centres.

± 500 kV, 1500MW Rihand Dadri Bipole HVDC system (commissioned in 1991) & 500MW Vindhyachal HVDC Back-to-Back system (commissioned in 1989) were refurbished successfully in 2021. Refurbishment of HVDC systems will ensure higher system availability and reliability of the grid.

To enhance the operational efficiency, ERP linked transmission line patrolling app "PG-DARPAN" was launched during the year. Further, a Web based portal, Asset Management Information System, has been developed in-house for Effective monitoring of Maintenance plan implementation.

World's 1st 400 kV Rector with natural ester oil has been commissioned at Maithon Substation (West Bengal) during the year. Natural ester oil is biodegradable, higher Fire Resistant and having higher flash Point than mineral insulating oil.

Drone based patrolling of important transmission lines using in-house micro category drones has been commenced in line with recent communication by MoCA and MoP regarding no restriction for flying drone under green zone up to 400 feet height.

COMMERCIAL PERFORMANCE

POWERGRID has achieved 103.78% of realization for the FY 2020-21. Realizations improved majorly with support of Atmanirbhar Bharat Package of Government of India.

During the FY 2021-22, till December, 2021 POWERGRID has realized ₹ 26,113 crore (94.79%) including previous outstanding, against the total bills raised of ₹ 27,547 crore.

CORPORATE STRUCTURE CHANGE IN YEAR 2021

- **FORMATION OF CTU AS SEPARATE SUBSIDIARY OF POWERGRID**

POWERGRID was designated as Central Transmission Utility



(CTU) since 1998. Govt. of India has decided to separate the CTU functions from POWERGRID, initially by designating a subsidiary of POWERGRID incorporated for this purpose followed by establishing it as a separate Government of India Company.

POWERGRID incorporated 'Central Transmission Utility of India Limited' (CTUIL), as its wholly owned subsidiary to undertake and discharge all functions of CTU w.e.f. 01st April, 2021. POWERGRID continues to be a deemed Transmission Licensee under the Electricity Act, 2003.

- **ACQUISITION OF JAIPRAKASH POWERGRID LIMITED (JPL)**

POWERGRID has acquired 74% stake of Jaiprakash Power Ventures Limited in JPL at an aggregate consideration of ₹354.50 crore resulting in JPL becoming a wholly own subsidiary of POWERGRID w.e.f. 25th March 2021. The company has been renamed as POWERGRID Himachal Transmission Limited.

- **POWERGRID SUCCESSFULLY LISTED ITS FIRST InvIT**

POWERGRID sponsored infrastructure investment trust, PGINvIT, was setup and in May'21, POWERGRID monetized transmission assets held through SPVs raising Rs 7,735 crore through initial public offering of units by the PGINvIT. Initial Public Offer of PGINvIT was successfully listed on the NSE & BSE on 14th May, 2021. Upon listing, PGINvIT has become the first InvIT to be launched by a CPSE or a government organization.

- **POWERGRID EMERGED SUCCESSFUL IN FIVE PROJECTS THROUGH TARIFF BASED COMPETITIVE BIDDING (TBCB)**

During the year 2021, POWERGRID emerged successful and acquired five ISTS projects associated with renewable energy viz. POWERGRID Ramgarh Transmission Limited, POWERGRID Bikaner Transmission System Limited, POWERGRID Sikar Transmission Limited, POWERGRID Bhadla Transmission Limited and POWERGRID Aligarh Sikar Transmission Limited.

- **FORMATION OF SUBSIDIARY FOR TELECOM BUSINESS**

POWERGRID has incorporated "POWERGRID TELESERVICES LIMITED" a Wholly Owned Subsidiary (WOS) of Company on 25th November 2021 to undertake Telecommunications and Digital Technology Business of POWERGRID.

- **ADDITIONAL EQUITY INFUSION IN ENERGY EFFICIENCY SERVICES LIMITED (EESL)**

To increase its investment in energy efficiency businesses, POWERGRID has infused ₹ 407 crore in EESL. With this, the share of POWERGRID in EESL has been increased to ~33%.

TRANSMISSION INFRASTRUCTURE (INTER & INTRA STATE) ADDITION

During the year 2021, POWERGRID added 7,750ckm of transmission lines and 55,608MVA of transformation capacity in the Inter and Intra state Transmission System. The Mega transmission scheme which was commissioned during this year is ± 800 kV Raigarh – Pugalur HVDC scheme (Scheme-I, Scheme-II and Scheme-III) with 6000 MW capacity. This system has facilitated power flow from Western Region to Southern Region ensuring reliable and quality

power supply. The project also gave major boost to the PM's Make in India program, as a significant part of design & engineering for this project has been done in India.

POWERGRID has also completed other major transmission systems viz. 765kV WR-NR Interconnector, Transmission System associated with LTA Application from Rajasthan SEZ (Part-A), POWERGRID Fatehgarh Transmission Limited, POWERGRID Mithilanchal Transmission Limited (ERSS-XXI), Transmission System for Ultra Mega Solar Park at Tumkur (Pavagada) Karnataka - Phase- II (Part-B), Transmission System Strengthening in Indian System for Transfer of Power from Mangdechhu Hydroelectric Project in BHUTAN and 1st Intra-State TBCB Project POWERGRID Jawaharpur Firozabad Transmission Limited (PJFTL) during the year.

The list of transmission lines and substation commissioned (including the augmentation of transformation capacity in existing substations) through Tariff Based Competitive Bidding (TBCB) projects and Regulatory Tariff Mechanism (RTM) during year 2021 (1st January 2021 to 31st December 2021) is attached at Annexure-I.

POWERGRID CONTRIBUTION TOWARDS RENEWABLE ENERGY INTEGRATION

In order to facilitate integration of large-scale renewable generation capacity addition in various RE resource rich states, a comprehensive scheme viz. Green Energy Corridors (GEC) including establishment of State-of-the-art Eleven (11) nos. Renewable Energy Management Centers (REMC) in SLDCs of RE resource rich states, RLDCs & NLDC equipped with forecasting & scheduling tools was evolved in a holistic manner. Scheme was designed to facilitate interconnection of renewable generation to the Grid (State/ISTS) as well as enlarge balancing area towards increasing the Grid flexibility. ISTS Part of GEC of RE capacity of 6GW has been implemented by POWERGRID. Eleven (11) nos. REMCs in Southern, Western & Northern regions of this scheme also have been implemented from the MOP GBS allocation. During year 2021, POWERGRID commissioned Energy Management Center in South Andaman and one REMC in Telangana is under implementation.

In the last five years, POWERGRID has implemented Inter-State transmission system for RE capacity of 6.5GW at seven (7) Ultra Solar Parks. These include Solar parks at Banaskantha (700MW), Rewa (750MW), Ananthpur (1500MW), Pavagada (2050MW), Bhadla - III & IV (750MW) & Essel (750MW). POWERGRID is also implementing evacuation of Power from Solar Energy Zones in Rajasthan (8.1GW) under Phase II (Part A, Part B, Part C, Part D, & Part F) and Transmission System for Providing Connectivity to RE Projects at Bhuj-II (2000MW) in Gujarat.

TECHNOLOGY DEVELOPMENT

POWERGRID through its flagship facility, Advanced Research and Technology Centre (PARTeC), had not only catered to the operational efficiency improvement including technology driven asset management needs of the organization but also extended its services to other stakeholders for dynamic/performance testing of relays, compliance testing of phasor measurement units, transmission line field measurement and analysis, etc. PARTeC

has got accredited for ISO 9001:2015 for its quality management system during this year.

POWERGRID has initiated development of several technologies like data analytics for circuit breakers health indexing, assessment of loadability and remnant life of power transformers, on-line vegetation management related with transmission line to reduce tripping, Robotic health inspection and diagnosis of substation equipment, establishment of Centre of Excellence on Cyber security etc.

Towards creation of awareness and capacity building including innovation in the field of Smart Grid through virtual mode, setting up of virtual Smart Grid Knowledge Centre (SGKC) is under progress.

DIGITIZATION IN POWERGRID:

POWERGRID has taken up various digital initiatives towards paperless working and IT enablement of various business processes. These initiatives enabled business continuity during the COVID lockdown facilitating work from home by its employees and real time monitoring of valuable assets.

The Company has established an e-Tendering Portal-PRANIT certified by Standardization, Testing and Quality Certification Directorate (STQC), Ministry of Electronics and Information Technology, Govt. of India. With this, POWERGRID is now the only organization in India to have an e-Procurement solution on SAP Supplier Relationship Management (SRM).

Centralized Vendor Bill tracking and contract closing portal has been established to streamline the processes of verification of bills and release of payments, optimizing the resources, to enhance the transparency and accountability in the system.

POWERGRID has successfully achieved SAP Customer Center of Expertise (CCoE) Certificate. This signifies that Company has the knowledge, capabilities and framework to bring forward continuous improvement and innovation in ERP implementation. POWERGRID has also developed various other portal like Property Declaration Portal, employee query portal, POWERGRID Estate Repository System (PERS), COVID Helpdesk Portal, transfer portal, E-library etc. for ease of communication and learning of its employees.

LEVERAGING HUMAN CAPITAL TO ACHIEVE EXCELLENCE

Through well-articulated talent management and learning & development interventions, POWERGRID has always endeavored to create a high trust, high performance work culture that brings out the best in people, enables and empowers them for continuous learning and be future ready. As on December 31, 2021, the employee strength of the Company stood at 8,555 as against 8,766 on March 31, 2021 which is exclusive of the employees on contract.

To scale up the learning & development in Power Sector, POWERGRID has setup the state-of-art POWERGRID Academy of Leadership (PAL) at Manesar which imparts a wide range of training and development opportunities for its employees and

other stakeholders in India and abroad. During the year, more than 300 training and development programs were organized through virtual mode through PAL, other Employee Development Centres in the regions and associated premier educational institutes in India and abroad. To promote social learning and capture and share both tacit and explicit knowledge, a portal for Mentoring and Coaching program named **"SANDARSHIKA"** has been rolled out successfully. Further, to promote employee education, 5 employees have been sponsored for a 15 months PGDM program by NTPC School of Business.

In the field of e-learning, POWERGRID has developed 72 e-Learning modules related to different business verticals and 9 refresher courses related to various company domains benefiting around 6500+ employees. In addition to above, POWERGRID has hosted 7 modules related to Power transmission for GOI's ambitious "Mission Karmayogi" Programme. To enhance the Leadership competencies, 1500 employees have been sponsored for online Harvard Manage Mentor Program. Further, Tie-up has been made with Ministry of IT & Electronics, GOI and IT Industry body NASSCOM for their Future Skills PRIME portal. This provides access to all employees in POWERGRID to e-courses in emerging technologies and professional skills in Future Skills PRIME.

Leveraging its people's capabilities and infrastructure available at PAL for capacity development of Power sector, POWERGRID has taken following initiatives for stakeholder development.

- 1100+ apprentices have been engaged in different trades as per the Apprentice Act.
- 350+ contract staff has been imparted training under (Recognition of Prior Learning) RPL certification.
- MoU has been signed among National Skill Development Corporation (NSDC), National Skill Development Fund (NSDF), Power Sector Skill Council (PSSC) and POWERGRID for Skill development training of 6000 unemployed youth in power Sector. As a part of this program, at present 2200+ trainees are undergoing training across 20 locations in India.
- Under the NERPSIP (CBIS-NERPSIP) Project, POWERGRID is undertaking Capacity Building and Institutional Strengthening program for State Power Utilities in 6 (six) states of NER (viz: Assam, Meghalaya, Mizoram, Manipur, Nagaland, Tripura) and Capacity Building under Comprehensive Scheme (Arunachal Pradesh & Sikkim – 2 states)
- The company has extended customized Training Programs for clients including NRPC, KIIFB, NPTI, POSOCO, HVPNL, DTL, REC, PFC, HPPTCL, NPMU, CSPTCL, MEA and Overseas Clients including KETRACO & PGCB.

MANAGEMENT OF ENVIRONMENTAL AND SOCIAL ISSUES

POWERGRID activities are non-polluting in nature and their environmental impacts are negligible. However, the principles of Environment, Social and Governance (ESG) are being embedded by POWERGRID into business operations and is continuing to attach highest importance to ESG ecosystem & taking steps to align its



sustainability related aspects with global requirements. In addition to above, POWERGRID is following the principles of Environmental and Social Policy & Procedures (ESPP), a comprehensive and board approved document, whose provisions are mandatorily applicable to all projects and activities. It is worth mentioning that the detailed and comprehensive coverage of POWERGRID's ESPP was certified by two leading Multi-lateral agencies of the world, i.e. The World Bank and the ADB. They recognized it under their policy of "Use of Country System (UCS)" and "Country Safeguard System (CSS)" respectively, which is a unique distinction.

By adoption of various technological and managerial innovations, involvement of forest land has been reduced progressively from 6 % in 1998 to less than 2.5 % presently in its projects. POWERGRID has taken the initiative to secure land through direct purchase on willing buyer willing seller basis on market/negotiated rate to avoid public resistance and court intervention faced during land acquisition. Further, to resolve the ROW issues and reduce social impacts, POWERGRID has started making payment for tower base land and corridor in all the states of the country, which have adopted the landmark guidelines on ROW compensation issued by MoP and adopted by states. Such additional payment for land cost/diminishing land value has not only eased project execution but has also revolutionized/transformed the very basis of compensation and has paved the way for true inclusive growth.

In line with Govt, POWERGRID has taken following sustainability initiatives:

- Installing about 6 MWp Rooftop Solar PV systems covering more than 65 locations, thereby reducing CO₂ emission of approx. 8000 MT per year.
- Use of inductive power in earth wire for powering of telecom antennas, which has huge potential to reduce emission of Green House Gases (GHGs) from DG sets resulting in saving of 40-60 tCO₂/ year/location.
- Massive plantations with suitable indigenous species in and around all substation facilities.
- Developing Electric Vehicle (EV) Charging Stations across India to facilitate E-mobility solutions, introduction of E-cart/Golf cart in substation premise to replace existing petrol/diesel vehicle etc.

CORPORATE SOCIAL RESPONSIBILITY

POWERGRID has taken many proactive measures for improving quality of life of people through its CSR initiatives in the field of Healthcare, Education, Rural Development, Skill Development programmes, Rural Development, Sanitation, Drinking Water and Environmental Sustainability etc. as mandated by the Companies Act. POWERGRID has constructed Vishram Sadans at AIIMS (Delhi), KGMU (Lucknow) and IGIMS (Patna). 6 more Vishram Sadans with an estimated cost of ₹ 97.95 crore at major Govt. health institutions, are being implemented by POWERGRID.

In FY 2021-22, POWERGRID has earmarked ₹ 257.07 crore budget for its CSR activities, which is 2% of its average net profit of

the preceding three years. As on 31.12.2021, POWERGRID has approved a total of 79 number of CSR projects amounting to ₹ 113.90 crore. As "Health & Nutrition with special focus on Covid related reassures" is the theme for undertaking CSR activities for FY 2021-22, major allocation under CSR initiatives are directed towards Healthcare and Nutrition (₹ 57.80 crore). Apart from this, other thrust areas like Education (₹ 2.82 crore), Rural Development (₹ 6.47 crore), Sanitation & Drinking Water (₹ 23.75 crore), Skill Development (₹ 14.0 crore), etc are also given priority.

During the year, POWERGRID has undertaken various comprehensive development activities such as procurement of vehicle mounted sweeping machine with vacuum cleaner for Municipal Corporations, providing Sanitary Napkin Vending machines, supply of Ambulances to various Public Health Centers, renovation and upgradation of Dechenling Crematorium Complex in Gangtok, Sikkim, upgrading schools and setting up Industrial Training Institutes in Uttar Pradesh and Tamil Nadu. Approval for other activities like providing 7 nos. MRI machine at various Govt. hospitals in the country; establishment of a Hub and Spoke model Tele-ICUs at Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow and at their selected medical colleges in the State of Uttar Pradesh (₹ 7.08 crore); providing Cath lab equipment with advanced features and renovation of Cath Lab premises at Govt. Rajaji Hospital, Madurai, Tamil Nadu (₹ 5.40 crore), financial assistance towards construction and development of Shri Badrinath Dham town as a spiritual smart hill town (₹ 19.29 crore) has been accorded.

To give boost to Government of India's initiatives of 'Skill India' and 'Atmanirbhar Bharat', POWERGRID has signed an MoU with Govt. of Rajasthan, through Department of Skill Development Employment and Entrepreneurship for setting up of ITI at Shergarh Tehsil of Jodhpur, Rajasthan.

Among Rural Development initiatives of POWERGRID, "Improving Rural Livelihoods and Protecting Environment through Farmer Centric Integrated Watershed Management" in about 10,000 Ha of semi-arid land each in Kurnool district (Andhra Pradesh) and Vijayapura district (Karnataka) have been completed and have already yielded results through substantial increase of 96,950 m³ in net water storage capacity resulting in conservation of more than 1,45,000 m³ of water and increase in crop productivity in the range of 10-40% in the targeted area.

Apart from above initiatives, POWERGRID is undertaking various integrated development initiatives in 09 aspirational districts allocated to POWERGRID by Government of India. As on 31.12.2021, around 220 CSR initiatives are under various stages of implementation across the country.

STEPS TAKEN BY POWERGRID DURING SECOND WAVE OF COVID-19

The second wave of COVID-19 showed its devastating effect mainly in the month of April-May 2021. The response to the second wave has been mostly taken by the state governments by implementing lockdowns and closing their borders. Power transmission being the essential service, POWERGRID has successfully operated

its transmission system during the lockdown period and also Implemented several on-going projects following all the guidelines issued by State/ Central Govt. POWERGRID took following Support/ Relief Measures during second wave of COVID-19:

- Set-up Oxygen Plants 1 each at Gurugram (Haryana) and Jaisalmer, Rajasthan;
- Provided Cold Chain Equipment worth ₹ 2.66 crore to 4 States and Union Territories namely; Punjab, Sikkim, Mizoram & Ladakh;
- Established COVID Isolation facility created at 190 locations with total around 369 beds with oxygen support across geographical locations of POWERGRID;
- Implemented 100% vaccination of eligible employees and contract workers.
- Provided ventilators for Hospital at Betul (MP), Banaskantha (Gujarat), Salem, Ranipet & Vellore (Tamil Nadu).

OTHER ACTIVITIES

BUSINESS DEVELOPMENT

POWERGRID is providing consultancy services to various national and international clients. It has footprints in 21 countries and currently executing 14 consultancy projects in Bangladesh, Nepal, Uganda & Fiji. During the year POWERGRID bagged Consultancy assignment for revalidation of cost for 225 kV Transmission system in Guinea. POWERGRID has also emerged as most preferred bidder for consultancy assignment in Moldova.

Under domestic consultancy, POWERGRID bagged 27 numbers of consultancy projects during the year 2021. Major assignments for the year include:

- Consultancy services to MSETCL for Up-gradation of existing HVDC Control & Protection System of ± 500 kV Chandrapur – Padghe HVDC Bipole link to suitable version of control and protection system.
- Consultancy services to TSTRANSCO for implementation of 4 nos. 400 kV GIS bays at POWERGRID's 765/400 kV Nizamabad GIS Sub-Station.
- Consultancy services to MPPTCL, JSW Energy, North Central Railways & M/s Tata Power Solar.

CONTRIBUTING TO DISTRIBUTION REFORMS

POWERGRID played a significant role in implementing the infrastructure in distribution system, in various parts of the country, under flagship schemes of Govt. of India. such as DDUGJY, Saubhagya and PMDP.

During the current FY (up to Dec'21) Electrification infrastructure of 83 villages have been created. In addition, 2 nos 33kV Substations and 2 nos 66kV substations were also completed under DDUGJY/ Saubhagya/PMDP schemes inspite of constraints of COVID-19 related lockdown, restrictions in intra-state movement & different quarantine policies of States. Electrification works of 5 nos villages & 1 nos 33 kV Substation are anticipated to be completed till 31st march 2022.

POWERGRID is presently carrying out village electrification strengthening work in UTs of J&K & Ladakh and Intra- State Transmission works at 220/132 kV voltage level under PMDP-2015 scheme in UT of J&K. During FY 2021-22, 220/66 kV Samba & Kathua AIS substation in Jammu has been completed. 1 no 132 kV GIS substation and 1 no 132 kV UG cable in Kashmir are anticipated to be completed till 31st March 2022.

TELECOM BUSINESS

POWERGRID diversified its business into telecommunication as a Telecom Infrastructure and Service Provider in the country owning a pan-India optic fiber network on its EHV Transmission lines. POWERGRID holds Unified License with the service authorization of National Long Distance (NLD) Services and Internet Service Provider (ISP) Category-A along with the IP-I Registration with DoT.

Company has created over 72,000 km of Optical Fiber cable (OFC) network connecting over 1200 locations of the country carrying traffic in multiple of 10G / 100G in rings and provides services to Telecom Operators, Internet Service Providers, MSOs, Enterprises, Banks, Govt. Institutions/dept., Ministries, Educational Institutions/ Universities like IITs and IIMs etc.

Company is providing nationwide services like Managed lease lines, Internet Leased line, Tower co-location, MPLS based IP-VPN, SD-WAN, DDoS, DNS etc. in all parts of the country with its Pan India high capacity network and also implementing various Govt. projects viz. National Knowledge Network (NKN) project and Bharatnet project.

POWERGRID has extended its reach of telecom network to newly formed Union Territory of India Leh. This has led to one step forward towards Digital India's flagship program driven by Government of India with a vision to transform India into a digitally empowered society and knowledge economy.

The Company is also exploring new businesses like setting up of Data Centres, use of transmission towers for telecom purposes by providing power to the telecom antennae, etc. With a vision to directly serve neighboring countries with reliable connectivity, your Company is proposing to obtain International Long Distance (ILD) service authorization from Department of Telecommunication (DoT) to serve Nepal, Bhutan and Bangladesh.

POWERGRID'S EFFORTS TOWARDS DEVELOPMENT OF NORTH EASTERN REGION (NER)

Government of India has sanctioned two Intra state power transmission and distribution schemes for North Eastern States for the power infrastructure development. These schemes will create reliable state power grid and improve its connectivity to the upcoming load centers and thus extend the benefits of the grid connected power to all categories of end consumers in NER States. POWERGRID has been assigned to undertake the implementation of the following intra state transmission schemes.

- North Eastern Region Power System Improvement Project (NERPSIP) for Six (6) States (Assam, Manipur, Meghalaya, Mizoram, Tripura and Nagaland) for strengthening of the



Intra-State Transmission and Distribution Systems (33kV and above).

- Comprehensive Scheme for Strengthening of Transmission and Distribution System in Arunachal Pradesh and Sikkim

Under NERPSIP, 339 elements out of 444 elements have been completed till Dec'21 and work is in progress in the balance elements. Under Comprehensive Scheme for Strengthening of Transmission and Distribution System in Arunachal Pradesh and Sikkim, 73 elements out of 292 elements have been completed till Dec'21 and balance works are under progress.

POWERGRID is also constructing new transmission lines, extension/ upgradation of existing substations, augmentation of transformation capacity, re-conductoring of transmission lines etc. in NER states under Inter State transmission System (ISTS) projects allocated by GoI, through Regulated Tariff Mechanism (RTM). These schemes will strengthen the North-Eastern Grid, improve the quality of power and will reduce the transmission losses.

MAJOR AWARDS AND ACCOLADES

- POWERGRID has been ranked 68th in the largest workplace culture study in the country for 2021 by the Great Place to Work Institute.
- POWERGRID won the Dun & Bradstreet award under the sectoral category Power Transmission at the PSU Awards 2021.
- S&P Global Platts Top 250 Energy Company Rankings - POWERGRID continues to be 'Fastest Growing Electric Utility in Asia' for the 8th successive year since 2014. POWERGRID remains the only Electric Utility to feature in the Top 50 Fastest Growing Energy Companies list and was positioned 9th.

- POWERGRID ranked 44th among India's largest Companies list published by Fortune India 500 for FY 2021.
- POWERGRID bestowed "CSR Times Award 2021" in Water Conservation and Management category for its prestigious project "Integrated Watershed Management at Kalahandi, Odisha" at the 8th National CSR e-summit.



±320kV, 2000 MW, Pugalur – Trichur HVDC Transmission System commissioned in 2021



220/66kV Phyang Substation at Leh under Srinagar-Leh Transmission System

CHAPTER 22

POWER FINANCE CORPORATION LTD.

1.0. OVERVIEW OF PFC

1.1. Introduction

PFC was incorporated on July 16, 1986, as part of Government of India's initiative to enhance funding of power projects in India, with an objective to provide financial resources and encourage flow of investments to the power and associated sectors. PFC commenced its lending activity in 1988. It was declared a Public Financial Institution (PFI), under Section-4A of Companies Act, in 1990.

PFC is a Schedule-A, Maharatna CPSE in the Financial Services Sector, under the administrative control of the Ministry of Power, with 55.99% shareholding by the Government of India as on 31.12.2021. Its Registered and Corporate Offices are in New Delhi. The Corporation has been conferred with the status of 'Maharatna' by Government of India on 12th October, 2021. This new recognition will enable PFC to offer competitive financing for the power sector, which will go a long way in making available affordable & reliable 'Power For All 24x7'. The enhanced powers that come with Maharatna Status will also help PFC in pushing the Government's agenda of funding under the National Infrastructure Pipeline, national commitment of 40% green energy by 2032 and effective monitoring and implementation of the New Revamped Distribution Sector Scheme with an outlay of more than Rs.3 Lakh crore. RBI has re-classified PFC from a 'Loan Company' to an 'Infrastructure Finance Company' (IFC) on July 28, 2010 which enabled PFC to be operationally more flexible and effectively capitalize on available financing opportunities.

Today, Power Finance Corporation Limited (PFC) group is the largest Financial Company in Indian Power Sector. PFC is a Non-Banking Financial Company which provides innovative fund and non-fund based support for the overall development of Indian Power Sector. PFC is the largest CPSE in terms of the balance sheet size. PFC is also the largest Infrastructure Finance Company in India and largest Govt owned NBFC on consolidated basis.

With a vision to power India's next phase of development, PFC has been at the forefront of flagship Government projects, powering the nation's ascent to the world stage. By leveraging its expertise in financing the power sector and prudently deploying resources, PFC has evolved with the changing policy dynamics to emerge as a dominant market leader.

1.2. Products & Services

PFC plays a strategic role in the initiatives of the GoI for the development of the power sector in India and works with GoI agencies, state governments, power sector utilities, other

power sector intermediaries and private sector clients for the development and implementation of policies and for structural and procedural reforms in the power sector in India.

PFC offers a bouquet of innovative fund-based and non-fund based products for its clientele in the power sector, including for Generation (conventional and renewable), Transmission and Distribution projects as well as Renovation and Modernization projects. Some of the fund-based products include; Project Term Loans, Corporate Loans, Buyer's Line of Credit, Debt Refinancing, Short Term & Medium Term Loans, etc. and non-fund based products like Deferred Payment Guarantee, LoC, LoU, Guarantee for Performance of Contract / Obligations with regard to FSA, etc. PFC also provides various fee-based technical, advisory and consultancy services for power sector projects through its 100% owned subsidiary, namely, PFC Consulting Limited.

PFC has introduced market-friendly policies for pre-payment and release of collateral securities to attract more business. The Company has also introduced online screening of solar and wind proposals to expedite the appraisal process and to capture more business in the sector. Further, PFC's specialised focus, coupled with over three decades of expertise in funding the power sector, enables it to provide customised solutions based on the financial profile of its clients, as well as the nation's fiscal health.

PFC has well established relationships with the Govt. of India, and State governments, regulatory authorities, major power sector organizations, Central and State power utilities, as well as private sector power project developers.

1.3. Association with Government of India

PFC is actively involved in implementation of various Govt. of India's flagship Programs for the power sector, including acting as the Nodal agency for implementation of UMPPs and the "Integrated Power Development Scheme" (IPDS) and as a Bid Process Coordinator for the 'Independent Transmission Projects' and implementation partner of Capacity Building under R-APDRP. PFC is also the nodal agency along with REC for the new Revamped Distribution Sector Scheme (RDSS) with an outlay of more than Rs. 3 Lakh Crores.

Promoting 'Aatmanirbhar Bharat'

In order to ease out the stress of DISCOMs on cash flows, Govt of India had announced reforms-linked allocation of Rs.90,000 Crore for cash-strapped distribution companies under the 'Aatmanirbhar Bharat Abhiyan'. PFC Group took on the responsibility of an being the implementing partner for the Government for providing the liquidity support under this scheme.



1.4. Subsidiaries and Joint Ventures

During FY 2018-19, PFC had acquired 52.63% of total paid up equity shareholding in REC and thus became the holding company and a promoter of REC. The acquisition promoted increased efficiencies in the processes and policies across both the institutions and helped create public value by offering better loan products to the power sector. The convergence between these entities as a combined group would also help the power sector reap benefits from a decentralized outreach of REC and a professional project finance expertise of PFC. Further, the ensuing diversification of assets of the group, as well as portfolio risk, would help in resolution of stressed power sector assets of the group in a better and co-ordinated manner.

PFC Consulting Limited (PFCCL) is a Subsidiary of PFC which provides various fee-based technical, advisory and consultancy services for power sector projects.

PFC is also one of the Promoters of Energy Efficiency Services Limited (EESL), which is implementing one of the world's largest energy efficiency portfolio. PFC is also an equity shareholder in PTC India Limited (PTC) which is involved in power trading and related activities.

PFC has also invested Rs.3.22 crores in the equity share capital of Power Exchange India Ltd. (PXIL), which is 6.64% of the paid-up equity capital. PXIL is India's first institutionally promoted Power Exchange that provides innovative and credible solutions to transform the Indian Power Markets. PXIL, provides nationwide, electronic Exchange for trading of power and handles power trading and transmission clearance, simultaneously, it provides transparent, neutral and efficient electronic platform. PXIL offers various products such as Day Ahead, Day Ahead Contingency, Any Day, Intra Day and Weekly Contracts. PXIL provides trading platform for Renewable Energy Certificates. Due to erosion of Net Worth of PXIL, PFC has provided the entire investment amount of ₹3.22 crore as provision for diminution in the value of investment in its books.

1.5. Expansion and Diversification Strategy

To drive sustained growth, PFC explores and taps latent opportunities in financing fuel suppliers and equipment manufacturers, among others, as well as in the renewable energy space. Being a leading lender in India, PFC is well-positioned to wholeheartedly support creation of more assets for production of renewable power.

As a corporate strategy, PFC has set up a subsidiary – PFC Consulting Limited – and several other business units, such as power exchanges, to strengthen its preparedness for addressing future challenges. PFC has aligned its lending policy for the renewable energy sector with the prevailing business environment to expand its market share. PFC has also strategically expanded its focus areas to include projects that represent forward and backward linkages to the core power sector projects, including procurement of capital equipment for the power sector, fuel sources for power generation

projects and related infrastructure development as well as power trading initiatives.

PFC also intends to increase its focus on debt syndication activities in the power sector and plan to continue to target debt syndication opportunities. PFC's technical knowledge and industry experience, project appraisal capabilities, and relationship with commercial banks and other financial institutions enable it to ensure timely completion of such projects.

2.0 PFC'S STRENGTHS

2.1 Memorandum of Understanding with Govt. of India

PFC has been signing MoU with the Govt. of India since 1993-94 and has consistently been rated 'Excellent' based on MOU targets in respect of various performance parameters. ('Very Good' in FY 2004-05 & FY 2019-20).

2.2 Favorable Credit Rating and Access to Various Cost-competitive Sources of Funds

Our primary sources of funds include equity capital, internal resources, and domestic and foreign currency borrowings. Excellence in performance is also reflected in consistently obtaining the highest Credit Rating from domestic rating agencies and investment grade rating from international credit rating agencies.

PFC Credit Ratings

Rating Agency	Long Term borrowings	Short Term Borrowings
Domestic Rating		
CRISIL	'AAA'	'A1+' (Highest Rating)
ICRA	'AAA'	'A1+' (Highest Rating)
CARE	'AAA'	'A1+' (Highest Rating)
International Rating (at par with 'Sovereign' rating)		
Moody's	Baa3	
FITCH	BBB-	

We believe that our financial strength and favorable credit ratings facilitate access to various cost competitive funding options. Our borrowings reflect various sources, maturities and currencies; and include bonds, term loans and commercial paper.

2.3 Effective Resource Mobilization

PFC raises the funds through market borrowings of various maturities and currencies. PFC accesses domestic debt markets through various sources which include Public / Private Placement of Long Term Taxable Bonds, Long Term Infrastructure Bonds, Tax Free Bonds, Rupee Term Loans, Commercial papers, Inter-corporate deposits etc. PFC also raises its funds from international market through ECBs and Loans from Bilateral and Multilateral Agencies.

2.4 Experienced and Committed Human Capital

PFC has an experienced, qualified and committed management and employee base. Many of PFC's employees, particularly senior management, have worked with PFC for significantly long periods. PFC has an efficient and lean organizational structure relative to the size of its operations and profitability. PFC's personnel Policies are aimed towards recruiting talented employees and facilitating their integration into the Company and encouraging the development of their skills.

PFC's management has significant experience in the power sector and the financial services industry, which has enabled it to develop a comprehensive and effective project appraisal process, implement a stringent risk management framework, identify specific requirements of power sector projects and offer comprehensive financing solutions and advisory assistance to such projects.

2.5 High Net Worth

Most projects in the Power Sector are highly capital intensive and are large size projects, which require considerable amount of financial resources. Considering the RBI regulatory regime, lending towards each such project is dependent upon the total permissible exposure in respect of the specific borrower. Since PFC has considerably high net worth, it is able to take significant exposure in projects of each borrower. This, in turn, leads to an early financial closure leading to faster capacity addition.

2.6 Robust Appraisal Methodology

Over the years, PFC has developed extensive knowledge of, and experience in the Indian power sector, and has comprehensive credit appraisal policies and procedures, which enable PFC to effectively appraise and extend financial assistance to various power sector projects. PFC follows a systematic institutional and project appraisal process to assess and mitigate project and credit risk. PFC's internal processes and credit review mechanisms reduce the number of defaults on loans and contribute to profitability. PFC believes that its comprehensive credit appraisal and project monitoring processes also result in strong collection and recovery.

2.7 ISO Certification

PFC's operations are ISO 9001:2015 certified and the certification is valid upto 08.01.2022. During the period under review, 23rd Management Review Meeting (MRM) was held on 25.03.2021. Further, the 3rd Surveillance Audit (SA) was conducted on 07.04.2021, as part of maintaining Quality management system (QMS) in PFC. Moreover, recertification audit was successfully conducted on 30.12.2021 and 31.12.2021, to extend the validity of certification in PFC. The certificate w.r.t. extension is expected shortly.

3.0 PERFORMANCE HIGHLIGHTS

3.1 PFC has been a profit-making enterprise right since inception and has registered impressive growth in its net profit every

year. The net profit of the company is Rs. 5,032 Cr. during the half year ended 30.09.2021.

3.2 Stage III Assets:

Stage III Assets: Net Stage III Loan Assets (>90 days overdue) are 7,153 Cr. which is 1.92 % of the total Loan Assets as on 30.09.2021.

3.3 PFC's financial performance for the last 2 years based on Ind AS Financials are as under:

(₹ Crore)

Particulars	2019-20	2020-21	Upto 30-Sep-2021
Profit before tax	8,193	10,207	6,143
Profit after tax	5,655	8,444	5,032
Dividend (Interim + final)	2,508	2,640	1,254

4.0 AWARDS & ACCOLADES

- I. PFC has been accorded MAHARATNA Status on 12th October 2021.
- II. FORTUNE India has ranked PFC 29th Amongst largest 500 Indian Companies as per FORTUNE India 2021 Rankings
- III. *PFC is ranked 365th in the World in terms of assets as per "Forbes Global 2021"*
- IV. PFC has received "RAJBHASHA KIRTI PURUSKAR" FIRST PRIZE for year 2019-20 for implementation of Official Language.
- V. PFC received coveted "Industry Excellence Award" instituted by Institution of Engineers (India)
- VI. PFC has bagged "NORTH INDIA BEST EMPLOYER BRAND" Award 2021-22 by Employer Branding Institute-India
- VII. PFC has been **rated 3rd** in "Swachhata Ranking" by New delhi Municipal Council in category of OFFICES in NDMC area.
- VIII. *Received 8th 'GOVERNANCE NOW' PSU Award in the category of "Strategic Performance"*
- IX. *Received "Best Navratna" PSU Award from Dun & Bradstreet*
- X. *SKOCH Gold Award for Relief Activities during Covid19*

5.0 OPERATIONAL HIGHLIGHTS

PFC sanctioned loans amounting to ₹1,66,370 Crore during fiscal 2020-21 to State, Central, Private and Joint Sector entities. An amount of ₹88302 Crore was disbursed during the same period. The loan assets as at 30.09.2021 stand at ₹3,71,732 Crore.

6.0 RESOURCE MOBILISATION

6.1 Domestic

PFC mobilized funds amounting to Rs. 24,160.28 crore from the domestic market during FY 2021-22 till 31.12.2021. Out of the above, Rs. 13,232.20 crore was raised through issue of taxable bonds in the nature of debentures, Rs. 923.08 crore



through Capital Gain Bonds and Rs. 10,005.00 crore through term loans.

6.2 External

PFC diversified its borrowing through tapping international market. During FY 20-21, PFC raised foreign currency equivalent to USD 900 million (eq. INR 6,603 crores)

Despite the COVID times, PFC was able to tap international markets, which reflects confidence of investors in PFC's business as well as its credit profile and the growth story of Indian Power sector.

7.0 NEW BUSINESS INITIATIVES

PFC has modified its Memorandum of Association (MoA) to fund schemes related to e-vehicles, charging infrastructure, electrical and electro mechanical systems of large projects like lift irrigation, sewage treatment plants, smart cities etc. This will enable PFC to diversify its loan book and also support project of under government of India schemes such as FAME etc. PFC is currently evaluating a few proposals w.r.t Electric Vehicles, Solar Cell Manufacturing etc.

With the increasing proportion of Renewables, it has become important to supplement them with storage projects in order to ensure grid stability. In this regard, PFC has sanctioned a loan of about Rs 5400 Crore for India's first Pumped Storage based integrated renewable energy project comprising 1.2GW PSP facility, being setup by Greenko Group in Andhra Pradesh. This is a first of its kind project being implemented in India.

Electric buses offer sustainable mobility solutions by tackling twin challenges of improving air quality as well in coverage of public transportation in the country. Govt. of India has launched FAME-II scheme for promoting adoption of Electric buses. In support of Govt's vision, PFC has marked its entry in Electric Mobility segment by providing financial assistance of ~Rs 275 cr for deployment of 350 electric buses in 9 cities of Uttar Pradesh by Green Cell Mobility, a platform supported by Govt. of India & Govt. of United Kingdom.

8.0 RISK MANAGEMENT

As a part of Risk Management, the Corporation has to manage various risks associated with its business. For managing such risk, PFC has an integrated risk management framework which identifies the risk(s) impacting PFC and the appropriate measures to mitigate the same. The risks are monitored at various levels throughout the Corporation. Departmental heads are responsible for monitoring and periodically reviewing the risk profile of their respective function. A Risk Management Compliance Committee (RMCC) has been formulated which comprises of Executive Director level members. Inputs against identified risks are obtained from various departments and the status of the risks are submitted to the RMCC. The RMCC reviews the various risks and provides guidance / corrective action wherever required. The Risk Management Committee of Board (RMCB) comprising of Board level members are then appraised on the key risks associated with the business, its root causes and measures taken to mitigate the same.

Further, to monitor some key risk associated with the lending business, PFC has constituted separate committee(s). To monitor the liquidity and interest rate risk, PFC has an Asset Liability Management Committee (ALCO) headed by Director (Finance). The Asset Liability Management framework includes periodic analysis of long term liquidity profile of asset receipts and debt service obligations. Such analysis is carried out on a periodic basis in various time buckets and is being used for critical decisions regarding the time, volume and maturity profile of the borrowings and creation of mix of assets and liabilities in terms of time period (short, medium and long-term) and in terms of fixed and floating interest rates.

To manage the foreign currency risk, PFC has a separate Currency Risk Management Framework under which a separate Currency Risk Management Committee has been constituted. To protect against foreign currency risk, PFC enters into hedging transactions to cover exchange risk and interest rate risk through various instruments like currency forward, option, principal swap and interest rate swaps.

Further, in line with RBI's directions, PFC had appointed Chief Risk Officer (CRO) to implement the Corporate Risk Management Framework. The CRO directly reports to the Chairman & Managing Director. The CRO is majorly concerned with controlling Credit Risk, Liquidity Risk, Market Risk & Operational Risk etc.. Further, CRO is also involved in the process of identification, assessment, monitoring and mitigation of the risks.

9.0 INSTITUTIONAL DEVELOPMENT OF BORROWERS

9.1 Categorisation of State Power Utilities By PFC (as on 31st December 2021)

For purposes of funding, PFC classifies State Power Generation and Transmission utilities into A++, A+, A, B, C and Non-responsive categories. The categorisation (biannually) of State Power Generation and Transmission utilities is arrived based on the evaluation of utility's performance against specific parameters covering operational & financial performance including regulatory environment, generation of audited accounts, etc. as per PFC categorization policy.

With regards to State Power Distribution utilities (including SEBs / utilities with integrated operations), PFC Categorisation policy provides for adoption of MoP's Integrated Ratings by aligning such ratings/gradings with PFC's standard categories of A+, A, B and C.

The categorisation enables PFC to determine credit exposure limits, pricing of loans and stipulation of security to the state power utilities. As on 31st December 2021, 131 utilities were categorized with 15 as 'A++', 36 as 'A+', 48 as 'A', 22 as 'B', 7 as 'C' and 3 as 'Non-Responsive'.

9.2 Ministry Of Power's Integrated Rating Framework For State Distribution Utilities

Ministry of Power, as part of its various initiatives, developed an Integrated Rating Methodology covering the State Power Distribution Utilities keeping in view of the poor financial

health of the State Distribution Utilities due to multifarious factors.

The objective of the integrated rating is to rate all utilities in power distribution sector on the basis of their performance and their ability to sustain the performance level. The methodology adopted attempts to objectively adjudge the performance of state distribution utilities against various parameters broadly classified under i) Operational & Reform parameters ii) External Parameters and iii) Financial parameters. The evaluation of certain parameters would cover current levels of performance as well as relative improvement from year to year. The operational and reform parameters viz. AT&C Losses, Efficiency of Power Purchase cost, RPO compliance, etc. carry weightage of 43% and the financial parameters viz. cost coverage ratio, payables, receivables, timely submission of audited accounts, etc. carry weightage of 42%. External parameters relating to regulatory environment, State Govt. subsidy support, etc. have been assigned weightage of 15%.

The methodology provides for assigning negative marks for non-compliance on such parameters viz. unavailability of audited accounts, non-formation of State Transmission Utility, non-filing of tariff petition, etc. The negative marks for such parameters give necessary depth to rating methodology.

The Integrated Rating framework covers all state distribution utilities (including SEBs/utilities with integrated operations) except state power departments. The integrated rating is carried out on an annual basis by independent credit rating agencies. ICRA and CARE were the designated rating agencies for the same upto 8th Integrated Ratings while the 9th Integrated Ratings was carried out by ICRA Analytics Limited (IAL) & CARE Advisory Research and Training Limited (CART), the consulting subsidiaries of ICRA & CARE. PFC has been nominated by MoP as the nodal agency for coordinating the activities relating to integrated rating of state distribution utilities including appointment of credit rating agencies.

So far, nine Annual Integrated Ratings have been approved by Ministry of Power with the last i.e. Ninth Annual Integrated Ratings covering 41 state distribution utilities having been released in July 2021.

M/s. McKinsey & Company Inc. has been appointed as a consultant for carrying out the tenth Integrated Ratings of 71 power distribution utilities including state & private sector discoms and state power departments. The Tenth Integrated Rating exercise for rating year FY 2020-21 is in progress and is expected to be notified in 2nd Quarter of FY 2022-23.

9.3 Annual Performance Report of State Power Utilities

PFC has been publishing the Report on Performance of State Power Utilities (SPUs) annually. For FY 2019-20 edition, coverage of the Report has been increased to include distribution utilities in all Union Territories and major Private Distribution Utilities. Accordingly, the report now covers distribution utilities in all states and UTs of India and State Gencos/Transcos/Trading utilities, offering a comprehensive insight into the Indian power sector. The Report for FY 2019-

20 covering 115 utilities was published in August 2021. The Report is a part of PFC's effort to provide a reliable database which can help to determine the results associated with the reforms in the sector. It is a comprehensive study of the performance of the State Power Utilities on key financial and operational parameters. The Report contains key performance parameters e.g. profitability, gap between average cost of supply and average realization (Rs./kwh), net worth, capital employed; receivables, payables, AT&C losses (%) etc. and consumption pattern of the sector at utility, state and national level. The Report for FY 2020-21 is under compilation.

10. FINANCING TO GENERATION PROJECTS

10.1 Renewable Energy Projects

Renewable capacity in the country needs significant augmentation for overall systems to have optimal energy mix. During 2021-22 as on 31st December, 2021, the Company has sanctioned Rs. 5,393 Crore and disbursed an amount of Rs. 4,197 crore. The cumulative financial support provided by the Company for renewable energy schemes is Rs. 59,100 crore out of which Rs. 34,429 crore has been disbursed till 31st December, 2021.

10.2 Conventional Projects (Thermal & Large Hydro)

Thermal power generation comprises a major proportion of India's installed capacity. During FY 2021-22 as on 31st December, 2021, the Company has sanctioned Rs. 2,713 crore and disbursed an amount of Rs. 6,312 crore. The cumulative financial support provided by the Company for thermal generation schemes is Rs. 3,46,754 crore out of which Rs. 2,86,075 crore has been disbursed till 31st December, 2021.

Hydro generation capacity in the country needs significant augmentation for overall systems to have optimal energy mix. During FY 2021-22 as on 31st December, 2021, the Company has sanctioned Rs. 4,643 Crore and disbursed an amount of Rs. 159 crore. The cumulative financial support provided by the Company for hydro generation schemes is Rs. 85,290 Crore out of which Rs. 41,233 Crore has been disbursed till 31st December, 2021.

11. RENOVATION, MODERNISATION AND LIFE EXTENSION

11.1 Conventional Projects

During FY 2021-22 as on 31st December, 2021, the Company has sanctioned Rs.1,056 Crore and disbursed an amount of Rs. 87 Crore against R&M of thermal and hydro projects. The cumulative financial support provided by the Company for R&M of thermal and hydro generation schemes is Rs. 25,009 Crore out of which Rs. 12,399 Crore has been disbursed till 31st December, 2021.

12. MEMORANDUM OF UNDERSTANDING WITH GOVT. OF INDIA

For the Financial Year 2021-22, Memorandum of Undertaking (MoU) to be signed between PFC and the Ministry of Power is under finalization.



13. HUMAN RESOURCE MANAGEMENT AND TRAINING

13.1 Human Resource Management

The company has put in place effective human resource acquisition and maintenance function, which is benchmarked with best corporate practices designed to meet the organizational needs. This apart from other strategic interventions leads to an effective management of Human Resources thereby ensuring high level of productivity.

The Industrial Relations within the organization has been very cordial and harmonious with the employees committing themselves entirely to the objectives of the organization. There was no mandays lost during the year under review. The attrition rate for the period from 1st April 2021 to 31st December 2021 is less than 1%.

13.2 Welfare Measure

The Corporation follows good management practices. The employees of the company have access to the Top Management officials thereby contributing effectively in the management and growth of the Corporation.

The commitment of the workforce is ensured through an effective package of welfare measures which include comprehensive insurance, medical facilities and other amenities which lead to a healthy workforce.

Measures undertaken in the wake of Covid-19 Pandemic

To ensure health and safety of employees during the period, PFC arranged for regular sanitisation of office premises and installed contactless attendance, thermal scanner and sanitiser dispenser at the entry point. Sanitisers were also arranged at every floor at multiple points including lifts and washrooms.

In order to ensure social distancing, roster-based attendance system was implemented from time to time depending upon severity of Covid waves. Smooth work from home was ensured during such periods through e-office without hampering the performance and efficiency. All the official meetings, trainings and ceremonies organised during the period were conducted through MS Teams only.

To counter the spread of Covid-19 virus, regular testing camps were organised and proper quarantine guidelines were implemented for affected employees. Multiple Vaccination camps were organised for all the employees till 100% vaccination was achieved. In case of any employee contacting the virus, all the necessary assistance was extended with the help of empanelled hospitals.

13.3 Human Resource Development & Training

During FY 2021-22 (upto 31st December 2021), the focus of conducting in house programs was maintained to ensure specific skill development in line with the corporate goals. Customized programs like training on Communication Skills, Online General Management & Leadership Programs for Executives, Cyber Security, Gender Sensitisation, CDA Rules & PIDPI, Sexual Harassment at Work place, Win Covid through

Immunity Booster Capsule of Yoga and Naturopathy, Induction and orientation program for newly joined executives, etc. were organized along with other need-based programs.

As on 31st December 2021, 11 Nos. of In-house training programs were organized by PFC for its employees. A total of 1128 man-days were achieved through conducting various in-house programs and by sponsoring PFC employees to the programs organized by other training agencies.

13.4 Capacity Building Process under R-APDRP

PFC is the Nodal Agency for operationalizing the programme for the Government of India. PFC has empanelled Partner Training Institutes (PTIs) to impart training to both level A&B and level C&D state Power Distribution Utility personnel. So far over 44,900 personnel of various utilities have been trained under IPDS (Subsumed RAPDRP) Capacity Building initiative.

14. CORPORATE SOCIAL RESPONSIBILITY (CSR) AND SUSTAINABLE DEVELOPMENT (SD):

PFC through its CSR initiative is undertaking projects for sustainable development by focusing on the thrust areas mentioned in its policy such as ensuring environmental sustainability, skill development leading to employment for unemployed youth belonging to weaker sections of society, basic education, health, sanitation, drinking water etc. PFC is consistently endeavouring through its CSR initiatives for upliftment of women and supporting persons with disabilities.

During the unprecedented time of Covid-19 pandemic, PFC supported districts in Rajasthan (provided Covid-19 relief measures in Kota district amounting to Rs.0.50 crore & Medical Infrastructure in District Hospital in Pratapgarh district amounting to Rs 0.50 crore), Uttar Pradesh (provided 60 nos. of Oxygen Concentrators in Covid care centres in Siddharthnagar district amounting to Rs.0.55 crore) and Manipur (provided Medical Infrastructure in Covid care centres, CHCs, PHCs in Churachandpur district amounting to Rs.1.74 crore).

14.1 CSR Expenditure:

For the FY 2021-22, PFC has earmarked a budget of Rs.170.43 crore against a budget of Rs.148.45 crore for the previous FY (@ 2% of the average stand-alone PBT of the three immediately preceding financial years as per Companies Act, 2013). PFC has sanctioned projects worth Rs.34.45 crore under CSR activities till 31st Dec 2021.

14.2 Major initiatives:

14.2.1 Environment Sustainability:

PFC focused on taking up Renewable energy/ Energy Efficiency projects, thereby sanctioning a total of Rs. 1.52 crore for providing various solar interventions in villages of Sawai Madhopur district, Rajasthan and Solar based LED Street Lighting System (SLSS) in Mohanlalganj region, Lucknow (U.P) in FY 2021-22.

14.2.2 Skill Development /Basic Education:

In FY 2021-22, PFC sanctioned a total of Rs.12.64 Crores for conducting skill development training of 1900 nos. unemployed youth belonging to SC/ST/OBC/ PwD/Women/ EWS sections of society in various locations in India.

Under 'Basic Education', PFC has sanctioned Rs. 5.30 crore for construction of classrooms and allied facilities in Akal Academy schools in 4 districts of Punjab and Rs. 0.58 crore for Construction of Daullah Smartgram Secondary School at village Daullah Gurugram, Hararyana.

14.2.3 List of major Projects sanctioned during FY 2020-21:

- Financial assistance towards Relief and Rehabilitation activities in Uttarakhand amounting to Rs.4.00 crore
- Rectification of toilets constructed by PFC in FY 2014-15 under CSR Swachh Bharat Swachh Vidyalaya Abhiyan (SBSV) in the States of Rajasthan after survey of toilets amounting to Rs.3.23 crore
- Providing 60 nos. of oxygen concentrators in the Covid care centres in Siddharthnagar, Uttar Pradesh amounting to Rs.0.55 crore
- Provided Covid-19 relief measures in Kota District, Rajasthan amounting to Rs.0.50 crore
- Providing Medical Infrastructure in Covid care centres, CHCs, PHCs in Churachandpur district, Manipur amounting to Rs.1.74 crore
- Financial assistance for construction of classrooms and allied facilities in Akal Academy schools in 4 districts of Punjab amounting to Rs. 5.30 crore
- Installation and commissioning of various solar interventions in various villages of Sawai Madhopur district of Rajasthan amounting to Rs.0.55 crore
- Installation and commissioning of 500 nos. of Solar based LED Street Lighting System (SLS) in various villages of Mohanlalganj Region, Lucknow, Uttar Pradesh amounting to Rs.0.97 crore
- Construction of Daullah Smartgram Secondary School at village Daullah Gurugram, Hararyana amounting to Rs.0.58 crore
- Providing Medical Infrastructure in District Hospital in Pratapgarh district, Rajasthan amounting to Rs 0.50 crore
- Skill development training to 1000 nos. of unemployed youth belonging to SC/ST/OBC/ PwD/Women/EWS sections of society in various locations in India amounting to Rs.10.03 crore
- Skill development training to 900 nos. of unemployed youth belonging to SC/ST/OBC/ PwD/Women/EWS sections of society in various locations in India amounting to Rs.2.61 crore

15. PFC CONSULTING LTD (PFCCL), A WHOLLY OWNED SUBSIDIARY OF PFC

15.1 PFC Consulting Ltd (PFCCL) was incorporated on March 25, 2008 as a wholly owned subsidiary of Power Finance Corporation Limited to provide consultancy services to the Power Sector. PFCCL commenced its business on April 25, 2008.

PFC Consulting Ltd (PFCCL), has undertaken assignments along with entire spectrum of power sector advisory services including Bid Process Management, regulatory matters like preparation & filing of tariff petitions & ARRs, Distribution System Improvement Scheme (IPDS / DDUGJY/Smart Grids/RDSS), Resource Mobilization, selection of EPC Contractor, Project & financial advisory for new power plant, Reforms and Restructuring of Power Sector, assistance to Regulatory bodies, power trading advisory, Transaction Advisory, project appraisal, PPA, strategy, Policy, Energy Audit, Contract related advisory, Coal block development, development of Transmission Projects, Energy Portfolio Management for DISCOMs, Development of Ultra Mega Renewable Energy Power Parks etc.

Under the Ministry of Power's initiative for the development of Ultra Mega Power Projects (UMPPs) each having a capacity of about 4000 MW each, PFC/ PFCCL incorporates Special Purpose Vehicles (SPVs) for each UMPP to undertake the bidding process on behalf of the power procuring (beneficiary) States. So far 4 UMPPs have been transferred to successful bidders.

PFCCL is also acting as a Bid Process Coordinator for development of Independent Transmission Projects (ITP). The objective of this ITP initiative is to develop transmission capacities in India and to bring in potential investors after developing such projects to a certain stage. So far 28 ITPs have been transferred to successful bidders.

PFCCL is also one of the implementing partners of the Govt's initiative of privatization of distribution companies operating in the Union Territories. Also, PFCCL is playing a key role in the development of Ultra Mega Renewable Energy Power Parks.

15.2 Services Offered

- Advisory services on issues emanating from implementation of Electricity Act 2003 like reform, restructuring, regulatory etc.
- Selection of Developers following Tariff based competitive bidding as per the Guidelines issued by MoP, GoI for various segments of Power Sector.
- Project Structuring/Planning/Development/Specific Studies including Environment & Social Impact Assessment Studies.
- Communication, information dissemination and feedback.
- Preparation of organization performance improvement plans.



- Contract related services for power sector
- Financial management, resource mobilization, accounting system etc.
- Coal block development
- Renewable and non-conventional energy project development.
- Transaction Advisory Waste to Energy (WtE) project development.
- Preparation of Detailed Project Reports (DPRs) for Projects like - Smart Grid and project management consultancy for transmission system and distribution system improvement schemes like RDSS, DDUGJY, IPDS and SAUBHAGYA.
- Development of DEEP e-reverse bidding portal and conducting bidding on behalf of Discom's for short term and medium term procurement of Power.
- Acquisition of land, obtaining Environment and Forest clearance, carrying out technical studies for setting up of thermal power projects.
- Exploration and preparation of Geological Report.
- As Lenders Independent Engineers and Lenders Insurance Advisor for PFC funded projects
- Smart Metering
- Energy Portfolio Management for DISCOMs
- Development of Ultra Mega Renewable Energy Power Parks

In addition to above, PFCCCL provides customized services for various needs of Power Utilities.

Operations

PFCCCL's operations are spread over:

- Govt. of India initiatives like UMPPs, UMREPPs and ITPs.
- Bid Process Management for selection of project developer for generation and transmission projects.
- Selection of JV partner for various segments of power sector.
- Preparation of Guidelines and Bidding Documents for Renewable Power.
- Assisting MoP in preparation of Guidelines and Standard Bidding Documents under section 63 of Electricity Act, 2003.
- Bidding on behalf of utility for short term, medium term, long term and coal flexibility for procurement of Power through DEEP e-reverse portal.
- Regulatory advice and assistance.
- Consultancy for auction of Coal linkages to Independent Power Producers (IPPs) under SHAKTI Scheme.
- Procurement of Power from Generating Companies without having Power Purchase Agreement under Pilot Scheme.

- 3rd and 4th round auction of coal under para B(II) and Procurement of Power under para B(V) of SHAKTI policy.
- Consultancy work in field of Energy Portfolio Management.

Footprints

Till date, consultancy services have been rendered for 76 Clients spread across 27 States/UTs namely Arunachal Pradesh, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Puducherry, Punjab, Rajasthan, Telangana, Tripura, Uttar Pradesh Manipur, Uttarakhand, Sikkim and West Bengal. The total number of assignments undertaken as on date is 158. The profile of clients is as below:

Clients	No.
States Utilities	41
Licensees/ Municipal Bodies/IPPs/JVs	13
Public Sector Undertakings	9
State Governments	8
Regulatory Commissions	3
Central Govt. Departments/Ministries	2
Total	76

ULTRA MEGA POWER PROJECTS (UMPPs)

a) STATUS OF UMPPs

Government of India through Ministry of Power launched the initiative of Ultra Mega Power Projects (UMPPs) in November 2005 with the objective to develop large capacity power projects (4000 MW) Super critical thermal power projects (both pit head and imported coal based) in India. Power Finance Corporation Ltd (PFC) has been appointed as the Nodal Agency to facilitate the development of these projects. So far 17 UMPPs have been identified to be located in the States of Madhya Pradesh, Gujarat, Andhra Pradesh, Jharkhand, Chhattisgarh, Karnataka, Maharashtra, Tamil Nadu, Odisha, Bihar and Uttar Pradesh.

Ten (10) projects in Odisha (3), Tamil Nadu (1), Madhya Pradesh (1), Chhattisgarh (1), Jharkhand (2), U.P.(1) and Bihar (1) are domestic coal based and the other seven (7) projects in Gujarat (2), Maharashtra (1), Karnataka (1), Andhra Pradesh (2) and Tamil Nadu (1) are based on imported coal.

19 Special Purpose Vehicles (SPVs) have been established for UMPPs. Out of these, fourteen (14) SPVs (Operating SPVs) were incorporated to undertake preliminary site investigation and other activities necessary for conducting the bidding process for the projects. These SPVs shall be transferred to successful bidder(s) selected through Tariff Based International Competitive Bidding Process for implementation and operation.

Five (5) additional SPVs (Infrastructure SPVs) were incorporated by PFC for holding the land for power plant and land for coal blocks in case of domestic coal based UMPPs (Odisha, Bihar, Deoghar, Cheyyur and Tilaiya UMPPs). These Infra SPVs would be transferred to the respective procurers of power. Out of these, four (4) SPVs namely Tatiya Andhra Mega Power Limited, Chhattisgarh Surguja Power Limited, Coastal Maharashtra Mega Power Limited and Coastal Karnataka Power Limited are being closed on the direction of MoP as per the request of the respective State Governments.

b) AWARDED UMPPS

Details of Awarded UMPPs is as follows:

Sl No.	Name of UMPP	Type	Date of Transfer	Levelling Tariff (in Rs./ kWh)	Successful developer	Status
1	Mundra, Gujarat	Coastal	22.04.2007	2.264	Tata Power Ltd	Operational
2	Sasan, MP	Pithead	07.08.2007	1.196	Reliance Power Ltd	Operational
3	Krishnapatnam* AP	Coastal	29.01.2008	2.333	Reliance Power Ltd	PPA Terminated
4	Tilaiya#, Jharkhand	Pithead	07.08.2009	1.770	Reliance Power Ltd	PPA Terminated

* Coastal Andhra Power Limited (Krishnapatnam UMPP) was transferred to RPL on 29.01.2008. For Krishnapatnam UMPP, the developer has stopped work at site, citing new regulation of coal pricing in Indonesia. The Procurers have issued termination notice on 15.03.2012. The matter was subjudice for more than 6 years. The Hon'ble High Court of Delhi dismissed the petition of RPL on 15.01.19.

Subsequent to dismissal of Petition the procurers en-cashed Bank Guarantee of Rs. 300 Crores submitted by RPL. RPL/CAPL filed a writ petition before Hon'ble High Court of Delhi invoking the clause of Share Purchase Agreements and prayed before Court to issue direction to PFC and APSPDCL to initiate and conclude the process of buyback of Shares of CAPL.

GoAP vide order dated 25.03.2021 took back the possession of the land measuring 2068 acres from CAPL for non-implementation of project for more than 10 years.

Jharkhand Integrated Power Limited was transferred to selected developer i.e. Reliance Power Limited (RPL) on 07.08.2009. Reliance Power Ltd/ Jharkhand Integrated Power Limited (JIPL) has issued Termination Notice of Power Purchase Agreement (PPA) for Tilaiya UMPP on 28th April 2015. Jharkhand Urja Vikas Nigam Ltd. on behalf of all the Procurers has taken over JIPL on 16.05.2018 from RPL.

ULTRA MEGA RENEWABLE ENERGY POWER PARKS (UMREPPs)

- Ministry of New & Renewable Energy (MNRE) allocated the States of Tamil Nadu, Rajasthan & Telangana to Power Finance Corporation Ltd. (PFC) for Development of Ultra Mega Renewable Energy Power Parks (UMREPPs).
- PFC has entrusted the work related to UMREPPs to PFC Consulting Limited (PFCCL), a wholly owned subsidiary of PFC Ltd..
- Progress of the UMREPPs in the States of Tamil Nadu, Rajasthan and Telangana is as below:
 - Tamil Nadu:** A Memorandum of Understanding (MoU) was signed amongst NLC India Ltd. (NLCIL), TANGEDCO and PFCCL on 10.10.2019 for development of UMREPP in the State of Tamil Nadu. TANGEDCO has floated a tender to finalize the land aggregators. Last date of bid submission is 21.01.2022
NLCIL, PFCCL and TANGEDCO are in the process of formulating a JV Company (JVC) for setting up the UMREPP. Board of PFC and NLC have approved formation of JVC. Board approval of TANGEDCO is awaited. PFCCL is following up with TANGEDCO for signing of JV Agreement.
Approval of Niti Aayog for formation of JVC would be sought after receipt of TANGEDCO's Board approval.
 - Rajasthan:** The process for setting up of UMREPP in the State of Rajasthan could not be initiated as already identified land near Jaisalmer is almost exhausted and new land needs to be identified for allocation. PFCCL has requested RREC to intimate the status of availability of land for setting up UMREPP.
 - Telangana:** Due to non-availability of land in Telangana setting up of UMREPP could not be initiated.



20.9 MW Waste to Energy (WTE) Plant in Bawana Industrial Area, New Delhi funded by PFC



600 MW (900 MWp) India's Largest Solar PV Plant at Bikaner, Rajasthan funded by PFC.



76 MW Wind Power Project in Kawaldhra, Maharashtra financed by PFC



35 MW Babsar Site funded by PFC



50MW (71MWp) Solar Power Project in Badaun, Uttar Pradesh funded by PFC



Switch Yard at 40 MW Bhordu Site funded by PFC



Ghatampur Transmission Line funded by PFC

CHAPTER 23

REC LIMITED

1. REC Limited (REC) was incorporated as a Company under the Companies Act, in the year 1969 with the main objective of financing rural electrification schemes in the country. The mandate/object clause of REC was expanded in the year 2002 to enable financing all kinds of power projects without any restriction on population, geographical location or size. In the year 2021 the same was further amended for focusing on projects of lift irrigation, smart city and for development of enabling infrastructure including energy conservation, emerging technologies like e-mobilities and associated infrastructure, etc. In the year 1992, REC was notified as a Public Financial Institution under Section 4A of the Companies Act, 1956 (corresponding Section 2(72) of the Companies Act, 2013). In the year 1998, REC was registered as a Non-Banking Financial Company (NBFC) under Section 45 IA of the RBI Act, 1934. The Government of India upgraded REC as a Schedule "A" PSU in the year 2001. REC was granted Mini Ratna Grade-I Status in the year 2002 and thereafter conferred with "Navratna Status" in May, 2008. REC has also been categorized as an Infrastructure Finance Company (IFC) by Reserve Bank of India (RBI) in September, 2010. The equity shares of REC are listed on the National Stock Exchange of India Limited (NSE) and BSE Limited (BSE) since March, 2008.

REC is a premier financial institution for development of Power Sector in the country, with the objective of financing schemes for extending and improving the rural electricity infrastructure. REC finances projects in the complete power sector value chain, encompassing generation, transmission and distribution segments. REC provides financial assistance to State Governments, Central/State Power Utilities, Independent Power Producers and Private Sector Utilities, which are critical to the projected addition of installed capacity in the country. The Registered Office of REC is located at New Delhi with Regional Offices in 22 States, across the country. Further, REC has shifted to its new ultra-modern Corporate office in Gurugram, on the occasion of its 52nd Foundation Day on July 25, 2021, which was inaugurated by Hon'ble Minister of Power Shri R K Singh, in the presence of Minister of State Shri Krishan Pal Gurjar; Secretary (Power) and other dignitaries. In addition, REC has a Training Institute viz. REC Institute of Power Management & Training (RECIPMT) at Hyderabad for imparting training to State Power Utilities.

REC has been appointed as a Nodal Agency for Government of India's flagship schemes viz. Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGAYA), Deen Dayal Upadhya Gram Jyoti Yojana (DDUGJY) and National Electricity Fund (NEF). Further, alongwith PFC, REC has also been designated as Nodal Agency for Revamped Distribution Sector Scheme (RDSS). Besides, REC assists Ministry of Power in monitoring of Power For All.

At the beginning of financial year 2020-21, REC had two wholly owned subsidiary companies i.e. REC Power Distribution Company Limited (RECPDCL) and REC Transmission Projects Company Limited (RECTPCL). However, to create a single entity, to achieve better synergies in operations, greater access to different market segments and to reap the benefits of higher capital base and pooled resources RECTPCL got amalgamated into RECPDCL. Later on, REC Power Distribution Company Limited was renamed as REC Power Development and Consultancy Limited (RECPDCL) w.e.f. July 16, 2021.

2. Highlights of Performance (during 2020-21)

2.1 The highlights of performance of REC Limited for the financial year 2020-21 are given below: -

(₹ in crore)

Particulars	Amount
Loans Sanctioned	1,54,820.87
Disbursements	92,987.49
Subsidy under DDUGJY (including DDG) & SAUBHAGYA	4,940.62
Recoveries (including interest)	71,755.40
Resource Mobilization	99,244.53
Profit before Tax	10,756.13
Profit after Tax	8,361.78
Net Worth	43,426.37
Dividend (Interim+Final)	2510.12
Business per employee*	384.91

*(Business per employee = Disbursements + Recoveries / No. of Employees as on March 31, 2021)

2.2 Memorandum of Understanding

The performance of REC in terms of Memorandum of Understanding signed with Power Finance Corporation Limited (holding company of REC) for the Financial Year 2020-21 has been rated as 'Excellent', by the Department of Public Enterprises.

2.3 Share Capital

As on December 31, 2021, the Authorized share Capital of the Company was ₹5,000 crore consisting of 500 crore equity shares of ₹10/- each and the Issued and Paid up Share Capital of the Company was ₹1,974.92 crore consisting of 197,49,18,000 equity shares of ₹10/- each.

As on December 31, 2021, Power Finance Corporation Limited (PFC) held 103,94,95,247 equity shares i.e. 52.63 % of the paid



up equity share capital of the Company and is the holding Company of REC Limited.

2.4 Mobilization of Funds

The total market Borrowing Programme of the company for the financial year 2021-22 is projected as ₹1,10,000 crore and against the same the Company has mobilized ₹61,723.04 crore up to December 31, 2021, and the anticipated mobilization of funds for remaining part of the year is ₹48,276.36 crore.

The domestic debt instruments of REC continued to enjoy "AAA" rating the highest rating assigned by CRISIL, CARE, India Ratings & Research and ICRA -credit rating agencies. REC also enjoys international credit ratings at par with sovereign ratings of "Baa3" and "BBB-" respectively from Moody's and Fitch, the International Credit Rating Agencies.

3. Progress made during the financial year 2021-22 (upto December 31, 2021) & anticipated targets to be achieved during the remaining period of the year i.e. upto March 31, 2022:

3.1 Sanctions

REC has sanctioned financial assistance as detailed below to various State & Private Sector Power entities:

(₹ in crore)

Sl. No.	Particulars	FY 2021-22	
		Achievements from April 1, 2021 to December 31, 2021	Anticipated targets from January 1, 2022 March 31, 2022
1	Transmission & Distribution (including DDUGJY)	16,676.25	3,000.00
2	Generation Projects	13,534.92	2,260.00
3	Renewable Energy	10,545.80	7,454.00
4	SLTTL – COVID 19 & UDAY Limit Relaxation	1,255.45	-
5	Medium Term Loan, Short Term Loan & Special Loan, etc.	1,585.00	-
Total		43,597.42	12,714.00

3.2 Sanctions under National Electricity Fund:

NEF Scheme provides interest subsidy to State Power Utilities, Distribution Companies (DISCOMs) based on achievement of pre-defined reform parameters against the interest paid on loans availed by them – both in public and private sector, for capital investment in distribution sector.

NEF provides interest subsidy spread over 14 years, for loan approved during financial years 2012-13 & 2013-14 against the projects. Against the sanction of 920 NEF projects with loan component of ₹23,973 crore for 24 DISCOMs in 14 States, till December 2020, ₹19,772 crore loan has been released. Based on interest subsidy evaluation i.e. Reduction of AT&C losses and Revenue Gap as carried out by Independent Evaluator and Nodal Agency, Ministry of Power during financial year 2021-22 have released ₹199.45 crore to State Power Utilities, till December 2021.

The progress made from April 1, 2021 to December 31, 2021 and anticipated targets from January 1, 2022 to March 31, 2022 is as below:

(₹ in crore)

Information for the period	Amount
Progress made from April 1, 2021 to December 31, 2021	720
Anticipated targets to be achieved from January 1, 2022 to March 31, 2022	850

3.3 Disbursements

The details of Disbursements are as below:

(₹ in crore)

Sl. No.	Particulars	FY 2021-22	
		Achievements from April 1, 2021 to December 31, 2021	Anticipated targets from January 1, 2022 March 31, 2022
1.	Transmission	6,918.23	12,890.00
2.	Distribution	5,184.68	
3.	Generation Conventional	13,965.09	
4.	Generation Renewables	1,910.06	
5.	Short Term Loan	3,835.00	
6.	Medium Term Loan	800.00	
7.	SLTTL	15,403.65	
8.	Loan against Government Programme	647.59	
9.	Subsidy against Government Programme	2,995.08	
Total		48,664.30	

3.4 Project Monitoring:

REC has a well-established Project Monitoring Department that carries-out regular site visits and monitoring of all REC funded under construction as well as commissioned Generation, Renewable, T&D and Irrigation projects to assess the status of implementation of under-construction projects or the performance of commissioned projects. REC has duly approved Project Monitoring Guidelines & the projects are identified by Project Monitoring Department at the beginning of the financial year based on their criticality/performance in consultation with all Operating Divisions & Regional/State Offices and approval is taken from the competent authority. The project list is reviewed quarterly. In addition to it, if there is urgent requirement of monitoring of any project which is not in approved list, the same is also monitored by the Project Monitoring Department.

Performance during FY 2021-22

In FY 2021-22, 24 nos. of projects (22 under-construction and 2 commissioned) have been identified for monitoring involving sanctioned cost of ₹1,21,400 crore and outstanding amount of ₹69,202 crore. Against the target, total 21 nos. of projects have been monitored including 4 nos. of irrigation projects and 2 no. of T&D projects till December 31, 2021 having sanctioned cost of ₹67,765 crore and outstanding amount of ₹34,427 crore.

Category-wise breakup of target and monitored projects is as follows:

Category	Under-Construction		Commissioned		Total	
	Target	Achievement	Target	Achievement	Target	Achievement
Thermal	14	10	2	1	16	11
Hydro	2	-	-	-	2	-
Renewable Energy	3	3	-	-	3	3
Transmission & Distribution	2	2	-	1	2	3
Irrigation	1	2	-	2	1	4
Total	22	17	02	04	24	21

3.5 REC Performance Highlights:

SL No.	Financial Parameters	Unit	FY 2021-22		
			Achievement as at September 30, 2021	MoU targets for the year 2021-22	% Achievement
1	Revenue from Operations	₹ crore	19,599	38,620	51%
2	EBTDA as a percentage of Revenue	%	31.25	33.76	93%
3	Return on Net Worth	%	10.78	21.05	51%
4	NPA to Total Loans	%	1.52	1.78	Within Limits

* Being a Listed CPSU, the desired financial data as on December 31, 2021 is under finalisation and are further subject to the approval of the Board of the Directors of the Company.

**Progress of work done/achievement during the current year 2021-22 (Upto December 31, 2021)**

During the current financial year 2021-22 (upto December 31, 2021), RECPDCL has been working on its ongoing project related to:

- (a) Revamped Distribution Sector Scheme (RDSS): The work of preparation of Action Plan and DPR has been awarded for (i) WBSEDCL in West Bengal, (ii) MSPDCL in Manipur, (iii) MePDCL in Meghalaya, (iv) JPDCL in Jammu, (v) KPDCL in Kashmir, (vi) LPDCL in Ladakh, (vii) TSNPDCL and TSSPDCL in Talangana, (viii) CSPDCL in Chhattisgarh, (ix) APDA in Arunachal Pradesh and (x) Power and electricity department in Andaman and Nicobar Islands.
- (b) Project Implementing Agency (PIA) projects namely (i) IT Implementation Works in GED, Goa under RAPDRP Part-A (ii) Implementation of urban distribution infrastructure in Jammu & Kashmir under urban schemes (IPDS, PMDP and R-APDRP part-B) (iii) Installation of 1.155 lakhs Smart Meters in Jammu & Srinagar towns under PMDP (U) Scheme.
- (c) Project Management Agency (PMA) Projects:
 - PMA for implementation of Advanced Metering Infrastructure (AMI), SCADA & Distribution Transformer Monitoring Unit (DTMU) for CED under National Smart Grid Mission;
 - Further, RECPDCL is providing PMA services under DDUGJY and IPDS schemes for APDA of Arunachal Pradesh, BESCOM, CESCO, MESCOM, HESCO, GESCOM and Hukkeri Society of Karnataka, GED of Goa, CSPDCL of Chhattisgarh, MPMKVCL of Madhya Pradesh, TSSPDCL & TSNPDCL of Telangana, WBSEDCL of West Bengal and PVVNL of Uttar Pradesh;
 - PMA Services under DDUGJY for APDCL of Assam, APEPDCL, APSPDCL of Andhra Pradesh, KPDCL of Kashmir.
 - PMA Services under IPDS for MePDCL of Meghalaya, MSPDCL of Manipur, additionally sanctioned DPR for Ghaziabad (M.Corp) under IPDS Scheme for PVVNL in Uttar Pradesh, Implementation of GIS Sub-Stations under IPDS Scheme in 10 towns of West Bengal, additional SRTPV DPR works under IPDS Scheme of CESCO in Karnataka, IPDS-IT in CSPDCL
 - In addition, RECPDCL is also providing PMC services for DVVNL of Uttar Pradesh, JBVNL of Jharkhand and TSECL of Tripura under DDUGJY RE XII Plan scheme, and PuVVNL of Uttar Pradesh under DDUGJY RE XI and XII Plan scheme, JBVNL of Jharkhand under DDUGJY RE X Plan scheme (left out work).
 - Further, RECPDCL is also providing consultancy services under various other state/central sponsored schemes which are (i) PMA Services for implementation of High Voltage Distribution System (HVDS) by installation of new DTr and using AB Cable in semi urban and rural areas in different districts of West Bengal, (ii) Preparation of DPR and Project procurement strategy document (PPSD) i.o. HVDS & GIS in 13 district and UG cabling works at 6 town under distribution network strengthening & grid modernization projects of WBSEDCL with financial assistance from world bank, (iii) PMA for OH to UG works in 4 Divisions of BESCOM, (iv) PMA services for PMDP (Rural & Urban) for JPDCL and KPDCL in UT of J&K
- PMA Services for implementation of UPPDNRP (Uttar Pradesh Power Distribution Network Rehabilitation Project), ADB Funded, LT Bare conductor to LTABC Conversion, in all 19 Districts of MVVNL, Lucknow in habitations having population 1000 and above.
- PMA Services for LT Bare Conductor to LTABC conversion in all 14 districts of PVVNL, Meerut.
- PMA/ PMC of 14 districts and 3 districts of PuVVNL, Varanasi under DDUGJY-12th Plan.
- (d) TPI Works: (i) JBVNL DISCOM of Jharkhand under Departmental scheme (ii) MSPDCL of Manipur under DDUGJY RE XI Plan (iii) APDCL of Assam under DDUGJY RE XII Plan scheme (iv) NBPDCCL & SBPDCL of Bihar under DDUGJY RE XI Plan, Third Party Inspection of underground cabling work in Ayodhya town (Erstwhile Faizabad & Ayodhya Town), Barabanki Town, Badaun Town (I&II), Sahaswan Town (District Badaun) of Uttar Pradesh, TPI works for installed renewable/solar systems in Uttar Pradesh, TPIA of 33kV, 11kV & UG lines under various schemes of Uttar Pradesh and TPI of refurbishing of existing electrical infrastructure in HESCO.
- (e) RQM & NQM works: (i) RQM under XII Plan Works in Bihar, Mizoram, Nagaland, Jammu & Kashmir and Manipur (ii) RQM works in Madhya Pradesh and Manipur under DDUGJY RE XI Plan scheme (iii) RQM New Project Works in 14 States under DDUGJY Scheme (iv) NQM works in Madhya Pradesh, Odisha and Rajasthan under DDUGJY RE XII Plan scheme.
- (f) Other Works: (i) Review of capitalization of assets for DERC (ii) PMC/AMC Services for Street Lightning Project of EESL in Tripura, Rajasthan, Chhattisgarh, Jharkhand, Punjab, Chandigarh, Maharashtra, Goa & Uttar Pradesh (iii) Management & Technical Services under the project SARTHI in UPPCL (iv) Power Management System for HPPC in UHBVN and DHBVN (v) AT & C Loss analysis in Narsinghpur, Madhya Pradesh, PMA Services under PMDP(U) & PMDP(R) for JPDCL & KPDCL in UT of J&K (vi) IT & revenue assurance support cell for Goa Electricity Department in Goa.

New Assignments:

During the current financial year 2021-22, the Company has undertaken following new assignments:

- i. Smart Metering Implementation of 6.0 lakh Consumers in UT of Jammu & Kashmir
- ii. Smart Metering Implementation for 60,000 Consumers in UT of Ladakh and Implementation of End-to-End Revenue Management System and Customer Call Center for UT of Ladakh.
- iii. Entrusted to conceptualize and implement National Feeder Monitoring System for monitoring of all distribution feeders across the country at Central level.
- iv. Project Management Agency (PMA) for the project 'System Strengthening Works of 33 KV, 11KV LT Line & Distribution system in West Kameng, Tawang & Namsai districts under DDUGJY scheme.
- v. Handholding support to power Dept. Ladakh.
- vi. PMA services for left over scope of work (package-B) under PMDP Scheme for JPDCL in Jammu Province.
- vii. Consultancy services for preparation of Action Plan & DPR under Revamped Distribution Scheme for KPDCL in Kashmir Province, APDCL in the state of Arunachal Pradesh, WBSEDCL in the state of West Bengal, TSNPDCL in the state of Telanagana, TSSPDCL in the state of Telanagana, CSPDCL in the state of Chhattisgarh, MePDCL in the state of Meghalaya, MSPDCL in the state of Manipur, Goa Electricity Department in the UT Goa, Power Department, UT Ladakh and JPDCL in Jammu province.
- viii. RECPDCL had been awarded with the works of PMA under Revamped Reformed Based Result linked Distribution Sector Scheme (RRBRDSS) by MSEDCL through competitive bidding.

During the current financial year 2021-22 (upto December 31, 2021), the bid process of the following transmission projects have been completed:

Sl. No.	Name of Transmission Project	Name of project Specific SPV	Remarks
INTER-STATE			
1.	Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II -Part B	Fatehgarh Bhadla Transco Limited	Project specific SPV transferred to M/s Power Grid Corporation of India Limited on June 4, 2021.
2.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part C	Sikar New Transmission Limited	Project specific SPV transferred to M/s Power Grid Corporation of India Limited on June 4, 2021.
3.	Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra	Kallam Transmission Limited	Project specific SPV transferred to Consortium of M/s IndiGrid 1 Limited (Lead Member) & M/s IndiGrid 2 Limited December 28, 2021.

Further, the following proposals are already submitted to DISCOMs/Power Departments and the same are expected to be awarded to RECPDCL within current financial year:

- i. Third party inspection of 50 Nos. of DTCs and 500 Nos. of Connection in Beed District in Latur Zone which has been completed under SAUBHAGYA Scheme in Maharashtra under MSEDCL
- ii. Third party for the inspection of works and workmanship executed by contractor under HVDS Scheme of MSEDCL

In addition to the above, following proposals are under consideration by various DISCOMs/Power Departments:

- i. Preparation of DPR for 86 Nos. of MIDC's for uninterrupted power supply to industrial consumer under MIDC.
- ii. Preparation of DPR for system strengthening works in 121 Nos. of Urban towns covering 40 Nos. of Districts for MSEDCL.
- iii. Proposal for Engagement as Supervision and Monitoring Agency for System Strengthening Work for 16 Circles of TSNPDCL.
- iv. Smart Metering DPR preparation and further implementation of Smart Metering in Mizoram.

Tariff Based Competitive Bidding (TBCB) Projects

Pursuant to amalgamation of RECTPCL with RECPDCL, the company (RECPDCL) is acting as Bid Process Coordinator (BPC), for selection of developer as Transmission Service Provider (TSP) through Tariff Based Competitive Bidding Process. In order to initiate development of each transmission project, RECPDCL incorporates a project specific Special Purpose Vehicle (SPV) as Wholly Owned Subsidiary Company and after the selection of successful bidder through Tariff Based Competitive Bidding Process notified for transmission projects, the respective project specific SPV along with all its assets and liabilities is transferred to the successful bidder.



INTRA-STATE			
4.	Development of intra-state transmission work in M.P. through Tariff Based Competitive Bidding: PACKAGE- II	MP Power Transmission Package-II Limited	Project specific SPV transferred to M/s Adani Transmission Limited on November 1,2021

During the current financial year 2021-22 (upto December 31, 2021), the bid process of the following Inter-State transmission projects is under progress:

SL. No.	Name of Transmission Project	Name of project Specific SPV	Bidding Status
1.	Transmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh	Rajgarh Transmission Limited	Expected to conclude during 2021-22
2.	Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka - Part A	Gadag Transmission Limited	Expected to conclude during 2021-22
2.	System Strengthening Scheme for Eastern and North Eastern Regions	ER NER Transmission Limited	Expected to conclude during 2021-22

Also, as per directions of CEA, bidding process of one already allocated transmission project namely, Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka has been put on hold and would be reinitiated after further direction from CEA. Further, the bidding process of following recently allocated Inter-State transmission projects shall be initiated in this FY and same shall be concluded in FY 2022-23:

SL. No.	Name of Transmission Project
1.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B
3.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D
5.	Transmission system for evacuation of power from Neemuch SEZ
6.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park
7.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park
8.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)
9.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1
10.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D
11.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F

In addition to above, RECPDCL is acting as Bid Process Coordinator for selection of developer for “Development of intra-state transmission work in M.P. through Tariff Based Competitive Bidding: PACKAGE- I” for the Madhya Pradesh state also.

Further, RECPDCL is acting as PIA for various Transmission Projects in UT of Jammu & Kashmir & Ladakh under PMDP-15 scheme as listed under:

SL. No.	Name of Project
Kashmir Region	
1	Construction of 220/33 kV, 160 MVA GIS, Grid Substation at Lassipora, Kashmir (in Kashmir Province)
Jammu Region	
1	Construction of 220/33 kV, 100 MVA, Grid Substation at Nagrota, Jammu, incl. LILO of Barn and Kishenpur Transmission Line at Nagrota (in Jammu Province)
Ladakh Region	
1	Construction of 220/33 kV, 50 MVA Grid Substations at Diskit with bay extension at Phyang (existing) SSStn
2	Construction of 220/33 kV, 50 MVA Grid Substations at Padum with bay extension at Drass (existing) SSStn
3	Construction of 220 kV S/C Transmission line on D/C towers (Phyang – Diskit)
4	Construction of 220 kV S/C Transmission line on D/C towers (Drass- Padum)

Transmission Project in Kashmir

The above mentioned transmission project in Kashmir region has been commissioned on October 25, 2021 and put on operation. The project is first of its kind in Kashmir region in

terms of technology and will act as a milestone to ensure 24x7 uninterrupted quality power supply to the people of Kashmir.

The project is situated in the industrial area of Pulwama district and therefore, it will act as a catalyst to the industrial growth by making uninterrupted power supply which will ultimately generate employment and will prosperity to people of Kashmir.

Transmission Project in Jammu

Construction of transmission project in Jammu region is in full swing and it is very much expected to make the project operational by November 2022. At present, ordering of all major equipment has been completed and civil works of major buildings have been initiated.

Upon completion of the project, this will enable increased interconnectivity between all the transmission sub-station of the State Grid and will subsequently result in ensuring 24x7 uninterrupted power supply in the region.

Transmission Projects in Ladakh:

In order to complete the transmission projects in Ladakh within minimum possible timeframe, these have been divided into various packages as detailed below:

Sl. No.	Name of Projects	Package Details
Transmission Line		
1	Construction of 220 kV S/C Transmission line on D/C towers (Phyang – Diskit)	Package-01 Phyang to North Pullu
		Package-02 North Pullu to Diskit
2	Construction of 220 kV S/C Transmission line on D/C towers (Drass- Padum)	Package-03 Drass to Kochik
		Package-04 Kochik to Rangdum
		Package-05 Rangdum to Padum
Sub-station		
3	Construction of 220/33 kV, 50 MVA Grid Substations at Diskit with bay extension at Phyang (existing) SStn	Construction of 220/33 kV, 50 MVA Grid Substations at Diskit with bay extension at Phyang (existing) SStn
4	Construction of 220/33 kV, 50 MVA Grid Substations at Padum with bay extension at Drass (existing) SStn	Construction of 220/33 kV, 50 MVA Grid Substations at Padum with bay extension at Drass (existing) SStn

All above mentioned projects are aimed to be completed by October 2023 and all out efforts are being made to achieve the target. At present, routes of Transmission Line have almost been finalized, ordering of major material such as

tower structures, conductor, GIS equipment etc. have been completed and engineering activities are being performed at full swing.

Upon completion of the projects, people of Nubra and Zaskar valley of Ladakh region will be benefited through availability of round the clock uninterrupted quality power supply throughout the year. The transmission projects would also help the Defense establishment strategically in the valley. Furthermore, with the grid power, there are ample scope for mushrooming of MSMEs, Tourism, Commercial and other economic activities leading to overall socio-economic development in the region.

Further, RECPDCL (erstwhile RECTPCL) under the guidance of Ministry of Power, Government of India has developed online web platform and Mobile App for better Transparency & Accountability as detailed below:

Urja Mitra : Urja Mitra is an initiative of Ministry of Power, Government of India which provides Outage Management and Notification Platform for disseminating the outage information to power distribution consumers across India through SMS/email/push notifications. It also provides Pan-India integrated Mobile Application for Android and iOS platforms to enable citizen to access outage information for Distribution Companies. Power Consumers can also inform about power outage in their area through mobile app.

As on December 31, 2021, data of around 23.29 crore Rural/ Urban/Mixed feeder consumers of 52 DISCOMs have already been linked on web portal and the application is live in 49 DISCOMs with consumer base of approximately 21.52 crore. Around 465.73 crore SMS have been sent to the consumers.

Tarang (Transmission App for Real Time Monitoring & Growth):- Tarang monitors the progress of transmission system in the country, both Intra State and Inter State Transmission Projects through Tariff Based Competitive Bidding (TBCB) as well as Regulated Tariff Mechanism. Tarang also shows the prospective upcoming Intra-State as well as Inter - State Projects along with NITs being floated by different Transmission Utilities Pan-India. Tarang provides advance information of upcoming transmission projects approved by Empowered Committee on Transmission helping bidders to gear up future transmission projects.

11 kV Rural Feeder Monitoring Scheme: RECPDCL (erstwhile RECTPCL) has been appointed as the nodal agency for “11 KV Rural Feeder Monitoring Scheme”. The scheme aims to enable monitoring of energy input/power supply at feeder level and also to give an accurate picture of power supply in rural area of country to ensure achievement of “24x7 Power for All”. Under the scheme, the distribution parameters viz. Power supply hours, outage, voltage, Current & PF, are captured. This scheme targets to develop a self-sustained, independent, web based automated system by installing Modem/DCUs for almost 1.1 lakh rural, agricultural and mixed (agriculture rural) feeders across country by acquiring various essential



parameters of all the outgoing 11kV rural feeders and such 66/33 kV incoming feeders from where 11kV rural feeders are emanating and making the information available online for all stakeholders. Under the scheme, meter data of rural feeders is sent to central Meter Data Acquisition System (MDAS) for analysis and the same is then integrated with National Power Portal (NPP) to make it available for use of all stakeholders. These reports are useful in decision support for betterment of rural power supply status.

RECPDCL continued to do profitable business in the financial year 2021-22 and earned total revenue of ₹68.44 crore and profit before tax of ₹37.26 crore till September 30, 2021. The financial data as on December 31, 2021 is under finalisation and are further subject to the approval of the Board of the Directors.

5. Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) is an integrated scheme covering all aspects of rural power distribution which was conveyed by the Ministry of Power on December 3, 2014. Under the scheme, 60% of the project cost (85% for special States) is provided as grant by Government of India and additional grant upto 15% (5% for Special Category States) is provided by Government of India on achievement of prescribed milestones. All erstwhile RE schemes (including Rajiv Gandhi Grameen Vidyutikaran Yojana) have been subsumed into DDUGJY. REC Limited was designated as the Nodal Agency for operationalization of DDUGJY.

6. SAUBHAGYA- Pradhan Mantri Sahaj Bijli Har Ghar Yojana

The Hon'ble Prime Minister launched Saubhagya scheme on September 25, 2017 to achieve universal household electrification covering every village and every district in the country. Universal household electrification requires creation of electricity access through last mile connectivity. Scheme outlay is ₹16,320 crore including Gross Budgetary Support of ₹12,320 crore.

6.1 Scope of the Scheme:

- Providing last mile connectivity and electricity connections to all un-electrified households in rural areas.
- Providing Solar Photo Voltaic (SPV) based standalone system for an-electrified households located in remote and inaccessible villages/habitations, where grid extension is not feasible or cost effective.
- Providing last mile connectivity and electricity connections to all remaining economically poor un-electrified households in urban area. Non-poor urban households are excluded of this scheme.

6.2 Salient Features:

- The prospective beneficiary households for free connection would be identified using Socio-Economic Caste Census (SECC) 2011 data. Households not found

eligible as per SECC data, would also be provided electricity connections on payment of ₹500 recoverable in 10 instalments through electricity bills.

- All DISCOMs including Private Sector DISCOMs, State Power Departments and RE Cooperative Societies are eligible for financial assistance.
- REC Limited (REC), is the Nodal Agency for operationalization of scheme.
- Dedicated web portal for SAUBHAGYA has been developed to capture the information and progress of household electrification.

6.3 Financial Progress:

₹14,109 crore sanctioned (Government of India Grant component of ₹10,890 crore) & ₹5,760.02 crore Government of India grant released to States/DISCOMs.

6.4 Physical Progress:

Ministry of Power and active support & cooperation of States/Power Utilities and other stakeholders, 281.697 lakh households have been provided electricity connections since launch of SAUBHAGYA. States have reported that all willing households identified under SAUBHAGYA have been electrified.

7. National Electricity Fund (NEF)

REC Limited is the Nodal Agency for operationalization of the National Electricity Fund (NEF), an Interest Subsidy Scheme introduced by Ministry of Power, Government of India to promote capital investment in distribution sector in the country.

8. Renewable Energy Projects

Under the Renewable Energy, REC has sanctioned loan assistance of ₹10,545.80 crore to 11 projects with installed generation capacity aggregating 859 MW, which includes private & state sector projects of various technologies viz. Wind, Solar, Waste to Energy Projects, SHP etc. The disbursement achieved during the year 2021-22 (up to December 31, 2021) was ₹1,910.06 crore.

9. North Eastern States

During the financial year 2021-22 (upto December 31, 2021), REC has sanctioned loan assistance of ₹1,002.89 crore (out of which Transmission and Distribution schemes comprises of ₹829.89 crore and Renewable Energy comprises of ₹173 crore). An amount of ₹247.54 crore was disbursed to North Eastern states during the period from April 1, 2021 to December 31, 2021.

10. International Cooperation and Development (IC & D)

REC has two lines of ODA credit with JICA, Japan. Both of them have also been fully drawn. Under JICA-I & II ODA loans with cumulative amount of JPY 16,949.38 Million (around ₹820.12 crore) and JPY 11,809.48 Million (around ₹640.64 crore) respectively have been drawn as on March 31, 2021.

REC has 5 lines of ODA (Official Development Assistance) credit with KfW, Germany. Out of which, 3 of them have aggregate amount of EUR 240 Million for financing energy efficient programs in Andhra Pradesh & Telangana, HVDS projects in Haryana and Renewable projects in the country, which had been fully drawn as on March 31, 2021. In Fiscal 2019, REC had entered into 4th loan agreement with KfW for financial assistance of USD 228 Million for financing of renewable energy projects. As on March 31, 2021, total amount of USD 168.85 Million has been drawn under this facility. REC has recently entered into 5th line of credit with KfW Development Bank for availing ODA term loan of USD 169.5 Million under Indo-German Bilateral Partnership in accordance with the approval granted by Department of Economic Affairs, Ministry of Finance, Government of India for part financing of innovative Solar PV Technology based generation Projects in India, at competitive interest rates.

11. Training Activities at REC Institute of Power Management & Training, Hyderabad

A. Progress made during the current year from April 1, 2021 to December 31, 2021

11.1 REC Institute of Power Management and Training (RECIPMT) earlier known as Central Institute for Rural Electrification was established at Hyderabad in 1979 under the aegis of Rural Electrification Corporation to cater to the training and development needs of engineers and managers of Power Sector Organisations. The programmes are conducted on the state-of-art subjects of Power Generation, Transmission, Distribution and Renewable energy sources.

11.2 National Training Programmes (NTP) under DDUGJY

RECIPMT is the Nodal agency for co-ordination and implementation of National Training Programmes for employees of C&D category, under DDUGJY, sponsored by Ministry of Power, Government of India. During the year 2021-22, as against the target of 15,000 employees of C&D Category, 29 MoAs are signed with DISCOMs and 8,323 were trained by December 31, 2021.

Power utilities i.e. APCPDCL, APSPDCL, APEPDCL, TANGEDCO, GETRI, HESCOM, CESC, PSPCL, TSSPDCL, TSNDPCL, MSEDCL, MPMKVCL, CSPDCL, KSEB, MeEL, MESCOM, MPED, HPSEB, JKPDD, MPPaKVCL, MPPoKVCL, SPDCL, GOAED, TSECL, UHBVNL, DHBVNL, AVVNL, JVVNL, JDVVNL has conducted in total 341 batches of programmes.

11.3 International Programmes under Sponsorship of ITEC Scheme of Ministry of External Affairs, Government of India

RECIPMT has organised 2 Webinar (Online Programmes) each of 3 Weeks duration and 64 Participants trained during 2021-22 i.e. 1) "Concept to Commissioning of Solar Power Plants" & 2) "Certificate Course in Electrical Power Management", Sponsored by Ministry of External

Affairs, Government of India. 64 Power Sector executives from various countries participated in the webinar.

11.4 Regular National Programmes

RECIPMT has organised 10 online Webinars & 1 classroom regular Training Programmes for the personnel of various Power Utilities on different topics such as, Distribution Loss Reduction and Pilferage of Electricity, Distribution Transformers O&M Failures, Solar Power Generation – GRID Enabling and Balancing, Open Access & Power Trading, O & M of EHV Substations and Lines, Underground Cables-Design, Selection, Laying, Monitoring & Fault Detection, Design, Construction of EHV Substation & Line, Smart Metering Technologies & Applications, Labour Laws & Procedures in Dealing Court Cases, Power Transformer - Operation & Maintenance, Distribution Loss Minimization and Smart Metering and Advance Practices. A total number of 176 participants attended the above programmes.

11.5 REC Sponsored Programmes

a. 1 Day Webinars:

RECIPMT has organised 50 batches of 1-day webinars on "Sustainability of Power Utility Electricity Act, Amendment, Tariff Reform, Real time Market and Renewable Integration" and trained 1027 participants of various Power Sectors GENCO, TRANSCO and DISCOMs.

b. 2 Day Webinars:

RECIPMT has organised 32 batches of 2-day webinars on "Techno-Commercial Improvement of DISCOM's Performance" and trained 800 participants of various Power Sectors DISCOMs.

c. 3 day Classroom Trainings :

During the year 2021-22, RECIPMT has organised 42 batches of 3 day duration each and trained 1243 Participants on "Electrical Safety" for various Power Utilities.

d. Customised Programmes:

During the year 2021-22, RECIPMT has organised 8 Classroom each of 12 days duration & 1 Online Webinar for HPSEBL. 8 batches of Training Programmes was for newly recruited Junior Technicians/Mates and Junior helpers of HPSEB Ltd. and 197 participants trained. 1 online training for 42 DVC executives of Power Cable Selection, Testing Laying & Commissioning was organised.

e. In-house Training Programmes:

RECIPMT also organised 2 Online Webinar & 2 Classroom for the employees of REC and 82 Employees have taken part in these programmes. The topics covered are Managing Change in Power Sector, Smart Metering Technologies & Applications and Loan Documentation, Purchase Procedures and E-Procurement through GeM.



In all from April 1, 2021 to December 31, 2021, coordinated/organised 491 programmes and trained 11,992 employees of various power utilities as details given below:

Sl. No.	Type of Programmes	No. of programmes conducted	No. of Participants trained	No. of Man days
Ministry of Power Sponsored Programmes				
1	NTP C&D organised under RECIPMT Banner	65	1,622	4,716
2	NTP C & D Programmes – by various DISCOMs	276	6,701	21,584
MEA Sponsored				
1	International Training Programme 3 weeks Online/ Webinar Mode	02	64	1,024
REC Sponsored				
1	1-Day Webinar Sustainability of Power Utilities	50	1,027	1,027
2	2-Day Webinar Techno Commercial Improvement of DISCOMs Performance	32	800	1,600
3	3-Day Electrical Safety Classroom Training	42	1,243	3,717
National Programmes				
1	National Regular Programme –Webinar Mode	10	198	396
2	National Regular Programme- Classroom Mode	01	15	60
IN-House Training Programmes				
1	3-Days Duration Classroom programme	02	37	87
2	2-Days Online Webinar	02	45	90
Customised Programmes				
1	Customised Online Webinar Programme	01	42	84
2	Customised Classroom Programme	08	198	2,376
Grand Total		491	11,992	36,761

B. Anticipated targets to be achieved during the remaining period of the year i.e. from January 1, 2022 to March 31, 2022.

Sl. No.	Type of Programmes	No. of programmes	Estimated No. of Participants
Ministry of Power Sponsored Programmes			
1	NTP C & D Programmes – RECIPMT is the Nodal agency for coordination Ministry of Power.	179	4,674
2	NTP C&D organised under RECIPMT Banner	80	2,003
REC Sponsored			
1	3-Day Electrical Safety Classroom Training Mode	10	257
2	2-Day Techno Commercial REC Sponsored Programmes (Online / Webinar)	8	200
In-House Training Programmes			
1	Class Room Training Programme – 3Days Duration	2	23
2	Online Webinar Training Programme – 2 Days Duration	4	78
National Programmes			
1	National Regular Programme Classroom Mode	3	45
GRAND TOTAL		286	7,280

12. Sustainable projects under Corporate Social Responsibility initiative by REC:

12.1 Progress made during the financial year 2021-22 (up to December 31, 2021)

In line with the REC Corporate Social Responsibility Policy, the Board of Directors of REC, has approved budgetary allocation of ₹173.17 crore for CSR activities for the financial year 2021-22. In pursuance of the REC Corporate Social Responsibility Policy, REC has undertaken sustainable projects under Corporate Social Responsibility initiatives in project mode. While identifying CSR initiatives REC has adopted an integrated approach to address the community, societal and environmental concerns.

12.2 Major CSR projects:

- Reconstruction and Restoration activities primarily for government schools and government health centers which have suffered damage in unprecedented rainfall and inundation in Various Districts of Uttarakhand;
- Broad basing of Sports and promotion of excellence in sports in India;
- Construction of REC Motorsports Race Track and Sports Complex at Lengpui, Mamit District of Mizoram;
- Free distribution of seeds to farmers residing in draught prone area at Aurangabad, Maharashtra;
- Upgrading the Uro Science Centre for Kidney Transplant in Sardar Patel (SP) Medical College", Prince Bijay Singh Memorial (PBM) Hospital, Bikaner, Rajasthan in Bikaner, Rajasthan;
- Procurement of various medical equipment and instruments for Agartala Government Medical College and Govind Ballabh Pant Hospital (AGMC & GBPH) Agartala, Tripura;
- Setting up of 64 Slice CT Scanner for Radio diagnosis and concerned other civil works at Safdarjung Hospital, New Delhi;
- Construction of 2 hostel towers (G+9) with furniture, fixtures, landscaping, external lighting & approach road for post graduate students (built up area 3960 sq.m) and installation of grid connected 100 kWp roof top solar PV panel under School of Medical Research and Technology (SMRT) in IIT Kanpur campus;
- Installation of 1700 liters per minute oxygen generation plant (full assembly) and 150 kVA generator plant in Dalvi Hospital, Pune;

- Infrastructure development, procurement of new medical equipment and renovation works in Gandhi Memorial hospital in Rewa Madhya Pradesh and Swami Vivekananda National Institute of Rehabilitation Training and Research (SVNIRTAR), Cuttack, Odisha;
- Improvement of health services and renovation & construction in Primary Health Centre, Primary Sub Health Centre, Community Health Centre and District hospital in Mamit, Mizoram;
- Farmer-Centric Integrated Watershed Management for Improving Rural Livelihood in Mahboobnagar and Anantapur district of Andhra Pradesh and Telangana;
- Infrastructure development by construction of auditorium in Govt. Higher Secondary School, at Munderi, Kannur, Kerala;
- Providing job oriented skill development training to people belonging to SC/ST/OBC/Women/Minority/EWS at various locations;
- Construction / extension of staff quarter for medical department and Modular prefabricated housing (quarter) for teachers at Kiphire District, Nagaland;
- Procurement, installation & commissioning of Digital Subtraction Angiography machine at SMS Hospital Jaipur;
- Setting up 2 Nos. of electrical cum gas operated (Hybrid)) Crematorium in Jhansi, UP;
- Conversion of 10 Govt. primary schools in modern primary schools by development of smart class rooms, library, computer room, RO water system etc. at four districts in Uttar Pradesh;
- Procurement and installation of 45 nos. of ICU cots, 45 nos. of multi parameter monitor, 35 nos. of Bipap and 39 nos. of HFNC to be installed at various Govt. hospitals in Malappuram district, to be implemented by District Disaster Management Authority; and
- Survey and repair of 12485 toilets constructed during 2014-15 under Swachh Vidyalaya Abhiyan (SVA) by REC in 6 states, namely, Uttar Pradesh, Bihar, Rajasthan, Telangana, Punjab and Madhya Pradesh.

12.3 Anticipated targets to be achieved during remaining period of the year up to March 31, 2022:

REC is expected to incur the CSR expenses allocated for financial year 2021-22 by the year end.



Hon'ble Minister of Power Shri RK Singh releases a report on Key Regulatory Parameters of Power Utilities in the presence of Minister of State Shri Krishan Pal Gurjar, Secretary (Power) Shri Alok Kumar and other dignitaries of Ministry of Power, REC and PFC.



Hon'ble Minister of Power Shri RK Singh inaugurates REC's new ultra-modern Corporate Office on the occasion of its 52nd Foundation Day on July 25, 2021 in the presence of Minister of State Shri Krishan Pal Gurjar, Secretary (Power) Shri Alok Kumar and other dignitaries of Ministry of Power, REC and PFC.



Hon'ble Minister of Power Shri RK Singh lights the lamp during the inauguration of REC's new ultra-modern Corporate Office in the presence of Minister of State Shri Krishan Pal Gurjar, Secretary (Power) Shri Alok Kumar and other dignitaries of Ministry of Power, REC and PFC



Hon'ble Minister of Power Shri RK Singh takes a Review, Planning and Monitoring (RPM) meeting with States and State Power Utilities on December 17, 2021 in the presence of Minister of State Shri Krishan Pal Gurjar, Secretary (Power) Shri Alok Kumar and other dignitaries of Ministry of Power, REC and PFC.



Hon'ble Minister of Power Shri RK Singh plants a tree during the inauguration of REC's new ultra-modern Corporate Office on the occasion of its 52nd Foundation Day on July 25, 2021.

CHAPTER 24

NORTH EASTERN ELECTRIC POWER CORPORATION (NEEPCO) Ltd.

The North Eastern Electric Power Corporation (NEEPCO) Ltd, a schedule A - Mini Ratna (Category-I) CPSE with an authorized share capital of Rs. 5000.00 Crore, was incorporated on 2nd April 1976 as a wholly owned Government of India Enterprise under the Ministry of Power to plan, promote, investigate, survey, design, construct, generate, operate and maintain hydro, thermal and solar power stations. At present, NEEPCO's total installed capacity is 2057 MW, out of which 1525 MW is in Hydro, 527 MW in Thermal and 5 MWp in Solar Sectors.

GENERATION PERFORMANCE (April 2021 to December 2021)

The generation from NEEPCO's Power Stations during April'21 to Dec'21 is 6690 MU against a MOU (Very Good) Target of 8160 MU for the year 2021-22. Plant Availability Factor (PAF) for Hydro Plants till Dec'21 is 79.47 % and for Thermal Plants is 76.88 % for the same period.

GENERATION PROJECTION (January 2022 to March 2022)

For the period January 2022 to March 2022 the projected generation from the plants of NEEPCO are as below:

Generation from Thermal Power Stations	: 565 MU
Generation from Hydro Power stations	: 609 MU
Generation from Solar Power Station	: 2 MU

PROVISIONAL FINANCIAL PERFORMANCE (April 2021 to March 2022)

• The revenue from operation	: Rs. 3166.34 Crore.
• The total income	: Rs. 3174.44 Crore.
• The Profit before Tax	: Rs. 428.28 Crore (after Regulatory Income)
• The Gross operating margin	: Rs. 1735.36 Crore.
• The Net Block	: Rs. 12855.87 Crore.
• The Sales Turnover / Net Block (%)	: 24.63%.
• The Share Capital (Paid up)	: Rs. 3609.81 Crore

Note: The above statement is prepared considering actual expenditure/income upto November 2021 & estimated income/expenditure for the period from December 2021 to March 2022.

BRIEF STATUS OF PROJECT(S) UNDER CONSTRUCTION

As of now, there are no project (s) of NEEPCO under construction.

FUTURE PROJECTS:

It has been NEEPCO's continued endeavor to enhance its capacity through development of more power projects. The following projects are in pipeline in Meghalaya and Arunachal Pradesh for future development:

1. Wah Umiam St-III HEP (85 MW), Meghalaya:

The CEA conveyed on 26.07.21, accord of appraisal to the Detailed Project Report (DPR) of 85 MW Wah Umiam Stage – III (2x 42.5 MW) HE Project in Meghalaya, under section 8 of the Electricity Act, 2003

Environment Action Committee, Govt. of India, recommended for grant of Environmental Clearance subject to Stage-I Forest Clearance (FC-I). Forest Clearance (Stage-I) for the Project is under process at the Forest Department, Govt. of Meghalaya. Acquisitions of land for Compensatory Afforestation, Land Demarcation & Survey works for acquisition of land etc. are in progress.

Initiatives for start of pre-construction works on receipt of investment approval has been taken.

Application for in-principle approval for budgetary support of enabling infrastructure works of Wah Umiam St – III as per the prescribed format has been submitted to CEA

2. Wah Umiam St-I HEP (50 MW), & Wah Umiam St-II HEP (100 MW), Meghalaya:

These projects, located on the upstream of the Wah Umiam St-III HEP were allotted by Govt. of Meghalaya on 12.03.2019. The MoAs are expected to be signed shortly.

3. Nafra HEP (120 MW), Arunachal Pradesh:

NEEPCO signed MoA with Arunachal Pradesh on 14.08.2021. As required, DPR is under updation.

4. New Melling HEP (90 MW), Arunachal Pradesh:

NEEPCO signed MoA with Arunachal Pradesh on 14.08.2021. Preparation of FR has been initiated.

5. Kurung HEP (330 MW), Arunachal Pradesh:

The MoA for the project was signed on 27.01.2015 with GoAP. As decided in the DIB meeting held on 18.01.2018, revisit of certain MoA clauses was taken up with GoAP. However, GoAP was of the opinion that MoA revision at this stage is not advisable. As indicated by MoP, pre-investment approval has been taken up with NTPC, in terms of letter dated 08.01.2021 of MoP for PIB/RCE approval of NEEPCO.

6. Siang Upper Stage-II HEP (3750 MW), Arunachal Pradesh:

The MoA with the State Govt. was signed on 28.05.2013. DPR preparation activities have been put on hold as per the advice of MoP vide letter dated 18.11.2015. As indicated by MoP on 22.12.2021, Siang Upper HEP is to be developed in single stage with 10000 MW installed capacity in joint venture between NHPC and NEEPCO.



7. 196 MW Ujh Multipurpose HE Project, J&K:

Ministry of Power, GOI nominated NEEPCO to the Ministry of Jal Shakti as the executing agency for the 196 MW Ujh Multipurpose HE Project in Kathua (J&K) on 31.03.2021. NEEPCO has established a coordination office at site. Meanwhile, updation of DPR was taken up by CWC.

OTHER FUTURE EXPANSION PLAN

As indicated by MoP based on the meeting chaired by Hon'ble Minister of Power & NRE on 12.11.2021 the following projects in Arunachal Pradesh are earmarked against NEEPCO for development on ownership basis:

SL. No.	Name of the Projects	Basin	Capacity (MW)
1	Tawang-I	Tawang	600
2	Tawang-II	Tawang	800
3	Talong (Londa)	Kameng	225
4	Phanchung (Pachi)	Kameng	56
5	Dibbin	Kameng	120
6	Nafra (120 MW)*	Kameng	120
7	Khuitam	Kameng	66
8	Saskangrong	Kameng	45
9	Par	Dikrong	52
10	Simang-I	Siang	67
11	Simang-II	Siang	66
12	Pauk	Siang	145
13	Heo	Siang	240
14	Tato-I	Siang	186
15	Tato-II	Siang	700
16	Hirong	Siang	500
17	Naying	Siang	1000
Total in Ownership			4,988 MW

*MoA already signed as mentioned above

Further two projects viz. 2700 MW Siang Lower and 10000 MW Upper Siang HEPs have been indicated for joint development by NHPC and NEEPCO.

COMMERCIAL PERFORMANCE (2021-22):

Total billing against sale of power during the year 2021-22 (till December 2021) is Rs 2020.03 Crore. However, only Rs 2122.18 Crore (including rebate allowed amounting to Rs 13.07 Crore) has been received from the beneficiaries up to the month of December 2021.

Further, total outstanding dues (including late payment surcharge amounting to Rs 0.11 crore) as on December 2021 is Rs 363.65 Crore which includes Rs 248.28 Crore against Tripura.

CSR ACTIVITIES

Since its inception, NEEPCO has accorded top priority towards all round development of the people residing in and around its operational areas spread across the North East Region of the Country. As a responsible corporate entity, NEEPCO has undertaken various community development activities particularly in the field of education, health, infrastructure development and other community needs.

In accordance with the provisions of the Companies Act, 2013, the Companies (Corporate Social Responsibility Policy) Rules, 2014, MCA General Circular no. 21/2014 dated 18.06.2014, and revised DPE guidelines, the NEEPCO's CSR policy has been approved by the Board of Directors on 14.07.2015 and has been also revised and duly approved by the Board of Directors on 11.08.2020.

During the year NEEPCO has undertaken CSR activities under five main domains – Health and Sanitation, Promotion of Education, Entrepreneurship Development Program, Rural Development and Swachh Bharat Abhiyan.

NEEPCO is committed to sustainable development and bringing improvement in the quality of life of the communities it serves. Since its inception, this has been the bottom line of the company's business ethics. The company's CSR activities emanate from such business ethics and most of the CSR activities are undertaken in the local area.

NEEPCO's INITIATIVES TO COMBAT COVID-19 PANDEMIC

NEEPCO had taken all efforts towards containment of the spread of COVID-19 pandemic while ensuring uninterrupted power generation from the Power Stations.

The Corporation adopted Standard Operating Procedure (SOP) in the workplaces and Township Colonies. NEEPCO distributed PPE items to the populace in and around its operational areas. Quarantine Centre and Isolation Wards were set up to accommodate employees, workers and their families returning to workplaces. Organization of Vaccination Camp, Support in Covid vaccine supply and necessary medical aid was extended to the States. Also, use of Aarogya Setu App was encouraged, awareness programs were conducted emphasizing the preventive care on Covid-19 for outsourced workers across the organization.



Top view of dam of 405 MW Ranganadi Hydro Power Station

CHAPTER 25

POWER SYSTEM OPERATION CORPORATION LTD. (POSOCO)

POSOCO Overview

'Power System Operation' is a mission critical function of national importance for smooth evacuation of power from generating stations and supply to the end consumers in the electricity supply value chain. System operators ensure the power balance in the interconnected power system on a real time basis in a secure and reliable manner. Power System Operation involves taking care of the over all reliability, security, economy and efficiency of the power system.

POSOCO has the onerous responsibility of operating the All India synchronous grid, one of the largest and most complex in the world, ensuring reliability and security. India is ranked third in terms of electricity generation, electricity consumption, installed generation capacity and size of transmission system in the world. The power sector in India has seen a transformational change with progressive policy-level reforms and effective implementation of the same in the recent years. POSOCO, through its National Load Despatch Centre (NLDC) and five (5) Regional Load Despatch Centres (RLDCs), facilitates the inter-state transmission of power to utilities across India ultimately reaching to over 1.38 billion people. POSOCO also administers India's wholesale electricity market through coordination with thousands of entities every day for balancing demand and generation every 15 minutes in line with the regulations of Central Electricity Regulatory Commission (CERC).

The functions of POSOCO have been evolving with the Integration

of power systems, increase in electrical energy demand, growth in the economy and changes in technology, regulations, market design, administration and management of the power system. POSOCO is a knowledge based organization and is fulfilling various other functions assigned by the Govt. of India, from time to time. POSOCO is facilitating and enabling power sector reforms by Ministry of Power, regular feedback is given to the Central Electricity Regulatory Commission, Central Electricity Authority and Central Transmission Utility on design & operational aspects pertaining to Power System and Power Market Operation.

POSOCO is committed to ensuring Integrated Operation of Regional and National Power Systems to facilitate transfer of electric power within and across the regions and trans-national exchange of power with Reliability, Security and Economy. It ensures independent system operation and provides level playing field to all stakeholders.

Operational Highlights

The tremendous pace of expansion of the generation, transmission and distribution in terms of higher voltages, large footprint and new technologies has strengthened the Indian power grid supporting the Government of India's vision on attaining 'Power for all'. Despite the COVID-19 crisis, the POSOCO has continued to advance grid operations and market design initiatives to prepare Indian grid for the future. The operational highlights for 2021-22 (Upto December) are as follows:

	2021-22 (till Dec)	2020-21 (till Dec)	% Variation	Highest ever
All India Energy Met (BU)	1040	948	9.7	4508MU on 7th July 2021
All India Highest Demand Met (GW)	201	183	9.6	201GW on 7th July 2021
All India Hydro Generation (BU)	138	137	0.5	816MU on 9th September 2019
All India Thermal Generation (Coal & Lignite) (BU)	753	664	13.4	3361MU on 13th April 2021
All India Wind Generation (BU)	55	44	25.2	541MU on 27th July 2021
All India Solar Generation (BU)	49	39	25.5	221MU on 1st April 2021
Energy facilitated through inter-regional exchange (BU)	172	161	6.8	-
Cross border interchange (Export) (MU)	6803	6504	4.6	-
Cross border interchange (Import) (MU)	7800	8917	-12.5	-
Energy approved through Short Term Open Access (BU)	121	86	40.8	-

Achievements

Frequency Profile

During 2021-22 (till December), Frequency remained within Indian Electricity Grid Code (IEGC) band of 49.90-50.05 Hz for 75% of time. Frequency remained within the IEGC band for highest 86.6% of time on 27th June 2021. On most of the days, average frequency was close to the national reference frequency of 50 Hz.



Testing of Frequency Response

IEGC mandates periodic checkups of primary frequency response of generating units at regular interval once in two years through independent agencies selected by RLDCs or SLDCs. POSOCO has formulated the terms of reference and procedure for conducting tests to verify primary response of generating units scheduled by RLDCs. POSOCO issued Expression of Interest on global basis from interested agencies on 1st October 2018. After a thorough and comprehensive process, testing agencies have been identified and allocation of generating units to testing agencies has been completed in March 2020. Generating unit owners have been requested to place award to the selected testing agencies and region-wise testing coordinators have been nominated. Testing of primary response in India started for the first time on 23rd September 2020, and by December 2021, testing has been completed at 120 units.

Automatic Generation Control (AGC)

During pilot project, 5120 MW generation capacity across all five regions was operated under AGC for nearly two years, which yielded valuable insights. POSOCO has taken active and continuous steps for implementation of pan India AGC and collaborated with all the relevant stakeholders including power plants, central transmission utility (CTU) and RPCs for expediting implementation. A total of 48 power plants (Pan-India) with 47420 MW installed capacity have been continuously operating 24x7 on a trial basis since 20th July 2021. For operating under AGC, industry-grade software has been customized at NLDC along with hardware and servers. At each of the 48 power plants, the required hardware for executing bidirectional communication with NLDC has been procured and installed by the power plants. NLDC has provided the relevant signal lists, architecture/design, generic hardware specifications, and standard operating guidelines for AGC. During 2021-22 (till Dec), about 474 MU was despatched in 'Up' regulation and 1260 MU in AGC 'down' regulation with net energy of 786 MU. Pan-India AGC shall enable efficiency and grid security in the Indian power system, making it ready to handle the 450 GW of renewables integration targeted by 2030.

Security Constrained Economic Despatch (SCED)

Pilot on Security Constrained Economic Despatch pan-India covering 52 thermal ISGS with 58 GW capacity was operationalized by POSOCO from 1st April 2019 onwards. A robust, integrated SCED software application was developed in-house, which runs every 15 minutes on 24x7 basis to optimize the all-India variable cost of generation, while fulfilling grid security constraints. The pilot has been expanded w.e.f. 1st June 2020, opening participation to all willing generators. 3 generating stations with 1600 MW capacity have joined the expanded SCED pilot. A new software platform for despatching ancillary services has been developed and implemented in-house which works in tandem with SCED. This application despatches ancillary services through an algorithmic approach and works in an automated fashion, ensures certainty of ancillary despatch, enables better operator control over ancillary despatch and provides a number of operator-friendly features. The detailed feedback report on the implementation of the pilot

and the operational experience of the first 9 months of operation was published in January 2020. A detailed feedback report on the expanded pilot was published in March 2021. The pilot has been extended until 30th September 2021 by CERC through its order dated 31st March 2021 and the same has been extended further until 31st March 2022 by CERC through its order dated 27th September 2021.

Renewable Energy Management Centres

Renewable Energy Management Centre (REMC) serves as dedicated RE management system to facilitate safe & secure grid operation in the area of renewables. A total of 11 REMCs have been established under the guidance of Ministry of Power and Ministry of New and Renewable Energy. Out of total 11 REMCs, 7 are in renewable energy rich states, namely Andhra Pradesh, Tamil Nadu & Karnataka in Southern Region, Gujarat, Madhya Pradesh & Maharashtra in Western region, Rajasthan in Northern region and 3 nos. are at regional level (Western, Southern and Northern Regions) and one at National level. All 11 REMCs were inaugurated by Shri R.K. Singh, Hon'ble Minister of State (IC), Power, New and Renewable Energy on 28th February 2020. Renewable Energy Management Centre (REMC), equipped with Forecasting and Scheduling Tool & Real Time Monitoring of RE generation would enable safe, secure and optimal operations of the overall grid. Around 79GW (39GW Solar, 40GW Wind) RE capacity has been monitored by these REMCs as on date (till Dec).

Impact of COVID-19 pandemic

All efforts are being made to maintain reliability of power system even during COVID-19 pandemic. Covid protocol is being strictly complied to protect the POSOCO staff and facilitate uninterrupted 24x7 operation of NLDC control room. IT technology has been deployed to facilitate remote working wherever feasible. The office premises, including control rooms, are being sanitized and fumigated several times every day, and arrangements for adequate PPE and other amenities for the front-line staff have been made. The All India lockdown for containment of COVID-19 from 25th March 2020 onwards had resulted in reduction of All India Electricity Demand by 25-30% as compared to the same period in 2019 due to shutting down of a large chunk of industrial, commercial and traction loads. Subsequently, with gradual removal of lock down and re-opening of the country's economy, the electricity demand started recovering. However, due to the second wave of the pandemic which started in April 2021, many states re-imposed lockdowns but due to the decentralized nature of lockdowns, Impact on all India demand was lower than first wave. During second wave more stringent measure had been taken and man power allocation had been done accordingly. During the above-mentioned periods as well as during the recovering phase, generation and transmission resources were mobilized in coordination with the utilities to ensure adequacy and security of the integrated power system.

Monitoring the power supply to oxygen generating plants

The demand for medical oxygen supply surged manifold due to the second wave of Covid-19 pandemic starting in April 2021. Ensuring continuous operation of oxygen plants supplying to medical

facilities became a high priority task. The power supply system of these oxygen plants located in different parts of the country were urgently audited by POSOCO team in coordination with CTU, STUs, SLDCs and distribution utilities. The power supplies to the Oxygen manufacturing plants were continuously monitored and interruptions were immediately analyzed and concerned utilities were pursued through concerned SLDCs for addressing the root cause of failures and restoration of power supply to the oxygen plants.

Green Day Ahead Market (GDAM)

MoSP (IC) Shri R. K. Singh launched Green Day Ahead Market on 25th Oct 2021 for the trade of green energy in Indian electricity market. It has been launched with the idea of deepening the green market and to provide competitive price signals, besides offering an opportunity to the market participants to trade in green energy, in the most transparent, flexible, competitive, and efficient manner. The market-based competitive prices will provide another option to renewable generators to sell power as well as accelerate the renewable capacity addition towards the Government's vision of building India as a sustainable and efficient energy economy.

National Open Access Registry (NOAR)

NOAR has been designed as an integrated IT based platform accessible to all stakeholders including open access participants, traders, national/regional/state load despatch centres for electronic processing of applications for short-term open access (STOA). NLDC-POSOCO has been designated as the nodal agency for implementation and operation of NOAR. M/s PWC led consortia has been selected as System Integrator for Design and Implementation of NOAR platform and virtual signing ceremony was held on 28th July, 2020. NOAR, implementation under progress, would be a huge milestone for the country in terms of automating the entire STOA process, leading the path for bringing in more flexibility in the bilateral, collective, intra-day and real time markets. The implementation is under advance stage. Registration of the entities on NOAR platform had commenced on 01st November 2021.

Participation in Policy & Regulatory Reforms

POSOCO actively supported Ministry of Power in the various policy and legislative processes. At the regulatory level too, POSOCO has been associated with introduction of National Open Access Registry, Gate Closure, Real Time Markets, pilot on five-minute scheduling and settlement, Security Constrained Economic Despatch, Sharing of Inter-State Transmission Charges and Losses etc.

POSOCO has contributed in framing of key statutes of various policies and regulations through its active participation in following sub-groups constituted by MoP/CEA:

- Steering Committee to monitor and implement a pilot project on BESS
- Policy framework to promote energy storage
- Identification of use of storage as a business case and for ancillary services

- Renewable purchase obligation beyond 2021-22
- Resource Adequacy Plan
- Expert Group for Optimal Generation Capacity Mix in 2029-30
- Review of Manual on Transmission Planning Criteria
- Committee on National Electricity Plan 2022-27
- Core Management Team (CMT) for fuel supply adequacy

Knowledge and Information Dissemination

A number of studies & simulations have been carried out in the recent past to understand various important aspects of Indian power system & electricity market, especially, for renewable integration. In 2020, various studies and data analysis have been undertaken namely, Detailed Feedback Report on SCED pilot, Report on Pan India Lights Off Event on 5th April 2020, Flexibility Analysis of Thermal Generation for Renewable Integration in India and Solar Eclipse-21st June 2020 – Analysis of impact on Indian Power System etc.

Grid Resilience

The impact of climate change leading to adverse weather conditions and/or natural disasters in many pockets as well as the increasing number of high impact low probability incidents bring about a need for making the system more resilient. POSOCO-NLDC as the Nodal Agency for Disaster Management in Power Sector coordinated for preventive measures and quick restoration during natural calamities such as extremely severe Cyclonic storm Tauktae, very severe cyclonic storm Yaasin May 2021 & Cyclone Gulabin September 2021.

Institution Building and Strengthening

Human capital management and building sustainable institutions is a key priority area for POSOCO. Employees are encouraged to learn new skills, take up more responsibilities and be unfazed in the face of challenges. As part of the

POSOCO's emphasis on development of human capital, employees now have greater access to upgrade themselves through online training platforms as well as training conducted by in-house and external trainers. POSOCO is also collaborating with the State Load Despatch Centres in various functional areas, leading to knowledge sharing and overall development of the sector. POSOCO is well-positioned to lead the transition to greater renewable energy penetration in the Indian power sector, given our quality resources, experience and technical knowhow.

Corporate Social Responsibility

Every year POSOCO carries out CSR activities in compliance of the provisions of the Companies Act, 2013. An amount equivalent to 2% of average of previous three years net profit of the company is allocated on the CSR activities. During FY 2021-22, an amount of Rs.109.52 lakh has been allocated towards taking up CSR activities. Following activities are under implementation, under CSR, during FY 2021-22:

- Design of prosthetic hand for below-elbow disabilities



- Activities promoting Swachch Bharat Abhiyan/ Swchcta Pakhwada/Swasthya/Contribution to Swachch Bharat Kosh
- Organising camps for providing Aids and Assistive devices to Persons with Disabilities in Osmanabad district in Maharashtra.
- Capacity Building in the field of Computer education
- Annual Maintenance charges towards Water ATMs provided at Safdarjung Hospital, New Delhi under CSR activity of FY 2019-20
- Supply of medical equipment's in the Govt. Hospitals in the rural areas of Karnataka to be utilized towards COVID-19 related activities.



National Load Despatch Centre Control Room



Supply of Medical Equipment to Rural Govt. Hospitals under CSR

CHAPTER 26

SATLUJ JAL VIDYUT NIGAM LIMITED (SJVN)

1.0 About SJVN

SJVN Limited, a Mini Ratna, Category-I and Schedule –‘A’ CPSE under administrative control of Ministry of Power, Govt. of India, was incorporated on May 24, 1988 as a joint venture of Government of India (GoI) and Government of Himachal Pradesh (GoHP) to plan, promote, develop all forms of power, both renewable as well as non-renewable and all ancillary activities related thereto, in India and abroad.

GoI through an Initial Public Offer (IPO) of SJVN in the month of May, 2010 offered 10.03% of its share to public and financial institutions. The Finance Ministry has also included SJVN stock in “Bharat 22” CPSE Exchange Traded Fund (ETF) portfolio basket. Present equity share holding of GoI, GoHP and Public is 59.92%, 26.85% and 13.23% respectively. The authorized capital of SJVN is Rs. 7,000 crore and paid up capital is Rs. 3930 Crore.

Beginning with a single project and single State operation (India's largest 1500 MW NathpaJhakri Hydro Power Station in Himachal Pradesh), SJVN is presently implementing Hydroelectric Projects in Himachal Pradesh and Uttarakhand in India besides neighbouring countries viz. Nepal and Bhutan. Apart from hydro power, SJVN has also ventured into thermal, wind power, solar power and transmission.

Nathpa Jhakri HPS and Rampur HPS started commercial operation in May, 2004 and in December, 2014 respectively.

During FY 2021-22, NJHPS and RHPS have generated 6400 MUs and 1791 MUs respectively up to December 31, 2021.

SJVN forayed in to other forms of power and commissioned 47.6 MW Khirvire Wind Power Project in Maharashtra in May, 2014; 5.6 MW Charanaka Solar Power Project in Gujarat in March, 2017 and 50 MW Sadla Wind Power Project during FY 2019-20. Khirvire Wind Power Plant, Sadla Wind Power Plant and Charanaka Solar Power Plant have generated 42 MUs, 81 MUs and 3.40 MUs respectively up to December 31, 2021 during FY 2021-22.

Presently, SJVN has a total of 31 power projects having 11211 MW total installed capacity and 3 transmission lines of 340 km. Out of this, 2017 MW (6 power projects) & one transmission line of 86 km are under operation, 3301 MW (8 power projects) & two transmission lines of 254 km are under construction and 5893 MW (17 power projects) are under investment approval, pre-construction and survey & investigation stages.

SJVN has paid a total dividend of Rs.864.56 Crores for FY 2020-21. The year wise details of dividend paid in last three years is given as under:

Year	GoI	GoHP	Public	Total
2018-19	524.29	226.83	93.79	844.91
2019-20	518.06	232.10	114.40	864.56
2020-21	518.04	232.13	114.39	864.56

2.0 Progress Made During 2020-21

The Progress made during the year 2021-22 up to 31.12.2021 is as under:

Description	Actual Achievement up to Dec 31, 21 during the FY21-22	Tentative projections of gross generation during the period January 22– March 22	Total projected gross energy generation up to end of March 2022	Target as per MoU for FY 2021-22
Hydro Power (MUs)	8191	809	9000	9000
Wind Power (MUs)	123	8	131	131
Solar Power (MUs)	3.40	3.60	7	7
Total	8317	821	9138	9138

3.0 Achievements and Awards

- Laying of foundation stone of 210 MW Luhri HEP and 66 MW Dhaulasidh HEP in Himachal Pradesh by Hon'ble Prime Minister of India on 27.12.2021.
- SJVN bagged Lower Arun HEP (679 MW) in Nepal through global competitive bidding process and project allotted to SJVN on 04.02.2021.
- SJVN bagged 1000 MW Grid connected Solar Power Project in Indian Renewable Energy Development Agency Limited (IREDA) tender for CPSUs through Open Competitive Bidding Process on 23.09.2021.
- SJVN has been nominated as nodal agency for development of 880 MW Kaza Ultra Mega Renewable Power Project by MNRE.
- SJVN bagged 200 MW Grid connected Solar PV Power Project from Bihar Renewable Energy Development Agency (BRENDA) through tariff based competitive bidding on 13.08.2021.



- SJVN bagged 100 MW Grid connected Solar PV Power Project from Punjab State Power Corporation Ltd (PSPCL) through tariff based competitive bidding on 03.11.2021.

4.0 Financial Parameters of SJVN

The financial performance of SJVN for the last five financial years is as under:

(Rs.Crores)

S. No.	Description	2020-21	2019-20	2018-19	2017-18	2016-17
1	Total income	3213.07	3095.24	2908.99	2587.07	3119.90
2	Profit before tax	2168.67	1959.36	1792.54	1648.37	1873.93
3	Profit after tax	1633.04	1557.43	1364.29	1224.88	1544.14
4	Dividend	864.56	864.56	844.91	864.56	1137.57
5	Other (equity) Reserves and Surplus	8832.04	8104.51	7308.98	6764.91	7347.20

5.0 Future Plan for Capacity Addition

SJVN has drawn a comprehensive capacity addition plan to emerge as a major contributor in power generation with a vision of installed capacity of 5000 MW by 2023-24, 12000 MW by 2029-30 and 25000 MW by 2039-40. In next five years (i.e. up to FY 2026-27), capacity addition plans of SJVN are as under:

- Capacity addition of 3683MW comprising of projects viz., 900 MW Arun 3 HEP, 60MW Naitwar Mori HEP, 1320 MW Buxar TPP, 600 MW Kholongchhu HEP, 210 MW Luhri Stage-I HEP, 66 MW Dhaulasidh HEP, 70 MW Shiyal Solar Power Project, 75 MW Parasan Solar Power project and 382 MW Sunni Dam HEP.
- Apart from above, commissioning of 2280 MW Solar power energy in next five years.
- Commissioning of 217 km, 400kV double circuit transmission line for evacuation of power from Arun-3 Project in Nepal up to Dhalkebar (in Nepal) and 37 km, 220 kV transmission line for evacuation of power of Naitwar Mori HEP from Mori (Uttarakhand) to Snail (Himachal Pradesh).
- Further, another 11 hydroelectric projects are under various stages of survey & investigation/ pre-construction totaling 3231 MW are expected to come into construction in next five years.
- Ministry of Power has identified five hydro projects totaling 5097 MW in Arunachal Pradesh for development by SJVN. Survey & Investigation of these projects would be started soon after signing MoU with Govt. of Arunachal Pradesh.

6.0 Current Project Portfolio

SJVN has currently a portfolio of thirty-one power projects and three transmission lines (TL) in India and abroad as per details given below:

S. No.	Name of Project	Location (State/ country)	Capacity (MW)
A. Projects under Operation			
1	Nathpa Jhakri Hydro Power Station	Himachal Pradesh (H. P.)	1500 MW

2	Rampur Hydro Power Station	H. P.	412
3	Khivire Wind Power Plant	Maharashtra	47.6
4	Charanaka Solar Power Plant	Gujarat	5.6
5	Sadla Wind Power Plant	Gujarat	50
6	Solar plants at NJHPS	H. P.	1.3
7	400 kV, D/C Cross Border transmission Line (26% equity)	Indian Portion (Muzaffarpur to Sursand on Indo-Nepal border).	86 ckm

B. Projects under Construction

8	Arun-3 HEP	Nepal	900
9	Arun 3 Transmission Line	Nepal Portion (Diding to Bathnaha on Indo Nepal Border)	217 km
10	Naitwar Mori HEP	Uttarakhand	60
11	Naitwar Mori HEP – Associated Transmission Line	Mori (Uttarakhand) to (Snail) H.P.	37 km
12	Buxar Thermal Power Project	Bihar	1320
13	Kholongchhu HEP	Bhutan	600
14	Luhri Stage-I HEP	H. P.	210
15	Dhaulasidh HEP	H. P.	66
16	Shiyal Solar Power Project	Gujarat	70
17	Parasan Solar Power Project	Uttar Pradesh	75

C. Under Investment approval and Survey & Investigation stage

18	Sunni Dam HEP	H. P.	382
19	Jakholsankri HEP	Uttarakhand	44
20	Devsari HEP	Uttarakhand	194

21	Luhri Stage-II HEP	H. P.	172
22	JangiThopanPowariHEP	H. P.	804
23	Purthi HEP	H. P.	232
24	Bardang HEP	H. P.	175
25	ReoliDugli HEP	H. P.	430
26	SachKhas HEP	H. P.	267
27	Rashil HEP	H. P.	130
28	Tandi HEP	H. P.	104
29	Lower Arun HEP	Nepal	679
30	Kaza Solar Project	H. P.	880
31	BREDA Solar Project	Bihar	200
27	IREDA Solar	Anywhere in India	1000
27	Raghanseda Solar Power Project	Gujarat	100
27	PSPCL Solar Power Project	Punjab	100

7.0 Industrial Relations

Regular interactions are held with the representatives of various Associations/Unions. The thrust area for discussions is related to policies as well as issues concerning enhancing production, efficiency and improving organizational climate. The above actions of the Management paved the way for cordial and better employee-employer relations & cordial industrial relations were maintained during the year. Recreational, cultural and sports activities are being organized on different occasions for improving inter – personal relations and also to bring out the talent of employees and their family members.

8.0 Environment

SJVN is aware of its obligation to conserve and protect the environment. SJVN strictly adheres to all policies and guidelines of Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt. of India (GoI) concerning identification and mitigation of environmental impacts of projects.

SJVN's Nathpa Jhakri and Rampur HPS in Himachal Pradesh which are under operation wherein measures such as Catchment Area Treatment, Compensatory Afforestation, Muck Management, Restoration of muck disposal sites, quarry sites and construction areas, Green belt development, Biodiversity Management, Fisheries Management, etc. were successfully undertaken.

Presently, SJVN is executing Naitwar Mori HEP in Uttarakhand and Luhri HEP Stage-I and Dhaulasidh HEP in Himachal Pradesh besides 1320 MW Buxar Thermal Power plant in Bihar. In these under construction projects, all the conditions mentioned in the Environment Clearance letter are strictly complied with.

9.0 Corporate Social Responsibility and Sustainability (CSR)

SJVN being a responsible corporate citizen has since been implementing CSR programs integral to its core business

activities. In accordance with Companies Act, 2013 and Companies (Corporate Social Responsibility Policy) Rules, 2014, SJVN allocates a minimum of 2% of the average net profits made during the three immediately preceding financial years for CSR activities. The CSR & Sustainability Plan for FY 2021-22 of SJVN has been approved with a budget outlay of Rs.58.45 Crore against the statutory requirement of Rs.39.47 Crore, considering the need to uplift and support the vulnerable groups of society; and same is under implementation. The major CSR activities carried out by SJVN under different verticals are detailed below:

9.1 Response to COVID-19: Perceiving the seriousness of global pandemic of COVID-19 at the very outset, SJVN has provided significant assistance to the society by providing financial support at all possible platforms. So far, SJVN has spent about Rs.317.93 Lakh towards these activities in the states of Himachal Pradesh, Uttarakhand and Bihar.

9.2 Health and hygiene: SJVN provides free medical consultancy services and medicines at the door steps of local communities in its project areas through 14 Mobile Medical Units (MMUs) in the states of Himachal Pradesh, Uttarakhand, Bihar and Maharashtra.

- Rs.188.11 lakh has been spent on healthcare for providing facilities of mortuary, vehicle for mobile medical unit, ambulance, dead body van, semi auto analyzer, cardiac monitor and oxygen concentrator facilities etc.
- Rs.100.70 lakh has been spent for providing of nutrition ingredients to community.
- Further, during FY, 2021-22, SJVN has spent Rs.39.73 lakh with special focus on CoVID-19 related measures including setting up makeshift hospitals and temporary CoVID care facilities etc.

9.3 Education and Skill development program: The following programs are being undertaken under this head:

- Skill Development trainings to 480 candidates through NSDC has been completed and short term (2-3 months) trainings to 150 candidates through HIMCON, Shimla in the projects areas and training for 50 kins and dependents of army personnel in HP is being conducted.
- 80 candidates from SJVN project areas are getting vocational trainings in Government ITIs. Besides tuition fees, a stipend of Rs.2000/- per month is given to these sponsored students. As a part of support to start-ups, 40 youths have been imparted training to start weaving units in their houses in distt. Kinnaur (HP).
- MoU with National Law University, Shimla signed on 29.11.2019 for providing financial support of Rs.10.80 crore for construction of hostel block and mess block. So far Rs.5.40 crore has been released.
- SJVN has spent Rs.382.29 lakh on education for construction of 17 schools buildings and setting-up of 18 Libraries in Educational Blocks in aspiration district, Chamba under the theme.



9.4 Sustainable Development: The following activities are being carried out by SJVN under this head:

- Deen Dayal Upadhyay SJVN Jal Sanrakshan Yojna under which natural water sources are being rehabilitated.
- SJVN has constructed a multipurpose medium height check dam at Gount Khad in Tehsil Nahan of Distt. Sirmour (HP) executed through Jal Shakti Vibhag, Nahan (HP) with financial support of Rs.57.39 lakh.
- Two villages namely, Jhakri and Bayal villages have been adopted under Adarsh Gaon Yojna for developing as smart/clean village. Further, SJVN is extending financial support of Rs.70.00 lakh to BDO, Chauntra for adopting Simas village, Tehsil- Lar Bharol, Distt. Mandi (HP) under "Sansad Gram Adarsh Yojna".

9.5 Preservation & promotion of culture and sports:

- Bhima Kali Temple Complex at Sarahan, Shimla (HP) and Tara Devi Temple at Shimla (HP) have been adopted for protection and preservation of its rich cultural heritage. Besides these, repair and cleanliness drives have been undertaken in many other temples and public places. Further, MOU with Govt. of H.P. has been signed for development of following cultural Heritage sites; (i) Sapni Fort, Village Sapani, Sangla Valley, Kinnaur, (ii) Parshu Ram Temple Complex, Nirmand, Tehsil Anni, District Kullu, (iii) Kalka- Shimla Railway, (iv) Chhitkul Village, Sangla Valley, District Kinnaur. Work in Sapni Fort is in progress and work in Parshuram Temple is to be started soon.
- MOU with Shree Kedarnath Utthan Charitable Trust (UK) was signed on 16.03.2021 for providing financial support of Rs.12.00 crore for re-development of all infrastructure at Kedarnath as well as Shree Badrinath Dham.
- SJVN sanctioned financial support of Rs.5 crore in the year 2021 to Sardar Vallabbhai Patel Rashtriya Ekta Trust (SVPRET), Gandhinagar, Gujarat for integrated development of Kevadia, Gujarat

9.6 SJVN Empowering Weaker Sections of Society: SJVN is running "Women and Child Development scheme" under which Below Poverty Line (BPL) women residing in Project Affected Areas of SJVN are eligible for a financial benefit of Rs.10,000/- and in addition a gift pack worth Rs.1000/- consisting of nutritional food items, soaps and other hygiene related items are also given.

- SJVN Foundation has extended financial support of Rs.8.28 Crore to the School/ Home for speech, hearing and visually impaired children at Dhalli (HP).

- SJVN has provided financial support of Rs.5.70 crore for construction of Manav Mandir at Solan (HP) which has been completed.

9.7 Assistance to the victims of natural disasters/ calamities/ pandemic contributions towards Relief Funds:

SJVN has contributed Rs.50.00 Lakh to Uttarakhand State Disaster Management Authority for various reconstruction activities. A financial support of Rs.1328.00 lakh has been sanctioned for construction of fodder/wood storage sheds for the 3579 families in the four blocks namely Mori, Purola, Naugaon and Chinyalisaur (Uttarakhand). So far Rs.9.00 Crore has been released.

10. Rehabilitation and Resettlement in SJVN

SJVN, being conscious of its responsibilities towards society, is committed to execute and operate power projects in a socially responsible manner by adopting generous Resettlement & Rehabilitation measures for the benefit of Project Affected Families (PAFs) and by investing in socio economic development of communities so as to continually minimize potential negative impacts as well as to establish sustainable positive impact of projects on them.

Well before any project is taken up for execution, Social Impact Assessment (SIA) study is carried out to ensure that the potential socio-economic benefits accrued from the project outweigh the social costs and adverse social impact. Public consultation meetings with the stakeholders are held by the project authorities to make them aware of developmental facilities and their benefits to the society. Subsequently, R&R plan is devised based on conclusive findings derived from socio economic survey carried out by an independent expert agency. The R&R Plan thus devised and approved, essentially prescribes mitigation measures for reconstruction and regeneration of economies of the PAFs.

The R&R Plans have been successfully implemented in 1500 MW Nathpa Jhakri Hydro Power Station (NJHPS) HP and 412 MW Rampur Hydro Power Station (Rampur HPS) HP.

Besides, R&R Plan is under implementation in Naitwar Mori HEP, Uttarakhand. Statutory land and house compensation have been disbursed. Other R&R benefits in terms of employment, house, land for land, financial assistance for land and non-land based activities have been provided. Also various community and infrastructural facilities like scholarship, health facility and drinking water etc. are being provided in the project area villages. Rural infrastructure like roads, schools, playground, renovation of temple community halls etc. have also been completed.

CHAPTER 27

THDC INDIA LTD (THDCIL)

THDC India Limited, is a Public Sector Enterprise under the administrative control of the Ministry of Power, Government of India and registered as a Public Limited Company in Jul'88 under the Companies Act, 1956.

The Equity of Company was earlier shared between Govt. of India and GoUP in the ratio of 75:25. As per share Purchase Agreement executed between NTPC Limited and President of India on 25.03.2020, Stake of Gol stands transferred to NTPC in March'2020.

The Authorised Share Capital of Corporation is Rs.4000 Cr. Paid up Capital of the Company as on 31st Dec-21 is Rs.3665.88 Cr.

THDCIL was conferred 'Miniratna Category -I' status in Oct-09 and upgraded to Schedule 'A' company in July-10 by the Govt. of India.

The Company successfully commissioned Tehri Dam & HPP (4x250 MW) Stage-I and Koteswar HEP (4x100 MW) in 2006-07 and 2011-12 respectively. With completion of Tehri PSP(4x250 MW) likely by Jun-2023, 2400MW Tehri Hydro Power Complex shall function as a major peaking station.

Vishnugad Pipalkoti Hydro Electric Project (4x111 MW) on the river Alaknanda in Uttarakhand is under construction. The project is funded by World Bank. The Project is anticipated to be commissioned by Dec-2024.

Dhukwan SHEP (3x8 MW) in Distt. Jhansi (UP) has also been commissioned in 2019-20.

Towards diversification of the company into other energy areas,

THDCIL is executing coal based Super Thermal Power Project (2x660 MW) at Khurja in the state of Uttar Pradesh.

THDCIL has also diversified into non-conventional and renewable sources of energy. THDCIL has two operational Wind Power Plants 50 MW Wind Power Plant at Patan, Gujarat and 63 MW Wind Power Plant at Devbhumi, Dwarka, Gujarat. A Solar Power Project (50 MW) in Kasargod, Kerala has also been commissioned in Dec'2020.

MNRE has allotted THDCIL to develop UMREPPs through SPV in the state of Uttar Pradesh and Rajasthan for the capacity of 2000 MW and 1500 MW respectively. 2000 MW UMREPPs (600 MW capacity of Solar Park, each at Jhansi and Lalitpur District and 800 MW at Chittarkoot District of UP) through SPV (a JV of 'THDCIL' and 'UPNEDA' named 'TUSCO') are under development in the state of Uttar Pradesh.

Further, Govt. of Rajasthan is being pursued for establishment 5000 MW UMREPPs in Rajasthan in JV mode.

THDCIL has also updated DPR of Sankosh HEP (2585MW) and Bunakha HEP (180 MW) in Bhutan. Bunakha HEP is proposed to be implemented through Joint Venture with Bhutanese PSU.

OPERATIONAL PERFORMANCE

THDCIL, at present, is generating power from Tehri HPP, Koteswar HEP, Dhukwan SHEP, Patan wind powerplant, Dwarka wind power plant and Kasargod Solar Power plant with total installed capacity of 1587 MW.

During the year 2020-21 THDCIL has generated 4565.38 MU and THDCIL generated total 3570 MU energy upto Dec-21 during current year 2021-22.



50 MW Kasargod Solar Power Project (Kerala) was dedicated to the Nation by the Hon'ble Prime Minister on 19.02.2021.



FINANCIAL PERFORMANCE

The total Revenue of THDCIL during the Financial Year 2020-21 is Rs.2501.93 Cr. THDCIL has earned a total comprehensive income of Rs.1092.72 Cr. during the Financial Year 2020-21. The Net Worth of the company as on 31st March 2021 is Rs.9917.43 Cr.as against Rs.9532.47 Cr. as on 31st March 2020.

COMMERCIAL PERFORMANCE

A revenue of approx. Rs. 2142 Cr. (92.51%) has been realized from the beneficiaries in the financial year 2021-22 till 31st Dec-21 against the energy sales of Rs. 2317.15 Cr. during the corresponding period.

Hearings for the Petition No. 98/GT/2020 for determination of Truing-up tariff for the period 2014-19 and Petition No. 97/GT/2020 for determination of tariff for the period 2019-24, for Tehri HPP (1000MW) have been completed and tariff orders have been reserved by Hon'ble CERC which are likely to be issued soon.

Hon'ble CERC has issued order on 23.10.2021 in Petition No. 347/MP/2020 for claiming additional O&M expenses on account of pay revision for Tehri HPP (1000MW) and an amount of Rs. 90.19 Cr. has been allowed.

Hearings for the Petition No. 245/GT/2020 for determination of Truing-up tariff for the period 2014-19, Petition No. 244/GT/2020 for determination of tariff for the period 2019-24 and Petition No. 341/MP/2020 for additional O&M expenses on account of pay revision, for Koteswar HEP (400 MW) have been scheduled on 25.01.2022 by Hon'ble CERC.

Long Term Access (LTA) for VPHEP (444 MW) has been granted by CTU on 17.03.2021. Signing of the LTA Agreement by beneficiary Discoms with CTU and PTCUL has been initiated by CTU.

THDCIL has filed reply in the matter of claim filed by PGCIL for transmission charges from COD of Transmission System associated with Tehri PSP (1000 MW) to 31.03.2024 for mismatching of COD Generating Station i.e. Tehri PSP (1000 MW) and Transmission System.

PROGRESS OF ONGOING PROJECTS

Tehri Pump Storage Plant (PSP) (4X250 MW)

Based on the principle of recycling of water, 4 reversible Turbines of 250 MW each will convert the off-peak energy to peak Energy. Consuming Energy of the order of 1651.66 MU have the capacity for pumping operation during off-peak hours, it will generate additional peaking power of 1321.82 MU by working in Turbine Mode during Peak hours.

Erection of EM equipment in Machine Hall for all 4 Units is in progress in full swing. Assembly of Stators of Unit-5 & Unit-6 has been completed and assembly of Rotors of Unit-5 and Unit-6 is under progress. Testing and pre-commissioning activities of all 04 Generator Step Up (GSU) Transformers has already been completed and erection work of GIS-GIB is also complete. Construction of Control room is in advance stage.

In HM works, fabrication of all Penstock steel liners is complete. Supply of almost 99% EM equipment has reached site.

Expenditure incurred on Tehri PSP Project till Dec-21 is Rs. 4374.67 Cr against the approved RCE-II of Rs 4825.60 Cr at Feb'2019 PL.

The 1st Unit of the Project is expected to be commissioned by Dec'22

Vishnugad Pipalkoti HEP (4X111 MW)

Vishnugad Pipalkoti HEP is a run-of-the-river scheme on river Alaknanda in district Chamoli, Uttarakhand.

On completion, the project will make a power capacity addition of 444 MW to the Northern Region. Annual Design Energy of the project is 1657 MU (with 95% machine availability).

Crowns of Machine Hall and Transformer Hall have been stabilized with steel rib supports and benching has commenced. Dam excavation 44% completed. Heading of all 3 De-silting Chambers has been completed and benching 69% completed. Heading of HRT by DBM - 94% completed. TBM has been commissioned. Issue of RBM zone in TBM path which hampered TBM operation is being addressed and TBM operations are expected to resume shortly. Work in TRT and TRT outlet area is also in progress in full swing. Supply of EM equipment amounting to Rs. 169.37 Cr. (47.5%) has been completed.

The expenditure incurred on VPHEP project till Dec-21 is Rs. 2356.88 against the approved RCE of Rs 3860.35 Cr at Feb'2019 PL.

The 1st Unit of the Project is expected to be commissioned by June'24.

Khurja STPP (2X660 MW)

Different Work packages viz. 'Steam Generator', 'Turbine Generator', 'Switchyard', 'Cooling Towers', 'Coal, Limestone & Gypsum Handling Plant', 'CW System Equipment', 'CW System Civil Works', 'Water Treatment Plant' and 'Railway Sidings', worth Rs. 7,486 Cr. have already been awarded and work is in progress in full swing at Site. Price bids of 'Ash Dyke Package' have been opened and award is expected shortly.

Erection of Boiler Unit#1 and Boiler Unit# 2 is in progress. Ceiling Girder Jack up of Boiler Unit-1 is planned to be completed in Jan-22. Casting of TG Deck of Unit#1 is planned in Jan-22. Shell erection of Chimney-1 is also expected to start from Feb-22.

The 1st Unit of the Project is expected to be commissioned by Feb-2024.

The expenditure incurred till Dec-21 on the Project is Rs. 3395.53 Cr against the approved cost of Rs. 11,089.42 Cr at Dec-17 PL.

Amelia Coal Mine

To meet fuel requirement of the Khurja STPP, Ministry of Coal, GoI has issued Allotment Order of Amelia Coal Mine to THDCIL on 17th Jan-17. Investment Approval for Amelia Coal Mine at an estimated cost of Rs. 1587.16 Cr. (Dec-17 PL) has been accorded on 7th Mar-19.

Revised Mining Plan (including Mine Closure Plan) for reduced PRC of 5.6 MTPA has been approved by MoC on 13.03.2020.

A total of 1412.37 Ha. land (337.35 Ha Private/ tenancy land, 178.13 Ha leasehold Revenue land, 53.13 Ha Revenue land for R&R site and 843.76 Ha. Forest land) for Amelia Coal Mine is under different stages of acquisition.

All major clearances have been accorded in FY 2021-22 viz. Grant of transfer of Environment Clearance on 03.08.21, Grant of Mining Lease of Amelia Coal Block on 16.08.21, Consent to Establish on 14.10.21, Possession of 178.13 Ha Revenue land in coal mine area, Possession of Govt. Land (14.29 Ha) and Private Land (11.54 Ha) for Coal Evacuation Corridor and Railway Siding.

Award of MDO is expected by Jan-22. Opening of Amelia Coal Mine is anticipated by Aug-22. The expenditure incurred till Dec-21 is Rs. 648.84 Cr.

Ultra Mega Renewable Energy Power Parks (UMREPPs – Through-JV)

Under the Ultra Mega Solar Power Scheme of Gol, MNRE has allotted THDCIL to develop UMREPPs through SPV/JVC mode of capacity 2000 MW in Uttar Pradesh and 1500 MW in Rajasthan.

- Joint Venture Company namely TUSCO Limited has been registered on 12th Sept'20 between 'THDCIL' and 'UPNEDA' (a PSU of Govt. of Uttar Pradesh) to develop 2000 MW UMREPPs as 600 MW Solar Park at District Jhansi, 600 MW Solar Park at District Lalitpur and 800 MW Solar Park at District Chittarkoot.
 - i. For setting up 600MW Solar Park in Jhansi district, acquisition of required 3000 acre land in process and approx 65% Lease agreements signed. DPR for Rs 431 Cr submitted to SECI and MNRE for approval. In-principle consent has been given by UPPCL for signing of PPA. Hon'ble Prime Minister has also laid down foundation stone of 600MW Solar Parks in Jhansi on 19.11.21.
 - ii. For setting up another 600MW Solar Park in Lalitpur district, acquisition of required 3000 acre land in process and approx 35% Lease agreements signed. DPR for Rs 371 Cr submitted to SECI and MNRE for approval.
 - iii. For setting up 800MW Solar Park in Chitrakoot district, 4000 acre land already identified and approx. 58% Consent Letter (EoI) obtained from Farmers. Signing of lease agreements is targeted by 31.03.2022.
- Recently, Govt. of Rajasthan in a meeting on 07.12.21 at Jaipur, has consented that around 5000 MW UMREPPs in Rajasthan in JV mode may be established by THDCIL. MoU to this effect is expected to be signed shortly.

OTHER PROJECTS:

• Uttarakhand

Bokang Bailing HEP (BBHEP) is on river Dhauliganga in district Pithoragarh (Uttarakhand) with a proposed installed capacity of 165 MW. DPR of the Project is currently under preparation.

• Maharashtra

THDCIL submitted DPR of Malshej Ghat PSS with enhanced installed capacity of 700 MW to GoMH on 16th Sept-10. EIA studies and draft EIA / EMP report stands completed long back.

GoMH constituted a committee of experts to formulate the draft policy for development of PSS in the state. First meeting with THDCIL was held on 15-12-2021 where in the discussions were held on various proposed models to GoMH.

• Arunachal Pradesh

MoP on 22.12.21 has directed THDCIL to pursue on 02 Hydro-Electric projects: Kalai-II (1200 MW) and Demwe-Lower (1750 MW) in Lohit Basin with the State of Arunachal Pradesh for carrying suitable analysis and preparation of evaluation report. THDCIL has initiated process to set up office in Arunachal Pradesh.

PROJECT IN OTHER COUNTRIES

• Bhutan

Under Indo-Bhutan co-operation in power sector development, THDCIL has updated DPR of Sankosh HEP (2585MW) and Bunakha HEP (180 MW) in Bhutan.

Presentation on final updated DPR of Sankosh HEP was made by THDCIL in the office of Commissioner, B&B Wing, Ministry of Water Resources, RD and GR at New Delhi on 17th Jul-17 for international clearance. The final updated DPR of Sankosh HEP, Bhutan stands submitted to MoWR and RGoB as per MoU on 11th Aug-17.

Discussions at various levels at MoP and MEA, Gol are being held for implementation of Sankosh HEP.

DPR for Bunakha HEP (180 MW) has been techno-economically concurred by CEA. Final DPR submitted to RGoB, has been approved by the Cabinet of RGoB on Feb-14. Bunakha HEP (180 MW) is proposed to be implemented in joint venture with PSU of Bhutan. Modalities for formation of JVC are being finalized.



Covid vaccination program for school students (15-18) age group by THDC India Limited



Aerial view of Bichom Dam of recently commissioned 600 MW Kameng Hydro Power Station, Arunachal Pradesh

CHAPTER 28

Damodar Valley Corporation (DVC)

INTRODUCTION:

Damodar Valley Corporation is the first multipurpose river valley project of independent India. DVC was conceived in line with the Tennessee Valley Authority (TVA) and came into existence on 7th July, 1948 by an Act of the Central Legislature keeping in view the integrated development of the Damodar Valley region in the States of Bihar (presently Jharkhand) and West Bengal.

DVC has been successful in providing its continued service to the nation by supplying reliable & quality power to its consumers in the valley area and to the various states across the country even during the trying time of the Covid pandemic. In consonance with its mandate, DVC strives to ensure the well-being and socio-economic development of the people of the Damodar Valley. DVC has extended support and assistance to the villages and the communities residing around DVC projects during the pandemic period.

INSTALLED CAPACITY:

The thermal power generation capacity of DVC at present is 6750 MW & Hydel Power Generation Capacity is 147.2 MW as below: -

Power Station	Jharkhand	West Bengal	Total
Hydel	Panchet: 80 MW (2x40 MW)	Maithon: 63.2 MW (2x20 MW, 1x23.2 MW)	147.2 MW
	Tilaiya: 4 MW (2x2 MW)		
Thermal	Bokaro: 500 MW (1x210 MW, 1x500 MW)	Durgapur: 210 MW (1x210MW)	6750 MW
	Chandrapura: 500 MW (2x250MW)	Durgapur Steel: 1000 MW (2x500MW)	
	Koderma: 1000 MW (2x500MW)	Mejia: 2340 MW (4x210MW, 2x250MW, 2x500MW)	
		Raghunathpur: 1200 MW (2x600MW)	
Total Capacity			6897.2 MW

GENERATION & POWER SUPPLY POSITION:

Performance of Thermal Units (6750 MW) & Hydel Units (147.2 MW):

DVC Units	FY 2020-21 (Apr'20 to Mar'21)	FY 21-22		FY 21-22	
		FY 2020-21 (till Dec'21)	Expected (Jan'22- Mar'22)	CEA Target	Expected (Apr'21- Mar'22)
Thermal Generation (MU)	38039	29718	10782	38625	40500
Hydel Generation (MU)	376.81	434.72	45	215	479.72
Thermal PLF (%)	62.39	66.71	73.95	65.32	68.49

NOTABLE MAJOR ACHIEVEMENTS:

Financial/Commercial:

- Recorded a profit of Rs. 302 Crore in FY 20-21.
- Reduction of annual interest to the tune of Rs 164 Crore by refinancing and swapping of existing loans.

Operational:

- Highest ever Generation of 38.42 Billion Units in FY 20-21. DVC is on the way to surpass the above and record generation to the tune of 41 Billion Units in FY 21-22. Achieved Declared Capacity of 82.82% (till December) in FY 21-22. Achieved thermal PLF (%) of 66.71 % in FY 2021-22 (till Dec'21) whereas all India thermal PLF (%) is 57.16 % during the same period.

DVC will also achieve highest ever Hydel Generation (expected 480 MU) in this financial year.

- DVC TPSs have ranked several times amongst the top 10 (in terms of PLF) central sector generating stations
- Highest ever T&D System Availability of 99.78 % during the period of April 21 to December 21.

Fuel Management:

- Achieved more than 100 % coal materialization in FY 2020-21 and FY 21-22 (till December).
- Procurement of 245 coal rakes in FY 2021-22 (till December 2021) through special forward e-auction.



- Till Dec'21 DVC has liquidated clear coal dues to the tune of Rs.3268 Cr. in addition to regular payment of monthly bills.

Capex:

- DVC has achieved 69 % (equivalent to Rs. 1971 Crore) of Capex target (FY 21-22) up to December 2021.

NHP Project

- Ranked First for two consecutive months (Nov & Dec 2021) amongst all Implementing agencies under State category towards implementation of work under NHP project.

CAPACITY ADDITION PROGRAMME AND ACHIEVEMENTS:

- **Capacity Addition:** No thermal & hydel capacity addition in FY 2021-22 till December 2021.
- **Raghunathpur TPS Ph-II:** DVC Board accorded 'In-principle' approval for revival of RTPS Phase-II (2x660 MW) based on emerging demand scenario both in valley area and in the country as a whole. MOP, GOI has also given consent for the project.
- **Pump Storage Hydro generating station of 1500 MW capacity at Lugu Pahar:** Pump Storage Project (PSP) of around 1500 MW is being planned at Lugu Pahar in Jharkhand on the Bokaro River which will serve as an important project for energy storage. DVC has engaged M/s WAPCOS on 22nd February 2021 as consultant for preparation of DPR. They are presently carrying out Topographical survey and Hydrological study. Completion of DPR within 24 months of LOA.
- **Floating Solar at DVC reservoirs:** DVC has contemplated to set up 2000 MW (approx.) Floating Solar PV Project at reservoirs of four DVC Dams (Maithon, Panchet, Tilaiya & Konar) and Ground mounted Solar under UMREPP & CPSU Schemes of MNRE, GOI. JV agreement (between DVC & NTPC) for the above project is under process of approval.
- **Rooftop Solar:** Rooftop Solar Projects of 3.83 MWp cumulative capacity has been set up in RESCO mode at DVC TPSs (Koderma TPS, Raghunathpur TPS, Durgapur Steel TPS & Mejia TPS) and Maithon project under a SECI scheme.
- **MOU between DVC & SJVN Ltd.:** DVC has signed an MOU with SJVN on 23.12.2021 for formation of JV company to set up Renewable energy projects within command area of the respective organisations and on pan-India basis.

ONGOING BALANCE WORK IN DVC TPSs:

1. **Main Coal Handling Package of Bokaro-A TPS (500 MW):** Transportation of coal through rail has started from 19.01.2022. Commissioning of Main Coal Handling Package is expected to be completed by January '22.
2. **Balance Ash pond at Koderma TPS (2x500 MW):** After resolving all local issues, civil work for balance Ash pond has commenced from August '21 by the vendor, engaged through fresh order at the cost of BHEL. Work is on progress and expected completion by January '23.

TRANSMISSION & DISTRIBUTION (T&D) SYSTEM:

T&D network of DVC is spread over Damodar Valley command area and beyond. It comprises of 35 nos. of EHV Sub-stations, 13 nos. of 33 kV Receiving Sub-stations and 12 nos. Switchyards at the Generating Stations. These are connected through 6418 Circuit KM of EHV transmission lines and 11249 MVA of EHV transformers at various voltage levels and 1506 Circuit KM of 33 KV lines for distribution of power.

DVC supplies power to various Firm Consumers and to Jharkhand Bijli Vitran Nigam Ltd. (JBVNL). DVC supplies power to Tata Steel Ltd (TSL) and Railway in open access mode. It also transmits power to various interstate beneficiaries as well as to Bangladesh.

To maintain steady and reliable power supply, construction of 731 Circuit KM of 220 KV line is in progress, out of which 95 CKM Single Circuit Ramgarh-Ranchi line has been commissioned and the rest is likely to be completed by March'22. One 220 kV GIS at Burdwan has been commissioned on 20.09.2021. Further, renovation and augmentation of age old control and protection system including related infrastructure of 10 nos. 220 kV substations utilising Power System Development Fund (PSDF) is on the verge of completion (out of which 08 nos. completed by 31.12.21 and the rest 02 nos. will be completed shortly). Replacement of conductors of old Extra High Voltage (EHV) transmission lines with HTLS and upgradation of further transformation capacity at substations have been taken up to enhance the system stability as well as to take care of growth in power demand. Transformation capacity of 554.5 MVA has already been added from April – December'2021 and another 180 MVA is likely to be added by March'22.

To strengthen the existing network further, steps like setting up of 220 kV substation at Burdwan, addition of 220/33 kV infrastructure at Kalyaneswari substation & CTPS Switchyard and extension of 132 KV system at Jamuria substation have been taken up.

To strengthen the existing network further, steps like addition of 220/33 kV infrastructure at CTPS Switchyard and extension of 132 KV system at Jamuria S/s have been completed and construction of 220/33 KV infrastructure at Kalyaneswari S/s is likely to be completed by March'22

Overall loss in the T&D System including Generating Stations stands at 1.92 % during the year (up to Dec-21). For proper accounting of T&D system loss and taking remedial measures thereof, DVC is in the process of implementation of 'System Energy Monitoring and Accounting (SEMA)' project covering the entire DVC Grid in three stages (02 nos. stages have been completed)

During the year, DVC has added 19 new consumers and registered an internal load growth of 86 MVA. 6 nos. Consumers with CD 22.75 MVA are likely to be added in DVC T&D system by end of this FY.

Relay & Instrument Testing Laboratory:

DVC's Relay & Instrument Testing Laboratory under Central Testing Circle (CTC), Maithon is one of its kind in the Eastern region having testing facilities for Relays and Instruments as well as all major electrical equipment & switchgear. Its meter testing cell is NABL accredited in accordance with the international standard ISO/IEC

17025:2017. It provides testing and commissioning services across DVC establishments and to various other industries/utilities in the region as well.

Communication System:

To utilise OPGW fibres to its full capacity, DVC has started protection of HT Lines through fibre by installing Digital Tele Protection Coupler in some of the strategic Lines. Now DVC is moving towards replacing all Protection Couplers through PLCC by Digital one using OPGW.

A separate network is being set up by using different pairs of fibre and installing switches/routers at all locations for IT. It will comply the requirement of cyber security by making IT and OT on two different networks on fibre level.

STATUS OF POWER SECTOR REFORMS

Following reform measures have been undertaken:

- Installation of FGD in DVC TPSs for compliance of New Environmental Norms for TPSs in order to comply with MoEF & CC guidelines issued on 07.12.2015 for mitigating pollution from DVC TPSs.
- Rationalisation of sources of coal for optimisation of transportation cost & better coal materialisation in DVC TPSs as per directives of IMTF.
- 3rd party sampling at loading & unloading end to address quality issues of the coal supplied to power plant.
- Flexibility in utilization of domestic coal for better utilization of FSA coal & increase in availability of coal to generating units to reduce cost of Power.
- Implementing Shakti Scheme for power Sector by signing of agreement with CIL subsidiaries.
- Implementing Policy of Biomass utilisation for power generation through Co-firing with coal to reduce carbon footprint in environment and to reduce coal consumption in power plants.
- Undergoing process for Renovation, Modernization and uprating of DVC Hydel Power Projects.
- Providing Flexibility in Bank Guarantees to provide relief to contractors.

DAM REHABILITATION & IMPROVEMENT PROJECT (DRIP):

- DVC has been a part of DRIP, a World Bank assisted project under the aegis of CWC, MoWR with an objective to improve safety and operational performance of selected dams, along with institutional strengthening. Rehabilitation work under DRIP for Konar, Maithon & Panchet Dams of DVC have been completed on 29.06.2020.
- DVC has further joined DRIP-Phase-II & III for the repair & rehabilitation activities of Tilaiya dam, Bokaro Barrage, Chandrapura weir and balance activities of Maithon, Panchet & Konar dams at a tentative cost of Rs. 145 Crore. The project duration is 10 years from April 2021 to March-2031.

NATIONAL HYDROLOGY PROJECT (NHP):

- DVC was included in the NHP, funded by World Bank, under the aegis of MoWR. Work is under progress. Tenure of the project is 8 years i.e. up to 2023-24. The project is aimed at strengthening Hydrological information system with a view to develop a Web based Flood Forecasting System, Real Time Data Acquisition System (RTDAS) & Real Time Decision Support System (RTDSS).

CONTRACT MANAGEMENT/ 'ATMANIRBHAR BHARAT':

- Public Procurement (Preference to Make in India), Order, 2017 along with all the revisions till date, have been implemented in DVC.
- Procurement through GeM Portal: Materials available in GeM Portal are mandatorily procured from GeM on regular basis.
- Provision for Digital platform to promote transparency and ease of operation in procurement (Procurement of good/ services/work through GEM, CPP Portal, e-procurement with e-reverse auction).

24X7 POWER TO DVC CUSTOMERS:

- DVC supplies to 291 Nos. Firm Industrial consumers in Damodar Valley area having Contract Demand of 3183 MVA.
- DVC also supplies power to other DISCOMs i.e. PSPCL (Punjab), HPGCL (Haryana), ESCOMs of Karnataka (Karnataka), TPPDL, BYPL & BRPL (Delhi), TSL, JBVNL (Jharkhand), WBSEDCL (West Bengal) and MPPMCL (Madhya Pradesh) with a PPA (Power Purchase Agreement) quantum of 3265 MW.
- DVC supplies 300 MW RTC (Round The Clock) power to Bangladesh through NVVNL as per Long Term Contract valid up to May 2033.

CLEAN/RENEWABLE ENERGY DEVELOPMENT PROGRAMME:

- DVC intends to achieve an optimal energy mix of conventional and renewable power in line with the national target of 500 GW RE by 2030.
- DVC & EESL have also signed a MoU to develop a Strategic Partnership and collaborate in the area of Energy Audit, Energy Efficient Lighting, Renewable Energy, e-mobility, Smart metering etc. to promote De-Carbonization drive in DVC.

ENERGY CONSERVATION:

DVC has been making continuous efforts to induct modern practices in Energy Management System towards sustainable improvement in availability of power with lower consumption of coal, oil, water and auxiliary power along with improvement in efficiency & heat rate. The following practices are followed for efficient energy management in DVC power plants:

- Introduction of energy efficient equipment like Variable Frequency Drive (VFD) is under progress.
- CT Fans at MTPS U#1 to 4 are being replaced in phases with Energy-Efficient FRP blade assembly.
- Energy efficient coating on pump internals of CW pumps have been taken up for U#1 to 6 of MTPS.



- Timely replacement & servicing of BFP recirculation valves is carried out to save energy.
- Analysis of different efficiency parameters like Boiler Efficiency, Turbine cycle Heat Rate, HP Heater performance etc. are regularly carried out and deficit areas are addressed accordingly.
- Necessary measures are regularly taken for combustion optimization, improvement of condenser vacuum, reduction of unburnt carbon, reduction of air leakage from ducts & expansion joints in line with improved O&M practices to optimize system efficiency and Aux. Power Consumption.
- DVC has replaced existing tube lights /CFL with LED at different office buildings in different field formations.
- Energy Audits are carried out in DVC TPSs by External Agencies as per the guidelines of Bureau of Energy Efficiency (BEE). Recommendations are implemented accordingly. Energy Auditing have been completed in 4 DVC TPSs during Nov-Dec'21 and for the rest of the stations, Energy Audit is scheduled to be completed by Mar'22.

RENOVATION AND MODERNIZATION (R&M) OF POWER STATIONS:

- **Renovation, Modernization & Up gradation (RM&U) of Panchet Hydel U#1 (40 MW):** LOA has been placed on BHEL on 17.01.2022 for upgradation of the unit from 40 MW to 46 MW. Completion: 2 years from date of LOA.
- **Renovation, Modernization & Up gradation (RM&U) of Maithon Hydel U#1&3 (2X20 MW):** M/s MECON was engaged as consultant for RLA study, Preparation of DPR, Technical specification etc. RLA study of Unit #1 & 3 has been completed.

DPR was submitted to CEA on 10.02.21 for Techno-economic clearance which is under progress and expected vetting by CEA within Feb 2022.

POLLUTION CONTROL MEASURES & COMPLIANCE OF NEW ENVIRONMENTAL NORMS:

- **Flue Gas Desulphurization (FGD) & De-NOx System:**

In order to comply with new environment norms of MoEF & CC, DVC placed orders in July '19 for installation of FGD at different power generating units of DVC having capacity of 500 MW & above and also awarded for MTPS Unit#1-6 (4x210 MW+2x250 MW) in February '21. Contract for FGD at Chandrapura TPS (2x250 MW) is expected to be awarded by March '22. Commissioning of installation of FGDs at all 500 MW and above units is targeted by March '23 and MTPS U# 1-6 by November '23.

De-NOx system at MTPS Unit#8, KTPS Unit#1 & BTPS-A has been installed. Installation at balance units of 500 MW & above is targeted by December22 in phases as per available overhauling schedule of the units. Also, contract for De-NOx system for MTPS Unit#4, 5&6 (210 MW+2x250 MW) and CTPS Unit#7&8 (2x250 MW) has been awarded in Sept '20. Material supply has commenced and De-NOx will be

commissioned in phases as per available overhauling schedule of the units.

- **ESP augmentation of Mejia Unit # 1 to 3 (3X210 MW):**

NTPC was engaged as consultant for preparation of DPR and tender documents. Accordingly, tender had been floated. But, it had to be cancelled due to high price of L1 bidder. After obtaining revised cost estimate from NTPC (Consultant), NIT (Re-tendering) issued on 30.12.2021. Expected awarding by March 2022.

- **Ash Utilization:**

DVC is putting more emphasis on utilization of Fly Ash. Dry Fly Ash (DFA) is sold to cement manufacturers and various traders. DFA is also supplied to brick and block manufacturers at free of cost as per MoEF & CC notification. DFA utilization from April 2021 to December2021 is 23.41LMT. Pond ash from DVC is utilized for filling of abandoned mines, low lying areas, construction of roads (mainly in NHAI projects) etc. in compliance of guidelines issued by MoEF & CC. The recent MoP guidelines regarding supply of fly ash to the end users by the power plants to increase fly ash utilization are being followed. DVC earned revenue of Rs.30.56 Crore (from April'2021 to December'2021) by selling 15.96 LMT of DFA. Ash utilization by DVC is 63.23 LMT i.e. 69.35 % of total ash produced (from April'2021 to December'2021).

- **Projection for January 2022 to March 2022:**

Approx. 31 LMT of ash (100% of total ash generated) will be utilized from January 2022 to March 2022. Revenue Generation of approx. Rs. 5.0 Cr. by selling approx.5.30 LMT of DFA is expected. DFA utilization of approx. 7.8 LMT from Jan'2022 to March'2022 is expected.

MINING ACTIVITIES:

Khagra Joydev Coal Mine:

Khagra Joydev coal mine, having mineable reserve of 103 million tonne and peak coal production capacity of 3 million tonnes annually, was allotted to end use projects Mejia TPS Unit # 7 & 8. Most of the statutory clearances have been received for the said mine. Process for acquisition of land is underway. M/s Khagra Joydev Resources Pvt. Ltd, a consortium of GDCL-AMPL-GCL, is the Mine developer cum Operator (MDO). Coal mining operation is expected to commence in FY 2022-23.

Tubed Coal Mine:

Tubed coal mine, having mineable reserve of 130 million tonne and peak coal production capacity of 6 million tonnes annually, has been allotted to end use projects Mejia TPS Unit # 7 & 8 and Chandrapura TPS Unit # 8. The land acquisition within coal block was done by the Govt. of India and vested to DVC under provisions of the CBA (A and D) Act 1957. Disbursement of compensation and taking over physical possession of the land is under process. Environmental Clearance, NOC for Ground Water extraction, Consent to Establish, Forest Clearance Stage-I have been received. Forest Clearance Stage-II is under process. M/s Develcto Mining Ltd, a Consortium of SICAL-AMPL-GCL, is the Mine Developer cum

Operator. Mining Operation is expected to commence in early FY 2022-23.

NON-POWER ACTIVITIES OF DVC:

Flood Control & Developmental activities in Water Resources Management:

Out of originally planned seven storage reservoirs in the Damodar Basin, construction of multi-purpose Dams at Tilaiya (1953), Konar (1955), Maithon (1957) and Panchet (1959) was completed in first stage. But designed storage levels could not be achieved due to constraints in acquiring required land for Maithon and Panchet reservoirs from the respective State Governments (Govt. of Jharkhand & West Bengal). In the first-phase, total flood reserve capacity planned was 1.51 million acre feet. But due to non-acquisition of land, flood reserve capacity achieved was only 1.047 million acre feet, which has further reduced to 0.95 million acre feet due to progressive siltation as per the latest capacity survey reports. However, even with partial implementation of the scheme, DVC, over the years, has been able to fulfil its primary objective of flood control in the lower valley to a great extent. Further, by judicious operation of reservoirs, all the committed requirements in Damodar Valley area like irrigation, municipal & industrial water supply are fully met, thus achieving efficient water resources management.

Flood Control:

During the year under consideration, average actual monsoon rainfall over Barakar and Damodar Catchments w.e.f June to October 2021 are 1114 mm and 1199 mm respectively against the normal rainfall of 1236 mm and 1067 mm respectively, the rainfall deficit being 9.91 % and -12.33 % respectively.

Water utilization for the period 1st January to 31st December 2021 & up to 31st March 2022 is given below in tabular form:

Year	Kharif		Rabi		Boro	
	Water Allocated (Lac Acre ft.)	Area Irrigated (Lac Acre)	Water Allocated (Th. Acre ft.)	Area Irrigated (Th. Acre)	Water Allocated (Th. Acre ft.)	Area Irrigated (Th. Acre)
1st Jan to 31st Dec' 21	10.00	8.22	70.00	52.00	391.00	127.00
Upto 31st Mar22	--	--	70.00	52.00	340.44	111.00

Municipal & Industrial (M&I) water supply:

DVC at present supplies water to about 162 agencies (89 nos. in State of Jharkhand and 73 nos. in West Bengal) for M&I purpose. Total allocated quantity for M&I uses in Jharkhand is 616.197 MCM/year (373.6793 MGD) and that in West Bengal is 688.218 MCM/year (417.3546 MGD). During the period of 1st January to 31st December 2021, there was no report from consumers regarding shortfall/scarcity of water.

Water Investigation and Developmental initiatives:

Status of a few projects taken up by DVC as a part of developmental activities in water resources sector are tabulated below:

SL.	Name of the Project	Status
1.	National Hydrology Project (NHP)	DVC was included in the NHP which is grant-in-aid project (for an amount of Rs. 45 Crore which is revised to 39.89 crore) funded by the World Bank, under the aegis of Dept. of Water Resources, River Development & Ganga Rejuvenation (WR, RD & GR). Work as per the Annual Work Plan approved by Department of WR, RD & GR is under progress. Tenure of the project is 8 years i.e. up to 2023-24.

Flood warning from Maithon and Panchet Dam were issued from time to time on receipt of the messages from the Member Secretary, DVRRRC (Damodar Valley Reservoir Regulation Committee) and flood release advices were implemented as per the guidelines stipulated in the Modified Flood Warning Memorandum issued by DVC in the year 2021. Flood warnings were also made available in DVC's website for general information to the public at large.

This year, flood has been received & major releases have been made from DVC dams. Maximum 1,50,000 cusecs (combined) of water was discharged on 01.10.2021.

The reservoir level attained at Maithon & Panchet Dam at the end of the monsoon i.e. on 01.11.2021 was more than the conservation level and were RL. 484.45 ft (147.66 m) & 417.91 ft. (127.38 m) respectively. No major flood release was required from Tilaiya and Konar reservoirs during this monsoon period.

Irrigation water supply:

Operation and maintenance of Durgapur Barrage and Irrigation System was transferred to Govt. of West Bengal in the year 1964 on agency basis but, its ownership still rests with DVC. DVC releases water for irrigation from Maithon & Panchet reservoirs as per the advice of Member Secretary, Damodar Valley Reservoir Regulation Committee based on the indents placed by Govt. of West Bengal for Kharif and Rabi cultivation in the Lower Valley.

However, this year surplus water is available in reservoirs to around 364.11 Th. Ac. ft. out of which 340.44 Th. Ac. ft. has been made available for utilization in Boro irrigation in the state of West Bengal. Rest of the water has been kept for emergency Hydel generation.



		Major works under progress in NHP are: - Supply, installation, testing, commissioning and maintenance of Real Time Data Acquisition System (RTDAS) of DVC: Instruments installation & commissioning for all 83 nos. sites has been completed on 31.01.2021 and the system is operational from 01.02.2021. - Consultancy services for developing flood forecasting & inundation model from 12 km downstream from Durgapur Barrage to Amta (outfall of Damodar River): LOA issued on 21.12.2020 and work to be completed by July'22. - Sedimentation Survey for DVC Reservoirs: Work completed. - Procurement of Automated Pipe Flow Measurement sensors for drinking /industrial water supply: Work Order issued and the work is in progress. Delivery date of Flowmeter: 10.02.2022. Installation completion date 30.12.2022. - Procurement of Automated Pipe Flow Measurement sensors for drinking /industrial water supply (Package-2): Tender to be finalized by 31.03.2022. - Procurement of water quality lab equipments: Tender to be finalized by 31.03.2022. - Total fund released up to 20.01.2022- Rs. 19.43 Cr. & Total expenditure up to 20.01.2022- Rs. 11.87 Cr.
2.	Construction of Balpahari Dam over Barakar river in Damodar Valley area	- DPR of Balpahari Dam was prepared by DVC in the year 2012. The DPR was circulated by DVC to all stakeholders. - GoWB requested DVC for multi-reservoir simulation study of reservoir in Damodar Barakar Basin in proposed Balpahari Reservoir. - The study was completed by DVC in April, 2017 in consultation with Basin Planning and Management, Organization (BPMO), CWC, New Delhi and draft report of the study was submitted to all stakeholders (CWC, GoJ & GoWB) in July, 2017 for their comments. - In 144th meeting of Damodar Valley Reservoir Regulation Committee (DVRRC) held on 15.12.2021, representative of GoJ informed that there is no comment on revised multi-reservoir simulation study of Balpahari Dam and this study should go on. CWC vide its letter dated 10.01.2022 asked for some data for multi-reservoir simulation study for DVC system. DVC has shared the data with CWC for simulation study. - Construction of the proposed Balpahari Dam to be considered only if technical/ financial/administrative aspects related to all the stakeholders are finalised.

ECO-CONSERVATION, AFFORESTATION & SOIL CONSERVATION

Annual Progress Report

Sl. No.	Evaluation Criteria	Unit	Annual Target	Actual Performance						
			Excellent	Q1 of 21-22 (Apr'21-Jun'21)	Q2 of 21-22 (Jul'21-Sep'22)	Q3 of 21-22 (Oct21-Dec22)	Accumulative Achievement	Expected Achievement (Jan, 22 to Mar, 22)	Expected Annual Achievement	Remarks
01	Fisheries									
i)	Spawn production at Maithon	Lakhs	700	53.2	646.45	0.35	700	Already Achieved	700	
ii)	Fingerlings production	Lakhs	40	Nil	35	Nil	35	Already Achieved	40	

iii)	Pisciculture in water bodies	Nos.	20	Nil	11	9	20	Already Achieved	20	
iv)	Distribution of spawn/fingerlings to the villagers as CSR activity	Nos.	1200	Nil	1104	97	1201	Already Achieved	1201	
02 Soil Conservation										
i)	Renovation of water bodies	Nos.	120	Nil	Nil	Nil	00	120	120	Administrative approval awaited
ii)	Construction of WHS	Nos.	35	Nil	Nil	Nil	00	35	35	- do -
iii)	Turfing Work of the Water Harvesting Structures	Nos.	155	Nil	158	Nil	158	Already Achieved	158	
iv)	Hydrological and sediment monitoring stations. (No.)	HMS	5	Nil	5	Nil	5	Already Achieved	5	
v)	Soil testing of farm land with fertilizer recommendation	No. of samples	1600	270	482	515	1267	333	1600	
vi)	Soil testing of farm land with fertilizer recommendation	Area in Acr.	487	487	487	487	487	Already Achieved	487	Maintenance Work

Areas of Operation for Soil & Conversation works:

Jharkhand	Hazaribagh, Chatra, Giridih, Dhanbad, Bokaro, Jamtara, Koderma, Ramgarh & Deoghar districts
West Bengal	Purulia district

The Department has already achieved total Annual Target of Pisciculture Scheme. The target of Soil Testing and Analysis has been achieved upto 80% and remaining 20% works will be completed by the end of the financial year. The maintenance work of Afforestation Scheme is on schedule.

The turfing work of 158 nos. of Old Renovated Water Bodies and New Water Harvesting Structures were completed during the Monsoon period. During the current financial year DVC's target was to construct 120 nos. of Old Renovated Water Bodies and 35 nos. of New Rain Water Harvesting Structures, which is expected to be achieved by 31st March' 2022

CORPORATE SOCIAL RESPONSIBILITY OF DVC

Provision of DVC Act 1948: "The promotion of public health and the agricultural, industrial, economic and general well-being in the Damodar valley and its area of operation"

DVC formally launched its CSR programme during the year 1981-82. The primary objective of CSR is socio-economic upliftment of the community residing within 10 km radius of its major projects. The CSR wing presently operates in 629 villages (West Bengal: 297 villages & Jharkhand: 332 villages) covering 7 districts.

The above programme is mainly divided into two types of activities.

First, which addressing the issues of social & economic development of the rural communities. These activities are sustainable and continuous in nature. Under this activity different areas which are covered includes:

Promotion of Primary and Non Formal Education - Augmenting school infrastructure and addressing the health & hygiene issues of school children.	Primary Health, Health awareness & Family Welfare - Immunization programme, awareness camps on various water and vector borne & communicable diseases and family welfare and Eye operation camps.
Vocational Training and Self-Employment - Imparting scientific training to rural youth on Computer operation, Plumbing, Electrical wiring etc.	Development of Agricultural & Non-Farming Activities - Scientific training is provided on agriculture and allied activities).
Sports, Entertainment and Cultural Activities.	Social Forestry and Fisheries (Distribution of seedlings, Farm Forestry and cage culture on fisheries.).
Rural Sanitation - Sanitation programme under "Swachh Bharat" mission, mass construction of Toilet in the rural area.	



The second is infra-structure development programme under which CSR takes up different activities for augmentation of rural infrastructure. Under this programme different rural infrastructure development works like construction of roads, school buildings, community centres, health centres, irrigation structures, water harvesting structure excavation and renovation, installation and renovation of tube wells and construction of drinking water wells, tube wells are taken up. Supply of drinking water through tankers during summers is often done in areas in the vicinity of the project.

To fight against the COVID-19 pandemic, DVC had taken several steps such as distribution of masks, sanitizers, soap, hand gloves, food packets and ration to the poor people residing adjacent to the project areas. Public Buildings in the vicinity of the projects like Banks, Post Offices, Market area etc. were sanitized by spraying Chemicals while Bleaching Powder was spread near water wells, drains and roadside as disinfectant. Some DVC hospitals and guest houses of DVC were made Quarantine Centres.

Out of the allocated fund, expenditure of Rs 359.84 lakhs was made towards Socio Economic development programme and Rs. 177.13 lakhs were made towards Infrastructure development programme respectively during 2021-22, till December 2021. The other programmes are under progress and the rest amount will be utilised by the end of the financial year.

Achievement by CSR wing of DVC for the year 2021-22

Sl No.	Name of activity/works	2021-22	
		01.04.2021 to 31.12.2021	01.01.2022 to 31.03.2022 (Anticipated)
1	Construction of toilets in nos.	181	137
2	No of Patients treated through MMU & Homoeo Centre	31048	9625
3	No of Health Camp organized	34	18
4	No of beneficiaries of Health Camp	5608	7600
5	No of beneficiaries of training through DVC ITI	258	252
6	No of IGP Training conducted	9	10
7	No of beneficiaries of IGP Training	543	251
8	No of Saplings distribution under social forestry	9629	532
9	No of sports activity	36	13
10.	Beneficiaries of sport activities(nos.)	10808	5000
11	No of fingerlings/spawn distribution (lakh)	11470000	0
12	Training on agriculture extension (nos.)	2	103
13	Establishment of dedicated Covid health care through Dist. Administration(no.)	1	0
14.	Provision of ambulance for Covid care health(no.)	1	0
15	Distribution of face mask, sanitizer , face shield soap(no of villages)	70	0
16	Financial Assistance to District Administration for Covid 19 care (Rs. In Lakhs)	74.87	0
17	Oxygen Concentrator provided to Dist. Administration(nos.)	25	0
18	Installation of water purifier 120 lit/80 lit (no. of schools)	2	0
19	Distribution of LEB Bulb in schools under AKAM (nos.)	250	0
20	Installation of wells in nos.	0	0
21	Installation of Hand pump in nos.	29	23
22	Installation/Renovation of solar pump with overhead tank and tap water in villages (nos.)	9	1
23	Length of village road constructed (PCC+ WBM)(meter)	5352	3445
24	No. of school Boundary wall	7	1
25	Length of boundary walls constructed (meter)	1155	60
26	No of Sheds/ Ghats/Chabutra	231	11
27	Renovation/ Installation of High Mast light /solar street light (Nos.)	20	4
28	Total Expenditure till December 2021(Rs. In Lakhs)	536.97	

E-GOVERNANCE/ INFORMATION TECHNOLOGY (IT) INITIATIVES:

- Platform to Work from Home (WFH) has been widened by increasing the numbers of secure networks so that more and more employees can work from home during pandemic.
- e-Office from NIC is under implementation and will be fully operational by February 2022.
- KPMG has been engaged as consultant for implementation of ERP. DPR is under preparation by KPMG. ERP implementation will help in integration of all business processes of the organization.



Receipt of Rajbhasha Kirti Puraskar by Chairman DVC for the year 2019-20 & 2020-21 from the Hon'ble Minister of Home Affairs on 14.09.2021

CHAPTER 29

BHAKRA BEAS MANAGEMENT BOARD

Bhakra Management Board (BMB) was constituted under Section 79 of the Punjab Re-Organization Act, 1966 for the administration, maintenance and operation of Bhakra Nangal Project with effect from 1st October, 1967. The Beas Project Works, on completion, were transferred by the Government of India from Beas Construction Board (BCB) to BMB as per Section 80 of the Act and Bhakra Management Board was renamed as Bhakra Beas Management Board (BBMB) with effect from 15.5.1976.

FUNCTIONS

Bhakra Beas Management Board is responsible for the administration, operation & maintenance of Bhakra Nangal Project, Beas Satluj Link Project & Beas Dam including Power Houses and a network of transmission lines & grid sub-stations. The functions of Bhakra Beas Management Board are:

- Administration, Operation & Maintenance of Bhakra-Beas Projects.
- The regulation of the supply of water from Bhakra-Beas Projects to the States of Punjab, Haryana and Rajasthan.
- The regulation of the supply of power generated at Bhakra-Beas Projects.
- Any other function as the Central Government may assign after consultation with the Governments of States of Haryana, Punjab & Rajasthan.
- The Govt. of India in the year 1999 has entrusted additional functions of providing & performing engineering and related technical consultancy services in field of Hydro Electric Projects & Irrigation Projects.
- Ministry of Power has assigned the work of construction and execution of 2X20 MW Baggi Power House to BBMB vide letter No.5-4/1/2019-BBMB dated 22nd October, 2019.

The works being managed by BBMB are broadly grouped as three large multipurpose projects viz. Bhakra Nangal Project, Beas Project Unit-I (BSL Project) and Beas Project Unit-II (Beas Dam).

The Bhakra Nangal project comprises the Bhakra Dam, Bhakra Left Bank & Bhakra Right Bank Power Houses, Nangal Dam, Nangal Hydel Channel, Ganguwal & Kotla Power Houses and associated transmission system. Bhakra Dam, the majestic monument across the river Satluj, is a high straight gravity concrete Dam rising 225.55 metres above the deepest foundation and spanning the gorge over 518.16 metre length at the top. The Gobind Sagar Lake created by the Dam has 168.35 square kilometer area and a gross storage capacity of 9621 million cubic metres. The two power houses, one on the Left Bank and the other on the Right Bank, have a combined installed capacity of 1397 MW. The Ganguwal and Kotla Power Houses fed from Nangal Hydel Channel have an installed capacity of 153.73 MW. The Beas Project Unit – I (BSL Project) diverts Beas Water into the Satluj Basin, rushing from a height of 320 metres and generating power at Dehar Power House having an installed capacity of 990 MW. This project comprises a diversion

dam at Pandoh, 13.1 Km long Pandoh-Baggi Tunnel, 11.8 Km long Sundernagar Hydel Channel, Balancing Reservoir at Sundernagar, 12.35 Km long Sundernagar-Satluj Tunnel, 125 metre High Surge Shaft and 990 MW Dehar Power House. The Beas Dam at Pong is earth-fill (earth core, gravel shell) dam 132.6 metre high with a gross storage capacity of 8579 million cubic metres. The 396 MW Pong Power House is located in the stilling basin downstream of penstock tunnels.

The total installed generating capacity of the BBMB Power Houses is 2936.73 MW as detailed below:-

Power House	Installed Capacity	Mega Watt
Bhakra (Right Bank)	5x157	785
Bhakra (Left Bank)	4x126+1x108	612
Ganguwal	1x27.99+2x24.20	76.39
Kotla	1x28.94+2x24.20	77.34
Dehar	6x165	990
Pong	6x66	396

Total installed capacity of Roof Top Solar in BBMB is as under:-

Jalandhar	125 kWp
Jamalpur	130 kWp
Narela	20 kWp
Delhi	80 kWp
Chandigarh	175 kWp
Ganguwal	100 kWp
Nangal	950 kWp
Talwara	790 kWp
Sangrur	60 kWp
Panipat	285.19 kWp
Kurukshetra	113.93 kWp
Bhiwani	283.24 kWp
Jagadhri	70 kWp
Hissar	49.5 kWp
Dhulkot	94.13 kWp
Samayapur	49.91 kWp
Total	3375.9 kWp

GENERATION AND TRANSMISSION SYSTEM:

The generation during 2020-21 was 11482.051 Million Units against the target of 9600 Million Units. The generation of BBMB Power Houses has been more than the targets for the year by 19.60%. During the FY 2021-22 upto 31.12.2021 the generation from BBMB Power Houses has been 7951.501 Million Units against the target of 7970 Million Units.

The Powerhouse wise plant availability for the FY 2020-21 remained



as 99.38% for Bhakra Left Bank (excluding RMU), 99.83% for Bhakra Right Bank, 99.50% for Ganguwal, 99.35% for Kotla, 92.23% for Dehar and 99.11% for Pong. Overall plant availability remained as 97.04%.

The Powerhouse wise plant availability for the FY 2021-22 (Up to 31/12/2021) remained as 99.95% for Bhakra Left Bank (excluding RMU), 100% for Bhakra Right Bank, 98.63% for Ganguwal, 98.16% for Kotla, 99.84% for Dehar and 89.80% for Pong. Overall plant availability upto 31.12.2021 is 98.48%.

The Power generation at BBMB Power Houses is being evacuated through BBMB Power evacuation system running into 3704.71 Ckt.Km length of 400 KV, 220 kV, 132 kV and 66 kV transmission lines and 24 Sub-stations. The Bhakra Beas Management Board power evacuation system operates in an integrated manner in the Northern Grid with its transmission network spread over the States of Himachal Pradesh, Punjab, Haryana and Delhi. The system is interconnected with transmission system of PGCIL and the states of Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, Uttar Pradesh, Rajasthan, Chandigarh and Delhi. The availability of transmission system during the year 2020-21 remained as 99.47%, whereas the Availability of transmission system during 2021-22 upto 31.12.2021 is 99.77%.

The Power Generation from Roof Top Solar during the FY 2020-21 is 1901520.42 KWH (19.015 LU). The Power Generation from Roof Top Solar during the FY 2021-22 (up to 31/12/2021) is 2.235 MU.

IRRIGATION

At the time of partition of India, about 80% of the irrigated area of pre-partition Punjab went to Pakistan leaving India with very meager irrigation resources. The mighty Bhakra-Nangal and Beas Projects changed the scenario and turned Northern India into Granary of the Nation. The Bhakra Nangal and Beas Projects have not only brought Green Revolution in the States of Punjab, Haryana and Rajasthan, but also White Revolution by way of record production of milk. The States of Punjab, Haryana and Rajasthan are being supplied about 28 million acre feet of water every year.

RENOVATION, MODERNISATION AND UPRATING (RM& U) OF POWER HOUSES

To augment its installed capacity, BBMB has embarked upon the novel route of Renovation, Modernization and Up-rating (R,M &U) of its existing power houses. Presently, R, M&U of five no. hydro-generating units at Bhakra Left Bank Power House is under progress. 4 no. Units of Bhakra Left Bank Power Houses have already been uprated from 108MW to 126 MW each.

Bhakra Left Bank Power House Unit No.3 (4th Unit) has been commissioned on 09.12.2021 after its R,M&U from 108MW to 126 MW. As such installed capacity of BBMB has increased by 18 MW.

Bhakra Left Bank Power House Unit No.1 (5th Unit) has been taken for R,M&U on 15.12.2021.

AUTOMATION OF 220KV SUB STATION

BBMB has taken a significant step in automation of Substations in its Transmission System. Fully automated 220 kV Sub Station at Barnala with remote operation from 220 kV Sub Station at Sangrur (40 km from Barnala) has been commissioned recently at a cost of Rs. 1.7 Crore. The Sub Station is now unmanned with Control Room locked up and no staff is deployed in shift duty. The benefits

include reduced O&M cost, increased system reliability, reduced downtime, remote monitoring of operations etc.

After successful commissioning of substation automation at 220kV substation Barnala in the first phase and seeking above mentioned benefits, in the second phase work of providing SAS at 220kV Grid substations Hisar, Charkhi Dadri, Ballabgarh and Samaypur of BBMB alongwith their remote operation from 400kV grid substation, BBMB Bhiwani and SLDC complex, 66kV substation, BBMB Chandigarh has been taken in hand and Letter of Award 1826/P&D(TS)/SS-1/PNGS-748 dated 20.07.2020 placed upon M/s Siemens Ltd. For Rs.13 Crore. After conducting Factory Acceptance Test, material of SAS reached at all sites and work is under progress and likely to be completed by August,2022.

SOLAR POWER PLANTS

BBMB has commissioned 3375.9 KWp Rooftop solar power plants on 71 no. non-residential buildings/ Sub Stations. In addition to this, tendering process for installation of 18 MWp of Ground Mounted Solar Power Plants at different locations at Nangal & Talwara and 15 MWp floating Solar Power Plant at Nangal Reservoir are under execution.

NATIONAL HYDROLOGY PROJECT

Bhakra Beas Management Board (BBMB) has set up Earth Receiving Station (ERS) at Chandigarh for inflow flood forecasting (i.e. short term 3 days and medium term 7 to 10 days) for optimum utilization of Bhakra and Pong Reservoirs and Canal Network. BBMB has the 'first mover' in the country under the World Bank funded Hydrology Phase-II project.

Under this project, 87 no. Real Time Data Acquisition stations comprising Automatic Rain Gauge Stations, Automatic Full Climate Stations, Snow Water Equivalent, Water Level Recorders etc. and 10 No. Automatic Stage Recorder at Contact Points of Partner states have been installed in the catchment of River Sutlej and Beas by using state of the art technology. In addition to this 6 No. Meteorological stations have also been co-opted with IMD. The schematic arrangement of Real Time Decision Support System involves real time transmission of Hydro meteorological data through INSAT-3D at 1 hour interval to Earth Receiving Station at Chandigarh.

Real Time Data is processed using Rainfall Runoff Model, Hydro Dynamic Model, Flood Model and Water Allocation of MIKE software. The outcome/ scenario generation is further shared on NHP Dashboard.

MOWR, Govt. of India in association with World Bank has initiated, National Hydrology Project (NHP) in India to carry forward the work and objectives of Hydrology Project Phase-II under the NHP. To this effect, BBMB has been allocated Rs. 30.00 Crore for strengthening and expansion of existing Data Acquisition system (DAS), development of alternate models and technology enhancement along with capacity building in the organisation to achieve better results.

Under NHP, Tender for installation of 11 no. new Hydromet stations and upgradation of 10 no. old stations installed under HP-II has been allotted to prospective bidder.

The Annual Work Plan 2021-22 under NHP have already been approved by MoWR, Govt. of India.

CHAPTER 30

BUREAU OF ENERGY EFFICIENCY

The Government of India enacted the Energy Conservation Act (EC Act), 2001 and for implementing various provisions in the EC Act, Bureau of Energy Efficiency (BEE) was operationalised with effect from 1st March 2002. The EC Act provides a legal framework for energy efficiency initiatives in the country. The Act has mandatory and promotional initiatives which broadly relate to Designated Consumers, Standards & Labeling programme for equipment and appliances and Energy Conservation Building Codes (ECBC) for new commercial buildings and residential buildings. The Bureau is spearheading the task of improving the energy efficiency in various sectors of the economy through regulatory and promotional mechanism. Bureau of Energy Efficiency co-ordinates with designated consumers, designated agencies and other organizations recognizes, identifies and utilizes the existing resources and infrastructure, in performing the functions assigned to it under the EC Act.

Mission of BEE

The Mission of Bureau of Energy Efficiency (BEE) is to develop policy and strategies with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act (EC Act), 2001 with the primary objective of reducing energy intensity of the Indian economy. This will be achieved with active participation of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors.

Objectives and Strategies

The primary objective of BEE is to reduce energy intensity in the Indian economy. In order to translate the objectives into result-oriented action, the broad strategies of BEE include:

- To coordinate policies and programmes on efficient use of energy and its conservation with the involvement of stakeholders.
- To plan, manage and implement energy conservation programmes as envisaged in the EC Act.
- To assume leadership and provide policy framework and direction to national energy efficiency and conservation efforts and programmes.
- To demonstrate energy efficiency delivery mechanisms, as envisaged in the EC Act, through Private-Public Partnership (PPP).
- To establish systems and procedures to measure, monitor and verify energy efficiency results in individual sectors as well as at the national level.
- To leverage multi-lateral, bi-lateral and private sector support in implementation of programmes and projects on efficient use of energy and its conservation.
- To promote awareness of energy savings and energy conservation.

Functions of BEE

BEE co-ordinates with designated consumers, designated agencies and other organizations; recognizes, identifies and utilizes the existing resources and infrastructure, in performing the functions assigned to it under the EC Act. The EC Act provides for regulatory and promotional functions.

Regulatory functions

The major regulatory functions of BEE include:

- Develop minimum energy consumption standards and labeling for equipment and appliances.
- Develop specific energy conservation building codes (ECBC).
- Activities focusing on designated consumers:
 - Develop energy consumption norms.
 - Certify energy managers and energy auditors.
 - Accreditation of energy auditors.
 - Define the manner and periodicity of mandatory energy audits.
 - Develop reporting formats on energy consumption and action taken on the recommendations of the energy auditors.

Promotional functions

The major promotional functions of BEE include:

- Create awareness and disseminate information on energy efficiency and conservation.
- Arrange and organize training of personnel and specialists in the techniques for efficient use of energy and its conservation.
- Strengthen consultancy services.
- Promote research and development.
- Develop testing and certification procedures and promote testing facilities.
- Formulate and facilitate implementation of pilot projects and demonstration projects.
- Promote use of energy efficient processes, equipment, devices and systems.
- Take steps to encourage preferential treatment for use of energy efficient equipment or appliances.
- Promote innovative financing of energy efficiency projects.



- Give financial assistance to institutions for promoting efficient use of energy and its conservation.
- Prepare educational curriculum on efficient use of energy and its conservation.
- Implement international co-operation programmes relating to efficient use of energy and its conservation.

PROJECTS AND PROGRAMMES

Bureau of Energy Efficiency is implementing schemes / programmes for promoting Energy Efficiency in the country. This year various Energy Efficiency Initiatives have been Launched under the Bharat ka Azadi Ka Amrit Mahotsav. The details of schemes / programmes and other initiatives relating to Energy Conservation have been given in Chapter 12:

- National Level Painting Competition
- National Energy Conservation Award
- National Energy Efficiency Innovation Awards (NEEIA)
- Standards & Labelling
- Energy Conservation Building Code (ECBC)
- Enhancing energy efficiency in Industries – Implementation of Perform Achieve and Trade (PAT)
- Demand Side Management (DSM)
- Energy Efficiency in Small and Medium Enterprises (SMEs)
- Improving Energy Efficiency in Transport Sector
- Energy Accounting in DISCOMS
- Strengthening of State Designated Agencies (SDA) To Promote Efficient Use of Energy and its Conservation
- Financing Initiatives
- Revision of National Mission on Enhanced Energy Efficiency (NMEEE) – ROSHANEE.

CHAPTER 31

CENTRAL POWER RESEARCH INSTITUTE

BACK GROUND

The Central Power Research Institute (CPRI) established by the Government of India in 1960 was re-organised into an Autonomous Society in 1978 to function as a National Power Research Organization and to serve as a National Testing and Certification Authority for the purpose of certification of rating and performance to ensure availability of equipment of adequate quality for the use under conditions prevalent in Indian Power Systems. The affairs of the Society are managed by Governing Council with Secretary to the Government of India, Ministry of Power as its President. The Governing Council has representation from various Ministries of Government of India, Power Utilities, Manufacturers, Academic Institutions etc.

The Institute has its Head Office and major laboratories at Bengaluru. The Institute has its Units at Bhopal, Hyderabad, Koradi, Noida & Kolkata. Establishment of new unit at Nashik is under progress.

The core activities of the Institute are :

- Research & Development
- Testing & Certification
- Consultancy
- Customised Training Programmes
- Vendor Analysis
- Third Party Inspection Services

Accreditations:

- Accredited as per ISO/IEC 17025:2017
- Member of Short Circuit Testing Liaison (STL) Group
- Corporate Member in DLMS UA (Device Language Message Specification User Association) and UCA IUG (Utility Communication Architecture International User Group)
- ISO 9001:2015 Certification for Research and Consultancy activities
- Accredited by Intertek-ASTA, UK
- Accredited by INMETRO, Brazil for Distribution Transformers
- Association with Underwriters Laboratories (UL) for testing of LV equipment

Important Events:

- 1) Director General-CPRI attended the Meeting of Parliamentary Standing Committee on Energy (2020-21) – Examination of the Demands for Grants, held at Parliament House, New Delhi, on 22nd February 2021.
- 2) 85th meeting of CPRI Governing Council and 43rd meeting of CPRI Society held on 18th March 2021.

- 3) Director General-CPRI attended the meetings Chaired by Secretary (Power) held through Video Conference, to discuss "Hydrogen Economy in India", on 23rd March 2021.
- 4) Director General-CPRI attended the 63rd & 64th Board Meeting of NHPTL held through video conference on 27th March 2021 & 31st March 2021 respectively.
- 5) Director General-CPRI attended the meeting Chaired by Hon'ble Union Cabinet Minister for Power, New & Renewable Energy to prepare draft response to Conference of the Parties (CoP) 26 deliberations, held on 6th April 2021 held through Video Conference
- 6) Director General-CPRI attended the meetings Chaired by Secretary (Power) held through Video Conference, regarding the progress in implementation of orders issued by MoP for promotion of Make in India and Atmanirbhar Bharat, on 29th April 2021.
- 7) Director General-CPRI attended the Meeting Chaired by Secretary (Power) held through Video Conference on "Make in India – Initiatives and Specific Needs of Industries for the proposed Manufacturing Zones", held on 25th May 2021.
- 8) Director General-CPRI attended the meetings held through Video Conference Chaired by Hon'ble Commerce and Industry Minister with Nodal Ministries/ Departments and Government Procuring Entities/CPSEs to discuss proposed changes in the PPP-MII Order, 2017, held on 8th June 2021.
- 9) Director General-CPRI attended the meeting held through Video Conference Chaired by Hon'ble Union Minister for Power, New & Renewable Energy on The National-level on Power Sector Resilience in cyclone affected states of India, held on 17th June 2021.
- 10) Director General-CPRI attended the 68th STL TC Meeting - 4th Part, held through Video Conference, on 21st June 2021.
- 11) Director General-CPRI attended the meeting held through Video Conference Chaired by Hon'ble Union Minister for Commerce and Industry regarding the proposed changes in PPP-MII order, held on 7th July 2021.
- 12) Director General-CPRI attended the meeting held through Video Conference Chaired by Additional Secretary (Hydro, Distribution, Vigilance) to discuss DIB proposal of CPRI for "Augmentation of existing test facilities & Establishment of New Test facilities at various centres of CPRI", held on 4th August 2021.
- 13) Eighth Meeting of the Technical Committee on Thermal Research, was held for review of progress of projects through video conferencing, on 6th August 2021.



- 14) Eighth Meeting of the Technical Committee on Hydro Research, for approval of new projects and for review of ongoing projects was held through video conferencing on 10th August 2021.
- 15) Ninth Meeting of the Technical Committee on Grid, Distribution and Energy Conservation Research, for approval of new projects was held through video conferencing mode, on 12th and 13th August 2021.
- 16) Eighth Meeting of the Technical Committee on Transmission Research, for approval of new projects was held through video conferencing on 14th August 2021. The meeting was Chaired by Prof. S C Srivastava, IIT, Kanpur and was attended by members from CEA, POWERGRID, KPTCL, IEEMA and CPRI
- 17) Director General-CPRI attended the meeting held through Video Conference Chaired by Hon'ble Minister for Power and New & Renewable Energy, to review Cyber Security for Power Sector, held on 2nd September 2021.
- 18) Director General-CPRI attended the meeting held through Video Conference Chaired by Secretary (Power) regarding the meeting of the Empowered Committee for Cyber Security in Power Sector, held on 9th & 14th September 2021,
- 19) Director General-CPRI attended the first meeting of Standing Committee for National Mission on use of Biomass in Coal Based Thermal Power Plant, held through Video Conference Chaired by Secretary (Power) held on 24th September 2021.
- 20) The 23rd meeting of the Standing Committee on Research & Development (SCRD) was organized under the chairmanship of Chairperson, CEA, on 28th September 2021
- 21) Vigilance Awareness Week – 2021 was observed in CPRI from 26th October to 1st November 2021 Integrity pledge was administered to all the employees of Head Office and Units of CPRI on 26th October 2021.
- 22) Director General-CPRI attended the meetings Chaired by Hon'ble Minister of Power and New and Renewable Energy regarding SFC on Continuation of R&D projects held on 11th November 2021.
- 23) Director General-CPRI attended the meeting held through Video Conference Chaired by Secretary (Power) to discuss about testing power equipment for use in the supply system and network in the country for the Cyber Security, held on 16th November 2021 and the meeting to review the status of scheme-wise budget utilization, held on 23rd November 2021.
- 24) Director General-CPRI attended the meetings held through Video Conference Chaired by Secretary (Power) to discuss the DIB proposal in respect of Augmentation of existing test facilities & Establishment of new test facilities at various centres by CPRI, held on 10th December 2021.
- 25) Director General-CPRI attended the meetings held through Video Conference Chaired by AS&FA, MoP on implementation of the recommendations of Expenditure Management Commission (EMC) on user charges held on 27th December 2021.

- 26) Director General-CPRI attended the 85th Standing Committee Meeting of CPRI, held through video conference, on 31st December 2021.

Important Consultancy Activities:

- Condition Monitoring/ Diagnostic tests on 170 MW, 13.8kV Hydro-Generators for M/s. NHPC, Teesta - V Power Station, Sikkim
- Metallurgical Analysis of Failed Water Wall Tube for Unit #8, 3x660MW, MSPGCL, Koradi Thermal Power Plant, Koradi
- Metallurgical Analysis of Platen Super Heater Tubes C13,T9 & Economiser Tube C183,T3 for 2x500 MW, MSPGCL, Bhusawal Thermal Power Station, Bhusawal
- Third Party Protection Audit of Five Substations in WR-II, PGCIL -Visit for Protection Audit of Vav, Gwalior, Satna, Bina and Itarsi for M/s PGCIL, WRTS-2, Vadodara
- Condition Monitoring Test on 120MVA Auto Transformer for M/s. NEEPCO, Ranganadh Hydro Electric Plant, Shannon
- Corrosion mapping of boiler water wall tubes of Unit # 4, Farakka Super Thermal Power Station, M/s. NTPC, Farakka
- Comprehensive Energy Audit for NEEPCO Hydro Power Station, Mizoram

Important Conference / Webinars / Training Programmes organized:

- **Webinar on “Testing and Evaluation of Instrument Transformer”**
One day Online Webinar on “Testing and Evaluation of Instrument Transformer”, was organised by STDS, CPRI, Bhopal, on 4th March 2021.
- **“National Conference on High Voltage Engineering and Technology”- NCHVET 2021**
“National Conference on High Voltage Engineering and Technology”- NCHVET 2021, was organised by UHVRL, CPRI, Hyderabad, through online, on 12th March 2021.
- **Training Programme on “Non-Destructive and Destructive Testing of boiler components of Thermal Power Plant**
Training Programme on “Non-Destructive and Destructive Testing of boiler components of Thermal Power Plant”, was organized by Thermal Research Centre, CPRI, Koradi at M/s. Khaperkheda Thermal Power Station, Khaperkheda, on 1st July 2021
- **Training Programme for WBSEDCL**
A three Weeks Residential Induction Training Programme for Engineers of West Bengal State Electricity Distribution Company Limited, (WBSEDCL), Kolkata, was organized by Training Division, CPRI, Bengaluru, at CPRI, Bengaluru, from 19th July to 7th August, 2021.
- Webinar on “Methodologies of Temperature Rise Tests on Low Voltage Switchgear and Controlgear Assemblies as per IEC 61439-1:2020” was organized by Short Circuit Laboratory, CPRI, Bengaluru, on 26th October 2021.

- Five days Residential Exposure Training programme on “PVC/XLPE Insulated Power Cables as per IS 694, IS 1554 & IS 7098” for the senior officers of M/s. Central Institute of Petrochemicals Engineering and Technology (CIPET), was organised by Cables & Diagnostics Division, CPRI, Bengaluru, at CPRI, Bengaluru, from 6th to 10th December 2021.

Participation in Exhibitions

- **DIGIELEC BHARAT Virtual Exhibition:** CPRI participated in 2nd edition of Digielec Bharat – Virtual Exhibition, organized by Indian Electrical & Electronics Manufacturer’s Association (IEEMA), held from 20th to 26th October 2021. The exhibition covered display of indigenously developed technology, products and solutions. CPRI displayed its Credentials, Research, Testing facilities, Consultancy and Training activities. The CPRI stall was visited virtually by over 100 visitors from Industry, Research Organizations, Government Departments etc. Photograph of CPRI stall is placed below:

Research & Development (R&D) related activities:

CPRI is the Coordinating Nodal Agency for selection, initiation, execution, review of Research and Development schemes in India under Ministry of Power (MoP). CPRI has been entrusted with the responsibility of administering the R&D Schemes of MoP, as detailed below:

- R&D Under National Perspective Plan (NPP) Scheme
 - Projects by IITs, IISc, NITs, Industries & CPRI
 - Project under Uchhatar Avishkar Yojana-I (UAY-I)
 - Project under Impacting Research Innovation and Technology-I (IMPRINT-I)
- Research Scheme on Power (RSoP)
- In-house Research & Development Scheme (IHRD)

Sponsored Projects by other Ministry/ Department/ Institutions/ Organizations etc. are also taken up by CPRI officials.

Tests conducted for Overseas Customers

- Dynamic & Thermal Short circuit test on Conductor at 33.04kA rms for 1 s and 84.25kA peak on 630A Type C Front & Rear T plug separable connector mounted on 3 x 185 sq.mm. 22kV XLPE Copper Cable with Terminations as per IEC 60502-4:2010, carried out at Short Circuit Laboratory, CPRI, Bengaluru, for M/s. 3M Vietnam Ltd., Vietnam
- Type test and FRLS tests on 1C X 240 Sq.mm, 26/45 kV, XLPE insulated FRLSOH Sheathed Cable as per IEC 60502-1 carried out at Cables & Diagnostics Division, CPRI, Bengaluru, for M/s. Phelps Dodge International Limited, Thailand.
- Vibration, Shock and Seismic qualification test on 110-127V AC Electromechanical Auxiliary Relay carried out at Earthquake Engineering & Vibration Research Centre, CPRI, Bengaluru for M/s. Hitachi ABB, Sweden.
- Type test on 3CX400 mm², Copper Conductor, XLPE insulated, PVC Inner Sheathed, PE outer sheathed 19/33 kV Cable as per IEC 60502-2 carried out at Cables & Diagnostics Division, CPRI, Bengaluru, for M/s. Dubai Cable Company, Dubai.



View of CPRI Stall

- Resonance Search & Seismic Qualification Tests on 630A Aluminium Busduct, 700A Copper Busduct, 5000A Aluminium Busduct & 5000A Copper Busduct as per IEEE Std 693:2018 carried out at Earthquake Engineering & Research Centre, CPRI, Bengaluru for M/s. Lectro EL Habachi for Electrical Products Co., Alexandria, Egypt.

Visit of overseas Team to CPRI

- Mr. Md. Biplob Hossain, Representative, M/s. JRC Powertech, Dhaka, Bangladesh visited Short Circuit Laboratory, CPRI, Bengaluru for witnessing Ability to withstand the dynamic effects of short circuit, Thermal ability to withstand short circuit & Temperature Rise tests carried out on 200kVA 11000/415V, 250kVA 11000/415V & 315kVA 11000/415V Three Phase Distribution Transformers as per IEC 60076 - 5 : 2006 & IEC 60076-2 : 2011 from 21st to 28th January 2021.
- Mr. Ganesh Gopalakrishnan, GM – Engg., M/s. Dorman Smith Switchgear, LLC, Dubai, UAE visited Short Circuit Laboratory, CPRI, Bengaluru for witnessing Verification of short circuit withstand strength test at 17kA for 0.25 s with 34 kA peak on main bus bars, at 10.2kA for 0.25s with 20.4 kA peak on neutral and earth bus bars carried out on 415V 160A 12 Way LV Distribution Board as per IEC 61439-1: 2011 & IEC 61439-2:2011 for M/s. Dorman Smith Switchgear LLC, Dubai, UAE, on 30th June 2021
- Remote/Virtual witnessing of Type testing on 3CX 300 Sq.mm, Cu/XLPE/SWA/PE Cable as per IEC 60502-2 by Mr. Mazin Aziz, Dubai Electricity & Water Authority, Dubai, Mr. Shadi Abd Al Azim, Mr. Hussain Akacha & Ms. Mahra L Mutawa, M/s. Jeddah Cable Company, Jeddah for tests carried out at Cables & Diagnostics Division, CPRI, Bengaluru, from 29th November to 22nd December 2021.

Important projects under implementation:

- Electromagnetic Interference (EMI) / Electromagnetic Compatibility (EMC) Test Facility-CPRI, Bengaluru
- Upgradation of High Power Laboratory from 2500 MVA to 7500 MVA at CPRI, Bengaluru
- Regional Testing Lab. at Nashik, Maharashtra, Comprising of test facility for Transformer, Energy Meter and Insulating Oil
- Temperature Rise Test facility (40 kA) at CPRI, Bengaluru
- Relocation of Thermal Research Centre-CPRI, Koradi-Nagpur



1500 MW Nathpa Jhakri Power Station

CHAPTER 32

NATIONAL POWER TRAINING INSTITUTE

National Power Training Institute (NPTI), an ISO 9001 & ISO 14001 organization under Ministry of Power, Govt. of India is a National Apex body for Training and Human Resources Development in Power Sector with its Corporate Office at Faridabad. NPTI had been providing its dedicated service for more than five decades. NPTI has trained over 3,76,350 Power Professionals in regular Programs over more than 5 decades. NPTI is the world's leading integrated power training institute. NPTI is the only institute of its kind with a wide geographical spread and covering a wide gamut of academic and training programs in Power Sector. NPTI has been recognized as Cadre training Institute for officers of CEA / Utilities. NPTI's committed faculty is providing excellent training in the Power Sector, which is the most important sector among various infrastructure sectors. A number of training programs for national as-well-as transnational customers have been conducted. These programs have increased the availability of Generation, Transmission & Distribution Systems and decreased Aggregate Technical & Commercial Losses. NPTI has been recognized as Training, Assessment & Certification body by Ministry of Skill Development through Gazette Notification for DDU-GKY.

NPTI operates on an all India basis with manpower strength of 181 including 83 officers through its Eleven Institutes in different zones of the country as per details below:

A. Northern Region

1. NPTI Corporate Office, Faridabad
2. NPTI (Northern Region), Badarpur, New Delhi
3. NPTI (Hydro Power Training Centre), Nangal

B. Southern Region

4. NPTI (Power System Training Institute), Bengaluru
5. NPTI (Hot Line Training Centre), Bengaluru
6. NPTI (Southern Region), Neyveli
7. NPTI, Alapuzza

C. Eastern & North Eastern Region

8. NPTI (Eastern Region), Durgapur
9. NPTI (North Eastern Region), Guwahati

D. Western Region

10. NPTI (Western Region), Nagpur

E. North- Central Region

11. NPTI, Shivpuri

Manpower Training and Academic Programs

NPTI conducts the following industry interfaced academic programs with the objective to create a pool of committed and competent professionals equipped with appropriate technical skills to steer the Indian Power Sector:

- One Year Post Graduate Diploma Course (PGDC) in Power Plant Engineering
- One Year Post Graduate Diploma Course (PGDC) in Power System Operation
- One Year Post Graduate Diploma Course (PGDC) in Renewable Energy & Grid Interface Technologies
- One Year Post Graduate Diploma Course (PGDC) in Smart Grid Technologies
- One Year Post Graduate Diploma Course (PGDC) in Power Management
- One Year Post Diploma Course (PDC) in Power Plant Engineering
- One Year Post Graduate Diploma Course (PGDC) in Sub-Transmission & Distribution Systems
- Nine Months Post Graduate Diploma Course (PGDC) in Hydro Power Plant Engg.
- Six Months Post Graduate Diploma Course (PGDC) in Transmission and Distribution Systems
- Six Months Post Diploma Course (PDC) in Hydro Power Plant Engineering
- Simulator Training Programs in Thermal, CCGT, Hydro & Load Despatch.

In addition to the above, several long-term, medium-term and short-term training programs in the areas of Thermal, Hydro, Transmission & Distribution, Management and Regulatory affairs etc. are being conducted in the various Institutes of NPTI. Customized training programs for various Power Utilities are also organized round the year. NPTI also conducts various training programs to ensure availability of properly trained personnel covering the syllabus as per Indian Electricity Rules.

NPTI has also been catering to the Training Needs of Power Sector Organizations viz., CEA, CESC, DPL, DVC, ECIL, FACT, GAIL, HINDALCO, HPGCL, IFFCO, IOCL, IREDA, KPCL, KRIBHCO, MPPGCL, NALCO, NEEPCO, NFL, NHPC, NLC, JUVNL, NTPC, OHPC, OPGCL, POWERGRID, RRVUNL, SAIL, THDC, UPRVUNL, ACC, AEC, APGENCO, BBMB, BHEL, BSES, etc.

Power Training Simulators

NPTI has a 500 MW Thermal Power Plant Training Simulator at Faridabad Institute and 210 MW Thermal Power Plant Training Simulator at Nagpur & Badarpur Institutes for imparting specialized skills to operation personnel across the country. A 430 MW (2x143 MW Gas Turbines and 1x144 MW Steam Turbine) Full Scope Combined Cycle Gas Turbine Replica Simulator commissioned at NPTI Corporate Office, Faridabad is utilised for training CCGT operation personnel. A High-fidelity Load Dispatch Operator



Training Simulator replicating the National Grid is also being used to impart training to System Operators at PSTI, Bengaluru. Training is also imparted to Hydro Operation Personnel on the 250 MW Hydro Simulator commissioned at HPTC, Nangal.

Six (6) Multi-functional training Simulators have been established replicating the real-time operation of 210 MW, 500 MW, 800 MW & 9F GE Combined Cycle Power Plant, 250 MW Hydro, SCADA & Smart Grid together with Smart Power Flow Controllers in an Integrated framework of System comprising Thermal, Hydro, Gas along with Renewables at Faridabad, Durgapur, Bengaluru, Nagpur, Alapuzha and Shivpuri and training is being imparted.

A 800 MW Supercritical Thermal Simulator has also been commissioned in NPTI, Corporate Office, Faridabad and training is being imparted to Utilities.

Hot Line Training Centre

A facility has been created at NPTI's Hot Line Training Centre, Bengaluru for Live Line Maintenance of Transmission Lines upto 400 kV which enables trained personnel to attend to maintenance requirements without power interruptions. Facilities for water washing of sub-station equipments are also available. This institute is one of its kind in the Asian sub continent.

Placement

Students of Post Graduate Diploma Course and Post Diploma Courses are finding placement in reputed companies like ACB Limited, HPPL, Vedanta Resource Ltd., JSW Energy, IERS, Kreate Energy, MotWane, Utility Powertech Ltd. etc.

Achievements during 1st Jan 2021 to 31st Dec 2021

NPTI provided training to 10923 trainees for total trainee-weeks of 37,774 till 31.12.2021.

Induction Training

NPTI has been providing induction training to fresh Graduate Engineers/Executives from various Power Sector Organizations: C Central Electricity Authority, UPL- Tanda etc.

Other Important Activities

Revamped Distribution Sector Scheme (RDSS) Programs

NPTI has been engaged by Ministry of Power for the capacity building of State DISCOMs under RDSS for Smart Meter Implementation and SCADA Systems. NPTI has identified five training programs for Smart Metering for Junior, Middle & Senior level employees of State DISCOMs and one program on SCADA System (practical demonstration on Smart Grid & SCADA simulator facility at NPTI). The Syllabus for RDSS program was inaugurated by Hon'ble Cabinet Minister of Power and New & Renewable Energy.

System Operator Certification Examination

NPTI's Power System Training Institute (PSTI) has been conducting Certification of Power System Operators since 2011. Training Courses at NPTI, Corporate Office, Faridabad and Power System Training Institute (PSTI), Bengaluru equip the System operators with necessary inputs to take up the System Operation Certification Exam.

Basic Level On-Line System Operator Certification exams are being conducted since November 2011 every year at various centres across the country. A total of 1873 System Operators were certified against for the Basic Level Certification Examinations. Specialist courses on 'Regulatory Framework in Power Sector', 'Power System Reliability', 'Renewable Energy Sources and Grid Integration', 'Power System Logistics' and 'Power Market Specialist' are being conducted both at Corporate Office, Faridabad and PSTI, Bengaluru. Examinations on all the specialist level subjects are being conducted. On-Line examinations for Specialist Level Certification have been conducted. As many as 691 System Operators were certified.

Consultancy Services

NPTI is providing Project Management Agency (PMA) services for DDUGJY & IPDS Project Works for NESCO & WESCO Utility areas of OPTCL, Odisha & IPDS PMA works for Assam Power Distribution Company Ltd., Assam. NPTI has been awarded the TPIA works under Saubhagya Scheme by U.P. Power Corporation. NPTI has also been appointed as Third Party Inspection Agency for Inspection of Rural Electrification Work in the various districts of the Odisha State under RE Component of DDUGJY (erstwhile RGGVY) and the work is in progress. NPTI has been appointed as Project Management Agency (PMA)/Consultant to provide services for the works of unmetered to metered consumers in rural areas of all districts in PuVNNL, and the work is in progress. The work of Preparation of DPR including SCADA System for conversion of HT/LT overhead line to undergrounding, erection of distribution transformers and electrical connection of consumer from over head to underground and other associated construction work of different area of Varanasi city under Purvanchal Vidyut Vitran Nigam Ltd. was awarded and DPR for the same has been submitted. NPTI is also conducting Financial & Technical Audit of Transformer Repair workshops of UPPCL. Third Party Inspection Works for DTL (Delhi TRANSCO), JVVNL and also for DVVNL, Agra is being conducted. NPTI is also preparing the DPR for Ayodhya Nagar Nigam under MVVNL.

International Training

NPTI conducted training programs through Indian Technical and Economic Cooperation (ITEC), MEA, Govt. of India. 3 Batches of Engineers from Various Countries have been trained through ITEC Programs.

Some of the Training Activities

26 weeks Induction Training for Assistant Directors of CEA-V Batch completed on 13.08.2021.

Online Awareness Program on "Regulation, Power Purchase Sale & ABT/Intrastate ABT & Statutory/Legal Requirement in Power Biz" conducted for MPL-TATA Power.

Online Program on Environmental Issues & FGD Technology was conducted for BPSCL, RGTPP, MITSUBISHI POWER INDIA PVT LTD, OPGC & DVC-DTPS.

Program on Advance Automation in Hydro Power Plant for OHPC, THDC INDIA, BBMB, MPGCL, KSEBL, Dept. of Hydro Power

Development, Govt. of Arunachal Pradesh, NTPC, MIT (Gwalior), Etc

Vibration Diagnostics & Fault Analysis course was conducted for BPSCL & RGTPP.

One Week Refresher Course on Power System Operations for NERLDC, POSOCO, Shillong

Program for National Mission on use of Biomass in Thermal Power Plant was conducted for various Manufacturer & Farmers.

Program on Renewable Energy & Emerging Technologies was conducted for SJVNL personnel.

Online Training Program on Risk management for Hydro Projects was conducted for NHPC Officials.

2 Weeks CCGT Simulator Training conducted for Executives from NTPC Ltd.

Refresher Training program on "GeM Utility" conducted for HPGCL

Five Weeks Training Program on "Thermal & Combined Cycle Gas Turbine Power Plant Familiarization" for Mitsubishi Power India Ltd.

Programs on Cyber Security Conducted:

NPTI has conducted 16 Programs on Cyber Security for Professionals from SLDC, RLDC, BBMB, OHPC, THDC, NHPC and

other power professionals and students. The syllabus for Cyber Security Programs was inaugurated by Hon'ble Secreary (Power).

MOU

MOU has also been signed with Tata Power Delhi Distribution Ltd., Bihar Electricity Regulatory Commission, RGPV.

Vision Ahead

To enhance existing skill sets in upcoming technologies to prepare efficient manpower and maximize employment opportunities.

To align the programs with the Ministry of Power's objectives and emerging National Electricity Plan for 2017-22 & 2022-27.

To bring about complete awareness to personnel in the power sector about MoP initiatives such as DDUGJY, IPDS, UDAY, 24x7 Power for All etc.

To conduct Skill development Programs in all areas of Generation, Transmission, Distribution, Equipment Manufacturing and Power Trading including Renewable Energy Sources, to achieve the Ministry of Power's target of training and skill development of Manpower. To support Country's Smart City Program, Rural development through Training Programs on Smart Grid, Decentralized Generation & Distribution, Demand Side Management (DSM), Peak Load Management with upcoming Electric Vehicle Charging Stations, etc

CHAPTER 33

PUBLIC GRIEVANCE

Ministry of Power

Public Grievance (PG) Cell of the Ministry is entrusted with the responsibility of redressal of public grievances. In pursuance of this, a link of CPGRAM/PG online portal of Department of Administrative Reforms & Public Grievances (CPGRAM/PG) has been provided on the website of Ministry of Power. All grievance petitions received in the Ministry are examined and forwarded to the concerned Division/Organisations for their redressal. As per the guidelines of DAR&PG, the grievances are to be redressed normally within a month.

Name of organization	From 01.01.2021 to 31.03.2021			From 01.04.2021 to 31.12.2021		
	No. of grievances received	No. of grievances disposed off	Balance Grievances	No. of grievances received	No. of grievances disposed off	Balance Grievances
Ministry of Power	1196	951	245	3627	3507	120

Organisations and PSUs

Organisations and Public Sector Undertakings under the Ministry Power have public grievance redressal mechanism in place for dealing with grievances of the public at large. Grievances received from the public are processed as per the guidelines issued by the Department of Administrative Reforms and Public Grievances. Grievances from employees are being dealt with, as per staff grievance procedure framed in this regard. The website of the PSUs contains all the details like designation, address, phone, email etc. of Public Grievance Redressal Officers of each project/unit, nominated by the management.

Public Grievance (PG) portal of Department of Administrative Reforms & Public Grievances for handling public grievances in efficient and time bound manner used by the PSUs also. Details of disposal of Public Grievances by the PSUs/organisations are as under:

Name of organization	From 01.01.2021 to 31.03.2021			From 01.04.2021 to 31.12.2021		
	No. of grievances received	No. of grievances disposed off	Balance Grievances	No. of grievances received	No. of grievances disposed off	Balance Grievances
NHPC	24	15	09	49	52*	06
POWERGRID	36	36	0	167	152	15
PFC	8	6	2	45	41	4
REC	56	54	2	80	75	6
NEEPCO	8	6	2	8	7	1
POSOCO	NIL	NA	NA	NIL	NA	NA
THDC	5	7	1	26	26	1
SJVN	2	2	0	5	5	0
NTPC	146	106	40	371	376	35
DVC	22	26	35	56	87	4
BBMB	14	10	4	52	47	9
BEE	6	1	5	22	27	0
NPTI	16	10	6	17	17	0
CPRI	1	1	0	20	20	0



Spillway of 60 MW Tuirial Hydro Power Station, Mizoram

CHAPTER 34

RIGHT TO INFORMATION ACT, 2005

Right to Information Act, 2005 (RTI Act, 2005) is a move to replace the culture of secrecy and control in Public Authorities with one of openness, transparency and participation. The Act proposes to strengthen the democratic setup of our country by providing citizen's access to Information in Public Authorities covering the executive, judiciary and legislature arms.

The Ministry of Power and all its PSUs and subordinate organizations are linked with 'RTI MIS online portal of DoPT for processing of RTI applications/First Appeals. Under the RTI Act, 2005, the Ministry of Power has designated Under Secretaries/Section Officers as CPIOs and Directors/Deputy Secretaries as First Appellate Authorities. Public Information Officers and Appellate Authorities have been designated at Corporate Centre and Regional Head Quarters and other offices of the PSUs under the provisions of the RTI Act, 2005. The Annual Return for the period 2020-21 has been uploaded on Central Information Commission website as required u/s 25(3) of the RTI Act, 2005.

Further, in order to strengthen compliance of the provisions of disclosures as contained in Section 4 of the RTI Act, 2005, Department of Personnel & Training (DoPT) vide its OM No. 1/6/2011-IR dated 15.04.2013 issued guidelines on the following :-

- (i) Suo moto disclosure of more items under Section 4;
- (ii) Guidelines for digital publication of proactive disclosure under Section 4;
- (iii) Guidelines for certain clauses of Section 4(1)(b) to make disclosure more effective;
- (iv) Compliance mechanism for suo-moto disclosure (proactive disclosure) under RTI Act, 2005.

In compliance of the aforesaid Guidelines, Ministry of Power and its PSUs have placed the requisite information on their websites.

PSUs also organize various training programmes for all its CPIOs/PIOs/Appellate Authorities (AAs) every year to sensitize them about their role in implementation of the RTI Act.

Further, for effective processing, monitoring and management of RTI's and Appeals, web based online RTI portal have been developed some of the PSUs.

The Status of RTI Applications & Appeals in the period 01.01.2021 to 31.03.2021 for Ministry of Power is as under:

MINISTRY OF POWER

The Status of RTI Applications & Appeals in the period 01.01.2021 to 31.03.2021

Applications received	Applications disposed off	First Appeals received	First Appeals Disposed off	Second Appeal Received From CIC	Second Appeal Disposed off by CIC	Whether suomoto disclosures are uploaded on company website
366	366	19	19	Nil	Nil	YES

The status of RTI Applications & Appeals in the period 01-4-2021 to 31-12-2021

Applications received	Applications disposed off	First Appeals received	First Appeals Disposed off	Second Appeal Received From CIC	Second Appeal Disposed off by CIC	Whether suomoto disclosures are uploaded on company website
1160	1160	39	38	13	13	YES

PAO

Twenty Three cases of RTI were received and all were replied, during the period from 01.01.20 to 31.12.2021.



PSUs and Organisations

The Status of RTI Applications & Appeals for Power sector PSUS/Organisations in the period 01.01.2021 to 31.03.2021

Name of organization	Applications received	Applications disposed off	First Appeals received	First Appeals Disposed off	Second Appeal Received From CIC	Second Appeal Disposed off by CIC	Whether suomoto disclosures are uploaded on company website
CEA	240	189	14	9	1	1	Yes
NTPC	506	352	80	80	0	0	Yes
NHPC	177	170	20	20	0	0	Yes
PGCIL	274	284	15	22	0	0	Yes
PFC	31	31	1	1	0	0	Yes
REC	72	72	5	5	0	0	Yes
NEEPCO	24	21	0	0	0	0	Yes
POSOCO	52	49	3	1	0	0	Yes
SJVN	38	38	1	1	0	0	Yes
THDC	250	250	26	26	2	2	Yes
DVC	97	107	13	21	0	0	Yes
BBMB	99	99	16	14	0	0	Yes
BEE	64	61	09	08	0	0	Yes
CPRI	15	15	2	2	0	0	Yes
NPTI	60	60	3	0	0	0	Yes

The Status of RTI Applications & Appeals for Power sector PSUS/Organisations in the period 01.04.2021 to 31.12.2021

Name of organization	Applications received	Applications disposed off	First Appeals received	First Appeals Disposed off	Second Appeal Received From CIC	Second Appeal Disposed off by CIC	Whether suomoto disclosures are uploaded on company website
CEA	670	537	34	27	9	9	Yes
NTPC	2026	1833	387	380	98	96	Yes
NHPC	416	399	47	46	5	5	Yes
PGCIL	840	811	59	67	29	29	Yes
PFC	92	92	3	3	3	3	Yes
REC	297	294	17	14	2	2	Yes
NEEPCO	100	63	4	4	0	0	Yes
POSOCO	125	120	12	14	0	0	Yes
SJVN	124	122	2	2	0	0	Yes
THDC	198	198	21	21	2	2	Yes
DVC	286	250	23	22	15	14	Yes
BBMB	273	273	33	35	16	16	Yes
BEE	116	102	02	02	00	00	Yes
CPRI	73	66	6	5	2	2	Yes
NPTI	60	60	3	Nil	Nil	Nil	Yes

CHAPTER 35.1

IMPLEMENTATION OF OFFICIAL LANGUAGE

Ministry of Power

Ministry of Power, its attached office and Public Sector Undertakings, Autonomous Bodies, Board and Institutions under the administrative control of the Ministry continued their efforts in ensuring effective implementation of the Official Language policy of the Government and promoting the progressive use of Hindi in day-to-day activities of the Ministry/Offices.

The Ministry ensured compliance of the Official Language Act, 1963 and the Official Language Rules, 1976 in the Ministry and offices under its administrative control.

In compliance with the Official Language Policy, Hindi fortnight was organised in the Ministry from 01 September, 2021 to 15 September, 2021. Banners were displayed at prominent places to motivate the Officers and staff of the Ministry to make more and more use of Hindi in their routine official work. During this period, Administrative Word and Phrase Competition, Hindi Noting and Drafting Competition, Hindi Typing Competition, Hindi Stenography Competition, Hindi Debate Competition, Hindi Self-Composed Poetry Recitation Competition, Hindi Dictation Competition, Quiz Competition (in writing), Hindi Essay Writing Competition, Slogan Writing Competition, Official work originally in Hindi (for gazetted officers) and Government work originally in Hindi (for non-gazetted officers/employees) competition were organised for the officers and employees of the Ministry. Officers and staff of the Ministry participated in these competitions with great enthusiasm. To review the progressive use of Hindi in the attached offices, Board, Organisations and Public Sector Undertakings under the administrative control of the Ministry, 04 offices viz. PFC, New Delhi, NHPC, Faridabad, BBMB, Chandigarh, POSOCO, New Delhi were inspected. Apart from this, official language inspection of THDC, Kaushambi, NTPC, Dadri, POWERGRID, Dadri was also done. Under Section 3(3) of the Official Language Act, 1963, all documents, reports, letters, notifications etc were issued bilingual. Quarterly progress reports and Annual assessment reports pertaining to progressive use of Hindi were made available to the Department of Official language.

During the year under review, 33 offices were inspected by the Committee of Parliament on Official Language. Joint Director (OL) of the Ministry also participated in the inspection meetings of the Committee of Parliament on Official Language. During the year, 14 Offices have been notified under the Rule 10(4) of the Official Language Rules, 1976.

Due to Covid-19 pandemic's ill effect, physical working of the Ministry was also affected. As per the guidelines issued in this regard, two quarterly meetings of Official Language Implementation Committee of the Ministry of Power were organized in online mode. One virtual workshop on Official Language was also organized for the Officials of the Ministry.

PAO

All the communication received in Hindi are entertained and replied.

NTPC

Several initiatives were taken for the progressive use of Hindi in the day to day official work and implementation of Official Language policy of Union in NTPC. The compliance of Official Language policy at regional headquarters, projects/stations, Joint Ventures, and subsidiaries were inspected and need based suggestions were given to the respective Heads of offices in this regard.

Quarterly meetings of Official Language Implementation Committee (OLIC) were held, in which detailed discussions took place on progressive use of Hindi. Similarly, OLIC meetings were held at regular intervals in Regional Headquarters, Stations/Projects/Offices.

Hindi Divas was celebrated on 14th September 2021 and Hindi Fortnight was organized from 01-15 September, 2021 at the Corporate Centre as well Regional Headquarters, Projects/Stations, Joint Ventures and subsidiaries to create awareness for Hindi propagation among the employees, associates and their family members through various competitions/programs. "Vidyut Swar" NTPC's Hindi magazine was published to promote creative and technical writing in Hindi.

Employees were motivated to progressively use Hindi in official work by organizing Hindi workshops, Unicode Hindi Computer Training along with Hindi e-tools, Kavi Sammelans and Hindi incentive schemes. Hindi suggestion portal has been created and webpage updated with important information pertaining to Rajbhasha. Further, NTPC's website is also having facility of operating in Hindi and English.

The second sub-committee of Parliament on official Language had inspected our Regional Headquarters and Stations/Projects, reviewed the progress of Rajbhasha implementation and appreciated our efforts.

NHPC

The Provisions of the Official Language Act and Rules were complied with during the year in the Corporation. Efforts were made to increase the progressive use of Official Language in accordance with the policy of Government of India.

During the period, Quarterly meetings of the Official Language Implementation Committee were organized as per the schedule. These meetings were conducted through video conferencing in compliance with Covid-19 pandemic guidelines. During these e-meetings, progressive use of Official Language across the



Corporation was reviewed by the Chairman and Managing Director in the presence of the Directors and senior officers.

Rajbhasha inspection/Rajbhasha e-inspection of various departments of the corporate office and Subordinate Offices were carried out by Rajbhasha Department. Further, during the period, senior officers also conducted Rajbhasha inspection in Subordinate Offices during their visit. In addition to this, Rajbhasha inspection of the Corporate Office was also carried out by the officers of Ministry of Power On 18.08.2021 and they appreciated Rajbhasha Implementation works in the corporation.

Hindi e-Workshops and Computer Workshops for employees and officers of various Grade and cadre posted at Corporate Office, Regional Office, Projects and Power Stations were organized through Video Conferencing during review period.

During the period under review, many programmes like Hindi Pakhwara, Hindi Competitions, announcement and distribution of Rajbhasha Shield and monthly Departmental meeting in all the Departments were organised continuously through video Conferencing for the propagation of Official Language Hindi.

In order to increase the interest of the employees towards Hindi, an 'Online Hindi Quiz Competition' was conducted on daily basis. This competition is being conducted online for all the employees posted at Corporate Office as well as employees posted at Projects, Power Stations and Regional Offices on every working day. 39th issue of Corporation's Hindi Magazine titled 'Rajbhasha Jyoti' was published successfully during the review period.

In order to encourage employees for promotion of Hindi, attractive incentive schemes have been implemented for the employees as per Government guidelines which include writing articles/write-ups in Hindi, Hindi books reading and Noting & Drafting in Hindi, etc. Prizes were given to employees during the period under review.

During the period under review Half yearly meeting of Town Official Language Implementation Committee(O), Faridabad was conducted through video conferencing, Hindi Competitions and Rajbhasha Shield competitions were organized for member offices of TOLIC. Publication of 12th issue of TOLIC magazine "Nagar Saurabh" were done.

Our corporation has been conferred with Second Prize for commendable work in implementation of Rajbhasha amongst Public Sector Undertakings located in Region 'A' under 'Rajbhasha Kirti Puraskar' Scheme, under the 'Rajbhasha Kirti Puraskar' scheme Corporation's Hindi Magazine namely 'Rajbhasha Jyoti' has been awarded the First prize for best Hindi House Magazine in region 'A' under the Rajbhasha Kirti Puraskar (house Magazine) category. In addition to this, Dr. Rajbir Singh, General Manager (Rajbhasha) has been conferred with the Second Prize for his article under the 'Rajbhasha Gaurav Puruskar'. These prizes has been received by Honourable CMD, Shri Abahay Kumar Singh in Rajbhasha Puraskar sammelan organized by Ministry of Home Affairs in Vigyan Bhawan on 14 September, 2021 on the occasion of Hindi Diwas from Honourable Home Minister.

During the remaining period of FY 2021-22 it is proposed to organize e-Hindi workshop, Rajbhasha Sameelan, Hindi Kavi Sammelan and fourth meeting of OLIC, Publication of 40th Issue of Rajbhasha Jyoti and Rajbhasha Inspection of Various Projects/Power Stations along with other Official Language programmes in compliance with provisions of Official Language Act and Rules.

PGCIL

In pursuance of Govt. of India's Rajbhasha policy to promote Indian languages and Rajbhasha "Hindi", POWERGRID has made all round efforts to integrate and promote use of Hindi in its works at all levels. POWERGRID has proved its commitment to ensure the implementation of Rajbhasha policy and to achieve the goal as laid out in the Rajbhasha Annual Target given by Department of Official Language.

To ensure the increased use of Official language, various activities such as Annuvad Abhayaas Karyakram, Workshops, Trainings, motivational programmes have been organized. Computer trainings are being imparted to enhance the working knowledge in Hindi on computers. Hindi classes are also being organized for non-Hindi speaking employees through Hindi Teaching Scheme.

Various activities are undertaken to publicize Hindi every year, Akhil Bhartiya Rajbhasha Sammelans and technical conferences in Hindi, Kavi Sammelans (Poetry sessions), Plays, publication of House Magazines, publication of monthly articles in Hindi via emails are most prominent among these. All programmes were organised by video conferencing in the year 2021-22 so far. Also, various competitions throughout the year with special emphasis during Hindi Pakhwada, Vigilance Awareness Week, Swachhta Pakhwada etc. along with departmental meetings as well as Official Language Implementation Committee (OLIC) meetings are also being conducted. POWERGRID has established one of the best Hindi libraries among Public Sector where popular/literary Magazines and News Papers have been made available for the employees.

Attractive incentive schemes for employees working in Hindi have been implemented as per the government guidelines. In addition, various reward schemes have been introduced to encourage employees to actively participate in promotion of Hindi, by giving articles/write-ups for in-house magazines, reading library books etc.

The effort made by POWERGRID has been applauded in several forums during the year so far in 2021-22. Various awards were given by "Town Official Language Implementation Committee (TOLIC), Rajbhasha Vibhag, Ministry of Home Affairs, Govt. of India and other agencies regarding Implementation of Official Language. The offices of the regional headquarters including Vadodara, Bangalore, Kolkata and Nagpur along with other offices like Siliguri, Itarsi, Nellore, Madurai, Durgapur, Roorkee, Mandola, Dadri etc. have been honored. Besides, POWERGRID's efforts were also applauded during various inspections and discussions done by Hon'ble Committee of Parliament on Official Language on different occasions.

PFC

It is a matter of great pride that PFC has been awarded the prestigious "Rajbhasha Kirti" Award (in 'A' Region) for the year 2020-21 by the Department of Official Language, Ministry of Home Affairs for its outstanding efforts made in the field of Implementation of Official Language Policy. PFC has received this award consecutively for Eighth time (Out of which Six time first prize).

In January, 2021 a technical Workshop on 'Kanthastha' was organized under the joint aegis of Department of Official Language and PFC on 28.01.2021 under the Chairmanship of Dr. Sumeet Jerath, Secretary, Department of Official Language, Ministry of Home Affairs in which around 50 Officials from various Central Government Offices, Undertakings, Banks and Para Military Forces located in Delhi participated.

Hindi Day on 14th September 2021 and Hindi Month from 14th September 2021 to 13th October 2021 were organized to create a Hindi oriented environment. On the occasion of Hindi Day on 14th September 2021, all the employees were administered 'Rajbhasha Pratigya'. Keeping in view Covid-19 protocol, five online Hindi competitions were conducted successfully during Hindi Month and 444 entries were received from employees for participation in these competitions. In addition, a webinar was also organized during Hindi Month in which Sh. K. P. Sharma, Deputy Director, (Implementation) Department of Official Language, Ministry of Home Affairs was invited for lecture. On the occasion of the closing ceremony of Hindi Month, a Kavi Sammelan was organized on October 13, 2020, in which five eminent poets Shri Waseem Bareilvi, Dr. Sunil Jogi, Shri Vineet Chauhan, Dr Kirti Kale and Dr Praveen Shukl were invited.

During the year, seven (07) Hindi workshops were conducted in which 278 employees participated. A Rajbhasha Sammelan was also organized from 15-18 October, 2021 at Jaisalmer, Rajasthan for top management of PFC. Apart from five (05) competitions held during Hindi Month, three (03) Hindi competitions namely 'Rajbhasha Samanya Gyan Pratiyogita', 'Sansmaran Lekhan Pratiyogita' and 'Quiz Competition' were also conducted to promote Rajbhasha Hindi and 114 entries were received for participation in these competitions. Review meetings, Internal inspections and personal contact programme were conducted with various units/employees for the purpose of reviewing the Rajbhasha related work being done by these units.

During the year, four (04) meetings of the Official Language Implementation Committee (OLIC) were organized through MS Teams under the chairmanship of CMD.

The Second Sub-Committee of the Committee of Parliament on Official Language inspected PFC's Regional Office (West), Mumbai and Regional Office (South) on 06.01.2021 and 16.04.2021 respectively and the Committee appreciated the efforts being done by the Corporation in the field of Official Language. The officials of Ministry of Power inspected the Corporation in August 2021 regarding implementation of Official Language and MoP officials also appreciated the efforts being made by the Corporation for the promotion of Official Language.

Four (04) editions including "Rajbhasha Visheshank" of the House Journal 'Urja Deepti' were also published and were uploaded on website of the Corporation and the Department of Official Language, Ministry of Home Affairs as well. In order to motivate employees towards Hindi a famous Hindi book namely "Saratchandra ki Lokpriya Kahaniyan" was distributed to all the employees.

All these efforts were motivational tools in creating possibilities of better and progressive use of Hindi in the Corporation.

REC

The progress made from April 1, 2021 to December 31, 2021:

In compliance with the statutory requirements of the Official Language policy, REC strove to promote the use of Hindi in its working during the year. To increase the progressive use of Hindi in official work, REC imparted training to its employees as well as motivated them through various means.

Official Language Implementation Committees (s) are constituted in REC offices to ensure the effective implementation of Official Language in compliance with the Official Language Act, 1963 and Official Language Rules, 1976. Hindi Workshops were organised in all REC offices to give hands-on exposure to participants in various facets of use of Hindi.

Hindi Fortnight was organized during September 14, 2021 to September 28, 2021 when various competitions like *Rajbhasha quiz*, *Hindispelling*, *Hindi word meaning*, *translation*, *poetry writing* and *essay writing* were organized motivating employees on Hindi usage. The participation of employees in all the events/competitions was encouraging and cash prizes were also awarded to winners in different categories to encourage larger participation to increase use of Hindi in their day to day work. Also, Hindi Fortnight was organized in all Regional/State offices of the Company/RECIPMT.

The Second Sub-Committee of Committee of Parliament on Official Language successfully conducted inspections in REC Regional offices of Chennai, Jammu, Hyderabad and Kolkata on April 16, 2021, July 14, 2021, September 29, 2021 and November 22, 2021, respectively. These inspections have generated awareness among the employees for enhanced adoption of Hindi in their work.

A two-day online Official Language Conference cum Hindi workshop was organized by REC Corporate Office and RECIPMT Hyderabad during 09-10 December, 2021. Further, a special Hindi Awareness programme was organized for REC Lucknow office on December 3, 2021.

Anticipated targets to be achieved from January 1, 2022 to March 31, 2022

All concerted efforts are being made to adhere to the Annual Programme 2021-22 issued by Department of Official Language, Ministry of Home Affairs and will be the primary concern during the said period.

NEEPCO

The Corporation is making all out efforts to implement effectively the Official Language Policy of the Government of India at its Corporate Office as well as Power Stations and subordinate offices.



Efforts were made to issue papers referred to in Section 3 (3) of the Official Language Act in bilingual. Employees posted at different power stations/offices were nominated for Hindi **Prabodh, Praveen & Pragya** training courses. Hindi workshops were organized to facilitate the employees for doing their official work in Hindi. Key words in Hindi with English & regional language were displayed everyday on the **Digital Board** under the programme **"Today's Word"** in order to enrich the Hindi vocabulary of the employees. NEEPCO website is also available in Hindi.

Rajbhasha (Hindi) Pakhwara was observed and **"Hindi Divas"** was celebrated at the Corporate Office as well as in the Power Stations and other offices of the Corporation to create awareness and to encourage the employees for doing their official works in Hindi. Various competitions were conducted in Hindi and attractive prizes were awarded to the participants. Hindipatrika **"NEEPCO JYOTI", "Ratandeep", "Panyor Pravah", "Arohi", "KopiliDarpan", "NEEPCO Tarang" & "AlokJyoti"** were published in the form of E-Magazine from **Corporate Head Quarter, Shillong, Corporate Affairs office, New Delhi, RHPS, AGBPS, KHPS, Guwahati & TGBPS**. Under Incentive Scheme, number of officers/employees was awarded Cash Award for writing noting/drafting in Hindi.

The Corporate Head Quarter, Shillong was awarded First Prize for the year 2019-20 by Town Official Language Implementation Committee (TOLIC), Shillong on 21/09/2021. The different offices of the corporation were also awarded by their respective TOLIC and other institutions for commendable works in the implementation of Official Language Policy.

NEEPCO Official Language Implementation Committee (OLIC) meetings are organized regularly. In the meeting review was made on the Implementation work of Rajbhasha and valuable suggestions were provided for its effective implementation.

POSOCO

POSOCO is committed towards implementation of Govt. of India's Rajbhasha Policy. Quarterly workshops were organized for the employees on topics like Rajbhasha Rules, Constitutional Status of Rajbhasha, Problems faced in performing routine office works in Rajbhasha and its solutions etc. Hindi Pakhwada was organized in POSOCO Corporate Centre, National Load Despatch Centre (NLDC) and all five Regional Load Despatch Centres (RLDCs) wherein series of Inspirational Talks, seminars, symposia and competition for employees were organized online due to COVID-19 pandemic. Employees were also enrolled for Praveena and Pragya classes under Hindi teaching scheme to enhance their Hindi knowledge. In order to motivate all the employees to work in Hindi, the employees who have worked in Hindi throughout the year are encouraged with incentives.

An e- magazine in Hindi titled "Grid Sanchallika" is being released half-yearly. A library has also been organized in the offices to inculcate interest in Hindi among the employees wherein all types of Hindi literature, grammar books are available and at least 50% of the library expenditure is incurred towards the purchase of Hindi book.

SJVNL

In order to ensure implementation of Official Language Policy of the Govt. of India, all possible efforts have been made by the company to achieve the targets as specified by Department of Official Language.

Under section 3.3(i) of Official Language Act 100% documents were issued bilingually & all the letters received in Hindi were replied in Hindi. Company's website is already in bilingual form and it is updated from time to time. To encourage executives and non-executives to do their entire work in Hindi, number of incentive schemes are under implementation.

During the year Hindi workshops/seminars, various Hindi competitions, Meeting of TOLIC were organized. To popularise Hindi in a big way 'Akhil Bhartiya Kavi Sammelan' was organised at Corporate Office, Shimla.

The Officials from Ministry of Power, Gol inspected the progress of use of Hindi at Corporate Headquarter & officials from Corporate Headquarter inspected the progress of use of Hindi at Corporate Headquarter including Projects/offices during the year under review and expressed its satisfaction about the progress made in this regard.

To give impetus to the multi-facet talent of employees an in-house bi-annual Hindi magazine "Himshakti " was published and circulated. Out of total expenditure on purchase of books, 85.25% of amount was spent on purchase of Hindi books.

THDCIL

As per guidelines of the Official Language Policy of Government of India, THDC India Limited is committed to enhance the progressive and innovative use of Hindi in day-to-day official working. During the F.Y. 2021-22, Quarterly meetings of the Official Language Implementation Committees in THDCIL at all Projects/Units were organized at regular interval. In order to motivate officers and employees, **Quarterly Hindi workshops** and **Hindi competitions** were also organised at all Projects/Units.

Hindi Pakhwadawas also celebrated from 14 to 28 Sept-2021 in THDCIL wherein various competitions were organized for the employees followed by distribution of prizes to the winners of competitions and under various incentive schemes undertaken by Official Language Deptt. Hindi Week/Hindi Day Programmes were also organised at all Projects/Units of THDCIL.

With the objective to encourage Hindi Reading among employees, Hindi House Journal **'THDC Pahal'** was published with 03 editions during the year. In order to facilitate bilingual functioning, Hindi Software / Fonts have also been installed in all the Computers / Laptops of the Corporation and the content are also being displayed bilingual on the THDCIL website. **Rajbhasha Head** is provided on Hindi page of Official website of the Corporation, wherein useful information related to Official language is being uploaded. The documents related to **Section 3(3)** have been issued bilingual in the Corporation.

In THDCIL, Corporate Office, Rishikesh and Unit office, Tehri of the Corporation are discharging the responsibility of Chairmanship

of Town Official Language Implementation Committee (TOLIC) Haridwar & TOLIC Tehri. Various activities / programs of TOLIC were organized at regular intervals during the year, such as; Half yearly meetings, Hindi coordinator's seminars, Hindi competitions and Hindi workshops. Officers and employees of the Corporation have participated in the programme and competition conducted under the aegis of TOLIC. Corporate Office conferred 1st Prize of TOLIC's Rajbhasha Vajyanti Award in the prize distribution ceremony held on 21 Jan' 2021 in half yearly meeting organised online.

DVC

The Official Language Cell of DVC is devoted towards the implementation of different Official Language programmes keeping in view the directives received from the Department of Official Language, Ministry of Home Affairs and Ministry of Power, Government of India for the progressive use of Hindi in the official work of the Corporation.

The Corporation is ushering towards meeting new benchmarks in implementing Official Language in DVC by purchasing Hindi Books, organizing Quarterly Meeting, participating in TOLIC meeting, making scheduled inspections in different units, implementing incentive schemes in line with directives received from Official Language Department, Gol publishing Official Language magazine and providing training on Voice Typing. DVC has established training centre for imparting Hindi knowledge among the employees which is being run at Headquarters as well as in field formations in collaboration with Hindi Teaching Scheme, Govt. of India.

Separate workshops were organised for officers and staff to develop their working knowledge required for implementation of official language policy. In these workshops, participants went through the routine exercises for day to day official work in Official Language. Apart from this, 03 (Three) special Official language workshops regarding the importance of Quarterly Report, Official Language Policy were organised in which 147 employees took part.

Hindi Diwas/Month was also celebrated from 14.09.2020 to 30.09.2020 in which several competitions related to official language like Extempore, Amplification, Hindi Noting & Drafting, Recitation & Quiz were organised to inspire employees for executing their official works in Hindi. Online Rajbhasha Seminar on "Literary Creation during Covid-19" was organised on 19.08.2020. Official Language Magazine 'Chachro' was inaugurated during Pakhwara. Bokaro Thermal Power Plant received first prize from TOLIC for excellent performance on implementation of Official Language policy during 2019-20.

During the period under review, DVC Hqs received "Rajbhasha Kirti Puraskar – First Prize" for its excellent performance in Official Language activities in the entire 'C' region. In the sequence of Awards & Prizes, Bokaro Thermal Power Station of Damodar Valley Corporation has been nominated for 2nd Prize in eastern region covering the states of West Bengal, Odisha, Bihar, Jharkhand and Andaman & Nicobar Islands for excellent implementation of Official Language Policies of Gol.

BBMB

Special efforts are made by BBMB for implementation of Official Language Policy of the Union. All the documents under section 3(3) of the Official Language Act are issued bilingually and letters received in Hindi or signed in Hindi are invariably replied in Hindi. Also, Efforts are made to reply English letters, in Hindi. At present correspondence of Board Secretariat with region 'A' offices is 99.52%, with region 'B' offices is 99.71% and approximately 100% with region 'C' is being done in Hindi. All the information in BBMB website is available bilingually.

Official Language Implementation Committees have been constituted in the Board Secretariat and its subordinate offices and their quarterly meetings are regularly held, in which reports in respect of progressive use of Hindi are reviewed. In Board Secretariat, about 94.54% notings are being done in Hindi. Hindi workshops are organized in every quarter and subordinate offices are regularly inspected by the Board Secretariat against the target fixed by the Government of India.

Bilingual working facilities have been provided on all the computers. Training in Hindi shorthand/typing has been imparted to all stenotypists/clerks.

Hindi Library has been set up in the Board Secretariat and project stations.

Hindi month was organized in all the offices in the month of September, 2021 during which various Hindi competitions were organized in order to create awareness amongst the employees to work in Hindi. Moreover, 18 employees doing considerable work in Hindi during the year are encouraged with cash awards also. Prize distribution ceremony was organized on 2nd December, 2021.

All magazines/journals of BBMB are published bilingually. July-September issue of the magazine is published as "Rajbhasha Visheshank". Some compilations to facilitate the use of Hindi, viz. Administrative Notings, 'Taqniki Shabdavali' and 'Rajbhasha Shayak Pustak' have been published and distributed to all the offices.

BEE

For the purpose of creating awareness towards progressive use of Hindi in official work, every year in the month of September, Hindi Pakhwara is observed in the Bureau of Energy Efficiency. During the year, various Hindi competitions and Hindi workshops etc. were organized to encourage and incentivize the officers/employees for doing their more and more official work in Hindi as per the rules under the Official Language Act.

Hindi Pakhwara was organized in BEE during 14-28 September 2021. During the Pakhwara, competitions namely, Essay competition, Hindi Poem Recitation, Slogan competition on energy efficiency, General Knowledge of Official Language, Hindi Dictation and separate Hindi Dictation for fourth class employees were organized. Eight prizes viz. first prize, second prize, third prize and five consolation prizes were given to the winners of the competitions. Bureau also organized Speech Competition first time for State Designated Agencies (SDA) through online.



Hindi workshops were organised during the year. Deep knowledge and experiences of the Expert Guest Speakers who not only shared their views and knowledge but also helped to solve the problems being faced by the participants in doing their day to day official work in Hindi as per the requirement of the Official Language Act. Participation in these workshops had helped enormously in increasing the use of Hindi in the official work. After participating in these workshops, employees had started typing notes through Unicode in Hindi in the files. No. of letters sent to 'A' & 'B' regions in Hindi are increasing in each quarter. Besides this, Quarterly meetings to review the progressive use of Hindi were held regularly under the Chairmanship of Director General (BEE).

CPRI

1. Award : TOLIC RajbhashaShield - First for the year 2019-20

CPRI, Bangalore was awarded TOLIC Rajbhasha Shield – First in Category 3 (more than 50 employees) for its excellent performance in Official Language Implementation during the year 2019-20 and the shield was awarded by the Chief Post Master General, Karnataka Circle and Chairperson, TOLIC (2), Smt. Sharda Sampath, during the TOLIC meeting held on 17th March 2021 at GPO, Bangalore.

2. Inspection by the Second Sub-Committee of Committee of Parliament on Official Language at CPRI, Bangalore

The Second Sub-committee of Committee of Parliament on Official Language conducted inspection meeting of CPRI, Bangalore, on 16th April 2021. The Committee reviewed the progress made in the use of Hindi by the Institute.

3. Inspection meeting of Second Sub-Committee of Committee of Parliament on Official Language held at TRC, Nagpur

The Second Sub-committee of Committee of Parliament on Official Language conducted inspection meeting with Unit Head, Thermal Research Centre, Central Power Research Institute, Nagpur, on 28th December 2021.

The Committee reviewed the Official Language work being carried out in the Unit and suitably advised for improving the use of Official Language. Senior Officers from the Ministry were also present during the occasion.

4. Celebration of Hindi Month and Hindi Divas

Hindi Month was observed in the Institute like every year. Various competitions were organized and the officers and employees of the Institute participated with great enthusiasm in all the competitions. Prizes were distributed to the winners on the occasion of Hindi Divas Celebrations on 28th September 2021.

5. Tenders and various Publications like Annual Report, CPRI News etc. and also CPRI Website were in bilingual form

6. TOLIC Activities

Under Inter organizational competitions, CPRI conducted Cross Word Puzzle competition in Hindi on 23rd November 2021 for the employees of all Central Govt. Offices in Bangalore under the auspices of TOLIC-II, Bengaluru. The officers of the Institute have also participated in the competitions organized by other organizations under TOLIC-II, Bengaluru.

NPTI

Implementation of Official Language Policy

- NPTI and its Training Institutes are implementing the various provisions of the official language policy of the Government. Progressive usage of Hindi in Official work is being used.
- In compliance with the constitutional and statutory requirements, all documents required to be issued bilingually are being adhered to. Similarly communications received in Hindi are replied in Hindi.
- Meetings of Official Language Implementation Committee at NPTI Corporate Office and Training Institutes are convened regularly.
- Cash Award Scheme such as Incentive Scheme for original noting/drafting in Hindi has been implemented. During the year under report 09 officers/Staff of NPTI Corporate Office and its Institutes have been awarded under this scheme.
- In order to assess the progressive use of Hindi at NPTI Corporate Office and its Institutes, periodic inspections are carried out.
- In compliance with the Official Language Policy, a "Hindi Pakhwada" was celebrated in NPTI Corporate Office and its Institutes from 14-28 September, 2021. In order to step up the use of Hindi in official work, competitions in Hindi Article, Hindi Typewriting on Computers, Hindi noting and drafting etc. were organized. Officers/employees took part in the competitions and winners were conferred with certificates and cash prize.
- In order to create a conducive and inspiring atmosphere for the implementation of the Official Language Policy "Hindi Workshops" were organized at NPTI Corporate Office and its institutes.
- From the last three years, during the Hindi Week fortnight, programs for children and women of NPTI staff are also being organized.

CHAPTER 35.2

VIGILANCE ACTIVITIES/ DISCIPLINARY CASES

Ministry of Power

1. Vigilance wing of Ministry of Power deals with the complaint against officers/officials of the Ministry of Power and Board level officers of the PSUs and other offices under administrative control of the Ministry. All the complaints received in the section are registered in the Ministry/Section through E-office system. After examining the complaints relating to Board level officers of PSUs, reports are submitted to relevant agencies i.e. CVC /PMO/Cabinet Secretariat /DOPT, as the case may be. Further, complaints received from CVC under CVC Act/PIDPI are also handled on priority basis, and reported to CVC within the specified period. Pending complaint cases are monitored on regular basis. Sectoral Review chaired by Central Vigilance Commissioner was held on 02.03.2021. Subsequently, Secretary, Ministry of Power held a meeting with all the CVOs of Power Sector on 05.04.2021 through Video Conferencing to review the work being done by CVOs and monitor the progress of the Annual Sectoral Review meetings held by CVC.
2. The "Vigilance Awareness Week 2021" was observed in Ministry of Power between 26th October 2021 to 1st November, 2021 with strict adherence to extant Covid-19 prevention guidelines. This year the theme for the Vigilance Awareness Week was **"Independent India@75 : Self Reliance with Integrity"**. During the week, banners/posters of Vigilance Awareness Week alongwith slogan on vigilance theme were displayed at all the entrance and other prominent places of the Shram Shakti Bhavan, New Delhi. The occasion, started

with a pledge taking ceremony, where a pledge to maintain integrity and transparency in all spheres of work and Integrity Pledge was administered to the Officers and Staff of the Ministry by Secretary (Power) on 26th October 2021. During the Vigilance Awareness Week, the Essay Competition for the employee of the Ministry was organized on 28th October 2021 on the topic "The Role of Technology in detecting and curbing corruption". Debate competition was also organized on 29th October 2021 on the topics- (i) "Value of Integrity in eradicating corruption" (ii) "Is e-Governance sufficient to curb corruption" and (iii) "Ethics and moral education are better means to cope with corruption".

3. The security arrangements of various installations under Power Sector are reviewed on regular basis. The compliance to the security instructions/advisories received from various agencies from time to time were also ensured through appropriate communications to the concerned authorities for prompt necessary action.

PAO

One Vigilance or disciplinary cases is pending against Sh. Arnab Barua, Accounts Officer.

NTPC

NTPC has a Vigilance Department headed by a Chief Vigilance Officer(CVO) who is assisted by an ED/GM (Vigilance) at the Corporate Centre. Vigilance set up in NTPC comprises of Vigilance Executives (VEs) in Projects who report to the Project Head in administrative matters and to the CVO for functional matters. CVO advises the management in all matters pertaining to Vigilance and is the nodal officer between the company and CVC/CBI for all matters pertaining to them.

The Corporate Vigilance consists of four Cells, namely i) Investigation & Processing Cell ii) Departmental Proceedings Cell iii) Technical Examination Cell and iv) MIS Cell. The vigilance works of Regions namely ER-I, ER-II, WR-I, WR-II, NR, DBF, SR, Mining, CC and Hydro Region have been assigned to Regional Vigilance Executives (RVEs) processing of vigilance cases.

In the year 2020-21 169 complaints were received from various agencies. 181 were handled including complaints of past year. A total of 40 Detailed Investigations were carried out during the year.

Vigilance Statistical Data for Year 2021-22 (up to Dec'21)

Appropriate disciplinary actions have also been initiated against the employees involved. Several system improvements using technological innovations were also made. In addition, several surprise checks, scrutiny of files etc. were conducted during the period and recovery of Rs. 99,39,089 was affected against various



Posters displayed at main entry gate of Shram Shakti Bhawan



discrepancies detected during these preventive checks. During the current financial year, a total of 76 Workshops on Preventive Vigilance were conducted at various projects sites.

Vigilance Awareness Week-2020

Vigilance Awareness Week 2021 was observed in all the NTPC Offices and Power plants, including the Joint Ventures and Subsidiaries spread across the country from 20th October to 1st November 2021 on the given theme "Independent India@ 75: Self Reliance with Integrity. "स्वतंत्र भारत @ 75 सत्यनिष्ठा से आत्मनिर्भरता"

Vigilance Awareness Week (VAW) 2021 was formally commenced on 26.10.2021 with administration of Integrity-Pledge in all offices of NTPC. Several activities were conducted to observe VAW 2021 with strict adherence to extant Covid-19 protocols, strict compliance to the economy measures issued by the Ministry of Finance vide the Department of Expenditure OM No. 7(2)E. Coord/2020 dated: 4.9.2020. Wide publicity on VAW theme and PIDPI done through print media, radio jingles, tele-film etc. Hoardings /banners on VAW Theme and on PIDPI awareness were put up in prominent locations. Various Competitions /Activities involving employees and stakeholders, Trainings / Workshops, Vendor Meets /Grievance redressal of Stakeholders, Gram Sabhas etc. were organized.

System Improvement Measure Measures undertaken during 2021

During the year, many of the vigilance processes have been digitized for smooth functioning, better transparency and to reduce timeline for various functions. Details of such initiatives have been mentioned in a separate chapter for the year 2021.

Vigilance Activities for inclusion in separate chapters as mentioned at Para 6 of MoP letter (C/5).

NTPC-Vigilance department has taken following steps to meet the goal of digitization & improved transparency: -

1. **Vigilance Complaint Handling System:-** An online module has been developed and implemented for online handling of complaints. With its implementation all complaints are registered in online system & processing time of complaints have been significantly decreased. Real time monitoring by CVO can be done on the status of complaint through dashboard.
2. **Software for Scrutiny of Annual Property Return (APR):-** An in-house software for scrutiny of APR has been developed and implemented. Most of the APR s submitted have been scrutinized through the software.
3. **Software for Real time generation of Vigilance Status:-** An in-house software for real time generation of vigilance status of the employees against whom no adverse vigilance record has been maintained has been developed. After implementation of software, executives of Human Resource Department can auto generate vigilance status of all such employees who have no adverse entry in their Vigilance Records. more than 90% employees at their end instantly.
4. **ISO Certification:-** NTPC CC Vigilance has been awarded ISO 9000:2015 certification by in September 2021.

NHPC

The vigilance wing at NHPC is headed by Chief Vigilance Officer (CVO) , appointed by the Ministry of Power, CVO is supported by Dy. CVO of the level of General Manager and other vigilance officers from NHPC both at Corporate office and different Project/ Power stations level as per structure defined by Central Vigilance Commission (CVC)

NHPC's Vigilance Division at Corporate office has been granted ISO 9001:2015 certification for implementation of Quality management system by M/s BIS (Bureau of Indian Standards). All the procedures have been documented and system of Monitoring of Vigilance complaints and disciplinary cases has been implemented to avoid delays. During the year 2021-22, one case of disciplinary case was completed however two (02) no. disciplinary cases are in progress as of now.

Corporate Vigilance Division in association with the Vigilance Units of Project/Power station (Project Vigilance Officer-PVO's) makes continuous effort in identifying and suggesting improvements in the systems and procedures prevalent in the corporation. The requirements of systemic improvement are addressed by issuing Circulars on anomalies notices during regular & surprise inspections and examinations of other reports carried out by the Vigilance officers. Actionable points identified by the project Vigilance officers are intimate to concern head of project/ Power Station from time to time for attending the same.

In addition to above, intensive examinations of works are carried out by Chief Technical Examiner (CTE) of the CVC time to time. Intensive examinations of works, on CTE's pattern at Projects and Power Stations are also carried out by Vigilance Division.

Updation of online vigilance status in respect of senior Executives of NHPC (E-8 and above including Board Level Executives) is being done in the web portal developed by Department of Personnel & Training.

PGCIL

POWERGRID Vigilance Department is headed by Chief Vigilance Officer, who functions as the extended arm of the Central Vigilance Commission in order to assist the management in the matter of vigilance functioning. CVO, POWERGRID in turn, is assisted by Deputy CVO who is of the rank of ED, 18 executives at Corporate Centre and 31 executives at the Regional level. Vigilance Department at Corporate Centre of POWERGRID has been divided into three wings, i.e. Investigation Wing, Disciplinary Proceedings Wing and Technical Wing.

Vigilance department of POWERGRID, in tandem with management, has always endeavoured to improve vigilance administration in the organization as per the directives of the Central Vigilance Commission and Ministry of Power regarding leveraging of technology from time to time. As part of this, e-payments, e-procurement, e-reverse auction, e-billing, as also sub-vendor registration and uploading of evaluation criterion on the website, online inspection system, Vigilance Inspection Management System, Online Property Return System, as well as Document Tracking System have been inculcated within the organization.

Besides this, POWERGRID has also formulated the Whistle Blower Policy and Fraud Prevention Policy.

The organization has also adopted the Integrity Pact since 2009 in which tenders having estimated value of above ₹ 1 crore are covered. Packages having estimated cost above ₹ 1 crore are covered under the IP program and Independent External Monitors are nominated for packages having estimated cost above ₹ 100 crore.

POWERGRID Vigilance performs various vigilance functions such as Preventive, Predictive, Pro-active, Participative, and Punitive Vigilance. However, the prime focus of vigilance Department is on Preventive and Predictive vigilance and suggesting System Improvements to the management in various spheres.

As an important tool of Preventive Vigilance, 89 surprise inspections, 12 CTE type inspections and 20 process-on-line inspections were conducted by Vigilance Department during the year.

In process online inspections, critical areas of the projects/schemes are inspected and checked at the initial stage of execution and any shortcomings observed thereon are referred to the site for immediate corrective measures. Surprise inspections are conducted primarily based on source information. CTE type Inspections are conducted in line with the format of inspections of Chief Technical Examiner, CVC. CTE Type inspections cover both pre- award as well as post-award activities of the selected work projects. Pursuant to Vigilance inspections and its observations and recommendations to the management, system improvements are taken up. Continuous improvement in systems and procedures has always remained one of the hallmarks of POWERGRID.

During the year, 47 complaints were received from different sources and taken up for verification/investigation. Further, during the year, 15 departmental proceedings were initiated. As part of capacity building, workshops on Preventive Vigilance were conducted at Corporate Centre as well as in the regions for the non-vigilance officials.

Vigilance Department also pursue with the management to transfer the personnel who are working on sensitive posts and also those officials, who are in Agreed List and ODI List.

In order to spread awareness towards company's rules and procedures, property returns and other issues relevant to Preventive Vigilance, bulk SMS and e-mail are regularly sent to all the employees of the corporation from time to time.

Structured Review meetings between CVO and CMD are held every quarter. Vigilance work of the organization is being reviewed externally by CVC and Ministry of Power. Reports on monthly/quarterly basis are sent to MoP/ CVC, in line with the extant directives. Annual Sectoral Review Meeting of Power Sector held on 02.03.2021 through VC. The meeting was chaired by Central Vigilance Commissioner Shri Sanjay Kothari. CMD and CVO of POWERGRID attended the meeting. Further, follow-up meeting was also taken by Secretary (Power) with CVO POWERGRID on 05.04.2021.

In pursuance to the directions of the Central Vigilance Commission, Vigilance Awareness Week-2021 was observed in POWERGRID from 26th October to 1st November, 2021 in line with the theme

for this year "Independent India @ 75: Self-Reliance with Integrity; 'स्वतंत्र भारत @ 75: सत्यनिष्ठा से आत्मनिर्भरता'" with full vigor following all government guidelines regarding pandemic. Different activities were undertaken at all the establishments of POWERGRID.

- Vigilance Awareness Week was celebrated all over POWERGRID along with employees and their family members. Stakeholders were also involved through vendor meets, conducted at Corporate Centre and all region.
- CMD administered Integrity Pledge to employees of POWERGRID working in various locations throughout India via live video transmission. Approximately 7000 employees took the Integrity Pledge by CMD through live transmission.
- A total of 696 activities including Essay Competition, Quiz Competition, Slogan Competition etc were organized by POWERGRID for employees and their family members wherein approximately 10000 individuals participated.
- Seminars/Workshops have been conducted wherein eminent personalities have been invited for a talk in line with the theme of VAW.
- Vendor Meets through online/offline mode were organized at Corporate Centre and all regions including Substations and Project offices.
- The message of VAW 2021 was propagated through Radio Channels. Print and Electronic media including Regional language newspaper and Television Channels exclusively covered events.
- Journal of Vigilance department of POWERGRID (CANDOUR) was released in digital mode during the closing ceremony of VAW at Corporate Centre, Gurugram, which is graced by Shri Anindo Majumdar, Secretary (Retd.), CVC.

PFC

During the financial year 2021-22 (upto 31st December 2021), the Vigilance Unit has taken the following measures on preventive vigilance.

1. Achievements:

- a. As a new initiative, a vigilance corner was introduced on website of PFC and PFCCL.
- b. Inspection (surprise and periodic) of different units of the corporation were carried out.
- c. Use of Information technology as an effective tool for providing on-line services to all the stakeholders and to enhance organizational efficiency.
- d. Manuals/policies on different areas of company's activities were reviewed.
- e. Issuing of effective guidelines to streamline systems with the aim of eliminating gaps and ensuring transparency in day to day operations.
- f. Further, the detailed investigation was carried out in sixteen cases of registered complaints.



2. Review:

The performance of Vigilance Unit was reviewed by the Central Vigilance Commission, Ministry of Power, Board of Directors and CMD of PFC in addition to regular reviews undertaken by the CVO, PFC as per prescribed norms.

3. Vigilance Awareness Week:

- a. In accordance with CVC directives, Power Finance Corporation Limited observed Vigilance Awareness Week from 26.10.2021 to 01.11.2021. The activities that were organized during the week were aimed to sensitizing the employees of the Corporation about efficiency and objectivity in governance. The banners showing observance of the Vigilance Awareness Week were displayed at the prime locations in and outside the office premises. Further, theme of Vigilance Awareness Week -2021 i.e, "Independent India @ 75: Self Reliance with Integrity" was also displayed on desktops of all the employees of the corporation. Publicity of the event was also done through social media such as facebook, twitter, Instagram and newspapers including their online editions. Vigilance Unit also provided link on intranet and PFC website to take e-Pledge on Integrity and 307 employees took e-pledge on integrity.
- b. Poem Writing Competition and Slogan writing Competition were organised on the subjects related to Vigilance. These competitions were open to all regular employees of this Corporation including those posted in the regional offices. The aim of these competitions was to stimulate the creativity, imagination and originality of the employees to enable them to come out with innovative ideas about dealing with Good Governance. A workshop on the topic "Overview of PFC's Conduct Rules and PIDPI Complaints" also organised for the benefit of employees. A sensitization talk was also organized for the employees of the PFCCL by the CVO, PFC Limited. It emphasized upon constant systemic improvements, integrity and transparency in public life. The Vigilance Awareness week 2021 was successfully concluded.

REC

REC constantly endeavoured to optimize probity and integrity among employees and to promote transparency, fairness and accountability in all operational areas; REC Vigilance Division mainly aims at "Preventive Vigilance" by review of policies, rotation/transfers of employees holding sensitive posts, review of Audit Reports, review of projects/tenders/contracts awarded, inspections of Regional Offices, review of Annual Property Returns (APRs), etc. In this regard, following major activities have been carried out:

Progress made from April 1, 2021 to December 31, 2021:

- Action Taken Report (ATR) on the issues raised in Annual Zonal Sectoral Review Meeting held with the CVOs of Power Sector on March 2, 2021 through VC was sent to the Commission on July 27, 2021.
- Action Taken Reports (ATRs) were sent to CVC for one no. project on observations of the Chief Technical Examiner's Organisation (CTEO).

- Scrutiny and field visit of CSR project for "Installation of 283 KW Solar Power Plant at ShahidUdham Singh, Punjab University Constituent College, Firozpur (Punjab)" was conducted.
- Review of file relating to award of contract to M/s BVG India Limited (Service of Manpower Supply) was performed.
- 91 paras of Internal Audit (IA) reports were scrutinized during the period.
- Twelve complaints were received in Vigilance Division during the period. One complaint was resolved after detailed investigation: eight complaints were filed being pseudonymous/anonymous after following extent CVC guidelines in this regard. Two complaints have been sent for verification and one is under investigation.
- Annual Property Returns in respect of 67 executives were scrutinized and Vigilance Clearance in respect of 160 officials were accorded, involved NOC for passport/visa, promotions, forwarding of application for outside employment, notification for superannuation etc. during the period.
- Sensitive posts have been identified. HR Division has been advised to rotate identified officers working in sensitive posts for more than 3 years as per instructions of Ministry of Power.
- The thrust on leveraging of technology had been continued, as a result information relating to loans, schemes, tenders, third party bills etc. are available online.
- Prescribed periodical statistical returns were also sent to CVC and Ministry of Power on time.
- It was ensured that information/policies like tenders, requisite forms, status of loan applications, Fair Practice Code, Prevention of Fraud Policy, CSR Guidelines, Whistle Blower Policy etc. are available on REC's website.

Almost all tenders above ₹2 lakhs were processed through E-Procurement mode. E-Reverse Auction is also in process in cases where estimated value of procurement and quoted prices exceed certain parameters.

Observance of Vigilance Awareness Week:

REC limited observed Vigilance Awareness Week 2021 from October 26, 2021 to November 1, 2021 on theme "Independent India @ 75: Self Reliance with Integrity" "स्वतंत्र भारत @ 75: सत्यनिष्ठा से आत्मनिर्भरता" in line with the Central Vigilance Commission, New Delhi Circular No. 15/09/21 dated September 1, 2021. Various interesting activities were organised, both within and outside the Organisation premises, with the aim to spread awareness among the employees as well as public at large. Competitions organized included Drawing competition, Quiz, Paragraph Writing, Collage Making and Rangoli Making. Activities were also organized at Regional Offices of REC all across India and subsidiaries of REC.

Along with the above, activity of learning the art of Nest making was organised with the cooperation of the "Nest Man of India" Mr. Rakesh Khatri, founder of the NGO "ECO Roots", which is working in the field of conserving the ecosystem, environment, and biodiversity.

All employees of the Corporation were administered Integrity

Pledge on October 26, 2021. Banners, Standees, posters etc. were displayed at different locations of REC's Offices throughout India, spreading the message of Integrity, message to demonstrate corruption-free character, message to employees and public to act virtuously regardless of circumstances.

Further, the report regarding Vigilance Awareness Week was submitted to CVC in the specified format.

Disciplinary Cases:

CVC has advised initiation of Disciplinary Proceedings for Major Penalty against four executives & Minor Penalty against three executives. The Disciplinary Proceedings for Minor Penalty against three executives has been completed. The charge sheet has been issued against four executives for Major Penalty & Disciplinary Proceedings are going on.

Anticipated targets to be achieved from January 1, 2022 to March 31, 2022:

- Scrutiny/review of one Generation Project.
- Scrutiny/review of one Renewable Energy Project.
- Scrutiny/review of one Contract by RECPDCL.
- Review of audit paras/ audit reports.
- Finalization of List of Executives whose APR's to be scrutinized during 2022.
- Finalization of Disciplinary Proceedings.
- Finalisation of Agreed List and ODI List for the year 2021.

The performance of the Vigilance Division was reviewed periodically by the CVC, Board of Directors and CMD in addition to regular reviews undertaken by the CVO in accordance with the prescribed norms.

NEEPCO

During the current year up to 31.12.2021, NEEPCO Vigilance Department has dealt with various aspects of Vigilance Mechanism under the directives and guidelines issued from the Central Vigilance Commission (CVC) from time to time. For exclusive and independent functioning of Vigilance department, NEEPCO ensured transparency, objectivity and quality in vigilance functioning. Complaints received from various sources other than anonymous/pseudonymous were taken up for prompt investigation and the same have been disposed off in accordance with the time frame prescribed by the CVC. Apart from investigation of complaints received from various sources, emphasis was also given to the aspect of preventive vigilance to streamline the rules and procedures and making all efforts to arrest the loopholes detected during investigation of various cases.

As a part of preventive vigilance, various systemic improvement suggestions were given to the Management as and when found necessary. Further, clarification against the paras raised by CTE/CVC in the intensive examinations on two major works in respect of Tuirial HPS, Mizoram and Pare HPS, Arunachal Pradesh was also furnished to CTE.

For improving vigilance administration by leveraging technology, implementation of e-procurement, e-payment, registering online

vigilance complaints and uploading of Annual Immovable Property Returns (AIPRs) of Executives in the NEEPCO's website have been implemented. All the important CVC circulars/ guidelines and OMs issued during the period have also been circulated to all concerned with a view to follow up the action and improve overall system in the Corporation.

POSOCO

Transparency in decision making awareness about good governance plays an important role in building the trust of the Stakeholders and eventually in making an organization successful and sustainable. With this goal, POSOCO strives to focus mainly on Preventive Vigilance and to achieve good governance by emphasizing transparency, integrity, accountability, fairness, equity and adherence to rules, regulations and the laws of the land. The Company uses technology in the form of e-payments, e-procurement, uploading of contract documents as well as award details etc. for preventive action and ensuring transparency. From 26 October to 1 November, 2021 'Vigilance Awareness Week' was observed on the theme, "Independent India @ 75 : Self Reliance with Integrity". Various programs were conducted for creating awareness among employees, their family members, and the public at large. During the year 2021-22, 3 Preventive Vigilance programs were organized in which more than 200 employees were sensitized about the nuances of Preventive Vigilance, RTI Act and Ethical dilemma in work. There was no Vigilance case against any employee in POSOCO during the year 2021-22 till date.

SJVN

Vigilance activities are being carried out in SJVN based on the directions issued from time to time by Ministry of Power, Govt. of India and Central Vigilance Commission. A brief detail of activities taken up during the year 2021-22 are as under:

1. **Disposal of Complaints:** Four Nos of complaints were received from CVC / MoP during the year 2021. Three complaints have been disposed off and one complaint is under process.
2. **Disciplinary cases:** Only one FSA received in the month of October, 2021 and the same will be dealt within the timeline prescribed by CVC / Govt. of India.
3. **Preventive Vigilance Activities:**

Type of Inspection / Scrutiny	Completed (Nos)
Periodic Inspections	22
Surprise Inspections	24
CTE Type Inspections	3
Scrutiny of LoA	12
Scrutiny of Annual Property Returns of the Employees	146
Scrutiny of Audit Reports	5
System Improvement Undertaken	7
Training / Workshops / Awareness Program	6



4. **Vigilance Status:** The Vigilance Status is provided to HR Department and MoP/ DoPT, Govt. of India as and when requisitioned. Vigilance status of Board Level Officers is intimated to the MoP, GoI by 5th of every month. The vigilance status of two level below board level officers is updated in DoPT's Solve Portal every month and as per the priority case.
5. **Observance of Vigilance Awareness Week:** Vigilance Awareness Week (VAW)-2021 with theme of Independent India @75 : Self Reliance with Integrity has been observed with great zeal and enthusiasm from 26th October to 1st November, 2021.

THDC

Vigilance in THDCIL is a key management tool that takes organization forward in higher growth trajectory. Its function should not be viewed as impediment in achieving the objective of the company rather it should be viewed as facilitator in accomplishing its objective. Its function emphasize more on sensitizing employees of the organization to bring awareness among the employees towards transparency in day to day activity keeping in mind the Rules & Regulations.

The functions performed by Vigilance department are wide in scope and include collecting information/ intelligence about corrupt practices committed, or likely to be committed by the employees of the organization, investigating or causing an investigation to be made into verifiable allegations reported, processing investigation reports for further consideration of the disciplinary authority concerned, referring the matters to the Commission for advice wherever necessary, taking steps to prevent commission of improper practices/ misconduct, etc.

The Vigilance activities broadly being undertaken in THDCIL are as under:-

Vigilance Activities:

- Preparation of list of officers of doubtful integrity
- Preparation of "Agreed list" of officers
- Scrutiny of property returns on immovable property/ assets
- Monitoring of rotation of officials in sensitive post/ areas
- Investigation of complaints with follow-up action
- Study systems & procedures and advise the Management for cost control / reduction and to eliminate scope for malpractices
- Review of procurement of materials and service contracts
- Surprise inspections
- Undertaking CTE type inspections
- Scrutiny of audit reports
- Follow-up of CVC's instructions
- Submitting Monthly/Quarterly & Annual Reports to CVC and MOP
- Observance of Vigilance Awareness Week

Status of Registered Complaints/ Case: (01-01-2021 to 31-12-2021)

During the year 2021, Vigilance Department registered Two (02) Complaints/ Cases for investigation. Based on the investigation conducted, both the cases have been closed and in one of the case, warning has been issued to concerned official.

Disciplinary Cases: (01-01-2021 to 31-12-2021)

During the year 2021, One (01) Major Penalty and Four (04) Minor Penalties have been effected. Six (06) Warnings were issued to the concerned officials.

Letter issued on Systemic Improvements: (01-01-2021 to 31-12-2021)

Vigilance department conducts Surprise Inspections and CTE type examinations on regular basis. During the course of inquiry/ investigation, certain issues were observed and came to notice of the Vigilance deptt. Based on the observations/ learning from inspections & feedbacks, various system improvements were issued. Such issues/ matters are brought to the notice of all concerned as a Systemic Improvement, so that mistakes & procedure lapses are not repeated in future. During the period, Vigilance department issued Fourteen (14) numbers of Systemic Improvement relating to various cases.

Training in Vigilance Matters: (01-01-2021 to 31-12-2021)

During the period, Vigilance Executives attended Two (02) numbers of Training Programmes pertaining to Vigilance Administration & Disciplinary proceedings. Lecture/ workshop on 'Preventive Vigilance' were organized for 31 Executives of THDCIL at HRD centre, Rishikesh and for 29 Executives at Bhagirathipuram, Tehri. Workshops/ Seminars are also being carried out by HRD deptt., THDCIL through digital mode on web learning platform to create awareness amongst the employees on vigilance related matters.

Vigilance Awareness Week, 2021:

Vigilance Awareness Week- 2021 was observed from 26th October 2021 to 01st November 2021 with the theme for the year specified by CVC "Independent India @75: Self Reliance with Integrity". Pledge was administered by CMD to all employees in Rishikesh and by HOPs in other Projects, in which Executives/ Staff participated enthusiastically. Employees also took online E-Integrity Pledge through the hyperlink provided in THDCIL website to enable wider participation. Various competitions were conducted for employees at all projects/offices/units of THDCIL. On the occasion, the Vigilance department published a booklet "Integrity: A Way to Self Reliance" covering the Case Studies, CVC Circulars, Systemic Improvements and Write-ups. The booklet was released by CMD, THDCIL in the presence of Director (Finance) & CVO to create awareness amongst the officials.

Posters/ Banners on Anti Corruption & Vigilance awareness were displayed at prominent locations in Projects/ Offices and Townships of THDCIL. Media/ Social media platforms were extensively used through Print media, Whatsapp, Twitter, Facebook etc. for spreading awareness.

Covid-19 prevention guidelines were adhered to & followed in all projects/ units during the observance of Vigilance Awareness Week -2021.

DVC

The Vigilance Department of DVC has been striving to bring about objectivity, transparency and accountability for the purpose of promoting good governance. The details of various activities taken up in the year 2020 is summarized below:

1. Inspection of works, services, contracts etc.:

Total 117 Periodic Inspection & 81 Surprise Inspection have been carried out this year. Points emerged in course of inspections were brought to the notice of the concerned HODs/HoPs and other officials for suitable corrective and administrative actions & also taking up as a measure of systemic improvement.

2. Disposal of Complaints:

Total 63 no. complaints have been received during the period, amongst which 58 nos. have been disposed of and rest complaints are at the various stages of investigation.

3. Disciplinary Cases:

During this period, on conclusion of departmental proceedings major penalty have been imposed upon 06(six) officers.

4. Vigilance Awareness Week(VAW):

Pursuant to the directives of the Central Vigilance Commission vide its Circular no. 09/09/2020 dtd.08.09.2020, the Vigilance Awareness Week (VAW)-2020 was observed with effect from 27.10.2020 to 02.11.2020 in Damodar Valley Corporation (DVC) at its Head Quarter at Kolkata & different field formations/projects, with the theme सतर्क भारत, समृद्ध भारत "Satark Bharat, Samriddh Bharat (Vigilant India, Prosperous India)." Different activities viz lectures/debates, slogan/ essay/ quiz/ painting competitions were carried out on online mode. Besides, as per the directives of the CVC & MoP, indicative list of areas/ activities like land management, allotment of houses/quarter & related issues, payments and other benefits to persons working in outsourced services in the organization, management of Assets, gender sensitization issues, leveraging technology – IT usage & E-governance, updation of rules, regulations and guidelines etc. were taken up in campaign mode as a part of Vigilance Awareness Week.

5. Systemic Improvement:

Following recommendations were made/ system improvements suggested by the Vigilance Department to increase transparency and objectivity in the existing procedures-

- 1) (a) On the basis of suggestion extended by Vigilance Department on banning of business dealing, an Office Memorandum has been issued by C&M Department clarifying banning order against any vendor in any Project which will be applicable across all establishments of DVC.

- (b) As suggested by Vigilance Department, instruction has been issued by C&M Department to all concerned to circulate the banning order issued against any agency in an establishment, to all establishment in DVC including HQ/C&M., so that uniform decision can be taken by each establishment.

- 2) As suggested by the Vigilance Department, provision has been made for incorporation of put to use certification tab in the indent screen of C&M module so that actual status in real time in the inventory is reflected.
- 3) A suggestion has been made to ensure checking of measurement of Weigh Bridge by comparing it with standard weight on daily basis & provision regarding immediate transfer of data regarding truck number and its weight to the concerned section online in real time.
- 4) On the advice of the Vigilance Department, guidelines has been issued by the HR Department vide letter dtd. 30.12.2019 regarding denial of vigilance clearance for the purpose of promotion, financial upgradation, foreign training/visits, issuance of NOCs for various purposes, in the event of failure to submit Annual Property Return(APR) within stipulated time period.
- 5) As per suggestion of Vigilance Department, provision has been made in EBA system so that there shall be no scope for generation of multiple code for same material and code should be accessible to all indentors instead of restricting it to O&M group only.
- 6) It has been suggested that the guideline issued by the C&M Department. DVC vide OM No. HQ/ED(C&M)/W&PM/549 dtd. 13.10.2017 regarding formation of screening committee for control of inventories may also be extended in r/o indents valuing less than Rs.2 lacs and less than the threshold limit of Rs. 25 lacs, as the case may be, to check the overall inventories.
- 7) On the advice of the vigilance Department, guidelines have been issued to the effect that medical bills /cash memos submitted by the DVC employees & pensioners shall mandatorily have a GST number without which the claim will not be processed.
- 8) It has been suggested that in case an agency is put on banning list after opening the price bid, the bid submitted by the agency shall not be considered any further even if the agency is lowest (L1) bidder.
- 9) It has been suggested that it is to be made obligatory on the part of Tender Committee to apply due diligence and make assessment of reasonability of rate quoted by L1 bidder irrespective of rate quoted by the bidder.
- 10) On the suggestion of Vigilance Department, SOP on weigh bridge was prepared & issued by the Fuel Department.

BBMB

The Vigilance Administration in Bhakra Beas Management Board comprises of a Chief Vigilance Officer (CVO), NTPC, holding additional charge of CVO, BBMB and Four Vigilance Officers (VOs)



viz-a-viz One No. Dy. CVO, One No. Dy. Director, Two Nos. ADs, who have been posted under CVO to carry out the vigilance work. Any complaint(s) received is got investigated by the VOs and based on finding/record appropriate action is recommended with the approval of CVO.

The Vigilance Organization in BBMB is making earnest efforts to inculcate the following principles among all the employees of BBMB, as a measure of preventive vigilance:-

- (i) To check and control the tendency to delay matters.
- (ii) To record speaking orders in clear terms on the files giving merits of the orders.
- (iii) To avoid decisions being influenced due to vested interest.
- (iv) To be receptive to any suggestion by a colleague, superior or a subordinate this may result in savings to the exchequer.
- (v) To be firm in conviction that integrity is to be safeguarded at any price.
- (vi) Identification and focus on sensitive spots, regular and surprise checks/inspections of such spots.
- (vii) Identification of officials suspected of corruption, and proper scrutiny of personnel who are posted in sensitive posts which involve public dealing, establishment and purchase related work and ensure their rotation after every 3 years as per CVC guidelines.
- (viii) To keep a watchful eye on all breeding grounds of corruption.
- (ix) To expose without fear those involved in acts of self-gratification.
- (x) To take pride in humble living and acts of honesty.
- (xi) To follow the rules, procedures, instruction, manuals, etc meticulously.
- (xii) To avoid drawing illogical and dubious inferences so as to derive undue benefits whenever an ambiguity in rules is encountered.
- (xiii) Agreed list & list of doubtful integrity are prepared and it is ensured that officers /officials of doubtful integrity are not posted on sensitive posts.
- (xiv) Expedite the inquiries, their follow-up action to get decision from parent States/State Electricity Boards.
- (xv) Implementation of disciplinary action without any delay.
- (xvi) Various advisory are issued for system improvement in BBMB.
- (xvii) Circulars for improving awareness as well as system improvement in working of BBMB are also taken up from time to time.

During the year 2021-22 (01/04/2021 to 31/12/2021), 33 no. complaints were received. 28 no. complaints have been disposed off and 05 no. complaints are under investigation.

Besides above, Vigilance Awareness Week – 2021 was observed w.e.f. 26.10.2021 to 01.11.2021 in BBMB offices at Chandigarh as well as at Project Stations. Various activities as the part of Vigilance Awareness Week in campaign mode were also conducted with theme “Independent India@75: Self Reliance with Integrity” at Chandigarh, Nangal, Talwara, Sundernagar, Panipat and Bhiwani.

BEE

During the year 2021-22, there were no major complaints received and no disciplinary case initiated.

CPRI

Ms. Trishaljit Sethi, IPoS, CVO of NTPC was assigned with additional charge of CPRI.

‘Vigilance Vision’ of CPRI is preventive over punitive actions, to enforce meaningful, workable and objective systems/procedures, to develop trust and transparency in all transactions, to prevent financial or other losses due to any malpractices, to promote pride and self-esteem of the Organization and its employees and time bound action in all spheres of activities.

System Improvements have been undertaken with IT usage and web enabled technologies like display of Status of booking of test dates is available in CPRI website. Technology communication with customers thorough emails, payment of test and consultancy fees through wire transfer, RTGS, e-tendering, posting of formats for submission of research proposals, project reports in CPRI website. Transparency in the technical, financial and administrative activities of CPRI is ensured.

NPTI

Vigilance Activities

Vigilance Awareness Week 2021 was organized in all the Institutes of NPTI from 26th October, 2021 to 1st November, 2021 with the theme “Independent India @ 75 : Self Reliance with Integrity: “स्वतंत्र भारत @ 75 : सत्यनिष्ठा से आत्मनिर्भरता”.

During the week number of activities were organized starting from the pledge taking to conducting online workshop on “Procurement Procedures under GeM” was organized on 27-10-2021” in an online with all the Institutes of NPTI.

Disciplinary cases

There were 14 disciplinary cases for major penalty proceedings under Rule ‘14’ of CCS (CCA) Rules, 1965. Out of which, 05 cases have been decided and in 01 case proceedings have been completed and the decision of Disciplinary Authority is awaited.

CHAPTER 35.3

ACTIVITIES RELATING TO WOMEN EMPLOYEES

Ministry of Power

There are 45 women employees in the Ministry of Power. The representation of women employees at various levels in the Ministry of Power as on 01.1.2022 is indicated below:

Group	Total Employees (as on 01.01.2022)	No. of Women employees	Percentage of overall staff strength
A	63	12	19.04
B	123	21	17.07
C	43	07	16.27
C (MTS)	47	02	4.25
Total	276	42	15.21

Employment of women in various grades in the Ministry of Power is dependent upon the nominations received from DOP&T and the recruiting agencies such as the Union Public Service Commission, Staff Selection Commission etc.

A Complaints Committee exists in the Ministry of Power and all the Power sector PSUs/ organisations to look into the complaints of sexual harassment made by the women employees of the Ministry. The Committee is currently chaired by Deputy Secretary Level Officer.

Ministry of Power and its organisations/PSUs have the provision of Maternity and Child Care leaves for all the female employees. Equal opportunities are provided for women employees in career advancement. Several initiatives have been taken to educate the woman of their rights and also sensitise men with regard to their responsibility on the subject.

International Women's Day is celebrated every year in all the PSUs/ Organisations.

PAO

Representation of women is as given below:-

Group	Total employees as on 31.12.2021	Number of women employees	Percentage of overall staff strength
A	4	01	25%
B	42	09	21.42%
C	24	5	20.83%
Total	70	15	21.42%

PSUs and Organisations

In view of the principle of gender equality as enshrined in the Indian Constitution, various steps have been adopted for positive discrimination in favor of women in power sector PSUs for ensuring their advancement in different spheres.

The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act 2013 has been brought to the notice of all concerned in PSUs and organisations for prevention of sexual harassment of working women. It is ensured that there is no discrimination against women on any count. In order to create awareness regarding female employees' rights, exclusive adequate training programs on women empowerment and development, including programs on gender sensitization are organized. Female employees are encouraged to freely participate in all activities like meetings, conferences/ seminars, exhibitions, competitions, training etc. which help in their integration. Various welfare activities for women have been undertaken by different PSUs like installation of sanitary pad dispensers in the washrooms, allotting designated parking space for expectant mothers, serving food on the table for pregnant ladies etc. so that a congenial atmosphere can be created to enable women employees to perform their duties with honor, dignity and without fear.

PSUs organise regular workshops for female employees to help them manage work stress and related challenges. A 2 day workshop was organized by THDC on Menstrual and Reproductive health. Awareness programs on POSH Act, 2013 were also conducted for the female employees.

Some of the PSUs like DVC, and THDC are life time members of Women in Public Sectors (WIPS) under aegis of Standing Conference of Public Enterprises (SCOPE) for the growth of women in public sector.

DVC participated in a one-day Training Program on theme "Wings for Women" at IOCL, Kolkata organized by WIPS- Eastern Region on 9th November 2020.

Representation of women employees in PSUs/organisations are given below:

NTPC

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength (%)
A	11,599	799	6.9
B	3,050	240	7.9
C	2,777	173	6.2
D	422	41	9.7
Total	17,848	1,253	7.0



NHPC

Group	Total Employees as on 31.12.2021	No. of female employees	% of overall staff strength
A	3021	254	8.41
B	334	46	13.77
C	1357	126	9.29
D	461	115	24.95
S	34	11	32.35
Total	5207	552	

PGCIL

Group	Total no. of Employees as on 31/12/2021	No. of Women Employees	% of overall Staff strength
A	4447	405	9.1%
B	1890	146	7.7%
C	2141	109	5.1%
D	77	9	11.7%
Total	8555	669	7.8%

PFC

Group	Total Employees (as on 31.12.2021)	Number of women employees	Percentage of overall staff strength
A	481	97	20.17%
B	6	2	33.33%
C	16	1	6.25%
D	0	0	0.00%
Total	503	100	19.88%

REC

Group	Total Employees as on December 31, 2021	No. of Women employees	Percentage of overall staff strength
A	390	67	17.18
B	16	0	0.00
C & D	35	5	14.29
Total	441	72	16.33

NEEPCO

Group	Total Employees as on 31/12/2021	Number of Women employees	Percentage of overall staff strength
A	605	54	18.28%
B	563	114	
C	477	106	
D	56	37	
Total	1701	311	

* Total number of employees is excluding 4 Board Level Directors.

POSOCO

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength
Total	616	81	13%

SJVNL

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength
Executive	833	72	8.64
Supervisors	261	40	15.32
Workmen	288	37	12.85
Total	1382	149	10.78

THDCIL

Group	Total Employees (as on 31/12/2021)	Number of Women Employees	Percentage of overall staff strength
Total	1673*	107*	6.39%*

DVC

Group	Total Employees as on 31.12.2020	Number of Women employees	Percentage of overall staff strength	
			Group-wise	Total-wise
Group A	2311	116	5.02%	1.75%
Group B	3402	224	6.58%	3.38%
Group 'C' & 'D'	914	104	11.38%	1.6%
Total	6627	444	6.70%	

BBMB

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength
A	402	46	11.44
B	781	146	18.69
C	2345	248	10.57
D	2657	337	12.68
Total	6185	777	12.56

BEE

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength
A	16	02	12.5%
B	09	05	55.55%
C	01	-	-
D	--	-	-
Total	26	07	26.92%

CPRI

Group	Total Employees as on 31.12.2021	Number of Women employees	Percentage of overall staff strength
A	165	28	16.97
B	132	21	15.91
C	151	16	10.60
Total	448	65	14.51

NPTI

Group	Total employees as on 31/12/2021	No. of women employees	% age of Overall Staff strength
A	83	09	10.84
B	28	11	39.28
C (including MTS)	70	09	12.85
Total	181	29	16.02



750 MW Rewa Solar Park, Madhya Pradesh

CHAPTER 35.4

PERSON WITH DISABILITIES (PwD's)

Ministry of Power

Ministry of Power provides reservation for the Persons with Disabilities in appointments in accordance with the instructions issued by Government from time to time. The implementation of the reservation policy for Persons with Disabilities in the Ministry and various organizations under its administrative control is monitored by Director (SC/ST) of the Ministry.

The representation of Persons with Disabilities in the Ministry as on 01.01.2022 is as under :

Group	Total Employees (as on 01.01.2022)	Persons with Disabilities Employees				Percentage of Persons with Disabilities employees
		VD	HD	OD	Total	
A	63	0	0	0	0	0
B	123	0	0	1	1	0.81
C	43	0	0	1	1	2.32
C (MTS)	47	1	0	2	3	6.38
Total	276	1	0	4	5	1.81

VD - Visually Disabled (Handicapped), HD - Hearing Disabled (Handicapped), OD - Orthopedically Disabled (Handicapped).

PAO

The representation of Physically Challenged Employees is as below:-

Group	Total employees as on 31.12.21	Physically challenged employees				Percentage of persons with Disabilities employees
		VD	HD	OD	Total	
Group A	4*	-	-	-	-	-
Group B	42	-	-	1	1	2.27%
Group C	24**	-	-	-	-	-
Total	70	-	-	1	1	1.43%

PSUs and Organisations

At all power sector PSUs/organizations, reservation and relaxation is provided to Physically Challenged Employees in direct recruitments as per guidelines issued by DoPT/Ministry of Social Justice & Empowerment from time to time. Reservation rosters are maintained for direct recruitment and promotion as applicable, which are periodically inspected by Ministry of Power and other concerned authorities. Vacancies for PwDs are notified as per reservation rosters, maintained in line with government directives/notifications.

All the PSUs/organisations are taking effective steps towards providing necessary provisions in office premises for facilitating easy access to persons with disabilities, and engraving names in Braille script for the comfort of visually disabled persons. Liaison Officers and Grievance Redressal Officers have been nominated to look after the welfare of persons with disabilities.

It is ensured while allocating work that physically challenged employees with due consideration have minimum inconvenience in discharging their official responsibilities. The GOI provisions for challenged employees are compiled with like special Transport Allowance at the rate of double the normal rate admissible to normal employees, ramp facilities in the buildings for their smooth movement at work places and so on.

In addition, some PSUs/Organisations are providing following welfare schemes to PwDs:

Grant of Financial Assistance for vocational Training to those who get physically handicapped while in service.



Reimbursement of charges for purchase of hearing aid is allowed to the employees and their dependents and reimbursement of Cost of Artificial Limbs on case to case basis.

Restriction of age is not applicable in respect of physically/mentally retarded children for considering him/her as a dependent for medical claims/treatment.

Physically challenged employees and employees who have disabled child may be exempted from the rotational transfer subject to administrative constraints.

Lifetime medical facility to the mentally or physically totally invalid dependent children having 40% or more of one or more disabilities in respect of retired/deceased employees under NHPC Retired Employees' Health Scheme.

The representation of Physically Challenged Employees in Power sector PSUs/Organisations is given below:-

NTPC

Representation of Physically Challenged Employees in NTPC is shown below:

Group	Total Employees as on 31.12.2020	Divyang/ Physically challenged employees				Percentage of Divyang/ physically challenged employees
		VD	HD	OD	Total	
A	11,599	137	12	17	166	1.4
B	3,050	51	8	17	76	2.5
C	2,777	76	54	45	175	6.3
D	422	26	20	30	76	18.0
Total	17,848	290	94	109	493	2.8

NHPC

Group	Total Employees as on 31.12.2021	Physically challenged employees				Percentage of physically challenged employees
		VD	HD	OD	Total	
A	3021	11	2	79	92	3.05
B	334			10	10	2.99
C	1357		1	4	5	0.37
D	461	1		5	6	1.30
S	34				0	0
Total	5207	12	3	98	113	

PGCIL

Group	Total Employees as on 31/12/2020	Physically Challenged Employees				Percentage of Persons with disabilities
		Visually Disabled (VD)	Hearing Disabled (HD)	Orthopaedic Disabled (OD)	Total	
A	4378	6	23	65	94	2.1%
B	1698	0	0	31	31	1.8%
C	2602	6	14	59	79	3.0%
D	78	1	0	1	2	2.6%
Total	8756	13	37	156	206	2.4%

PFC

Group	Total employees (as on 31.12.2021)	Persons with Disabilities (PWDs) Employees	Percentage of overall staff strength
A	481	16	3.33%
B	6	0	0.00%
C	16	1	6.25%
D	0	0	0.00%
Total	503	17	3.38%

REC

Group	Total Employees as on December 31, 2021	Persons with Disabilities Employees				Percentage of persons with disabilities employees
		OD	VD	HD	Total	
A	390	10	0	1	11	2.82
B	16	0	1	0	1	6.25
C	35	0	1	0	1	2.86
Total	441	10	2	1	13	2.95

NEEPCO

Group	Total Employees as on 31/12/2021	Persons with Disabilities Employees				Percentage of Persons with Disabilities employees
		VD	HD	OD	Total	
A	605	3	3	7	13	2.65%
B	563	6	6	5	17	
C	477	3	3	1	7	
D	56	0	2	6	8	
Total	1701	12	14	19	45	

POSOCO

Group	Total Employees as on 31/12/2021	Divyang Employees				Percentage of Persons with Disabilities employees
		VD	HD	OD	Total	
Total	616	3	1	14	18	3%

SJVNL

Group	Total Employees as on 31/12/2021	Divyang Employees				Percentage of Divyang
		VD	HD	OD	Total	
Executives	833	4	4	9	17	2.04
Supervisors	261	0	1	2	3	1.15
Workmen	288	3	2	4	9	3.12
Total	1382	7	7	15	29	2.09



THDCIL

Group	Total Employees (as on 31st Dec-21)	Person with Disabilities				% of person with Disabilities
		VD	HD	OD	Total	
Total	1673	5	6	17	28	1.67%

DVC

Group	Total Employees as on 31/12/2020	Persons with Disabilities Employees				Percentage of Persons with Disabilities employees
		VD	HD	OD	Total	
Group A	2311	0	0	20	20	0.86%
Group B	3402	03	1	25	29	0.85%
Group 'C' & 'D'	914	0	0	05	05	0.55%
Total	6627	03	01	50	54	0.81%

BBMB

Group	Total Employees as on 31.12.2021	Physically challenged employees				Percentage of physically challenged employees
		VD	HD	OD	Total	
A	402	-	-	1	1	0.29
B	781	-	-	8	8	1.02
C	2345	2	-	27	29	1.23
D	2657	2	2	25	29	1.09
Total	6185	4	2	61	67	1.08

BEE

Group	Total Employees as on 31.12.2021	Persons with Disabilities Employees				Percentage of Persons with Disabilities Employees
		VD	HD	OD	Total	
A	16	-	-	01	01	6.25%
B	09	-	-	01	01	11.11%
C	01	-	-	-	-	-
D	--	-	-	-	-	-
Total	26	-	-	02	02	7.69%

CPRI

Group	Total Employees as on 31.12.2021	Persons with Disabilities				Percentage of physically challenged employees
		VD	HD	OD	Total	
A	165	-	-	5	5	3.03
B	132	1	-	2	3	2.27
C	151	-	2	3	5	3.31
Total	448	1	2	10	13	2.90

NPTI

Group	Total Employees as on 31.12.2021	Physically challenged employees				Percentage of physically challenged employees
		VD	HD	OD	Total	
Group A	83	-	-	02	02	2.40
Group B	28	-	-	01	01	3.57
Group C (including MTS)	70	01	01	04	06	8.57
Total	181	01	01	07	09	4.97



36 MW Floating Solar Project - Visakhapatnam, NTPC

CHAPTER 35.5

RECREATION ACTIVITIES

Ministry of Power

Recreation is essential to promote positive behavior, which leads to opportunities for learning and living a balanced, productive life. Recreation is also an important process that helps refresh and reinvigorate both the body and mind.

Ministry of Power gives significant importance to the physical and mental well-being of its employees. The Recreation Club organizes many sports and cultural events each year.

The employees of Ministry of Power actively participate in the recreation activities of sports and take active part in Inter Ministry and Inter- CPSU Tournaments. During the year 2021, only a few sporting events could be played due to the covid-19 pandemic.

NHPC

To ensure a quality living for the employees, residential township in NHPC Corporate Office/Projects/Power Stations has already been constructed and occupied. To further add value to the quality of life, well equipped Medical/Health centre, yoga centre, Recreation centre and community centre with all the facilities including gymnasium, sports facilities etc. have been established in the township.

Further, NHPC teams have been taking part in different disciplines in various tournaments and cultural meets organized by Power Sports Control Board (PSCB).

Recreational cultural and sports activities are being organized during different occasions for improving inter – personal relations and also to bring out the talent of employees and their family members.

PGCIL

POWERGRID strives to create employee-friendly workplaces mindful of the balance between work and personal lives, where a diverse workforce can fully demonstrate their capabilities. As part of our efforts to create a corporate culture in which employees can work in the best of physical and mental health with the objectives of generating high productivity, high-quality output, new value creation as well as allowing diverse employees to work with enthusiasm.

POWERGRID has been working towards expanding programs that help employees to maintain the balance between work and personal life through the creation of programs providing benefits like POWERGRID Employee Welfare Association (PEWA), Mahila Samitis in substation, Regional Headquarters & Corporate Centre.

Cultural programmes and recreational activities were conducted in virtual mode for promoting healthy community living like Kavi Sammelans, musical night on Raising Day, etc.

PFC

PFC is committed towards holistic personality development of its employees through facilities like Gymnasium, Library, Table Tennis and participation of employees in various sports, cultural and literary activities. PFC being a member of Power Sports Control Board (PSCB), PFC employees participate with full vigour and enthusiasm in various Inter-CPSU sports tournaments organized by the PSCB member organisations every year.

In the wake of restrictions on physical gatherings, various recreational activities were organised through online mode as a part of Hindi Month observance during Sep.-Oct. 2021 which were aimed at encouraging the use of official language among employees. Competitions such as Spelling Correction, Poetry Recitation, Slogan Writing and Dictation Writing were organized during Hindi Month. PFC also observed Vigilance Awareness Week by organizing virtual competitions for PFC employees during Oct.- Nov., 2021.

Employees also explored their love for writing, photography, etc. during the period through active engagement with 'Urja Deepti' – a quarterly magazine of PFC. Entries selected for the magazine are also rewarded to encourage the employees for frequent engagement with the recreational activities and promotion of the official language.

To ensure a healthy lifestyle, regular yoga sessions are also conducted for the interested employees through online mode.

REC

REC believes that the health of an employee is best investment that a Corporation can make. The Corporation has therefore taken several initiatives for inculcating healthy living habits and providing periodical break from work to employees to relax the body and mind. The Corporation has a well-equipped Gym at the Corporate office and also several Regional Offices, where employees are encouraged to work out and maintain their fitness levels. To inculcate the spirit of team work and physical fitness, employees are encouraged to take part in various sports events like Carrom Board, Chess, Cricket, Badminton, Table Tennis, Kabaddi and athletics organized in house and also by other CPSUs. They are also provided facilities for excursion trips/Picnics, where employees along with their spouse and children can go out to nearby locations.

For enhancing the mental agility, the Company encourages the employees them to take part in various quizzes, paper presentation and business simulations competitions/games etc. conducted by reputed institutions.

During the year 2021, due to the COVID Pandemic while outdoor



activities and sports events could not be held, however, a number of recreational and other activities like Online Quizzing, Singing Competitions, programmes on physical exercises, yoga etc. were conducted for employees as well as their family members to keep the employees engaged and in good health both physically and psychologically.

NEEPCO

In order to provide recreational facilities to the employees and their family members, NEEPCO Recreational Club has been established in all Power Generating Stations of the Corporation. Various events are held amongst the employees and their wards under the Cultural, Sports and Art etc. from time to time. Celebrations on Foundation Day of the Corporation and during other local festivals are held in these Stations under the aegis of the respective Recreation Club.

The Corporation is a member of the Power Sports Control Board and participates in different Inter CPSU Tournaments such as Badminton, Table Tennis, Chess, Carrom, Bridge, Cricket etc. The Corporation also sponsors local Football Tournament/Sporting events organized by different sporting bodies in the North Eastern Region.

During the FY 2021-2022, NEEPCO participated in the 25th Inter CPSU Bridge Tournament hosted by NHPC w.e.f. 21.10.2021 to 23.10.2021 and 24th Inter CPSU Carrom Tournament hosted by THDC India Ltd. w.e.f. 08.11.2021 to 12.11.2021.

The Corporation has established wellness centers with multi gym facility in all Power Stations of the Corporation. Medical Camps/ Health Checkup, expert talks on health issues including holding of Yoga Camps are also organized in different Offices/Power Stations.

SJVNL

Recreational Activities in SJVN: Due to CoVID-19 pandemic, external sports and active recreation activity were undertaken in restrictive mode during 2021-22. Indoor games like carom, chess, table tennis, etc., are being organized through sports council. Further, to keep the employees fit and healthy, a daily yoga activity is done by employees in the office/work places for 10-15 minutes before lunch break and all employees of SJVN actively take part in this yoga break.

THDC

THDCIL has a dedicated welfare department for implementing welfare policies aiming at increasing the wellness quotient of its employees. THDCIL believe in "People First" approach. Many welfare activities were organized during 2021 namely-

- ICPSU Carrom Tournament

- Diwali Mela
- Dussehra Mela
- Marathon Walk

Moreover, when Covid-19 was on declining, several online as well as offline welfare activities were organized, according to prevailing government guidelines as given below-

- Foundation Day celebrated with minimum gathering
- Online Suggestion Mela
- Award and Rewards for motivating employees
- Online participation in Regional and National QC Conventions
- Celebration of days like International Yoga Day, Constitution Day, Rashtriya Ekta Diwas etc. with the adherence of Covid-19 guideline issued from time to time by the Govt. of India, State Govt. and District Administration.
- Online activities like Essay/Slogan/Quiz Competition In addition to that, canteen, gymnasium facility, Parks, Badminton court and TT facility in Officers club is available to the employees and their family members for their recreation in accordance to Covid-19 guidelines, issued from time to time.

BBMB

Various recreational facilities have been provided at BBMB projects & other stations for the welfare of employees. Well-equipped Officers club and staff club have been provided at the project stations with facilities for indoor games as well as outdoor games, along with an Open Air Gymnastic Indoor stadium at Nangal. Regular Intra-BBMB tournaments in respect of various sports are held from time to time and selected teams are deputed to participate in Inter-Power utility tournaments. Moreover well-developed parks have been provided in BBMB colonies for relaxation and recreation.

Inter CPSU Sports were scheduled to held from December 2021-February 2022 at Delhi, Bangalore, Kolkata, Guhati & Nangal but the same are postponed due to sudden surge of Covid-19 & concerned guidelines/ advisories issued by concerned state governments.

HINDI AWARDS:

Bhakra Beas Management Board (BBMB) has received two first prizes (CE/System Operation for the year 2018-19 & CE/Transmission System for the year 2019-20) and one second prize (Director/P&D (PPs) under System Operation for the year 2019-20 under 'B' Zone at Rajbhasha Conference and Prize Distribution Function organized by Department of Official Language, Ministry of Home Affairs, Government of India was held at Kanpur (UP) on 27.11.2021.

CHAPTER 35.6

WELFARE OF SC/ST/OBCs & MINORITIES

Ministry of Power

Welfare of Minorities

The schemes, as recommended by the Government for the welfare of the Minorities from time to time, are implemented, from time to time.

Welfare of Scheduled Castes, Scheduled Tribes and Other Backward Classes

An SC/ST Cell has been functioning in the Ministry since the early nineties under the direct control of the Director/DS (SC/ST), who is also the Liaison Officer for Scheduled Castes and Scheduled Tribes. SC/ST Cell assists the Liaison Officers for SCs/STs & OBCs. The Cell monitors the implementation of reservation policies of the Government of India in respect of Scheduled Castes, Scheduled Tribes, Other Backward Classes, Persons with Disabilities, Minority Community, Ex-Servicemen and Economically Weaker Section in the Ministry, as well as Autonomous Bodies/CPSUs under the administrative control of the Ministry of Power.

The total strength of employees and representation of Scheduled Castes, Scheduled Tribes and Other Backward Classes in the Ministry of Power as on 01.01.2022 is indicated below:

Group	Total number of Employees (as on 01.01.2022)	Representation					
		SCs	SCs%	STs	STs%	OBCs	OBCs%
Group A	63	16	25.39	2	3.17	6	9.52
Group B	123	30	24.39	3	2.43	27	21.95
Group C	43	13	30.23	1	2.32	5	11.62
Group C (MTS)	47	22	46.80	2	4.25	6	12.76
TOTAL	276	81	29.34	8	2.89	44	15.94

PAO

Representation of SC/ST/OBC may be indicated in Performa given below:-

Group	Total employees as on 31.12.21	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Group A	4*	2	50%	-	-	-	-
Group B	42	8	19.04%	3	7.14%	3	7.14%
Group C	24**	2	8.33%	2	8.33%	4	16.66%
Total	70	12	17.14%	5	7.14%	7	10%

Remarks:- Sr. AOs/AOs/AAOs = 23 (7+16)

* 02 the post of Senior Accounts Officer in Central Civil Accounts Service is classified as Group 'A' post vide Ministry of Finance, Department of Expenditure I.D Note No. A-12034/7/2017-Ad.I dated 25.10.2019 issued with the approval of Hon'ble Finance Minister subsequently O/o CGA vide O.M No. A-32014/2009/ Misc/MF.CGA(a)/Gr.B/343 dated 31.10.2019.

**One LDC has been technical resigned on 08.11.2021(F/N).

NTPC

Representation of SC/ST/OBC in NTPC is given below:

Group	Total Employees as on 31/12/2020	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	11599	1701	14.7	701	6.0	2594	22.4
B	3050	492	16.1	262	8.6	410	13.4
C	2777	404	14.5	222	8.0	1047	37.7
D	422	110	26.1	52	12.3	109	25.8
Total	17848	2707	15.2	1237	6.9	4160	23.3



NHPC

Representation of SC/ST/OBC may be indicated in proforma given below:-

Group	Total No of Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	3021	512	16.95	233	7.71	680	22.51
B	334	40	11.98	9	2.69	62	18.56
C	1357	133	9.80	73	5.38	78	5.75
D	461	74	16.05	33	7.16	18	3.90
S	34	31	91.18	1	2.94	0	0.00
Total	5207	790		349		838	

PGCIL

Details are given below:-

Group	Total Employees (as on 31/12/2021)	Representation					
		SC	SC%	ST	ST%	OBC	OBC%
A	4447	666	15.0%	315	7.1%	1086	24.4%
B	1890	256	13.5%	198	10.5%	537	28.4%
C	2141	343	16.0%	211	9.9%	792	37.0%
D	77	16	20.8%	7	9.1%	22	28.6%
Total	8555	1281	15.0%	731	8.5%	2437	28.5%

Above data includes regular manpower in POWERGRID through en-masse transfer of employees by process of absorption from various constituent organizations during its formation (i.e. 23.10.1989, in which POWERGRID had no control) as well as all recruitment carried out by POWERGRID. As per government directives, reservation does not apply to appointments made by permanent absorption. Therefore, permanent absorption of employees did not take place in accordance with percentages of reservation prescribed for reserved categories. However, in all recruitment carried out by POWERGRID, the Govt. guidelines on reservation norms with respect to prescribed percentage of reservation have been strictly followed.

POWERGRID is committed to implement the reservation policy in recruitment and promotion as per Govt. directives for fulfillment of reservation for Scheduled castes, Scheduled Tribes and Other Backward classes (NCL). To achieve prescribed percentage of reservation of such categories in recruitment and ensure that reserved categories are not deprived of reservation, various relaxations as admissible are provided to SCs, STs and OBCs (NCL) etc. in all recruitment in the Corporation. POWERGRID has strictly adhered to the prescribed reservation in all its recruitment since inception.

Besides providing employment, periodical training is also imparted for these categories of employees in order to empower them handling key responsibilities. Exclusive refresher and awareness programmes are organized for reserved category employees to acquaint them with reservation policies, welfare guidelines, company policy on recruitment, systems and processes etc. The awareness programmes exclusively for reserved category employees are conducted to acquaint them with provisions of reservation policy.

MINORITIES WELFARE

POWERGRID, being a 'Maharatna' Central Public Sector Enterprise, gives high priority to its responsibility to promote welfare of minorities. The Government's directives on giving due considerations to minorities in recruitment are scrupulously followed in the Corporation. These instructions include association of one member belonging to minority community in Selection Boards/ Committees, advertisement for vacancies in local language etc.; also, submission of Annual Reports regarding recruitment of Minorities prescribed by Government within time limit set for this purpose. The employees of the Corporation belong to different minority communities. Their integration into mainstream workforce is ensured by way of their participation in all business activities. There is no discrimination on account of their minority status. All employees are treated at par in terms of providing facilities like residential accommodation, promotion, training, transfer etc.

PFC

Representation of SC/ST/OBC may be indicated in proforma given below:-

Group	Total employees as on 31.12.21	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	481	86	17.88%	30	6.24%	93	19.33%
B	6	1	16.67%	1	16.67%	0	0.00%
C	16	2	12.50%	1	6.25%	3	18.75%
D	0	0	0.00%	0	0.00%	0	0.00%
Total	503	89	17.69%	32	6.36%	96	19.08%

PFC as a part of its social responsibility makes all efforts to ensure compliance of the Directives and Guidelines issued by the Government of India from time to time pertaining to the welfare of SC/ ST/ OBC employees. The steps taken include due reservations and relaxation as applicable under the various directives for direct recruitment as well as for promotions. A separate Liaison officer has been appointed to look into the matter of reservations.

REC

It is stated that REC strictly follows the prescribed reservation norms in regard to SC/ST/OBC as laid down by the Central Government. Details of the number of SC/ST/OBC employees employed in the company are as under:

Group	Total Employees (as on December 31, 2021)	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	390	43	11.03	17	4.36	81	20.77
B	16	3	18.75	0	0.00	1	6.25
C & D	35	15	42.86	0	0.00	3	8.57
Total	441	61	13.83	17	3.85	85	19.27

Anticipated details as on March 31, 2022:

Group	Total Employees (as on March 31, 2022)	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	394	43	10.09	17	4.31	82	20.81
B	16	3	18.75	0	0	1	6.25
C & D	35	15	42.86	0	0	3	8.57
Total	445	61	13.68	17	3.82	86	19.32

NEEPCO

Representation of SC/ST/OBC is indicated in Performa given below:

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	605	78	12.89%	123	20.33%	133	21.98%
B	563	34	6.04%	216	38.37%	97	17.23%
C	477	32	6.70%	269	56.39%	73	15.30%
D	56	0	0.00%	51	91.10%	3	5.36%
Total	1701	144	8.47%	659	38.74%	306	18%

*Total number of employees is excluding 4 Board Level Directors.



POSOCO

Representation of SC/ST/OBC may be indicated in proforma given below:-

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Total	616	91	14.8	35	5.7	151	24.5

SJVNL

Representation of SC/ST/OBC in SJVN is given below:

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Executive	833	136	16.33	55	6.60	140	16.81
Supervisors	261	61	23.37	11	4.21	34	13.03
workmen	288	94	32.64	33	11.16	19	6.59
Total	1382	291	21.06	99	7.16	193	13.97

Policy of Govt. of India regarding the reservation for SCs, STs and OBCs in recruitment is being followed in SJVN. As per the reservation policy of the Govt. of India, certain percentages of posts are reserved for SC, ST & OBCs.

THDCIL

Representation of SC / ST / OBC in THDCIL is indicated in table below:-

Group	Total Employees as on 31st Dec-21	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Total	1673	231	13.8%	26	1.55%	140	8.37%

Guidelines issued by Govt. of India from time to time on implementation of reservation policy, welfare, training, grievance redressal etc. are strictly followed. Liaison Officers nominated unit wise to identify their problems and implementation of various welfare activities for them. A grievance cell for SC/ST/OBC and minorities exists to redress their grievances. Efforts are made to arrange training programmes to equip them with up-date information on Reservation Policy and other service conditions. The Company recruited 01 No. candidate from SC category and 02 Nos. candidates from OBC (NCL) category in Group-A.

DVC

Representation of SC, ST and OBC may be indicated in proforma given below:

Group	Total Employees as on 31/01/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Group A	2311	439	19.00	147	6.36	557	24.10
Group B	3402	682	20.04	194	5.70	735	21.60
Group 'C' & 'D'	914	296	32.38	120	13.13	180	19.69
Total	6627	1417	21.38	461	6.96	1472	22.21

- Special recognition has been granted to the Employees Depressed Class League (EDCL) which is body of SC/ST employees.
- All types of support have been extended to EDCL by Corporation in arranging various programmes which are being undertaken by them and close to their social and cultural philosophy.
- Employees from EDCL are representing in all the committees of the corporation constituted for welfare of the employees viz Housing Committee, JPLC etc.
- Regular quarterly meeting of EDCL with DVC management is conducted to address the issues and grievances of employees belong to SC/ST.

- v) DVC gives a significant grant to celebrate various important events like Dr. Bhimrao Ramji Ambedkar Jayanti etc.
- vi) Separate cells for SC/ST and OBC have been formed both at HQ and Field Formations. Orders for appointment of Liaison Offices/ Nodal Officers for SC/ST and OBC have also been issued.
- vii) Members of EDCL are given weightage in Training Programmes within India.
- viii) In all Selection Board, SC/ST/OBC/Minorities members are mandatorily included to safe guard the interest of SC/ST/OBC employees

BBMB

Representation of SC/ST/OBC is indicated below:-

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	402	66	16.41	2	0.49	36	8.95
B	781	157	20.10	4	0.51	83	10.62
C	2345	600	25.58	10	0.42	341	14.54
D	2657	912	34.32	7	0.26	374	14.07
Total	6185	1735	28.05	23	0.37	834	13.48

BBMB discharges its functions as laid down in Section 79(1) of the Punjab Reorganization Act, 1966 for which staff for the operation and maintenance of BBMB work is provided by partner States/SEBs on transfer basis. However, in the event of inability of partner States/SEBs to provide the requisite staff, BBMB resorts to direct recruitment and promotion in respect of Group-C & D employees only. BBMB Class-III & Class-IV Employees Regulations, 1994 & Class-I & Class-II officers Regulation, 2015 were approved by the Central Govt. As per old Regulation 11 of these Regulations, the members belonging to SC, ST, BC, Ex-servicemen, Physically handicapped persons and dependent of deceased employees in the service had the reservation and all other concessions as prescribed by Punjab Govt. from time to time. Now, the aforesaid Regulation 11 has been amended by Gazette Notification of Govt. of India dated May, 2017 vide which Central Govt. Reservation Policy is applicable in BBMB. Hence, BBMB is following Central Government Reservation Policy since May, 2017 and accordingly due representation concessions and reservations in service is provided to SC/ST/OBCs as prescribed in Central Government Reservation Policy.

For providing general welfare measures for Scheduled Castes employees, the instructions have been issued to all field offices requesting them to provide the following facilities, if so demanded by the Members of Scheduled Castes, on the occasion of Birthday of Dr. B. R. Ambedkar, Maharishi Balmiki Ji and Sri Guru Ravidass Ji:-

- i) Bus facilities for Shobha Yatra at token charges of Re.1 per Km.
- ii) Auditorium for function on above occasions, free of charge.
- iii) 50% concession on the rent of Community Centre hired for the marriage or daughters of BBMB Group-D employees belonging to SC/BC/ST categories.
- iv) Concession of 50% in tuition fee for the second child of Group-D employee including SC/ST/BC

Instructions have been issued to all HODs that the Heads of organizations and senior officials should meet their SC/ST officers/staff once in month or particularly on occasions like Dr. B. R. Ambedkar jayanti, Maharishi Balmiki Jayanti etc.

BEE

Representation of SC/ST/OBC may be indicated in proforma give below:-

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
A	16	02	12.5%	-	-	1	6.25%
B	09	-	-	-	-	2	22.22%
C	01	-	-	-	-	-	-
D	--	-	-	-	-	-	-
Total	26	02	7.69%	-	-	3	11.54%



CPRI

Shri P Kaliappan, Joint Director and Shri Mallikharjuna Rao T, Joint Director, CPRI, Bangalore served as Liaison Officers for SC/ST and OBC categories respectively in CPRI, during the year 2021-22 (from 1st April 2021)

The representation of SCs/STs/OBCs/Minorities in the Institute is given below:

Group	Total Employees as on 31/12/2021	Representation							
		SCs	% of SCs	STs	% of STs	OBC	% of OBCs	Minorities	% of Minorities
A	165	38	23.03	14	8.48	33	20.00	12	7.27
B	132	27	20.45	21	15.91	30	22.73	10	7.58
C	151	42	27.81	15	9.93	38	25.17	10	6.62
Total	448	107	23.88	50	11.16	101	22.54	32	7.14

NPTI

The Group-wise number of Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Castes (OBC) is given in the table below:

Group	Total Employees as on 31/12/2021	Representation					
		SCs	SC%	STs	ST%	OBC	OBC%
Group A	83	17	20.487	03	3.61	13	15.66
Group B	28	06	21.42	02	7.14	02	7.14
Group C (Including MTS)	70	22	31.42	09	12.85	13	18.57
Total	181	45	24.86	14	7.73	28	15.46

CHAPTER 36

E-GOVERNANCE/ INFORMATION TECHNOLOGY (IT) INITIATIVES

MINISTRY OF POWER

1. Cyber Security in Power Sector

Power Sector is one of the critical infrastructure of the country. Protection of critical information infrastructure and power system equipment from cyber threat is extremely important from the National Security perspective.

Under direction of Union Power and New & Renewable Energy Minister Shri R K Singh the Central Electricity Authority, Ministry of Power has prepared the guideline for the Cyber Security in Power Sector and has been released on 7.10.2021.

CEA under the provision of Section 3(10) on Cyber Security in the "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019" has framed Guideline on Cyber Security in Power Sector to be adhered by all Power Sector utilities to create cyber secure eco system. This is the first time that a comprehensive guideline has been formulated on cyber security in power sector. The guideline lays down required actions for cyber security preparedness across various utilities in power sector so as to raise the level of cyber security preparedness for power sector.

The Guideline has been prepared after intensive deliberations with stakeholder and inputs from expert agencies in the field of cyber security, such as CERT-In, NCIIPC, NSCS, IIT Kanpur and subsequent deliberations in Ministry of Power as well.

The Guideline have been issued with the objective of creating a cyber secure ecosystem. It lays down a cyber assurance framework, the strengthens the regulatory framework, puts in place mechanisms for security threat early warning, vulnerability management and response to security threats, securing remote operations and services, protection and resilience of critical information infrastructure, reducing cyber supply chain risks, encouraging use of open standards, promotion of research and development in cyber security, human resource development in the domain of Cyber Security, Developing effective public private partnerships and information sharing and cooperation.

Guideline are applicable to all Responsible Entities as well as System Integrators, Equipment Manufacturers, Suppliers/ Vendors, Service Providers, IT Hardware and Software OEMs engaged in the Indian Power Supply System for protection of Control Systems for System Operation and Operation Management, Communication System and Secondary Automation and Tele control technologies.

These Guideline are mandatory requirements to be met by all stakeholders and lay emphasis on establishing cyber hygiene,

training of all IT as well OT Personnel on Cyber Security, designating of Cyber Security Training Institutes as well as Cyber Testing labs in the Country. The Guideline mandates ICT based procurement from identified "Trusted Sources" and identified "Trusted Products" or else the product has to be tested for Malware/Hardware Trojan before deployment for use in power supply system network when system for trusted product and service is in place. It will promote research and development in cyber security and open up market for setting up Cyber Testing Infra in Public as well as Private Sector in the country.

2. National Power Portal (NPP)

NPP is a central hub for the collection and dissemination of information regarding Indian power sector. The NPP facilitates the online capture and input of information from entire power value chain; generation, transmission, and distribution utilities in the country on defined periodicity. It also disseminates power sector information such as operational, capacity, demand, supply, and consumption information through various reports, infographics and statistics for data analysis for generation, transmission and distribution at various level across India, regional and state level for the use of central, state, and private sector entities. NPP also serves as a single source of power sector information. Central Electricity Authority is the and nodal agency for NPP.

Salient features of NPP are:

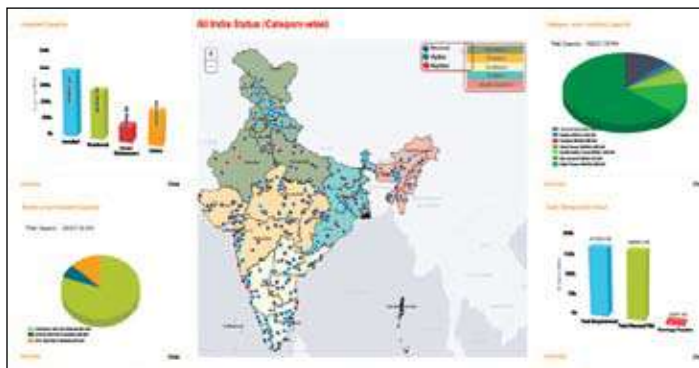
- 24X7 access and availability of Power Sector Data.
- System is designed and developed using open source technologies and hosted on National Data Centre.
- Optimization of cost by maintaining common infrastructure.
- Data collection at Source.
- Minimize manual entry of data.
- To ensure effective and timely collection of Data.
- To ensure data authenticity and accuracy.
- Standardization of Master Data facilitate seamless exchange of information between NPP and respective application systems at utilities as well as integration with other systems.
- Dissemination of information to Apex Bodies, Power Utilities and Public Users through analytical reports/charts for planning, monitoring and integration with other related sectors.
- Ease of sharing information among the stakeholders.

The NPP Dashboard is designed to distribute analyzed information about the sector through GIS-enabled navigation and visualization charts that display information on capacity, generation, transmission and distribution. Links of various Apps deployed



by Ministry of Power are also available on the portal. The system also facilitates various types of statutory reports required to be published regularly.

Installed Capacity : Captures and displays information on Installed Capacity, Sector-wise Installed Capacity, Category-wise Installed Capacity, Daily Demand (All India).



Transmission : Captures and displays information on Transmission Lines (Annual Achievements), Transformation Capacity (Annual Achievements), Transmission Lines (CKm), Transformation Capacity (MVA).



Urban Distribution : Captures and displays information IT Enabled Towns, Towns where AT&C loss reduced, Connections Released in (SERC timelines), Complaints Redressed in (SERC timelines), Monthly Avg. No. of Interruptions, Monthly Avg. Duration of Interruptions.



Rural Distribution: Captures and displays information about rural power supply.

Access to backend data inputs has been given to States/UTs for further granular analysis for adoption of promotion of data based policy making and decisions.



2. Web Portals and Apps.

Various Web Portals/mobile App have been made available for e-enablement and information dissemination of various schemes/projects of Ministry of Power.

DDUGJY (Deendayal Upadhyaya Gram Jyoti Yojana), Saubhagya, Vidut Pravah, URJA MITRA, Rural Feeder Monitoring Scheme, URJA (Urban Jyoti Abhiyaan), Ujwal DISCOM Assurance Yojana (UDAY), Unnat Jyoti by Affordable LEDs for All (UJALA), DEEP E-Bidding Portal, TARANG, PRAAPTI, Ash Track etc.

3. Social Media

Ministry of Power is actively engaging with the citizens various social media platforms for disseminating the achievements and activities carried out by Ministry. Updated information on power sector are regularly posted on these social media platforms.

Ministry of Power has verified accounts on Facebook ,Twitter , Instagram, Public Appand has more than 1.7 lakh followers on Facebook and more than 4lakh followers on Twitter respectively.

4. Promotion of Digital Payments

As part of Government of India's focus on promotion of digital payment, Ministry of Power has taken various steps for making payment of electricity bill by consumers across the country through digital means in coordination with States/UTs/DISCOMs in government and private sector. Most of the States/UTs/DISCOMs have on boarded Bharat Bill Payment System (BBPS) for digital payment facilitation. BHIM/UPI and Bharat QR Code for facilitating digital payment of electricity bill are also being promoted on high priority.

"As a result of congruent efforts, total digital transactions achieved by Ministry of Power in current FY 2021-22(till Nov 2021) is 50.5% of total transaction and amount collected in through digital transaction is 66.14% of total amount collected.

NHPC

NHPC makes use of information and communication technologies for the execution and management of projects and power stations. NHPC considers information technology to be a strategic tool to improve overall productivity and efficiency. NHPC has successfully implemented an Enterprise Resource Planning (ERP) software solution to help in managing optimum utilization of generating assets, accelerated development of construction projects thereby improving quality, productivity and profitability of the organization.

NHPC has very elaborate Information Technology and Communication infrastructure and all the sites are now connected with the Corporate Office through multimode, fail-safe communications links using MPLSVPN/VSAT-Ku Band / Broadband technologies. A high speed wireless network (Wi-Fi) has also been installed at NHPC Corporate office. NHPC has presently co-located key servers at TIER-III Data Centres of BSNL at Faridabad and National Informatics Centre Service Incorporated (NICSI), at New Delhi. Disaster Recovery (DR) site is also operational at NHPC office at Kolkata. IT & Cyber Security policy is also in place to manage the Information Technology (IT) system to ensure optimum and secure utilization of the assets owned by NHPC.

IFS ERP has been implemented in NHPC in centralized environment and the data for the entire Corporation pertaining to ERP resides in single Oracle database. IFS ERP is being accessed remotely from all locations viz. Corporate Office, Regional offices/Projects/Power stations to run the IFS application through above communication network. All key business functions viz. Finance, HR, Procurement & Contracts, Inventory, Project Management, Power Plant Operation and Maintenance Energy Sales and Accounting, Quality Assurance etc. have been implemented in the IFS ERP System. Employee Self Service (ESS) is also implemented across the Corporation catering to all employees of the Corporation.

A host of other software applications has been implemented covering key business functions and providing services like E-mail, Voice, Video Conferencing, Web-casting, Desktop virtualization etc. leveraging the IT & Communication Infrastructure. A bilingual official website of NHPC with state-of-the-art technology can be accessed as <http://www.nhpcindia.com>. In addition, NHPC has its own integrated intranet which plays pivotal role in displaying information of various divisions of Corporate Office / Projects / Regional Offices for wide 15 viewing throughout the Corporation through WAN. SAHAJ SEWA portal so that users can have easy access to their personal information etc.

As part of Digitalization initiative of Govt. of India e-Office solution of NIC is being implemented in NHPC for achieving paperless or less paper office. As per Government of India directives, the procurement process through e-procurement (Electronic Tender) System has also been successfully implemented.

NHPC has also implemented Vendor Payment Portal through NHPCs website to monitor the Payments and its current status to Vendors connected with NHPC.

NHPC has also implemented ISMS 27001:2013 at Corporate Office for cyber security' NHPC has been nominated as Sectoral CERT - nodal agency of CERT and designated as CERT-Hydro for hydro sector by MoP.

Key Initiatives taken by IT&C :

In the event of Covid -19 Pandemic NHPC has taken initiative

- to provide Video Conferencing to carry out meetings from remote
- to facilitate Training Department for conducting trainings to officials remotely
- to provide remote connectivity to officials at every level to

deliver work / job assigned (Work from Home) effectively and smoothly

To comply various regulatory requirements and upkeep the IT Infrastructure upgraded following major initiatives has been taken by NHPC during 2020-21:

- Implementation of e-Office across NHPC as part of Digitalization.
- Commissioning of centralised Data Centre in NHPC Office Complex, Faridabad using smart rack technology.
- Implementation of ISMS 27001:2013 for secured IT environment in Corporate Office against Cyber threats.
- Digitisation of Board Meetings through automated process.

To meet the organization requirement related to Information Technology following are the new key applications developed and Implemented during 2020-21:

1. Mobile App :: Sachal :: Employee Attendance using Geo-fencing facility
2. Capturing for Competency Mapping of Executives
3. Online capturing for Annual Compliance – Code for Business Conduct and Ethics
4. Online daily capturing for CCTV Running Status
5. Online capturing and monitoring of Quality Control and its Reports
6. Online Feedback System-Canteen, Office Building-Civil & Electrical
7. Online Bachelors Accommodation Allotment System
8. Online Transfer Request System
9. Online Integration of ERP and GeM Portal
10. Online SSL VPN Request System
11. Online Quiz System
12. Online system for Arogya Setu Undertaking
13. Online system for Weekly Work by an official
14. Visitor Pass System
15. Online system for Vehicle Requisition
16. HR/Vigilance Online Clearance

PGCIL

POWERGRID has taken up various digital initiatives towards paperless working and IT enablement of various business processes. These initiatives enabled business continuity during the COVID lockdown facilitating work from home by its employees and real time monitoring of valuable assets.

The Company has established an e-Tendering Portal-PRANIT certified by Standardization, Testing and Quality Certification Directorate (STQC), Ministry of Electronics and Information Technology, Govt. of India. With this, POWERGRID is now the only organization in India to have an e-Procurement solution on SAP Supplier Relationship Management (SRM).

Centralized Vendor Bill tracking and contract closing portal has been established to streamline the processes of verification of bills and release of payments, optimizing the resources, to enhance



the transparency and accountability in the system. Digitization of personnel files at corporate Office for easy accessibility.

POWERGRID has successfully achieved SAP Customer Center of Expertise (CCoE) Certificate. This signifies that Company has the knowledge, capabilities and framework to bring forward continuous improvement and innovation in ERP implementation. POWERGRID has also developed various other portal like Property Declaration Portal, employee query portal, POWERGRID Estate Repository System (PERS), COVID Helpdesk Portal, transfer portal, E-library etc. for ease of communication and learning of its employees.

SYSTEMS IMPROVEMENT MEASURES INITIATED / FACILITATED:

- Initiatives to support families of deceased employees – Accommodation security, revision in Insurance coverage, comprehensive medical coverage of dependents, revision in Death Relief Scheme, insurance/ waiver of outstanding advances, 'SAKSHAM' scheme for providing education assistance to children and support for overall rehabilitation of the bereaved family, etc.
- Rationalization of Medical Rules like removal of residence criteria for dependent parents and no requirement of approval for treatment outside place of posting.
- Revised Transfer Policy for Executives.
- Introduction of NPS for POWERGRID employees.
- Introduction of Equal Opportunity Policy as a formal commitment from POWERGRID to help differently abled employees to achieve their full potential at workplace.
- Scheme for Company provided vehicles for female employees on official tours.

PFC

1.0 The Management Systems Unit is dedicated to delivering strategic advantage to PFC by fostering creative and innovative use of technology to achieve the Corporation's objectives. The Unit promotes effective stewardship of information access and provides a secure, reliable technology infrastructure along with quality user services and support, so as to meet the ever changing business needs. Accordingly, MS unit has undertaken many Information Technology (IT) initiatives to help streamline operations, reduce costs, improve efficiency, optimise resource utilization and devote talent to core business to enable better services and relationship with stakeholders.

2.0 IT arrangements to address the pandemic

COVID pandemic has thrown unprecedented challenge to the corporate world and work from home (WFH) became new normal for employees to deliver their official work. To facilitate the same, PFC employees were provided with secure VPN access & Remote Desktop access (RDA) through which a seamless secured connectivity has been enabled to connect to the PFC's business applications from remote locations.

In addition, Web-based video conferencing arrangements were made using MS-Teams platform, through which the employees

could collaborate with external & internal stakeholders for work delivery. E-office software is implemented to facilitate the employees to deliver their official work remotely in digital mode.

3.0 Augmentation of IT Infrastructure / Software Applications:

In order to keep pace with the demand for high speed computing, PFC keeps on augmenting its IT infrastructure on regular basis. PFC has enhanced the following ICT infrastructure/Software services during the reporting period.

- Implementation of MIS Portal for Senior Management at PFC:** PFC has implemented MIS portal for Top & Senior management using next generation reporting & analytical tool "Tableau". This Portal provides high level view of PFC's Business metrics for the management with great visuals and to take informed Business decisions. Thru this Portal, Dashboards have been made on crucial parameters like Loan Sanctions, Disbursements, Exposure, Outstanding, Renewable Portfolio, Borrowing profile, NPA, HR etc., where User can drill down & access even root level Information on the fly.
- Revamping of PFC corporate website:** PFC website has been revamped in order to make more informative, improving navigation paths on the front end of the site, and implementing a responsive & modern design while meeting to all compliance guidelines & cyber security arrangements.
- Implementation of Next Generation Firewall at PFC data center:** PFC has implemented next generation firewall solution from Palo Alto to protect its Network perimeter and IT infrastructure from Security Threats and Vulnerabilities along with controlling what users and systems can do with outer networks. NGFW not only halts suspicious traffic and also blocks network access based on a predefined blacklist it also have additional features such as intrusion prevention.
- Introduction of Hindi Font in e-office software:** PFC has successfully implemented e-Office solution to facilitate the digital way file movements as part of its paperless office initiative to take the technological advantage. As part of PFC's endeavor to comply with Rajbhasha guidelines, Hindi font has been implemented in the e-office application to work in Hindi language.

4.0 As part of the digital initiatives, an IT roadmap has been drafted and plans for revamping the Information Technology setup at PFC. In order to keep up with the fast pacing digital technology and safeguarding of IT setup from digital threats are utmost priority to ensure the endeavour to be India's lead lender of PFC's infrastructure funding in the power domain. The Management Systems Unit is committed to implement the IT roadmap by fostering creative & innovative use of technology to achieve the Corporation's objectives and to keep up the reputation of a Maharatna.

REC**A) The progress made during current year up to December 31, 2021**

1. NIC e-Office efile and KMS are implemented in REC to achieve a simplified, responsive, effective and transparent working of the corporation and to enable users to create and manage electronic documents that can be viewed, searched and shared.
2. Improvements in latest version of ERP running in REC: REC has revamped the existing eBusiness ERP (Oracle e-Biz suite) 11i to the latest version R12.2.7 and migrated the ERP hardware to private cloud environment at REC Datacenter. The system is being improved continuously by adding new features.
3. REC Limited was fully operational during Covid-19 pandemic – Business continuity was provided with work from home facility to employees, for critical applications and also through Video Conferencing
4. Augmentation of the ICT infrastructure of the Corporation: Latest network security solutions are being implemented to strengthen the cybersecurity posture of REC.
5. Implementation of IT Framework as per RBI Master Direction: REC has implemented IT security directives of Master Direction of IT Framework for NBFC sector as per RBI Guidelines and continue to comply with these Master Directions.
6. REC has also deployed a number of in-house developed systems as part of IT initiatives towards achieving better e-governance.
7. Providing training and Computing facility to Employees: Computer to Employee population ratio is 100%. IT Division also organizes and impart various training programs to upgrade Computer skills of the employees of the Corporation.

B) Targets to be achieved during the remaining period of the year i.e. upto March 31, 2022

1. ISO 27001: 2013 certification: Successful Surveillance audit for Data Centre and Disaster Recovery Centre.
2. Compliance to IT security directives of Master Direction of IT Framework as per RBI Guidelines.
3. Upgradation of REC Network Security solutions and implementation of Managed Security Services.
4. Implementation of 2 Factor Authentication for Accessing Email Services (Kavach) for all the users across the Corporation.

NEEPCO

Moving towards a better digitalization effort in the Company, the ERP system which was undertaken for implementation is now nearing finalization with nine locations attaining Go-Live / operational status.

In this process, NEEPCO has opted for the Selection of Cloud Service Provider for Data Center (DC) and Disaster Recovery Center (DRC)

on Govt Community Cloud DC for hosting the current SAP ERP system via Open Tendering process. The LOI has been issued to M/S ESDS Software Solution Pvt Ltd on 25th Nov 2021. Preparatory measures are presently underway for the migration and installation of Applications and related secured processes in the Cloud DC and DR. The Network Connectivity to the DC and DR has been extended from the present Network Service Provider – PGCIL (Power Grid). It is also decided that for user administration and authentication, Active Directory services from the CSP (Cloud Service Provider) will be used for all ERP Application users. Inline to implementation of ERP, the Material and Asset reclassification and recodification tasks were also extensively undertaken and separate softwares are made available for streamlining the recodification and generation of new Assets and Material Codes for the SAP system.

In its endeavour to continuous improvement of services rendered and in response to the working and travelling challenges posed in pandemic situation, the IT department had facilitated remote collaborations, video Conferencing Solutions via Microsoft Teams and enabled various meetings, trainings of official matters on this platform. As per advisories, the IT System Security Audit for IT Devices was completed in Sept 2021 by CERT-IN empanelled agencies. Improvement of Network Connectivity along with enhancement measures to all locations is being continuously monitored.

SJVNL

SAP S/4 HANA ERP has been implemented in SJVNL covering major business functions of ERP landscape including Project Management, Finance & Accounting, Plant Maintenance, Human resource functions including Payroll and Employee Self-Service (ESS), Materials Management, Procurement and Contracts Management, Commercial & Billing etc. Apart from above Management Dashboard for business Intelligence reports has also been deployed. Also File Life Cycle Management System from SAP has been implemented.

THDCIL

THDC India Ltd has adopted IT initiatives on priority in the organisation by using latest hardware and software. Most of the functions have been computerized.

The Impact of IT initiatives taken by THDC India Ltd are as follows.

- Increased computer Literacy and awareness on Cyber Security (e.g. providing desktops and laptops, conducting Cyber security training and workshops).
- Organisation has IT and Cyber Security Guidelines, which has been circulated and also available on website for employees.
- All the applications are audited by CERT-in empanelled organisation.
- Transparency in the official working, which can also be tracked by the external stakeholders. (E-Tender, Bill Tracking system, Grievance tracking system, e-payments).
- Confidence building of all stakeholders on established IT systems.



- Reduced use of Papers , Printers and toner Cartridge (FMS, HRMS, eOffice, Commercial Billing etc)
- Considerable reduction in the time for various approval processes. (FMS, HRMS, eOffice, GTS-MIS etc.)
- Safe, secure and fast communication (eOffice, emails, FMS, HRMS Video Conferencing).
- Tracing and tracking of Files and correspondences. (Eoffice)
- As most of the functions related to employees such as claims, loans & advances, Leave, PMR, Salary, Income tax etc are online which improves transparency and build confidence on the systems and also increase the satisfaction level in the employees.
- Less use of papers in office working, improving efficiency, consistency and effectiveness in the responses from the individual / department(s) in handling the letters and files
- Better control on project implementation through Project Monitoring software.
- Knowledge and Information sharing (THDCIL's website)
- Online activities : Various web collaboration tools such as Microsoft Teams application, Cisco Webex, Google meet etc. were used during the Covid 19 period for conducting meetings, online training with in the organisation outside the organisations.
- Work from Home: eOffice was used during the Lockdown period to facilitate the employees to work from home. As the proposals, notes and approvals were done online.
- E-dairy: Online project e-Diary system has been developed for ongoing construction projects for recording the progress, hindrances, quality, safety issues and daily progress.
- The work contract module has been developed and deployed in FMS system for ongoing works contract. The MB is made online, and bills are system generated for making the payments.
- Online Complaint Management system: The system have been developed and deployed at Tehri for complaint related to township works. The individual occupant can file the complaint in the online system and monitor the work progress.
- Gate Pass: Visitor gate pass system have been developed and deployed. With this software application, security passes for the visitors are created and approved by the concerned (Designated officer, CISF etc).

BBMB

1. **e-Tendering/e-Procurement:** BBMB on-boarded GePNIC portal of National Informatics Centre (NIC) for e-Tendering/ e-Procurement activities. All tenders by various offices of BBMB above a threshold value of Rs. Two Lakh are invited through e-Procurement/e-Tendering system.
2. **e-Reverse Auction:** The e-Reverse Auction (e-RA) has been implemented for all tenders with threshold value of Ten Lakh. Item wise e-RA for individual item(s) having value less than Rs. Ten Lakh may be carried out by suitable grouping of item(s) is deemed appropriate. The threshold value individual item(s)

group for carrying out e-RA shall have estimated values of minimum Rs. Four Lakh and these groups(s) must be the part of specifications of NIT.

3. Web based Software for MIS in respect to Legal cases for all divisions of BBMB (instituted in any court of India) has been developed and implemented.
4. A study regarding introduction and implementation of ERP system in BBMB has been got conducted and recommendation are under consideration.
5. A software for online GPF advance application for BBMB employees has been developed and is under testing/ implementation.
6. Pension Monitoring / Documents Tracking System developed and has been implemented in all offices of BBMB.
7. Procurements from GeM Portal enabled and Buyers accounts, Consignees and Paying authorities' accounts have been created on GeM Portal.
8. Software for MIS for Plantation Drive has been developed and implemented.
9. Centralization of Salary processing i.e. Data updation, Generation of Pay ledgers, Pay slips, Bank statements and other schedules at Dy. CAO level for various offices of BBMB.
10. e-Office, a Mission Mode Project under the National e-Governance Programme (NeGP) of Gol has been implemented at Boards Office as well as all Chief Engineer's Offices. Training to all the users was provided along with training on the use of the system. e-Office Implementation has now been extended to all the divisions/offices of BBMB and Initial training has also been provided to all the divisions/ offices of BBMB.
11. Visitor Pass Management Software has been implemented at more project locations i.e Nangal and Sundernagar.
12. e-library – a central repository for collating literature pertaining to Seminars, Trainings attended by BBMB officers/ officials created and is accessible from BBMB Intranet.
13. BBMB Website awarded Standard Testing and Quality Certificate by STQC Directorate, Ministry of Electronics and Information Technology Govt. of India.
14. Meetings of BBMB ISMS committees i.e. Information Security Forum & Information Security Steering Committee being conducted. Information Security Management System (ISMS) policies and procedures implemented for protection of BBMB LAN/WAN IT assets. Action on regular cyber security advisories received from CERTs, NCIIPC etc. being taken.

CPRI

- CPRI has successfully implemented e-office for Leave Management System and Tour Management System
- CPRI is active in social media such as Facebook, twitter
- Online test booking facility has been implemented for Distribution Transformers
- Online applications for Recruitment have been introduced.

CHAPTER 37

REGION-WISE INSTALLED CAPACITY

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS (As on 31.12.2021)
(UTILITIES)

Region	Ownership/ Sector	Mode wise breakup									Grand Total
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)	Total	
Northern Region	State	17319.00	250.00	2879.20	0.00	20448.20	0.00	5888.25	731.35	6619.60	27067.80
	Private	22425.83	1080.00	558.00	0.00	24063.83	0.00	3061.00	23135.33	26196.33	50260.16
	Central	15662.48	250.00	2344.06	0.00	18256.54	1620.00	11484.52	379.00	11863.52	31740.06
	Sub Total	55407.31	1580.00	5781.26	0.00	62768.57	1620.00	20433.77	24245.68	44679.45	109068.02
Western Region	State	21290.00	900.00	2849.82	0.00	25039.82	0.00	5446.50	571.48	6017.98	31057.80
	Private	31947.17	500.00	4676.00	0.00	37123.17	0.00	481.00	31114.79	31595.79	68718.96
	Central	20479.10	0.00	3280.67	0.00	23759.77	1840.00	1635.00	666.30	2301.30	27901.07
	Sub Total	73716.27	1400.00	10806.49	0.00	85922.76	1840.00	7562.50	32352.57	39915.07	127677.83
Southern Region	State	20322.50	0.00	791.98	159.96	21274.44	0.00	11819.83	597.88	12417.71	33692.15
	Private	13272.00	250.00	5340.24	273.70	19135.95	0.00	0.00	44956.35	44956.35	64092.30
	Central	11835.02	3390.00	359.58	0.00	15584.60	3320.00	0.00	541.90	541.90	19446.50
	Sub Total	45429.52	3640.00	6491.80	433.66	55994.99	3320.00	11819.83	46096.13	57915.96	117230.95
Eastern Region	State	7450.00	0.00	100.00	0.00	7550.00	0.00	3537.92	275.11	3813.03	11363.03
	Private	5553.00	0.00	0.00	0.00	5553.00	0.00	209.00	1436.96	1645.96	7198.96
	Central	14863.38	0.00	0.00	0.00	14863.38	0.00	1005.20	10.00	1015.20	15878.58
	Sub Total	27866.38	0.00	100.00	0.00	27966.38	0.00	4752.12	1722.07	6474.19	34440.57
North Eastern Region	State	0.00	0.00	466.36	36.00	502.36	0.00	422.00	233.25	655.25	1157.60
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.82	160.82	160.82
	Central	770.02	0.00	1253.60	0.00	2023.62	0.00	1522.00	30.00	1552.00	3575.62
	Sub Total	770.02	0.00	1719.96	36.00	2525.98	0.00	1944.00	424.07	2368.07	4894.04
Islands	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	5.25	45.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.66	27.66	27.66
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10	5.10
	Sub Total	0.00	0.00	0.00	40.05	40.05	0.00	0.00	38.01	38.01	78.06
ALL INDIA	State	66381.50	1150.00	7087.36	236.01	74854.86	0.00	27114.50	2414.31	29528.81	104383.68
	Private	73198.00	1830.00	10574.24	273.70	85875.95	0.00	3751.00	100831.91	104582.91	190458.86
	Central	63610.00	3640.00	7237.91	0.00	74487.91	6780.00	15646.72	1632.30	17279.02	98546.93
	Total	203189.50	6620.00	24899.51	509.71	235218.72	6780.00	46512.22	104878.53	151390.75	393389.46

Figures at decimal may not tally due to rounding off

Abbreviation :- SHP=Small Hydro Project (≤ 25 MW), BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

Note :- 1. RES include SHP, BP, U&I, Solar and Wind Energy. Installed capacity in respect of RES (MNRE) as on 31.12.2021 (As per latest information available with MNRE)



*Break up of RES all India as on 31.12.2021 is given below (in MW) :

Small Hydro Power	Wind Power	Bio-Power		Solar Power	Total Capacity
		BM Power/Cogen.	Waste to Energy		
4839.40	40082.70	10175.61	434.11	49346.71	104878.53

A. Capacity Added during Dec., 2021 525 MW

1. Unit-1 (525 MW) of TUTICORIN TPP ST-IV has been commissioned and added to private sector of Tamilnadu.

B. Capacity removed due to change from IPP to CPP Dec., 2021 0 MW

C. Net Conv. Capacity Added during Dec., 2021 A-B 525 MW

D. Net RES Capacity Added during Dec., 2021 847.22 MW

E. Net Capacity Added during Dec., 2021 C+D 1372.22 MW

* Unit-1 (525 MW) of TUTICORIN TPP ST-IV was commissioned in Nov-2021 but information was received in Dec-2021

Off-grid RES Capacity has been included from July-2021 onwards

Sector wise breakup of RES capacity as shown is provisional.

Allocation from central sector stations has been updated till 31.10.2021.

Share of Railway (819 MW) from NABI NAGAR TPP (1000 MW) is included in central sector of Bihar.

Share from private sector generating stations has been updated as per latest information available.

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTHERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup									Grand Total
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)	Total	
Delhi	State	0.00	0.00	1800.40	0.00	1800.40	0.00	0.00	0.00	0.00	1800.40
	Private	878.22	0.00	108.00	0.00	986.22	0.00	0.00	263.12	263.12	1249.34
	Central	3527.29	0.00	207.01	0.00	3734.31	102.83	723.09	0.00	723.09	4560.23
	Sub Total	4405.51	0.00	2115.41	0.00	6520.93	102.83	723.09	263.12	986.21	7609.97
Haryana	State	2510.00	0.00	150.00	0.00	2660.00	0.00	200.00	69.30	269.30	2929.30
	Private	4561.78	0.00	0.00	0.00	4561.78	0.00	539.00	1012.58	1551.58	6113.36
	Central	1564.80	0.00	535.61	0.00	2100.41	100.94	1579.52	5.00	1584.52	3785.86
	Sub Total	8636.58	0.00	685.61	0.00	9322.19	100.94	2318.52	1086.88	3405.40	12828.52
Himachal Pradesh	State	0.00	0.00	0.00	0.00	0.00	0.00	805.60	256.61	1062.21	1062.21
	Private	0.00	0.00	0.00	0.00	0.00	0.00	1039.40	774.13	1813.53	1813.53
	Central	151.69	0.00	62.01	0.00	213.70	28.95	1223.88	0.00	1223.88	1466.53
	Sub Total	151.69	0.00	62.01	0.00	213.70	28.95	3068.88	1030.74	4099.62	4342.27
Jammu & Kashmir and Ladakh	State	0.00	0.00	175.00	0.00	175.00	0.00	1230.00	136.82	1366.82	1541.82
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.17	102.17	102.17
	Central	577.14	0.00	129.07	0.00	706.22	67.98	1091.88	0.00	1091.88	1866.08
	Sub Total	577.14	0.00	304.07	0.00	881.22	67.98	2321.88	238.99	2560.87	3510.07
Punjab	State	1760.00	0.00	150.00	0.00	1910.00	0.00	1243.40	127.80	1371.20	3281.20
	Private	5115.50	0.00	0.00	0.00	5115.50	0.00	288.00	1638.31	1926.31	7041.81
	Central	1440.00	0.00	264.01	0.00	1704.01	196.81	2277.72	0.00	2277.72	4178.55
	Sub Total	8315.50	0.00	414.01	0.00	8729.51	196.81	3809.12	1766.11	5575.23	14501.56
Rajasthan	State	7580.00	250.00	603.80	0.00	8433.80	0.00	433.00	23.85	456.85	8890.65
	Private	2957.00	1080.00	0.00	0.00	4037.00	0.00	104.00	14178.86	14282.86	18319.86
	Central	1062.59	250.00	221.10	0.00	1533.69	556.74	1402.19	344.00	1746.19	3836.62
	Sub Total	11599.59	1580.00	824.90	0.00	14004.49	556.74	1939.19	14546.71	16485.90	31047.13
Uttar Pradesh	State	5469.00	0.00	0.00	0.00	5469.00	0.00	724.10	49.10	773.20	6242.20
	Private	8814.33	0.00	0.00	0.00	8814.33	0.00	842.40	4274.02	5116.42	13930.75
	Central	5470.51	0.00	549.49	0.00	6020.00	289.48	1857.53	30.00	1887.53	8197.01
	Total	19753.84	0.00	549.49	0.00	20303.33	289.48	3424.03	4353.12	7777.15	28369.96
Uttarakhand	State	0.00	0.00	0.00	0.00	0.00	0.00	1252.15	67.87	1320.02	1320.02
	Private	99.00	0.00	450.00	0.00	549.00	0.00	248.20	838.69	1086.89	1635.89
	Central	392.60	0.00	69.66	0.00	462.26	31.24	475.54	0.00	475.54	969.04
	Sub Total	491.60	0.00	519.66	0.00	1011.26	31.24	1975.89	906.56	2882.45	3924.95
Chandigarh	State	0.00	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	53.45	53.45	53.45
	Central	44.83	0.00	15.03	0.00	59.86	8.01	101.71	0.00	101.71	169.57
	Total	44.83	0.00	15.03	0.00	59.86	8.01	101.71	53.45	155.16	223.02
Central - Unallocated		1431.03	0.00	291.05	0.00	1722.08	237.03	751.45	0.00	751.45	2710.57
Total (Northern Region)	State	17319.00	250.00	2879.20	0.00	20448.20	0.00	5888.25	731.35	6619.60	27067.80
	Private	22425.83	1080.00	558.00	0.00	24063.83	0.00	3061.00	23135.33	26196.33	50260.16
	Central	15662.48	250.00	2344.06	0.00	18256.54	1620.00	11484.52	379.00	11863.52	31740.06
	Sub Total	55407.31	1580.00	5781.26	0.00	62768.57	1620.00	20433.77	24245.68	44679.45	109068.02



INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN WESTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup								Grand Total	
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)		Total
Goa	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05
	Private	0.00	0.00	48.00	0.00	48.00	0.00	0.00	18.83	18.83	66.83
	Central	492.27	0.00	19.67	0.00	511.94	26.00	2.00	0.00	2.00	539.94
	Sub Total	492.27	0.00	67.67	0.00	559.94	26.00	2.00	18.88	20.88	606.82
Daman & Diu	State	0.00	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	40.72	40.72	40.72
	Central	164.74	0.00	43.34	0.00	208.08	7.00	0.00	0.00	0.00	215.08
	Sub Total	164.74	0.00	43.34	0.00	208.08	7.00	0.00	40.72	40.72	255.80
Gujarat	State	4510.00	900.00	2177.82	0.00	7587.82	0.00	772.00	88.29	860.29	8448.11
	Private	7144.67	500.00	3985.00	0.00	11629.67	0.00	0.00	15115.77	15115.77	26745.44
	Central	4647.60	0.00	424.00	0.00	5071.60	559.00	0.00	243.30	243.30	5873.90
	Sub Total	16302.27	1400.00	6586.82	0.00	24289.09	559.00	772.00	15447.36	16219.36	41067.45
Madhya Pradesh	State	5400.00	0.00	0.00	0.00	5400.00	0.00	1703.66	83.96	1787.62	7187.62
	Private	6079.00	0.00	75.00	0.00	6154.00	0.00	0.00	5037.42	5037.42	11191.42
	Central	4608.48	0.00	257.00	0.00	4865.48	273.00	1520.00	300.00	1820.00	6958.48
	Sub Total	16087.48	0.00	332.00	0.00	16419.48	273.00	3223.66	5421.38	8645.04	25337.52
Chhattisgarh	State	1840.00	0.00	0.00	0.00	1840.00	0.00	120.00	11.05	131.05	1971.05
	Private	7667.50	0.00	0.00	0.00	7667.50	0.00	0.00	841.53	841.53	8509.03
	Central	2714.39	0.00	0.00	0.00	2714.39	48.00	113.00	0.00	113.00	2875.39
	Sub Total	12221.89	0.00	0.00	0.00	12221.89	48.00	233.00	852.58	1085.58	13355.47
Maharashtra	State	9540.00	0.00	672.00	0.00	10212.00	0.00	2850.84	388.13	3238.97	13450.97
	Private	10856.00	0.00	568.00	0.00	11424.00	0.00	481.00	10055.06	10536.06	21960.06
	Central	4858.18	0.00	2272.73	0.00	7130.91	690.00	0.00	123.00	123.00	7943.91
	Sub Total	25254.18	0.00	3512.73	0.00	28766.91	690.00	3331.84	10566.19	13898.03	43354.94
Dadra & Nagar Naveli	State	0.00	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	5.46	205.46
	Central	222.44	0.00	66.34	0.00	288.78	9.00	0.00	0.00	0.00	297.78
	Total	422.44	0.00	66.34	0.00	488.78	9.00	0.00	5.46	5.46	503.24
Central - Unallocated		2771.00	0.00	197.59	0.00	2968.59	228.00	0.00	0.00	0.00	3196.59
Total (Western Region)	State	21290.00	900.00	2849.82	0.00	25039.82	0.00	5446.50	571.48	6017.98	31057.80
	Private	31947.17	500.00	4676.00	0.00	37123.17	0.00	481.00	31114.79	31595.79	68718.96
	Central	20479.10	0.00	3280.67	0.00	23759.77	1840.00	1635.00	666.30	2301.30	27901.07
	Sub Total	73716.27	1400.00	10806.49	0.00	85922.76	1840.00	7562.50	32352.57	39915.07	127677.83

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN SOUTHERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup								Grand Total	
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)		Total
Andhra Pradesh	State	5010.00	0.00	235.40	0.00	5245.40	0.00	1673.60	56.18	1729.78	6975.18
	Private	3873.88	0.00	3831.32	36.80	7742.00	0.00	0.00	8884.33	8884.33	16626.34
	Central	1546.83	180.23	0.00	0.00	1727.06	127.27	0.00	250.00	250.00	2104.33
	Sub Total	10430.71	180.23	4066.72	36.80	14714.46	127.27	1673.60	9190.51	10864.11	25705.84
Telangana	State	5972.50	0.00	0.00	0.00	5972.50	0.00	2479.93	41.22	2521.15	8493.65
	Private	1389.45	0.00	831.82	0.00	2221.27	0.00	0.00	4550.52	4550.52	6771.79
	Central	1806.85	210.57	0.00	0.00	2017.42	148.73	0.00	10.00	10.00	2176.15
	Sub Total	9168.80	210.57	831.82	0.00	10211.19	148.73	2479.93	4601.74	7081.67	17441.59
Karnataka	State	5020.00	0.00	0.00	0.00	5020.00	0.00	3631.60	193.89	3825.49	8845.49
	Private	1948.50	0.00	0.00	25.20	1973.70	0.00	0.00	15593.32	15593.32	17567.02
	Central	2877.80	471.90	0.00	0.00	3349.70	698.00	0.00	0.00	0.00	4047.70
	Sub Total	9846.30	471.90	0.00	25.20	10343.40	698.00	3631.60	15787.20	19418.80	30460.20
Kerala	State	0.00	0.00	0.00	159.96	159.96	0.00	1856.50	183.90	2040.40	2200.36
	Private	1047.50	0.00	174.00	0.00	1221.50	0.00	0.00	400.51	400.51	1622.01
	Central	1011.42	314.20	359.58	0.00	1685.20	362.00	0.00	50.00	50.00	2097.20
	Sub Total	2058.92	314.20	533.58	159.96	3066.66	362.00	1856.50	634.41	2490.91	5919.57
Tamil Nadu	State	4320.00	0.00	524.08	0.00	4844.08	0.00	2178.20	122.70	2300.90	7144.98
	Private	5012.67	250.00	503.10	211.70	5977.47	0.00	0.00	15515.62	15515.62	21493.09
	Central	3025.32	1517.30	0.00	0.00	4542.62	1448.00	0.00	231.90	231.90	6222.52
	Sub Total	12357.99	1767.30	1027.18	211.70	15364.17	1448.00	2178.20	15870.22	18048.42	34860.59
NLC	State	0.00	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	0.00	0.00	0.00
	Central	0.00	166.00	0.00	0.00	166.00	0.00	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	0.00	166.00
Puducherry	State	0.00	0.00	32.50	0.00	32.50	0.00	0.00	0.00	0.00	32.50
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.05	12.05	12.05
	Central	140.80	111.80	0.00	0.00	252.60	86.00	0.00	0.00	0.00	338.60
	Total	140.80	111.80	32.50	0.00	285.10	86.00	0.00	12.05	12.05	383.15
Central - Unallocated		1426.00	418.00	0.00	0.00	1844.00	450.00	0.00	0.00	0.00	2294.00
Total (Southern Region)	State	20322.50	0.00	791.98	159.96	21274.44	0.00	11819.83	597.88	12417.71	33692.15
	Private	13272.00	250.00	5340.24	273.70	19135.95	0.00	0.00	44956.35	44956.35	64092.30
	Central	11835.02	3390.00	359.58	0.00	15584.60	3320.00	0.00	541.90	541.90	19446.50
	Sub Total	45429.52	3640.00	6491.80	433.66	55994.99	3320.00	11819.83	46096.13	57915.96	117230.95



INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN EASTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup									Grand Total
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)	Total	
Bihar	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.70	70.70	70.70
	Private	700.00	0.00	0.00	0.00	700.00	0.00	0.00	316.25	316.25	1016.25
	Central	5828.21	0.00	0.00	0.00	5828.21	0.00	110.00	0.00	110.00	5938.21
	Sub Total	6528.21	0.00	0.00	0.00	6528.21	0.00	110.00	386.95	496.95	7025.16
Jharkhand	State	420.00	0.00	0.00	0.00	420.00	0.00	130.00	4.05	134.05	554.05
	Private	580.00	0.00	0.00	0.00	580.00	0.00	0.00	92.37	92.37	672.37
	Central	1426.50	0.00	0.00	0.00	1426.50	0.00	61.00	0.00	61.00	1487.50
	Sub Total	2426.50	0.00	0.00	0.00	2426.50	0.00	191.00	96.42	287.42	2713.92
West Bengal	State	5290.00	0.00	100.00	0.00	5390.00	0.00	986.00	121.95	1107.95	6497.95
	Private	2437.00	0.00	0.00	0.00	2437.00	0.00	0.00	462.95	462.95	2899.95
	Central	1370.34	0.00	0.00	0.00	1370.34	0.00	410.00	0.00	410.00	1780.34
	Sub Total	9097.34	0.00	100.00	0.00	9197.34	0.00	1396.00	584.90	1980.90	11178.24
DVC	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	150.00	0.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	150.00
	Central	3097.02	0.00	0.00	0.00	3097.02	0.00	186.20	0.00	186.20	3283.21
	Sub Total	3247.02	0.00	0.00	0.00	3247.02	0.00	186.20	0.00	186.20	3433.21
Odisha	State	1740.00	0.00	0.00	0.00	1740.00	0.00	2061.92	26.30	2088.22	3828.22
	Private	1686.00	0.00	0.00	0.00	1686.00	0.00	0.00	560.74	560.74	2246.74
	Central	1601.21	0.00	0.00	0.00	1601.21	0.00	89.00	10.00	99.00	1700.21
	Sub Total	5027.21	0.00	0.00	0.00	5027.21	0.00	2150.92	597.04	2747.96	7775.17
Sikkim	State	0.00	0.00	0.00	0.00	0.00	0.00	360.00	52.11	412.11	412.11
	Private	0.00	0.00	0.00	0.00	0.00	0.00	209.00	4.65	213.65	213.65
	Central	50.27	0.00	0.00	0.00	50.27	0.00	64.00	0.00	64.00	114.27
	Sub Total	50.27	0.00	0.00	0.00	50.27	0.00	633.00	56.76	689.76	740.03
Central - Unallocated		1489.83	0.00	0.00	0.00	1489.83	0.00	85.01	0.00	85.01	1574.84
Total (Eastern Region)	State	7450.00	0.00	100.00	0.00	7550.00	0.00	3537.92	275.11	3813.03	11363.03
	Private	5553.00	0.00	0.00	0.00	5553.00	0.00	209.00	1436.96	1645.96	7198.96
	Central	14863.38	0.00	0.00	0.00	14863.38	0.00	1005.20	10.00	1015.20	15878.58
	Sub Total	27866.38	0.00	100.00	0.00	27966.38	0.00	4752.12	1722.07	6474.19	34440.57

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTH-EASTERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup								Grand Total	
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)		Total
Assam	State	0.00	0.00	329.36	0.00	329.36	0.00	100.00	5.01	105.01	434.37
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74.67	74.67	74.67
	Central	402.52	0.00	435.56	0.00	838.08	0.00	422.08	25.00	447.08	1285.16
	Sub Total	402.52	0.00	764.92	0.00	1167.44	0.00	522.08	104.68	626.76	1794.20
Arunachal Pradesh	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.11	107.11	107.11
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.23	35.23	35.23
	Central	37.05	0.00	46.82	0.00	83.87	0.00	544.55	0.00	544.55	628.42
	Sub Total	37.05	0.00	46.82	0.00	83.87	0.00	544.55	142.34	686.89	770.76
Meghalaya	State	0.00	0.00	0.00	0.00	0.00	0.00	322.00	32.53	354.53	354.53
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.93	17.93	17.93
	Central	51.60	0.00	109.69	0.00	161.29	0.00	87.27	0.00	87.27	248.56
	Sub Total	51.60	0.00	109.69	0.00	161.29	0.00	409.27	50.46	459.73	621.02
Tripura	State	0.00	0.00	137.00	0.00	137.00	0.00	0.00	16.01	16.01	153.01
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87	9.87	9.87
	Central	56.10	0.00	436.95	0.00	493.05	0.00	68.49	5.00	73.49	566.54
	Sub Total	56.10	0.00	573.95	0.00	630.05	0.00	68.49	30.88	99.37	729.42
Manipur	State	0.00	0.00	0.00	36.00	36.00	0.00	0.00	5.45	5.45	41.45
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.20	12.20	12.20
	Central	47.10	0.00	71.57	0.00	118.67	0.00	95.34	0.00	95.34	214.01
	Sub Total	47.10	0.00	71.57	36.00	154.67	0.00	95.34	17.65	112.99	267.66
Nagaland	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.67	30.67	30.67
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.04	3.04	3.04
	Central	32.10	0.00	48.93	0.00	81.03	0.00	66.33	0.00	66.33	147.36
	Sub Total	32.10	0.00	48.93	0.00	81.03	0.00	66.33	33.71	100.04	181.07
Mizoram	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.47	36.47	36.47
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.88	7.88	7.88
	Central	31.05	0.00	40.46	0.00	71.51	0.00	97.94	0.00	97.94	169.45
	Total	31.05	0.00	40.46	0.00	71.51	0.00	97.94	44.35	142.29	213.80
Central - Unallocated		112.50	0.00	63.62	0.00	176.12	0.00	140.00	0.00	140.00	316.12
Total (North-Eastern Region)	State	0.00	0.00	466.36	36.00	502.36	0.00	422.00	233.25	655.25	1157.60
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	160.82	160.82	160.82
	Central	770.02	0.00	1253.60	0.00	2023.62	0.00	1522.00	30.00	1552.00	3575.62
	Sub Total	770.02	0.00	1719.96	36.00	2525.98	0.00	1944.00	424.07	2368.07	4894.04



INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN ISLANDS

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.12.2021)

Region	Ownership/ Sector	Mode wise breakup								Grand Total	
		Thermal					Nuclear	Renewable			
		Coal	Lignite	Gas	Diesel	Total		Hydro	RES * (MNRE)		Total
Andaman & Nicobar	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	5.25	45.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.39	24.39	24.39
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10	5.10
	Sub Total	0.00	0.00	0.00	40.05	40.05	0.00	0.00	34.74	34.74	74.79
Lakshadweep	State	0.00	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	3.27	3.27	3.27
	Central	0.00	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	3.27	3.27	3.27
Total (Islands)	State	0.00	0.00	0.00	40.05	40.05	0.00	0.00	5.25	5.25	45.30
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.66	27.66	27.66
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	5.10	5.10
	Sub Total	0.00	0.00	0.00	40.05	40.05	0.00	0.00	38.01	38.01	78.06

NEEPCO

NEEPCO'S POWER PLANTS IN OPERATION (AS ON 31.12.2021):

SL. No.	Name of the Plant	State	Installed Capacity (MW)	Year of Commissioning
HYDRO				
1	Kopili Hydro Power Station	Assam	275	50 MW: 1984 100 MW: 1988 100 MW: 1997 25 MW: 2004
2	Doyang Hydro Power Station	Nagaland	75	2000
3	Ranganadi Hydro Power Station	Arunachal Pradesh	405	2002
4	Tuirial Hydro Power Station	Mizoram	60	2017
5	Pare Hydro Power Station	Arunachal Pradesh	110	2018
6	Kameng Hydro Power Station	Arunachal Pradesh	600	Unit # 1 & 2: 2020 Unit # 3 & 4: 2021
Hydro Total			1525	
THERMAL				
7	Assam Gas Based Power Station	Assam	291	GTG: 1995/96 STG: 1998
8	Agartala Gas Based Power Station	Tripura	135	GTG: 1998 STG: 2015
9	Tripura Gas Based Power Station	Tripura	101	GTG: 2015 STG: 2017
Thermal Total			527	
SOLAR				
10	Monarchak Solar Power Station	Tripura	5	2015
Solar Total			5	
Total			2057	

CHAPTER 38

OFFICE OF THE CHIEF CONTROLLER OF ACCOUNTS

The Secretary (Power) is the Chief Accounting Authority of the Ministry. The office of chief Controller of Accounts functions under overall supervision of Additional Secretary & Finance Adviser. The office is headed by the Chief Controller of accounts with one Controller of accounts and seven Pay & account Officers responsible for making all the payments, expenditure control & banking arrangements, Internal Audit and accounting of all the receipts/payments. Out of these one pay and Accounts office is stationed in Bengaluru. The Principal Accounts Office is responsible for consolidation of monthly Accounts of all the Pay & Accounts Offices and submission of monthly accounts of the Ministry to Controller General of Accounts (CGA), Department of Expenditure, Ministry of Finance, preparation of Appropriation Accounts, Statement of Central Transactions (SCT) and Finance accounts on annual basis for submission to the CGA. It is also responsible for the compilation of various data and generation of reports for submission to Ministry of Power, Ministry of Finance, and CGA etc.

The Office of Chief Controller of Accounts also bring out an annual accounting booklet called Accounts at a Glance which contains details of total transactions (receipts, Expenditure, Investments and Loans) of the Ministry and its various organization. It gives a brief overview of accounting trends. The office is also responsible for preparing the Receipt Budget of the Ministry.

Internal Audit Wing

The Internal Audit Wing facilitates the executive for adoption of sound procedure, rule and regularities and financial propriety of transactions of accounts. This Wing advises DDOs and Grantee Institutions for correct implementation of rules and maintenance of records. The Internal Audit Wing also conducts audit of Deen Dayal Upadhyay Gram Jyoti Yojna (DDUGJY), Integrated Power Development Scheme (IPDS), Power System Development Fund (PSDF) and Transmission Line Scheme of J&K, A.P and Sikkim.

Performance of the Internal Audit Wing, during the year 2021-22 is as under:-

No. of Units		No. of Paras Raised	No. of Paras Settled	Total No. of Paras Outstanding
Audit Target	Audit Done			
21	13	39	21	677

Audit Observations

The Organization-wise Break-up of outstanding Audit Observation & Inspection Reports issued up-to 31/12/2021 is as under:-

Sl. No	Name of organization/Office	No. of Inspection Reports Issued	No. of Paras Outstanding (Including old Paras)
01	Ministry of Power	02	74
02	Central Electrical Authority	16	171
03	Appellate Tribunal for Electricity	01	11
04	Grantee Institutions	09	178
05	Special Audits	13	120
06	RGGVY/DDUGJY Scheme	29	34
07	R-APDRP Scheme	26	27
08	Pay & Accounts Officers	07	53
09	PSDF Scheme	06	06
10	Transmission Line	03	03
Total		112	677

* Due to Pandemic of Covid-19, the Internal Audit wing started conducting audit from July 2021 and upto Dec 2021.



STATUS OF OUTSTANDING PARA AS ON 31st Dec, 2021

Sl. No	Office	Opening Balance as on 1.4.2021	Para Added	Total	Para Settled	Closing Balance as on 31.12.21
Ministry of Power						
01	MoP USGAD	55	0	55	0	55
02	MoP (FTE/OE)	19	0	19	0	19
Total of MoP		74	0	74	0	74
Central Electricity Authority						
01	CEA (HQ)	57	0	57	2	55
02	RPSO, MUMBAI	5	0	5	0	5
03	RPSO, DELHI	4	3	7	2	5
04	RPSO, KOLKATA	3	0	3	0	3
05	RPSO, BANGALORE	9	0	9	1	8
06	RIO, MUMBAI	5	0	5	4	1
07	RIO, N.DELHI	7	0	7	1	6
08	RIO, KOLKATA	7	0	7	0	7
09	RIO, CHENNAI	7	0	7	0	7
10	RIO, SHILONG	3	0	3	0	3
11	NRPC, N.DELHI	13	0	13	0	13
12	WRPC, MUMBAI	8	0	8	0	8
13	SRPC, BANGALORE	9	0	9	0	9
14	ERPC, KOLKATA	20	0	20	0	20
15	NERPC, SHILONG	6	0	6	0	6
16	DEPTT. of CANTEEN	15	0	15	0	15
Total of CEA		178	3	181	10	171
Appellate Tribunals For Electricity						
01	ATE (APTEL)	7	7	14	3	11
GRANTEE INSTITUTIONS						
01	BBMB, NANGAL	4	0	4	0	4
02	JERC, GURGAON	4	0	4	0	4
03	NPTI, FARIDABAD	37	22	59	1	58
04	CPRI, BANGALORE	20	0	20	0	20
05	FOR, DELHI	16	0	16	1	15
06	BEE, N.DELHI	25	0	25	0	25
07	CERC, N.DELHI	33	0	33	0	33
08	CPRI, UHVRL Hyderabad	7	0	7	0	7
09	CPRI Bhopal	12	0	12	0	12
Total of Grantee		158	22	180	2	178
SPECIAL AUDITS						
01	REC (AG& SP) &RGGVY	5	0	5	0	5
02	BEE (BLY)	1	0	1	0	1
03	BEE (NMEEE)	11	0	11	0	11
04	BBMB (CHANDIGARH)	10	0	10	0	10

05	THDC	5	0	5	0	5
06	NEEPCO SHILONG	10	0	10	0	10
07	PFC (HQ) New Delhi	14	6	20	0	20
08	LOHARINAG PALA	9	0	9	0	9
09	NHPC FARIDABAD	7	0	7	0	7
10	BTPS	1	0	1	0	1
11	NLDC	18	1	19	6	13
12	REC (HQ) new Delhi	22	0	22	0	22
13	NEF (REC) New Delhi	6	0	6	0	6
Total of Special Audits		119	7	126	6	120

OFFICE OF CHIEF CONTROLLER OF ACCOUNTS

Sl. No	Office	Opening Balance	Added	Total	Dropped	Closing Balance
01	Pr. AO ADMIN	12	0	12	0	12
02	Pr. AO A/c	8	0	8	0	8
03	PAO (Sectt.)	16	0	16	0	16
04	PAO (BMCC)	4	0	4	0	4
05	PAO (CEA), N.DELHI	7	0	7	0	7
06	PAO (CEA), BENGALURU	6	0	6	0	6
Total of O/o Chief Controller of Accounts		53	0	53	0	53

RGGVY/DDUGJY

Sl. No	Office	Opening Balance	Added	Total	Dropped	Closing Balance
01	RGGVY/DDUGJY	29	0	29	0	29
01	REC Soubhagya (HQ)	5	0	5	0	5
Total		34	0	34	0	34

RAPDRP SCHEME

Sl. No	Office	Opening Balance	Added	Total	Dropped	Closing Balance
01	RAPDRP/IPDS	27	0	27	0	27
Total		27	0	27	0	27

PSDF SCHEME

Sl. No	Office	Opening Balance	Added	Total	Dropped	Closing Balance
01	PSDF	6	0	6	0	6
Total		6	0	6	0	6

Transmission Line SCHEME

Sl. No	Office	Opening Balance	Added	Total	Dropped	Closing Balance
01	Transmission Line (PGCIL- J&K, A.P and Sikkim)	3	0	3	0	3
Total		3	0	3	0	3



**Consolidated Report of Outstanding Paras
(as on 31-12-2021)**

Opening Balance as on 01.04.2021

Compliance and Special Audit	589
RGGVY/DDUGJY Scheme (Units)	34
R-APDRP	27
PSDF	6
Transmission Line	3
Total	659

Added between 01.04.2021 to 31.12.2021

Compliance and Special Audit	39
RGGVY/DDUGJY Scheme (Units)	0
R-APDRP	0
PSDF	0
Transmission Line	0
Total	39

Dropped between 01.04.2021 to 31.12.2021

Compliance and Special Audit	21
RGGVY/DDUGJY Scheme (Units)	0
R-APDRP	0
PSDF	0
Transmission Line	0
Total	21

Closing balance as on 31.12.2021

Compliance and Special Audit	607
RGGVY/DDUGJY Scheme (Units)	34
R-APDRP	27
PSDF	6
Transmission Line	3
Total	677

CHAPTER 39

AUDIT OBSERVATIONS OF C&AG

Report 18/2020

10.1 Avoidable loss due to under-recovery of capacity charges

Decision of Damodar Valley Corporation towards reduction of the quantum of power of PPA with Kerala State Electricity Board in respect of RTPS-I resulted in loss due to under-recovery of capacity charges, amounting to ₹ 78.15 crore during the period May 2016 to March 2019.

Damodar Valley Corporation (Corporation) decided (June 2006) to set up Raghunathpur Thermal Power Station Phase-I (RTPS-I) with two units (Unit-I & II) having capacity of 600MW each. The Commercial Date of Operation (COD) of Unit-I and Unit-II were scheduled in November 2010 and February 2011 respectively. The Corporation entered (2006) into Power Purchase Agreements (PPAs) with Punjab State Electricity Board (PSEB), Haryana Power Generation Corporation Limited (HPGCL) and Kerala State Electricity Board Limited (KSEBL) for supply of 300 MW, 100 MW and 150 MW of power respectively from RTPS-I for a period of 25 years.

However, the commissioning of RTPS-I was delayed and it was anticipated (February 2015) that the COD would be achieved in July 2015 and August 2015 for Unit-I and Unit-II respectively. The Corporation proposed (March 2015) to KSEBL to shift the quantum of power (150MW) of RTPS-I in the above PPA, to its other operational units with the anticipation of further delay in commissioning of RTPS-I and there by fixation of higher tariff by Central Electricity Regulatory Commission (CERC) for the same, due to increased project cost. KSEBL accepted (July 2015) the above proposal. However, it was mutually agreed (July 2015) to reduce the quantum of power from RTPS-I in respect of the above PPA from 150 MW to 50 MW considering the operational aspect of inter-state transmission system of power. The Corporation also proposed to KSEBL to enter into a supplementary PPA in respect of such reduced 50 MW of power for RTPS-I and a fresh PPA for supply of 100 MW of power from its existing MTPS units. However, no such PPAs were entered into with KSEBL.

10.2 Undue favour extended by NSPCL in award of contracts on nomination basis

Undue favour was extended by the NTPC SAIL Power Company Limited to a private party by awarding routine maintenance work valuing ₹ 129.76 crore during 2013-14 to 2018-19 on nomination basis at a profit margin of 10 per cent of the contract price disregarding the CVC guidelines/public procurement regulations.

NTPC SAIL Power Company Limited (NSPCL), a Joint Venture Company of NTPC Limited and Steel Authority of India Limited (SAIL) is a power generating Company, presently having its power stations at Bhilai, Durgapur and Rourkela. NSPCL Board decided (August 2007) to enter into Power Station Maintenance Agreement (PSMA) with M/s Utility Powertech Limited (UPL) to undertake various maintenance and miscellaneous works in line with the agreement made by NTPC. PSMA was finalised with UPL in January 2008 for 10 years but the same was terminated on 31 May 2016 on mutual understanding of both the parties. Subsequently the company signed a new PSMA with UPL for a period of five years in May 2016. NSPCL Bhilai, Rourkela and Durgapur got 346 works executed by UPL (including its sub-contractors) during 2013-19 for which it paid ₹129.76 crore to UPL including ₹11.53 crore profit margin. Out of above, 75 works valuing ₹4.58 crore only were executed by UPL itself and remaining 271 works valuing ₹125.18 crore were executed through the sub-contractors.

Audit noted that Para 5 of the Public Procurement Bill 2012 envisaged inter alia that, 'the procuring entity shall, in relation to a public procurement, have the responsibility and accountability to (i) ensure efficiency, economy and transparency; (ii) provide fair and equitable treatment to bidders; (iii) promote competition'. Further, as per the CVC order (July 2007), tendering process or public auction is a basic requirement for the award of contract by any Government agency as any other method, especially award of contract on nomination basis, would amount to a breach of Article 14 of the Constitution guaranteeing right to equality, which implies right to equality to all interested parties. The Hon'ble Supreme Court of India in its judgment (Special Leave Petition Civil No. 10174 of 2006) also held that the awarding of Government contract be done only through public auction/ tender, the prime objective being to ensure transparency in the Government Contracts as well as to weed out corrupt/irregular practices. The Judgment also stipulated a departure from the aforementioned rule only in exceptional cases such as natural calamities where a Government Contract may be awarded on nomination basis. The above Judgment was also circulated (5 July 2007) by CVC to all the CVOs. CVC reiterated (December 2012) their earlier instruction for strict implementation. NSPCL, being engaged in public procurement on behalf of Government of India, has the responsibility to ensure compliance of the above regulations.

SJVN

Details of pending ATN/reports

- Report No-18 of 2019:** Para-3.3.4. 4.5.3.4/8.10.2: Meeting of BoD and Board Committee Local Area Non achievement of MPS norms in listed CPSEs.

Status: Letter no-15-7/2/2020-H-II dated 13.02.2020 received from MoP and SJVN replied to U/S MoP vide letter no- SJVN/



CHQ/IA/1206/3368 dt. 22.04.2020. Further MoP seeks some information vide letter no. 15-7/2/2020-H-II dated 15.03.2021 which has been replied to MoP vide letter no-SJVN/CHQ/IA/3733 dated 23.03.2021 & SJVN/CHQ/IA/3751 dated 30.03.2021 Further MoP letter no-15-7/2/2020-H-II dated 28.06.2021 replied by SJVN vide letter no-SJVN/CHQ/IA/2021-1206-3982 dated 21.07.2021. Para is put up under MoP.

- 2. Report No-7 of 2020:** Para No.3.2.2/3.3.3/3.4/4.5.2.12/4.5.5: Independent Directors Meeting of BoD and Board Committee Filling up the post of Directors-functional, non- functional or independent Directors CRS Expenditure on Common Theme.

Status: Letter no-15/01/20-21-H-II dated 19.03.2021 received from MoP and SJVN replied to U/S MoP vide letter no-SJVN/CHQ/IA/2021-2014-3801 dt. 15.04.2021. Further MoP seeks some information i.r.o. para no.3.3.3/4.5.2.12/4.5.5 vide letter no. 15/01/2021-H-II dated 30.06.2021 which has been replied by SJVN vide letter no-SJVN/CHQ/IA/2021/2017-3983 dated 21.07.2021. Para is put up under MoP.

NEEPCO

Status of pending C&AG IR Paras & C&AG Audit Paras, as on 31.12.2021

SL. No.	Report Ref.	Para No.	Particulars	Remarks
1	Inspection Report for FY 2015-16	Part-IIB, Para No.4	Under Insurance of Contractors' All Risk policies in respect of KaHEP.	No further communication / observation received from PDCA-I since last reply submitted on 04.10.19.
2		Part-IIB, Para No.6	Non-completion of additional capitalization as per schedule of Tariff Order.	No further communication / observation received from PDCA-I since last reply submitted on 10.01.20.
3		Part-IIB, Para No.7	Increase of Project Cost by Rs.701.80 crore and higher electricity cost per unit - Pare Project.	No further communication / observation received from PDCA-I since last reply submitted on 19.03.20.
4	Inspection Report for FY 2016-17(Thermal)	Part-IIA, Para No 1	Loss of Rs.272.20 Crore due to under recovery of Fuel Cost and Fixed cost at AGBPP.	No further communication / observation received from PDCA-I since last reply submitted on 10.01.20.
5		Part-IIB, Para No 1	Delay in commissioning of Combined Cycle Extension Project in AGTCCP and non-recovery of LD of Rs. 16 crore from M/s Thermax Ltd.	
6		Part-IIB, Para No 4	Disallowance of additional expenditure of Rs.68.38 crore by CERC for tariff fixation of combine Cycle Extension Project	
7	Inspection Report for FY 2016-17 (Hydro)	Part-IIA, Para No 1	Unfruitful Expenditure of Rs.32.26 crore for acceleration of Hydro-Mechanical work	No further communication / observation received from PDCA-I/ MOP since last reply submitted on 03.03.20
8		Part-IIA, Para No 2	Loss of Rs. 9.83 crore due to prolonged / unplanned storage of Electro-Mechanical materials at site	
9		Part-IIA, Para No 3	Additional expenditure of Rs.8.06 crore on purchase of construction power during the period April 2016 to March 2017 at Kameng HEP	
10	Inspection Report for FY 2017-18	Part-IIA Para No 2	Indecision in foreclosing the contract with respect to Tuirial Hydro Electric Project leading to extra burden of Rs.456.90 crore towards idle claims of various contracts.	No further communication / observation received from PDCA-I since last reply submitted on 05.02.20
11	Inspection Report for FY 2017-18 & 2018-19	Part-IIA Para No 1	Loss of Rs. 34.29 Crore due to non-levying of penalty from the contractor(5MW Solar PV Power Plant-TGBPP)	No further communication / observation received from PDCA-I since last reply submitted on 10.01.20
12		Part-IIB Para No 2	Undue advantage to a section of employees (HQ)	No further communication / observation received from PDCA-I since last reply submitted on 23.01.20

Sl. No.	Report Ref.	Para No.	Particulars	Remarks
13		Part-IIB Para No 3	Vehicle of the Corporation not in physical possession (HQ)	Additional query received from CAG. Reply under process.
14	Inspection Report for FY 2018-19	Part-IIA Para No 2	Poor monitoring of project (KaHEP)	No further communication / observation received from PDCA-I/MOP since last reply submitted on 06.10.20
15		Part-IIA Para No 3	Extra lead for carriage paid on doubtful supply (KaHEP)	No further communication / observation received from PDCA-I since last reply submitted on 10.02.20
16		Part-IIB Para No 1	Non recovery of Liquidated damage of Rs.18.80 Crore from "M/s. Patel Engineering Ltd. Mumbai" due to delay in Civil Works of Dam and Spillway (LOT-II) (TrHEP)	No further communication / observation received from PDCA-I since last reply submitted on 21.09.20
17	Inspection Report for FY 2019-20 (Hydro)	Part-IIB Para No 1	Extra expenditure of Rs.45.42 crore due to consequences of leakages in Penstock under Package V (E & M Works) (KaHEP)	No further communication / observation received from PDCA-I since last reply submitted on 06.08.20
18		Part-IIB Para No 2	Non-recovery of Rs.16.60 crore from M/s OMIL – JSC (JV) against Electricity, Accommodation and others charges (KaHEP)	
19		Part-IIB Para No 3	Compensation payment amounting Rs. 3.05 Crore to the contractor for delay in handing over of work fronts along with Rs. 1.33 Crore for warranty (PaHEP)	
20		Part-IIB Para No 4	Delay in Commissioning caused additional cost amounting to Rs. 1.04 Crore in Overhauling/ procurement of equipment in Kameng.	
21		Part-IIB Para No 5	Inordinate delay in execution of Pare and Kameng Hydroelectric Projects.	
22		Part-IIB Para No 6	Loss of revenue to the tune of Rs. 185 crore due to lack of proper repair/ maintenance of Kopili Power Plant	
23	Inspection Report for FY 2019-20 (Thermal)	Part-IIB Para No 1	Observations on Corporate Governance.	No further communication / observation received from PDCA-I since last reply submitted on 13.12.21
24	Inspection Report for FY 2019-20 (Thermal)	Part-IIB Para No 2	Non-mitigation of foreign exchange loss.	No further communication / observation received from PDCA-I since last reply submitted on 13.12.21.
25		Part-IIB Para No 3	Non-submission of records.	
26		Part-IIB Para No 4	Operational performance of Gas Based Thermal Power Plants.	
27	Inspection Report for FY 2020-21	Part-IIB Para No 1	Extra expenditure incurred due to defective work of Penstocks of Kameng HE Project by M/s OMIL + JSC (JV).	No further communication / observation received from PDCA-I since last reply submitted on 31.12.21.
28		Part-IIB Para No 2	Loss of revenue due to excess Auxiliary Energy Consumption.	
29		Part-IIB Para No 3	Loss of Rs. 27.63 crore due to under recovery of Capacity Charges and Energy Charges.	
30		Part-IIB Para No 4	Generation loss of Rs.559 crore due to ineffective work by BHEL and subsequent unwarranted outages of the units at Kameng HEP.	



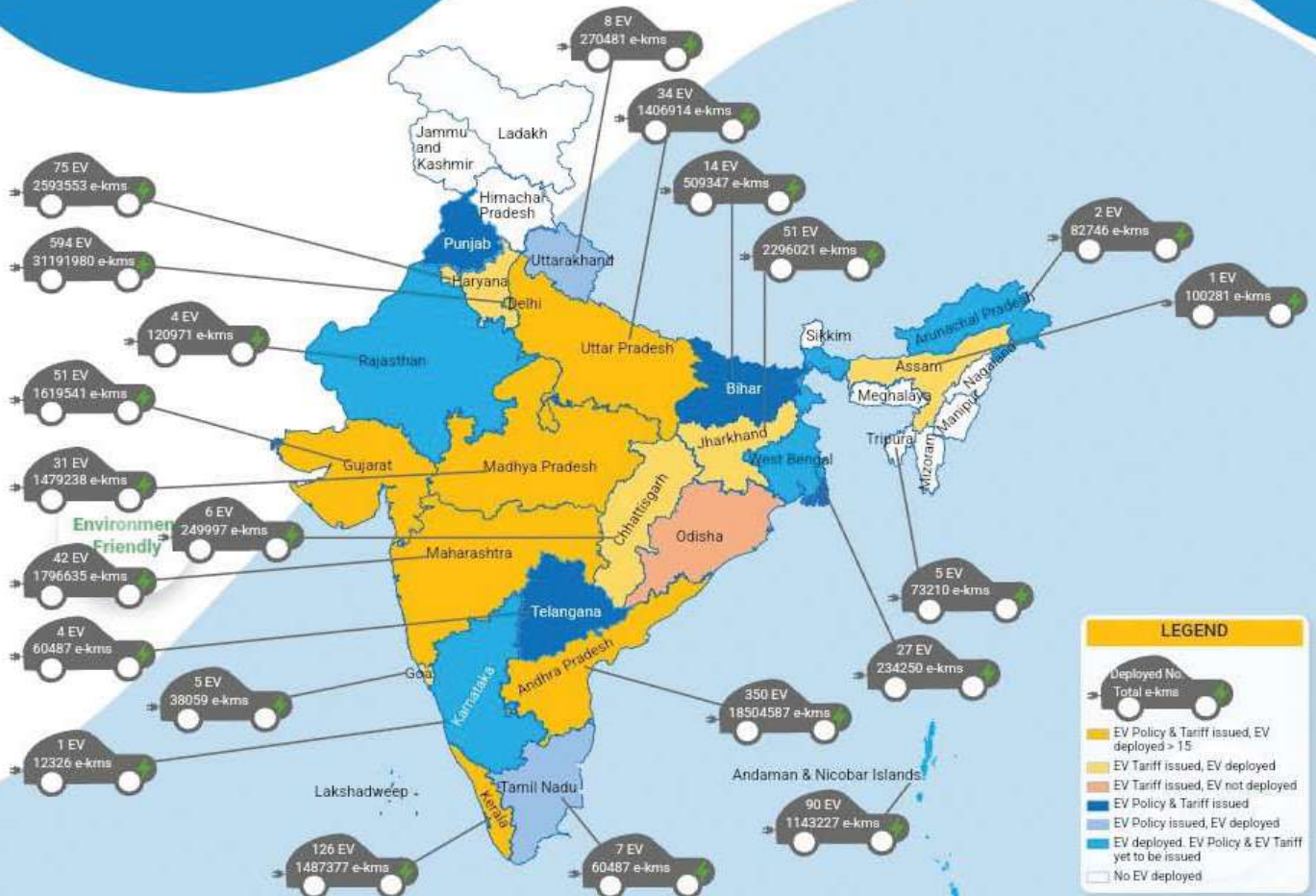
Sl. No.	Report Ref.	Para No.	Particulars	Remarks
31	Audit Report No. 18/2019	4.5.5	CSR by CPSEs: Reporting and disclosure	No further communication / observation received from MoP since last reply submitted on 30.06.20.
32	Audit Report No. 7 of 2020-Union Government (Commercial) for the year ended 31st March 2019, on Compliance Audit Observation	1.4.3	Return on Equity (ROE) of CPSEs	No further communication / observation received from MoP since last reply submitted on 17.11.21
33		4.5.2.3	CSR: Utilization of Funds	No further communication / observation received from MoP since last reply submitted on 03.12.21.

**#10SAAAL
BEMISAAL**

National Electric Mobility Dashboard



as on 16-Nov-2021





सत्यमेव जयते

Ministry of Power

Government of India

Shram Shakti Bhawan, Rafi Marg, New Delhi-110001