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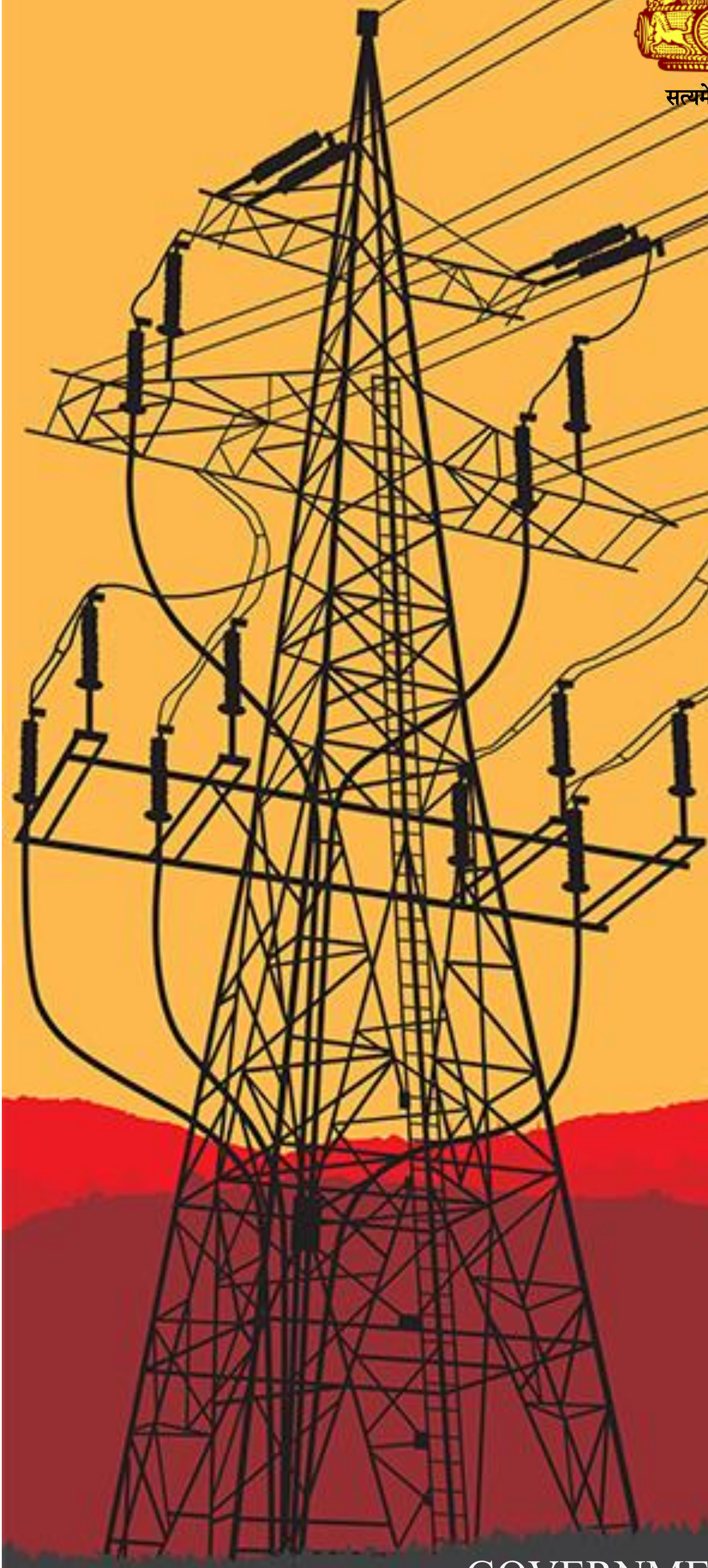

NATIONAL ELECTRICITY PLAN

VOLUME II – TRANSMISSION

[In fulfilment of CEA's obligation under Section 3(4) of the Electricity Act 2003]

OCTOBER 2024

GOVERNMENT OF INDIA
MINISTRY OF POWER
CENTRAL ELECTRICITY AUTHORITY

Contents

ACRONYMS

Acronyms	Expansion
AAAC	All Aluminium Alloy Conductor
ABT	Availability Based Tariff
ACSR	Aluminium Conductor Steel reinforced
AIS	Air Insulated Sub-station
ATC	Available Transfer Capability
BESS	Battery Energy Storage System
CAGR	Compound Annual Growth Rate
CCAI	Coal Consumers' Association of India
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CICA	Composite Insulated Cross Arm
ckm	circuit kilometer [route length (in km) x number of circuits]
CSD	Controlled Switching Device
CSIRT	Computer Security Incident Response Team
CTU	Central Transmission Utility
DISCOM	Distribution Company
DLR	Dynamic Line Rating
EHV	Extra High Voltage
EMT	Electro Magnetic Transient
EPS	Electric Power Survey
FACTS	Flexible Alternating Current Transmission System
GDP	Gross Domestic Product
GEC	Green Energy Corridor
GIL	Gas Insulated Lines
GIS	Gas Insulated Sub-station
GNA	General Network Access
GW	Giga Watt (1 GW =1000 MW)
HEP	Hydro Electric Power Plant/Project
HTLS	High Temperature Low Sag
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICT	Inter-Connecting Transformer
IEEE	Institute of Electrical and Electronics Engineers
IGBT	Insulated Gate Bipolar Transistor
Intra-STS	Intra State Transmission System
IPP	Independent Power Producer
ISGS	Inter State Generating Stations
ISTS	Inter State Transmission System
IWPA	Indian Wind Power Association
kV	kilo Volts
LiDAR	Light Detection and Ranging
LILO	Line In Line Out
MNRE	Ministry of New and Renewable Energy
MoEF&CC	Ministry of Environment, Forest and Climate Change
MoP	Ministry of Power
MPLS	Multi-Protocol Label Switching
MSC	Mechanically Switched Capacitor
MSR	Mechanically Switched Reactor
MU	Million Units (1 MU =10^6 kWh)
MVA	Mega Volt Amperes (1 MVA = 10^6 VA)

MVAr	Mega Volt Ampere reactive
MW	Mega Watt (1 MW=10^6 Watt)
NCIIPC	National Critical Information Infrastructure Protection Center
NCT	National Committee on Transmission
NGR	Neutral Grounding Resistor
NR/WR/SR/ER/NER	Northern/ Western/ Southern/ Eastern/ North-Eastern Region(s)
OPGW	Optical Ground Wire
OSOWOG	One Sun One World One Grid
PDH	Plesiochronous Digital Hierarchy
PLCC	Power Line Carrier Communication
PMGS-NMP	PM GatiShakti National Master Plan
PMU	Phasor Measurement Unit
PSP	Pumped Storage Plant/Project
PSS	Power System Stabilizer
PST	Phase Shifting Transformer
RE	Renewable Energy
REZ	Renewable Energy Zone
RoW	Right of Way
RPC	Regional Power Committee
RTC	Round the Clock
RTM	Regulated Tariff Mechanism
S/C and D/C	Single Circuit and Double Circuit
S/s	Sub-station
SAARC	South Asian Association for Regional Cooperation
SC	Synchronous Condenser
SCADA	Supervisory Control and Data Acquisition
SCoD	Scheduled Commercial Operation Date
SDH	Synchronous Digital Hierarchy
SECI	Solar Energy Corporation of India
SERC	State Electricity Regulatory Commission
SLR	Switchable Line Reactor
SSSC	Static Synchronous Series Compensator
STATCOM	Static Compensator
STU	State Transmission Utility
SVC	Static VAR Compensator
TBCB	Tariff Based Competitive Bidding
TCSC	Thyristor Controlled Series Compensator
TOV	Temporary Over Voltage
TSP	Transmission Service Provider
TTC	Total Transfer Capability
VSC	Voltage Source Converters

Summary of Comments received on Draft National Electricity Plan - Transmission

	Comments received	Comments received from	Action taken/Remarks
	General comments		
1	Need for publishing draft and final Transmission plan well before the start of the plan period. It would be ideal to notify the five-year plan of generation as well as transmission one year to six months in advance of the start date of the plan period for the coming cycles.	Prayas Energy Group	Once the generation plan is firmed up, transmission plan is prepared. National Electricity Plan (Generation) was notified in May, 2023. In future effort would be made to bring out the generation and transmission plans (National Electricity Plan) well in advance before the start of the period covered in the plan.
2	(i) Interim/progress/status report of achievement- interim report for the years 2022-24 may be notified and included in the plan. (ii) Progress check on project wise basis- the number of projects actually completed vs envisaged to be completed during a five year period (iii) Reporting of projects given some sort of relaxation like extension due to COVID-19 pandemic (iv) Utilisation of transmission elements during solar generation hours, peak demand hours, off-peak hours etc. (v) Power factor /Grid Reliability improvement devices- assessment of impact of such devices on grid operation and management shall be reported on an annual basis and (vi) Data reporting at various portals- for planning of any new transmission lines PMGS-NMP to be used. Data on utilisation of NSWS portal on quarterly/annual basis to be reported.	Prayas Energy Group	(i) Progress during the years 2022-23 and 2023-24 has also been incorporated in the Plan. The plan already covers the review of transmission system augmentation during 2017-22. (ii) The transmission lines and sub-stations targeted during 2017-22 but subsequently slipped beyond 2022 is already included in the NEP. (iii) Projects which were given extension due to COVID-19 is already included in the National Electricity Plan (iv) Utilisation of transmission elements during different hours of the day would be very difficult to capture as it will vary throughout the year. (v) impact of STATCOM/SVC on the grid is already being analysed by Grid-India. (vi) PMGS-NMP is being used for route alignment of transmission lines during planning stage. PMGS-NMP is being used by the Bid Process Coordinators (BPCs) during preliminary survey of the transmission lines/sub-stations. Application through NSWS portal is mandatory for prior approval under Section 68 of Electricity Act, 2003, and authorisation under Section 164 of the Electricity Act, 2003. About 90 applications for prior approval under Section 68 of Electricity Act, 2003, has been processed during 2023-24.
3	Reactive power compensation option may be operationalized through RE generators capable of generating reactive power during non-generation hours with a suitable tariff compensation proposed.	Indian Wind Power Association (IWPA)	Not in the scope of NEP (Transmission).
4	Silt removal must be organised in most of the Hydel reservoir. Nearly 30% additional energy can be envisaged which can be better utilised for RE integration.	IWPA	Not in the scope of NEP (Transmission). Transmission system is planned for the quantum of connectivity granted (in MW) to the generation developers, drawal of power by entities, system strengthening etc. Silt removal would lead to increase in energy

	Comments received	Comments received from	Action taken/Remarks
			generation. Electrical Energy (MU) is not factored in Transmission Planning.
5	Review impact of ISTS RE waiver and minimum connectivity threshold (50 MW) on ISTS Transmission addition or planning: there is a need for an analysis to be carried out to study the impact of ISTS waiver on ISTS connectivity requirements and whether connectivity for some projects at the InSTS network would have been more optimal from a planning and operational point of view.	Prayas Energy Group	As per extant regulation, any generator (above a certain capacity) may seek connectivity to ISTS and cannot be denied connectivity. The suggested exercise is being carried out separately. Analysis is being done to determine whether it would be economical to set up RE in intra-state system by the State (having low CUF of RE), rather than wheeling power through ISTS network from RE rich state, once ISTS waiver is gradually phased out .
6	Due to massive increase in peak power demand, the transmission infrastructure also will be expected to grow massively by 2047. The ecological and environmental impact of the same needs to be assessed.	Shri Shankar Sharma, Power & Climate Policy Analyst	To meet the increasing electricity demand, new generating stations are being planned. Commensurate transmission network needs to be planned for evacuation of power from generating stations to the load centres. While planning and building transmission lines, efforts are made to ensure that the line does not traverse through eco-sensitive areas; no- go areas etc. Effort is made to minimize infringement in forest.
7	Since the role of conventional technology electricity generating sources such as coal based, gas based, dam-based hydro, nuclear based will have to drastically reduce in the next few decades in our efforts to address the credible threats of climate change, the high growth rate of transmission infrastructure will not be needed, and may even come down drastically. If the distributed renewable energy sources such as roof top solar PV systems is optimally utilised, there would not be a need for so many additional transmission lines and sub-stations as being proposed in the draft plan. In a scenario of optimal harnessing of distributed renewable energy sources, even many of the existing transmission lines may become redundant, and can be decommissioned.	Shri Shankar Sharma	To address the climate change issues, thrust is on development of non-fossil sources for electricity generation like wind, solar, hydro (dam-based and run of river), nuclear etc. Coal based capacity is also being added, though at a slower pace. As the wind and solar resources are concentrated in few states and that too very far away from load centres, adequate transmission infrastructure would be required for evacuation of power from the RE sources. The existing transmission lines would not become redundant as power will be required to be supplied from other generation sources during period of no electricity generation (during night, cloudy cover etc.) from solar plants. Further, electricity demand would have to be met in winters also when hydro generation would be quite low. Wind generation is also seasonal and there are period of no or very low wind generation. Hence, for ensuring availability of electricity as per requirement, a mix of generation resources and associated transmission lines is required.
8	The continued preference to build more of conventional technology power plants, and hence the associated transmission infrastructure will be diametrically opposite to	Shri Shankar Sharma	Capacity of Rooftop solar installations is likely be about 60 GW by the year 2032. Entire electricity demand cannot be met only with roof-top solar installations.

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	the Union power minister's lofty statement on the humongous potential of RE sources, and the recent announcement by the honourable PM on a scheme to install roof top SPV systems on 1 crore houses.		Government is committed towards increasing the share of Renewable Energy and the share of non-fossil electricity generation capacity is planned to increase to about 500 GW by the year 2030. Transmission infrastructure would be required to be built for evacuation of power from the RE parks located in RE rich states like Rajasthan, Gujarat, Karnataka, Andhra Pradesh, Tamil Nadu etc. to the load centres in the country. Thrust is on meeting the electricity demand in a sustainable manner.
9	Clear absence of discussion on the inevitable impact on the grid of the large number of distributed RE sources, such as rooftop SPVs solar, and on the imperative of micro/ mini/ smart grids for our country. There is a critical need to take the discussions on micro/ mini/ smart grids from the confines of academic focus only, to the national level debates for early consideration for implementation at various levels of our country.	Shri Shankar Sharma	Micro, mini grids etc. do not require the expansion of transmission system. Hence, not included in the National Electricity Plan (Transmission).
10	Since the large capacity RE sources in one location, such as solar and wind power parks, will also demand diversion of large chunks of lands for setting up power plants and the dedicated transmission lines of low utilisation factor (in usage for only 8-10 hours a day), the focus should obviously be on distributed RE sources, such as rooftop SPV systems. India's residential rooftop solar potential alone is estimated at about 650 GW; and if the rooftop surface area of various kinds of buildings in the country is objectively considered for this purpose, the total potential of distributed kind of solar power can be thousands of GW at the national level, and may contribute more than 70-80 % of annual electrical energy for the country.	Shri Shankar Sharma	Thrust is being given to roof-top solar installations, however, roof top solar alone cannot meet 70-80% of annual electricity demand. A mix of generation sources needs to be developed to meet the electricity demand. Solar and wind parks are being developed in areas having high CUF leading to reduction in generation tariff and better utilisation of associated transmission system.
11	In view of the unacceptable costs to the society, and the very nature of PSPs, as net energy consumers, should we not consider optimizing the usage of BESS at all voltage levels instead of PSPs? It is also deplorable that numerous pumped storage plants in thick forests and eco-sensitive areas are being planned in the country, without diligently considering various other options to meet the peak loads of the grid, such as demand side management (DSM), and battery energy storage systems (BESS). The first priority in planning any power sector for the future should be to consider all the options available to minimise the grid electricity demand, while ensuring equitable and adequate electricity supply to all sections of the society.	Shri Shankar Sharma	The projected electricity demand as per 20th EPS Report already accounts for demand side management, reduction of transmission & distribution losses, energy efficiency improvement measures etc. The off- grid electricity demand, demand to be met locally etc. are not included in the electricity demand projections of 20th EPS. A mix of energy storage technologies such as BESS as well as Pumped storage plants have been planned. Like the Pumped storage plant, even BESS is a net energy consumer of electricity. Pumped storage plants have some inherent advantages like contribution towards system inertia and reactive power management.

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12	It is a highly deplorable scenario that the concerned authorities did not deem it necessary to ask the question why Goa and Kerala are desperate to import power through 400 kV systems through the forest of Western Ghats from a distant Chhattisgarh, at humongous costs to the environment and ecology of the country, as compared to much attractive option of harnessing REs within their own borders.	Shri Shankar Sharma	Goa and Kerala have RE resources, however, these states cannot meet their electricity demand in an isolated way only through their own RE potential. Given the intra-day, seasonal variation in RE generation, entire electricity demand cannot be met round the year only through wind, solar or hydro. Hence, for reliable electricity supply, these areas need to be connected to the National Grid and given the geographical location of these states, the transmission line connecting Goa and Kerala to the main grid has to pass through forest area. It is never intended that the transmission line passes through forest. Utmost care is taken to route the line through non forest area, wherever possible.
13	A few years ago, one such line to Kerala (Mysore- Kozhikode 400 kV D/C line) through the Nagarahole Wildlife Sanctuary resulted in felling of more about 50,000 mature trees in Karnataka alone, in addition to similar environmental damage in Kerala forests. The concerned authorities refused to prevent such destruction despite fervent and credible representations by civil society groups which also provided credible alternatives. As a matter of fact, the authorities could not provide any valid reasons as to why this line was essential, since there were already two other power lines between Karnataka and Kerala, and six of 400 kV lines between Tamil Nadu and Kerala were functioning.	Shri Shankar Sharma	There is only one 400 kV D/c line between Karnataka and Kerala (Mysore- Kozhikode D/c line). There are four number of 400 kV interconnections between Tamil Nadu & Kerala. Voltage Sourced Converter (VSC) based HVDC link of 2000 MW is also there between Pugalur (Tamil Nadu) - North Trichur (Kerala). To meet the electricity demand of Kerala (Northern as well as Southern part of Kerala) reliably, these interconnections have been planned. Expansion of grid is carried out keeping in view the growth of electricity demand in different parts of any State/UT as well as availability of generation sources within the State and the import requirement of the State. Transmission line is planned through forest if and only if there are no other options of routing the transmission line.
14	It is in this larger context of national welfare that the critical need to consider adopting a holistic planning approach to the generation, transmission and distribution of electricity should be appreciated; as opposed to the ongoing practice of viewing generation and transmission as two distinct entities. Additionally, since the future scenario will have a large number of small size REs and PROSUMERS, there will be a need to focus more on distribution planning than the transmission planning, because of the need for distribution systems to handle most of the localised generation and loads.	Shri Shankar Sharma	Generation developers seek connectivity to the grid and transmission system is planned for evacuation of power from the generating stations as per the quantum of connectivity granted. Generation and Transmission system is being planned holistically. Further, Distribution plan is also being prepared.
15	Keeping in view the humongous costs/ risks to our society in building the ever growing and complex centralised transmission grid infrastructure, the time has come to diligently question as to the necessity of connecting even the small, non-essential and remote loads	Shri Shankar Sharma	The suggestion is already being followed. Feeder segregation has been done/is being done by the States to feed the agriculture load only during day time during solar hours through solar generation. Agriculture load is even being met by standalone solar pumps.

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	to the centralised grid. Such extension of centralised grid to all nooks and corners of a vast country like India (even through forests and protected areas) will further exacerbate the AT&C losses, while also complicating the voltage profile in the grid, in addition to complicating the grid operations. A large number of smaller loads such as streetlights, remote villages, agricultural pump sets, temples on hills, small hamlets in forests etc. can only pull down the voltage profile of the centralised grid, and hence should be diligently considered to be fed by localised RE sources. Such a rational approach to the credible need of every individual load must be diligently considered as a part of the overall power system planning, keeping in view the larger needs of the society.		Demand of small hamlets, far flung villages etc. are being met locally.
16	When we diligently consider our country's overall welfare in the context of climate emergency, the vast potential of REs in the country, and the already constrained natural resources, it should become evident that we have no alternative but to move over to an energy transition based on REs at an early date.	Shri Shankar Sharma	As a part of energy transition, thrust is on development of RE sources for electricity generation and Government has planned to increase the share of non-fossil fuel based capacity to 50% in the total installed generating capacity by the year 2030.
17	Another common feature of the last few National Electricity Plans on Transmission, including the present one, has been that there is hardly any reference to the ecological impacts of the power sector; especially on the forest and agricultural lands of the ever-expanding transmission infrastructure.	Shri Shankar Sharma	Effort is made to avoid forests or minimise the forest areas in the construction of transmission lines. For lines passing through forest, clearance from MoEF&CC is obtained. Like any other linear infrastructure project, transmission line has to traverse through urban and rural areas and agricultural lands cannot be totally avoided. Technological solutions exist and are being adopted to minimise the RoW like narrow base towers, multi circuit towers etc. To utilise the existing RoW, reconductoring of transmission lines is also being done. To minimize damage to crops, stringing of transmission lines is generally carried out after the crop season.
	Chapter 1: Introduction		
1	Requested to add exemption criteria for Intra-STS projects as available for ISTS projects (exempted projects are implemented through RTM mode) for awarding them under TBCB process	MPPTCL	The exemption criteria for Intra-STS projects has to be finalised by the respective States.
2	At central level, CTUIL holds this responsibility, while STU does the same at Intra-state level. However, after formation of CTUIL, segregation of the roles & responsibilities of PGCIL and CTUIL, and revision of TBCB guidelines in 2021, CTUIL now also acts as the Nodal agency for TBCB bids. On similar lines, we opine that STUs	Tata Power	Write up has been included in the NEP (Transmission) in Chapter 1.

	Comments received	Comments received from	Action taken/Remarks
	should also be segregated into two (2) subsidiaries, with one executing the responsibility of charting the transmission roadmap (in form of a 3 or 5 year rolling plan, which is being done by CTUIL at present) **f**or the state and acting as the Nodal agency for executing TSA with TBCB SPV, while the other acts as the TSP/Licensee for transmission schemes. This step is suggested to protect the interests of developers selected as TSP for implementing transmission scheme under TBCB mode.		
	Chapter 3: Transmission Planning Philosophy		
1	To change the voltage margin from $\pm$ 5 % to $\pm$ 10 % due to very high voltage during off-peak generation of RE	KPTCL	The voltage limits are as per the Manual on Transmission Planning Criteria, 2023. The Manual has been finalised after detailed consultation with stakeholders. Appropriate compensation devices need to be installed in the sub-stations to keep the voltage within the limits.
2	Providing STATCOMs by RE generators and stipulation regarding Dynamic VAR Compensation to be provided by Inverter based Wind and Solar Generators to be stipulated in NEP	KPTCL	RE generators are mandated by CEA Regulation for supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading. This can be inter-alia achieved by installing appropriate reactive compensation devices.
3	Requested to revise the time horizon of transmission planning from 3-5 years to 5-10 years on rolling basis every year.	Adani Electricity Mumbai Ltd. (AEML)	The NEP (Transmission) covers detailed transmission plan for the next five years and perspective plan for another five years, thereby covering a period of 10 years. The National Electricity Plan would be updated on rolling basis.
4	The STUs shall provide adequate reactive compensation to bring power factor as close to unity at 132 kV and 220 kV voltage levels and ensure that the Transmission licensees make appropriate provision for Reactive Power compensation at LV level at all proposed EHV Substation Schemes.	AEML	Already included in Chapter 3. As per Central Electricity Authority (Grid Standards) Regulations, 2010, all Entities, Appropriate Load Despatch Centres and Regional Power Committees, for the purpose of maintaining the Grid Standards for operation and maintenance of transmission lines, shall, 3 (b) maintain the steady state voltage within the limits specified in the regulation in Table 1. As per the Manual on Transmission Planning Criteria, 2023, STUs shall provide adequate reactive compensation to bring power factor as close to unity at 132 kV and 220 kV voltage levels.
5	In a very large interconnected grid, there can be unpredictable power flows in real time due to variation in load-generation balance with respect to anticipated load generation balance in different pockets of the grid. This may lead to overloading of transmission elements during operation, which cannot be predicted in advance at the planning stage. This can also	AEML	Planning Margins, as specified in the Manual on Transmission Planning Criteria, 2023, has been considered while planning the transmission system.

	Comments received	Comments received from	Action taken/Remarks
	happen due to delay in commissioning of a few planned transmission elements, delay/abandoning of planned generation additions or load growth at variance with the estimates. Also, pending readiness of Transmission System Users to connect their downstream network to outlets at transmission EHV substations affects power evacuation and utilization of Transmission Network. Such uncertainties are unavoidable and hence some margins at the planning stage may help in reducing impact of such uncertainties. Therefore, at the planning stage, planning margins need to be provided. However, care also need to be taken to avoid stranded transmission assets.		
6	+/- 320 kV, 1000 MW VSC based HVDC from Aarey (Mumbai) - Kudus is under construction and to be included	AEML	Included in NEP (Transmission)
7	Consider the integration of renewable energy sources and their impact on reactive power management in the grid, assess the feasibility and cost-effectiveness of converting existing synchronous generators to synchronous condensers to address reactive power requirements and improve voltage stability. Explore the potential benefits of operating hydro generators in synchronous condenser mode for voltage control and frequency regulation in the grid.	Coal Consumers' Association of India (CCAI)	Reactive Power Planning is also being done while planning the transmission system for integration of RE. Further, a committee has been constituted under Member Secretary (NRPC), to look into the requirement of Synchronous Condenser in Northern Region. The recommendations of the Committee would be suitably adopted in other regions. As per CEA Regulations, hydro generators above 50 MW need to have the provision to operate in Synchronous Condenser mode.
8	The emphasis on accuracy of data for modelling is essential, as it significantly impacts planning outcomes. It might be helpful to include a brief on data validation techniques or standards used to ensure data accuracy.	CCAI	Data received from CTUIL/STUs is collated and discussed with CTUIL/STUs wherever discrepancies are observed. Parameters of the transmission elements are also verified with the normative values. This ensures accuracy of data.
9	The outlined timeframes for concept to commissioning provide a realistic expectation for planning processes. It could be beneficial to include a discussion on how rapid technological advancements might influence these timeframes in the future.	CCAI	Technological advancement would reduce the overall time taken in survey of the scheme. Advanced survey techniques are already being adopted. Initial route alignment and preliminary survey of transmission lines is being done on PM GatiShakti NMP. This has led to reduction in time taken for survey and has helped in better route alignment. Advanced technology options are already being adopted in construction of transmission schemes. For construction of the transmission schemes, already compressed time schedule of generally 24 months is being followed.
10	The suggestion to incorporate typical daily and seasonal variations in load-generation scenarios is crucial for realistic planning. Including methodologies or tools used for scenario development would enhance the	CCAI	Included in NEP (Transmission) Scenarios have been developed by analysing the load curve and generation profile for the past years. The scenarios have been chosen

	Comments received	Comments received from	Action taken/Remarks
	section's practicality. Providing examples of how different load-generation scenarios influence transmission planning decisions would help illustrate their importance.		to capture the extreme events to be encountered throughout the year, like high electricity demand with high solar generation, high electricity demand with almost no solar generation, low electricity demand with almost no RE generation, seasons of high wind and low wind generation, seasons of high hydro and low hydro generation etc. so that the planned system is adequate for evacuation of power from any combination of generating stations to the load centres.
11	The inclusion of high wind/solar generation injections and their integration with conventional dispatch scenarios reflects the evolving nature of power generation. Providing examples of successful integration of renewable energy sources into transmission planning would be informative. Including discussions on challenges and solutions related to integrating renewable energy sources into transmission planning would add depth to the section.	CCAI	Included in NEP (Transmission). Transmission system has been planned for integration of over 600 GW RE capacity to the grid and the same is discussed in Chapter 10 (Transmission Planning for integration of Renewable Energy Sources). As renewable energy sources like solar and wind power become increasingly integrated into the grid, their intermittent and variable nature poses challenges to grid stability. Dynamic compensation devices like STATCOM provides dynamic voltage support and reactive power compensation, enhancing grid reliability and enabling the seamless integration of renewable energy. Energy Storage Systems (ESS) also helps to integrate the variable and intermittent RE sources by storing excess energy during surplus RE generation and providing backup power during periods of deficient RE generation. Several STATCOMs have been planned along with the transmission system associated with RE. Energy storage (BESS and Pumped Storage Plants) have also been planned. Details are given in chapter 7 and 8 of NEP (Transmission). Some of the Technological options to deal with the challenges associated with RE integration are discussed in Chapter 3 and Chapter 4 of the NEP (Transmission).
12	The consideration of planning margins to accommodate uncertainties is prudent. It might be helpful to discuss strategies for minimizing the impact of uncertainties while avoiding over-engineering.	CCAI	The planning margins in terms of capacity of transmission lines, voltage limits etc. are adequately described in Chapter 3 of the NEP (Transmission). These help in minimizing the impact of uncertainties while avoiding over-engineering. The margins have been arrived at after wider stakeholder’s consultation.

	Comments received	Comments received from	Action taken/Remarks
13	The section provides a detailed overview of power flow and short circuit studies. It could be enhanced by discussing the role of other types of studies, such as transient stability and voltage stability studies, in transmission planning. Including examples of how various system studies inform transmission planning decisions and improve system reliability would enrich the section.	CCAI	Brief write up on Transient Stability and Voltage Stability studies have been included in the National Electricity Plan. Manual on Transmission Planning Criteria, 2023, may be referred for detailed description of the studies.
14	It would be appropriate that for system studies, reactive power capability of Solar PV/ BESS / Wind power plant (permanent magnet type) may be considered as zero unless such plants are required by law to have specified to have aforesaid capability by installing static / dynamic reactive generation equipment.	Shri Shanti Prasad	RE generators are mandated by CEA Regulation for supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading.
15	In case of Nuclear power station, the angular separation between its start-up power source and the generation switchyard should be, as far as possible, be maintained within 10 degrees. It is submitted that prima facie, 10 degree angular separation between start up power source and nuclear power station may lead to long distance which may be prone to faults. As power failure at nuclear station can lead to poisoning of nuclear fuel so it would be appropriate to have close by start-up power source and it would be appropriate to specify limiting distance in km also.	Shri Shanti Prasad, Ex-Chairman, RERC	As per the Manual on Transmission Planning Criteria 2023, there shall be two independent sources of power supply for the purpose of providing start-up power to the Nuclear Power Plants. Further, the angular separation between start-up power source and the generation switchyard should be, as far as possible, be maintained within 10 degrees. The criteria specified in the Manual is followed while planning the transmission system for nuclear power plants. As two independent sources of power supply is considered for nuclear power plants, chances of poisoning are very rare.
16	It will be appropriate that in the Manual on Transmission Planning Criteria-2023, in respect of the conductors for transmission line from wind farm/wind park to pooling station (i) table II A is incorporated corresponding to wind velocity of 12 km/hr or (ii) formula of say IEC method to be considered to working out thermal current rating may be incorporated below table II to enable its calculations for wind velocity of 12 km/hr(iii) formula of say IEC method to be considered for working out thermal current rating may be incorporated in this plan also.	Shri Shanti Prasad	The suggestion is regarding modification in Manual on Transmission Planning Criteria has been forwarded to the concerned for examination/ inclusion.
	Chapter 4: New Technologies Options for Transmission System & Cyber Security		
1	**Comments on cyber security:** Requested to include the following: All utility staff must undergo compulsory periodical bi-yearly National level cyber security training with latest trends in the field; all utility staff must undergo one time compulsory National Level Cyber Security training in service period; usage of private emails like g mail, yahoo etc. must be stopped and may be shifted to gov.in or nic mail service for better service to citizens and consumers; all power utilities must adopt	Shri Jayan K S., working in Power utility of Kerala	Training of staff, Mock Drill, Cyber Security Audit etc have been included in NEP. Use of NIC server, nic mail etc. is already being promoted. Other suggestions like one time grant to the utilities are not in the scope of NEP.

	Comments received	Comments received from	Action taken/Remarks
	latest software, technology and applications for better service to citizens and consumers; National level cyber security expert groups annual inspection must be conducted with clear updated criteria in every utility up to the district level; one time special grant may be sanctioned to all the utilities for successful deployment of cyber security measures with a clear cut criteria scale and ranking; promote use of NIC server, cloud, applications, software for better security and secrecy of data of Indian citizens		
2	It is suggested that planning of reconductoring if any, with identified capacity and time frame may also be incorporated with this plan.	Prayas Energy Group	Included in NEP.
3	An expert group or a committee may be constituted under CEA to assess the techno-economic benefits of these new options. Further pilot projects (by different entities) on many of these technologies should be tried out to assess the practical results and to analyse their performance and impact on grid stability and reliability. Based on learnings from their implementation and performance, the future consideration for wider adoption can be decided.	Prayas Energy Group	Most of the Technology options mentioned in the NEP have been adopted in a limited way by few utilities. These have been mentioned in the NEP for their wider adoption as per feasibility. Some pilot projects are being initiated. Committee/expert groups are constituted as per specific requirement.
4	Dynamic Line loading system may please be considered for adoption	IWPA	Included in NEP in Chapter 4.
5	Advance line differential/distance protections which include travelling wave fault locating method to locate faults within a tower span which is more accurate and useful for transmission lines with Overhead and UG cable combination- Requested to include this technology	KPTCL	Included in NEP in Chapter 4.
6	Requested to add Grid Scale Battery Energy Storage System (BESS) for Grid Support against variable RE Generation or grid contingency, GIS Under Ground Substation, Digital Sub Station, Online Travelling Wave Fault Locator (TWFL) system for EHV Transmission Lines in New Technologies	AEML	Write up on Consideration of Energy Storage Systems in Transmission Planning has been included in the National Electricity Plan (Transmission). NEP (Generation) has a Chapter on Energy Storage System (Chapter 13), which inter-alia includes Grid Scale BESS. Hence, the write up on Grid Scale BESS has not been included in NEP (Transmission). Brief write up on GIS Under Ground Substation in case of Mega Cities, Gas Insulated Lines have been included in NEP (Transmission), Digital Sub-stations, online Travelling Wave Fault Locator (TWFL) included.
7	Encourage the use of advanced technologies such as synchro-phasors and digital relays for real-time monitoring and protection of substation equipment	CCAI	Synchro-phasors and digital relays are already being used on large scale in the power system.
8	It would be helpful to discuss potential cybersecurity challenges and solutions associated with digital substations	CCAI	Included in NEP

	Comments received	Comments received from	Action taken/Remarks
9	Adding information on the cost -effectiveness and scalability of VSC based HVDC would further enrich the study	CCAI	Included in NEP
10	Integrating LiDAR and drone data with Geographic Information System (GIS) mapping enhances the visualization and analysis of transmission infrastructure. It enables utilities to manage and maintain a comprehensive database of assets and their spatial relationships.	CCAI	Included in NEP
11	New technologies: It would be appropriate that for clarity more detailed description is given or preferably reference to literature/ specification is given.	Shri Shanti Prasad	Included in NEP
	Chapter 5: Analysis and Studies for 2026-27		
1	It is suggested that additional scenarios may be run by considering the seasonal variation of demand, high demand/low demand months, impact of Energy Storage, Time of Day tariffs, Green hydrogen and EV charging as well.	Prayas Energy Group	The nine scenarios (three each in June, August and February) had been identified considering the variation in electricity demand for the past 3-4 years as well as the pattern of RE Generation. The scenarios are a combination of high electricity demand with high/low RE generation, low electricity demand with high/low RE generation etc. Impact of Energy Storage, EV charging, impact of Green Hydrogen etc. are already factored in the load-generation scenarios.
2	Planning for bi-directional transmission links	Prayas Energy Group	AC links are already bidirectional. Most of the planned HVDC links have been assumed to have 100 % capacity in both directions. Some of the existing HVDC links have limited capacity in reverse direction. The capacity in forward and reverse direction has been mentioned in the Plan. Efforts are being made to increase the capacity of existing HVDC links in reverse direction, on case to case basis.
3	Requested to re-examine the figure for Renewable Energy considered in the plan in Tamil Nadu	IWPA	Renewable Energy has been considered based on the inputs received from respective states and MNRE/SECI.
4	Requested to review the demand considered in 20th EPS	IWPA	The 20^{th} EPS projections are being revised. Revised 20^{th} EPS Projections (draft) has been considered in the studies.
5	Requested to review the demand considered in 20th EPS - Peak demand considered in Resource Adequacy Plan may be considered instead of EPS	KPTCL	The 20^{th} EPS projections are being revised. Revised 20^{th} EPS Projections (draft) has been considered in the studies.
6	Requested to consider RE planned under GEC-I & II	KPTCL	RE planned under GEC-I & II Schemes is already considered in the NEP.
7	The addition in ISTS includes total 170 transmission schemes with estimated cost of Rs. 3,13,950 Crores. The estimated cost of intra-state transmission system is Rs. 1,61,854 Crores. However, the data for ISTS does not match with the data given in the rolling plans of 2027-28 and 2028-29. We request you to provide the relevant data, along with a	Tata Power	The rolling plan of CTUIL for 2028-29 considers less transmission schemes as compared to the National Electricity Plan (Transmission). The rolling plan considers only the under construction, under bidding and the schemes firmed up. The National Electricity Plan covers all the transmission schemes envisaged till the year 2032.

	Comments received	Comments received from	Action taken/Remarks
	tentative YoY division of No. of schemes and estimated capex that may be issued under TBCB mode of implementation in the 5 or 10 year window.		Details of under bidding transmission schemes (TBCB route) are provided in Annex 7.1 and Annex 8.2. Most of the planned transmission schemes mentioned in Annex 7.1 and Annex 8.2 would be implemented through TBCB route.
8	It would be appropriate to clearly bring out in the Plan the transmission lines and substations considered for FY26-27 and FY31-32 and mechanism of representing loads at these substations for the purpose of further load flow studies for perspective intra-state transmission plan by STUs.	Shri Shanti Prasad	The transmission system planned till the period FY 2026-27 has been given in the Plan in Annex 7.1 and Annex 7.2. For the period 2027-32, the planned transmission system has been given in Annex 8.2 and Annex 8.3. Load at the intra-state sub-stations has been arrived at after detailed discussions with STUs.
9	Report does not give details of loadings of lines in terms of active and reactive power and voltage and phase angle separation of substation buses. These are essential to offer comments / suggestions on the transmission plan and also for STUs to undertake further studies, based on entire state grid or truncated state grid, to determine intra-state transmission system. It is requested that the state wise results of load flow studies (computer output as it is or plotted on single line diagram) for FY26-27 under normal condition and above 9 scenarios may be incorporated in separate volume (say Vol-IIA) of the report and placed on web site and intimated through a letter in continuation to aforesaid letter dated 24.01.2024 with copy (by e-mail) to those who have offered comments.	Shri Shanti Prasad	The Transmission planning studies have been carried out as per the criteria specified in the Manual on Transmission Planning Criteria, 2023. Suggestion regarding publication of details of load flow studies in a separate volume (say Vol-IIA) would not be much useful.
10	It would be appropriate that for the stations conceived to be created in stages with same name, locations as considered in system studies, may be given by latitude and longitude up to say 1 decimal place.	Shri Shanti Prasad	Location of sub-stations conceived to be created in stages cannot be given at present with latitude and longitude (upto 1 decimal place). Exact location of any sub-station is identified only after detailed survey. Further, the TSP implementing the scheme has the option of locating the sub-station within 3 km to 10 km radius of the identified location (after survey), depending on the nature of the sub-station viz. generation pooling, load serving, intermediate sub-station etc.
11	Note '#Exclusive of the BESS capacity' below table 5.7 [for Installed Generation Capacity (MW) likely by 2026-27 as per NEP (Volume-I) Generation], needs elaboration by adding that 'and no reduction in RE generation capacity for its utilisation for PSP and BESS has been considered'.	Shri Shanti Prasad	'#Exclusive of the BESS capacity' below table 5.7 means that BESS has not been added in the installed capacity figure. BESS like any storage device has been modelled to act as a load during high RE generation period, consuming power from the grid, and it delivers power to the grid during low or no RE generation period as per requirement.
12	Similarly note '***#Includes 16,743 MW solar roof top capacity. Excludes BESS capacity' below table 5.9 (*****Installed Generating Capacity and Peak Electricity Demand**	Shri Shanti Prasad	Excludes BESS Capacity means that the installed capacity figure mentioned in the table does not includes BESS Capacity. BESS has been considered in the load flow

	Comments received	Comments received from	Action taken/Remarks
	likely by 2026-27) *needs review* *since solar generation capacity (which includes solar roof top capacity) does not load distribution system, so not to be considered for load flow studies. PSP and BESS which meet peak demand shall be utilising solar and wind generation to have storage of hydro/ chemical energy so either both (PSP and BESS) be excluded or both be included.*		studies. BESS like any storage device has been modelled to act as a load during high RE generation period, consuming power from the grid, and it delivers power to the grid during low or no RE generation period as per requirement. Roof top solar is factored in the electricity demand projection i.e. the projected electricity demand as per 20th EPS Report excludes the demand to be met from roof top solar installations.
13	It would be appropriate to mention generation dispatch factors for FY 26-27 in Chapter 5.	Shri Shanti Prasad	Included in NEP
14	It has been mentioned that the all-India, region-wise and state-wise electricity demand as per the 20th EPS Report has been considered in the studies. Considering the current peak demand met by different regions, the demand growth considered in some of the regions seems to be on the higher side. Same may be reviewed.	Grid-India	The 20th EPS projections are being revised. Revised 20th EPS Projections (draft) projections has been considered in the transmission planning studies.
15	In the final NEP Vol-1 report, 8.7 GW BESS in 2026-27 and 47.2 GW BESS in 2031-32 has been mentioned. However, in the draft NEP Vol-II (transmission), 13.5 GW BESS in 2026-27 and 51.5 GW BESS in 2031-32 has been considered. Further, 4000 MW out of this 13500 MW BESS capacity is considered in WR whereas in the 500 GW transmission report, the total BESS quantum considered in WR was only 1.1 GW while no BESS capacity is indicated in WR in NEP Vol-I (Generation). It is suggested that the uniformity in the installed capacities of different sources may be maintained in different generation and transmission planning exercises being carried out for same time-frame. The reason for the difference in capacity of BESS considered in different reports may be mentioned. The pooling stations where the BESS capacity is being considered in the transmission planning (NEP) may also be explicitly indicated in the NEP.	Grid-India	BESS figures have been reconciled with NEP (Vol I: Generation). Details of sub-stations where BESS has been considered along with the quantum of BESS has been provided in the National Electricity Plan (Transmission) in Chapter 7 and Chapter 8.
16	It is suggested that load-generation balance including unit commitment may be taken from NEP Vol-1 (Generation) results or separate production cost modelling studies with the installed capacities considered for 2026-27 and 2031-32.	Grid-India	Dispatch philosophy considered in NEP (Transmission) is the same as considered in NEP (Generation). To arrive at the dispatch of generating units, dispatch factors have been considered in NEP (Transmission) which had been arrived at based on detailed discussions between CEA, Grid-India and CUTIL.
17	PSP dispatch in pump mode is considered as (-)8191 MW in some of peak solar scenarios against installed capacity of 7446 MW. The rating of some of PSPs is not the same in pumping mode as in generation mode. Further, some of the commissioned PSPs are	Grid-India	For the existing PSPs, normative power requirement during pumping mode has been considered as 110%. National Electricity Plan (Generation) considers pumping mode operation of all the PSPs. The same has also

	Comments received	Comments received from	Action taken/Remarks
	not even operational at present. Therefore, considering 110% PSP dispatch in pump mode may be an optimistic scenario.		been considered in National Electricity Plan (Transmission).
18	In all the evening peak scenarios, dispatch of BESS is not as per maximum capacity. Maximum dispatch in this scenario is only around 66%. Further, BESS dispatch is also considered in off-peak hours (even in Feb). Rationale for the same may be included in the report.	Grid-India	Dispatch from BESS has been considered during non-solar hours and it is based on the dispatch of wind, coal based, gas based, hydro, nuclear and other sources. Dispatch from BESS has been considered so as to optimise the requirement of coal based capacity. In February, hydro dispatch is quite low at late night or early morning, so dispatch from BESS has been considered.
19	In 2026-27, solar dispatch in peak solar case (Aug and June) is ~54% and ~60% respectively which is on the lower side. Whereas, in 2031-32, the solar dispatch in peak solar case (Aug and June) is >75%. It has been observed from the LGB scenarios of respective months that coal-fired generation has been backed down up to ~45% in peak solar case. The backing down will further increase after reviewing the solar and PSP dispatch. It is suggested that the requirement of backing down thermal generation to this level may be brought out as a recommendation of the report.	Grid-India	In the year 2026-27, as per revised studies, solar dispatch in peak solar generation scenario is 72% (in June and August, excluding solar roof top). In the year 2031-32, the solar dispatch in peak solar generation scenario in June is 81% and in August the dispatch is 75% (excluding solar roof top capacity). Requirement of backing down of thermal generators during peak solar generation scenario has been included in the NEP.
20	It is suggested that along with IR transmission capacity addition figures, the TTC/ATC figures in 2026-27 may also be provided in the report.	Grid-India	TTC/ATC figures depend on a number of factors and may keep on changing in real time. Hence, these have not been mentioned in the NEP.
21	The transmission capacity of WR-NR corridor may be different than that of NR-WR corridor due to different capacity of IR HVDCs in forward and reverse direction. Therefore, in the IR capacity addition table, separate transmission capacity for forward and reverse direction may be tabulated.	Grid-India	Included in NEP
22	The import and export capability figures of some important RE states may also be included – Rajasthan observed to export around 44 GW in solar peak scenario. Max. Import of Maharashtra - ~ 15 GW.	Grid-India	Import/export capability figures keep on changing in real time. The maximum import/export of Rajasthan, Maharashtra etc. in 2026-27 have been mentioned in the NEP.
23	The possibility of enhancing the capacity of already commissioned HVDCs in reverse direction may also be considered in the transmission plan. For instance, the maximum capacity of HVDC Raigarh-Pugalur is limited to 3000 MW in reverse compared to 6000 MW in forward direction. Similar upgradation may also be planned for creating/enhancing the capability of HVDC Mundra-Mahendragarh, Champa-Kurukshetra etc.	Grid-India	The new HVDC systems have been assumed to have 100% power reversal capability. For the existing HVDC system, power reversal has been considered as per the present capability. For Raigarh-Pugalur HVDC link, feasibility study for reversal of power to 6000 MW is under consideration. Hence, capacity in reverse direction has been considered as 3000 MW (the present capacity in reverse direction).

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24	The Southern Region import during peak demand season of SR is already close to the current import ATC. As, apart from 765 kV Narendra – Pune D/c line, no new line is being planned towards SR, there might be issues in import by SR during peak demand season. This aspect may be reviewed.	Grid-India	Additional links between SR and WR/ER have been planned and included in NEP in Chapter 8.
	Chapter 6: Review of Programme of Transmission System Augmentation during 2017-2022		
1	CEA may recommend, as a joint initiative between the Ministry of Power and the Ministry of Environment, Forest and Climate Change to introduce a time bound fast-track Forest Clearance mechanism	Apraava Energy	Forest clearance mechanism is a comprehensive process which has to be followed such that the impacts of transmission projects are thoroughly assessed and mitigated. Streamlined processes for obtaining forest clearance for transmission projects, including the introduction of online portals and time-bound clearance mechanisms to reduce delays, is already in place. The pending forest clearances are discussed regularly by MoP/CEA with the concerned officials to ensure early clearance.
2	For environment clearance, it is suggested that a fast-track clearance mechanism, akin to the one suggested above for forest clearances maybe implemented for environment clearance as well.	Apraava Energy	
3	It is suggested that CEA may, with appropriate stakeholder consultation, notify a Standard Operating Procedure for addressing Right of Way issues arising during construction phase, especially in case of private transmission licensees and generators. Such an SOP will allow the licensee and generator a recourse in case of RoW issues obstructing the construction, without largely impacting the implementation timelines.	Apraava Energy	Regular meetings are being held by MoP and CEA for addressing the RoW issues highlighted by the transmission developers. Letters addressed to concerned District Collector (DC) are also sent by CEA/MoP, requesting to provide all the necessary administrative support to the transmission developers so as to ensure resolution of the RoW issues. Ministry of Power also conducts meetings with concerned DCs to address these issues. The Transmission projects involving severe RoW issues, which still remain unresolved, are highlighted on PMG/PRAGATI Portals and are taken up in PMG review meetings. Further, New Guidelines for payment of compensation in regard to Right of Way (RoW) for transmission lines has been isssued by MoP vide letter dated 14.06.2024.
4	Steps taken to resolve the issues arising in implementation of Transmission Schemes – If these steps have been implemented effectively, then why have more than 50% of transmission projects bid under TBCB faced time delays resulting in cost overruns. The steps mostly talk about monitoring of projects, but our suggestion is to have more reforms in	Tata Power	Recently, new guidelines (dated 14.06.2024) for RoW compensation have been issued by MoP vide which the amount of compensation to be paid has been enhanced. Streamlined processes for obtaining forest clearances for transmission projects,

	Comments received	Comments received from	Action taken/Remarks
	terms of policies pertaining to ROW/Land acquisition/Forest approvals/etc., powers under telegraph act, as well as ensuring their actual implementation on ground. The success of these policies should be measured in terms of no. of days reduced to conclude these processes.		including the introduction of online portals and time-bound clearance mechanisms to reduce delays are already in place. Forest clearance mechanism is a comprehensive process which has to be followed such that that impacts of transmission projects are thoroughly assessed and mitigated. Sometimes the transmission schemes are delayed due to court cases, law and order issues etc.
5	Sum not provided against Target columns of transmission line (ckm) and sub-station (MVA)	Tata Power	Provided in NEP.
6	**Challenges faced in implementation of Transmission System:** Despite all the stakeholders (MoP, CEA, CTU, STUs, TSPs, etc.) being aware and repeatedly highlighting the multiple challenges, as well as mitigation measures being put in place, yet a noteworthy number of transmission lines and substations continue to face time and cost overruns. Almost all the elements listed in Annexure 6.2 specify RoW issues as being the major constraint in timely completion of projects. While these are the legacy issues which are requested to be resolved timely as India is looking to integrate more than 500 GW of RE by 2030, we also opine that the SCOD timelines of 18 / 24 months can be reviewed, and maybe extended to a min. of 27 or 30 months.	Tata Power	Regular meetings are being held by MoP and CEA for addressing the issues during the construction of transmission lines as highlighted by the implementing agencies. Letters, addressed to concerned DCs are also sent, requesting to provide all the necessary administrative support to the transmission developers so as to ensure resolution of the RoW issues. Ministry of Power also conduct meetings with concerned DCs to address these issues. The Transmission projects involving severe RoW issues, which still remain unresolved are highlighted on PMG/PRAGATI Portals and are taken up in PMG review meetings.
	Chapter 7: Transmission System requirement during 2022-27		
1	Issues faced due to connected projects like delay in commissioning in the one project due to another. It is requested that the transmission schemes may be planned in a manner to minimize such delays and mismatches on part of the Bid Process Coordinator. Moreover, that the Bid Process Coordinators may be allotted the transmission scheme calendar and timetable for execution of the projects simultaneously.	Apraava Energy	SPV of inter-linked transmission schemes is being transferred in matching timeframe to the successful TSPs by the BPCs.
2	Specify categorization (for load, generation evacuation, system strengthening etc.) of transmission projects	Prayas Energy Group	It may be difficult to categorise the transmission schemes, as the same transmission scheme may be serving more than one purpose. The schemes which can be clearly demarcated have been indicated in Chapter 7 and Chapter 8.
3	The draft proposes 1,23,577 ckm of transmission lines and 7,10,940 MVA of transformation capacity (at 220 kV and above voltage levels) need to be added during the period 2022-27. Table 7.2 gives a breakup of this capacity by voltage but the data provided is far too aggregated and even sparse details	Prayas Energy Group	Planning of Transmission system during 2022-27 has been discussed in detail in Chapter 5 and Chapter 7. Further, the planned transmission system is mentioned in detail in chapter 7. Granular details like transformation capacity and ckm associated

	Comments received	Comments received from	Action taken/Remarks
	on the various transmission elements such as number of towers, transformers etc. are not provided. Chapter 7 - Transmission System Requirement during 2022-27, which is the heart of the entire exercise is a mere 4-5 pages long and should provide many more granular details of the results of the studies		with each transmission scheme is given in chapter 7.
4	Requested to consider the 765/400 kV 4x1500 MVA Mangaluru S/s, 765/400 kV 3x1500 MVA Chikkanayakanahalli S/s, 765/400 kV 4x1500 MVA Yalwar S/s and other associated network under intra-state to meet the demand of green hydrogen and other sub-stations also	KPTCL	As per MNRE, electricity demand on account of Green Hydrogen/Ammonia is likely to be 2250 MW at Mangaluru by 2030. 765/400 kV sub-stations at CN Halli and Mangaluru (presently under ISTS) have been considered in the studies for the period 2027-32 for meeting the electricity demand on account of Green Hydrogen/Green Ammonia production. However, the same may be developed under Intra-State, based on the connectivity sought by the Green Hydrogen/Green Ammonia manufacturers.
5	Include 2000 MW PSP at Shivmoga district	KPTCL	The PSP has been already been considered during 2027-32 in the NEP.
6	page 254: Annex 7.1: Augmentation of transformation capacity at KPS2 (GIS) by 1x1500 MVA has total MVA capacity of 6000 MVA. Kindly check.	Tata Power	Typographical error has been corrected.
7	It's crucial to include the methodology behind the projections for transmission system requirements. How were factors like electricity demand, generation projects, and regional needs calculated? Adding this information enhances transparency and credibility. Provide a detailed cost-benefit analysis of the proposed transmission system expansion. Evaluate the economic, social, and environmental benefits against the investment required to implement the plan.	CCAI	Generation projects have been considered as per the National Electricity Plan (Vol I: Generation) notified in May, 2023 and addition RE potential zones as identified by SECI/MNRE. Electricity Demand projections is as per the revised 20th Electric Power Survey Report (draft) and these are already mentioned in the NEP (Transmission). Expansion of transmission system is dependent on the growth of electricity demand and growth in generation capacity. For meeting the increasing electricity demand, commensurate transmission system has to be planned for evacuation of power from the planned generating stations. While planning the transmission scheme, minimization of transmission losses is considered. Different alternatives like HVAC/HVDC, voltage levels etc. are examined while formulating the Plan.
8	Though, the implementation of dynamic compensation (STATCOMs) is proposed, it is suggested that detailed methodology of arriving at the requirement may also be included in Chapter-3 "Transmission Planning Philosophy".	Grid-India	Included in Chapter 3.
9	The planning of adequate dynamic reactive power compensation (both FACTS and sync. condenser as per requirement coming out of studies) may be carried out and included in	Grid-India	Included in NEP in Chapter 7 and Chapter 8 in relevant Annexures.

	Comments received	Comments received from	Action taken/Remarks
	NEP for implementation of the same in matching time-frame of upcoming RE generation.		
10	Considering high RE capacity addition, NEP shall include inertia assessment studies for 2026-27 and 2031-32 and identify the requirement of required elements in this regard. The information regarding number of units on-bar is available through the output of NEP Vol-I (Generation) studies. Same may be utilized to carry out the inertia assessment for 2026-27 and 2031-32. It is also suggested that the detailed methodology for inertia assessment may be included in Chapter-3 "Transmission Planning Philosophy".	Grid-India	Inertia assessment is being carried out separately.
11	It is suggested that the Short Circuit Ratio (SCR) of all RE pooling stations in 2026-27 and 2031-32 time-frame may also be tabulated and included in the report. Further, SCR computation methodology may also be included in Chapter-3 "Transmission Planning Philosophy".	Grid-India	Detailed methodology of SCR calculation is under deliberation between CEA, CTUIL and Grid-India considering multiple Inverter based resources connected to the grid. SCR at the RE pooling stations would be calculated once the methodology is finalised.
12	It is suggested that following may be considered in the transmission planning in large RE complexes in view of enhancing resiliency: • VSC based HVDC in place of LCC based • Limit of RE generation pooling at a single station • N-1-1 applicability in critical complexes (large RE complexes, natural disaster-prone areas)	Grid-India	VSC based HVDC system is being planned on a case to case basis. Limit in RE being pooled at any sub-station has been considered as per the maximum MVA capacity of generation pooling sub-station as per the Manual on Transmission Planning Criteria. N-1-1 criteria, in certain areas, has not been considered while evolving the broad transmission system in the NEP, however, the same would be considered at the time of detailed planning for specific areas.
13	As per the "Report of task force on cyclone resilient robust electricity transmission and distribution infrastructure in the coastal areas", the supply network in a particular area may be planned & designed by system planning cell to operate within limits in the event of a double contingencies (N-1-1 / N-2) depending on the sensitivity of the load center. The same may be considered in the planned schemes. Further, while planning the transmission system, resilience in terms of nearby black start resources and building up of the cranking path to load centers/cities and thermal generating stations may also be considered and mentioned in the report. All generating plants with installed capacity say >1000 MW should have connectivity at 220 kV level also. This 220 kV connectivity would be useful during black start for early extension of power supply otherwise there might be huge delay for extending supply	Grid-India	NEP gives the broad transmission system. The double contingencies (N-1-1/N-2) would be considered while evolving the detailed transmission system in coastal areas, disaster prone areas etc. Several generators have the black start capability and are part of the inter-connected system, to revive the system as per requirement.

	Comments received	Comments received from	Action taken/Remarks
	from 400 kV side or 765 kV side due to voltage issues.		
14	It is suggested that the list of buses/stations where fault level will exceed the rated capacity may be included in the NEP. The planned measures/schemes to address the high fault level viz. bus-split arrangement, series reactor etc. may also be included.	Grid-India	The exercise is being carried out separately. The list of buses/stations where fault level will exceed the rated capacity and the associated remedial measures would be evaluated while finalising the system for deliberation in RPC/NCT as it would depend on the generation capacity in proximity, number of circuits terminating at the bus etc.
15	HTLS has been mentioned as a technology option in the report and there are several schemes on re-conductoring of existing Transmission Lines. In National Committee on Transmission (NCT) meeting, a note on re-conductoring was deliberated wherein criteria for implementation was agreed upon. That note may be included in the NEP.	Grid-India	Brief write up has been included in NEP.
16	India's National Green Hydrogen Mission aims to develop green hydrogen production capacity of at least 5 MMT per annum by 2030. Significant portion of this capacity is expected to be connected at ISTS level. Therefore, it is suggested that the dedicated transmission schemes may be planned for these envisaged bulk loads and same may be included in the report.	Grid-India	Transmission system for delivery of power to Green Hydrogen/Green Ammonia manufacturing hubs has been included in the NEP in chapter 7 and chapter 8.
	Chapter 8: Perspective Transmission Plan for 2027-32		
1	ckm and MVA estimated for the period 2027-32: Kindly provide a break-up as to how much is envisaged under ISTS and Intra-state respectively.	Tata Power	Included in NEP
2	It can be observed that major thrust has been levied on addition of Thermal and RES capacities, while Hydro and Nuclear assets are not seeing any significant capacity addition. Such planning is also to be reviewed so as to avoid under- utilization of Transmission assets.	Tata Power	Capacity addition from Nuclear power plants is as per the projections of NPCIL. Hydro capacity addition is as per the assessment of Hydro Wing, CEA. The planned transmission system associated with hydro and nuclear generating stations are taken up for implementation in the matching timeframe of commissioning of these generation projects.
3	it would be appropriate to state in chapter 8 that generation dispatch factors considered are their maximum values. During normal operation, their scheduling may vary diurnal depending on energy availability.	Shri Shanti Prasad	Included in NEP
4	It is observed that transformation capacity requirement has been increasing at higher pace than transmission lines. This needs to be elaborated with probable reasons in chapter 8.	Shri Shanti Prasad	Included in NEP in Chapter 7.
5	KPTCL has planned transmission system for evacuation of power from 2000 MW Sharavathy Pumped Storage Project of KPCL	KPTCL	Sharavathy Pumped Storage Project and associated transmission system is included in NEP.

	Comments received	Comments received from	Action taken/Remarks
6	Transmission system for evacuation of RE Power to Green Hydrogen Plants- intra-state network augmentation planned by KPTCL		Included in NEP
	Chapter 9: Cross Border Inter-Connections		
1	Stress the importance of international collaboration and cooperation in achieving the goals of the OSOWOG initiative. Highlighting partnerships with countries like Maldives, Singapore, UAE, and Saudi Arabia underscores the collaborative nature of the initiative and its potential to foster diplomatic ties. Provide insights into the technical feasibility and challenges associated with interconnecting regional grids. Addressing concerns related to grid stability, voltage compatibility, and transmission losses will be crucial for the successful implementation of the initiative. Identify potential risks and challenges associated with the OSOWOG initiative, including geopolitical tensions, cybersecurity threats, and regulatory barriers. Develop strategies for risk mitigation and contingency planning to ensure the resilience of the interconnected grid network.	CCAI	Included in NEP
	Chapter 10: Transmission Plan for Integration of Renewable Energy Sources		
1	The following paragraph needs to be reworded: For the planned transmission schemes in Northern Region, dynamic compensation requirement like STATCOMs, Synchronous Condensers etc. would be identified separately based on the detailed reactive power planning studies and the Short Circuit Ratios (SCRs) at different locations. Requirement of Synchronous condensers based on inertia considerations will also be assessed based on detailed studies	Hitachi Energy	As suggested, the paragraph has been suitably revised in the NEP.
2	It would be desirable that maps showing transmission system for RE power transmission upto FY26-27 and up to FY31-32 are incorporated and details at annexure 10 are also segregated as those up to FY26-27 and FY31-32 in the Plan.	Shri Shanti Prasad	RE Zones to materialise till 2026-27 and 2031-32 timeframe have been segregated and shown in Chapter 10.
3	From the details at annexure 10, it is observed that transmission system conceived is for evacuation of RE power and except for a few substations, augmentation of intra-state transmission system for RE power evacuation (for state's share) has not been considered in detail and only broad assessment based on past trend and state's share in generation capacity might have been made for length of intra-state transmission lines and substation transformation capacity. A note on this aspect	Shri Shanti Prasad	Chapter 10 primarily focusses on evacuation of power from RE Potential Zones. The same has been clarified in the NEP. Augmentation of intra-state system has been given in detail in Chapter 7 (Annex 7.2) and Chapter 8 (Annex 8.3).

	Comments received	Comments received from	Action taken/Remarks
	needs to be incorporated in chapter 10 and annexure 10		
4	page 135: Kindly update if the schemes have been commissioned by December, 2023 and how much RE capacity has actually been integrated to Intra-State systems	Tata Power	Reference is being made to transmission schemes under GEC-II. None of the schemes have been commissioned. Some states have awarded some packages and remaining states are in the process of awarding the schemes. The same has been incorporated in the Chapter along with in RE capacity already integrated to intra-state system.
5	page 406: Annexure 10.2: The table does not mention any schemes/packages planned by Uttar Pradesh for integration of 4000 MW RE under GEC – II. However, in past 1-2 years, several Transmission Works Committee (TWC) meetings of UPPTCL have issued and amended scope of 2-3 schemes pertaining to the aforementioned capacity integration. Is it right to assume these schemes shall be implemented in UP under TBCB mode? If yes, please provide the details of ckm and MVA addition anticipated through these schemes/ packages.	Tata Power	Transmission schemes planned by UPPTCL under GEC-II Scheme have been included in NEP. Matter regarding implementation of intra-state transmission schemes under GEC, is under deliberation by MNRE with the Concerned States. Hence, mode of implementation has not been included in the NEP.
6	KPTCL has already commissioned 3898 MW wind/solar under GEC-I. Another 2,410 MW is to be commissioned under GEC-I. About 3,700 MW RE capacity is proposed to be commissioned under GEC-II in Karnataka. Same to be considered in NEP	KPTCL	The RE capacity under GEC-I and GEC-II schemes have been mentioned in the NEP. The RE capacity commissioned under GEC-I Scheme is as per information obtained from MNRE.
7	It appears that no solar power addition has been contemplated in Tamil Nadu till 2030 and therefore no transmission plan has been proposed in Tamil Nadu for Solar power till 2030. In light of this, we request that Solar Power also be considered in the transmission plan.	IWPA	The solar and wind potential considered in each state is as per the data provided by the State, MNRE/SECI.
	Chapter 11: Private Sector Participation in Transmission		
1	page 143:Table 11.11: Intra-State Transmission Schemes awarded through TBCB route: There is no mention of Sangod Transmission Project which was bid under TBCB route, wherein STU (RVPNL) was the BPC and SPV was acquired by Adani	Tata Power	Included in NEP
2	Overall the draft NEP presents policies, data and details of estimated investment which allow private sector to explore and participate in implementing Transmission scheme under TBCB mode. However, a critical inference after studying Chapter 11 is the presence of the State-run (non-private) organization, PGCIL, as the single largest entity having maximum share in both the projects commissioned as well as under implementation under TBCB (till October 2023). While Chapter 11.3 implies that the	Tata Power	The policies of MoP encourage competition and it equally supports all the bidders. All bidders fulfilling the eligibility criteria, have the right to participate in the competitive bidding process for implementation of transmission schemes. Data given in the referred Tables are factual figures giving the details of transmission schemes already implemented or being implemented by the TSPs.

	Comments received	Comments received from	Action taken/Remarks
	Ministry of Power is continuously revising policies so that competition and private sector investment is promoted, yet data provided under Table 11.5 and 11.7 itself counters all the efforts of the Ministry. Thus, a policy review is mandated to ensure that competition is encouraged among private sector entities only, since PGCIL is anyhow granted projects of augmentation/modernization (of the system already awarded to it) as well as those categorized as being strategically important (e.g.: Ladakh) under RTM mode.		The overall suggestion is not in the scope of NEP.

Executive Summary

India is now amongst the fastest developing countries in the world in terms of GDP as well as the electricity consumption. Electricity demand in the country has increased at a CAGR of about 5 % during the period 2017-22. During the period 2022-24, electricity demand has increased at a CAGR of about 9.46 %. The development of an efficient, coordinated, economical and robust electricity system is essential for smooth flow of electricity from generating station to load centers and for optimum utilization of resources in the country in order to provide reliable, affordable, uninterrupted (24x7) and Quality Power for All.

Transmission system establishes the link between source of generation on one side and distribution system, which is connected to ultimate consumer, on the other side. Transmission planning is a continuous process of identification of transmission system addition requirements, their timing and need. Need for augmentation of transmission system could arise from the following:

a) Addition of electricity generation capacity
b) Increase in electricity demand
c) System strengthening that may become necessary to achieve reliability.

The transmission systems that are in place in the country consist of Inter-State Transmission System (ISTS) and Intra State Transmission System (Intra-STS). ISTS is developed by the Inter-State Transmission Licensees. On the other hand, Intra-State Transmission System is developed by State Transmission Utilities / Intra-State Transmission Licensees.

As per Section 3 of the Electricity Act 2003, Central Electricity Authority (CEA) has been entrusted with the responsibility of preparing the National Electricity Plan (NEP) in accordance with the National Electricity Policy and to notify such plan once in five years.

The National Electricity Plan (Volume I) on Generation Planning was published on 31.05.2023. Draft National Electricity Plan (Volume II) on Transmission, had been published for suggestions and comments of stakeholders, including public on 24th January, 2024. The National Electricity Plan (Volume II: Transmission) has been finalized considering relevant comments received from the stakeholders.

The National Electricity Plan (Volume II: Transmission) covers the review of development of transmission system during the period 2017-22, detailed plan for the period 2022-27, and perspective plan for the period 2027-32.

Review of Transmission System augmentation during the period 2017-22

1,04,400 ckm of transmission lines and 3,27,889 MVA of transformation capacity in sub-stations at 220 kV and above voltage levels were planned to be added during the period 2017-22. Against this target, 88,865 ckm (85 % of the target) of transmission lines and 349,685 MVA transformation capacity (107 % of the target) has been added during 2017-22. In addition, 14,000 MW of HVDC bi-pole capacity as planned has also been added during 2017-22 as detailed below:

Transmission System Type / Voltage Class	Unit	Target for 2017-22	Achievement during 2017-22	% Achievement wrt Target
Transmission Lines				
(a) HVDC ± 320 kV/ ± 800 kV Bipole	ckm	3531	3819	108%
(b) 765 kV	ckm	25670	19783	77%
(c) 400 kV	ckm	36770	36191	98%
(d) 230/220 kV	ckm	38429	29072	76%
Total-Transmission Lines	**ckm**	**104400**	**88865**	85%
Sub-stations- AC				
(a) 765 kV	MVA	116700	89700	77%
(b) 400 kV	MVA	125535	152306	122%
(c) 230/220 kV	MVA	85654	107679	125%
Total – AC Sub-stations	**MVA**	**327889**	**349685**	107%
HVDC				
(a) Bi-pole + Monopole	MW	14000	14000	100%
(b) Back-to-back capacity	MW	0	0	
Total - HVDC	**MW**	**14000**	**14000**	**100%**

At the end of 2021-22 (31.03.2022), the length of transmission lines and transformation capacity in sub-stations (220 kV and above voltage level) was 4,56,716 ckm and 10,70,950 MVA respectively. The HVDC bi-pole capacity including back-to-back capacity was 33,500 MW. There has been more increase in the transmission system at higher voltage levels (400 kV and 765 kV level). This aspect of growth in transmission system highlights the requirement of transmission network to carry bulk power over longer distances and at the same time optimize right of way, minimize losses and improve grid reliability.

Few of the planned transmission systems got delayed because of Right-of-Way (RoW) issues, delay in getting forest clearance, contractual issues, delay in land acquisition for sub-stations, COVID-19 pandemic etc. In addition, some transmission system not included in the target were commissioned during 2017-22.

Transmission System planned for the period 2022-27

Expansion of transmission system depends on the projected electricity demand and the generation capacity addition. As per 20th EPS Report, peak electricity demand during 2026-27 is 277 GW and the installed generation capacity required to meet this electricity demand is 609.6 GW on all-India basis as per National Electricity Plan (Vol I: Generation). Details are given below.

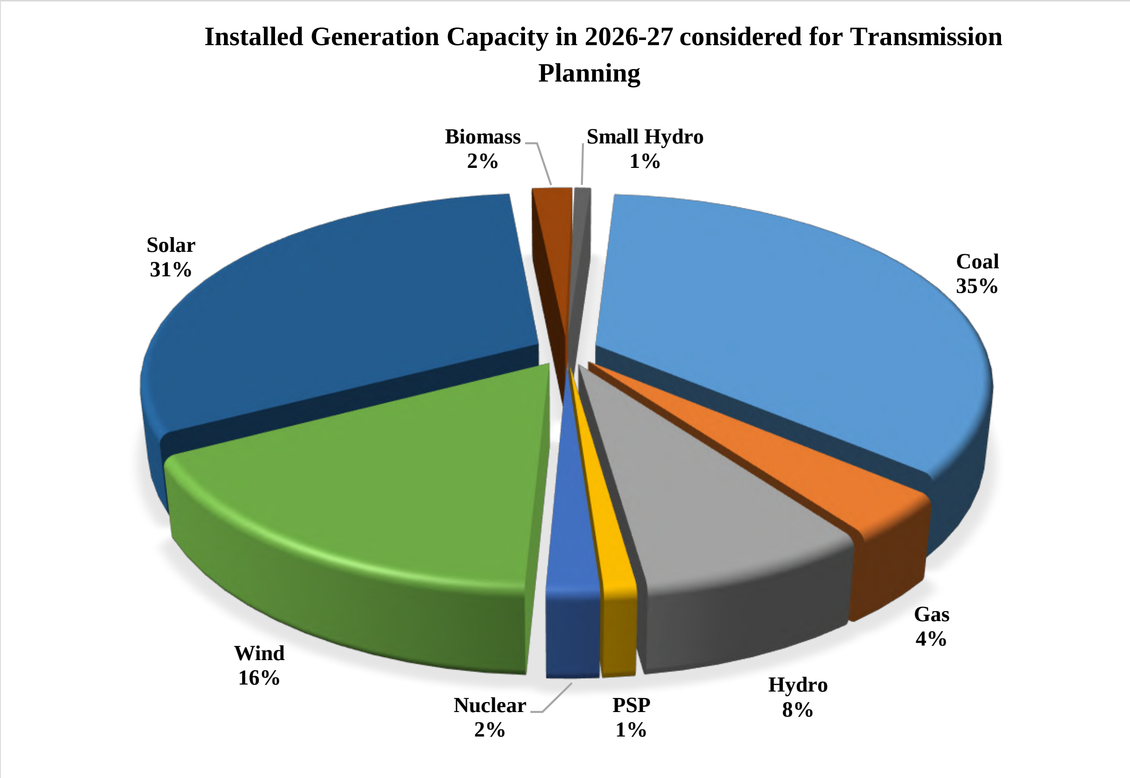
Installed Generation Capacity (MW) by 2026-27 as per NEP (Generation)

	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar	Biomass	Small Hydro	Total	BESS
All - India	235133	24824	52446	7446	13080	72896	185566	13000	5200	**609591**	8680

However, based on inputs from MNRE/SECI regarding RE potential zones materialising by 2026-27 and considering the connectivity applications submitted by RE generation developers to CTUIL as well as information regarding RE capacity to be integrated to intra-state network as furnished by STUs, about 111 GW of wind and 208 GW of solar generation capacity is likely to be commissioned by 2026-27. Transmission system has to be planned for the additional RE potential zones. Hence, for planning of transmission system, the installed electricity generation capacity by 2026-27 has been considered as 669 GW as given below:

Installed Generation Capacity (MW) likely by 2026-27 considered for Transmission Planning

	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar	Biomass	Small Hydro	Total	BESS
All - India	235133	24824	52446	7446	12080	110951	208260	13000	5200	**669340**	8680



Further, as per the revised 20th Electric Power Survey (EPS) Report (draft), the projected peak electricity demand during 2026-27 is 296 GW.

The adequacy of existing and under construction transmission system and requirement of additional transmission system has been assessed based on the power system studies with representation of the power system network of the state as well as inter-state transmission system. The cross-border power transfer with neighbouring countries have also been considered. Load-generation balance scenarios have been worked out for nine scenarios, three scenarios (i.e. evening peak electricity demand, night off-peak electricity demand, afternoon high solar generation) each for February, June and August in 2026-27 time frame.

Based on the planned generation capacity addition and projected electricity demand, 1,14,687 ckm of transmission lines and 7,76,330 MVA of transformation capacity (220 kV and above voltage levels) are planned to be added during the period 2022-27. In addition, 1,000 MW of HVDC bi-pole capacity is also planned to be added during 2022-27. With the planned addition, the length of transmission lines and transformation capacity in sub-stations (220 kV and above voltage level) would become 5,71,403 ckm and 18,47,280 MVA respectively. The HVDC bi-pole capacity including back-to-back capacity would increase to 34,500 MW. Details are given below:

Transmission lines and sub-station capacity addition by 2026-27

Transmission System Type / Voltage Class	Unit	At the end of 2021-22 (31.03.2022)	Likely addition during 2022-27	Likely at the end of 2026-27 (31.03.2027)
Transmission lines				
(a) HVDC (± 320 kV/ 500 kV/800 kV Bipole)	ckm	19375	80	19,455
(b) 765 kV	ckm	51023	36,558	87,581
(c) 400 kV	ckm	193978	34,618	2,28,596
(d) 230/220 kV	ckm	192340	43,431	2,35,771
Total–Transmission Lines	**ckm**	**456716**	**1,14,687**	**5,71,403**
Sub-stations				
(a) 765 kV	MVA	257200	3,43,500	6,00,700
(b) 400 kV	MVA	393113	2,84,970	6,78,083
(c) 230/220 kV	MVA	420637	1,47,860	5,68,497
Total – Substations	**MVA**	**1070950**	**7,76,330**	**18,47,280**
HVDC				
(a) Bi-pole link capacity	MW	30500	1000	31500
(b) Back-to back capacity	MW	3000	0	3000
Total- HVDC	**MW**	**33500**	**1000**	**34500**

14,625 ckm of transmission lines and 75,902 MVA of transformation capacity (220 kV and above voltage levels) has been added during the year 2022-23. 14,203 ckm of transmission lines and 70,728 MVA of transformation capacity (220 kV and above voltage levels) has been added during the year 2023-24. Target of transmission system augmentation during 2024-25 is 16,667 ckm of transmission lines and 1,16,490 MVA of transformation capacity (220 kV and above voltage level).

In order to provide reactive power support to the grid under steady state as well as under dynamic conditions, adequate reactive compensation in the form of bus reactors, line reactors and Static Compensators (STATCOMs) have been planned. Further, space provision is being kept for addition of reactors and STATCOMs at the upcoming substations, especially the substations associated with integration of RE generation.

Inter-Regional Transmission Links (till 2027)

There has been substantial growth in inter-regional power transmission capacity to facilitate smooth flow of power from surplus to deficit regions and for optimum utilization of the country's generation resources. Aggregate inter-regional transmission capacity by the end of 2021-22 was 1,12,250 MW. Inter-Regional transmission capacity addition planned during the period 2022-27 is 30,690 MW. With this, the Inter-Regional transmission capacity would increase from 1,12,250 MW during 2021-22 to 1,42,940 MW by the end of 2026-27 as given below:

Inter-Regional Transmission Capacity (MW)			
Inter-Regional corridors	**At the end of 2021-22 (31.03.2022)**	**Addition planned during the period 2022-27**	**At the end of 2026-27 (31.03.2027)**
West – North	36,720	18,400	55,120
North East - North	3,000	0	3,000
East – North	22,530	0	22,530
East – West	21,190	1,600	22,790
East – South	7,830	0	7,830
West – South	18,120	10,000	28,120
East - North East	2,860	690	3,550
Total	**112,250**	**30,690**	**1,42,940**

Inter-regional transmission capacity of 6,490 MW has been commissioned during 2022-24 (till 31st March, 2024), 7,400 MW capacity is under construction, 8,400 MW capacity is under bidding and 8,400 MW capacity is planned and has to be taken up for bidding/construction during the year 2024-25. The Inter-regional transmission capacity as on 31st March, 2024, was 1,18,740 MW.

Estimated Cost of Transmission System during the period 2022-27

Estimated expenditure of Rs. 4,25,222 Crore would be required for implementation of additional transmission system in the country (transmission lines, sub-stations, reactive compensation etc.) during the period 2022-27.

Perspective Transmission Plan for the period 2027-32

As per 20th EPS Report, peak electricity demand during 2031-32 is 366 GW and the installed generation capacity to meet this demand is 900 GW on All-India basis as per National Electricity Plan (Vol I: Generation) as given below:

Installed Generation Capacity (MW) by 2031-32 as per NEP (Generation)

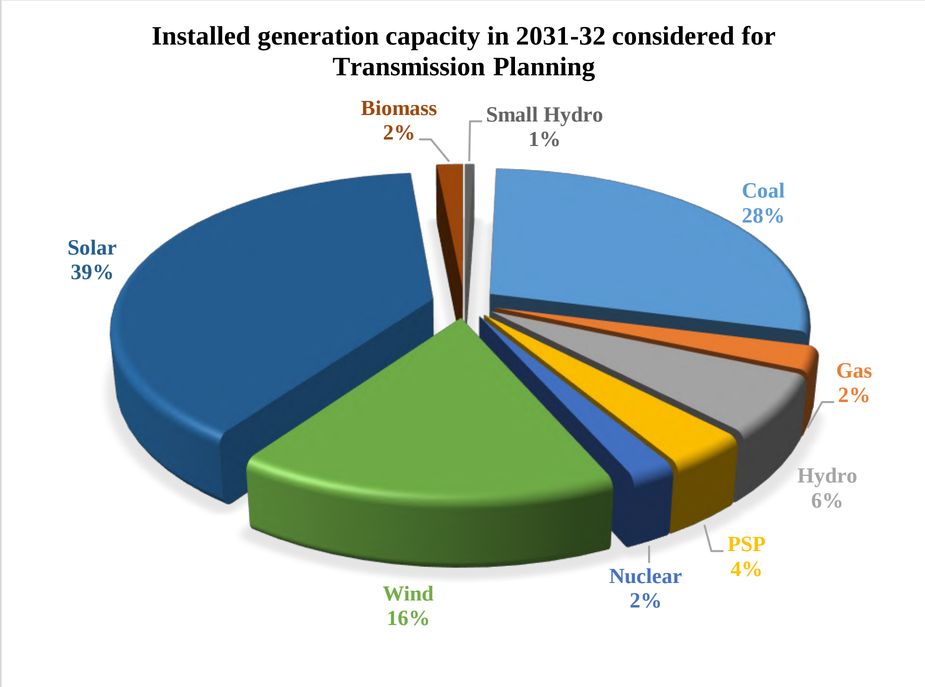
	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar[1]	Biomass	Small Hydro	Total	BESS
All - India	259643	24824	62178	26686	19680	121895	364566	15500	5450	900422	47244

Perspective transmission plan for the period 2027-32 has been prepared based on peak electricity demand projection of 388 GW by 2031-32 as per revised 20th EPS (draft) and expected generation capacity addition likely during the period. Considering the RE potential zones as per MNRE/SECI which are to be integrated to ISTS network as well as the RE capacity addition planned to be integrated to the intra-state network by the States during 2027-32, additional planned coal-based capacity, additional pumped storage capacity etc., the installed generating capacity would be about 997 GW by 2031-32 as given below. Transmission system has been planned for installed generation capacity of 997 GW by 2031-32.

Installed Generation Capacity (MW) in 2031-32 considered for Transmission Planning

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar[1]	Biomass	Small Hydro	Total	BESS
All - India	**283803**	**24823**	**62788**	**35596**	**19680**	**164559**	**385153**	**15500**	**5450**	**997352**	**47244**

[1] Includes 60,207 MW of solar rooftop capacity



The adequacy of existing and under construction transmission system and requirement of additional transmission system has been assessed based on the power system studies with representation of the power system network of the state as well as inter-state transmission system. The cross-border power transfer with neighbouring countries have also been considered. Load-generation balance scenarios have been worked out for nine scenarios, three scenarios (i.e. evening peak electricity demand, night off-peak electricity demand, afternoon high solar generation) each for February, June and August.

Considering the planned generation capacity addition and projected electricity demand, about 76,787 ckm of transmission lines and 4,97,855 MVA of transformation capacity in the substations (220 kV and above voltage level) are planned to be added during the period 2027-32. In addition, 32,250 MW of HVDC bi-pole capacity is also planned to be added during 2027-32. With the planned addition, the length of transmission lines and transformation capacity in sub-stations (220 kV and above voltage level) would become 6,48,190 ckm and 23,45,135 MVA respectively. The HVDC bi-pole capacity including back-to-back capacity would increase to 66,750 MW by 2031-32. Details are given below:

Transmission lines and sub-station capacity addition by 2031-32

Transmission System Type / Voltage Class	Unit	At the end of 2021-22 (31.03.2022)	Likely addition during 2022-27	Likely at the end of 2026-27 (31.03.2027)	Likely addition during 2027-32	Likely at the end of 2031-32 (31.03.2032)
Transmission lines						
(a) HVDC (± 320 kV/ 500 kV/800 kV Bipole)	ckm	19,375	80	19,455	15,432	34,887
(b) 765 kV	ckm	51,023	36,558	87,581	27,138	1,14,719
(c) 400 kV	ckm	1,93,978	34,618	2,28,596	20,989	2,49,585
(d) 230/220 kV	ckm	1,92,340	43,431	2,35,771	13,228	2,48,999

Total–Transmission Lines	**ckm**	**4,56,716**	**1,14,687**	**5,71,403**	**76,787**	**6,48,190**
Sub-stations						
(a) 765 kV	MVA	2,57,200	3,43,500	6,00,700	3,19,500	9,20,200
(b) 400 kV	MVA	3,93,113	2,84,970	6,78,083	1,35,745	8,13,828
(c) 230/220 kV	MVA	4,20,637	1,47,860	5,68,497	42,610	6,11,107
Total – Substations	**MVA**	**10,70,950**	**7,76,330**	**18,47,280**	**4,97,855**	**23,45,135**
HVDC						
(a) Bi-pole link capacity	MW	30,500	1000	31,500	32,250	63,750
(b) Back-to back capacity	MW	3,000	0	3,000	0	3,000
Total- HVDC	**MW**	**33,500**	**1000**	**34,500**	**32,250**	**66,750**

Transmission system for evacuation of power from the RE potential zones has been planned considering BESS capacity of 47.2 GW during 2027-32. This reduces the requirement of transmission system and increases its utilisation.

Reactive compensation in the form of bus reactors, line reactors and Static Compensators (STATCOMs) have been planned with the transmission schemes likely during 2027-32. The electricity demand projections as per 20th EPS Report is being revised. Resource adequacy plan of intra-State transmission system till the year 2031-32 is being prepared and States/UTs are in the process of firming up the intra-State transmission plan for 2027-32. Hence, the figures of transmission capacity addition (ckm, MVA, reactive compensation etc.) during 2027-32 would be reviewed subsequently based on revised electricity demand projections, materialisation of BESS, ISTS/ intra-state transmission plan etc.

Inter-Regional Transmission Links (till 2032)

A number of Inter-Regional transmission corridors have been planned during 2027-32. The inter-regional transmission capacity addition planned during 2027-32 is 24,600 MW and inter-regional transmission capacity is likely to increase to 1,67,540 MW by 2031-32 as given below:

Inter-Regional Transmission Capacity (MW)

Inter-Regional Transmission Capacity (MW)			
Inter-Regional corridors	**At the end of 2026-27 (31.03.2027)**	**Addition planned during the period 2027-32**	**At the end of 2027-32 (31.03.2032)**
West - North	55,120	6,000	61,120
North East - North	3,000		3,000
East - North	22,530	6,000	28,530
East - West	22,790		22,790
East - South	7,830	4,200	12,030
West - South	28,120	8,400	36,520
East - North East	3,550		3,550
Total	**1,42,940**	**24,600**	**1,67,540**

Transmission system for delivery of power to green hydrogen/green ammonia manufacturing hubs

As per MNRE, green hydrogen/green ammonia manufacturing is planned in the coastal areas of Gujarat, Odisha, West Bengal, Andhra Pradesh, Tamil Nadu and Karnataka. As per initial estimates, MNRE had indicated additional electricity demand on account of green hydrogen/green ammonia production as 70.5 GW by the year 2031-32.

Though MNRE is in the process of re-assessing the electricity demand on account of green hydrogen/green ammonia production by the year 2031-32, transmission system has been planned for delivery of power to all the green hydrogen/green ammonia manufacturing hubs as per the initial estimates.

The planned transmission system would be taken up for implementation in a phased manner commensurate with the progress of establishment of green hydrogen/green ammonia manufacturing hubs.

Greening the Andaman & Nicobar Islands

Electricity demand of Andaman & Nicobar Islands is primarily met through electricity generated using DG sets with some small-scale renewable energy sources such as solar and wind power. It is planned to connect Andaman & Nicobar Islands with main land of the country through HVDC under-sea cables. The ±320 kV, 250 MW HVDC (VSC based) interconnection of 1150 km through under-sea cable (capacity of cable: 500 MW) will be first of its kind in the country connecting Port Blair, Andaman to Paradeep, Odisha.

In second phase, another 250 MW HVDC terminal would be added at both Paradeep and Nicobar Islands along with under-sea cable from Port Blair to Nicobar Islands to meet the electricity demand of Nicobar Islands.

Power generated from RE sources would be supplied to Andaman & Nicobar Islands through the HVDC link.

Estimated Cost of Transmission System during the period 2027-32

Estimated expenditure of Rs. 4,90,920 Crore would be required for implementation of additional transmission system in the country (transmission lines, sub-stations, reactive compensation etc.) during the period 2027-32. As the States/UTs are in the process of firming up the intra-State transmission plan for the 2027-32, the estimated cost of intra-State transmission system and the overall cost would change subsequently.

Cross Border Power Transfer

At present, exchange of power between India and Neighbouring countries (Nepal, Bangladesh, Bhutan and Myanmar) is taking place in synchronous as well as asynchronous mode. Transmission links (at 33 kV, 132 kV and 400 kV levels) have been established between Border States (Bihar, UP, Uttarakhand, Tripura, West Bengal and Assam) of Indian Territory with neighbouring countries. Some interconnections are under construction and several cross border interconnections have been planned. At present about 4,100 MW of power is being exchanged with the neighbouring countries through cross border links and the same is likely to increase to about 7,000 MW by the end of 2026-27.

Interconnection between India and Sri Lanka is in advanced stage of discussion. Under One Sun One World One Grid (OSOWOG) initiative, interconnection of Indian Electricity Grid with Singapore, UAE, Saudi Arabia etc. are under discussion.

Technology options for Transmission System

Indian power system is continuously expanding. Huge generation capacity addition and commensurate expansion and strengthening of the associated Transmission & Distribution network, operation of multiple agencies (State Utilities, Central Utilities, and Private players), expansion of electricity market, integration of huge quantum of generation from Renewable Energy sources and cross border interconnection have increased the complexity of Indian Power system.

In such an environment, adoption of right technological option, optimum utilization of transmission assets & transmission line corridors, balancing the variability in generation from Renewable Sources, improving quality during erection and commissioning / execution of the transmission system, increasing reliability and availability of the system etc. would play important role in smooth operation of power system.

Some of the technology options, which are considered to be beneficial for the overall development of the power system are : Hybrid sub-station; Digital Substation; Multi Circuit / Multi circuit & multi voltage transmission line towers; Compact towers with insulated cross arms for optimum use of Right of Way (RoW); Extra High Voltage (EHV) XLPE Cable and Gas Insulated Lines (GIL) where overhead connection is not feasible; High Temperature Low Sag (HTLS) conductors for enhancement of power flow per meter of Right of Way (RoW); Helicopter and UAV for route survey, erection and monitoring of transmission line; Phase Shifting Transformers (PST), Dynamic Line Rating/Loading; Voltage Sourced Converters (VSC) based HVDC, Grid Forming Inverters, Travelling Wave Fault Detectors etc.

Cyber Security in Transmission

Cyber Security plays a very important role in smooth operation of the grid. To ensure that the electricity grid is resilient to cyber-attacks, several steps have been taken like the CEA (Cyber Security in Power Sector) Guidelines 2021, formulation of Cyber Crisis Management Plan by power sector utilities, Establishment of National Critical Information Infrastructure Center, Notification of CSIRT-Power, Establishment of Security Operations Center and on boarding with Cyber Swachhta Kendra etc. Draft Cyber Security Regulations for the Power Sector is being prepared by CEA.

Transmission Plan for Renewable Energy Sources

The installed generating capacity from RE sources as on 31st March, 2022, was 157 GW (including 46.72 GW large hydro), which was about 39% of the total installed capacity. As on 31st May, 2024, the installed electricity generating capacity in the country from RE sources was 193.5 GW (including 46.92 GW large hydro), which is about 43.5% of the total installed electricity generating capacity in the country.

The RE potential zones in the country are primarily located in Rajasthan, Gujarat, Karnataka, Andhra Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Madhya Pradesh and Leh. Transmission system has been planned for over 600 GW RE capacity/ potential zones by the year 2031-32.

Private Sector Participation in Transmission

Private sector has an important role to play in the development of power sector. Introducing competition in different segments of the electricity industry is one of the key features of the Electricity Act, 2003. The National Electricity Policy 2005, mentions about encouraging private investment in transmission sector. Tariff Policy mentions about tariff determination through competitive bidding. Government has taken a number of steps for creating an enabling framework for encouraging competition and private sector participation in transmission sector.

Till 31st March, 2024, 144 number of ISTS schemes have been identified for implementation through TBCB route. Out of these, 106 ISTS transmission schemes have been awarded through Tariff Based Competitive Bidding route and 38 ISTS schemes are currently under bidding. Out of the 106 transmission schemes already awarded for implementation through TBCB route, 53 schemes have already been commissioned and 49 are under implementation by various Transmission Service Providers. Four ISTS schemes could not be taken up due to various reasons. Details are given below:

ISTS schemes being implemented through TBCB route (as on 31st March, 2024)

Status of transmission schemes being implemented through TBCB route	No. of ISTS Schemes	765/400 kV transformation capacity (MVA)	400/220 kV transformation capacity (MVA)	HVDC ±800, ±500 kV (MW)	765 kV (ckm)	400 kV (ckm)	HVDC ±800, ±500 kV (ckm)
Commissioned	53	41000	27360	0	16520	14487	0
Under implementation	49	79500	32500	0	13881	5227	0
Under bidding	38	108000	29990	14500	8550	5050	5500
Total	**140**	**228500**	**89850**	**14500**	**38951**	**24764**	**5500**

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Chapter - 1

Introduction

1.1 National Electricity Plan

As per Section 3 of the Electricity Act 2003, Central Electricity Authority (CEA) has been entrusted with the responsibility of preparing the National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five years. The National Electricity Plan is brought out in two volumes i.e. Volume I (Generation) and Volume II (Transmission).

1.2 National Electricity Plan – Transmission

Transmission planning is a continuous process of identification of transmission system addition requirements along with their timing. Transmission addition requirements could arise from the following:

(i) increase in generation capacity

(ii) increase in electricity demand

(iii) system strengthening that may become necessary to achieve reliability under changed load generation scenario.

These transmission addition requirements are identified, studied and firmed through transmission planning process.

1.3 Transmission System in India

The transmission system in the country consists of Inter State Transmission System (ISTS) and Intra-State Transmission System (Intra-STS).

1.3.1 Inter-State Transmission System (ISTS)

ISTS serves the following purpose:

(i) Evacuation of power from Inter-State Generating Stations (ISGS) which have beneficiaries in more than one state.

(ii) Onwards transmission of power for delivery of power from inter-state generating stations up to the delivery point of the state grid.

(iii) Transfer of operational surpluses from surplus state(s) to deficit state(s) or from surplus region(s) to deficit region(s).

The Inter-State Transmission System (ISTS) are generally being built through Tariff Based Competitive Bidding (TBCB) route with some schemes being built under Regulated Tariff Mechanism (RTM) route. Many private sector entities now Build, Own and Operate the ISTS elements.

1.3.2 Intra State Transmission System (Intra-STS)

Intra-STS within the state are mainly owned and operated by the State Transmission Utilities of each state. Intra-STS serves the following purpose:

(i) Evacuation of power from the state's generating stations (both under state and private sector) having beneficiaries in that State.

(ii) Onwards transmission within the State from ISTS boundary up to the various substations of the state grid network.

(iii) Transmission within the state grid for delivery of power to the load centres within the state.

1.4 Provisions in the Electricity Act, 2003, related to Planning of Transmission System

As per Section 3, 38 and 39 of the Electricity Act 2003, transmission planning agencies in the country are CEA, CTUIL and STUs. CEA is coordinating transmission planning process under section 73(a) of the Electricity Act, 2003.

Role of CEA in Transmission Planning

Role of CEA in transmission planning process as per Electricity Act 2003 is as follows:

(i) As per section 73 (a) of the Electricity Act 2003, Central Electricity Authority (CEA) shall advise the central government on the matters relating to the National Electricity Policy, formulate short-term and perspective plans for development of the electricity system and co-ordinate the activities of the planning agencies for the optimal utilization of resources to subserve the interest of the national economy and to provide reliable and affordable electricity for all consumers.

(ii) As per section 3 (4) of the Electricity Act 2003, CEA shall prepare National Electricity Plan in accordance with the National Electricity Policy and notify such plan once in five years.

(iii) As per section 3 (5) of the Electricity Act 2003, CEA may review or revise the National Electricity Plan in accordance with the National Electricity Policy.

Role of CTUIL in Transmission Planning

Role of CTUIL in transmission planning process as per the Electricity Act, 2003, is as under:

As per section 38 (2) of the Electricity Act 2003, Central Transmission Utility of India Limited (CTUIL) performs the following functions:

a. To undertake transmission of electricity through Inter-State Transmission System.

b. To discharge all functions of planning and co-ordination relating to Inter-State Transmission System with State Transmission Utilities (STUs), Central Government, State Government, Generating Companies, Regional Power Committees (RPCs), Central Electricity Authority, Licensees, any other person notified by the Central Government in this behalf.

c. To ensure development of an efficient, co-ordinated and economical system of Inter-State Transmission lines for smooth flow of electricity from generating stations to the load centres.

d. To provide non-discriminatory open access to its transmission system for use by:

    (i) Any licensee and generating company on payment of the transmission charges; or

    (ii) Any consumer as and when such open access is provided by the State Commissions under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon as may be specified by the Central Commission;

Role of State Transmission Utilities (STUs) in Transmission Planning

Role of STUs in transmission planning process as per the Electricity Act, 2003, is as under:

As per section 39 (2) of the Electricity Act, 2003, STUs perform the following functions:

a. To undertake transmission of electricity through intra-State transmission system.

b. To discharge all functions of planning and co-ordination relating to intra-state transmission system with Central Transmission Utility, Central Government, State Government, Generating Companies, Regional

Power Committees (RPCs), Central Electricity Authority, Licensees, any other person notified by the State Government in this behalf.

c. To ensure development of an efficient, co-ordinated and economical system of intra-State transmission lines for smooth flow of electricity from a generating station to the load centres.

d. To provide non-discriminatory open access to its transmission system for use by:

   (i) Any licensee or generating company on payment of the transmission charges.

   (ii) Any consumer as and when such open access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission

1.5 Provisions in the National Electricity Policy related to planning of Transmission System

Some of the transmission related provisions of the "National Electricity Policy" are given below:

"

(i) Adequate and timely investments and also efficient and coordinated action to develop a robust and integrated power system for the country.

(ii) While planning new generation capacities, requirement of associated transmission capacity would need to be worked out simultaneously in order to avoid mismatch between generation capacity and transmission facilities. The policy emphasizes the following to meet the above objective:

- *The Central Government would facilitate the continued development of the National Grid for providing adequate infrastructure for inter-state transmission of power and to ensure that underutilized generation capacity is facilitated to generate electricity for its transmission from surplus regions to deficit regions.*
- *The Central Transmission Utility of India Limited (CTUIL) and State Transmission Utility (STU) have the key responsibility of network planning and development based on the "National Electricity Plan" in coordination with all concerned agencies as provided in the Electricity Act. The CTUIL is responsible for the national and regional transmission system planning and development. The STU is responsible for planning and development of the intra-state transmission system. The CTUIL would need to coordinate with the STUs for achievement of the shared objective of eliminating transmission constraints in cost effective manner.*
- *Network expansion should be planned and implemented keeping in view the anticipated transmission needs that would be incident on the system in the open access regime. Prior agreement with the beneficiaries would not be a pre-condition for network expansion. CTUIL/STU should undertake network expansion after identifying the requirements in consultation with stakeholders and taking up the execution after due regulatory approvals.*
- *Structured information dissemination and disclosure procedures should be developed by the CTUIL and STUs to ensure that all stakeholders are aware of the status of generation and transmission projects and plans. These should form a part of the overall planning procedures.*

(iii) To facilitate orderly growth and development of the power sector and also for secure and reliable operation of the grid, adequate margins in transmission system should be created. The transmission capacity would be planned and built to cater to both the redundancy levels and margins keeping in view international standards and practices.

"

1.6 Provisions in Tariff Policy related to Planning of Transmission System

1.6.1 In compliance with Section 3 of the Electricity Act 2003, Central Government notified the Tariff Policy on 6th January, 2006. Central Government notified the revised Tariff Policy to be effective from 28th January 2016. Some of related provisions of the Tariff Policy, which provide objective in development of transmission systems are:

1.6.2 Objective (Section 7 of Tariff Policy)

- The tariff policy, insofar as transmission is concerned, seeks to achieve the following objectives:
  1. Ensuring optimal development of the transmission network ahead of generation with adequate margin for reliability and to promote efficient utilization of generation and transmission assets in the country;
  2. Attracting the required investments in the transmission sector and providing adequate returns.

1.6.3 Implementation of the Transmission Schemes

Section 7.1 of Tariff Policy inter-alia states that

i. Investment by transmission developer including CTUIL/STUs would be invited through competitive bids in accordance with the guidelines issued by the Central Government from time to time.

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

1.7 Provisions in CERC Regulations

CERC has issued Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022, which covers Connectivity and General Network Access to the inter-State Transmission System. As per these regulations, General Network Access would be granted to State Transmission Utility on behalf of intra-state entities including distribution licensee; drawee entity connected to intra-state transmission system; distribution licensee or bulk consumer, seeking to connect to ISTS, directly; trading licensees engaged in cross border trade of electricity; transmission licensee connected to ISTS for drawl of auxiliary power. Generating stations including renewable energy generating stations, captive generating plant, standalone energy storage systems and renewable power park developers have to apply for connectivity to inter-state transmission system.

1.8 Transmission Planning Methodology

1.8.1 Major inputs for planning of transmission system are as follows:

(i) Connectivity applications for evacuation of power from new generation projects as received by CTUIL/STUs as per appropriate regulation of CERC/SERC.

(ii) General Network Access applications from State Transmission Utilities, distribution licensee, bulk consumer etc. for drawl of power from inter-state transmission system as received by CTUIL.

(iii) Electricity demand projections, including projections from Electric Power Survey (EPS) Report of CEA.

(iv) Input from States regarding generating stations likely to be connected to the State Grid, transmission system requirement of the states etc.

(v) Operational Feedback from Grid-India viz. line overloading, high voltage/low voltage etc. in the system.

1.8.2 The studies have to be carried out for transmission system planning with normative assumptions as specified in the “Manual on Transmission Planning Criteria” brought out by CEA. The manual includes general planning philosophy, reliability criteria, transmission equipment limits and their parameters, time horizon, load - generation scenarios, active and reactive power considerations etc.

1.9 Implementation of Transmission Schemes

1.9.1 Implementation of Inter State transmission system (ISTS)

The following structure is being followed for approval of ISTS schemes:

- CTUIL after consulting Regional Power Committee(s) [RPC(s)] shall submit the proposal for expansion of ISTS to the NCT (National Committee on Transmission) for their consideration. For proposal up to Rs.500 Crore, prior consultation with RPC would not be required. Schemes costing more than Rs. 500 Crore have to be recommended by NCT to MoP for approval.
- Schemes costing between Rs. 100 Crore to 500 Crore to be approved by NCT along with mode of implementation under intimation to MoP.
- Schemes costing less than or equal to Rs. 100 Crore to be approved by CTUIL along with mode of implementation under intimation to NCT & MoP.

The transmission schemes are implemented either through Tariff Based Competitive Bidding (TBCB) route or Regulated Tariff Mechanism (RTM), in accordance with provisions of the Tariff Policy.

1.9.2 Implementation of Intra- State Transmission System (Intra-STS)

Intra-State Transmission system is implemented by the STUs. Tariff Policy, 2016, inter-alia states the following:

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

In line with the above provision, Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Odisha, DVC etc. have initiated competitive bidding process for award of transmission schemes.

In line with the process being followed for planning and implementation of ISTS through TBCB route, it is suggested that for implementation of Intra-STS through TBCB route, STU may be segregated into two entities, one entity would carry out the functions of planning the Intra-STS, executing TSA with the TSP implementing the Intra-STS and other functions as per section 39 (2) of the Electricity Act, 2003. The other entity may function as Transmission Service Provider (TSP) and participate in the competitive bidding process for implementation of transmission schemes.

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Chapter - 2

Growth of Transmission System in India

2.1 Development of Transmission System in India

2.1.1 Formation of State Grids for Integrated Planning

At the time of independence, power systems in the country were essentially isolated systems, developed in and around urban and industrial areas. The installed generating capacity in the country as on 31.12.1947 was 1,362 MW and the power system consisted of small generating stations feeding power radially to load centres. The highest transmission voltage was 132 kV. The voltage level of state sector network grew from 132 kV level during the 50s and 60s to 220 kV level during 60s and 70s. Subsequently, 400 kV network was also developed in many States (Uttar Pradesh, Maharashtra, Madhya Pradesh, Gujarat, Odisha, Andhra Pradesh and Karnataka) for bulk power transfer over long distances. With the development of State Grids in most of the States of the country, stage was set for development of regional grids.

2.1.2 Concept of Regional Planning and Integration of State Grids

During the 3rd Five Year Plan (01.04.1961 to 31.03.1966), the concept of Regional planning in Power Sector was introduced. Accordingly, for the purpose of power system planning and development, the country was demarcated into five regions viz. Northern, Western, Southern, Eastern and North-Eastern. In 1964, the Regional Electricity Boards (REBs) were established in each region of the country for facilitating integrated operation of State Systems in the Region and encouraging exchange of power among the States. To encourage the States to build transmission infrastructure for exchange of power, Inter-State lines were treated as 'centrally sponsored' and the States were provided interest free loans. 55 Nos. of Inter-State lines were constructed under the programme, out of which 13 lines were connecting the States located in different Regions and this created the initial set of inter-regional links. These lines facilitated exchange of power in radial mode among various Regions.

2.1.3 Evolution of Regional Grids

Till the year 1975, development of transmission system was essentially by the State Electricity Boards (SEBs)/ Electricity Departments (EDs) in the States and Union Territories (UTs). In 1975, to supplement the efforts of the States in increasing generation capacity, Central Sector generation utilities viz. National Hydroelectric Power Corporation (NHPC) and National Thermal Power Corporation (NTPC) were created. These corporations established large generating stations for the benefit of States in a region. These corporations also undertook development of associated transmission lines for evacuation of power and delivery of power to the beneficiary States transcending State boundaries. This gave a fillip to the formation of Regional Grid Systems and by the end of 1980s, strong regional networks came into existence.

2.1.4 Development of Inter-Regional Links

In the year 1989, transmission wings of Central Generating Companies were separated to set up Power Grid Corporation of India (POWERGRID) to give thrust to implementation of transmission system associated with Central generating stations and inter-regional transmission programme based on perspective planning done by Central Electricity Authority (CEA). Till then, the generation and transmission systems in the country were planned and developed on the basis of regional self-sufficiency. The initial set of inter-regional links developed under the Centrally sponsored programme were utilized to facilitate exchange of operational surpluses among various Regions in a limited manner. It was mainly because the Regional Grids operated independently, experiencing different operating frequencies. The power exchanges on these inter-regional links could take place only in radial mode.

2.2 National Grid

The National Grid is a large, meshed transmission grid where all the regional and State grids are electrically connected (through AC and HVDC links) and operate at single frequency. The National Grid consists of the transmission system for evacuation of power from generating stations, the inter-regional links, Inter-State transmission system (ISTS) and Intra-State transmission system (Intra-STS) of the State Transmission Utilities (STUs). Thus, the development of national grid has been an evolutionary process**.**

2.2.1 Asynchronous Interconnections between Regional Grids

Considering the operational regime of the various Regional Grids, it was decided around 1990s to initially establish asynchronous connection between the Regional Grids to enable them to exchange large regulated quantum of power. Accordingly, the following High Voltage Direct Current (HVDC) back-to-back links were established:

- 500 MW HVDC link between the Northern Region and the Western Region at Vindhyachal
- 1000 MW HVDC link between Western Region and Southern Region at Bhadrawati
- 1000 MW HVDC link between Eastern Region and Southern Region at Gazuwaka
- 500 MW HVDC link between Eastern Region and Northern Region at Sasaram

2.2.2 Synchronization of Regional Grids

In 1992, Eastern Region (ER) and North-Eastern Region (NER) were synchronously interconnected through Birpara-Salakati 220 kV D/C (double circuit) transmission line and subsequently by 400 kV Bongaigaon - Malda D/C line. Western Region was interconnected to "ER-NER" system synchronously through 400 kV Rourkela-Raipur D/C line in 2003 and thus the Central India system consisting of ER-NER-WR came into operation. In 2006, with commissioning of Muzaffarpur-Gorakhpur 400 kV D/C line, Northern Region also got interconnected to this system. In 2007, Northern Region was also synchronously interconnected with Western Region (WR) through Agra-Gwalior 765 kV S/C line (charged at 400 kV level) leading to formation of NEW grid. The southern grid was synchronised with rest of all-India grid i.e. NEW grid in December, 2013, through the Raichur-Solapur 765 kV S/C line, thus leading to formation of one synchronous National Grid (one Nation- one Grid - one frequency).

2.2.3 All India Planning and Evolution of Integrated National Grid

Focus of planning the generation and the transmission system in the country has gradually shifted from the orientation of regional self-sufficiency to the concept of optimum utilization of resources on all-India basis. Generation planning studies carried out by CEA had indicated that the capacity addition required on all-India basis would be less than that required on regional basis on account of diversity in demand among the regions. Further, a strong all-India integrated national grid enables harnessing of unevenly distributed generation resources in the country.

Recognizing the need for development of National grid, thrust was given to enhance the capacity of inter-regional links in a phased manner. Total inter-regional transmission capacity by the end of 9th Plan (1997-2002) was 5,750 MW. During 10th Plan i.e. 2002-2007, a total of 8,300 MW of inter-regional capacity was added. In this effort, major achievements were - addition of Talcher-Kolar HVDC Bipole link, second module of HVDC back-to-back system between SR and ER at Gazuwaka, HVDC back-to-back system between NR and ER at Sasaram, synchronous inter-connection of NER/ER grid with WR grid by Rourkela-Raipur 400 kV D/C line, synchronous inter-connection of NER-ER-WR grid with NR grid by Muzaffarpur-Gorakhpur 400 kV D/C (quad) line and subsequently, Patna-Balia 400 kV D/C (quad) line and Agra-Gwalior 765 kV transmission line. Total inter-regional transmission capacity by the end of 10th Plan was 14,050 MW which increased to 27,750 MW by the end of 11th Plan (31.03.2012). This capacity increased to 75,050 MW by the end of 12th Plan

(31.03.2017). Inter-regional transmission capacity added during the period 2017-22 was 37,200 MW, taking the total inter-regional transmission capacity in the country to 112,250 MW (as on 31.03.2022). Inter-regional transmission capacity as on 31st March, 2024, is 1,18,740 MW. Details of inter-regional links that have been implemented till 2021-22 are given in Chapter-6, and those under-construction/ planned for period 2022-27 are given in Chapter-7.

2.3 Growth of Transmission System

There has been a consistent expansion in the transmission network and increase in transformation capacity in the country. This increase is in consonance with the increase in electricity generation and electricity demand in the country. There has been more increase in the transmission system at higher voltage levels. This aspect of growth in transmission system highlights the requirement of transmission network to carry bulk power over longer distance and at the same time optimize Right of Way (RoW), minimize transmission losses and improve grid reliability.

2.3.1 Growth in Transmission Lines

Cumulative growth in transmission lines of 220 kV and above voltage levels since the end of 6th five-year plan (i.e. March 1985) to 2023-24 is given in Table 2.1 and in Fig. 2.1:

Table-2.1: Growth of Transmission Lines (ckm)

Voltage level	End of 6th Plan (31.03.1985)	End of 7th Plan (31.03.1990)	End of 8th Plan (31.03.1997)	End of 9th Plan (31.03.2002)	End of 10th Plan (31.03.2007)	End of 11th Plan (31.03.2012)	End of 12th Plan (31.03.2017)	End of 2021-22 (31.03.2022)	End of 2023-24 (31.03.2024)
765 kV	0	0	0	971	2184	5250	31240	51023	54797
400 kV	6029	19824	36142	49378	75722	106819	157787	193978	203838
230/220 kV	46005	59631	79600	96993	114629	135980	163268	192340	207534
HVDC	0	0	1634	3138	5872	9432	15556	19375	19375
Total (ckm)	**52034**	**79455**	**117376**	**150480**	**198407**	**257481**	**367851**	**456716**	**485544**

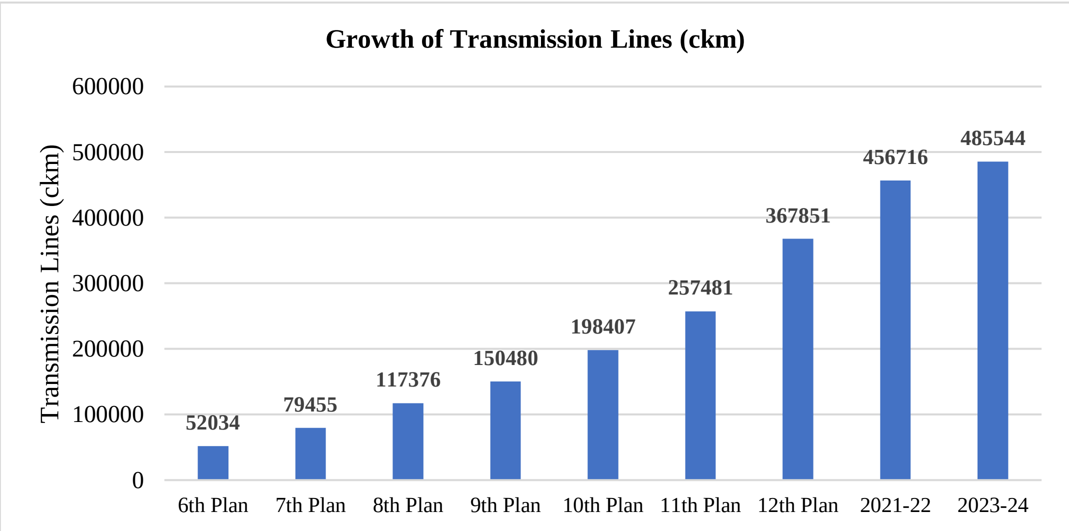

Fig. 2.1: Growth of Transmission Lines (ckm)

2.3.2 Growth of Sub-stations

Cumulative growth in transformation capacity of sub-stations and HVDC terminals (220 kV and above voltage levels) since the end of 6th five-year plan to 2023-24 is given in Table 2.2 and in Fig. 2.2:

Table-2.2: Growth of Sub-stations (MVA/ MW)

Voltage level	End of 6th Plan (31.03.1985)	End of 7th Plan (31.03.1990)	End of 8th Plan (31.03.1997)	End of 9th Plan (31.03.2002)	End of 10th Plan (31.03.2007)	End of 11th Plan (31.03.2012)	End of 12th Plan (31.03.2017)	End of 2021-22 (31.03.2022)	End of 2023-24 (31.03.2024)
765 kV	0	0	0	0	0	25000	167500	257200	294700
400 kV	9330	21580	40865	60380	92942	151027	240807	393113	457933
230/220 kV	37291	53742	84177	116363	156497	223774	312958	420637	464947
HVDC	0	0	0	5000	8000	9750	19500	33500	33500
Total (MVA/MW)	**46621**	**75322**	**125042**	**181743**	**257439**	**409551**	**740765**	**1104450**	**1251080**

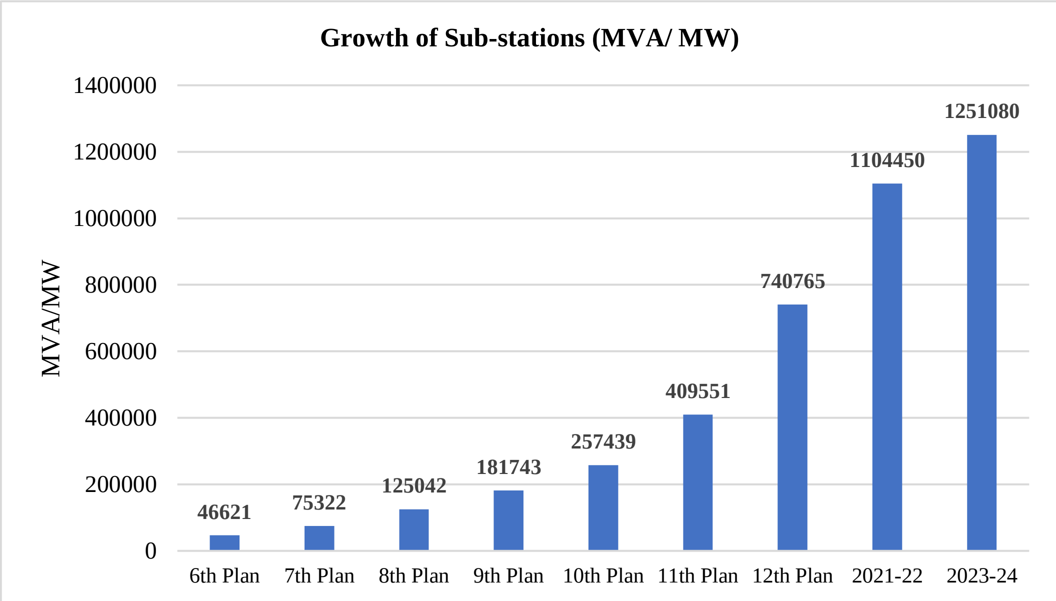

Fig. 2.2: Growth of Sub-stations (MVA/ MW)

2.4 Landmark Events of Transmission Sector

Development of the transmission system has been done in tandem with growth in generation capacity. The growth in transmission system is characterized by the physical growth in transmission network as well as introduction of higher transmission voltages and new technologies for bulk power transmission. Landmark events of this growth are:

1948	Electricity (Supply) Act, 1948. The Act provided for establishment of the Central Electricity Authority (CEA) and the State Electricity Boards
1950-60	Growth of State Grids and introduction of 220 kV voltage level
1964	Constitution of Regional Electricity Boards
1965-73	Interconnecting State Grids to form Regional Grid systems
1977	Introduction of 400 kV voltage level
1980-88	Growth of Regional Grid Systems as associated transmission system with Central Sector generation
1989	HVDC back-to-back System

1990	Introduction of HVDC bi-pole line (± 500 kV, 1500 MW HVDC line from Rihand to Dadri)
1992	Synchronous inter-connection of ER and NER
1999	Transmission planning re-oriented towards all-India system
2000	Introduction of 765 kV transmission line (initially charged at 400 kV)
2003	- Electricity Act, 2003 - ABT with real time settlement mechanism implemented in all the five electrical regions creating the basic infrastructure for the operation of an electricity market. - Synchronous inter-connection of WR with ER-NER system - Bulk inter-regional HVDC transmission system (Talcher – Kolar HVDC link)
2004	Open access in transmission
2006	Synchronous inter-connection of NR with ER-NER-WR system (formation of NEW Grid)
2007	- 765 kV operation of Sipat Sub-station - 765 kV operation of 765 kV transmission lines
2010	Notification of POSOCO (Power System Operation Corporation Limited, Grid Controller of India Limited since 09th November 2022) for operation of Regional Load Despatch Centres (RLDCs)/National Load Despatch Centre (NLDC) as a separate organization
2011	Implementation of point-of-connection (PoC) based method for sharing transmission charges and losses across the country.
2013	Synchronous inter-connection of SR and NEW Grid
2016-17	- Interconnection between India and Bangladesh (500 MW asynchronous HVDC back-to-back link at Bheramara, Bangladesh and 400 kV D/c transmission line between Baharampur in India and Bheramara in Bangladesh.) - Interconnection between India and Mynmaar - NER directly connected with NR. The longest ± 800 kV, 6000 MW HVDC line from Bishwanath Chariali in NER to Agra in NR for dispersal of power from NER to NR/WR
2017-18	Introduction of ±100 MVAR STATCOM at N P Kunta and ± 2 x150 MVAR STATCOMs at Aurangabad and Satna. STATCOM at N P Kunta commissioned in June, 2017 and at Aurangabad and Satna in March, 2018.
2018-19	Guidelines on Import/Export (Cross Border) of Electricity issued.
2020-21	Commissioning of ± 320 kV, Voltage Sourced Converter (VSC) based HVDC terminal at Pugalur, Tamil Nadu and North Trichur, Kerala of 1000 MW capacity (Monopole-II) along with HVDC link of 288 ckm.
2021-22	- Functioning of Central Transmission Utility of India Ltd (CTUIL) as a 100% subsidiary of POWERGRID - Introduction of 1200 kV line (charged at 400 kV) between Wardha and Aurangabad
2022-23	General Network Access (GNA) to the ISTS introduced

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Chapter - 3

Transmission Planning Philosophy

3.1 Transmission Planning Philosophy

3.1.1 Transmission planning philosophy in India has evolved over last few decades keeping pace with developments and needs of the electricity sector. The transmission planning has been aligned with the Electricity Act 2003, National Electricity Policy, Tariff Policy, Regulations and market orientation of the electricity sector. The objectives, approach and criteria for transmission planning, which evolved in time, take care of uncertainties in load growth and generation capacity addition while optimizing investment in transmission on long term basis. These objectives, approach and criteria are kept in view while planning transmission addition requirements to meet targets for adequacy, security and reliability. Transmission plan is firmed up through system studies/analysis considering the planning philosophy and guidelines given in "Manual on Transmission Planning Criteria" of Central Electricity Authority.

3.2 Transmission Planning Criteria

Manual on Transmission Planning Criteria was first brought out by CEA in 1985 setting the planning philosophy of regional self-sufficiency. The manual was revised in 1994 considering the experience gained on EHV systems. Technological advancements and institutional changes necessitated further review of the Transmission Planning Criteria.

The Electricity Act, 2003, has brought profound changes in electricity supply industry of India leading to unbundling of vertically integrated State Electricity Boards, implementation of Open Access in power transmission and liberalisation of generation sector, among others. The phenomenal growth of private sector generation and the creation of open market for electricity have brought its own uncertainties. Large numbers of generation projects are coming up with no information regarding firm beneficiaries. Adequate flexibility needs to be built in the transmission system to cater to such uncertainty, to the extent possible. However, given the uncertainties, the possibility of stranded assets or congestion cannot be entirely ruled out. In creation of very large interconnected grid, there can be unpredictable power flows leading to overloading of transmission lines due to imbalance in load generation in different pockets of the grid in real time operation. Reliable transmission planning is basically a trade-off between the cost and the risk involved. There are no widely adopted uniform guidelines which determine the criteria for transmission planning vis-à-vis acceptable degree of adequacy and security. Practices in this regard vary from country to country. The common theme in the various approaches is "acceptable system performance".

As the National grid grew in size and complexity, grid security was required to be enhanced considering large scale integration of renewable energy sources. Therefore, the transmission planning criteria was reviewed again in the year 2013.

The regional electrical grids of Northern, Western, Southern, Eastern and North-Eastern regions have been synchronously interconnected in December 2013 to form one of the largest synchronous electricity grid in the world. The country has moved from the concept of regional self-sufficiency to bulk inter-regional transfer of power through high capacity AC and HVDC corridors forming an all-India National Grid.

Ministry of Power has promulgated Electricity (Transmission System Planning, Development and Recovery of Inter-State Transmission Charges) Rules, 2021, in October 2021, paving the way for complete overhauling of transmission system planning to give power sector utilities easier access to electricity transmission network across the country. These Rules underpin that transmission planning shall be done in such way that the lack of availability of the transmission system does not act as a barrier on the growth of different regions and the transmission system shall, as far as possible, be planned and developed matching with growth of generation and load. While doing the transmission planning, care shall be taken that there is no wasteful investment. These rules also introduced General Network Access (GNA) in the inter-state transmission system.

In context with anticipated large-scale renewable generation capacity addition, growth of load, increasing fault level, right of way issues, technological advancement and notification of Transmission Rules 2021, the 'Manual on Transmissions Planning Criteria' has been revised in 2023.

3.2.1 Scope

(i) Central Electricity Authority is responsible for preparation of perspective generation and transmission plans and for coordinating the activities of planning agencies as envisaged under Section 73(a) of the Electricity Act 2003. Central Transmission Utility (CTU) is responsible for development of an efficient and coordinated inter-state transmission system (ISTS). Similarly, the State Transmission Utility (STU) is responsible for development of an efficient and coordinated intra-state transmission system (Intra-STS). The ISTS and Intra-STS are interconnected and together constitute the electricity grid. It is therefore imperative that there should be a uniform approach to transmission planning for developing a reliable transmission system.

(ii) The planning criteria is primarily meant for planning of Inter-State Transmission System (ISTS), Intra-State Transmission System (Intra-STS) and dedicated transmission lines down to 66 kV level.

(iii) The manual covers the planning philosophy, the information required from various entities, permissible limits, reliability criteria, broad scope of system studies, modelling and analysis, and prescribes guidelines for transmission planning.

3.2.2 Applicability

(i) These planning criteria shall be applicable with effect from 1st April, 2023.

(ii) The existing and already planned transmission system may be reviewed with respect to the provisions of these planning criteria. Wherever required and possible, additional system may be planned to strengthen the existing system. Till implementation of the additional system, suitable defence mechanisms may be put in place.

3.2.3 Planning philosophy and general guidelines

(i) The transmission system forms a vital link in the electricity supply chain. Transmission system provides inter-connection between the source (electrical energy sources) and consumption (load centres) of electricity. In the Indian context, the transmission system has been broadly categorised as Inter-State Transmission System (ISTS) and Intra-State Transmission system (Intra-STS). The ISTS is the top layer of National Grid below which lies the Intra-STS. The smooth operation of power system gets adversely affected on account of any disturbance in these systems. Therefore, the criteria prescribed in the Manual are intended to be followed for planning of ISTS, Intra-STS and dedicated transmission line.

(ii) The transmission system is generally augmented to cater to the power transfer requirements posed by eligible entities, for example, for increase in electricity demand, generation capacity addition etc. Further, system may also be augmented considering the feedback regarding operational constraints and feedback from drawing entities.

(iii) The principle for planning of the ISTS shall be to ensure that it is available as per the requirements of the States and the generators, as reflected by their General Network Access (GNA)/connectivity requests. As far as possible, the transmission system shall be planned and developed matching with growth of generation and load and care shall be taken that there is no wasteful investment.

(iv) The transmission customers as well as utilities shall give their network access requirement well in advance considering time required for implementation of the transmission assets. The transmission customers are also required to provide a reasonable basis for their transmission requirement such as size and completion schedule of their generation facility, demand and their commitment to bear transmission service charges.

(v) Planning of transmission system for evacuation of power from hydro projects shall be done river basin wise considering the identified generation projects and their power potential.

(vi) In case of highly constrained areas like congested urban / semi-urban area, very difficult terrain (including hilly terrain) etc., the transmission corridor may be planned by considering long term perspective of optimizing the right-of-way and cost. This may be done by adopting higher voltage levels for final system and operating one level below voltage level in the initial stage, or by using multi-circuit towers for stringing circuits in the future etc.

(vii) Routing of the transmission line may be planned in accordance with Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, and its amendments or re-enactment thereof, to minimise Right of Way (RoW), technical options and line configurations.

(viii) PM Gati Shakti National Master Plan (PMGS-NMP) was launched on 13th October 2021 for providing multimodal connectivity infrastructure to various economic zones. It provides a digital platform for integrated planning and coordinated implementation of infrastructure connectivity projects. The information available on this platform to be used while planning of transmission system. For planning of any new transmission lines or substations, the portal of PMGS-NMP to be used to identify preliminary feasibility of the same.

(ix) In line with Section 39 of the Electricity Act, 2003, STU shall act as the nodal agency for Intra-STS planning in coordination with distribution licensees and intra-state generators connected/to be connected in the STU grid. The STU shall be the single point contact for the purpose of ISTS planning and shall be responsible on behalf of all the intra-State entities for evacuation of power from State’s generating stations, meeting requirements of DISCOMs and exchange of power with ISTS commensurate with the ISTS plan with due consideration to the margins available in existing system.

(x) Normally, various intra-state entities shall be supplied power through the intra-state network. Only under exceptional circumstances, the load serving intra-state entity may be allowed direct inter-connection with ISTS on recommendation of STU, provided that such an entity would continue as intra-state entity for the purpose of all jurisdictional matters including energy accounting. Under such situation, this direct interconnection may also be used by other intra-state entity(ies). Further, STUs shall coordinate with urban planning agencies, Special Economic Zone (SEZ) developers, industrial developers etc. to keep adequate provision for transmission corridor and land for new substations for their power transfer requirements.

(xi) The system parameters and loading of system elements shall remain within permissible limits as specified in the Manual on Transmission Planning Criteria. The adequacy of the transmission system should be tested for different probable load-generation scenarios.

(xii) The system shall be planned to operate within permissible limits both under normal as well as after probable credible contingency(ies). However, the system may experience extreme contingencies which are rare, and the system may not be planned for such rare contingencies. To ensure security of the grid, the extreme/rare but credible contingencies should be identified from time to time and suitable defence mechanism, such as load shedding, generation rescheduling, islanding, system protection schemes, Automatic Under Frequency Load Shedding (AUFLS) schemes (AUF Relay & df/dt), etc. may be worked out to mitigate their adverse impact.

(xiii) For strengthening of the transmission network, cost, reliability, Right of Way requirements, transmission losses, down time (in case of up-gradation and re-conductoring options) etc. need to be studied. If need arises, addition of new transmission lines/ substations to avoid overloading of existing system including adoption of next higher voltage may be explored.

(xiv) Critical loads such as - railways, metro rail, airports, refineries, underground mines, steel plants, smelter plants etc. shall plan their interconnection with the grid with 100% redundancy and as far as possible from two different sources of supply.

(xv) The planned transmission capacity would be finite and there are bound to be congestions if large quantum of electricity is sought to be transmitted in the direction not previously planned.

(xvi) Communication system for new transmission system shall be planned and implemented in accordance with Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, and its amendments or re-enactment thereof. Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 and its amendments or re-enactment thereof and CEA Manual of Communication Planning in Power System Operation 2022 and its amendments, such that the communication system is available at the time of commissioning of the transmission system.

3.2.4 Transmission Planning

3.2.4.1 Power system data for transmission planning and modelling

(i) In order to precisely model the power system for planning studies, accuracy of data is very important as the same can have considerable effect on outcome of system studies and ultimately on the system planning.

(ii) For ISTS planning, the transmission network may be modelled down to 220 kV level and wherever required such as for North Eastern Region, Uttarakhand, Himachal Pradesh and Sikkim, the transmission network may be modelled down to 132 kV level.

The generating units that are stepped-up at 132 kV level may be connected at the nearest 220 kV bus through a 220/132 kV transformer for simulation purpose. The generating units smaller than 50 MW size within a plant may be lumped and modelled as a single unit. Load may be lumped at 220 kV or 132 kV, as the case may be.

(iii) For Intra-STS planning, the transmission network may be modelled down to 66 kV level and lumping of generating units & loads may be considered accordingly. The STUs may consider modelling of smaller size generating units, if required.

3.2.4.2 Time Horizons for transmission planning

(i) Concept to commissioning of transmission elements generally takes about three to five years; about two to three years for augmentation of capacitors, reactors, transformers etc., and about four to five years for new transmission lines or substations. Therefore, system studies for firming up the transmission plans may be carried out with 3-5 year time horizon on rolling basis every year.

3.2.4.3 Load - generation scenarios

(i) The load-generation scenarios shall be worked out in a pragmatic manner so as to reflect the typical daily and seasonal variations in electricity demand and generation availability. Typical load generation scenario may include high/low wind, high/low solar, high/low hydro generation, high electricity demand, low electricity demand and combinations thereof.

3.2.4.4 Load

(A) <u>Active power (MW)</u>

(i) The system peak electricity demand (state-wise, regional and national) shall be based on the latest Electric Power Survey (EPS) report of CEA. However, the same may be moderated based on actual load growth of past five years, if required.

(ii) The electricity demand at other periods (seasonal variations and minimum loads) shall be derived based on the annual peak demand and past pattern of demand variations.

(iii) While doing the simulation, if the peak load figures are more than the peaking availability of generation, the loads may be suitably adjusted substation-wise to match with the availability. Similarly, if the peaking availability is more than the peak load, the generation dispatches may be suitably reduced to the extent possible considering merit order dispatch.

(iv) From practical considerations the load variations over the year shall be considered as under:

a) Annual peak load

b) Variation of load in different hours of the day

c) Seasonal variation in peak loads for Winter, Summer and Monsoon

(B) <u>Reactive power (MVAr)</u>

(i) Reactive power plays an important role in EHV transmission system planning and hence, forecast of reactive power demand on an area-wise or substation-wise basis is as important as active power forecast. This forecast would obviously require adequate data on the reactive power demand at different sub-stations as well as the projected plans (including existing) for reactive power compensation.

(ii) For developing an optimal ISTS, STUs must clearly spell out the substation-wise maximum and minimum demand in MW and MVAr on seasonal basis. In the absence of MVAR data, the load power factor shall be taken as per Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, and its amendments or re-enactment thereof. The STUs shall provide adequate reactive compensation to bring power factor as close to unity at 132 kV and 220 kV voltage levels.

(iii) Reactive power capability of generators including RE generators shall be as per provisions of Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, and its amendments or re-enactment thereof. RE generators are mandated by CEA Regulation for supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading. This can be inter-alia achieved by installing suitable compensation devices.

3.2.4.5 Generation dispatches and modelling

(i) For the purpose of development of Load Generation scenarios on all India basis, all India peaking availability may be calculated as per seasonal and daily variations based on the past pattern of generation variations.

(ii) For evolving transmission systems for integration of RE generation projects, high wind/solar generation injections may also be studied in combination with suitable conventional dispatch scenarios.

3.2.4.6 Special area dispatches such as following may be considered in planning, wherever necessary:

a) Special dispatches corresponding to high agricultural load/lift irrigation schemes with low power factor, wherever applicable.

b) Complete closure of a generating station close to a major load centre.

3.2.4.7 In case of coal based thermal generating units, the minimum level of output (ex-bus generation, i.e. net of the auxiliary consumption) shall be taken as not less than 40% of the rated installed capacity.

3.2.4.8 The generating units shall be modelled to run as per their respective capability curves. In the absence of capability curve, the reactive power limits (Q_{max} and Q_{min}) for generating units can be taken as under:

Type of generating unit	Q_{max}	Q_{min}
Thermal units	Q_{max} = 0.60 x P_{max}	Q_{min} = (-) 0.30 x P_{max}
Nuclear units	Q_{max} = 0.50 x P_{max}	Q_{min} = 0
Hydro units	Q_{max} = 0.48 x P_{max}	Q_{min} = (-) 0.24 x P_{max}
Wind / Solar / BESS	Q_{max} = 0.33 x P_{max}	Q_{min} = (-) 0.33 x P_{max}

3.2.4.9 It shall be duty of all the generators to provide technical details of generating units, such as generator capability curves, exciter, governor, PSS parameters etc., for modelling of their machines for steady-state and transient-state studies. In case of Wind/Solar/BESS, equivalent generator model shall also be provided.

3.2.4.10 Planning margins

(i) In a very large interconnected grid, there can be unpredictable power flows in real time due to variation in load-generation balance with respect to anticipated load generation balance in different pockets of the grid. This may lead to overloading of transmission elements during operation, which cannot be predicted in advance at the planning stage. This can also happen due to delay in commissioning of a few planned transmission elements, delay/abandoning of planned generation additions or load growth at variance with the estimates. Such uncertainties are unavoidable and hence some margins at the planning stage may help in reducing impact of such uncertainties. Therefore, at the planning stage, planning margins need to be provided. However, care also need to be taken to avoid stranded transmission assets.

(ii) Against the requirement of power transfer, the new transmission lines emanating from a power station to the nearest grid point may be planned considering overload capacity of the generating stations in consultation with generators.

(iii) The new transmission additions required for system strengthening may be planned keeping a margin of 10% in the thermal loading limits of lines and transformers. Further, the margins in the interregional links may be kept as 15%.

(iv) At the planning stage, a margin of about ± 2% may be kept in the voltage limits and thus the voltages under load flow studies (for 'N-0' and 'N-1' steady-state conditions only) may be maintained within the limits given below:

Voltage (kV_{rms}) (after planning margins)		
Nominal	**Maximum**	**Minimum**
765	785 (1.03 pu)	745 (0.97 pu)
400	412 (1.03 pu)	388 (0.97 pu)
230	240 (1.04 pu)	212 (0.92 pu)
220	240 (1.09 pu)	203 (0.92 pu)
132	142 (1.08 pu)	125 (0.95 pu)
110	119 (1.08 pu)	102 (0.93 pu)
66	70 (1.06 pu)	62 (0.94 pu)

(v) In planning studies all the transformers may be kept at nominal taps and On Load Tap Changer (OLTC) may not be considered. The effect of the taps should be kept as operational margin.

(vi) For the purpose of load flow studies at planning stage, the nuclear generating units shall normally not run at leading power factor. To keep some margin at planning stage, the reactive power limits (Q_{max} and Q_{min}) for generating units may be taken as under:

Type of generating unit	Q_{max}	Q_{min}
Thermal Units	$Q_{max} = 0.50 \times P_{max}$	$Q_{min} = (-)\ 0.10 \times P_{max}$
Nuclear units	$Q_{max} = 0.40 \times P_{max}$	$Q_{min} = 0$
Hydro units	$Q_{max} = 0.40 \times P_{max}$	$Q_{min} = (-)\ 0.20 \times P_{max}$
Wind / Solar / BESS	$Q_{max} = 0.20 \times P_{max}$	$Q_{min} = (-)\ 0.20 \times P_{max}$

Note: In case of limitation in Q_{max} and Q_{min}, similar ratio of margins as provided in Paragraph 3.2.4.8 and Paragraph 3.2.4.10 of the Maual, shall be considered for the generating unit with respect to capability curve.

(vii) During operation, as per the instructions of the System Operator, the generating units shall operate at leading power factor within their respective capability curves.

3.2.4.11 System studies for transmission planning

(i) The system shall be planned based on one or more of the following power system studies, as per requirements:

a) Power Flow Studies
b) Short Circuit Studies
c) Stability Studies
d) TTC/ATC Calculations

(ii) Additional studies as given below may be carried out at appropriate time as per requirement.

a) EMT studies
b) Inertia studies

Power flow studies, short circuit studies, voltage stability and transient stability studies are described below. For other studies, the Manual on Transmission Planning Criteria may be referred.

<u>Power Flow studies</u>

(i) Load flow study is the steady state analysis of power system network. It determines the operating state of the system for a given load generation balance in the system. It helps in determination of loading on transmission elements and helps in planning and operation of power systems from steady state point of view.

(ii) All the elements of transmission network viz. transmission lines, transformers, generators, load, bus reactors, line reactors, HVDC, FACTS etc. are modelled using steady state parameters in the simulation software.

(iii) Load flow solves a set of simultaneous non-linear algebraic equations for the two unknown variables ($|V|$ and $\angle\delta$) at each node in a system. The output of the load flow analysis is the voltage and phase angle, real and reactive power, losses and slack bus power.

<u>Short circuit studies</u>

(i) The short circuit studies shall be carried out using the classical method with flat pre-fault voltages and sub-transient reactance (X''_d) of the synchronous machines.

(ii) For inverter-based generators, the response of an inverter to grid disturbances is a function of the controls programmed into the inverter and the rated capability of the inverter. Wind / Solar / Hybrid plants need to clearly articulate how the inverter would behave during fault events to ensure that the correct response is provided during and immediately following fault conditions. In case of non-availability of data, sub-transient reactance (X''_d) for wind and solar generation may be assumed as 0.85 pu and 1 pu respectively for short circuit studies.

(iii) MVA of all the generating units in a plant may be considered for determining maximum short-circuit level at various buses in system. This short-circuit level may be considered for substation planning.

(iv) Vector group of the transformers shall be considered for doing short circuit studies for asymmetrical faults. Inter-winding reactance in case of three winding transformers shall also be considered. For evaluating the short circuit levels at a generating bus (11 kV, 13.8 kV, 21 kV etc.), the unit and its generator transformer shall be represented separately.

(v) Short circuit level for both, three phase to ground fault, and single phase to ground fault shall be calculated.

(vi) The short-circuit level in the system varies with operating conditions, it may be low for light load scenario as compared to peak load scenario, as some of the plants / unit(s) may not be on-bar. For getting an understanding of system strength under different load-generation / export-import scenarios, the MVA of only those machines shall be taken which are on bar in that scenario.

Transient Stability

Transient stability means the ability of the system to maintain synchronism with other generators following a large disturbance, which depends on system pre-fault condition, fault severity, and the fault clearance manner. Transient Stability Studies are crucial in the planning and operation of power systems. These studies involve the analysis of the system's response to disturbances, such as faults or sudden changes in load, and the determination of the system's ability to maintain stability and recover from these disturbances.

Voltage Stability

Voltage stability is the ability of a power system to maintain steady acceptable voltages at all buses in the system under normal operating conditions and after being subjected to a disturbance. The system enters a state of voltage instability when there is disturbance/increase in load demand/change in system condition which causes a progressive and uncontrollable drop in voltage. The main factor causing instability is the inability of the power system to meet the demand for reactive power.

Voltage instability results in voltage collapse. Voltage collapse is the process by which the voltage falls to a low, unacceptable value as a result of an avalanche of events accompanying voltage instability. Voltage Stability Analysis is important for researchers and power system planners to prevent such incidents from occurring.

3.2.5 Criteria for Contingency

3.2.5.1 General Principles

The transmission system shall be planned considering following general principles:

(i) In normal operation ('N-0') of the grid, with all elements to be available in service in the time horizon of study, it is required that all the system parameters like voltages, loadings, frequency should remain within permissible normal limits.

(ii) The grid may however be subjected to outage / loss of an element and it is required that after loss of an element ('N-1' or single contingency), all the system parameters like voltages, loadings, frequency shall be within permissible normal limits.

(iii) Under outage / loss of an element, the grid may experience another contingency, though less probable ('N-1-1'), wherein some of the equipment may be loaded up to their emergency limits. To bring the system parameters back within their normal limits, load shedding/re-scheduling of generation may have to be done, either manually or through automatic system protection schemes (SPS).

SPS may be planned in high RE generation pockets, high capacity transmission corridors and in areas having high concentration of Bulk loads to relieve impact of credible contingencies and enhance grid security.

3.2.5.2 Permissible normal and emergency limits

(i) Normal thermal ratings and normal voltage limits represent equipment limits that can be sustained on continuous basis. Emergency thermal ratings and emergency voltage limits represent equipment limits that can be tolerated for a relatively short time which may be one hour to two hours, depending on design of the equipment. The normal and emergency ratings to be used in this context are given in subsequent paragraphs.

(ii) The loading limit for a transmission line shall be its thermal loading limit. The thermal loading limit of a line is determined by design parameters based on ambient temperature, maximum permissible conductor temperature, wind speed, solar radiation, absorption coefficient, emissivity coefficient etc. In India, all the above factors and more particularly ambient temperatures in various parts of the country are different and vary considerably during various seasons of the year. However, during planning, the ambient temperature and other factors are assumed to be fixed, thereby permitting margins during operation. Generally, the ambient temperature may be taken as 45 deg Celsius; however, in some areas like hilly areas where ambient temperatures are less, the same may be taken.

(iii) Design of transmission lines with various types of conductors should be based on conductor temperature limit, right-of-way optimization, losses in the line, cost and reliability considerations etc.

(iv) The loading limit for an inter-connecting transformer (ICT) shall be its name plate rating.

(v) During planning, a margin as specified in Paragraph: 3.2.4.10 shall be kept in the above lines/transformers loading limits.

(vi) The emergency thermal limits for the purpose of planning shall be 120% of the normal thermal limits for one hour and 110% of the normal thermal limits for two hours.

(vii) In real time system operation, capacity of transmission line may be assessed through Dynamic Line Loading, however, this may not be used while transmission system planning.

3.2.5.3 Voltage limits

a) The steady-state voltage limits are given below. However, at the planning stage a margin as specified at Paragraph 3.2.4.10 may be kept in the voltage limits.

Voltages (kV_{rms})				
	Normal rating		Emergency rating	
Nominal	**Maximum**	**Minimum**	**Maximum**	**Minimum**
765 (1 pu)	800 (1.05 pu)	728 (0.95 pu)	800 (1.05 pu)	713 (0.93 pu)
400 (1 pu)	420 (1.05 pu)	380 (0.95 pu)	420 (1.05 pu)	372 (0.93 pu)
230 (1 pu)	245 (1.07 pu)	207 (0.90 pu)	245 (1.07 pu)	202 (0.88 pu)
220 (1 pu)	245 (1.11 pu)	198 (0.90 pu)	245 (1.11 pu)	194 (0.88 pu)
132 (1 pu)	145 (1.10 pu)	122 (0.92 pu)	145 (1.10 pu)	119 (0.90 pu)
110 (1 pu)	123 (1.12 pu)	99 (0.90 pu)	123 (1.12 pu)	97 (0.88 pu)
66 (1 pu)	72.5 (1.10 pu)	60 (0.91 pu)	72.5 (1.10 pu)	59 (0.89 pu)

b) Temporary over voltage limits due to sudden load rejection:

i) 800 kV system 1.4 p.u. peak phase to neutral (653 kV = 1 p.u.)
ii) 420 kV system 1.5 p.u. peak phase to neutral (343 kV = 1 p.u.)
iii) 245 kV system 1.8 p.u. peak phase to neutral (200 kV = 1 p.u.)
iv) 145 kV system 1.8 p.u. peak phase to neutral (118 kV = 1 p.u.)
v) 123 kV system 1.8 p.u. peak phase to neutral (100 kV = 1 p.u.)
vi) 72.5 kV system 1.9 p.u. peak phase to neutral (59 kV = 1 p.u.)

c) Switching over voltage limits:

i) 800 kV system 1.9 p.u. peak phase to neutral (653 kV = 1 p.u.)
ii) 420 kV system 2.5 p.u. peak phase to neutral (343 kV = 1 p.u.)

3.2.5.4 Reliability criteria

(i) No contingency ('N-0')

a) The system shall be tested for all the load-generation scenarios as given at Paragraph 3.2.4.3.

b) For the planning purpose all the equipment shall remain within their normal thermal loadings and voltage ratings.

c) The angular separation between adjacent buses shall not exceed 30 degrees.

(ii) Single contingency ('N-1')

Steady-state:

a) All the equipment in the transmission system shall remain within their normal thermal and voltage ratings after outage / loss of any one of the following elements (called single contingency or 'N-1'), but without load shedding / rescheduling of generation:

- Outage of a 132 kV single circuit,
- Outage of a 220 kV single circuit,
- Outage of a 400 kV single circuit (with or without fixed series capacitor),
- Outage of an Inter-Connecting Transformer (ICT) / power transformer,
- Outage of a 765 kV single circuit
- Outage of one pole of HVDC bipole

b) The angular separation between adjacent buses under 'N-1' shall not exceed 30 degrees.

c) 'N-1' criteria for FACTS devices may not be considered, however studies may be carried out to address the issues like reduction in transfer capability, restriction on generation evacuation etc. in case of outage of FACTS devices.

Transient-state:

Usually, perturbation causes a transient that is oscillatory in nature, but if the system is stable, the oscillations will be damped. The system is said to be stable in which synchronous machines, when perturbed, will either return to their original state, if there is no change in exchange of power or will acquire new state asymptotically without losing synchronism. The transmission system shall be stable after it is subjected to one of the following outage / loss:

a) The system shall be able to survive a permanent three phase to ground fault on a 765 kV line close to the bus to be cleared in 100 ms.

b) The system shall be able to survive a permanent single phase to ground fault on a 765 kV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.

c) The system shall be able to survive a permanent three phase to ground fault on a 400 kV line close to the bus to be cleared in 100 ms.

d) The system shall be able to survive a permanent single phase to ground fault on a 400 kV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.

e) In case of 220 kV / 132 kV networks, the system shall be able to survive a permanent three phase fault on one circuit, close to a bus, with a fault clearing time of 160 ms (8 cycles) assuming 3-pole opening.

f) The system shall be able to survive a fault in HVDC convertor station, resulting in permanent outage of one of the poles of HVDC Bipole.

g) Loss of generation: The system shall remain stable under the loss of single largest generating unit or a critical generating unit (choice of candidate critical generating unit is left to the transmission planner).

h) Loss of largest radial load, connected at single point.

(iii) Second contingency (N-1-1)

1. Under the scenario as defined at Paragraph 3.2.5.4 (ii) the system may experience another contingency (called 'N-1-1'):

    a) The system shall be able to survive a temporary single phase to ground fault on a 765 kV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and successful re-closure (dead time 1 second) shall be considered.

    b) The system shall be able to survive a permanent single phase to ground fault on a 400 kV line close to the bus. Accordingly, single pole opening (100 ms) of the faulted phase and unsuccessful re-closure (dead time 1 second) followed by 3-pole opening (100 ms) of the faulted line shall be considered.

    c) In case of 220 kV / 132 kV networks, the system shall be able to survive a permanent three phase fault on one circuit, close to a bus, with a fault clearing time of 160 ms (8 cycles) assuming 3-pole opening.

2. In the 'N-1-1' as stated above, if there is a temporary fault, the system shall not lose the second element after clearing of fault but shall successfully survive the disturbance.

3. In case of permanent fault, the system shall lose the second element as a result of fault clearing and thereafter, shall asymptotically reach to a new steady state without losing synchronism. In this new state, the system parameters (i.e. voltages and line loadings) shall not exceed emergency limits, however, there may be requirement of load shedding / rescheduling of generation so as to bring system parameters within normal limits.

(iv) Radially connected generation with the grid

For the transmission system connecting generator(s) radially with the grid, the following criteria shall apply:

1. The radial system shall meet 'N-1' reliability criteria as given at Paragraph 3.2.5.4 (ii) for both the steady-state as well as transient-state.
2. For subsequent contingency i.e. 'N-1-1' (as given at Paragraph 3.2.5.4 (iii)), only temporary fault shall be considered for the radial system.
3. If the 'N-1-1' contingency is of permanent nature or any disturbance/contingency causes disconnection of such generator(s) from the main grid, the remaining main grid shall asymptotically reach to a new steady-state without losing synchronism after loss of generation. In this new state the system parameters shall not exceed emergency limits, however, there may be requirement of load shedding / rescheduling of generation so as to bring system parameters within normal limits.

(v) The 'N-1' criteria may not be applied to the immediate connectivity system of renewable generations with the ISTS/Intra-STS grid i.e. the line connecting the generation project switchyard to the grid and the step-up transformers at the grid station.

Provided that, 'N-1' criteria shall be applicable in case of renewable generation projects with storage, which are firm in nature and fully dispatchable.

Provided that, 'N-1' reliability criteria may be considered for ICTs at the ISTS / STU pooling stations for renewable energy-based generation of more than 1000 MW after considering the capacity factor of renewable generating stations.

3.2.6 Sub-station Criteria

3.2.6.1 General criteria

(i) The requirements in respect of EHV sub-stations in a system such as the total load to be catered by the sub-station of a particular voltage level, its MVA capacity, number of feeders permissible etc. are important to the planners so as to provide an idea to them about the time for going in for the adoption of next higher voltage level sub-station and also the number of substations required for meeting a particular quantum of load. Keeping these in view, the EHV substation planning criteria have been laid down in this Chapter.

(ii) There may be need for upgradation of the system or renovation and modernization of the existing system depending on technological options and system studies. Therefore, transmission licensee shall provide details to CEA/CTU/STUs of the transmission equipment which are required to be upgraded or for which renovation and modernization needs to be carried out.

(iii) As far as possible, an incoming and an outgoing feeder of same voltage level in a substation may be terminated in bays of same diameter in one and half breaker switching scheme, so as to make direct connection in case of outage of the substation, especially in case of Loop-in Loop-out of existing line(s).

(iv) Line approaching substation shall normally be perpendicular to the substation boundary for a stretch of 2-3 km.

(v) The maximum short-circuit level on any new substation bus should not exceed 80% of the rated short circuit capacity of the substation equipment. The 20% margin is intended to take care of the increase in short-circuit levels as the system grows. The rated breaking current capability of switchgear at different voltage levels may be taken as given below:

Voltage Level	Rated Breaking Capacity
765 kV	50 kA / 63 kA
400 kV	63 kA / 80 kA
220 kV	40 kA / 50 kA / 63 kA
132 kV	25 kA / 31.5 kA / 40 kA
66kV	31.5 kA

Measures such as sectionalisation of bus, series reactor, or any new technology may also be adopted to limit the short circuit levels at existing substations wherever short circuit levels are likely to cross the designed limits.

(vi) Rating of the various substation equipment shall be such that they do not limit the loading limits of connected transmission lines.

(vii) Connection arrangement of switchable line reactors shall be such that it can be used as line reactor as well as bus reactor with suitable NGR bypass arrangement.

3.2.6.2 Transformers

(i) Sub-stations may be classified into two categories i.e. (i) Load Serving Sub-station (LSS); where loads are connected (ii) Generation Pooling Sub-station (GPS); where generating stations are connected directly or through dedicated transmission line for evacuation of their power.

Provided that the substations where both generator(s) and load(s) are connected, shall be treated as load serving sub-station.

(ii) The capacity of any single sub-station at different voltage levels shall not normally exceed as given in column (B) and (C) in the following table:

Voltage Level (A)	Transformation Capacity	
	Load Serving Substation (B)	Generation Pooling substations (C)
765 kV	9000 MVA	9000 MVA
400 kV	2500 MVA	5000 MVA
220 kV	1000 MVA	1000 MVA
132 kV	500 MVA	500 MVA
66 kV	160 MVA	160 MVA

(iii) Size and number of interconnecting transformers (ICTs) shall be planned in such a way that the outage of any single unit would not over load the remaining ICT(s) or the underlying system

Provided that for immediate connectivity of RE plants, Paragraph 3.2.5.4 (v) may be referred.

(iv) While augmenting the transformation capacity at an existing substation or planning a new substation, the fault level of the substation shall also be kept in view. If the fault level is low, the voltage stability studies shall be carried out.

3.2.6.3 Bus- Sectionalisation

(i) To have minimum disruption during struck breaker condition, the bus switching scheme provided in Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 and its amendments or re-enactment thereof shall be implemented.

(ii) Sources and loads should be mixed in each diameter to maximize reliability in 'one and half breaker scheme' during planning of a new substation. Hence, one double circuit line consisting of two numbers feeders and originating from a transmission or generating switchyard shall not be terminated in one diameter. Similarly, termination of two numbers of transformers of identical primary voltage rating in one diameter of 'one and half breaker scheme' shall be avoided so that sudden outage is minimized. Layout and bus switching scheme of a substation shall be planned in such way that it shall have maintainability, operation flexibility, security and reliability.

(iii) Bus switching scheme shall be as per Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 and its amendments or re-enactment thereof. Bus section shall be planned in such a way that feeders are adequately distributed with respect to power flow with bus sectionalizers in open condition. Further, sectionalizer arrangement may be implemented also keeping in view transformation capacity in each section, fault current rating adopted, number of feeders etc.

3.2.6.4 Reactive Power compensation

(i) **General:**

a) Requirement of reactive power compensation through shunt capacitors, shunt reactors (bus reactors or line reactors), static VAr compensators, fixed series capacitor, variable series capacitor (thyristor controlled) or other FACTS devices shall be assessed through appropriate studies.

b) Near to large RE complex(es) synchronous condenser(s) may be planned for dynamic voltage support, in addition to FACTS devices.

c) While planning of bus capacitors/reactors, aspects such as voltage sensitivity due to switching of these devices, size, reliability (contingency) etc. shall be considered.

d) Space provision for converting fixed line reactors/switchable line reactors to be usable as bus reactors after line opening with bypass arrangement for NGR/control switching.

e) RE generators to have provision to operate the generators in voltage control mode, fixed-Q and power factor control mode as per the grid requirements.

f) While planning Bus Reactor (BR), size, reliability aspect (outage of BR), etc. may be taken care of.

(ii) **Shunt capacitors**

a) Reactive Compensation shall be provided as far as possible in the low voltage systems with a view to meet the reactive power requirements of load close to the load points, thereby avoiding the need for VAr transfer from high voltage system to the low voltage system. In the cases where network below 132 kV/220 kV voltage level is not represented in the system planning studies, the shunt capacitors required for meeting the reactive power requirements of loads shall be provided at the 132 kV/220 kV buses for simulation purpose.

b) It shall be the responsibility of the respective utility to bring the load power factor as close to unity as possible by providing shunt capacitors at appropriate places in their system.

c) Reactive power flow through 400/220 kV or 400/132 kV or 220/132(or 66) kV or 220/33 kV ICTs, shall be minimal. Wherever voltage on HV side of such an ICT is less than 0.975 pu no reactive power shall flow down through the ICT. Similarly, wherever voltage on HV side of the ICT is more than 1.025 pu no reactive power shall flow up through the ICT. These criteria shall apply under the 'N-0' conditions. It shall be responsibility of respective STU to plan suitable reactive compensation in their network including at 220 kV and 132 kV levels connected to ISTS, in order to fulfil this provision.

(iii) **Shunt reactors**

a) Bus reactors shall be provided at EHV substations for controlling voltages within the limits (defined in the Paragraph: 3.2.5.3(a)) without resorting to switching-off the lines. The bus reactors may also be provided at generation switchyards to supplement reactive capability of generators. The size of reactors should be such that under steady state condition, switching on and off of the reactors shall not cause a voltage change exceeding 5%. The standard sizes (MVAr) of reactors are:

Voltage Level	**Standard sizes of reactors (in MVAr)**
132 kV (3-ph unit)	12.5 and 25 (rated at 145 kV)
220 kV (3-ph unit)	50, 25 (rated at 245 kV)
400 kV (3-ph unit)	50, 63, 80,125 and 250 (rated at 420 kV)
765 kV (1-ph unit)	80 and 110 (rated at $765/\sqrt{3}$ kV)

b) Fixed line reactors may be provided to control power frequency temporary over-voltage (TOV) after all voltage regulation action has taken place within the limits as defined in Paragraph: 3.2.5.3(b) under all probable operating conditions.

c) Line reactors (switchable/ controlled/ fixed) may be provided if it is not possible to charge EHV line without exceeding the maximum voltage limits given in Paragraph: 3.2.5.3(a). The possibility of reducing pre-charging voltage of the charging end shall also be considered in the context of establishing the need for reactors.

d) The line reactors may be planned as switchable wherever the voltage limits, without the reactor(s), remain within limits specified for TOV conditions given at Paragraph: 3.2.5.3(b).

(iv) **Shunt FACTS devices**

a) Shunt FACTS devices such as Static VAr Compensation (SVC) and STATCOM shall be provided where found necessary to damp the power swings and provide the system stability under conditions defined in the 'Reliability Criteria' (Paragraph 3.2.5.4). As far as possible, the dynamic range of static compensators shall not be utilized under steady state operating condition.

The Static Synchronous Compensator (STATCOM) plays a pivotal role in the ongoing global effort towards decarbonization. As renewable energy sources like solar and wind power become increasingly integrated into the electrical grid, their intermittent and variable nature poses challenges to grid stability. STATCOM provides dynamic voltage support and reactive power compensation, enhancing grid reliability and enabling the seamless integration of renewable energy.

By mitigating voltage fluctuations and maintaining grid voltage within desired limits, STATCOM facilitates optimal operation of renewable sources, reduces curtailment, and minimizes the need for fossil-fuel-based backup generation. Consequently, the deployment of STATCOM technology not only accelerates the transition to a cleaner energy mix but also promotes a more resilient and sustainable energy infrastructure essential for successful decarbonisation strategies.

STATCOMs can provide fault ride-through capability by injecting reactive power during system faults, helping to maintain grid stability and prevent cascading failures.

Calculating the requirement for dynamic compensation in a transmission system involves various steps and considerations as given below:

- Load Flow Analysis: Load flow studies are carried out for various anticipated system operating scenarios (high RE generation, low Re generation, peak, off-peak conditions etc.) to understand the steady-state behaviour of the transmission system.
- Transient Stability Analysis: Assessment of the dynamic behaviour of the transmission system under disturbances to identify potential stability issues in various scenarios.
- Estimation of parameters such as the amount of reactive power support required, voltage regulation requirements, and the expected impact of introducing dynamic compensation.
- Optimize the placement and sizing of the dynamic compensation device to achieve the desired system performance improvements.

(v) **Synchronous Condenser**

a) A synchronous condenser is a synchronous machine operating without a prime mover. Reactive power output regulation of synchronous condenser is performed by regulating the excitation current. The level of excitation determines if the synchronous condenser generates or consumes reactive power. Synchronous Condenser provides improved voltage regulation and stability by continuously generating/absorbing reactive power, improved short-circuit strength and frequency stability by providing inertia.

b) The conventional power stations could be refurbished to a synchronous condenser, thereby potentially reducing initial capital cost. A synchronous condenser consumes a small amount of active power from the system to cover losses. As many gas and coal-based synchronous generators approach the end of their life, the retiring of a plant can possibly create a reactive power deficit at the local network, which may impact voltage stability. The conversion of the existing generator to a synchronous condenser can be potentially economical and effective.

c) Operating Hydro generators in synchronous condenser mode may be a possible way for voltage control with the existing resources, which may be explored to regulate voltage in grid locally and thus preventing the switching of other elements for voltage control purpose, which in turn help in keeping the system reliability intact.

As per Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, hydro generating units having rated capacity of 50 MW and above shall be capable of operation in synchronous condenser mode, wherever feasible.

3.2.7 Additional Criteria

3.2.7.1 Wind / Solar / Hybrid projects

(i) All the generation projects based on renewable energy sources shall comply with Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007, and its amendments or re-enactment thereof, for which requisite system studies shall be carried out by renewable generation project developer.

(ii) Connectivity/GNA quantum shall be considered while planning the evacuation system, both for immediate connectivity with the ISTS/Intra-STS and for onward transmission requirement.

(iii) As the generation of energy at a wind farm is possible only with the prevalence of wind, the thermal line loading limit of the lines connecting the wind farms to the pooling substations may be assessed considering 12 km/hour wind speed.

3.2.7.2 Nuclear power stations

(i) In case of transmission system associated with a nuclear power station, there shall be two independent sources of power supply for the purpose of providing start-up power. Further, the angular separation between start-up power source and the generation switchyard should be, as far as possible, be maintained within 10 degrees.

(ii) The evacuation system shall generally be planned so as to terminate it at large load centres to facilitate islanding of the power station in case of contingency.

(iii) Adequate reactive power compensation shall be provided at generation switchyard so as to maintain power factor in accordance with Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 and its amendments or re-enactment thereof.

3.2.7.3 HVDC Transmission System

(i) The option of HVDC bipole may be considered for transmitting bulk power (more than 2000 MW) over long distance (preferably more than 700 km). HVDC transmission may also be considered in the transmission corridors that have AC lines carrying heavy power flows (total more than 5000 MW) to control and supplement the AC transmission network.

(ii) The ratio of fault level in MVA at any of the convertor station (for conventional current source type), to the power flow on the HVDC bipole shall not be less than 3.0 under any of the load-generation scenarios and reliability criteria mentioned above. Further, in areas where multiple Conventional HVDC bipoles are feeding power (multi infeed), the appropriate studies may be carried at planning stage so as to avoid commutation failure.

3.2.7.4 Resiliency

(i) The IEEE Technical Report PES-TR65 defines resilience as "The ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event". This may also be simply defined as "The ability to protect against and recover from any event that would significantly impact the grid".

(ii) **Resilience v/s Reliability:**

The IEEE defines Reliability as "The probability that a system will perform its intended functions without failure, within design parameters, under specific operating conditions, and for a specific period of time." Further different utilities worldwide have defined and developed different reliability standards for robustness, resourcefulness, rapid recovery and adaptability of their power systems.

The IEEE Technical Report PES-TR83 states that reliability is a system performance measure, and resilience is a system characteristic. Generally better reliability results in better resilience and vice versa. However, in some cases, a highly reliable system may have lower resilience and vice versa. The primary difference between reliability and resilience is that resilience encompasses all events, including "High Impact – Low Frequency" events commonly excluded from the reliability calculations.

(iii) Resilience Evaluation: Several frameworks and methods for advancing resilience evaluation have been developed in the last decade. These frameworks can be grouped into two general categories: qualitative and quantitative frameworks.

a) Qualitative Frameworks: Qualitative frameworks usually evaluate the power system's resilience, along with other interdependent systems, such as information systems, fuel supply chain, and other such infrastructures. These frameworks evaluate resilience capabilities such as preparedness, mitigation, response, and recovery. Qualitative frameworks are appropriate for long-term planning because they provide a comprehensive and holistic depiction of system resilience.

b) Quantitative Frameworks: Quantitative frameworks are based on the quantification of system performance. Resilience is quantitatively evaluated based on the reduced magnitude and duration of deviations from the targeted or acceptable performance. Quantitative resilience metrics should be: 1) performance-related, 2) event-specific, 3) capable of considering uncertainty, and 4) useful for decision-making.

An effective resiliency framework should strive to minimize the likelihood and impacts of a disruptive event from occurring and provides the right guidance and resources to respond and recover effectively and efficiently when an incident happens. This can be accomplished by applying the framework towards assessing and developing a mitigation program with the five main focus areas: Prevention, Protection, Mitigation, Response, and Recovery.

(iv) The Recommended Measures in the "Report of Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution Infrastructure in the Coastal Areas" accepted by Ministry of Power vide letter dated 10th June, 2021 for Creating Resilient Transmission Infrastructure may be referred.

3.2.7.5 Right of Way (RoW)

(i) For laying electricity transmission lines, licensee erects towers at stipulated intervals and conductors are strung on these towers maintaining a safe height depending on the voltage and other geographical parameters. The tower base area and corridor of land underneath the strung conductors between two towers forms RoW. The maximum width of RoW corridor is calculated on the basis of tower design, span, wind speed, maximum sag of conductor and its swing plus other requirement of electric safety.

(ii) In order to reduce RoW, the technological options for reducing the tower footing/base, area/corridor requirements may be explored.

(iii) Central Electricity Authority (Technical Standards for Construction of Electric Plants and Electric Lines) Regulations, 2022, provides that, Right of Way for transmission lines shall be optimized keeping in view the corridor requirement for the future by adopting suitable alternative of multi-circuit or multi-voltage lines as applicable. Following may be adopted to optimise RoW utilisation:

- Application of Series Capacitors, FACTS devices and phase-shifting transformers in existing and new transmission systems to increase power transfer capability.
- Up-gradation of the existing AC transmission lines to higher voltage using existing line corridor.
- Re-conductoring of the existing AC transmission line with higher ampacity conductors.
- Use of multi-voltage level and multi-circuit transmission lines.
- Use of narrow base towers and pole type towers in semi-urban / urban areas keeping in view cost and right-of-way optimization.
- Use of HVDC transmission – both conventional as well as voltage source convertor (VSC) based.

3.3 Consideration of Energy Storage Systems in Transmission Planning

The Energy Storage Systems (ESS) helps to integrate the variable and intermittent RE sources by storing excess energy during surplus RE generation and providing backup power during periods of deficient RE generation.

Integrating ESS with transmission infrastructure reduces the need for transmission infrastructure augmentation, maximizes the use of transmission assets and increases the duration of their usage. ESS also provide other benefits like frequency control, voltage control etc.

3.4 Technological Options

The various technological options are given below:

- ⇨ 765 kV AC, 1200 kV AC transmission system
- ⇨ HVDC/UHVDC (±350 kV, ±500 kV, ±600 kV, ±800 kV)
- ⇨ GIS/Hybrid sub-station
- ⇨ Underground GIS in Cities
- ⇨ High capacity lines with high conductor temperature
- ⇨ Gas Insulated Line (GIL)
- ⇨ Towers with Insulated Cross arm
- ⇨ Series compensation, dynamic reactive power compensation- TCSC, SVC, STATCOM/FACTS, Synchronous condenser

Various technological options are given in detail in Chapter 4.

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Chapter - 4

New Technology Options for Transmission System & Cyber Security

4.1 New Technology Options for Substations:

4.1.1. Hybrid sub-station

Hybrid sub-station can be considered as one of the techno-economically viable solutions for locations where availability of space is a constraint and also for renovation/augmentation of existing sub-stations. Hybrid sub-station can be of outdoor or indoor type. In a hybrid sub-station, the bus-bar is air insulated type. In present day construction technology, switchgear for a hybrid sub-station has some or all of the functional units generally enclosed in SF_6 gas (at suitable pressure) filled housing. A hybrid sub-station requires lesser space than conventional Air Insulated Sub-station (AIS) but comparable with Gas Insulated Sub-station (GIS) based on layout/configuration. Just to cite few examples, hybrid sub-stations have been implemented at 220 kV Hapur and Ghaziabad sub-stations of UPPTCL.

4.1.2. Digital Sub-station

A sub-station is called digital in which the data related to protection, control and monitoring of the primary processes is digitized immediately after the measurement. Technically, digital sub-station refers to a sub-station that employs both IEC 61850 Process Bus and Station Bus in its protection and control architecture. In the digital sub-station, conventional measuring equipment such as current transformers (CTs) and voltage transformers (VTs) are replaced with non-conventional instrument transformers using digitalized sensor technology. Due to unavailability of non-conventional instrument transformers at Extra High Voltage (EHV) level, conventional instrument transformers in conjunction with "merging units" and process bus communications technology are employed, which allow the primary values to be digitalized at process level and be communicated within the sub-station via Ethernet. This new breed of high-performance digital sensors and merging units are much easier to install and can pass digital outputs directly to the process bus and preserve signal integrity. Cost saving by reducing wiring, improved safety, space saving, interoperability, flexible assignment of functions, minimizing cyber security risks etc are the advantages of the digital sub-station.

POWERGRID has commissioned a 400 kV digital sub-station at Malerkotla, Punjab, in December, 2020. The digital sub-station was a case of retrofitting the existing conventional Malerkotla sub-station (commissioned in 1992) with full digital technology.

IEC 61850 Process Bus based Digital substations typically integrate various sensors, intelligent electronic devices (IEDs), and communication networks, increasing the attack surface for potential cyber threats. The complexity of digital substations, with interconnected devices and protocols, can make it challenging to manage and secure effectively. Ensuring the integrity and authenticity of data transmitted and received within the substation network is crucial for reliable operation.

The cybersecurity challenges need to be addressed to ensure the availability, integrity and security of critical infrastructure. Some of the possible solutions to address cybersecurity challenges in digital sub-stations can be- strict access controls and authentication mechanisms to restrict access to authorized personnel only, using multi-factor authentication and role-based access controls; implementing network segmentation to isolate critical systems from less secure networks would reduce the attack surface; continuous monitoring of network traffic and system logs to detect suspicious activities or anomalies in real-time needs to be done, ensuring timely updates and patches for all software and firmware to address known vulnerabilities, educating personnel about cybersecurity best practices and raising awareness.

4.1.3. Fault Current Limiter

In order to meet growing electricity demand, generation capacity addition and strengthening of transmission and distribution (T&D) network is being done in the country. With the addition of huge power generation capacity and increase in number of connecting transmission lines at a bus, fault level at a number of sub-stations is approaching or exceeding existing equipment ratings. High fault current causes severe mechanical and thermal stresses on equipment/material of the power system which could lead to damage and failure of equipment/material.

Fault Current Limiter can be considered as an alternative to conventional method of limiting short circuit levels in existing sub-station where the fault level has exceeded the design limit or is likely to exceed the design limit. These fault-current limiters, unlike reactors or high-impedance transformers, can limit fault currents without adding impedance to the circuit during normal operation. Detailed system studies and techno-economic analysis are required to be carried out for implementation of the Fault Current Limiter at specific locations.

4.1.4. Use of Environmental-friendly gas in place of SF_6 in Circuit Breaker and GIS

Global warming potential of SF_6 gas is very high and it is about 25,200 times warmer than CO_2 and has life span of 3200 years. This huge carbon footprint needs to be reduced by use of SF_6 gas free options/alternative gas mixtures. Such alternatives are already in use in different parts of the world and more encouraging results are envisaged in near future, especially in EHV category. Switching technology using purified air and vacuum is also an environment friendly solution which needs to be adopted for appropriate circuit breaker or gas insulated (SF_6) switchgear.

4.1.5. Voltage Source Converters (VSC) based HVDC

LCC based HVDC system is used for transmitting bulk power over long distances. Losses in LCC based HVDC system is low as compared to VSC based HVDC system due to bulk power transfer at significantly high voltage ($\pm$800 kV) in LCC. However, LCC based HVDC requires significant reactive power support which can complicate integration with weak AC grids, generates significant harmonics and require a larger footprint due to the need for extensive harmonic filters, reactive power compensation equipment and larger valve halls.

VSC based HVDC have several advantages over LCC based HVDC like dynamic reactive power and voltage control (no requirement of additional STATCOM or SVC), grid forming capability, black start capability, fact and flexible power reversal, can be connected to weak networks (eg. RE rich areas having low SCR), synthetic inertia etc. These features of VSC based HVDC systems make them ideal for integrating renewable energy sources.

In terms of initial cost, VSC based HVDC is costly as compared to LCC based HVDC, however, considering the inherent advantages offered by VSC based HVDC, initial cost should not be the only consideration while choosing between VSC and LCC HVDC. VSC based HVDC is scalable i.e. more modules can be added in parallel depending on the power transfer requirement.

VSC based HVDC system is being considered in the country on a case to case basis based on requirement. $\pm$320 kV, 2000 MW VSC based HVDC from Pugalur (Tamil Nadu) to North Trichur (Kerala) is operational in the country. $\pm$320 kV, 1000 MW VSC based HVDC from Aarey (Mumbai) to Kudus is under construction. $\pm$500 kV, 2500 MW VSC based HVDC from Khavda RE park (KPS3) to South Olpad is under bidding.

4.1.6. Resin Impregnated Paper (RIP) and Resin Impregnated Synthetic (RIS) Bushings

Failure of Oil Impregnated Paper (OIP) bushings is one of the major causes of failure of transformers. Use of Resin Impregnated Paper (RIP) bushing is on rise as these bushings are more resilient to fire and less prone to failure. However, these bushings require precautions during storage as these tend to absorb moisture.

RIS bushings are better alternatives which provide a better performance in service. However, these bushings are still under development stage for EHV voltage class.

Use of RIP/RIS bushings for 145 kV, 245 kV and 420 kV class transformers and reactors have already been made mandatory in CEA's "Standard Specification for Transformers and Reactors (66 kV and above voltage class)".

4.1.7. Regulation of Power Flow: FACTS Devices

With integration of huge quantum of renewable energy generation and expansion of electricity grid, there is a need for optimum utilization of existing assets and regulation of power flow. The use of FACTS devices is need of the hour. FACTS devices are of two categories and are connected to the power system either as a parallel/shunt Compensation (most common) or as a series compensation device. Static Var Compensator (SVC) and STATCOM are shunt connected reactive power compensation elements of FACTS family, capable of providing dynamic control of system voltage at the point of connection with the grid. Static Synchronous Compensator (STATCOM) is basically a Voltage Source Converter (VSC) and can act as either a source or sink of reactive power to an electrical network. VSCs operating with the specified vector control strategy can perform independent control of active/reactive power at both ends of the transmission line. This ability of VSC makes it suitable for connection to weak AC networks, i.e. without local voltage sources. Number of STATCOMs have been commissioned in the grid and several have been planned. Similarly, series compensating devices are in operation in Indian Power system either as Fixed Series Compensation (FSC) or as Thyristor Controlled Series Compensation (TCSC).

4.1.8. Containerized Sub-station or Mobile Sub-stations

In the case of any disaster, immediate restoration of power supply, particularly to vital services or installations become one of the prime objectives. The vehicle mounted mobile sub-station [comprising of trailer, incoming and outgoing High Voltage (HV) and Low Voltage (LV) hybrid switchgears, power transformer, and associated connectors] can be put into immediate service as a quick substitute to conventional sub-station of 220 kV and below voltage class to resume power supply in short time in case of emergency/natural or other disasters causing total collapse/disruption of power supply.

Many big industry projects require temporary and fast power supply to feed their expansion needs. Mobile or containerized sub-station may also be used as an alternative for supplying power in such situations, till the time planned sub-station is constructed.

4.1.9. Tank-rupture proof transformers

In general, and especially with increasing concentration of electric power sub-stations in the prime locations within the cities, safety is of paramount importance in the sub-station. A large number of failures related to transformers are attributable to tank rupture/explosion. Depending on the application and place of installation, transformers with "Tank-rupture proof" technology can be used to prevent the potential catastrophic failures to catch fire.

4.1.10. Controlled Switching Devices

Random switching of Circuit Breaker can result in high transient over voltages and / or high inrush current. These transients generate stresses for sub-station and network equipment. Controlled switching devices are now well proven to control switching over voltages during switching of transformers and reactive elements to minimize switching transients and inrush currents. In accordance with the power system requirement and to improve equipment performance and their useful life, as an alternative to Pre-Insertion Resistor (PIR), the circuit breakers of 400 kV voltage class on electric transmission lines of more than 200 km length may be provided with Controlled Switching Devices (CSD). In case of voltages higher than 400 kV, the CSD might be required for shorter lengths also, and the same shall be determined by the studies. Controlled Switching Devices would increase the life of high voltage equipment and enhance power system security.

Use of Controlled Switching Devices for minimizing switching transients and inrush currents in transformers and reactors of 400 kV and above voltage class has been mandated in Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.

4.1.11. Regulation of Power Flow: Phase Shifting Transformer (PST)

In order to achieve the optimum utilization of transmission lines, power flows needs to be regulated which can be achieved by using a Phase Shifting Transformer (PST). Phase-shifting transformer can be used for controlling the power flow through various lines in a power transmission network by changing the effective phase displacement. These transformers are site specific and need to be planned on case to case basis through proper system studies. One phase shifting transformer was installed at Kothagudem Thermal Power station (TPS) in Telangana.

4.1.12. Static Synchronous Series Compensators (SSSC)

The SSSC is a series compensation device that regulates active power flow on meshed networks to increase overall system utilisation. SSSC solutions are installed in series with the transmission line to push power away from the line or to pull power into the line and thereby relieve the line(s) from overloads. The same device can operate in both push and pull modes to meet different network requirements at different times. Optimum network performance can typically be achieved by using a number of smaller installations rather than a single installation. Examples of where this is needed include where there is unequal power flow in parallel circuits having unequal lengths (impedance) or parallel circuits at different voltages. An SSSC injects a voltage in quadrature with the line current. This allows the SSSC to have a similar effect as adjusting the line impedance or changing the phase angle of the line as explained below in the phasor diagrams.

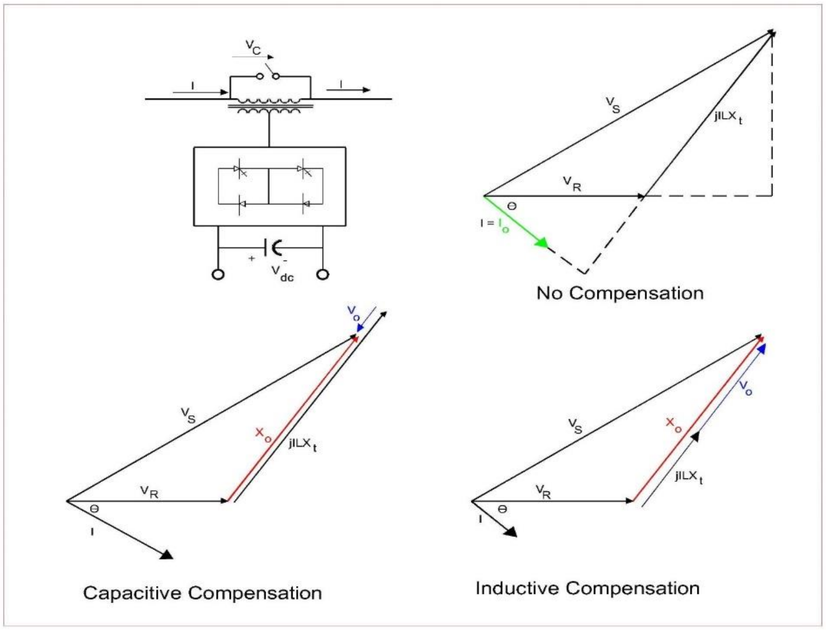

Fig 4.2: Phasor diagram of voltage injections

The SSSC is comparable to a STATCOM but is connected in series with the line rather than shunt connected. Similar to STATCOM, Voltage Source Converters (VSCs) are used to generate a voltage waveform that is injected in quadrature with the line current and a transformer then couples this to the electricity system. The injection leads or lags the line current by 90^0, which has the effect of adjusting the line reactance. The leading or lagging injection determines whether it is increasing or decreasing the line reactance, and therefore whether the SSSC is acting to push active power off an overloaded line or pull on to an under loaded line.

The SSSC solution has been implemented in large scale commercial projects, such as National Grid in the UK where initially 48 devices of Smart Wires patented "Smart Valve" technology have been installed across five circuits.

4.1.13. Grid Forming Inverters

At present, the inverters in the RE generation plants in the Indian power system operate as grid-following sources i.e., the inverter controllers cannot generate AC voltage independently at their terminals, and lock to the phase of the already existing AC voltage. The large RE complexes in the country are mostly coming up at remote locations. The non-availability of grid forming sources (conventional synchronous generators), especially in these remotely located large RE complexes, may significantly delay the restoration of supply in case of any untoward incident. Emerging technologies such as grid-forming inverters can play a pivotal role in the remote renewable energy complexes, offering a host of advantages. One of their key benefits is their capability to initiate a black start, a crucial function for restoring power in case of grid failures. By autonomously re-establishing the grid's operation, grid-forming inverters can minimize downtime, prevent economic losses, and enhance overall grid resilience. These inverters also provide stability to grids which may get weak due to replacement of conventional generation by RE generation. Moreover, these inverters help in maintaining grid frequency and voltage.

4.1.14. Underground Gas Insulated Sub-stations

With increasing power demand, expansion of transmission and distribution system becomes necessary. Keeping in view the limited land availability, especially in urban areas, feasibility of underground Gas Insulated Sub-stations (GIS) must be explored by the Utilities. Underground substations already exist in other countries. KPTCL is exploring the feasibility of setting up an underground GIS in Bengaluru.

4.2 New Technology Options for Transmission Lines:

4.2.1. Insulated Cross Arm (ICA)

Upgrading lines on existing corridors is one of the options to deal with growing electricity demand and can be achieved by modifying towers to handle higher voltages which could be possible with Insulated Cross Arm.

The key benefits of Insulated Cross Arms are that insulator swing under windy conditions is reduced to a minimum. There is no requirement for additional tower height to accommodate the length of the insulator string itself. Therefore, use of insulated cross-arms can effectively raise the height of conductors from ground level, i.e. approximately 4 m in the case of a 400 kV line. Basically, such a solution can resolve ground clearance problems on existing lines, allow for more sag on existing or new conductors, facilitate voltage upgrading due to improved clearances from towers, permit more compact towers with smaller foundations etc. Insulated Cross Arm can also be provided with the Pole type Structures. Use of less foot print and additional ground clearances are the major advantages of using pole type structures with ICA. The ICA with the adoption of High Temperature Low Sag (HTLS) conductor, which have excellent sag characteristics (lesser sag as compared to conventional conductors), can further raise the height of conductor above the ground, which can contribute to voltage up-gradation to higher level, leading to increase in power transfer capability of the line.

At present, the use of insulated cross arm is not much in practice in Indian transmission system, except for a few utilities in the states of Telangana and Kerala. In Kerala, one 66 kV line (50 km) was upgraded to 110 kV using Composite Insulated Cross Arm (CICA), which is in operation since 2007. In Telangana, the steel cross arm of Imlibun-Bandlaguda 132 kV transmission line was replaced in 2019 by CICA to minimize the Right-of-Way (RoW), increase horizontal clearance to buildings and increase ground clearance. The corridor width was reduced by about 4 m and ground clearance was increased by about 2 m. Other utilities are also exploring the possibility of using Insulated Cross Arm on transmission lines. Use of CICA is particularly useful on old transmission lines which could be upgraded to higher than the existing voltage level on the same towers, offering the above stated advantages.

Concept paper on Insulated Cross Arm was prepared by Central Electricity Authority in May, 2021.

4.2.2. EHV XLPE Cable

Due to increasing urbanization and scarcity of land (particularly in densely populated urban areas), it has become very difficult for utilities to construct overhead transmission and distribution lines. RoW issues have always resulted in inordinate delays in execution of transmission projects. To avoid such problems, utilities resort to use of EHV XLPE Cables. Due to technical limitations, the use of XLPE cable at EHV level is restricted to a certain length. The creation of unavoidable joints and terminations are vulnerable to failure, leading to outage of cable system. Gas Insulated Lines (GIL) in certain areas of application is considered to be a good alternative to EHV XLPE cables, especially where normal current/power flow requirement is high and length is short. Manufacturing facilities in respect of XLPE cable upto 400 kV level are available in the country.

4.2.3. High Performance Conductors

The conventional Aluminium Conductor Steel reinforced (ACSR) and All Aluminium Alloy Conductors (AAAC) are currently designed to operate at maximum temperature of 85 ^{0}C and 95 ^{0}C respectively. The thermal limit of the conductor is determined by the fact that further heating results in annealing of the conductor. The ordinary hard drawn aluminium used in conventional ACSR starts annealing and losing strength above 93 ^{0}C, making it unsuitable for usage at higher temperatures. Thus, the ampacity of these conductors is restricted by above mentioned conductor temperature and further enhancement of ampacity is not possible. Ampacity in the same transmission line can be enhanced by use of either higher size conductor or High-Performance Conductors (HPC). High Performance Conductors are designed to operate at temperature higher than that for conventional conductors. Because of their operation at high temperature, these conductors can carry higher current (typically 1.5 to 2 times of the ACSR conductors) without exceeding the size and the weight of existing conductor and offering similar or better tensile strength, hence, allowing use of same structure without any or with minimal modification, resulting into short construction period. Apart from its use in enhancement of power transmission capacity in existing corridor, such conductors could also be used in new lines where higher power flow is required which otherwise is not possible through ACSR or AAAC conductors. HTLS conductors are already in use in India. In February 2019, CEA published a report on “Guidelines for Rationalised Use of High-Performance Conductors”. The report provides the detailed description of High-Performance conductors, ampacity comparison and cost benefit analysis.

4.2.4. Photonic Coating on Conductor

Thermal rating of overhead transmission line conductors limits the transmission capacity, especially at 66/132/220 kV level. Applying photonic coating on the conductors, lowers the operating temperature of the line through increasing thermal radiation and minimising the heat absorbed. With this, the capacity of the line can be increased up to some extent. Sufficient data/study shall be required before adoption of this technology. Further, this technology may be deployed in selected lines considering temperature zone and capacity enhancement requirement.

4.2.5. Covered Conductor

Covered conductors may be one of the solutions for the transmission and distribution lines passing through the forest areas where problem of accidental electrocution of animals is very prominent. Covered conductor will be helpful where there is high probability of trees in forest or densely vegetated areas touching the live conductor due to wind forces. This will avoid frequent outage of the lines and burning of trees.

4.2.6. Dynamic Line Rating (DLR)

The rating (current carrying capacity) of a conductor varies according to the prevalent atmospheric conditions. Factors like ambient temperature, solar irradiance, wind speed etc. impact the rating of a conductor in real time. If the varying weather conditions cannot be monitored in real time, the safest method is to assume the worst-case conditions (which didn’t exist, most of the time) for conductor design and strictly adhere to it, in view of safety requirements.

Amongst all the ambient factors, wind speed is the single most critical parameter to impact the rating of the Conductor/overhead line. Ampacity loading of a conductor with varying wind speed is shown in Fig. 4.1.

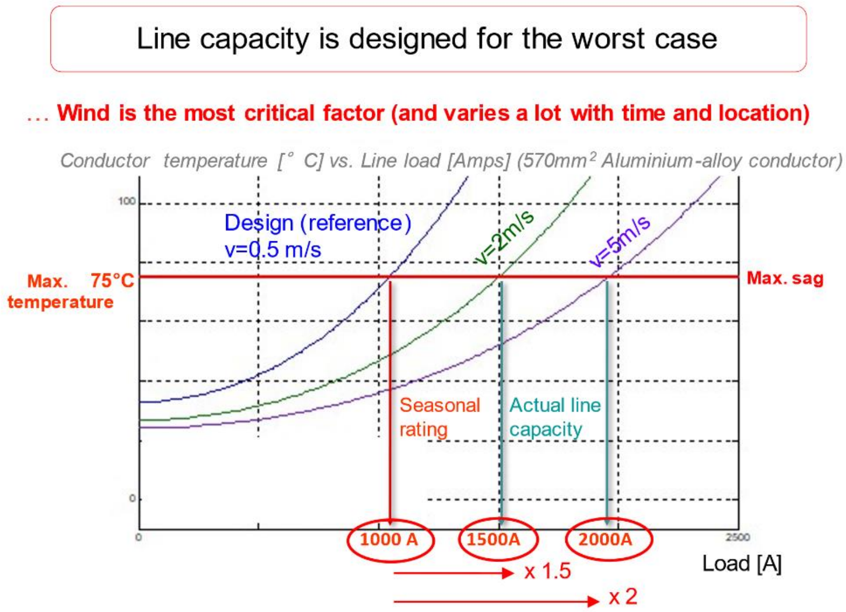

Fig 4.1: Ampacity of conductor vs wind speed

The actual wind speed impacting the conductor in real time helps the conductor dissipate the heat continuously, thereby releasing the additional reserves in capacity. With evolution of technology and innovation, it has been possible to monitor these changes in real time and Dynamic Line Rating (DLR) has been used in Grid Optimization since more than a decade now.

Experience in Europe and other western countries have shown substantial growth in capacities which have been possible due to deployment of proper DLR solutions; in some cases, even 30-40% increase in capacity has been achieved.

DLR solution can be a boon to handle congestion issues immediately as the cost of deploying DLR could be a fraction of other forms of mitigating congestion issues on overhead line. However, it should be noted that DLR is not a substitute for augmentation of transmission lines.

As a pilot project for DLR implementation, Tuticorin- Madurai 400 kV D/c line is being considered.

4.2.7. Monopole structure

In recent years, use of monopole structures are increasing in specific areas due to much reduced footprints, less component and faster erection and commissioning. The benefit of smaller base installation space, even for erection of higher than 40 to 50 m heights, makes monopoles an eco-friendly alternative to lattice towers. Monopoles have distinct advantages over the lattice towers with respect to space, faster erection and short delivery time. In India, monopoles have been installed at several locations. ‘Standard technical specification for steel monopole structure for AC transmission line’ was prepared by CEA in July, 2022.

4.2.8. Introduction of 1200 kV transmission level in India

To connect the bulk load centres with generation resources, high capacity bulk power transmission corridors are being developed on continuous basis. In this process, the next higher voltage level of transmission at 1200 kV needs to be developed. The Ultra High Voltage (UHV) AC level of 1200 kV has several advantages like high power intensity (less Right of Way for same power transfer) and lower losses.

India has already developed 1200 kV UHVAC technology indigenously through establishment of 1200 kV National Test Station, Bina (Madhya Pradesh). The 1200 kV Wardha – Aurangabad line (presently charged as 400 kV D/C line) was also constructed. As a first step towards commercialization of 1200 kV level, the Wardha – Aurangabad line is planned to be upgraded to 1200 kV level.

Large thermal capacity addition is planned in Chhattisgarh and Odisha till 2032. To integrate the new upcoming conventional generations and demand centres in south-eastern part of country, 1200 kV corridor could be planned. Likely 1200 kV corridor could be from Champa (Chhattisgarh) to Sundargarh (Odisha) which may be further extended to Srikakulam (Andhra Pradesh) via Bolangir (Odisha). Several other high-capacity corridors are also being identified to meet the future power transmission requirement, supplementing the 765 kV, 400 kV AC voltage levels and HVDC systems.

4.2.9. Gas Insulated Lines (GIL)

Gas-insulated transmission lines (GIL) is an established high voltage technology used when environmental or structural considerations restrict the use of overhead transmission lines. Due to the special structure of GIL, its cost is six to eight times higher than that of ordinary overhead lines. Therefore, Gas Insulated Lines are generally used in short lengths within substations, in densely populated areas or to connect industrial/power plants to the transmission network.

4.2.10 Travelling Wave Fault locating Technology

Fast and accurate fault locating on transmission lines is of great value to power transmission asset owners and operators. Faults on overhead transmission lines cause transients that travel at the speed of light and propagate along the power line as traveling waves. Traveling-wave fault-locating technology calculates fault locations by measuring the arrival times of the naturally occurring traveling waves caused by a transmission line fault. This provides much greater accuracy than traditional impedance-based methods.

For example, on a 300 km line, impedance-based fault locating (typically accurate to about 2 percent of the line length) would require the visual inspection of approximately 6 km of the line. Traveling-wave-based fault locating can estimate the fault location to within 300 m, independent of the line length which is about one tower span for the typical overhead transmission line.

Travelling wave fault fault-locating technology can accurately locate fault in hybrid lines comprising of both overhead conductor and underground cable sections.

4.3 New Technology Options for Communication Equipment in Transmission System:

4.3.1 OPGW based Communication

Communication System plays a critical role in ensuring safe, secure, stable and reliable operation of the grid as well as economical and integrated operation of the grid. Power System in the country is expanding rapidly with increased number of interconnections between regions, integration of RE, and emergence of Smart Grid applications.

In addition, Indian Grid is characterized by wide power flow variation due to daily/monthly/seasonal variation in demand/ generation. As a result, the complexity in grid operation has increased manifold, which necessitates dynamic monitoring of grid parameters/conditions on real-time basis. The existing Supervisory Control and Data Acquisition (SCADA) System/Energy Management System (EMS) provides data which is steady state in nature and not suitable for dynamic monitoring and control of the Grid due to high degree of latency of tele-metered data and also non-synchronized sampling of data. Technologies like Phasor Measurement Unit (PMU), Wide Area Measurement (WAM) system provide dynamic monitoring of network on real time basis. Monitoring through the said measurements shall facilitate development of various control, regulation and preventive features like Remedial Action Schemes (RAS), System Integrated Protection Scheme (SIPS), Adaptive Islanding, self-healing grid etc. In addition to these, utilities are moving towards more advanced monitoring with Asset Management. These technologies require a highly reliable communication system with high bandwidth and low latency.

While Power Line Carrier Communication (PLCC) based communication system has been a reliable technology for distance protection, it falls short of meeting bandwidth requirement of current differential protection for transmission lines and other communication services. The Fiber Optic based communication system, viz. optical ground wire (OPGW), underground fiber optic (UGFO) cable and all-dielectric self-supporting (ADSS) fiber optic cable being widely adopted nowadays are capable of meeting this high bandwidth requirements of power system for its reliable and stable operation.

Considering above aspects, in all upcoming transmission lines of 110 kV and above, use of OPGW has been mandated in CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022.

4.3.2 Communication Equipment and DC Power Supply

With wider adoption of fiber optic communication to achieve the high bandwidth requirement of power system communication services, associated terminal equipment such as Synchronous Digital Hierarchy (SDH), Plesiochronous Digital Hierarchy (PDH) etc are being used. Unlike PLCC equipment, this terminal equipment offers higher data rate and requires less input power. In addition, these equipment offer the advantage of linking multiple directions into the same terminal equipment.

Optical terminal equipment has been evolving from circuit switching technologies like SDH and PDH to packet switching technologies like Multi-Protocol Label Switching (MPLS) which use routers to transmit and receive data. Packet switching technologies offer advantages of dynamic routing, scalability and bandwidth provisioning over circuit switching technologies. With MPLS technology already tried, tested and evolved in telecom domain, power utilities are eyeing for migration from SDH technology to MPLS technology in power system operation. In spite of the fact that SDH is an established technology in power sector for data communications and tele-protection services, MPLS technology is being evaluated by the power utilities as a replacement to the legacy system. Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020, also contains provision pertaining to introduction and adoption of new technologies.

The above communication equipment mostly operate at 48 V DC power supply and ensuring continuous DC supply is important for uninterrupted data transfer. Reliable 48 V DC Power Supply is to be planned in a comprehensive manner to cater to all the communication applications instead of multiple supply systems. This will optimize space and avoid multiple systems in a sub-station/control centre.

4.4 Surveying Technologies

4.4.1 Pre-construction survey is essential for the construction of transmission lines/sub-stations. It helps in identifying the shortest possible route of the transmission line and number of towers required along the route. Owing to the time-consuming nature and inaccuracy of conventional surveying techniques such as walkover surveys, utilities may explore the use of Light Detection and Ranging (LiDAR) technology and drones for surveys, topographic mapping etc. to assess potential site locations, design site layouts, generate 3D visualizations and make RoW estimations.

Further, helicopters/drones equipped with LiDAR, thermo-vision cameras and corona cameras can be used for aerial patrolling, operations and maintenance of transmission lines and towers.

4.5 Cyber Security

To ensure reliability of power supply and reduce the impact of disturbances, automation is a must. However, with increasing digitization/automation, cyber security becomes equally important. Without cyber security, cyber- attacks could easily infiltrate the electricity grid and bring forth devastating consequences like blackout in concentrated or large areas.

The Indian electricity grid comprises of Generators, Transmission and Distribution systems and the consumers of the electricity. The supervision of electricity grid and coordination with different utilities is being carried out by the respective Load Despatch Centres (LDCs) as per their jurisdiction at various hierarchical level at state, regional and national level.

Cyber Security plays a very important role in smooth operation of the grid. To ensure that the electricity grid is resilient to cyber-attacks, following steps have been taken by the Government:

a. As per sub section (4) of Section 70(B) of the Information Technology Act 2000, Indian Computer Emergency Response Team (CERT-In) has been designated as the National Agency to collect, analyse and disseminate information on cyber incidents in the country. CERT-In also issues alerts and advisories regarding latest cyber threats/vulnerabilities and counter measures to protect computers and networks on a regular basis.

b. **Sub-sector Specific CERTS:** For necessary coordination of Cyber Security preparedness of respective sectors with CERT-In, Ministry of Power has established six sub-sector-specific Computer Emergency Response Teams (CERTs) to detect and respond to cybersecurity incidents-(i) CERT Thermal, (ii) CERT Hydro (iii) CERT Renewable Energy (iv) CERT Transmission (v) CERT Grid Operation and (vi) CERT Distribution.

c. **CEA (Cyber Security in Power Sector) Guidelines 2021:** Central Electricity Authority (CEA) has issued "CEA (Cyber Security in Power Sector) Guidelines 2021" in October, 2021, which serves as a roadmap for cybersecurity readiness in the power sector. By adhering to these guidelines, which are now part of IEGC 2023, power companies can ensure the integrity and resilience of their critical systems, mitigating the risk of cyber-attacks.

d. **Implementation of Cyber Crisis Management Plan:** Each power sector utilities have developed their own Cyber Crisis Management Plans (C-CMPs) based on customized C-CMP developed for each sub-sector by their Sectoral CERTs, to ensure quick response and recovery.

e. **Establishment of National Critical Information Infrastructure Centre (NCIIPC):** IT Act recognizes the concept of "Critical Information Infrastructure" (CII) in the form of Section 70A wherein the nodal agency designated by central government shall be responsible for all measures including R &D related to protection of CIIs. The Designated agency NCIIPC (National Critical Information Infrastructure Protection Centre) shall identify certain computer systems, networks, or databases as CII based on factors like their significance to the national security, economy, public health, or safety for further approval thereof by the appropriate government for notifying them as Protected System. NCIIPC provides expert guidance to mitigate and prevent cyber incidents to protect Critical Information Infrastructure.

f. **Notification of CSIRT-Power:** Ministry of Power vide Office Order dated 05.04.2023 has decided to set up Computer Security Incident Response Team-Power (CSIRT-Power) at CEA, specifically for Power Sector and to function as an extended arm to CERT-In to coordinate and support the response to cyber security incidents that occur in Power Sector and hand-hold utilities for preventing, detecting, handling, and responding to cyber security incidents. CSIRT-Power provides expert guidance to mitigate and prevent cyber incidents to protect Critical Information Infrastructure. All Power Sector utilities need to report to CSIRT-POWER along with CERT-IN, while dealing with activities related to Cyber Security.

g. **Establishment of Disaster Recovery Plan**: For ensuring cyber security, disaster recovery, redundancy and business continuity, comprehensive Disaster Recovery and backup plan have been setup. All five regional grid centers along with National Load Dispatch Center along with State Load Dispatch Centers are having functional backup setup in geographically distant locations.

h. **Laying down the Cyber security framework for power sector** - Nomination of CISOs and Alternate CISOs, Identification of CIIs, Cyber Security Audit, Cyber security awareness, Cyber security training programs, formation of Information Security Division (ISD) among others.

i. **Establishment of Security Operations Center (SOC)**: GRID-INDIA has established a 24x7 Security Operations Center. Logs from various devices of the non-critical IT, critical IT and selected OT systems are continuously being collected and monitored in the SOC. Various Artificial Intelligence (AI)/ Machine Learning (ML) based automated response techniques have been adopted to mitigate cyber incidences and vulnerabilities observed in SOC. Government of India have set up the National Cyber Coordination Centre (NCCC) to generate necessary situational awareness of existing and potential cyber security threats.

j. **Cyber Swachhta Kendra (CSK) (Botnet Cleaning and Malware Analysis Centre)**: All Utilities of Power Sector have been directed by Ministry of Power to on-board Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) of CERT-In. The CSK issues Fortnightly Situational Awareness Report (SAR) for the Power Sector wherein utility wise as well as sub sector wise events observed during a period of fifteen days are reported. These events / observations which are reported are classified under following heads viz. Exposed Service, Open Service, Weak Encryption, DDOS Potential, Vulnerable Service and Malware Infection. The affected utilities/ Sub-Sectoral CERTs are communicated about the alerts from CSK, which in turn submit the corresponding Action Taken Reports to CSK, CISO-MOP. CSIRT-Power also handholds the utilities in mitigating such reported events.

k. Alerts and advisories are regularly issued to organizations and sub-sectoral CERTs by CERT-In and NCIIPC, IB and MHA for taking countermeasures and to pre-empt emerging cyber-attacks. CSIRT-Power handholds the utilities in mitigation of such reported events.

l. **Mock Drills:** Cyber security mock drills in co-ordination with CERT-In, NCIIPC are being conducted regularly by utilities of Power Sectors.

m. **Training:** As per clause 8(d), CEA (Cyber Security guidelines for Power Sector), 2021, utilities have been mandated to ensure that all personnel engaged in O&M of IT and OT Systems to mandatorily undergo courses on cyber security of Power Sector from the designated training institutes.

n. **Cyber Supply Chain Risk Management**: Ministry of Power vide Order No. 25-11/6/2018-PG dated 02-07-2020, as amended till date, has directed that all equipment, components, and parts imported for use in the power supply system and network should be tested in the country to check for any kind of embedded malware/trojans/cyber threats and for adherence of Indian Standards. Ministry of Power issued an Order No. 12/34/2020-T&R dated 08.06.2021 notifying Central Power Research Institute (CPRI) as the nodal agency for testing imported power system equipment for cyber security. Further the order stated about the designated laboratories and the products for which cyber security conformance testing is to be undertaken.

   As per article 9 (e) of CEA (Cyber Security guidelines for Power Sector), 2021, utilities have been mandated to ensure that the equipment/system supplied by the successful bidder accompanies with a certificate obtained by OEM from a certification body accredited to assess devices and process for conformances to IEC 62443-4 standards during design and manufacture. The utility shall accept the certificate submitted along with the supplied equipment/system only if it is in line with the Testing Protocol as notified by Ministry of Power, Government of India, from time to time.

o. **Cyber Security Coordination Forum:** Clause 53 of IEGC 2023, mandates each Sub-Sectoral CERT of Power Sector to form a Cyber Security Coordination Forum (CSCF) with members from all concerned utilities and other statutory agencies to coordinate and deliberate on the cyber security challenges and gaps at appropriate level. It even mandates to form sub -committees at Regional level as well. CERT-Grid Operation (Grid India) has already formed such CSCF and CISO-MoP is a member of its Central Committee.

p. **Cyber Security Audit:** As per Article 14 of CEA (Cyber Security guidelines for Power Sector), 2021, IT audit is mandated half yearly while OT audit is mandated annually through a CERT-In empanelled auditor. It also mandates that utilities need to close all critical and high vulnerabilities within a period of one month, and medium as well as low non-conformity before the next audit.

q. **Cyber Security Regulations in Power Sector:** CEA is currently preparing draft Cyber Security Regulations for the Power Sector and the same shall be floated for public comments shortly.

4.6 Skill Development

Skill development in the Indian transmission sector is crucial for supporting the country’s expanding transmission infrastructure. Skilled labour/technicians in the field of erection, commissioning and O&M is very much required. The skill set should be developed in a systematic manner and institutional arrangements should be made for promoting the skills on a regular basis. Further, with the introduction of advanced technologies such as Smart Grid systems, automation in the transmission sector, cyber security etc. there would be requirement of skilled professionals to design, implement, and manage these technologies effectively. Suitable government programs, industry partnerships, and specialized training initiatives could address this need by providing targeted education/training and certification. Progressive steps such as establishment of training centres in various regions, including rural areas, to ensure broad access to skill development resources and raising awareness about career opportunities in the transmission sector etc. could be taken. The transmission companies and state utilities could partner with technical colleges and universities to offer specialized training programs and internships. Skill development is essential for development of transmission sector and by investing in training and education, the sector can build a capable workforce ready to tackle the challenges of modernizing and expanding the transmission network. The experienced professionals may be retained as trainers.

Note: All the references (Concept paper, reports, guidelines, regulations etc.) prepared by CEA are available on CEA's website (cea.nic.in).

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Chapter - 5

Analysis and Studies for 2026-27

5.1 Introduction

5.1.1 Expansion of the transmission system depends on the projected electricity demand and the generation capacity addition. For planning of transmission system, peak electricity demand projection, demand variations over various seasons/months during a year as well as daily variations in electricity demand are required as the flow on transmission lines keep on varying based on load-generation scenarios throughout the year. With high share of RE in the grid, the RE generation pattern is also equally important in planning of transmission system as power flow on the transmission lines may totally change and a net exporting region/state during high RE generation scenario may become a net importing region/state in low RE generation scenario.

5.2 Electricity Demand Projections for 2026-27

5.2.1 The Electric Power Survey (EPS) Report gives the projections of annual electricity demand. The all-India, region-wise and state-wise electricity demand as per the revised 20th EPS Report (draft) has been considered in the studies and the same is given in Table 5.1.

Table – 5.1: Forecast of Annual Peak Electricity Demand for 2026-27 as per revised 20th EPS Report (draft)

Region	Peak Electricity Demand 2026-27 (MW)	Electrical Energy Requirement 2026-27 (MU)
Northern Region	101054	583920
Western Region	93126	619750
Southern Region	81752	502982
Eastern Region	37497	234404
North-Eastern Region	4393	24963
all- India	**295601**	**1966021**

5.2.2 State-wise projections of peak electricity demand for the year 2026-27 as per the revised 20th EPS Report (draft) is given in Table 5.2.

Table – 5.2: State-wise forecast of Annual Peak Electricity Demand for 2026-27 as per revised 20th EPS Report (draft)

Northern Region		
State	**Peak Electricity Demand (MW)**	**Electrical Energy Requirement (MU)**
Chandigarh	492	1928
Delhi	9460	42566
Haryana	16337	79332
Himachal Pradesh	2571	15238
Jammu & Kashmir	3566	22507

Ladakh	85	321
Punjab	17698	82735
Rajasthan	23383	133550
Uttar Pradesh	36499	185602
Uttarakhand	3122	20143
Total (Northern Region)	**101054**	**583920**
Western Region		
State	**Peak Electricity Demand (MW)**	**Electrical Energy Requirement (MU)**
Chhattisgarh	7661	49561
DNH & DD	1766	12996
Goa	901	5863
Gujarat	30873	182507
Madhya Pradesh	22400	128844
Maharashtra	36775	239980
Total (Western Region)	**93126**	**619750**
Southern Region		
State	**Peak Electricity Demand (MW)**	**Electrical Energy Requirement (MU)**
Andhra Pradesh	16262	101444
Karnataka	20066	109081
Kerala	6197	36318
Lakshadweep	13	72
Puducherry	582	3909
Tamil Nadu	23013	149323
Telangana	19529	102835
Total (Southern Region)	**81752**	**502982**
Eastern Region		
State	**Peak Electricity Demand (MW)**	**Electrical Energy Requirement (MU)**
Andaman & Nicobar	70	406
Bihar	10553	53067
DVC	4507	32647
Jharkhand	2641	17713
Odisha	7630	48627
Sikkim	159	819
West Bengal	13973	81127
Total (Eastern Region)	**37497**	**234404**
North Eastern Region		
State	**Peak Electricity Demand (MW)**	**Electrical Energy Requirement (MU)**
Arunachal Pradesh	218	1176
Assam	2908	15151

Manipur	305	1363
Meghalaya	452	2711
Mizoram	204	1252
Nagaland	202	1088
Tripura	542	2222
Total (North Eastern Region)	**4393**	**24963**

5.2.3 Region-wise growth in Electricity Demand

Region-wise growth of peak electricity demand from 2016-17 to 2026-27 is given in Table 5.3 and depicted in Figure 5.1. Peak electricity demand in the year 2024-25 (April- June, 2024) has been 2,49,856 MW.

Table – 5.3: Region-wise growth of peak electricity demand from 2016-17 to 2026-27

Region	Peak Electricity Demand (Actual) in 2016-17 (MW)	Peak Electricity Demand (Actual) in 2021-22 (MW)	Projected Peak Electricity Demand in 2026-27 (MW) as per revised 20th EPS Report (draft) (MW)
Northern Region	53372	73305	101054
Western Region	48531	65433	93126
Southern Region	42232	61138	81752
Eastern Region	18908	26019	37497
North-Eastern Region	2487	3427	4393
all India	**159542**	**203014**	**295601**

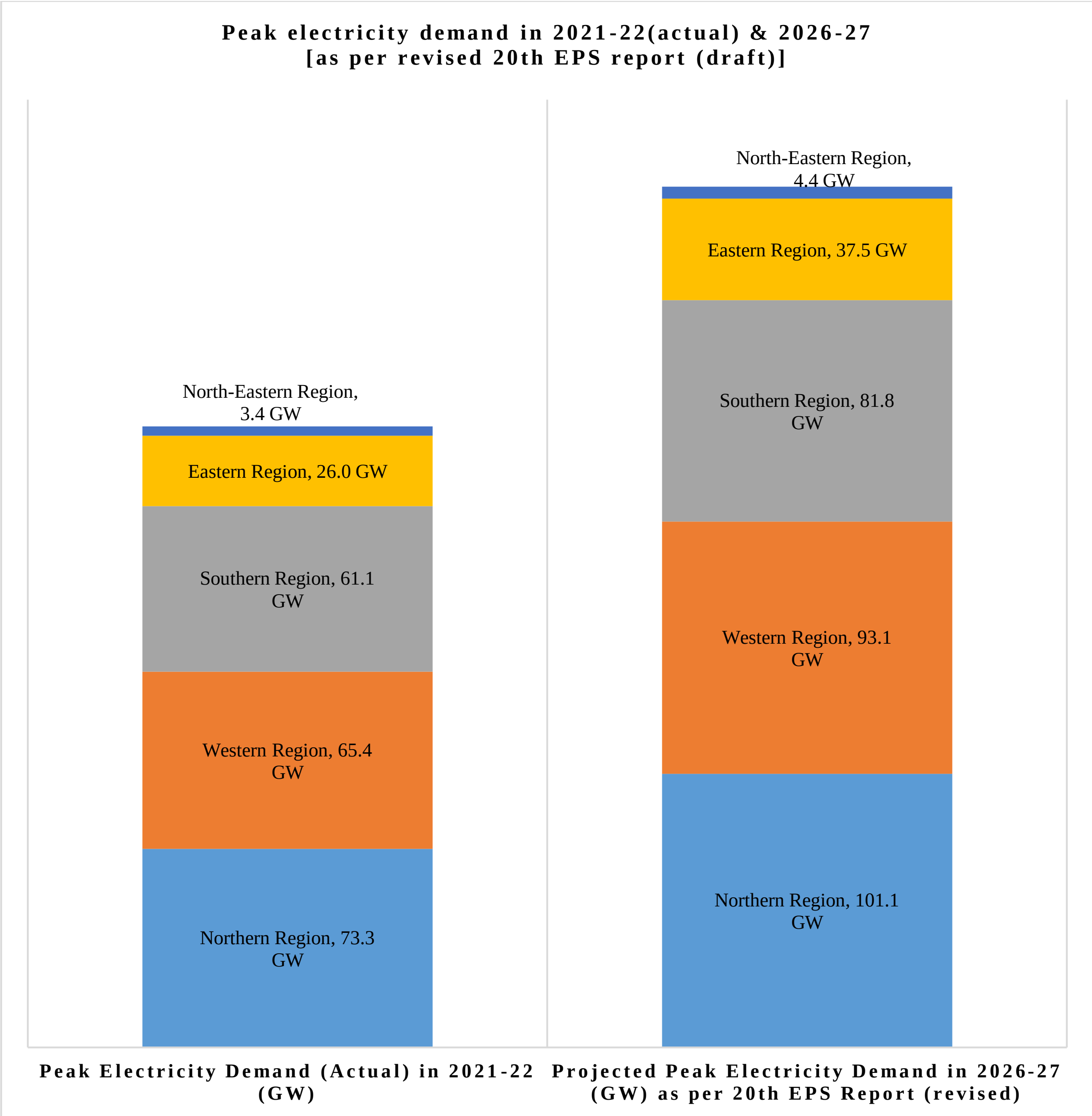

Fig 5.1: Region-wise peak electricity demand in 2021-22 & 2026-27

5.2.4 Growth in Peak Electricity Demand: State-Wise

The state-wise growth of peak electricity demand from 2016-17 to 2026-27 is given in Table 5.4.

Table – 5.4: State-wise growth of Peak Electricity Demand

Northern Region			
State	**Peak Electricity Demand (Actual) in 2016-17 (MW)**	**Peak Electricity Demand (Actual) in 2021-22 (MW)**	**Projected Peak Electricity Demand in 2026-27 (MW) as per revised 20th EPS Report (draft)**
Chandigarh	361	426	492
Delhi	6342	7323	9460
Haryana	9262	12120	16337

Northern Region			
State	**Peak Electricity Demand (Actual) in 2016-17 (MW)**	**Peak Electricity Demand (Actual) in 2021-22 (MW)**	**Projected Peak Electricity Demand in 2026-27 (MW) as per revised 20th EPS Report (draft)**
Himachal Pradesh	1499	2030	2571
Jammu & Kashmir	2675*	3076*	3566
Ladakh			85
Punjab	11408	13556	17698
Rajasthan	10613	15784	23383
Uttar Pradesh	17183	24965	36499
Uttarakhand	2037	2468	3122
Northern Region	**53372**	**73305**	**101054**

*Including the peak electricity demand of UT of Ladakh

Western Region			
State	**Peak Electricity Demand (Actual) in 2016-17 (MW)**	**Peak Electricity Demand (Actual) in 2021-22 (MW)**	**Projected Peak Electricity Demand in 2026-27 (MW) as per 20th EPS Report (revised)**
Gujarat	14724	19451	30873
Madhya Pradesh	11512	15917	22400
Chhattisgarh	3875	5019	7661
Maharashtra	22516	28075	36775
Goa	546	703	901
DNH & DD	1118	1262	1766
Western Region	**48531**	**65433**	**93126**

Southern Region			
State	**Peak Electricity Demand (Actual) in 2016-17 (MW)**	**Peak Electricity Demand (Actual) in 2021-22 (MW)**	**Projected Peak Electricity Demand in 2026-27 (MW) as per 20th EPS Report (revised)**
Andhra Pradesh	7969	12551	16262
Karnataka	10261	14830	20066
Kerala	4132	4374	6197
Lakshadweep	8	11	13
Puducherry	371	469	582
Tamil Nadu	14823	16891	23013

Southern Region			
State	Peak Electricity Demand (Actual) in 2016-17 (MW)	Peak Electricity Demand (Actual) in 2021-22 (MW)	Projected Peak Electricity Demand in 2026-27 (MW) as per 20th EPS Report (revised)
Telangana	9187	14163	19529
Southern Region	**42232**	**61138**	**81752**

Eastern Region			
State	Peak Electricity Demand (Actual) in 2016-17 (MW)	Peak Electricity Demand (Actual) in 2021-22 (MW)	Projected Peak Electricity Demand in 2026-27 (MW) as per 20th EPS Report (revised)
A&N Islands	40	60	70
Bihar	3883	7154	10553
DVC	2721	3355	4507
Jharkhand	1498	1887	2641
Odisha	4012	5643	7630
Sikkim	112	133	159
West Bengal	7931	9089	13973
Eastern Region	**18908**	**26019**	**37497**

North-Eastern Region			
State	Peak Electricity Demand (Actual) in 2016-17 (MW)	Peak Electricity Demand (Actual) in 2021-22 (MW)	Projected Peak Electricity Demand in 2026-27 (MW) as per 20th EPS Report (revised)
Arunachal Pradesh	148	197	218
Assam	1673	2126	2908
Manipur	163	258	305
Meghalaya	331	408	452
Mizoram	98	169	204
Nagaland	148	173	202
Tripura	284	328	542
North-Eastern Region	**2487**	**3427**	**4393**

5.3 Monthly Variation of Peak Electricity Demand

5.3.1 The electricity demand varies on a diurnal, monthly and seasonal basis throughout the year. In India, there are distinct time periods of peak (peak load) and off-peak (base load) electricity demand during a year. The region-wise and state-wise plot of monthly peak electricity demand (in %) for the year 2021-22 is depicted in Figures 5.2 - 5.7:

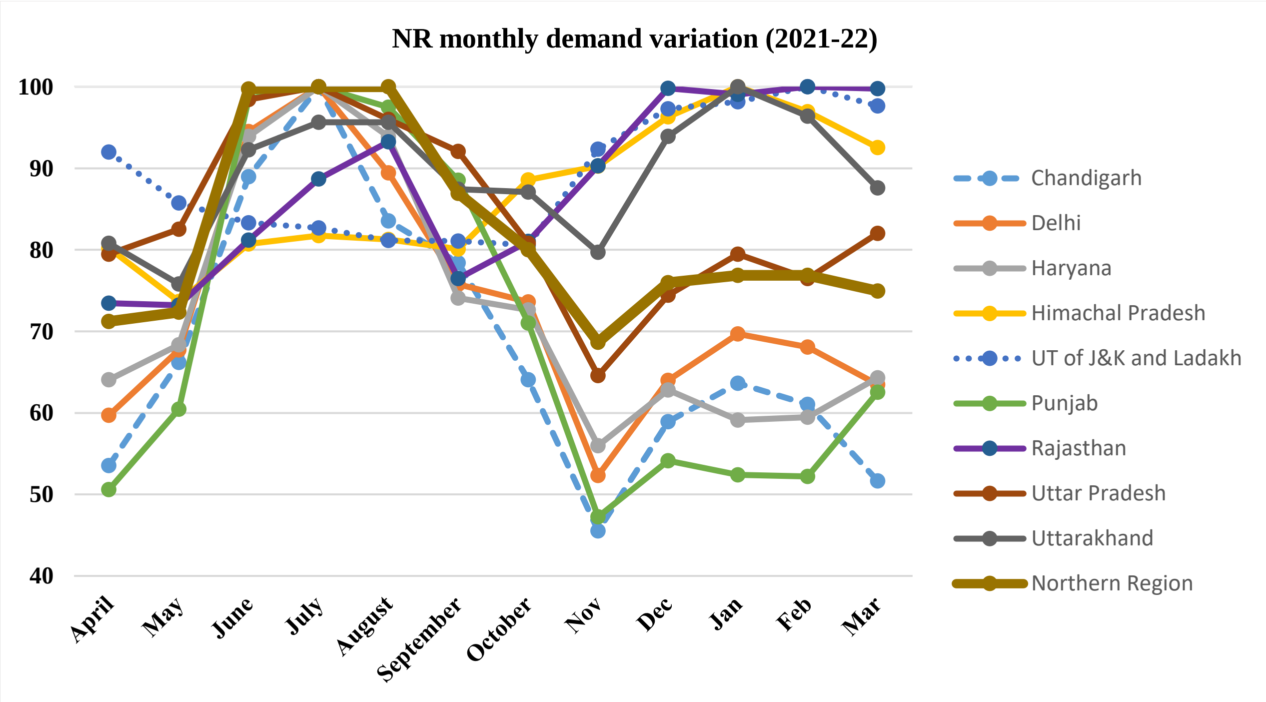

Fig. 5.2: NR monthly demand variation 2021-22

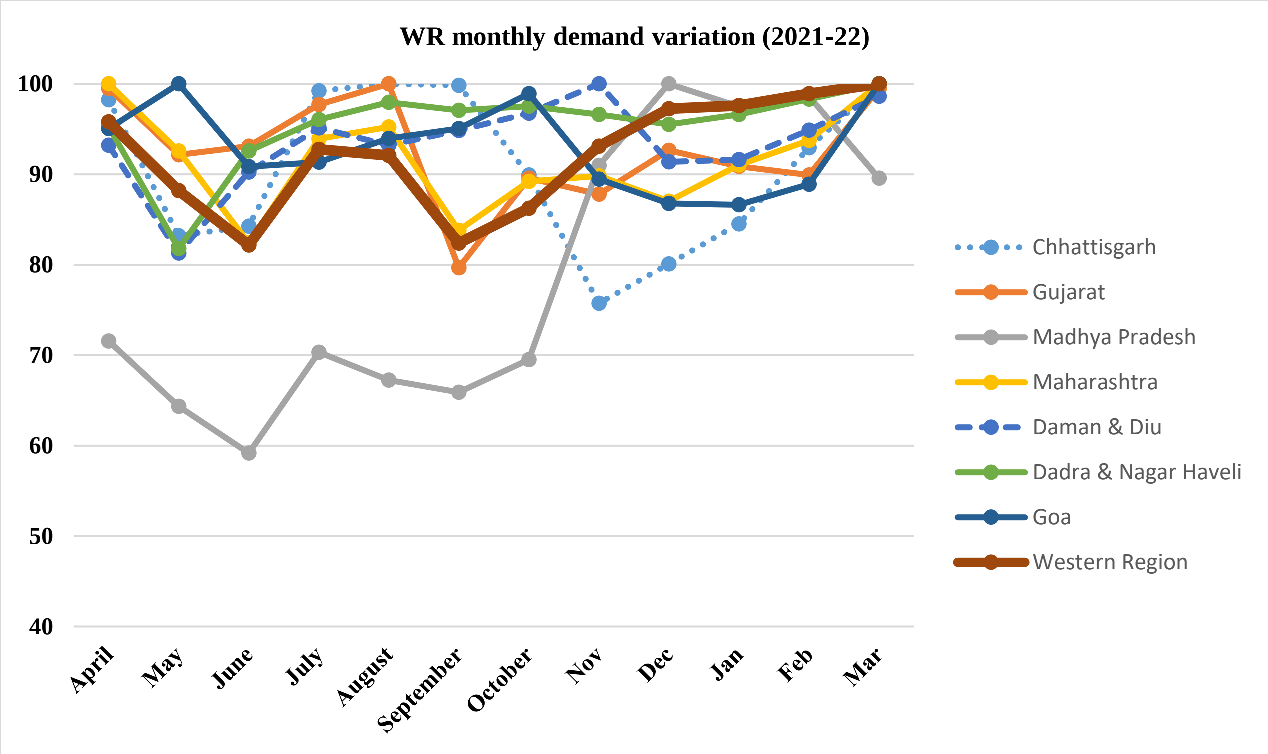

Fig. 5.3: WR monthly demand variation 2021-22

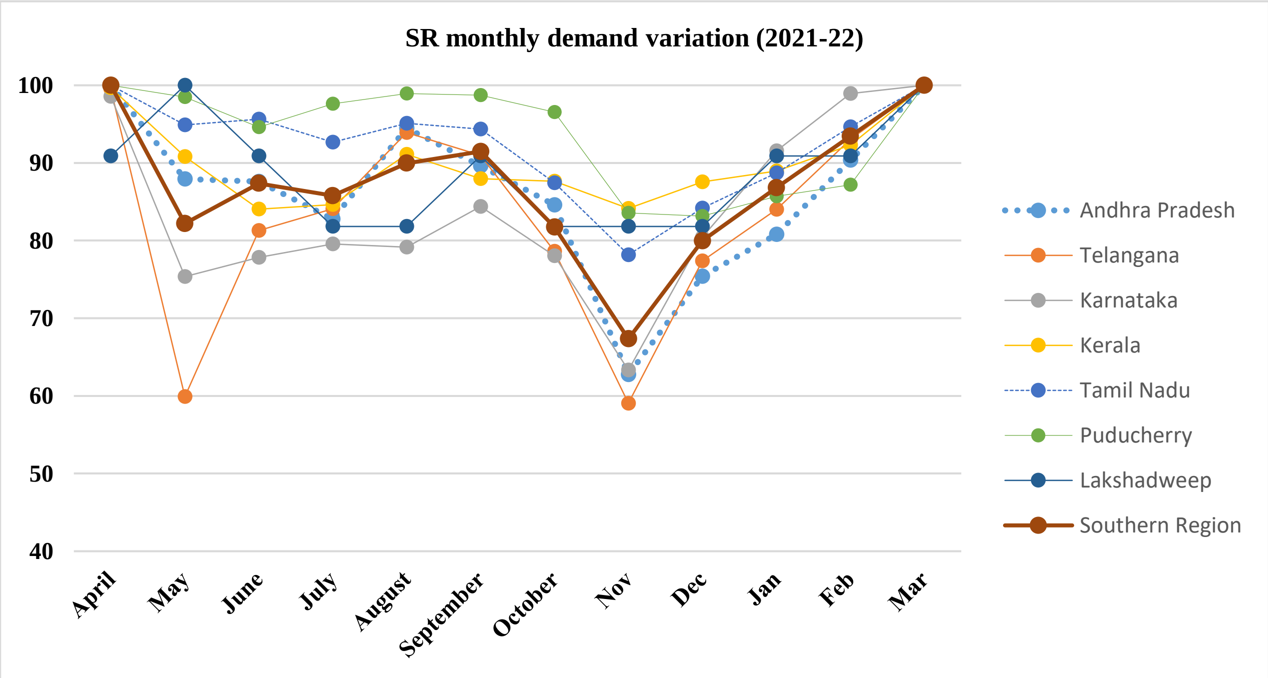

Fig. 5.4: SR monthly demand variation 2021-22

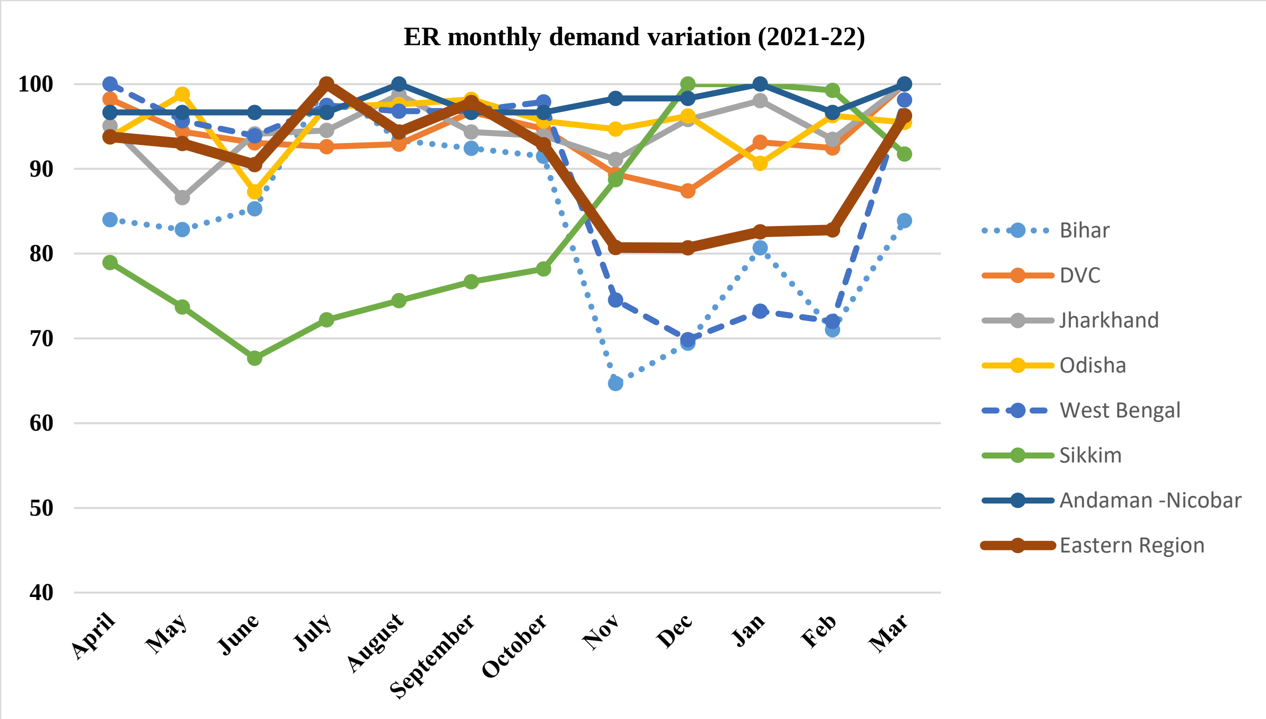

Fig. 5.5: ER monthly demand variation 2021-22

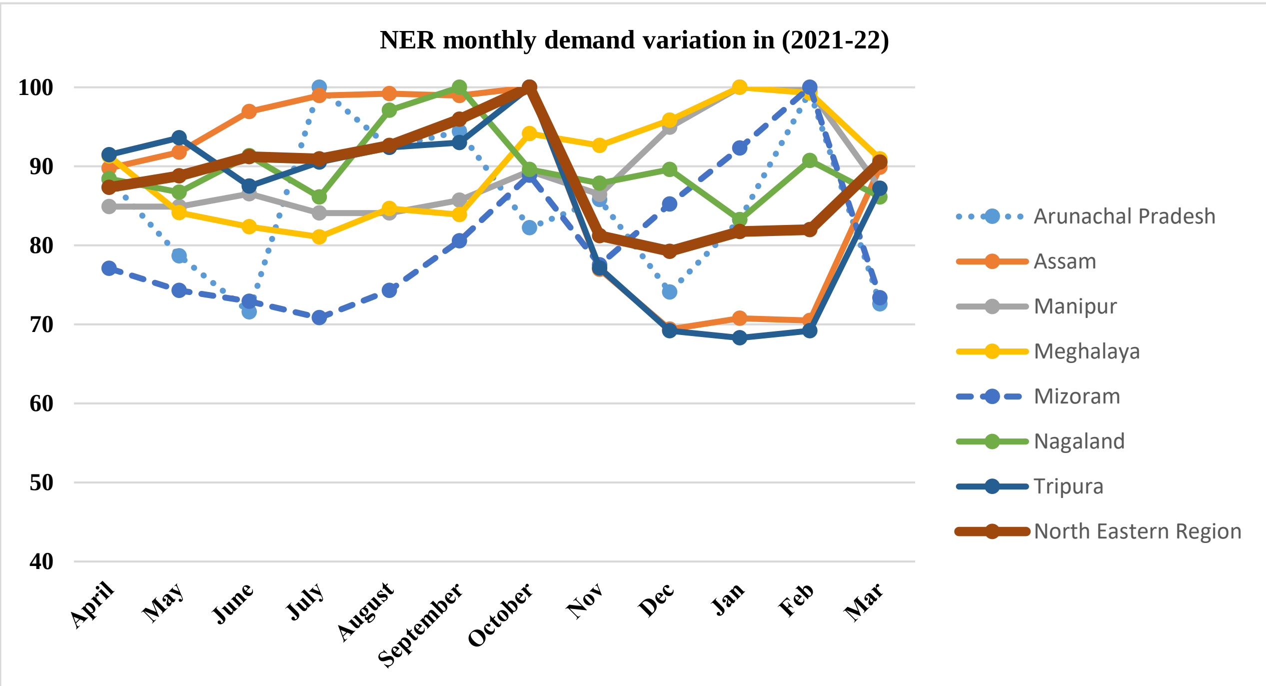

Fig. 5.6: NER monthly demand variation 2021-22

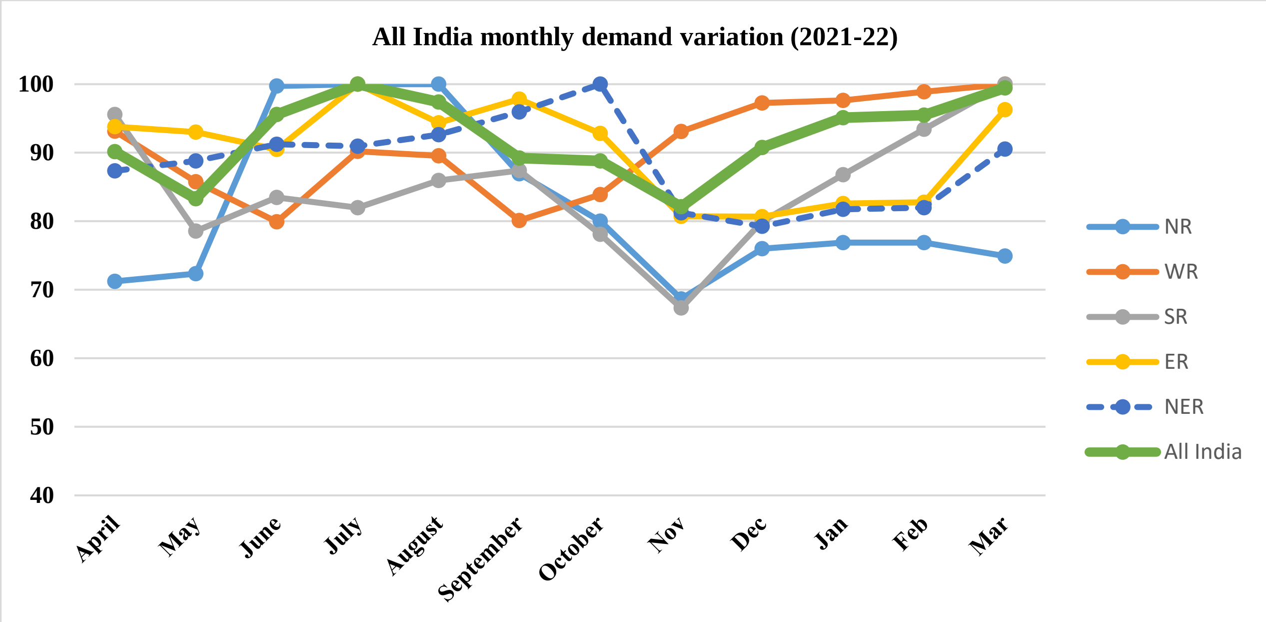

Fig. 5.7: All India monthly demand variation 2021-22

5.3.2 These load profiles have importance in transmission planning as it helps in identifying the key load-generation scenarios in which maximum stress is likely to occur on the system.

5.4 Installed Generation Capacity by 2026-27

5.4.1 Installed electricity generation capacity in March 2022, was about 399.5 GW. Generation capacity addition likely during 2022-27 is about 210.1 GW. Thus, the installed electricity generation capacity at the end of March 2027, would be about 609.6 GW [(as per National Electricity Plan (Generation)]. Region-wise summary of the likely installed generation capacity at the end of March, 2027, is given in Table 5.5.

Table – 5.5: Installed generation capacity: Region-wise

Region	Installed Capacity in March, 2022 (MW)	Installed Capacity likely in March, 2027 (MW)*
Northern	99927	184403
Western	139274	194400
Southern	111494	171928
Eastern	43795	51767
North Eastern	5007	7095
all – India	**399497**	**609591**

**Capacity to be retired by 2026-27 has been adjusted*.

5.4.2 Installed electricity generation capacity in the country in March, 2022, was about 399.5 GW. State-wise details of installed generation capacity is given in Table 5.6.

Table – 5.6: Installed Electricity Generation Capacity at the end of March, 2022

Installed Electricity Generation Capacity at the end of the March, 2022 (MW)										
State	**Coal**	**Gas**	**Diesel**	**Hydro**	**Nuclear**	**Wind**	**Solar**	**Biomass**	**Small Hydro**	**Total**
Northern Region										
Haryana	5330	432	0	0	0	0	911	258	74	7004
Himachal Pradesh	0	0	0	10263	0	0	76	10	954	11303
J&K and Ladakh	0	175	0	3449	0	0	55	0	184	3863
Punjab	5680	0	0	1096	0	0	1100	492	176	8544
Rajasthan	10480	1023	0	411	1180	4327	12565	125	24	30135
Uttar Pradesh	24389	1493	0	502	440	0	2244	2190	49	31307
Uttarakhand	0	450	0	3855	0	0	574	139	219	5237
Delhi	0	2208	0	0	0	0	211	59	0	2478
Chandigarh	0	0	0	0	0	0	55	0	0	55
Total-NR	**45879**	**5781**	**0**	**19576**	**1620**	**4327**	**17791**	**3273**	**1680**	**99927**
Western Region										
Gujarat	16092	7551	0	1990	440	9209	7180	109	89	42661
Madhya Pradesh	21950	0	0	2235	0	2520	2718	131	100	29654
Chhattisgarh	23688	0	0	120	0	0	518	275	76	24677
Maharashtra	23856	3207	0	3047	1400	5013	2631	2632	381	42167
Goa	0	48	0	0	0	0	20	0	0	68
DNH & DD	0	0	0	0	0	0	46	0	0	46
Total-WR	**85586**	**10806**	**0**	**7392**	**1840**	**16742**	**13113**	**3148**	**646**	**139274**
Southern Region										
Andhra Pradesh	11590	4899	37	1610	0	4097	4387	566	162	27347
Karnataka	9480	0	25	3689	880	5131	7591	1902	1281	29979
Kerala	0	534	160	1857	0	63	363	3	243	3221
Tamil Nadu	13685	1027	212	2178	2440	9871	5112	1043	123	35690
Telangana	7843	0	0	2406	0	128	4520	220	91	15208
Puducherry	0	33	0	0	0	0	14	0	0	46
Lakshadweep	0	0	0	0	0	0	3	0	0	3
Total-SR	**42598**	**6492**	**434**	**11740**	**3320**	**19290**	**21989**	**3733**	**1899**	**111494**
Eastern Region										
Andaman & Nicobar Islands	0		41	0	0	0	29	0	5	75
Bihar	8400	0	0	0	0	0	191	126	71	8788
Jharkhand	4250	0	0	210	0	0	89	4	4	4557
Odisha	9540	0	0	2155	0	0	451	59	107	12312
West Bengal	13697	100	0	1341	0	0	166	322	99	15725
Sikkim	0	0	0	2282	0	0	5	0	52	2339
Total-ER	**35887**	**100**	**41**	**5988**	**0**	**0**	**931**	**512**	**337**	**43796**
North-Eastern Region										

State	Coal	Gas	Diesel	Hydro	Nuclear	Wind	Solar	Biomass	Small Hydro	Total
Assam	750	620	0	350	0	0	118	2	34	1874
Manipur	0	0	36	105	0	0	12	0	5	158
Meghalaya	0	0	0	322	0	0	4	14	33	372
Nagaland	0	0	0	75	0	0	3	0	31	109
Tripura	0	1100	0	0	0	0	15	0	16	1131
Arunachal Pradesh	0	0	0	1115	0	0	11	0	131	1257
Mizoram	0	0	0	60	0	0	8	0	36	104
Total-NER	**750**	**1720**	**36**	**2027**	**0**	**0**	**171**	**16**	**286**	**5006**
all India	**210700**	**24900**	**510**	**46723**	**6780**	**40359**	**53995**	**10682**	**4848**	**399497**

5.4.3 As per the NEP (Generation), the installed generating capacity required to meet the projected peak electricity demand during the year 2026-27 would be of the order of 609.6 GW (after deducting capacity likely to retire during the period 2022-27) which includes about 73 GW of wind and 186 GW of Solar capacity as given in Table 5.7. However, this was based on projected peak electricity demand of 277 GW by 2026-27 as per the 20th EPS Report.

Table – 5.7: Installed Generation Capacity (MW) by 2026-27 as per NEP (Generation)

Installed Generation Capacity projected at the end of 2026-27 (in MW)											
	Coal	**Gas**	**Hydro**	**PSP**	**Nuclear**	**Wind**	**Solar**	**Biomass**	**Small Hydro**	**Total**	**BESS**
All India	235133	24824	52446	7446	13080	72896	185566	13000	5200	**609591**	8680

5.4.4 As per the revised 20th EPS projections (draft), the peak electricity demand by 2026-27 would be 296 GW. Revised projection of electricity demand is based on the recent trend in growth of electricity demand, additional demand due to high industrial growth areas, concentrated load like green hydrogen/green ammonia manufacturing etc. by 2026-27. Revised 20th EPS (draft) projections have been considered for carrying out the transmission planning studies. Based on the final demand projections, the plan may be reviewed.

5.4.5 Based on inputs from MNRE/SECI regarding RE potential zones materialising by 2026-27 and considering the connectivity applications submitted by RE generation developers to CTUIL as well as the information regarding RE capacity to be integrated to intra-state network, about 111 GW of wind and 208 GW of solar generation capacity is likely to be commissioned by 2026-27 and the total installed electricity generation capacity would be 669 GW by 2026-27 as given in Table 5.8. Hence, for planning of transmission system, installed generation capacity of 669 GW has been considered by 2026-27. State-wise details of installed generating capacity considered for planning of transmission system is given in Table 5.9.

Table – 5.8: Likely Installed Generation Capacity (MW) by 2026-27 for planning of transmission system

Installed Generation Capacity likely at the end of 2026-27 (in MW)											
	Coal	**Gas**	**Hydro**	**PSP**	**Nuclear**	**Wind**	**Solar**	**Biomass**	**Small Hydro**	**Total**	**BESS**
All India	235133	24824	52446	7446	12080	110951	208260	13000	5200	**669340**	8680

Table – 5.9: State-wise likely Installed Generation Capacity (MW) by 2026-27 for the purpose of transmission planning

Installed Generation Capacity likely by 2026-27 (in MW)											
State	**Coal**	**Gas**	**Hydro**	**PSP**	**Nuclear**	**Wind**	**Solar**	**Biomass**	**Small Hydro**	**Total**	**BESS**
Northern Region											
Haryana	5330	432	0	0	0	0	1306	279	74	7421	0
Himachal Pradesh	0	0	12279	0	0	0	27	13	1014	13333	0
J&K and Ladakh	0	175	6549	0	0	0	53	0	184	6961	0
Punjab	5680	0	1302	0	0	0	1309	608	176	9075	0
Rajasthan	9840	1023	411	0	2580	9182	74780	155	24	97995	8680
Uttar Pradesh	31100	1493	502	0	440	0	8356	2693	49	44633	0
Uttarakhand	0	450	5075	1000	0	0	653	172	260	7610	0
Delhi	0	2208	0	0	0	0	339	64	0	2611	0
Chandigarh	0	0	0	0	0	0	78	0	0	78	0
Total-NR	**51950**	**5781**	**26118**	**1000**	**3020**	**9182**	**86902**	**3984**	**1781**	**189718**	**8680**
Western Region											
Gujarat	16092	7551	550	1440	1840	31647	37357	131	95	96704	0
Madhya Pradesh	21120	0	2235	0	0	6391	9976	156	112	39991	0
Chhattisgarh	25067	0	120	0	0	0	524	335	86	26132	0
Maharashtra	23967	3207	2647	400	1400	9081	14166	3208	415	58491	0
Goa	0	48	0	0	0	0	57	0	0	105	0
DNH & DD	0	0	0	0	0	0	45	0	0	45	0
Total-WR	**86246**	**10806**	**5552**	**1840**	**3240**	**47120**	**62126**	**3830**	**708**	**221468**	**0**
Southern Region											
Andhra Pradesh	11930	4899	2570	1200	0	14517	22855	674	182	58827	0
Karnataka	9850	0	3689	0	880	24824	22818	2326	1360	65747	0
Kerala	0	534	1964	0	0	0	1591	3	264	4356	0
Tamil Nadu	18128	1027	1778	900	4940	15177	6712	1272	131	50065	0
Telangana	13266	0	800	1606	0	128	3074	269	94	19237	0
Puducherry	0	33	0	0	0	0	67	0	0	99	0
Lakshadweep	0	0	0	0	0	3	0	0	0	3	0
Total-SR	**53175**	**6492**	**10801**	**3706**	**5820**	**54649**	**57117**	**4544**	**2031**	**198334**	**0**
Eastern Region											
Bihar	12200	0	0	0	0	0	237	153	75	12665	0

State	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar	Biomass	Small Hydro	Total	BESS
Jharkhand	7575	0	210	0	0	0	123	5	5	7918	0
Odisha	9540	0	2155	0	0	0	470	72	115	12352	0
West Bengal	13697	100	561	900	0	0	190	393	106	15947	0
Sikkim	0	0	2902	0	0	0	7	0	62	2971	0
Andaman Nicobar	0		0	0	0	0	6	0	6	12	0
Total-ER	**43012**	**100**	**5828**	**900**	**0**	**0**	**1033**	**623**	**369**	**51865**	**0**
North-Eastern Region											
Assam	750	620	470	0	0	0	1056	2	38	2937	0
Manipur	0	0	105	0	0	0	9	0	6	120	0
Meghalaya	0	0	322	0	0	0	0	14	38	374	0
Nagaland	0	0	75	0	0	0	3	0	34	112	0
Tripura	0	1024	0	0	0	0	6	0	19	1049	0
Arunachal Pradesh	0	0	3115	0	0	0	6	3	139	3263	0
Mizoram	0	0	60	0	0	0	3	0	37	100	0
Total-NER	**750**	**1644**	**4147**	**0**	**0**	**0**	**1083**	**19**	**311**	**7954**	**0**
All India	**235133**	**24824**	**52446**	**7446**	**12080**	**110951**	**208260**	**13000**	**5200**	**669339**	**8680**

5.5 Assessment of Transmission Capacity Requirement

In any state, there can be State sector generation tied up completely to the host state, Central sector generating station serving more than one State as well as generating stations with 100% share of the host state, and Inter-State IPPs. Each State has its own electricity demand with typical variation in demand throughout the year. The net electricity demand of a State and power availability from all the sources in the State gives the net import or export of that State. The aggregation of import or export requirements of States within a region, and taking into consideration the diversity factor in electricity demand, translates into inter-regional power transfer requirements. Transmission system has been planned to meet the projected electricity demand considering the import/export requirements.

5.6 Load Generation Balance Approach

In order to find out the requirement of the transmission system, it is important to find out the surplus/deficit of each Region/State under various scenarios which would give the import/export requirement of respective Region/State. For this, the total power available within a Region/State has been considered based on the generation projects physically located in the Region/State irrespective of its classification. Based on the combined availability of power from the Central sector/State sector/IPP generation projects in the Region / State as well as the projected electricity demand, the import/export requirement has been worked out as shown in Figure 5.8.

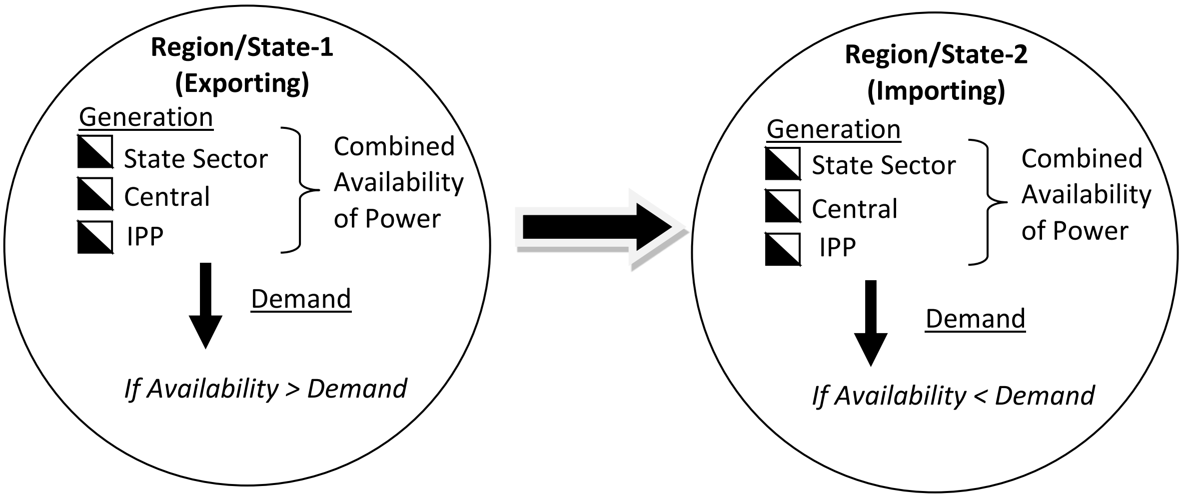

Fig. 5.8: Load Generation balance approach

5.7 Load-Generation Scenarios and Transmission Capacity requirement for 2022-27

5.7.1 The load generation scenarios have been worked out considering different scenarios corresponding to seasonal load and generation variations. Scenarios have been developed by analysing the load curve and generation profile for the past years. The scenarios have been chosen to capture the extreme events to be encountered throughout the year, like high electricity demand with high solar generation, high electricity demand with no solar generation, low electricity demand with almost no RE generation, seasons of high wind and low wind generation, seasons of high hydro and low hydro generation etc. so that the planned system is adequate for evacuation of power from different combination of generating stations to the load centres.

Nine scenarios, three scenarios each for February, June and August (i.e. evening peak electricity demand, night off-peak electricity demand, afternoon high solar generation) have been considered. The power exchange with neighbouring countries considered for the year 2026-27 includes about 5,856 MW import from Bhutan and Nepal and 1,160 MW export to Bangladesh and some power being exported to Myanmar. The region wise installed generation capacity and peak electricity demand at the end of 2026-27, considering the import and export with the neighbouring countries is given in Table 5.10.

Table 5.10
Installed Generating Capacity and Peak Electricity Demand likely by 2026-27

(Figures in MW)

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar#	Biomass	Small Hydro	Total	BESS	Peak Electricity Demand
Northern	51950	5781	26118	1000	3020	9182	86902	3984	1781	189718	8680	101054
Western	86246	10806	5552	1840	3240	47120	62126	3830	708	221468	0	93126
Southern	53175	6492	10801	3706	5820	54649	57117	4544	2031	198334	0	81752
Eastern	43012	100	5828	900	0	0	1033	623	369	51865	0	37497
North Eastern	750	1644	4147	0	0	0	1083	19	311	7954	0	4393

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar#	Biomass	Small Hydro	Total	BESS	Peak Electricity Demand
all-India	**235133**	**24824**	**52446**	**7446**	**12080**	**110951**	**208260**	**13000**	**5200**	**669339**	**8680**	**295601**
Bangladesh	0	0	0	0	0	0	0	0	0	0	0	1160
Nepal	0	0	900	0	0	0	0	0	0	900	0	0
Bhutan	0	0	4356	0	0	0	0	0	0	4956	0	0
Grand Total	**235133**	**24824**	**57702**	**7446**	**12080**	**110951**	**208260**	**13000**	**5200**	**674595**	**8680**	**296761**

#Includes 16,743 MW solar roof top capacity.

5.7.2 The availability factor for various type of RE generation varies throughout the day and across the seasons. While arriving at the dispatch from different RE generation sources for the year 2026-27, normative values have been considered. Dispatch in real time will depend on the electricity demand and availability of the resource. Due to low availability of gas, low availability factor has been considered for Gas based generation projects. Accordingly, the generation dispatch factors and load generation balance for nine scenarios are given in Table 5.11 – 5.28.

For coal based generating units, it has been assumed that the same coal based generating units will operate throughout the day in any scenario and dispatch of the generating units will keep on changing depending on the load generation scenario. The operating coal based generating units have been assumed to ramp down to about 40 % of its installed capacity during high solar generation period. Shut-down of coal based generating units during high solar generation period has not been considered.

5.7.3 Data of transmission lines and sub-stations along with relevant details have been obtained from CTUIL/STUs and Electricity Departments. Data received has been collated and discussed with CTUIL/STUs/Electricity Departments wherever discrepancies were observed. Parameters of the transmission elements have also been verified with the normative values.

5.7.4 From the load generation balance for different scenarios, it is observed that as far as installed electricity generation capacity is concerned, all the regions have surplus installed capacity. However, considering dispatch priority from RE sources, Northern Region is net exporter of power during afternoon due to large installed capacity of solar generation in the region. Western and Southern regions are also net exporter of power during June and August afternoon due to large capacity of solar generation coupled with low electricity demand as compared to February afternoon scenario. Western and Eastern Regions are generally net exporter of power during evening peak demand and night off-peak demand scenarios due to large quantum of thermal generation in the region.

5.7.5 Amongst the states, due to large capacity of solar generation in Rajasthan, Rajasthan is net exporter of power with maximum export being about 48,000 MW in high solar generation scenario in February. Gujarat is also net exporter in high solar generation period with the maximum export being 16,000 MW in August high solar generation scenario. Karnataka is also net exporter in certain scenarios, with the maximum export being 15,200 MW in August high solar generation scenario. Maharashtra imports power, with the maximum import being 12,000 MW. Chhattisgarh is net exporter with maximum export being 14,000 MW in non-solar hours due to large capacity of coal based generating stations in the state. Punjab, Haryana, Delhi and Telangana are net importers with the maximum import during high solar generation period being 12,500 MW, 13,400 MW, 7,800 MW and 12,700 MW respectively. Odisha is net exporter in non-solar hours with maximum export being 4,800 MW.

5.7.6 Based on the planned generation capacity addition and projected electricity demand, about 1,14,687 ckm of transmission lines and 7,76,330 MVA of transformation capacity in the substations at 220 kV and above voltage levels are planned to be added during the period 2022-27. In addition, 1000 MW of HVDC bi-pole capacity is also planned to be added. Details are given in Chapter-7.

Table 5.11: Generation dispatch factors for February Evening Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	50%	90%	0%	15%	50%	95%
Western	80%	10%	80%	60%	90%	0%	20%	60%	95%
Southern	80%	10%	80%	40%	90%	0%	30%	40%	95%
Eastern	80%	0%		70%	90%	0%	0%	70%	95%
North Eastern	80%	60%		60%	90%	0%	0%	60%	95%

Table 5.12: Load Generation Balance for February Evening Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	28824	1156	2416	13059	900	0	1377	891	8246	56869	62560
Western	58568	1081	2592	3331	1656	0	9424	425	0	77077	80695
Southern	29152	649	4656	4318	3335	0	15644	812	0	58566	56404
Eastern	28919	0	0	4080	810	0	0	258	0	34067	25542
North-Eastern	600	986	0	2488	0	0	0	187	0	4261	3180
all India	146063	3873	9664	27276	6701	0	26445	2573	8246	230840	228380
Bhutan											300
Nepal											1000
Bangladesh											1160
Grand Total	146063	3873	9664	27276	6701	0	26445	2573	8246	230840	230840

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,82,410 MW)

Table 5.13: Generation dispatch factors for February Night Off-Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	10%	80%	20%	90%	0%	25%	20%	5%
Western	80%	5%	80%	10%	90%	0%	25%	10%	5%
Southern	80%	5%	80%	20%	90%	0%	15%	20%	5%
Eastern	80%	0%		5%	90%	0%	0%	5%	5%
North Eastern	80%	60%		10%	90%	0%	0%	10%	5%

Table 5.14: Load Generation Balance for February Night Off-Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	28824	578	2416	5224	900	0	2296	356	434	41027	47239
Western	58568	540	2592	555	1656	0	11780	71	0	75762	66946
Southern	29152	325	4656	2159	3335	0	7822	406	0	47855	56120
Eastern	28831	0	0	291	810	0	0	18	0	29951	22065
North-Eastern	600	986	0	415	0	0	0	31	0	2032	1797
all India	145975	2429	9664	8644	6701	0	21897	883	434	196628	194168
Bhutan											300
Nepal											1000
Bangladesh											1160
Grand Total	145975	2429	9664	8644	6701	0	21897	883	434	196628	196628

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,82,410 MW)

Table 5.15: Generation dispatch factors for February Solar Peak Generation Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	40%	0%	70%	20%	-110%	95%	10%	20%	-100%
Western	40%	0%	80%	30%	-110%	90%	10%	30%	-100%
Southern	40%	0%	80%	20%	-110%	90%	20%	20%	-100%
Eastern	40%	0%		10%	-110%	80%	0%	10%	-100%
North Eastern	40%	0%		10%	-110%	80%	0%	10%	-100%

Table 5.16: Load Generation Balance for February Solar Peak Generation Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[2]	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	13836	0	2114	5224	-1100	75797	918	356	-8680	88465	71415
Western	28113	0	2592	1666	-2024	47182	4712	212	0	82453	83434
Southern	13993	0	4656	2159	-4077	47093	10429	406	0	74659	75427
Eastern	13880	0	0	583	-990	395	0	37	0	13905	25709
North-Eastern	288	0	0	415	0	782	0	31	0	1516	2552
all India	70110	0	9362	10045	-8191	171249	16059	1043	-8680	260998	258538
Bhutan											300
Nepal											1000
Bangladesh											1160
Grand Total	70110	0	9362	10045	-8191	171249	16059	1043	-8680	260998	260998

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,82,410 MW)
[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.
(-) sign indicates pumping mode operation of PSP/ charging of BESS

Table 5.17: Generation dispatch factors for June Evening Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	64%	30%	80%	80%	90%	0%	60%	80%	0%
Western	64%	30%	80%	60%	90%	0%	70%	60%	0%
Southern	64%	10%	80%	60%	90%	0%	70%	60%	0%
Eastern	64%	0%		90%	90%	0%	0%	90%	0%
North Eastern	64%	60%		70%	90%	0%	0%	70%	0%

Table 5.18: Load Generation Balance for June Evening Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	19510	1734	2416	20894	900	0	5509	1425	0	52389	81371
Western	44648	3242	2592	3331	1656	0	32984	425	0	88878	71054
Southern	15451	649	4656	6476	3335	0	36502	1219	0	68289	58414
Eastern	21866	0	0	5245	810	0	0	332	0	28253	30616
North-Eastern	0	986	0	2903	0	0	0	218	0	4107	4031
all India	101475	6612	9664	38850	6701	0	74995	3618	0	241915	245486
Bhutan				3920						3920	
Nepal				810						810	
Bangladesh											1160
Grand Total	101475	6612	9664	43580	6701	0	74995	3618	0	246646	246646

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,57,435 MW)

Table 5.19: Generation dispatch factors for June Night Off-Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	60%	90%	0%	80%	60%	100%
Western	80%	15%	80%	20%	90%	0%	40%	20%	100%
Southern	80%	5%	80%	20%	90%	0%	50%	20%	100%
Eastern	80%	0%		80%	90%	0%	0%	80%	100%
North Eastern	80%	50%		35%	90%	0%	0%	35%	100%

Table 5.20: Load Generation Balance for June Night Off-Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	24244	1156	2416	15671	900	0	7346	1069	8680	61481	80008
Western	55480	1621	2592	1110	1656	0	18848	142	0	81449	69070
Southern	19200	325	4656	2159	3335	0	26073	406	0	56154	53826
Eastern	27180	0	0	4662	810	0	0	295	0	32948	30753
North-Eastern	0	822	0	1451	0	0	0	109	0	2382	3276
all India	126104	3924	9664	25054	6701	0	52266	2020	8680	234414	236933
Bhutan				3049						3049	
Nepal				630						630	
Bangladesh											1160
Grand Total	126104	3924	9664	28733	6701	0	52266	2020	8680	238093	238093

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,57,435 MW)

Table 5.21: Generation dispatch factors for June Solar Peak Generation Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	40%	0%	80%	60%	-110%	85%	50%	60%	-100%
Western	40%	0%	80%	20%	-110%	75%	50%	20%	-100%
Southern	40%	0%	80%	20%	-110%	80%	40%	20%	-100%
Eastern	40%	0%		70%	-110%	75%	0%	70%	-100%
North Eastern	40%	0%		60%	-110%	75%	0%	35%	-100%

Table 5.22: Load Generation Balance for June Solar Peak Generation Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[2]	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	11637	0	2416	15671	-1100	62639	4591	1069	-8680	88242	85990
Western	26630	0	2592	1110	-2024	36315	23560	142	0	88325	79086
Southern	9569	0	4656	2159	-4077	38663	20858	406	0	72235	68540
Eastern	12694	0	0	4080	-990	342	0	258	0	16384	33000
North-Eastern		0	0	1451	0	677	0	109	0	2238	3327
all India	60530	0	9664	24471	-8191	138636	49009	1984	-8680	267423	269942
Bhutan				3049						3049	
Nepal				630						630	
Bangladesh											1160
Grand Total	60530	0	9664	28150	-8191	138636	49009	1984	-8680	271102	271102

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,57,435 MW)
[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.
(-) sign indicates pumping mode operation of PSP/ charging of BESS

Table 5.23: Generation dispatch factors for August Evening Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	30%	80%	80%	90%	0%	40%	80%	46%
Western	80%	30%	80%	70%	90%	0%	40%	70%	46%
Southern	80%	20%	80%	50%	90%	0%	60%	50%	46%
Eastern	80%	0%		90%	90%	0%	0%	90%	46%
North Eastern	80%	70%		90%	90%	0%	0%	90%	46%

Table 5.24: Load Generation Balance for August Evening Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	27028	1734	2416	20894	900	0	3673	1425	3993	62063	85283
Western	55880	3242	2592	3886	1656	0	18848	496	0	86600	76145
Southern	19200	1298	4656	5397	3335	0	31288	1016	0	66190	61320
Eastern	28905	0	0	5245	810	0	0	332	0	35292	32991
North-Eastern	600	1151	0	3732	0	0	0	280	0	5763	4002
all India	131613	7426	9664	39155	6701	0	53808	3548	3993	255908	259741
Bhutan				4138						4138	
Nepal				855						855	
Bangladesh											1160
Grand Total	131613	7426	9664	44148	6701	0	53808	3548	3993	260901	260901

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,64,465 MW)

Table 5.25: Generation dispatch factors for August Night Off-Peak Electricity Demand Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	70%	90%	0%	40%	70%	54%
Western	80%	15%	80%	50%	90%	0%	40%	50%	54%
Southern	80%	10%	80%	30%	90%	0%	50%	30%	54%
Eastern	80%	0%		80%	90%	0%	0%	80%	54%
North Eastern	80%	60%		70%	90%	0%	0%	70%	54%

Table 5.26: Load Generation Balance for August Night Off-Peak Electricity Demand Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	27028	1156	2416	18283	900	0	3673	1247	4687	59390	84467
Western	55880	1621	2592	2776	1656	0	18848	354	0	83727	68770
Southern	19200	649	4656	3238	3335	0	26073	609	0	57761	55632
Eastern	28764	0	0	4662	810	0	0	295	0	34532	30383
North - Eastern	600	986	0	2903	0	0	0	218	0	4707	3383
all India	131472	4413	9664	31862	6701	0	48594	2723	4687	240116	242635
Bhutan				3049						3049	
Nepal				630						630	
Bangladesh											1160
Grand Total	131472	4413	9664	35541	6701	0	48594	2723	4687	243795	243795

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,64,465 MW)

Table 5.27: Generation dispatch factors for August Solar Peak Generation Scenario

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	40%	0%	80%	70%	-110%	80%	50%	70%	-100%
Western	40%	0%	80%	40%	-110%	70%	55%	40%	-100%
Southern	40%	0%	80%	40%	-110%	70%	55%	40%	-100%
Eastern	40%	0%		70%	-110%	70%	0%	70%	-100%
North Eastern	40%	0%		70%	-110%	70%	0%	70%	-100%

Table 5.28: Load Generation Balance for August Solar Peak Generation Scenario: 2026-27 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[2]	Wind	Small Hydro	BESS	Total Availability	Electricity Demand
Northern	13194	0	2416	18283	-1100	63592	4591	1247	-8680	93543	92114
Western	26822	0	2592	2221	-2024	36561	25916	283	0	92371	84453
Southern	9216	0	4656	4318	-4077	36492	28680	812	0	80098	77005
Eastern	13586	0	0	4080	-990	344	0	258	0	17278	33148
North-Eastern	288	0	0	2903	0	682	0	218	0	4090	3179
all India	63106	0	9664	31803	-8191	137671	59187	2818	-8680	287379	289899
Bhutan				3049						3049	
Nepal				630						630	
Bangladesh											1160
Grand Total	63106	0	9664	35483	-8191	137671	59187	2818	-8680	291059	291059

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,64,465 MW)

[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.

(-) sign indicates pumping mode operation of PSP/ charging of BESS

5.8 Power System Studies

5.8.1 The adequacy of existing and under construction transmission system and the requirement of additional transmission system has been assessed based on the load flow studies representing the inter-state transmission system as well as intra-state transmission system. The load generation balance scenarios have been worked out for the nine scenarios (three scenarios viz. evening peak electricity demand, night off-peak electricity demand, afternoon high solar generation, each for February, June and August) and load flow studies have been carried out corresponding to the year 2026-27 for the nine scenarios. The existing transmission system and generation projects as well as those planned for the period 2022-27 have been simulated in the study. Base case analysis has been carried out for each scenario and then contingency/outage analysis has been carried out to ensure that the planned transmission system is adequate for normal and 'N-1' contingency scenarios.

5.8.2 The study results have been represented in terms of the power flow between regions as well as between states in each region.

5.8.3 In all the scenarios, generation dispatch has been considered as per the availability factors. Generation from biomass and small hydro sources are likely to be connected at lower voltage levels (i.e. 11 kV / 33 kV). Accordingly, these generations in respective state / region have been adjusted against the electricity demand of the corresponding state/region. Also, the electricity demand has been adjusted locally to account for the electricity generation from solar roof top capacity.

5.9 Analysis of load-generation scenarios

5.9.1 Inter-regional power flow

Transmission system has been planned for the period 2022-27 to meet the requirement of transfer of power within and among the regions of the country to meet the projected electricity demand. Based on load-flow studies, details of inter-regional power flow in base case for each of the nine scenarios are given in Table 5.29 and Fig. 5.9.

Table 5.29: Inter-regional power flow in different scenarios

(figures in MW)

	ER-NR	ER-WR	ER-SR	WR-NR	WR-SR	NER-ER
June Evening Peak	5000	-4083	286	23303	-9330	76
June Night Off-peak	4810	-2861	1839	13210	-3608	-910
June Solar Peak	-4981	-11670	1625	2703	-4425	-1098
August Evening Peak	7475	-1134	1448	15229	-5768	1685
August Night Off-peak	7579	-1442	2032	17197	-3622	1243
August Solar Peak	-3119	-11074	2093	1871	-4305	856
February Evening Peak	3676	1184	2329	1526	-4035	916
February Night Off-peak	2344	-134	3288	3350	5378	69
February Solar Peak	-7779	-8773	1386	-8600	-385	-1179
Maximum Power Flow	**7779**	**11670**	**3288**	**23303**	**9330**	**1685**

	ER-NR	ER-WR	ER-SR	WR-NR	WR-SR	NER-ER
Power Transmission Capacity Between Two Regions	**22530**	**22790**	**7830**	**55120**	**28120**	**3550**

Note: (i) The transmission capacity between two regions as mentioned above is the aggregate of capacity of individual transmission lines between the two regions. The ability of a single transmission line to transfer power, when operated as part of the interconnected network is a function of the physical relationship of that line to the other elements of the transmission network and the prevalent load – generation scenario. Hence, the actual power transfer capacity between two regions may be less than the aggregated capacity of the individual transmission lines.

(ii) The inter-regional transmission capacity in one direction may not be same as the inter-regional capacity in other direction. For instance, the maximum capacity of HVDC Raigarh-Pugalur is 6000 MW in WR-SR direction whereas the capacity in reverse direction (i.e. SR-WR) is limited to only 3000 MW. Similarly, the Champa – Kurukshetra HVDC link cannot be operated in reverse direction.

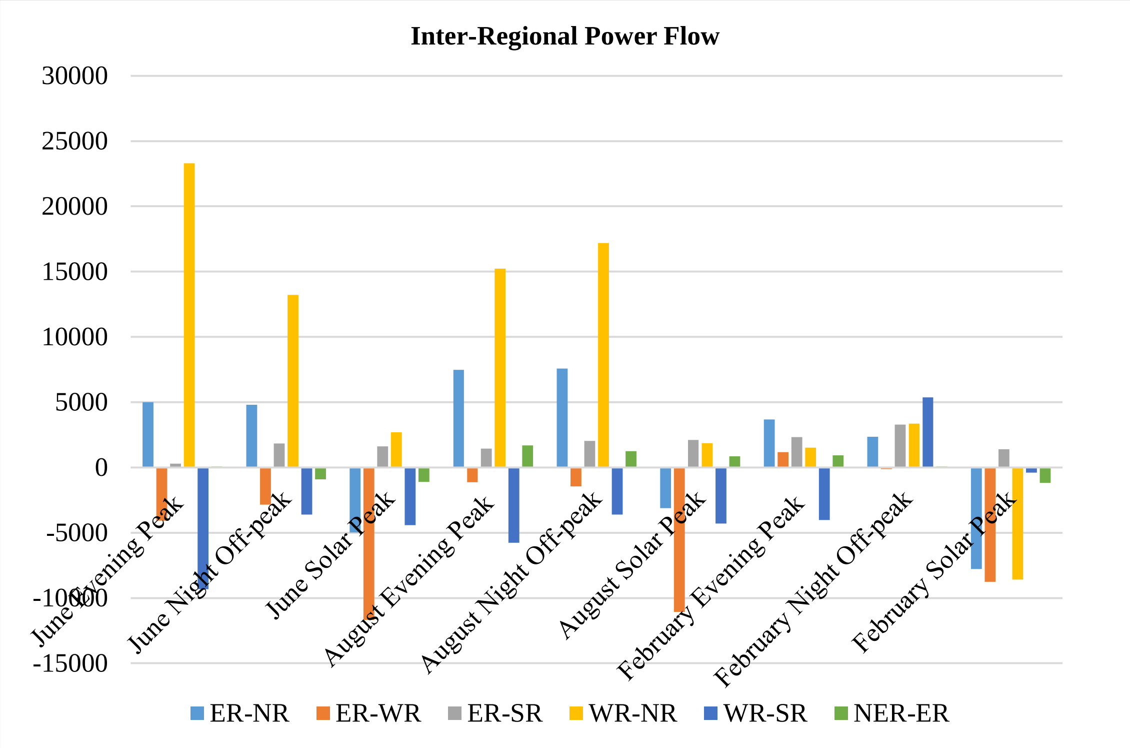

Fig. 5.9: Inter-regional power flow (in MW) in various scenarios

The power flow between regions in different scenarios are given as per the following annexures.

Case Studies			
	February	**June**	**August**
Evening Peak Electricity Demand	Annex-5.1a	Annex-5.2a	Annex-5.3a
Night off-Peak Electricity Demand	Annex-5.1b	Annex-5.2b	Annex-5.3b

Maximum Solar Generation	Annex-5.1c	Annex-5.2c	Annex-5.3c

The detailed power flow within each region and among the states in each region and tie-line flows are given at Annexure as detailed below:

Case Studies									
Region / States	February cases			June cases			August cases		
	A	B	C	A	B	C	A	B	C
NR States	5.4a	5.5a	5.6a	5.7a	5.8a	5.9a	5.10a	5.11a	5.12a
WR States	5.4b	5.5b	5.6b	5.7b	5.8b	5.9b	5.10b	5.11b	5.12b
SR States	5.4c	5.5c	5.6c	5.7c	5.8c	5.9c	5.10c	5.11c	5.12c
ER States	5.4d	5.5d	5.6d	5.7d	5.8d	5.9d	5.10d	5.11d	5.12d
NER States	5.4e	5.5e	5.6e	5.7e	5.8e	5.9e	5.10e	5.11e	5.12e

A - Evening Peak Electricity Demand Scenario

B - Night Off-peak Electricity Demand Scenario

C - Afternoon Peak Solar Generation Scenario

5.10 Analysis of Power Flow Study results

From power flow studies, it is observed that the planned transmission system will be sufficient to cater to the assessed import / export requirement of each region/state for the year 2026-27 under normal and 'N-1' contingency conditions.

However, transmission planning is based on certain assumptions of commissioning of generation capacity, load growth etc. in a particular time frame. Depending on the materialisation of generation capacity, actual load growth etc., the planned transmission system needs to be reviewed from time to time.

5.11 Conclusions

1,14,687 ckm of transmission lines and 7,76,330 MVA of transformation capacity (220 kV and above voltage level) is planned to be added during the period 2022-27. In addition, 1000 MW of HVDC bi-pole capacity is also planned to be added. The inter-regional transmission capacity addition likely during 2022-27 is 30,690 MW. The inter-regional power transmission capacity at the end of 2026-27 is likely to increase to 1,42,940 MW.

Chapter - 6

Review of Programme of Transmission System Augmentation during 2017-2022

6.1 Introduction

6.1.1 As on 31st March 2017, the installed electricity generation capacity and peak electricity demand in the country was about 326.8 GW and 159.5 GW respectively. The corresponding transmission network (220 kV and above voltage level) spread over the country was 367,851 circuit kilometres (ckm) of transmission lines and 740.76 GVA of transformation capacity.

6.1.2 As per the 19th Electric Power Survey (EPS) Report, the projected peak electricity demand during the year 2021-22 was 225.7 GW. However, the actual peak electricity demand during the year 2021-22 has been about 203 GW. The generation capacity addition during 2017-22 was 30,667.91 MW from conventional sources (Thermal & Nuclear) which is about 59.5 % of the target of 51,561.15 MW. Capacity addition of 54,779.15 MW from renewable energy sources including large hydro has been achieved during the period 2017-22.

6.1.3 1,04,400 ckms of transmission lines and 3,27,889 MVA of transformation capacity in sub-stations at 220 kV and above voltage levels was targeted to be added during 2017-22. Against this target, 88,865 ckm (85.12 % of the target) of transmission lines and 3,49,685 MVA (about 107 % of the target) of transformation capacity addition in sub-stations (220 kV and above) have been achieved during the period 2017-22. In addition, 14,000 MW of HVDC bipole capacity as planned has also been added during 2017-22. Few transmission schemes were delayed because of Right-of-Way (RoW) issues, delay in getting Forest Clearance, delay in land acquisition for sub-stations, delay due to COVID-19 pandemic etc.

6.2 Target v/s Achievement of Transmission Capacity addition during 2017-22

6.2.1 1,04,400 ckms of transmission lines and 3,27,889 MVA of transformation capacity in sub-stations at 220 kV and above voltage levels were planned to be added during the period 2017-22. Against this target, 88,865 ckms of transmission lines and 349,685 MVA transformation capacity has been added. In addition, 14,000 MW of HVDC bipole capacity as planned has also been added during 2017-22. Details are given in Table 6.1.

Table – 6.1: Summary of target v/s achievement of transmission capacity addition during 2017-22

Transmission System Type / Voltage Class	Unit	Target for 2017-22	Achievement during 2017-22	% Achievement wrt Target
Transmission Lines				
(a) HVDC ± 320 kV/ ± 800 kV Bipole	ckm	3531	3819	108%
(b) 765 kV	ckm	25670	19783	77%
(c) 400 kV	ckm	36770	36191	98%
(d) 230/220 kV	ckm	38429	29072	76%
Total-Transmission Lines	**ckm**	**104400**	**88865**	85%
Sub-stations- AC				
(a) 765 kV	MVA	116700	89700	77%
(b) 400 kV	MVA	125535	152306	122%
(c) 230/220 kV	MVA	85654	107679	125%
Total – AC Sub-stations	**MVA**	**327889**	**349685**	107%

Transmission System Type / Voltage Class	Unit	Target for 2017-22	Achievement during 2017-22	% Achievement wrt Target
HVDC				
(a) Bi-pole + Monopole	MW	14000	14000	100%
(b) Back-to-back capacity	MW	0	0	
Total - HVDC	**MW**	**14000**	**14000**	**100%**

6.2.2 With the addition of 88,865 ckms of transmission lines, 349,685 MVA transformation capacity during the period 2017-22, the length of transmission lines and transformation capacity in sub-stations (220 kV and above voltage level) has increased to 456,716 ckms and 1070,950 MVA respectively. The HVDC bipole and back to back capacity was 33,500 MW at the end of 2021-22. Details are given in Table 6.2.

Table - 6.2: Transmission system at the end of 2021-22

Transmission System Type / Voltage Class	Unit	At the end of 2011-12 (31.03.2012)	At the end of 2016-17 (31.03.2017)	Addition during 2017-22	At the end of 2021-22 (31.03.2022)
Transmission Lines					
(a) HVDC ± 320 kV/ 500 kV/800 kV Bipole	ckm	9432	15556	3819	19375
(b) 765 kV	ckm	5250	31240	19783	51023
(c) 400 kV	ckm	106819	157787	36191	193978
(d) 230/220 kV	ckm	135980	163268	29072	192340
Total - Transmission Lines	**ckm**	**257481**	**367851**	**88865**	**456716**
Sub-Stations AC					
(a) 765 kV	MVA	25000	167500	89700	257200
(b) 400 kV	MVA	151027	240807	152306	393113
(c) 230/220 kV	MVA	223774	312958	107679	420637
Total-AC Sub-stations	**MVA**	**399801**	**721265**	**349685**	**1070950**
HVDC					
(a)Bi-pole + Monopole	MW	6750	16500	14000	30500
(b)Back-to-back capacity	MW	3000	3000	0	3000
Total of (a), (b)	**MW**	**9750**	**19500**	**14000**	**33500**

6.3 Summary of Target v/s Achievement during 2017-22

The details of target v/s achievement of transmission system augmentation (220 kV and above voltage level) during the years 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22 is summarised in Table 6.3(a).

Table - 6.3(a): Summary of Target V/S Achievement during 2017-22

	Target	Achievement

Year	Transmission lines (ckm)	Sub-station (MVA)	Transmission lines (ckm)	Sub-station (MVA/MW)*
2017-18	23,086	53,978	23,119	86,193
2018-19	22,647	62,600	22,437	72,705
2019-20	23,621	81,716	11,664	68,230
2020-21	15,791	63,050	16,750	57,575
2021-22	19,255	81,545	14,895	78,982

*including HVDC bi-pole link capacity

Achievement during the year 2019-20 was substantially low due to impact of COVID-19 pandemic. Target of transmission system augmentation during the year 2020-21 was kept low keeping in view the slow progress of works due to COVID-19 pandemic.

Further, the details of target v/s achievement of transmission system augmentation (220 kV and above voltage level) for ISTS and Intra-state transmission system during the years 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22 are summarised in Tables 6.3(b) & 6.3(c).

Table - 6.3(b): Summary of Target v/s Achievement of transmission line during 2017-22 for ISTS and Intra-state

	ISTS			Intra- State		
Year	**Target (ckm)**	**Achievement (ckm)**	**% Achievement**	**Target (ckm)**	**Achievement (ckm)**	**% Achievement**
2017-18	9047	10155	112	14039	12964	92
2018-19	9961	10681	107	12686	11756	93
2019-20	8395	6756	80	15226	4908	32
2020-21	6856	7490	109	8935	9260	104
2021-22	5516	6095	110	13739	8800	64

Table - 6.3(c): Summary of Target V/S Achievement of transformation capacity during 2017-22 for ISTS and Intra-state

	ISTS			Intra- State		
Year	**Target (MVA)**	**Achievement (MVA)**	**% Achievement**	**Target (MVA)**	**Achievement (MVA)**	**% Achievement**
2017-18	27090	44590	165	26888	41603	155
2018-19	34435	27037	79	28165	45668	162
2019-20	36150	40987	113	45566	27243	60
2020-21	25335	23479	93	37715	34096	90
2021-22	41595	40664	98	39950	38318	96

Table - 6.3(d): Summary of target v/s achievement of transmission lines and transformation capacity during 2017-22 for ISTS and Intra-state

	Transmission lines			Transformation Capacity		
Year	**Target (ckm)**	**Achievement (ckm)**	**% Achievement**	**Target (MVA)**	**Achievement (MVA)**	**% Achievement**
ISTS	39775	41177	104%	164605	176757	107%
Intra-State	64625	47688	74%	178284	186928	105%
Total	104400	88865	85%	342889	363685	106%

Target v/s achievement of transmission line and sub-station capacity addition during 2017-22 is depicted in Figure 6.1 and Figure 6.2 respectively.

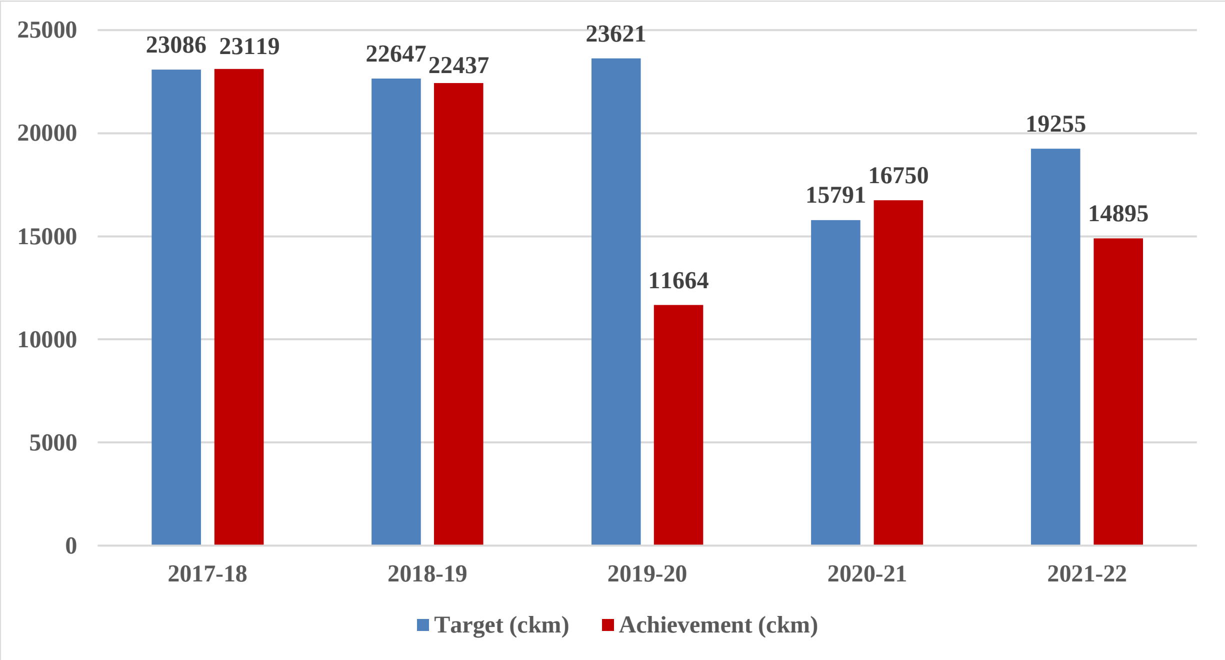

Fig. 6.1: Target vs achievement of transmission line addition during 2017-22

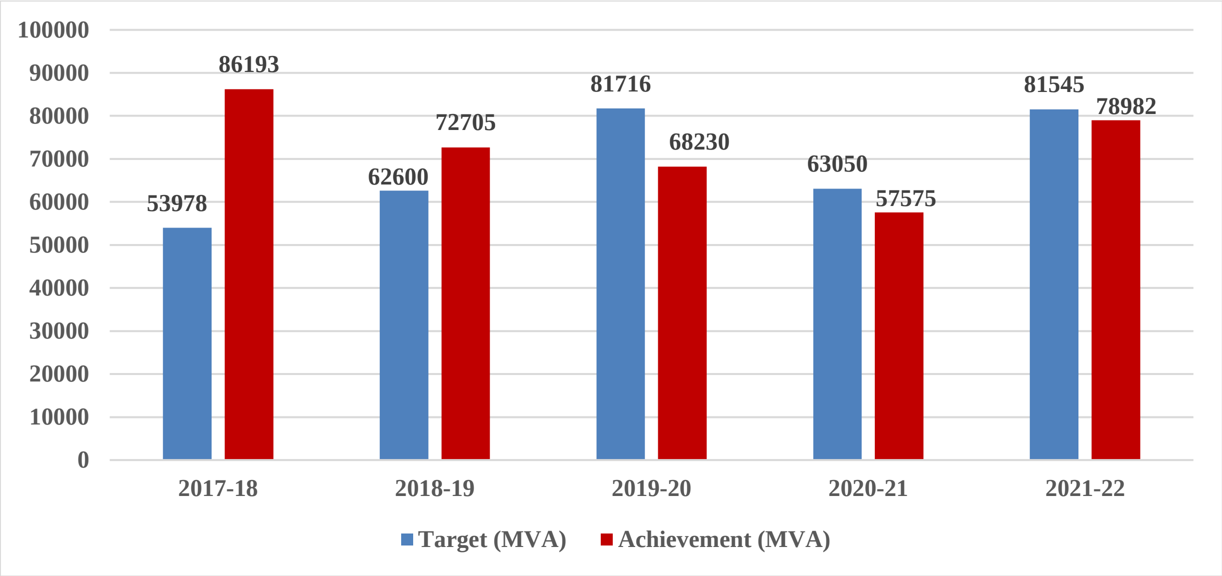

Fig. 6.2: Target vs achievement of sub-station capacity addition during 2017-22

6.3.1 Transmission System addition during 2017-18

23,119 ckm of transmission lines and transformation capacity of 86,193 MVA (220 kV and above voltage level) was commissioned during 2017-18. Special achievement during this period was the completion of 4th pole of 1500 MW capacity at Alipurduar and Agra (Extn) converter station and completion of 2nd pole of 1500 MW capacity at Champa and Kurukshetra converter station. 23,000 MVA transformation capacity at 765 kV level along with 3,819 ckms of 765 kV transmission lines were commissioned in 2017-18.

6.3.2 Transmission System addition during 2018-19

22,437 ckm of transmission lines and transformation capacity of 72,705 MVA (220 kV and above voltage level) was commissioned during 2018-19, including 21,000 MVA of transformation capacity at 765 kV level along with 6,750 ckm of 765 kV transmission lines.

6.3.3 Transmission System addition during 2019-20

11,664 ckm of transmission lines and transformation capacity of 68,230 MVA (220 kV and above voltage level) was commissioned during 2019-20. Highlights of this period has been commissioning of 3rd and 4th poles of 1500 MW each at Champa and Kurukshetra HVDC station. Transformation capacity of 19,500 MVA at 765 kV level along with 3,044 ckm of 765 kV transmission lines were commissioned.

6.3.4 Transmission System Addition during 2020-21

16,750 ckm of transmission lines and transformation capacity of 57,575 MVA (220 kV and above voltage level) was added during 2020-21. HVDC line of 3,531 ckm with voltage level of ± 800 kV from Raigarh HVDC Sub-station in Chhattisgarh to Pugalur HVDC sub-station in Tamil Nadu was operationalised along with 1st and 2nd poles of 1500 MW each at Raigarh and Pugalur HVDC station during 2020-21. VSC based HVDC terminal at Pugalur and North Trichur of 1000 MW capacity (Monopole –II) was commissioned during this period. HVDC line of 288 ckm with voltage level of ± 320 kV from Pugalur, Tamil Nadu to North Trichur, Kerala was also commissioned. 7,700 MVA of transformation capacity at 765 kV level along with 1,237 ckm of 765 kV transmission lines were commissioned.

To minimise the wide spreading of COVID-19 in the coutry, Government of India issued orders for national lockdown from last week of March 2020. This affected manpower mobilization and transportation of materials to project sites, delaying the completion of transmission projects.

All the inter-state transmission projects which were under construction as on 25th March, 2020 (date of lockdown), and whose SCoD was not prior to 25th March, 2020, were granted an extension of five months in respect of SCoD by Ministry of Power, Government of India vide letter dated 27th July 2020.

6.3.5 Transmission System Addition during 2021-22

14,895 ckm of transmission lines and transformation capacity of 78,982 MVA (220 kV and above voltage level) was added during 2021-22. VSC based HVDC terminal at Pugalur and North Trichur of 1000 MW capacity (Monopole –I) and 3rd & 4th poles of 1500 MW each at Raigarh and Pugalur were commissioned during this period. 18,500 MVA transformation capacity at 765 kV level along with 4,933 ckm of 765 kV transmission lines were commissioned. Due to spread of second wave of COVID-19 during April’21, May’21 and June’21, manpower mobilization and transportation of materials to project sites becme difficult and the construction activities had been affected at almost all the sites.

Further, in view of second wave of COVID-19 pandemic, all the inter-state transmission projects which were under construction with SCoD after 1st April, 2021, were granted an extension of three months in respect of their SCoD by Ministry of Power, Government of India vide letter dated 12th June 2021.

6.4 Development of Inter-Regional Transmission Capacity during 2017-22

6.4.1 Progress and achievement at the end of 2021-22

The inter-regional transmission capacity at 220 kV and above voltage level was 75,050 MW as on 31.03.2017. The target of inter-regional transmission capacity addition during 2017-22 was 43,000 MW. Against this target, 37,200 MW of inter-regional transmission capacity was added, taking the total inter-regional transmission capacity (at 220 kV and above voltage level) to 1,12,250 MW as on 31.03.2022. Details are given in Table 6.4.

Table - 6.4: Details of the inter-regional transmission capacity by 2021-22

Inter-Regional Links	Transmission capacity (MW)
EAST-NORTH	
Dehri-Sahupuri 220 kV S/c line	130
Muzaffarpur-Gorakhpur 400 kV D/c line (with Series Cap+TCSC)	2000
Patna – Balia 400 kV D/c (Quad) line	1600
Biharshariff – Balia 400 kV D/c (Quad) line	1600
Barh – Patna - Balia 400 kV D/c (Quad) line	1600
Gaya - Balia 765 kV S/c line	2100
Sasaram – Allahabad/Varanasi 400 kV D/c line (Sasaram HVDC back to back has been bypassed)	1000
Sasaram - Fatehpur 765 kV S/c line	2100
Barh-II-Gorakhpur 400 kV D/c (Quad) line	1600
Gaya-Varanasi 765 kV 2xS/c line	4200
Biharsharif-Varanasi 400 kV D/c (Quad) line	1600
LILO of Biswanath Chariali - Agra ± 800 kV, 3000 MW HVDC Bi-pole at Alipurduar	3000
Sub-total (East-North)	**22530**
EAST-WEST	

Inter-Regional Links	Transmission capacity (MW)
Raigarh-Budhipadar 220 kV S/c line	130
Budhipadar-Korba 220 kV 2xS/c line	260
Rourkela-Raipur 400 kV D/c line (with series comp.+TCSC)	1400
Ranchi –Sipat 400 kV D/c line (with series comp.)	1200
Rourkela-Raipur 400 kV D/c 2nd line (with series comp.)	1400
Ranchi - Dharamjayagarh 765 kV S/c line	2100
Ranchi - Dharamjaygarh 765 kV 2nd S/c line	2100
Jharsuguda-Dharamjaygarh 765 kV D/c line	4200
Jharsuguda-Dharamjaygarh 765 kV 2nd D/c line	4200
Jharsuguda - Raipur Pool 765 kV D/c line	4200
Sub-total (East-West)	**21190**
WEST- NORTH	
Bhanpura-Ranpur 220 kV S/c line	130
Bhanpura-Modak 220 kV S/c line	130
Auriya (UP)-Malanpur 220 kV S/c line	130
Auriya (UP) – Bhind 220 kV S/c line	130
Vindhyachal HVDC back-to-back	500
Gwalior-Agra 765 kV 2 x S/c line	4200
Zerda-Kankroli 400 kV D/c line	1000
Gwalior-Jaipur 765 kV 2xS/c lines	4200
Adani (Mundra) - Mahendranagar +/- 500 kV, HVDC Bi-pole	2500
RAPP-Sujalpur 400 kV D/c line	1000
Champa Pool- Kurukshetra +/- 800 kV, HVDC Bi-pole	6000
Jabalpur - Orai 765 kV D/c line	4200
LILO of Satna - Gwalior 765 kV S/c line at Orai	4200
Banaskantha-Chittorgarh 765 kV D/c line	4200
Vindhyachal-Varanasi 765 kV D/c line	4200
Sub-total (West-North)	**36720**
EAST- SOUTH	
Balimela-Upper Sileru 220 kV S/c line	130
Gazuwaka HVDC back-to-back	1000
Talcher-Kolar HVDC bipole	2000
Upgradation of Talcher-Kolar HVDC Bipole	500
Angul – Srikakulum 765 kV D/c line	4200
Sub-total (East-South)	**7830**

Inter-Regional Links	Transmission capacity (MW)
WEST- SOUTH	
Chandrapur HVDC back-to-back	1000
Kolhaphur (Talandage)-Chikkodi 220 kV S/c line	130
Ponda-Ambewadi 220 kV S/c line	130
Xeldem-Ambewadi 220 kV S/c line	130
Kolhaphur (Mudshingi)-Chikkodi 220 kV S/c line	130
Raichur - Sholapur 765 kV S/c line	2100
Raichur - Sholapur 765 kV S/c line	2100
Narendra - Kolhapur 765 kV D/c line	2200
Wardha - Nizamabad 765 kV D/c line	4200
Raigarh-Pugulur ± 800 kV HVDC Bi-pole link	6000
Sub-total (West-South)	**18120**
EAST- NORTH EAST	
Birpara-Salakati 220 kV D/c line	260
Siliguri - Bongaigaon 400 kV D/c line	1000
Siliguri - Bongaigaon 400 kV D/c (Quad) line	1600
Sub-total (East- North East)	**2860**
NORTH EAST-NORTH	
Biswanath Chariali - Agra ± 800 kV HVDC Bi-pole	3000
Sub-total (North East –North)	**3000**
TOTAL	**112,250**

Note: (i) The transmission capacity between two regions as mentioned above is the aggregate of capacity of individual transmission lines between the two regions. The ability of a single transmission line to transfer power, when operated as part of the interconnected network is a function of the physical relationship of that line to the other elements of the transmission network and the prevalent load –generation scenario. Hence, the actual power transfer capacity between two regions may be less than the aggregated capacity of the individual transmission lines.

(ii) It is to mention that the inter-regional transmission capacity in one direction may not be same as the inter-regional capacity in other direction. For instance, the maximum capacity of HVDC Raigarh-Pugalur is 6000 MW in WR-SR direction whereas the capacity in reverse direction (i.e. SR-WR) is limited to only 3000 MW. Similarly, the Champa – Kurukshetra HVDC link cannot be operated in reverse direction.

6.5 Development of HVDC Systems during 2017-22

3,819 ckm of HVDC transmissison lines and 14,000 MW of HVDC Bi-pole capacity has been added during the period 2017-22. The total ckm of HVDC lines, bi-pole capacity and back-to back capacity at the end of 2021-22 was 19,375 ckm, 30,500 MW and 3,000 MW respectively. Summary of development of HVDC systems in India till 2021-22 is given in Table 6.5.

<u>Table - 6.5</u>: Development of HVDC systems in India till 2021-22

HVDC Transmission Systems				At the end of 2016-17 (31.03.2017)	Addition during 2017-22	At the end of 2021-22 (31.03.2022)
HVDC Bipole Line						
Chandrapur-Padghe	± 500 kV	MSEB	ckm	1504		1504
Rihand-Dadri	± 500 kV	PGCIL	ckm	1634		1634
Talcher-Kolar	± 500 kV	PGCIL	ckm	2734		2734
Balia-Bhiwadi	± 500 kV	PGCIL	ckm	1580		1580
Mundra-Mohindergarh	± 500 kV	Adani	ckm	1980		1980
Biswanath Chariyali - Agra	± 800 kV	PGCIL	ckm	3506		3506
Champa Pooling Station – Kurukshetra line	± 800 kV	PGCIL	ckm	2574		2574
LILO of Bishwanath Chariali - Agra at Alipurduar	± 800 kV	PGCIL	ckm	44		44
Pugalur - North Trichur	± 320 kV	PGCIL	ckm		288	288
Raigarh - Pugalur	± 800 kV	PGCIL	ckm		3531	3531
TOTAL			ckm	**15556**	**3819**	**19375**
HVDC Bi-pole Transmission Capacity						
Chandrapur-Padghe	bipole	MSEB	MW	1500		1500
Rihand-Dadri	bipole	PGCIL	MW	1500		1500
Talcher-Kolar	bipole	PGCIL	MW	2500		2500
Balia-Bhiwadi	bipole	PGCIL	MW	2500		2500
Mundra-Mohindergarh	bipole	Adani	MW	2500		2500
Biswanath Chariyali – Agra (Pole-I & II)	bipole	PGCIL	MW	3000		3000
Champa - Kurukshetra (Pole-I)	bipole	PGCIL	MW	1500		1500
Alipurduar - Agra (Extn.) HVDC S/S (Pole-III)	bipole	PGCIL	MW	1500		1500
Alipurduar and Agra (Extn) HVDC S/S (Pole -IV)	bipole	PGCIL	MW		1500	1500
Raigarh and Pugalur Station with 6000 MW HVDC Terminal (Pole-I, II, III and IV)	bipole	PGCIL	MW		6000	6000
Champa and Kurukshetra HVDC Station (Pole- II, III and IV)	bipole	PGCIL	MW		4500	4500
HVDC Mono-pole Transmission Capacity						
VSC based HVDC Terminal at Pugalur and North Trishur (2000 MW)	monopole	PGCIL	MW		2000	2000
TOTAL			**MW**	**16500**	**14000**	**30500**

HVDC Transmission Systems				At the end of 2016-17 (31.03.2017)	Addition during 2017-22	At the end of 2021-22 (31.03.2022)
HVDC Back-to-back Transmission Capacity						
Vindhyachal	b-t-b	PGCIL	MW	500		500
Chandrapur	b-t-b	PGCIL	MW	1000		1000
Gazuwaka	b-t-b	PGCIL	MW	1000		1000
Sasaram	b-t-b	PGCIL	MW	500		500
TOTAL			**MW**	**3000**		**3000**

Some of the HVDC systems (Talcher-Kolar HVDC link, Chandrapur-Phadge HVDC link, Sasaram b-t-b etc.) are more than 20 years old. The respective TSPs may review the requirement of refurbishment of these systems.

6.6 Development of 765 kV transmission system during 2017-22

Up to the end of 10th plan (31.03.2007), all 765 kV systems in the country were operated at 400 kV. Sipat to Seoni was the first transmission system that was operated at 765 kV in September, 2007. This set a new milestone in development of transmission system in the country. At the end of 2016-17, 31,240 ckm of 765 kV transmission lines and 167,500 MVA of transformation capacity at 765 kV was existing. During the period 2017-22, 19783 ckm of 765 kV transmission lines and 89,700 MVA of transformation capacity at 765 kV level was added. At the end of 2021-22, 51023 ckm of 765 kV transmission lines and 257,200 MVA transformation capacity at 765 kV level are existing in the country. Details of 765 kV transmission system in India at the end of 2021-22 is given at **Annex 6.1**.

6.7 Challenges faced in implementation of Transmission System during 2017-22

The main challenges faced by implementing agencies in completion of transmission projects include delay in forest clearance, problems of Right of Way and compensation issues, problem in acquisition of land for sub-stations, contractual issues etc. Delay in execution of works has also been due to COVID-19 pendemic. The major challaenges are described below:

6.7.1 Forest Clearance

Forest Clearance is a mandatory requirement for the portion of the line traversing through the forest area. While finalizing the route alignment, emphasis is given to avoid forest, National Parks, Wildlife Sanctuary etc. However, it is not always possible to avoid such areas completely. Getting Forest Clearance takes considerable time due to lengthy process and involvement of different levels. The project executing agency are facing problems in getting the consent of Gram Sabhas which has been made compulsory under Forest Act, 2006. Even the State Governments take lot of time in forwarding the proposal to MoEF&CC for further clearances.

6.7.2 Right of Way (RoW) Issues

With increase in transmission voltage, the requirement of land for tower footing and RoW width increases substantially. Despite adoption of latest technological solutions to optimize the RoW requirements, difficulties in getting RoW results in delay in implementation of transmission projects. Transmission lines are also held up on matters related to payment of compensation and associated court cases.

6.7.3 Land for Sub-stations:

The land for sub-stations is normally government land or private land, which is acquired through Land Acquisition Act, 1984. Sometimes, acquisition of land for sub-station takes considerable time which delays the project. While doing town planning for new sub-urban area and planning of industrial centers, provision for laying transmission line and sub-stations should be kept in mind. To reduce the requirement of land for constructing sub-station, use of Hybrid sub-station and Gas Insulated Sub-stations (GIS) which requires about 30-40% of land compared to conventional sub-station are being increasingly adopted in metro cities, hilly and other areas.

6.7.4 COVID-19 Pandemic

Novel Corona virus (COVID-19) originated in December 2019 and spreaded across the globe during 2020 and 2021. In oder to control wide spread of COVID-19, Government of India had issed orders for national lockdown from last week of March 2020, which affected the manpower mobilization and transportation of materials to project sites, delaying the completion of transmission projects. Due to wide spread of COVID-19 second wave during April’21, May’21 and June’21, the manpower mobilization and transportation of materials to project sites and the construction activities have also been affected.

All the inter-state transmission projects which were under construction as on 25th March, 2020 (date of lockdown), and whose SCoD was not prior to 25th March, 2020, were granted extension of five months in respect of SCoD by Ministry of Power, Government of India, vide letter dated 27th July 2020. Further, all the inter-state transmission projects which were under construction with SCoD coming after 1st April, 2021 were granted an extension of three months in respect of their SCoD by Ministry of Power, Government of India vide letter dated 12th June 2021.

Details of transmission lines and sub-stations (220 kV and above voltage level) slipped from year wise target during 2017-22 are given at **Annex - 6.2**.

6.8 Steps taken to resolve the issues arising in implementation of Transmission Schemes

In fulfillment of obligation under Section 73(f), of the Electricity Act, 2003, Central Electricity Authority (CEA), has to promote and assist in timely completion of projects for improving and augmenting the electricity system.

Accordingly, the physical progress and constraints / bottlenecks in execution of power transmission schemes (interstate & intrastate transmission lines & substations) under Central/State/Private sector (of 220 kV and above voltage levels) in the country are being monitored on regular basis by Power System Project Monitoring (PSPM) Division of CEA to ensure timely completion of transmission schemes.

The quarterly review meetings and meetings exclusively for critical projects (involving serious problems relating to ROW & compensation, contractual issues, clearances from railways, forest/wildlife, civil aviation/ mining/National Highway Authority of India) are being held in Ministry of Power/Central Electricity Authority on regular basis to address critical issues and resolve the bottlenecks in progress & execution of transmission schemes. The unresolved issues are also addressed in multi-tier monitoring mechanism covering PMG Portal/ NITI Ayog / E-Samiksha/ PRAGATI Portal etc.

Officers are also deputed to site to assess actual progress of transmission schemes and to assess severity of issues and take up the matter with respective state/District Authority /Concerned Ministry etc. for its early resolution.

All the power transmission utilities have been assigned User id and password for updating the progress of execution of ongoing transmission projects on monthly basis on the National Power Portal. Based on the information provided by power transmission utilities, CEA publishes various progress reports on monthly basis.

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Chapter-7

Transmission System Requirement during 2022-27

7.1 Formulation of Transmission Plan

7.1.1 Transmission system for a particular timeframe is planned considering the existing transmission system, under construction and planned transmission system likely to be commissioned; existing generation projects, under construction and planned generation projects likely to be commissioned and the projected electricity demand in that timeframe. The transmission system requirement covers the power evacuation system for the generation projects and strengthening of transmission network for meeting the projected electricity demand. The transmission system is evolved keeping in view the overall optimization at National level.

7.1.2 Development of transmission system is a continuous process involving expansion of both inter-State and intra-State transmission network. Studies have been carried out as discussed in detail in Chapter-5 for assessing the transmission system requirement under various scenarios. The transmission system planned for the period 2022-27 has been compiled and presented in this Chapter.

7.2 Transmission System planned during 2022-27

7.2.1 Transmission lines and transformation capacity planned during 2022-27

Based on the planned generation capacity addition and projected electricity demand, about 1,14,687 ckm of transmission lines and 7,76,330 MVA of transformation capacity in the substations at 220 kV and above voltage levels are planned to be added during the period 2022-27. In addition, 1,000 MW of HVDC bi-pole capacity is also planned to be added during 2022-27. The likely growth in transmission system from 2022-23 to 2026-27 is given in Table 7.1.

Table 7.1: Likely growth in transmission system till 2026-27

Transmission System Type / Voltage Class	Unit	At the end of 2021-22 (31.03.2022)	Likely addition during 2022-27	Likely at the end of 2026-27 (31.03.2027)
Transmission lines				
(a) HVDC (± 320 kV/ 500 kV/800 kV Bipole)	ckm	19,375	80	19,455
(b) 765 kV	ckm	51,023	36,558	87,581
(c) 400 kV	ckm	1,93,978	34,618	2,28,596
(d) 230/220 kV	ckm	1,92,340	43,431	2,35,771
Total–Transmission Lines	**ckm**	**4,56,716**	**1,14,687**	**5,71,403**
Sub-stations				
(a) 765 kV	MVA	2,57,200	3,43,500	6,00,700
(b) 400 kV	MVA	3,93,113	2,84,970	6,78,083
(c) 230/220 kV	MVA	4,20,637	1,47,860	5,68,497
Total – Substations	**MVA**	**10,70,950**	**7,76,330**	**18,47,280**
HVDC				

(a) Bi-pole link capacity	MW	30,500	1000	31,500
(b) Back-to back capacity	MW	3000	0	3000
Total- HVDC	**MW**	**33,500**	**1000**	**34,500**

The transformation capacity comprises of 229 Nos. of 1500 MVA 765/400 kV ICTs; 545 Nos. of 500 MVA 400/220 kV ICTs; 56 Nos. of 315 MVA 400/220 kV ICTs; 2 Nos. of 200 MVA 400/132 kV and 1 No. of 100 MVA 400/132 kV ICT. The 400/220 kV ICT includes replacement of 18 Nos. of 315 MVA ICTs by 500 MVA ICTs and several 220/132 kV, 220/66 kV, 220/33 kV ICTs.

Transformation capacity addition planned during 2022-27 is 7,76,330 MVA whereas the transformation capacity added during 2017-22 was 3,49,685 MVA. Transformation capacity requirement is increasing on account of substantial RE capacity being integrated in the grid. RE Potential Zones are concentrated in few states and that too far away from the load centers necessitating transfer of bulk power from the RE potential Zones to the load centers. For long distance transmission of power, generated power is stepped up to 220 kV and further to 400 kV and 765 kV depending on the quantum of power and associated distance. Thereafter at load centres, it is again stepped down from 765 kV to 400 kV and further to 220 kV and lower voltages. Transmission of power at high voltage helps in optimizing right of way and minimize losses.

7.2.2 Transmission system planned under ISTS and intra-State during 2022-27

Details of transmission system planned during 2022-27 under ISTS and Intra- State is given in Table 7.2.

Table 7.2: Transmission lines and transformation capacity under ISTS and intra-state

		At the end of 2016-17 (31.03.2017)	Addition during 2017-22	At the end of 2021-22 (31.03.2022)	Planned addition during 2022-27	At the end of 2026-27 (31.03.2027)	Total
Transmission lines (ckm)	ISTS	1,58,859	41,177	2,00,036	51,185	2,51,221	**5,71,403**
	Intra-State	2,08,992	47,688	2,56,680	63,502	3,20,182	
Transformation capacity (MVA)*	ISTS	2,84,208	1,76,757	4,60,965	4,72,225	9,33,190	**18,81,780**
	Intra-State	4,56,557	1,86,928	6,43,485	3,05,105	9,48,590	

*includes HVDC bi-pole/back-to-back capacity

Details of Inter-State Transmission System (ISTS) planned to be added during the period 2022-27 are given at Annex- 7.1. The Intra-State Transmission System planned to be added during the period 2022-27 are given at Annex- 7.2.

7.2.3 Transmission system added during 2022-23 and 2023-24

14,625 ckm (4,671 ckm in ISTS and 9,954 ckm in intra-State) of transmission lines and 75,902 MVA (23,765 MVA in ISTS and 52,137 MVA in intra-State) of transformation capacity has been added during the year 2022-23.

14,203 ckm (6,283 ckm in ISTS and 7,920 ckm in intra-State) of transmission lines and 70,728 MVA (31,820 MVA in ISTS and 38,908 MVA in intra-State) of transformation capacity has been added during the year 2023-24.

Length of transmission lines in the country (220 kV and above voltage level) as on 31st March, 2024, was 4,85,544 ckm. Total transformation capacity in the country (220 kV and above voltage level) as on 31st March, 2024, was 12,51,080 MVA (including 33,500 MW of HVDC capacity).

Details of target v/s achievement of transmission system augmentation (220 kV and above voltage level) during the years 2022-23 and 2023-24 is summarised in Table 7.3.

Table 7.3: Summary of target v/s achievement during 2022-24

	Target		Achievement	
Year	**Transmission lines (ckm)**	**Sub-station (MVA)**	**Transmission lines (ckm)**	**Sub-station (MVA)**
2022-23	14,581	78,959	14,625	75,902
2023-24	16,682	78,109	14,203	70,728

Target of transmission system augmentation during 2024-25 is 16,667 ckm of transmission lines and 1,16,490 MVA of transformation capacity (220 kV and above voltage level).

7.2.4 Reconductoring of existing transmission lines

In addition to building new transmission lines for transfer of power, reconductoring of existing transmission lines with high capacity conductors is also being done in order to utilize the existing RoW in a more efficient way by enhancing quantum of power in the same RoW. By definition, reconductoring is the process of stringing of new high capacity conductors on existing towers using the same RoW. Requirement of replacement of bay equipment at terminal ends commensurate with rating of new conductor will arise and as such, planning for upgradation of bay equipment also needs to be carried out along with reconductoring. With reconductoring, the power carrying capacity of transmission line generally increases by 2-3 times. Reconductoring of transmission lines (ISTS) planned during the period 2022-27 is given in Table 7.4.

Table 7.4: Reconductoring works (ISTS) planned during 2022-27

Transmission line (ISTS)	Status of reconductoring work
Reconductoring of 400 kV Kishenpur-Kishtwar section (formed after LILO of Kishenpur-Dulhasti line at Kishtwar S/s) with high capacity conductor.	In progress
Reconductoring of 400 kV Jodhpur (Surpura) (RVPN) – Kankroli S/c line with high capacity conductor	Completed
Re-conductoring of Kolhapur (PG) – Kolhapur (MSETCL) 400 kV D/c line with high capacity conductor.	Completed
Reconductoring of Parli (PG) – Parli (MSETCL) 400 kV D/c line with high capacity conductor	Completed
Re-conductoring of NP Kunta - Kolar 400 kV S/c line with high capacity conductor	Completed
Reconductoring of Raichur - Veltoor (Mahabubnagar) 400 kV S/c line with high capacity conductor	In progress
Re-conductoring of Somanahalli - Bidadi 400 kV D/c line with high capacity conductor	In progress
Re-conductoring of Maheshwaram (PG) - Hyderabad 400 kV S/c line with high capacity conductor	In progress
Reconductoring of Jharsuguda/Sundargarh (PG) – Rourkela (PG) 400 kV, 2xD/c line with high capacity conductor.	In progress

Transmission line (ISTS)	Status of reconductoring work
Reconductoring of Maithon RB - Maithon 400 kV D/c line with high capacity conductor	Completed
Reconductoring of Siliguri - Bongaigaon 400 kV D/c line with high capacity conductor	Completed
Reconductoring of Alipurduar - Salakati 220 kV D/c line with high capacity conductor	Completed
Reconductoring of Rangpo (PG) – Gangtok (PG) 132 kV D/c line with high capacity conductor	In progress
Reconductoring of Aizawl (PG) – Luangmual (Mizoram) 132 kV ACSR Panther S/c line with high capacity conductor	In progress
Reconductoring of Loktak (NHPC) – Imphal (PG) 132 kV S/c line with high capacity conductor	In progress
Reconductoring of Melriat (PG) – Zuangtui (Mizoram) 132 kV ACSR Panther S/c line with high capacity conductor	In progress
Reconductoring of Khandong (NEEPCO) – Halflong (PG) 132 kV S/c line [excluding the LILO portion of this line at Umrangshu (AEGCL) S/s, which is owned by AEGCL] with high capacity conductor	In progress
Reconductoring of Halflong (PG) – Jiribam (PG) 132 kV S/c line with high capacity conductor	In progress

Reconductoring of several 400 kV, 220 kV, 132 kV and 66 kV Intra-State lines have been planned by the State Utilities. Details of reconductoring works are given in Annex 7.1 and Annex 7.2.

7.3 Transmission system for delivery of power to green hydrogen/green ammonia manufacturing hubs

As per information furnished by MNRE, green hydrogen/green ammonia manufacturing is planned in the coastal areas of Odisha, West Bengal, Gujarat, Andhra Pradesh, Tamil Nadu and Karnataka. As per initial estimates, electricity demand likely by 2026-27 on account of green hydrogen/green ammonia production is about 10,500 MW. MNRE is re-assessing the electricity demand on account of green hydrogen/green ammonia production by the year 2026-27.

Transmission system has been planned for delivery of power to green hydrogen/green ammonia manufacturing hubs in Odisha, Gujarat, Andhra Pradesh and Tamil Nadu in the initial phase for meeting the electricity demand of 10,500 MW by the year 2026-27 as given in Table 7.5. Detailed transmission system is given at Annex 7.1.

Table 7.5: Likely electricity demand on account of Green hydrogen/green ammonia production

Manufacturing Hub	State	Likely electricity demand in 2026-27 (MW)	Status of transmission system
Paradeep	Odisha	1500	Transmission system is under bidding
Gopalpur	Odisha	1500	Transmission system is under bidding
Mundra	Gujarat	1500	Transmission system is under bidding
Kandla	Gujarat	3000	Transmission System has been planned
Kakinada	Andhra Pradesh	1500	Transmission System has been planned
Tuticorin	Tamil Nadu	1500	Transmission System has been planned

The planned transmission system would be taken up for implementation in a phased manner commensurate with the progress of establishment of green hydrogen/green ammonia manufacturing hubs.

7.4 Transmission and sub-transmission infrastructure in border areas

The existing, under construction and planned transmission schemes would also cater to the power requirement of border areas. Several transmission schemes are under construction/ have been planned in Ladakh, Himachal Pradesh, Uttarakhand, Rajasthan, Gujarat, Sikkim and Arunachal Pradesh.

Revamped Distribution Sector Scheme (RDSS) was launched in July, 2021, with the objective of improving the quality and reliability of power supply to consumers through a financially sustainable and operationally efficient distribution sector. The scheme is for a period of five years from 2021-22 to 2025-26. RDSS has a universal coverage and is mainly focussed on strengthening of sub-transmission and distribution network for the benefit of consumers including tribal, remote, hilly and border areas.

Further, Ministry of Defence, had identified certain locations wherein extension of electricity distribution infrastructure was required for defence establishments/camps in the States/UTs of Arunachal Pradesh, Himachal Pradesh, Ladakh, Sikkim and Uttarakhand. The sanctioned works under RDSS includes the works identified by Ministry of Defence.

7.5 Inter-Regional Transmission Links

The total Inter-Regional transmission capacity addition planned during the period 2022-27 is 30,690 MW. With this, the Inter-Regional transmission capacity would increase from 1,12,250 MW (as on 31st March, 2022) to 1,42,940 MW by the end of 2026-27. Inter-regional transmission capacity of 6,490 MW has been commissioned during 2022-24 (till 31st March, 2024). The total Inter-regional transmission capacity as on 31st March, 2024, was 1,18,740 MW. Summary is given in the Table 7.6 and Table 7.7.

Table 7.6: Inter-Regional Transmission Capacity (MW)

Inter-Regional Transmission Capacity (MW)			
Inter-Regional corridors	**At the end of 2021-22 (31.03.2022)**	**Addition planned during the period 2022-27**	**At the end of 2026-27 (31.03.2027)**
West – North	36,720	18,400	55,120
North East - North	3,000	0	3,000
East – North	22,530	0	22,530
East – West	21,190	1,600	22,790
East – South	7,830	0	7,830
West – South	18,120	10,000	28,120
East - North East	2,860	690	3,550
Total	**1,12,250**	**30,690**	**1,42,940**

Table 7.7: Inter-Regional Transmission Capacity (MW)

Inter-Regional Transmission Capacity (MW)				
Inter-Regional corridors	**At the end of 2021-22 (31.03.2022)**	**At the end of 2023-24 (31.03.2024)**	**Addition planned during the period 2024-27**	**At the end of 2026-27 (31.03.2027)**
West – North	36,720	38,320	16,800	55,120

Inter-Regional Transmission Capacity (MW)				
North East – North	3,000	3,000	0	3,000
East – North	22,530	22,530	0	22,530
East – West	21,190	21,190	1,600	22,790
East – South	7,830	7,830	0	7,830
West – South	18,120	22,320	5,800	28,120
East - North East	2,860	3,550	0	3,550
Total	**1,12,250**	**1,18,740**	**24,200**	**1,42,940**

Out of the 24,200 MW inter-regional capacity addition planned during the period 2024-27, 7,400 MW capacity is under construction, 8,400 MW capacity is under bidding and 8,400 MW capacity is planned and has to be taken up for bidding/construction during the year 2024-25. Details of the Inter-Regional transmission corridors planned during 2022-27 is given at Annex- 7.3.

The summation of the transmission capacities of inter-Regional links is a figurative representation of the transmission capacity between the regions. These aggregate numbers do not indicate actual power transfer capability across different regions/states. The power transfer capability between two points in a grid depends upon a number of factors such as power flow pattern, voltage stability, angular stability, loop flows, line loading limits etc. Hence, the actual power transfer capacity between two regions may be less than the summation of the transmission capacity of Inter-Regional links. The system operator would have to assess the transfer capability between two points of the grid from time to time.

Further, the inter-regional transmission capacity in one direction may not be same as the inter-regional transmission capacity in other direction. For instance, the maximum capacity of Raigarh (WR) – Pugalur (SR) HVDC link is 6,000 MW in WR-SR direction whereas the capacity in reverse direction (i.e. SR-WR) is limited to only 3,000 MW. Similarly, the Champa (WR) – Kurukshetra (NR) HVDC link cannot be operated in reverse direction at present. The inter-regional transmission capacity considering the reversal capability of HVDC links is given in Table 7.8:

Table 7.8: Inter-Regional Transmission Capacity considering capacity of HVDC links in reverse direction (MW)

Inter-Regional Transmission Capacity (MW)				
Inter-Regional corridors	**At the end of 2021-22 (31.03.2022)**	**At the end of 2023-24 (31.03.2024)**	**Addition planned during the period 2024-27**	**At the end of 2026-27 (31.03.2027)**
North-West	29,220	30,820	16,800	47,620
North- North East	3,000	3,000	0	3,000
North-East	19,530	19,530	0	19,530
West-East	21,190	21,190	1,600	22,790
South-East	5,530	5,530	0	5,530
South-West	15,120	19,320	5,800	25,120
North East- East	2,860	3,550	0	3,550
Total	**96,450**	**1,02,940**	**24,200**	**1,27,140**

7.6 Reactive Compensation

7.6.1 Voltage control in an electrical power system is important for proper operation of electrical power equipments, preventing damage due to overheating of generators and motors, insulation failure, reducing transmission losses and to maintain the ability of the system to withstand and prevent voltage collapse. Voltage control is essential on account of several reasons namely:

- Power-system equipments are designed to operate within a range of voltages, usually within ±5% to ±10% of the nominal voltage.
- To maximize the amount of real power that can be transferred across a transmission line, reactive-power flows must be minimized.
- Reactive power flow on transmission system incurs real-power losses.

7.6.2 The above reasons necessitate proper reactive power management in power system. In order to provide adequate reactive compensation, line reactors as well as bus reactors have been planned and the same is summarised in Tables 7.9.

Table 7.9: Summary of Bus and Line Reactors planned during the period 2022-27

Summary of Bus and Line Reactors planned during the period 2022-27					
Region	**Period**	**Bus Reactors (MVAr)**		**Line Reactors (MVAr)**	
		765 kV	**400 kV**	**765 kV**	**400 kV**
NR	**2022-27**	12720	9580	36570	2518
WR	**2022-27**	11220	6875	16290	1448
SR	**2022-27**	5910	2875	12600	310
ER	**2022-27**	1800	1000	660	412
NER	**2022-27**	0	410	0	176
All India	**2022-27**	31650	20740	66120	4864
Total MVAr compensation planned during 2022-27		**52390**		**70984**	

7.6.3 In addition to the above reactive compensation devices that provide reactive power support to the grid under steady state conditions, several Dynamic Compensation devices such as Static Var Compensators (SVCs) and Static Compensators (STATCOMs) are under implementation. These devices have been planned to provide dynamic stability to the Grid under contingency conditions and to provide fast robust system response to severe disturbances in the grid where voltage recovery is crucial. At present, 20 Nos. of STATCOMs/SVCs have been commissioned, 13 Nos. of STATCOMs are under implementation and 2 Nos. of STATCOMs have been planned in ISTS. Details are given in Annex-7.4.

In addition to the above, following dynamic compensation devices have been commissioned/ planned under intra-State transmission system:

i. ± 120 MVAr STATCOM at Timbdi S/s of GETCO (commissioned)
ii. ± 300 MVAr STATCOMs each at 765 kV Jaisalmer S/s and 400 kV Bhadla S/s of RVPNL (Planned)
iii. ± 100 MVAr, STATCOMs each at 220 kV Phalodi S/s and 220 kV Tinwari S/s of RVPNL (Planned)

Space provisions are being kept at several under construction/ planned sub-stations for installation of STATCOMs as per requirement in future.

7.7 Estimated cost of Transmission System during the period 2022-27

An estimated expenditure of Rs. 4,25,222 Crore would be required for implementation of additional transmission system of 220 kV and above voltage level in the country (Transmission lines, Substations, and reactive compensation etc.) during the period 2022-27.

The estimated cost of Inter State Transmission System is Rs. 2,69,150 Crores and the estimated cost of intra-State transmission system is Rs. 1,56,072 Crores.

7.8 Conclusions

The transmission system addition during 2022-27 has been worked out based on estimates of peak electricity demand and generation capacity addition likely during the period 2022-27. Transmission system has also been planned for delivery of power to green hydrogen/green ammonia manufacturing hubs as per initial estimates.

1,14,687 ckm of transmission lines and 7,76,330 MVA of transformation capacity (220 kV and above voltage level) is planned to be added during the period 2022-27. In addition, 1000 MW of HVDC bi-pole capacity is also planned to be added.

Chapter – 8

Perspective Transmission Plan for 2027-32

8.1 Introduction

This Chapter covers the transmission system requirement during the period 2027-32. The state-wise projected electricity demand and generation capacity addition are required to plan the transmission system. Requirement of transmission system has been worked out broadly based on estimates of peak electricity demand and generation capacity addition planned during the period 2027-32.

8.2 Assessment of Electricity Demand

8.2.1 Demand assessment is an essential prerequisite for planning of generation capacity addition and commensurate transmission system required to meet the projected electricity requirement of various sectors of the economy. The type and location of power projects to be planned in the system is largely dependent on the magnitude, spatial distribution as well as the variation of electricity demand during the day, seasons and on a yearly basis. Therefore, planning for generation capacity addition and commensurate transmission system is largely dependent on assessment of the future electricity demand.

8.2.2 As per the revised 20th Electric Power Survey (EPS) Report (draft), all-India peak electricity demand is expected to increase from about 296 GW in 2026-27 to about 388 GW in 2031-32 as given in Table 8.1.

Table 8.1: Forecast of annual Peak Electricity Demand during 2031-32 as per revised 20th EPS Report (draft)

Region	Peak Electricity Demand (MW)
Northern Region	1,29,562
Western Region	1,19,480
Southern Region	1,09,525
Eastern Region	50,479
North- Eastern Region	5,870
All-India	**3,87,710**

8.3 Assessment of Generation Capacity:

8.3.1 Installed generation capacity in the year 2031-32 as per National Electricity Plan (Vol I: Generation) would be 900 GW as given in Table 8.2. This requirement of installed generation capacity is based on the peak electricity demand projection of 366 GW during 2031-32 as per the 20th EPS Report brought out in October, 2022.

Table 8.2: Installed Generation Capacity (MW) in 2031-32 as per NEP (Generation)

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar[1]	Biomass	Small Hydro	Total	BESS
Northern	54320	5781	28956	5360	6520	21327	168575	4758	1867	297464	35995
Western	93951	10806	5952	4780	3940	39842	69104	4569	742	233686	0
Southern	54495	6492	10802	14646	9220	60726	125730	5407	2129	289646	11249
Eastern	56127	100	6765	1900	0	0	954	743	387	66975	0
North Eastern	750	1644	9704	0	0	0	203	23	326	12650	0

All - India	**259643**	**24824**	**62178**	**26686**	**19680**	**121895**	**364566**	**15500**	**5450**	**900422**	**47244**

[1] Includes 60,207 MW of solar rooftop capacity

Considering the RE potential zones as per MNRE/SECI which are to be integrated to ISTS network as well as the RE capacity addition planned to be integrated to the intra-state network by the States during 2027-32, additional planned coal based capacity, additional pumped storage capacity etc., the installed generation capacity is likely be about 997 GW by 2031-32 as given in Table 8.3 and Figure 8.1. This installed generation capacity has been considered for planning the transmission system.

Table 8.3: Likely Installed Generation Capacity (MW) in 2031-32 for planning of transmission system

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar[1]	Biomass	Small Hydro	Total	BESS
Northern	60610	5781	29303	12500	6520	23327	156037	4758	1867	**300703**	25995
Western	105906	10806	5952	6340	3940	66604	122289	4569	742	**327148**	10000
Southern	58395	6492	11064	14856	9220	74628	104711	5407	2129	**286902**	11249
Eastern	58142	100	6765	1900	0	0	1033	743	386	**69069**	0
North Eastern	750	1644	9704	0	0	0	1083	23	326	**13530**	0
All - India	**283803**	**24823**	**62788**	**35596**	**19680**	**164559**	**385153**	**15500**	**5450**	**997352**	**47244**

[1] Includes 60,207 MW of solar rooftop capacity

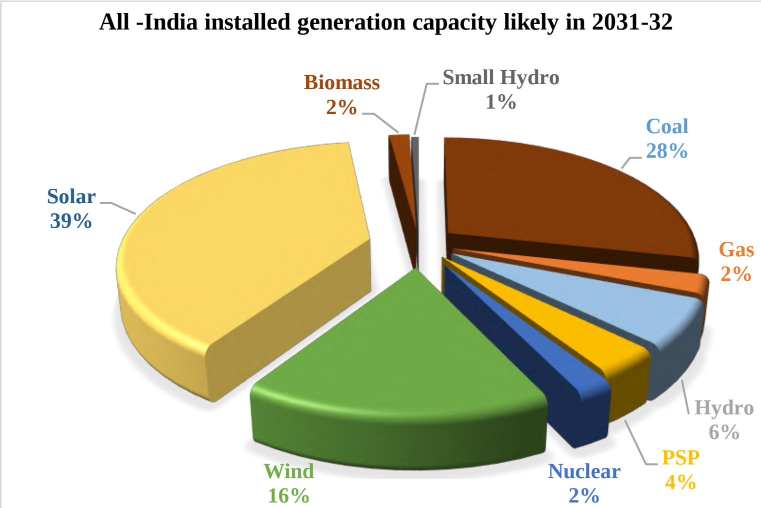

Fig. 8.1: All-India Installed generating capacity likely in 2031-32

8.4 Load-Generation Scenarios and Transmission Capacity requirement for 2027-32

8.4.1 Load generation scenarios have been worked out considering different scenarios corresponding to seasonal load and generation variations. Nine scenarios, three each for February, June and August (i.e. evening peak electricity demand, night off-peak electricity demand, afternoon high solar generation) have been considered.

8.4.2 The availability factor for various type of RE generation sources, varies throughout the day and across the seasons. While arriving at the dispatch from different RE generation sources for the year 2031-32, normative values have been considered. Dispatch in real time will depend on the electricity demand and availability of the resource. Due to low availability of gas, low availability factor has been considered for Gas based generation projects. Accordingly, the generation dispatch factors and load generation balance for nine scenarios are given in Annex- 8.1.

8.4.3 From the load generation balance for different scenarios, it is observed that as far as installed generation capacity is concerned, all the regions have surplus installed capacity. However, considering dispatch priority from RE sources, during afternoon maximum solar generation scenario in February, Northern and Western regions are net exporter of power due to large installed capacity of solar generation in the region whereas Southern and Eastern regions are net importer of power. In the high electricity demand scenario in June evening, Western and Southern regions are net exporters due to high wind generation, as the installed capacity of wind generation is high in both the regions. Coal based installed generation capacity is also high in Western region. Western and Southern regions are also net exporter of power in the night off-peak electricity demand scenario in June and August. Eastern region is net importer of power in most of the scenarios due to very low RE installed capacity in the region and high electricity demand on account of Green hydrogen/ Green Ammonia manufacturing in the region. Southern region is net exporter of power during evening peak demand and night off-peak electricity demand scenarios of June and August, as electricity demand in Southern region is comparatively low in these months as compared to February.

8.4.4 Data of transmission lines and sub-stations planned during 2027-32 along with relevant details have been obtained from CTUIL/STUs and Electricity Departments. Data received has been collated and discussed with CTUIL/STUs/Electricity Department, wherever discrepancies were observed. Transmission system for evacuation of power from the RE potential zones has been planned considering BESS capacity of 47.2 GW during 2027-32 as per National Electricity Plan (Generation). This reduces the requirement of transmission system and increases its utilisation.

8.5 Transmission system planned during 2027-32

8.5.1 ckm and MVA capacity planned for the period 2027-32

Based on the analysis, about 76,787 ckm of transmission lines and 4,97,855 MVA of transformation capacity in the substations at 220 kV and above voltage levels are planned to be added during the period 2027-32. In addition, 32,250 MW of HVDC bi-pole capacity is also planned to be added. Details are given in Table 8.4.

Table 8.4: Transmission lines and sub-station capacity addition by 2031-32

Transmission System Type / Voltage Class	Unit	At the end of 2021-22 (31.03.2022)	Likely addition during 2022-27	Likely at the end of 2026-27 (31.03.2027)	Likely addition during 2027-32	Likely at the end of 2031-32 (31.03.2032)
Transmission lines						
(a) HVDC (± 320 kV/ 500 kV/800 kV Bipole)	ckm	19,375	80	19,455	15,432	34,887
(b) 765 kV	ckm	51,023	36,558	87,581	27,138	1,14,719
(c) 400 kV	ckm	1,93,978	34,618	2,28,596	20,989	2,49,585
(d) 230/220 kV	ckm	1,92,340	43,431	2,35,771	13,228	2,48,999
Total–Transmission Lines	**ckm**	**456716**	**1,14,687**	**5,71,403**	**76,787**	**6,48,190**
Sub-stations						
(a) 765 kV	MVA	2,57,200	3,43,500	6,00,700	3,19,500	9,20,200
(b) 400 kV	MVA	3,93,113	2,84,970	6,78,083	1,35,745	8,13,828
(c) 230/220 kV	MVA	4,20,637	1,47,860	5,68,497	42,610	6,11,107
Total – Substations	**MVA**	**10,70,950**	**7,76,330**	**18,47,280**	**4,97,855**	**23,45,135**
HVDC						
(a) Bi-pole link capacity	MW	30,500	1000	31,500	32,250	63,750

Transmission System Type / Voltage Class	Unit	At the end of 2021-22 (31.03.2022)	Likely addition during 2022-27	Likely at the end of 2026-27 (31.03.2027)	Likely addition during 2027-32	Likely at the end of 2031-32 (31.03.2032)
(b) Back-to back capacity	MW	3,000	0	3,000	0	3,000
Total- HVDC	**MW**	**33,500**	**1000**	**34,500**	**32,250**	**66,750**

The transformation capacity comprises of 213 Nos. of 1500 MVA 765/400 kV ICTs; 244 Nos. of 500 MVA 400/220 kV ICTs; 43 Nos. of 315 MVA 400/220 kV ICTs; 1 No. of 200 MVA 400/132 kV ICT; 1 No. of 100 MVA 400/132 kV ICT and several 220/132 kV, 220/66 kV, 220/33 kV ICTs.

Details of transmission system addition during 2027-32 under ISTS and Intra- State is given in Table 8.5:

Table 8.5: Transmission lines and transformation capacity under ISTS and intra-state

		At the end of 2021-22 (31.03.2022)	Planned addition during 2022-27	At the end of 2026-27 (31.03.2027)	Planned addition during 2027-32	At the end of 2031-32 (31.03.2032)	Total
Transmission lines (ckm)	ISTS	2,00,036	51,185	2,51,221	43,324	2,94,545	**6,48,190**
	Intra-State	2,56,680	63,502	3,20,182	33,463	3,53,645	
Transformation capacity (MVA)*	ISTS	4,60,965	4,72,225	9,33,190	3,48,165	12,81,355	**24,11,885**
	Intra-State	6,43,485	3,05,105	9,48,590	1,81,940	11,30,530	

*including HVDC bi-pole/back-to-back capacity

Details of Inter-State Transmission System (ISTS) planned to be added during the period 2027-32 are given at Annex- 8.2. The Intra-State Transmission System planned to be added during the period 2027-32 are given at Annex- 8.3. Additional thermal and nuclear based capacity addition during 2027-32 is 47,730 MW and 7,600 MW respectively. The list of thermal and nuclear projects along with associated transmission system is given at Annex- 8.4 and Annex- 8.5 respectively.

Resource adequacy plan of intra-State transmission system till the year 2031-32 is being prepared and States/UTs are in the process of firming up the intra-State transmission plan for 2027-32. Hence, the figures of transmission capacity addition (ckm and MVA) during 2027-32 would be reviewed subsequently.

8.5.2 Transmission system for delivery of power to green hydrogen/green ammonia manufacturing hubs

As per information furnished by MNRE, green hydrogen/green ammonia manufacturing is planned in the coastal areas of Gujarat, Odisha, West Bengal, Andhra Pradesh, Tamil Nadu and Karnataka. Transmission system for meeting the electricity demand on account of green hydrogen/green ammonia production by the year 2026-27 is given in Chapter 7. As per initial estimates, electricity demand likely by 2031-32 on account of green hydrogen/green ammonia production is about 70,500 MW as given in Table 8.6. MNRE is re-assessing the electricity demand on account of green hydrogen/green ammonia production by the year 2031-32.

Table 8.6: Likely electricity demand on account of Green hydrogen/green ammonia production

Manufacturing hub	State	Likely electricity demand in 2031-32 (MW)
Paradeep	Odisha	3150
Gopalpur	Odisha	5400
Kendarpada	Odisha	1500
Malkangiri	Odisha	1800

Rayagada	Odisha	1100
Shyama Prasad Mukherjee Port	West Bengal	1000
Mundra	Gujarat	22000
Kandla	Gujarat	10290
Kakinada	Andhra Pradesh	6000
Pudimadka (near Vizag Port)	Andhra Pradesh	5000
Ramayapatnam	Andhra Pradesh	4000
Tuticorin	Tamil Nadu	7000
Mangalore	Karnataka	1500
New Mangalore Port	Karnataka	750
Total		**70490**

The electricity demand on account of green hydrogen/ammonia production would be maximum (100 %) during solar generation hours. Some green hydrogen/ammonia manufacturers have indicated that they would produce green hydrogen/green ammonia only during solar generation hours and would produce only green ammonia during non-solar hours, thereby resulting in substantial reduction in electricity demand in non-solar hours. Some green hydrogen/ammonia manufacturers have indicated that they would be tying up power from solar, wind and storage and would operate round the clock. As per these manufactures, electricity demand would be maximum during solar generation and wind generation hours. Accordingly, the electricity demand on account of green hydrogen/ ammonia production would be about 45 % during evening peak demand period and about 55 % during night off-peak demand scenario as compared to the electricity demand in the afternoon solar generation scenario.

Though MNRE is re-assessing the electricity demand on account of green hydrogen/green ammonia production by 2031-32, transmission system has been planned for delivery of power to all the green hydrogen/green ammonia production hubs mentioned above and the detailed transmission system is given at Annex- 8.2. The planned transmission system would be taken up for implementation in a phased manner commensurate with the progress of establishment of green hydrogen/green ammonia manufacturing hubs.

Some green hydrogen/green ammonia manufacturers have indicated electricity demand of the order of 1-5 MW, mostly at inland locations. Power supply to these green hydrogen/green ammonia production sites would be extended from the existing network depending on the connectivity sought by these developers.

8.5.3 Inter-Regional Transmission Links

To cater to the import/export requirement of various regions, Inter-Regional Transmission links totalling to 24,600 MW have been planned during 2027-32. The Inter-Regional Transmission Capacity is likely to increase to 1,67,540 MW by 2031-32. Details of planned Inter-Regional Transmission Links are given at Annex- 8.6. The summary of inter-regional transmission capacity planned till the year 2031-32 is summarised in Table 8.7.

Table 8.7: Inter-Regional Transmission Capacity (MW)

Inter-Regional Transmission Capacity (MW)			
Inter-Regional corridors	**At the end of 2026-27 (31.03.2027)**	**Addition planned during the period 2027-32**	**At the end of 2027-32 (31.03.2032)**
West - North	55,120	6,000	61,120
North East - North	3,000		3,000
East - North	22,530	6000	28,530

Inter-Regional Transmission Capacity (MW)			
Inter-Regional corridors	**At the end of 2026-27 (31.03.2027)**	**Addition planned during the period 2027-32**	**At the end of 2027-32 (31.03.2032)**
East - West	22,790		22,790
East - South	7,830	4,200	12,030
West - South	28,120	8,400	36,520
East - North East	3,550		3,550
Total	**1,42,940**	**24,600**	**1,67,540**

Based on load-flow studies, details of inter-regional power flow in base case for each of the nine scenarios are given in Annex- 8.7. The summary of the inter-regional power flow is given in the Table 8.8.

Table 8.8: Inter-regional power flow in different scenarios in 2031-32

(Figures in MW)

	ER-NR	ER-WR	ER-SR	WR-NR	WR-SR	NER-ER
June Evening Peak	-584	-8222	378	16673	-10973	908
June Night Off-peak	-5981	-7747	2354	1833	-5702	-854
June Solar Peak	-12161	-18839	4206	-11619	8328	-1054
August Evening Peak	1154	-6180	21	8017	-14290	3038
August Night Off-peak	183	-7148	1593	9391	-9768	1575
August Solar Peak	-8060	-17054	4232	-9981	5699	1500
February Evening Peak	-4773	-187	4288	-7313	-5836	1188
February Night Off-peak	-8282	-2140	6837	-11217	10999	-758
February Solar Peak	-16065	-14095	5420	-21555	14588	-1825
Maximum Power Flow between two Regions	**16065**	**18839**	**6837**	**21555**	**14588**	**3038**
Power Transmission Capacity between Two Regions	**28530**	**22790**	**12030**	**61120**	**36520**	**3550**

8.5.4 Greening the Andaman & Nicobar Islands

Electricity demand of Andaman & Nicobar Islands is primarily met through electricity generated using DG sets with some small-scale renewable energy sources such as solar and wind power. It is planned to connect Andaman & Nicobar Islands with main land of the country through HVDC under-sea cables. The ±320 kV, 250 MW HVDC (VSC based) interconnection of 1,150 km through under-sea cable (capacity of cable: 500 MW) will be first of its kind in the country connecting Port Blair, Andaman, to Paradeep, Odisha (Fig. 8.2). Tentative cost of this Phase-I transmission system would be Rs. 31,000 Crore (approx.). Implementation timeframe of the scheme is about 60 months.

In Phase-II, another 250 MW HVDC terminal would be added at both Paradeep and Nicobar Islands along with under-sea cable from Port Blair to Nicobar Islands to meet the electricity demand of Nicobar Islands.

Fig 8.2: Paradeep - Andaman HVDC link

8.6 Reactive Compensation

For providing reactive compensation, line reactors as well as bus reactors have been planned and the same is summarised in Table 8.9.

Table 8.9: Summary of Bus and Line Reactors planned during the period 2027-32

Summary of Bus and Line Reactors planned during the period 2027-32					
Region	**Period**	**Bus Reactors (MVAr)**		**Line Reactors (MVAr)**	
		765 kV	**400 kV**	**765 kV**	**400 kV**
NR	**2027-32**	4140	3250	8520	410
WR	**2027-32**	7830	3250	10440	702
SR	**2027-32**	5940	2750	8760	820
ER	**2027-32**	240	375	2880	0
NER	**2027-32**	0	250	0	320
All India	**2027-32**	18150	9875	30600	2252
Total MVAr compensation planned during 2022-27		**28025**		**32852**	

STATCOMs have also been planned with some of the transmission schemes. The requirement of reactive compensation would be reviewed while finalising the transmission schemes for implementation.

8.7 Estimated cost of Transmission System during the period 2027-32

An estimated expenditure of Rs. 4,90,920 Crore would be required for implementation of additional transmission system of 220 kV and above voltage level in the country (Transmission lines, Substations, and reactive compensation etc.) during the period 2027-32. The estimated cost of Inter State Transmission System is Rs. 3,91,624 Crores and the estimated cost of intra-State transmission system is Rs. 99,296 Crores.

ISTS network for evacuation of power from some of the potential RE Zones has been planned considering storage capacity co-located with RE generation. Further, the States/UTs are in the process of firming up the intra-State transmission plan for the 2027-32. Hence, the estimated of transmission system during 2027-32 may change depending on the finalised intra-State transmission plan, materialisation of storage capacity etc.

8.8 Conclusions

The transmission system during 2027-32 has been worked out based on estimates of peak electricity demand and generation capacity addition likely during the period 2027-32. Transmission system has also been planned for delivery of power to green hydrogen/green ammonia manufacturing hubs.

76,787 ckm of transmission lines and 4,97,855 MVA of transformation capacity (220 kV and above voltage level) is planned to be added during the period 2027-32. In addition, 32,250 MW of HVDC bi-pole capacity is also planned to be added.

Transmission system for evacuation of power from the RE potential zones has been planned considering some storage capacity co-located with RE generation. Further, States/UTs are in the process of firming up the intra-State transmission plan for 2027-32. Hence, the figures of transmission capacity addition (ckm and MVA) during 2027-32 would be reviewed subsequently based on generation capacity addition, intra-State transmission plan, materialisation of planned BESS capacity, progress of green hydrogen/green ammonia manufacturing hubs etc.

Chapter - 9

Cross Border Inter-Connections

9.1 Cross Border Power Transfer

The cross border power transfer between India and neighbouring countries is taking place through inter-Governmental bilateral cooperation. The planning of cross border interconnection, system operation, commercial agreement, Regulatory matters etc. are in accordance with the bilateral agreement between Governments.

India, being centrally placed in South Asian region and sharing political boundaries with SAARC/BIMSTEC countries namely Nepal, Bhutan, Bangladesh, Myanmar & Sri Lanka, is playing a major role in facilitating planning of interconnections with these countries for effective utilization of regional resources. This will also ensure Energy Security of the entire region. Existing and planned cross border interconnections between India and neighbouring countries are given below:

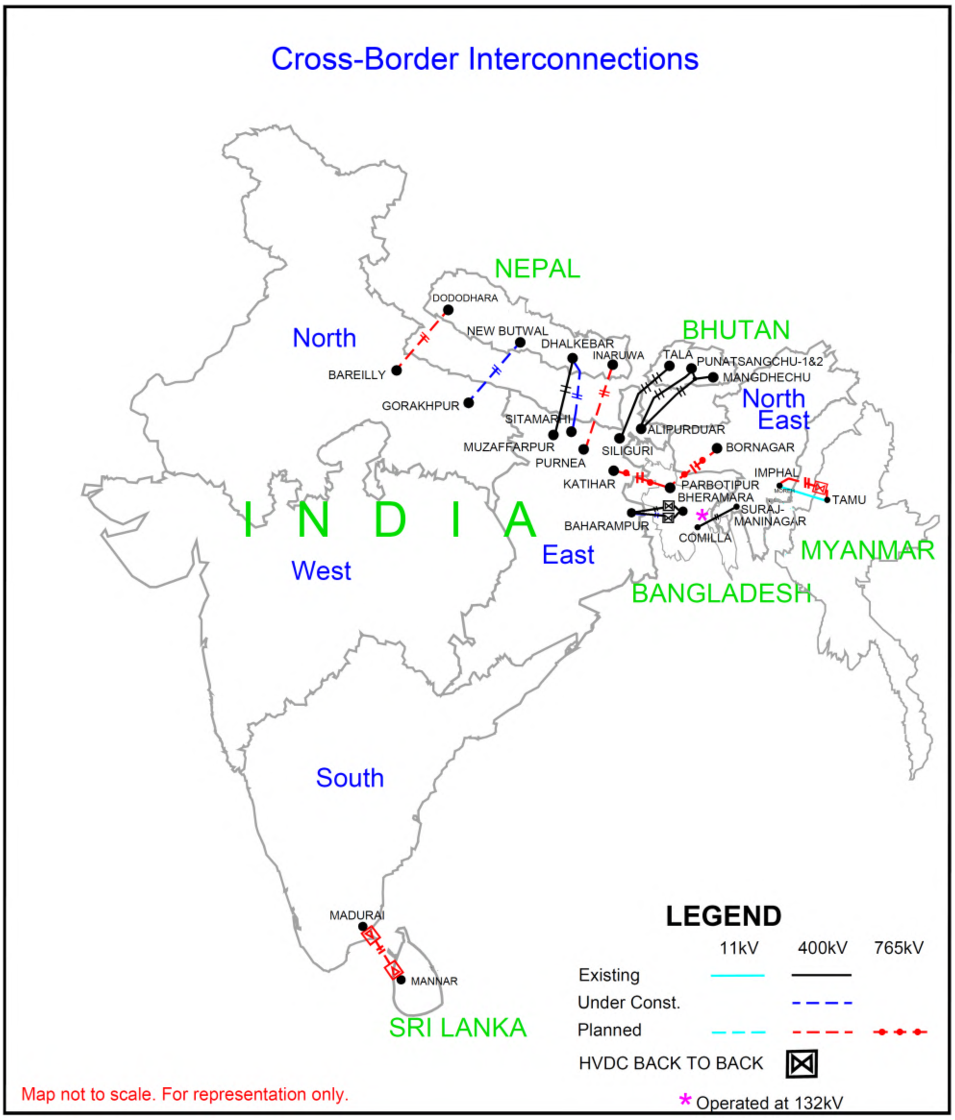

Fig 9.1: Cross Border Interconnections

9.2 Guidelines on Cross Border Trade of Electricity

Guidelines for Import/Export (Cross Border) of Electricity 2018, was issued by Ministry of Power on 18th December 2018, with the following objectives:

- Facilitate import/ export of electricity between India and neighbouring countries;
- Evolve a dynamic and robust electricity infrastructure for import/export of electricity;
- Promote transparency, consistency and predictability in regulatory mechanism pertaining to import/ export of electricity;
- Reliable grid operation and transmission of electricity for import/ export.

Ministry of Power has appointed Member (Power Systems), Central Electricity Authority, as Designated Authority under Clause 4.2 of the "Guidelines for Import/Export (Cross Border) of Electricity 2018" for facilitating the process of approval and laying down the procedure for import/ export of electricity. The Designated Authority has issued "Procedure for approval and facilitating Import/Export (Cross Border) of Electricity" on 26th February, 2021. Broad functions of Designated Authority are as under:

a) To facilitate coordination with nodal agencies/Authority of Neighbouring Countries (ANC) for transmission system planning, joint system studies, surveys, preparation of feasibility study reports, system development, construction, erection, monitoring, testing, commissioning, operation and maintenance of transmission system for Import/Export (Cross Border) of Electricity in a transparent manner, etc.
b) To lay down procedure for safety, security and coordinated operation of the interconnected national grids.
c) To facilitate grant of approval to eligible entities to participate in Import/Export (Cross Border) of Electricity.
d) To lay down procedure for grant of approval to an Indian generating station, supplying electricity exclusively to neighbouring country for building a dedicated transmission line for connecting to the transmission system of neighbouring country.

9.3 Agreements with Neighbouring Countries

9.3.1 India-Bhutan

An agreement was signed between Government of the Republic of India and The Royal Government of Bhutan on the 28th July, 2006, on "Cooperation in the Field of Hydroelectric Power". The agreement, inter-alia, envisages development and construction of hydro power projects and associated transmission systems as well as trade in electricity between the two countries, both through public and private sector participation.

9.3.2 India-Bangladesh

A Memorandum of Understanding (MoU) was signed between Government of the Republic of India and Government of the People's Republic of Bangladesh on the 11th January, 2010 on "Cooperation in Power Sector". The MoU, inter alia envisages cooperation in power generation, transmission, energy efficiency, development of various types of renewable energy and establishment of grid connectivity between the two countries.

9.3.3 India-Nepal

An agreement was signed between the Government of the Republic of India and the Government of Nepal on the 21st October, 2014 on "Electric Power Trade, Cross-Border Transmission Interconnection and Grid Connectivity". The agreement, inter alia, envisages cooperation in the power sector, including developing transmission interconnections, grid connectivity, power exchange and trading through the governmental, public and private enterprises of the two countries on mutually acceptable terms.

9.3.4 India-Myanmar

A Memorandum of Understanding (MoU) between the Govt. of the Republic of India and the Govt. of the Republic of the Union of Myanmar on Cooperation in the field of Power Sector was signed on 19th October, 2016. The MoU, inter- alia, envisages cooperation in the field of power sector including investments for mutual benefit, cooperation in power generation, transmission, energy efficiency and development of various types of renewable energy including hydropower, trading and transfer of power at a mutually agreed price and procedure, consultancy services, training, research and development programmes for the development of human resources and enhancement of productivity and efficiency in the power sector.

9.3.5 India- Saudi Arabia

A Memorandum of Understanding (MoU) was signed between Government of the Republic of India and Government of the Kingdom of Saudi Arabia on the 8th October, 2023, in the fields of Electrical Interconnection, Green/Clean Hydrogen and Supply Chains. The MoU, inter alia envisages cooperation in the field of electrical interconnection, exchange of electricity during peak times and emergencies, co-development of projects and co-production of green/clean hydrogen and renewable energy in both countries and establishing secure, reliable and resilient supply chains of materials used in green/clean hydrogen and the renewable energy sector in accordance with their capabilities, the applicable laws and regulations of their respective countries and based on the principles of equality, mutual benefit and respect.

9.3.6 India- United Arab Emirates

A Memorandum of Understanding (MoU) between Ministry of Power of the Republic of India and Ministry of Energy and Infrastructure of the United Arab Emirates on Cooperation in the field of Electricity Interconnection and Trade was signed on the 13th day of February, 2024. The MoU, inter alia envisages cooperation in the field of Electrical Interconnection and Trade, Regulatory Affairs, Clean Energy development and trade including Green Hydrogen and Energy Storage, knowledge exchange on net zero activities.

9.3.7 SAARC Framework Agreement

"SAARC Framework Agreement for Energy Cooperation (Electricity)" was signed by member countries of SAARC during the 18th SAARC Summit held at Kathmandu, Nepal on 26-27 November, 2014. This Agreement, inter-alia, has enabling provisions for following:

i) Cross border trading of electricity on voluntary basis
ii) Planning of cross border grid interconnection by transmission planning agencies of the Governments through bilateral/trilateral/mutual agreements, based on the needs of the trade in the foreseeable future through studies and sharing technical information required for the same.
iii) Building, owning, operating and maintaining the associated transmission system of cross-border interconnection falling within respective national boundaries and/or interconnected at mutually agreed locations.
iv) Joint development of coordinated network protection systems incidental to the cross-border interconnection to ensure reliability and security of the grids of the Member States.
v) Joint development of coordinated procedures for the secure and reliable operation of the inter-connected grids and to prepare scheduling, dispatch, energy accounting and settlement procedures for cross border trade.

9.3.8 MoU for establishment of BIMSTEC Grid Interconnection

A Memorandum of Understating for establishment of the BIMSTEC Grid Interconnection was signed between member states of BIMSTEC on 31st August, 2018. Under this MoU, BIMSTEC Grid Interconnection Coordination Committee (BGICC) has been formed to actively coordinate for successful implementation of grid interconnections and trade in electricity.

The BGICC is to prepare the BIMSTEC Grid Interconnection Master Plan Study, formulate BIMSTEC Policy for Transmission of Electricity and BIMSTEC Policy for Trade, Exchange of Electricity and Tariff Mechanism.

9.4 Existing Cross Border Inter-Connections

9.4.1 India-Bhutan

Presently, about 2,070 MW power from the existing hydro power projects in Bhutan is being exported to India**.** The associated cross-border transmission system for evacuation and transfer of power from these HEPs is being operated in synchronism with the Indian Grid**.**

Chukha HEP (336 MW):

i) Chukha (Bhutan)-Birpara (West Bengal) 220 kV D/C line

ii) Chukha (Bhutan) - Malbase - Birpara (West Bengal) 220 kV S/C line

Kurichu HEP (60 MW):

i) Gelephu (Bhutan)-Salakati (Assam) 132 kV S/C line

ii) Motanga (Bhutan) – Rangia (Assam) 132 kV S/C line

Tala HEP (1020 MW):

i) Tala (Bhutan) – Siliguri (West Bengal) 400 kV 2xD/C lines (one of the circuit of a D/C line is LILOed at Malbase S/S in Bhutan

Dagachu HEP (126 MW)

i) Power from Dagachhu HEP is exported to India using transmission system associated with Chukha and Tala HEPs through Dagachhu-Tsirang-Rurichhu-Chukha 220 kV S/c line.

Mangdechu HEP (720 MW)

i) Jigmeling – Alipurduar 400 kV D/c (Quad) line

Punatsangchu-I HEP (1200 MW)

i) Punatsangchu-I – Alipurduar 400 kV D/c (Quad) line

Punatsangchu-II HEP (1020 MW)

i) Punatsangchu-II – Alipurduar 400 kV D/c (Quad) line

(Punatsanghu I & II HEPs are yet to be commissioned but the associated transmission line works have been completed)

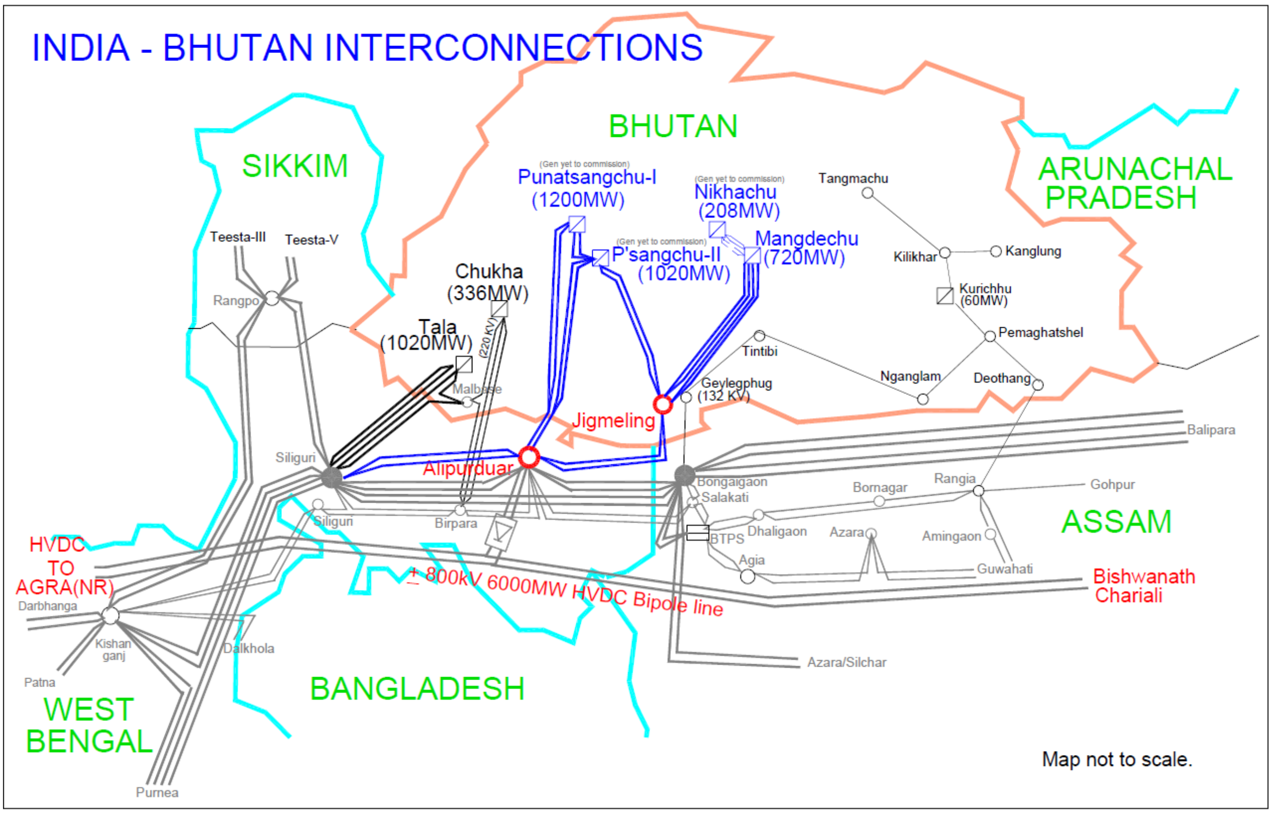

Fig 9.2: India – Bhutan Interconnections

Power from the 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 link.

9.4.2 India- Bangladesh

1) India is supplying power to the extent of 1160 MW to Bangladesh through the following existing interconnections:

   i) Baharampur (India) - Bheramara (Bangladesh) 2x400 kV D/C line alongwith 2x500 MW HVDC back-to-back Station at Bheramara.

   ii) Surajmaninagar (Tripura) – Bangladesh (Comilla) 400 kV D/C line (operated at 132 kV)

2) Planned links

   i) 765 kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link (likely commissioning 2028-29)

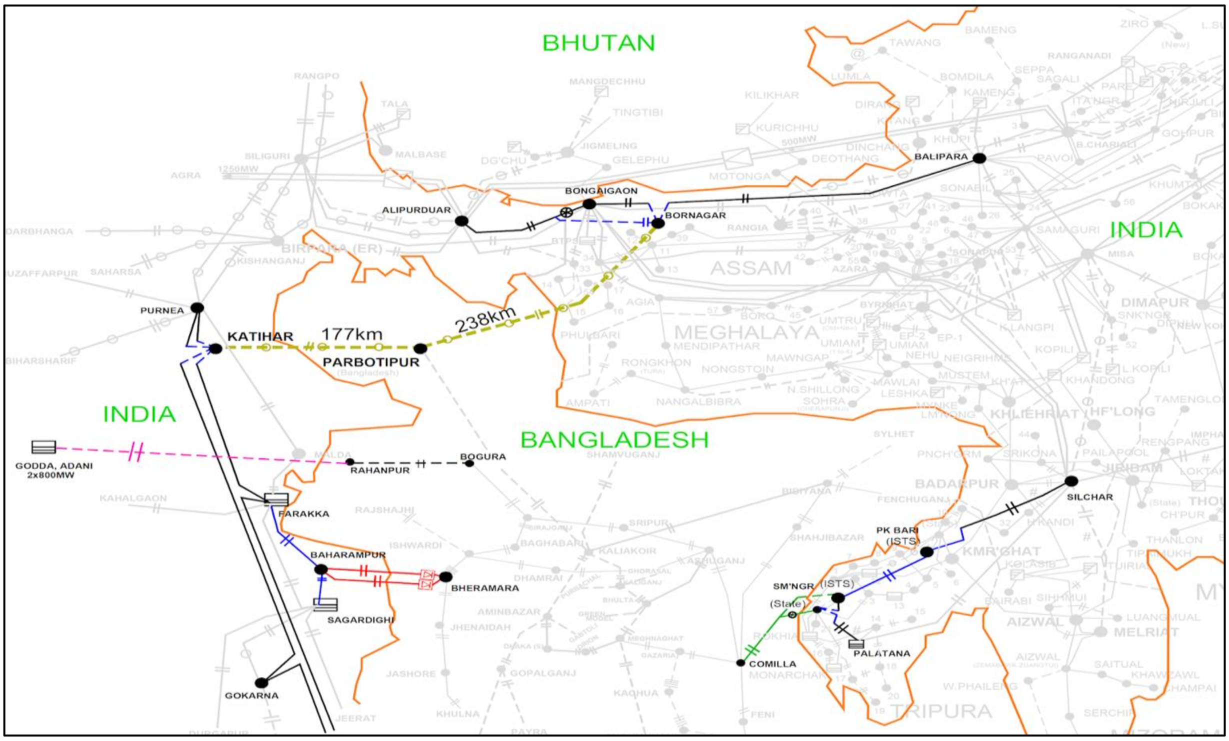

Fig 9.3: India – Bangladesh Interconnections

9.4.3 India-Nepal

At present, Nepal is drawing power from India through cross border interconnections at 11 kV, 33 kV, 132 kV and 400 kV voltage level. Details of the same are given below:

Existing links

(i) Muzaffarpur (India) - Dhalkebar (Nepal) 400 kV D/C line
(ii) Tanakpur HEP (India) -Mahendra Nagar (Nepal) 132 kV S/C line

Under implementation links

(i) Gorakhpur (India) – New Butwal (Nepal) 400 kV D/c (Quad) line
(ii) Arun-3 HEP (Nepal) – Dhalkebar (Nepal) – Sitamarhi (India) 400 kV D/c (Quad) line for evacuating power from Arun-3 (900 MW) HEP and other hydro projects

Planned links

(i) Dododhara (Nepal) - Bareilly (New) (India) 400 kV D/c (Quad) line (likely commissioning 2028-29)
(ii) Inaruwa (Nepal) - Purnea (New) (India) 400 kV D/c (Quad) line (likely commissioning 2027-28)

State Grids - Nepal

Several interconnections at 132 kV and below voltage level exist /planned between Nepal and State grid of Bihar, Uttar Pradesh and Uttarakhand as mentioned below:

Transmission line	Status
Bihar (BSPTCL)-Nepal	
Kataiya –Kushaha 132 kV transmission line (3 circuits)	Existing

Ramnagar – Surajpura 132 kV S/c transmission line	Existing
Raxaul – Parwanipur 132 kV D/c transmission line	Existing
Kataiya – Rajbiraj 33 kV S/C line	Existing
Jainagar – Siraha 33 kV S/C line	Existing
Sursand (Pupri) – Janakpur (Jaleshwer) 33 kV S/C line	Existing
Raxaul-Birganj 33 kV S/C line	Existing
Uttar Pradesh (UPPTCL)-Nepal	
New Nautanwa – Mainhiya 132 kV D/c line	Existing
Nanpara –Nepalgunj 33 kV S/C line	Existing
Nanpara – Kohalpur 132 kV D/C line	Under Construction

In addition, some 11 kV links exist between Uttarakhand (UPCL) and Nepal, Bihar and Nepal, Uttar Pradesh and Nepal. However, these links are not in service. Some other 33 kV links also exist between Uttar Pradesh and Nepal which are not in service

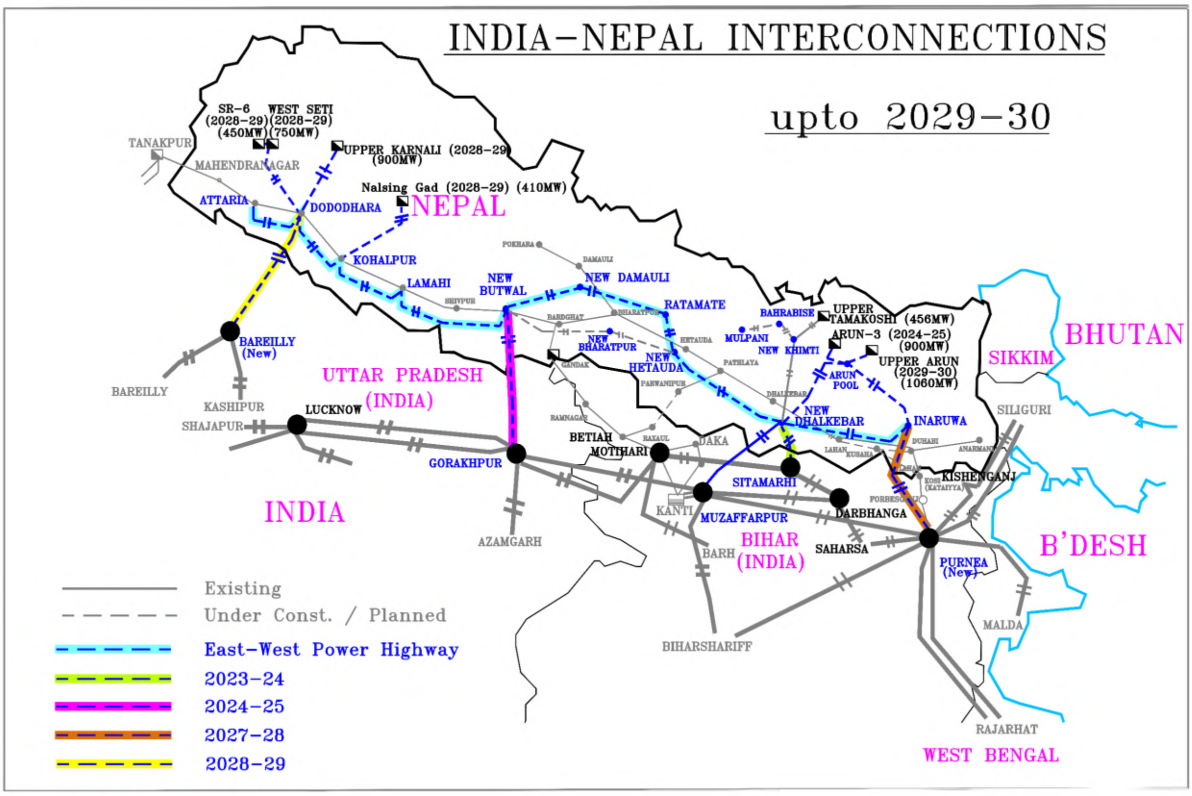

Fig. 9.4: India – Nepal Interconnections

9.4.4 India-Myanmar

India is providing about 2 to 3 MW power (since 5th April 2016) from Manipur (India) to Myanmar through 11 kV transmission line from Moreh in Manipur (India) to Tamu Town in Myanmar. Further, a 500 MW HVDC interconnection between India (Imphal) and Myanmar (Tamu) has been agreed. Additionally, low voltage radial interconnection between India and Myanmar from Indian States (Arunachal Pradesh, Manipur, Mizoram and Nagaland) are under consideration.

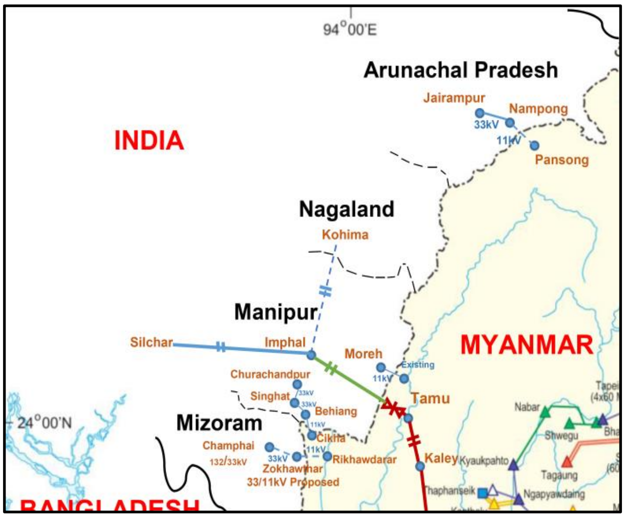

Fig. 9.5: India – Myanmar Interconnections

9.4.5 India-Sri Lanka

Detailed Project Report (DPR) for the India- Sri Lanka Grid Interconnection, i.e, between New Madurai (India) and Mannar (Sri Lanka) 1000 MW VSC HVDC Bipole line, with HVDC terminals at both ends in two phases of 500 MW each has been agreed.

Fig. 9.6: India – Sri Lanka Interconnection

9.5 One Sun One World One Grid (OSOWOG) Initiative

The idea for the One Sun One World One Grid (OSOWOG) initiative was put forth by the Hon'ble Prime Minister of India at the First Assembly of the International Solar Alliance (ISA) in October 2018. The vision behind the OSOWOG initiative is the mantra that “the sun never sets”. The OSOWOG initiative aims to connect different regional grids through a common grid that will be used to transfer power generated from renewable energy and, thus, realize the potential of renewable energy sources, especially solar energy.

Renewable resources such as hydro, solar and wind, vary in abundance from country to country. Various renewable energy sources can be shared across different locations by integrating power grids through transnational interconnections. If there is excess solar or wind energy in one region/country, that energy can be transmitted to another region/country that may have a shortage of renewable energy, resulting in an increased overall share of renewable energy in the regional power supply mix. Even the requirement for storage facilities would reduce with the integration of electricity grids. Time diversity in solar availability is another important factor that helps in better utilisation of Solar Energy across countries. The aggregation of multiple power systems with diversity in supply and demand, allows for meeting the peak electricity demand with fewer resources and lowering the total reserve requirements, thereby reducing investments and maintenance expenses in costly generating units.

The key drivers and enabling factors behind the transmission interconnection of regional power grids to facilitate the smooth transfer of renewable energy are political support, regional coordination mechanisms, institutional framework, commercial agreements, legal and regulatory mechanism etc.

Under OSOWOG initiative, interconnection of Indian Electricity Grid with Singapore, Saudi Arabia, UAE, Maldives, etc. are under discussion.

9.6 Conclusions

Cross border interconnections have a vital role in ensuring energy transition. With grid interconnections, the surplus clean sources of electricity in one country can be effectively utilised by other countries. Time diversity in solar generation can be very effectively utilised with interconnections. With the existing/planned interconnections, hydro generation of Bhutan and Nepal is being exported to India. During lean hydro season, power is being exported from India to Nepal and Bhutan to meet the electricity demand. Power is also being exported by India to Bangladesh. Detailed Project Report of interconnection between India and Sri Lanka has already been agreed. Under OSOWOG initiative, interconnection of Indian Electricity Grid with Maldives, Singapore, UAE, Saudi Arabia etc. are under discussion.

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Chapter – 10

Transmission Plan for Integration of Renewable Energy Sources

10.1 Introduction

The installed generating capacity from RE sources as on 31st March, 2022, was 157 GW (including 46.72 GW large hydro), which was about 39% of the total installed capacity. As on 31st May, 2024, the installed electricity generating capacity in the country from RE sources was 193.5 GW (including 46.92 GW large hydro), which is about 43.5% of the total installed electricity generating capacity in the country. For enabling growth of Renewable Energy (RE) capacity, areas which have high solar and wind energy potential, needs to be connected to Inter-State Transmission System (ISTS), so that the power generated could be evacuated to the load centers. The gestation period of wind and solar based generation projects being much less than the gestation period of associated transmission system, transmission system has to be planned well in advance. As a significant step towards successfully achieving the planned RE capacity, transmission system has been planned for evacuation of power from about 613 GW of RE capacity by the year 2032 and the same is given in this Chapter.

10.2 Status of Transmission System associated with RE

Transmission system has been planned for about 613 GW of RE capacity by the year 2032. Status of Transmission System associated with RE capacity is given in Table 10.1.

Table 10.1

RE Capacity and status of associated Transmission System

		RE Capacity (GW)
RE Capacity existing (as on 31.05.2024)		193.5
RE capacity (Solar and Wind) for which ISTS network is under implementation (*Transmission system for 82.2 GW RE Capacity is under construction and transmission system for 55.0 GW RE Capacity is under bidding*)		137.2
RE Capacity (Solar and Wind) for which ISTS network has been planned		159.4
RE Capacity to be integrated to intra-state network	GEC Scheme	24.0
	Other	47.0
Additional Hydro capacity (including Pumped Storage Plants)		51.6
Total		**612.7**

Transmission system (ISTS) is under implementation (under construction/bidding) for 137.2 GW wind and Solar capacity, and for 159.4 GW wind and solar capacity, ISTS network has been planned. State-wise bifurcation of the potential Solar and Wind zones for which ISTS network is either under implementation or has been planned is given in Table 10.2.

Table 10.2

Wind and Solar Potential Zones

State/District	Capacity (GW)
Northern Region	
Rajasthan	99.15

State/District	Capacity (GW)
Ladakh	13.00
Sub Total (NR)	**112.15**
Western Region	
Gujarat	60.00
Maharashtra	7.75
Madhya Pradesh	12.18
Sub Total (WR)	**79.93**
Southern Region	
Andhra Pradesh	58.0
Karnataka	26.5
Tamil Nadu	6.0
Telangana	13.0
Sub Total (SR)	**103.5**
NER	
Assam	1.0
Sub Total (NER)	**1.0**
Total	**296.58**

As renewable energy sources especially solar and wind generation capacity become increasingly integrated into the grid, their intermittent and variable nature poses challenges to grid stability. Dynamic compensation devices would be required to provide dynamic voltage support and reactive power compensation, enhancing grid reliability and enabling the seamless integration of renewable energy. Energy Storage Systems (ESS) also helps to integrate the variable and intermittent RE sources by storing excess energy during surplus RE generation and providing backup power during periods of deficient RE generation.

Several STATCOMs have been planned along with the transmission system associated with RE. Energy storage (BESS and Pumped Storage Plants) have also been planned.

10.3 Transmission system for evacuation of power from solar and wind potential zones in Northern Region

10.3.1 Rajasthan

Status of upcoming ISTS network for 99.15 GW solar and wind potential zones in Rajasthan is given in Table 10.3 and Figure 10.1.

Table 10.3
Status of upcoming ISTS network in Rajasthan

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Under Implementation *(implementation timeframe by 2026-27)*	a) Fatehgarh-II (Phase-II)	2.2	27.15
		b) Bhadla-II (Phase-II)	1.05	
		c) Fatehgarh-III (Phase II) (erstwhile Ramgarh)	1.9	
		d) Fatehgarh-II (Phase III)	1	
		e) Fatehgarh-III (new section) (Phase III)	6	
		f) Fatehgarh IV (Phase III)	2.1	
		g) Ramgarh (Phase III)	2.9	

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
		h) Bhadla II (Phase III)	1.5	
		i) Bhadla-III (Phase III)	0.5	
		j) Bikaner II (Phase IV: Part 1)	4	
		k) Bikaner III (Phase IV: Part 1)	4	
2	Under Tendering *(implementation timeframe by 2026-27)*	a) Fatehgarh IV(Phase IV: Part 2)	4	22
		b) Barmer- I (Phase IV: Part 2)	1.5	
		c) Bikaner IV (Phase IV: Part 3)	6	
		d) Fatehgarh IV(Phase IV: Part 4)	1	
		e) Barmer-I (Phase IV: Part 4)	2.5	
		f) Nagaur (Phase IV: Part 4)	1	
	Under Tendering *(implementation timeframe 2027-32)*	g) Bhadla-III (HVDC) (Phase III)	6	
3	Planned *(implementation timeframe by 2026-27)*	a) Fatehgarh- IV	1.855	50
		b) Barmer- I	2	
		c) Sirohi	2	
		d) Nagaur	1	
		e) Ramgarh	1	
	Planned *(implementation timeframe 2027-32)*	f) Ajmer	2	
		g) Sirohi	1	
		h) Bikaner-V	4	
		i) Jalore	3	
		j) Sanchore	3	
		k) Pali	3	
		l) Bhadla IV	5	
		m) Ramgarh	9	
		n) Fatehgarh- IV	5.145	
		o) Barmer- I	1	
		p) Barmer –II	6	
	Total			**99.15**

Note: Transmission system for the RE potential zones is being developed in phases. eg. Fatehgarh IV (Phase III) denotes transmission system being taken up under Phase-III for evacuation of RE potential at Fatehgarh IV.

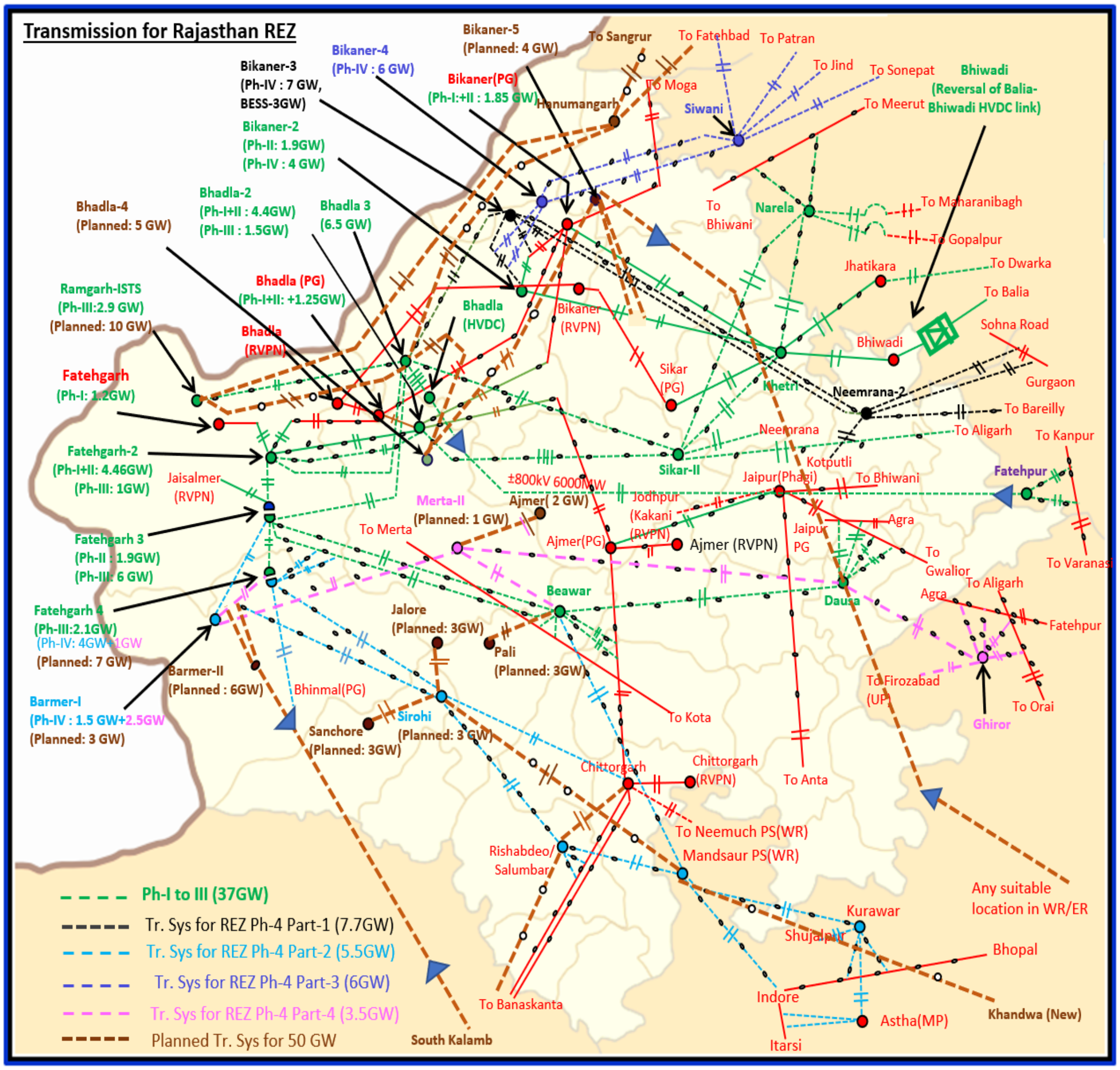


Fig. 10.1: Transmission system for evacuation of RE power in Rajasthan

10.3.2 Ladakh

Status of upcoming ISTS network for 13 GW RE capacity in Ladakh is given in Table 10.4 and Figure 10.2.

Table 10.4
Status of upcoming ISTS network in Ladakh

Sl. No.	Status of transmission scheme	RE Potential Zone	Identified Potential (GW)	Total (GW)
1.	Under Implementation *(HVDC system being implemented by Powergrid under RTM. AC system beyond Kaithal to be implemented under TBCB route in matching timeframe of the HVDC*	Leh	(9 GW solar + 4 GW wind + 12 GWh Storage)	13

Sl. No.	Status of transmission scheme	RE Potential Zone	Identified Potential (GW)	Total (GW)
	system) *(implementation timeframe 2027-32)*			

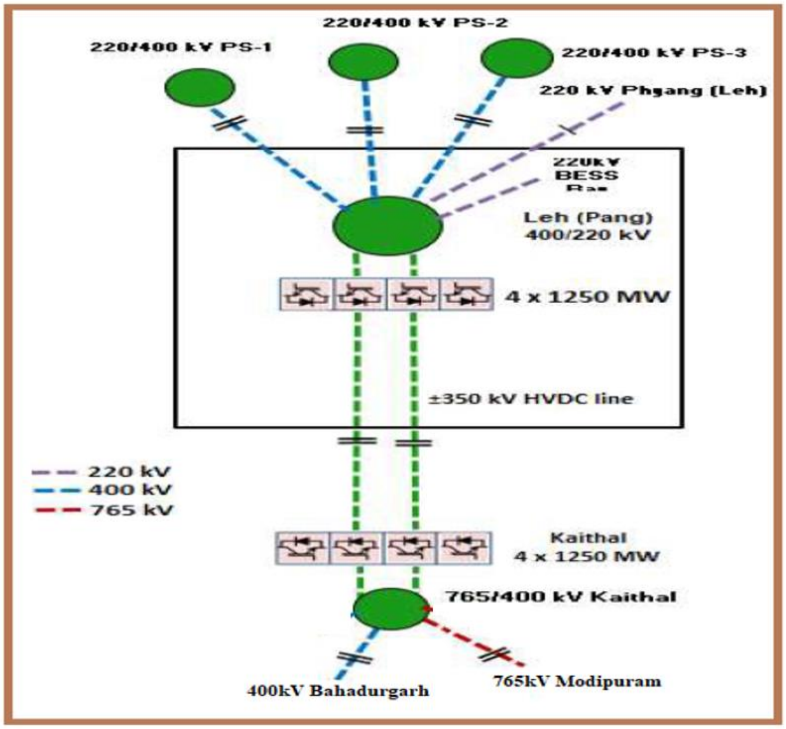


Fig. 10.2: Transmission system for evacuation of RE power from renewable energy parks in Leh

Details of the ISTS network in Northern Region with broad scope of works is given at Annex 10.1

10.4 Transmission system for evacuation of power from solar and wind potential zones in Western Region

10.4.1 Gujarat

Status of upcoming ISTS network for 60.0 GW solar and wind potential zones in Gujarat is given in Table 10.5 and Figure 10.3, 10.4.

Table 10.5
Status of upcoming ISTS network in Gujarat

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Under Implementation *(implementation timeframe by 2026-27)*	a) Khavda (Phase-II)	5	13.5
		b) Khavda (Phase-III)	7	
		c) Lakadia	1	
		d) Bhuj PS	0.5	
2	Under Tendering	a) Khavda (Phase-IV)	7	17

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
	(implementation timeframe by 2026-27)	b) Bhuj II	0.5	
		c) Jam Khambhaliya	1.5	
	Under Tendering *(implementation timeframe 2027-32)*	d) Khavda (Phase-V) (HVDC)	8	
3	Planned *(implementation timeframe by 2026-27)*	a) Lakadia	2.5	29.5
		b) Bhuj II	1.5	
		c) Radhanesda	3	
	Planned *(implementation timeframe 2027-32)*	d) Khavda (Phase VI)	10	
		e) Radhanesda	7.5	
		f) Offshore wind	5	
	Total			**60.0**

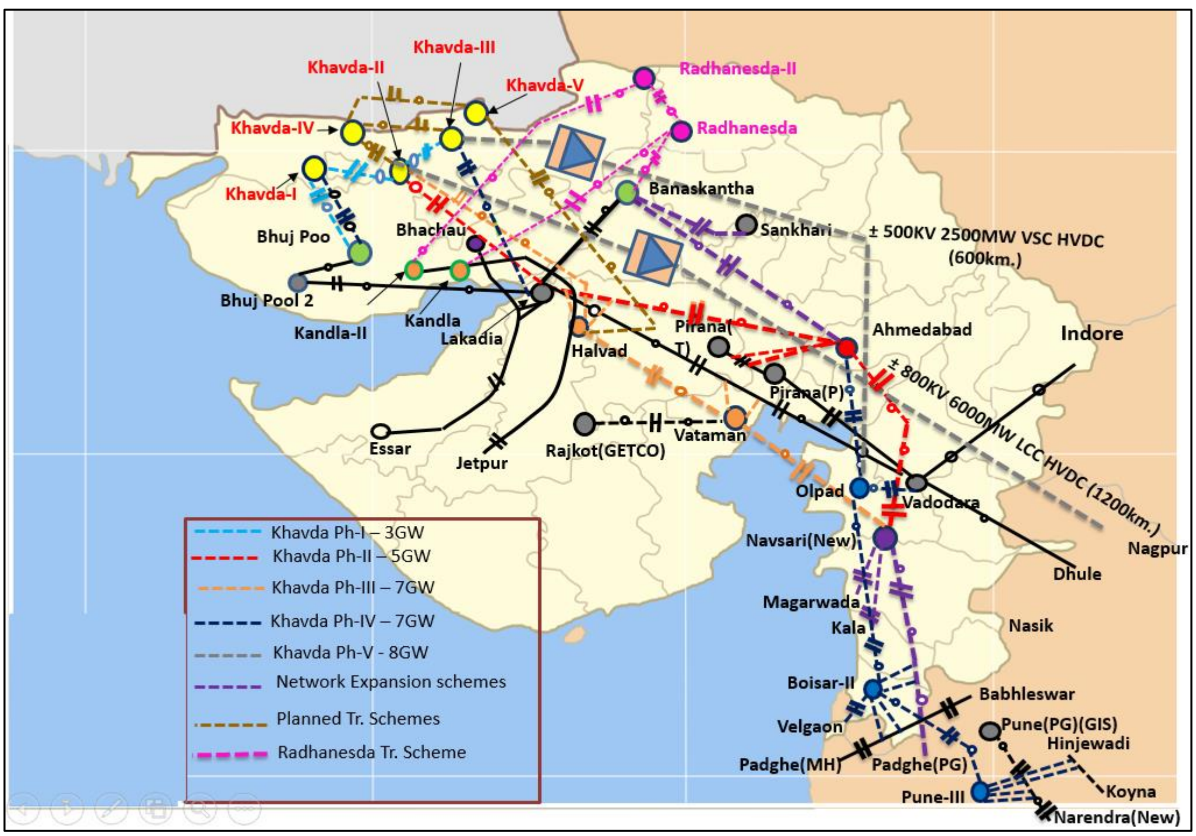


Fig. 10.3: Transmission system for evacuation of RE power in Gujarat

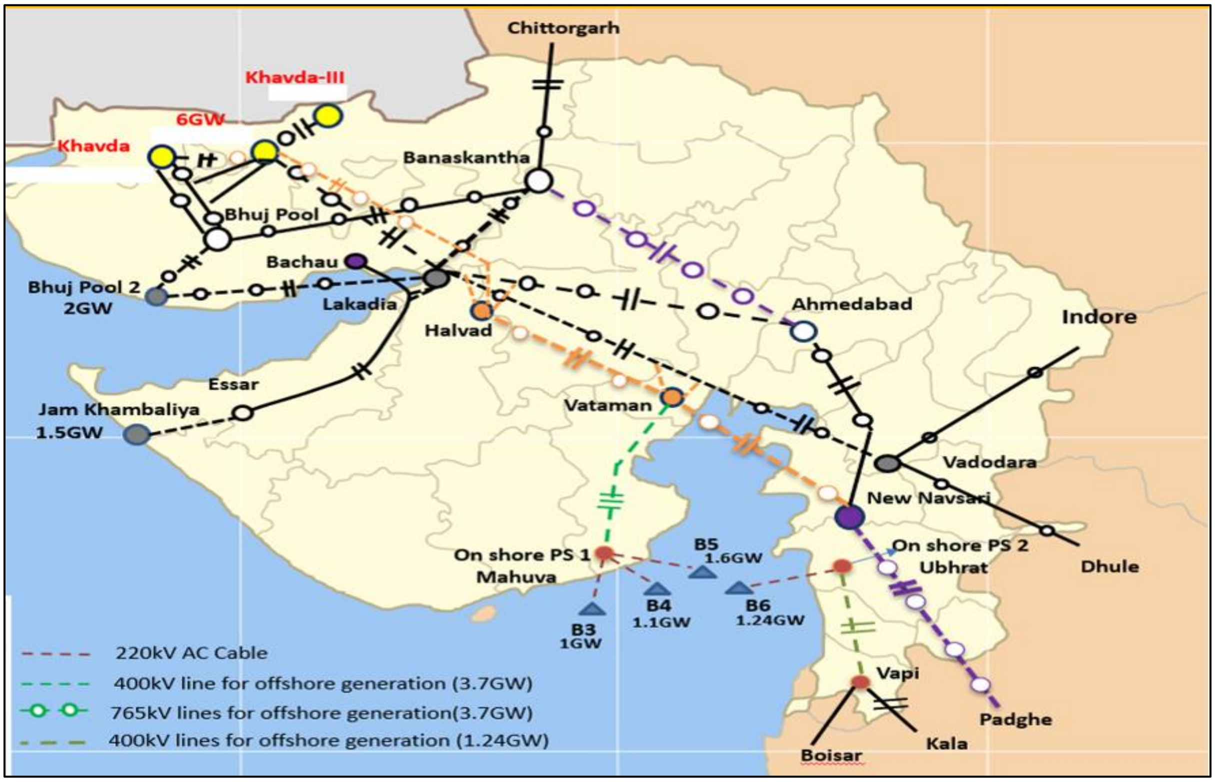


Fig. 10.4: Transmission system for off-shore wind potential zones in Gujarat

10.4.2 Maharashtra

Status of upcoming ISTS network for 7.75 GW solar and wind potential zones in Maharashtra is given in Table 10.6 and Figure 10.5.

Table 10.6
Status of upcoming ISTS network in Maharashtra

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1.	Under Implementation *(implementation timeframe by 2026-27)*	a) Kallam/ Parli	1	7.75
		b) Solapur [to be integrated at existing Solapur (PG) S/s]	2	
		c) Solapur	1.5	
		d) Dhule	2	
		e) Kallam	1.25	
	Total			**7.75**

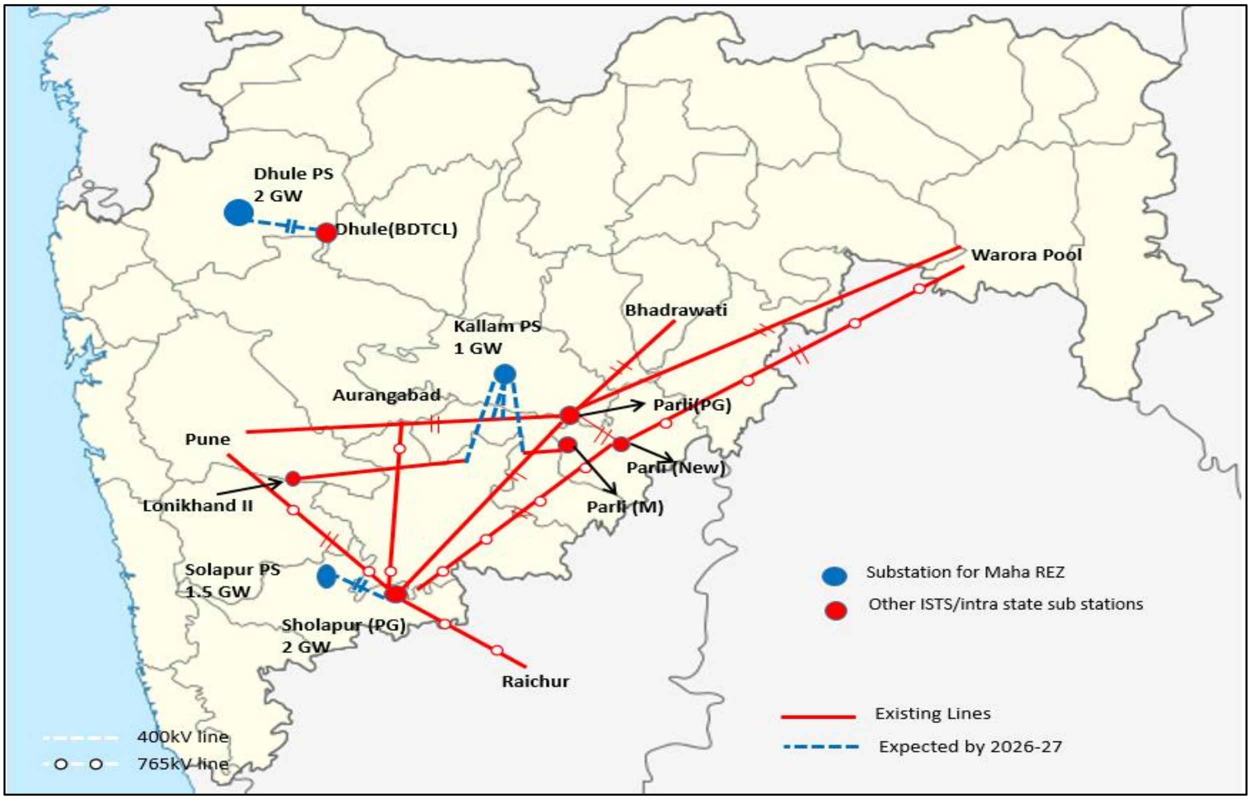


Fig. 10.5: Transmission system for evacuation of RE power in Maharashtra

10.4.3 Madhya Pradesh

Status of upcoming ISTS network for 12.18 GW wind and solar potential zones in Madhya Pradesh is given in Table 10.7 and Figure 10.6.

Table 10.7
Status of upcoming ISTS network in Madhya Pradesh

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1.	Under Implementation *(implementation timeframe by 2026-27)*	a) Rajgarh	0.776	1.776
		b) Rajgarh II (Pachora)	1	
2.	Under Tendering *(implementation timeframe by 2026-27)*	a) Chhatarpur	1.5	3.5
		b) Mandsaur	2	
3.	Planned *(implementation timeframe by 2026-27)*	a) Morena	2.5	6.9
		b) Rajgarh II c) (Pachora)	1.5	

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
	Planned *(implementation timeframe 2027-32)*	d) Sagar	1.5	
		e) Morena	1.4	
	Total			**12.176**

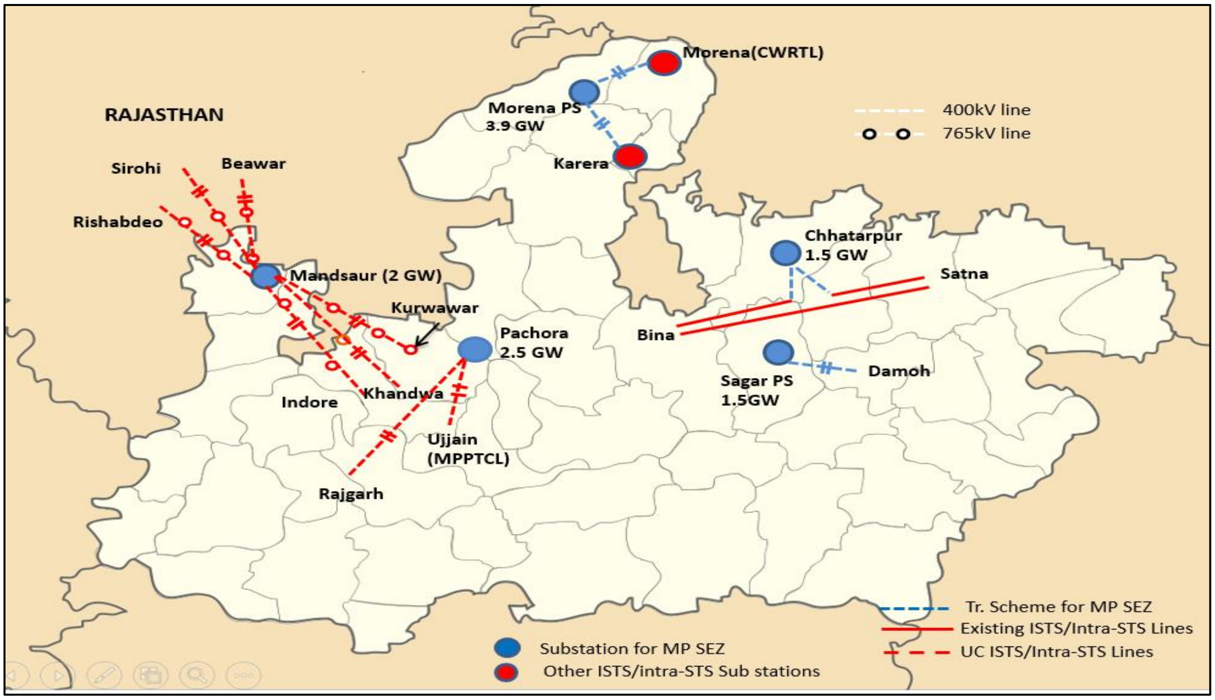


Fig. 10.6: Transmission system for evacuation of RE power in Madhya Pradesh

Details of ISTS network in Western Region with broad scope of works is given at Annex 10.1.

10.5 Transmission system for evacuation of power from solar and wind potential in Southern Region

10.5.1 Andhra Pradesh

Status of upcoming ISTS network for 58.0 GW solar and wind potential zones in Andhra Pradesh is given in Table 10.8 and Figure 10.7.

Table 10.8
Status of upcoming ISTS network in Andhra Pradesh

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1.	Under Implementation *(implementation timeframe by 2026-27)*	a) Anantapur	3.5	8
		b) Kurnool III (Ph-I)	4.5	
2.	Planned	a) Kurnool III (Ph-II)	1.5	50.0
		b) Kurnool IV	7.5	

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
	(implementation timeframe by 2026-27)	c) Anantapur	1.5	
		d) Anantapur II	4	
	Planned	e) Kurnool IV	4	
	(implementation timeframe 2027-32)	f) Kurnool V	11.5	
		g) Anantapur II	12	
		h) Kadapa	8	
	Total			**58.0**

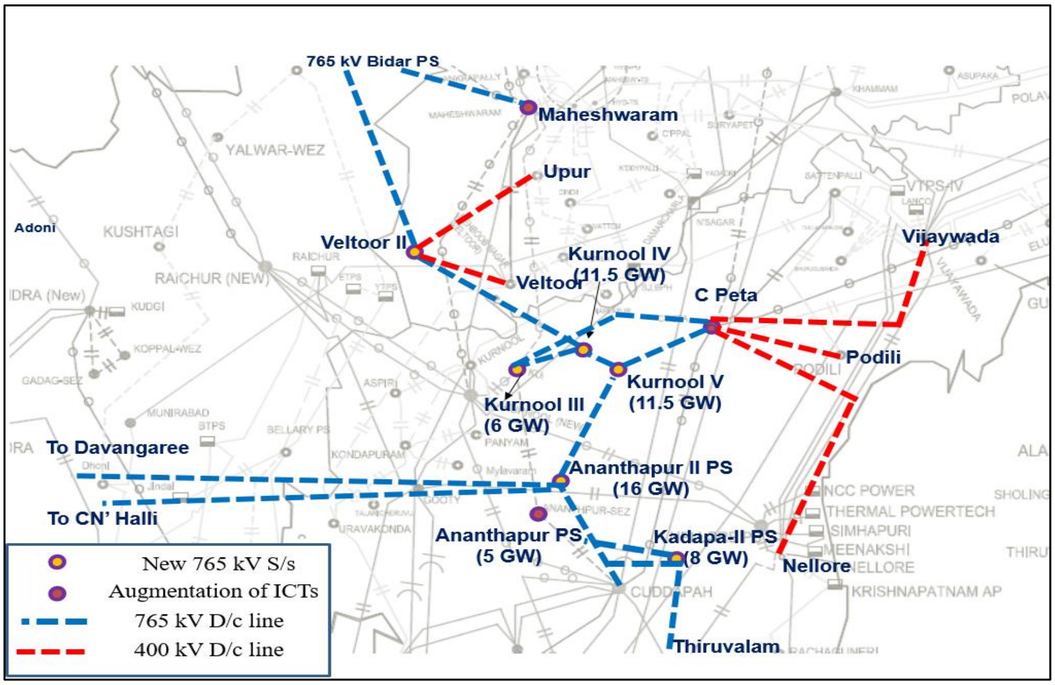


Fig. 10.7: Transmission system for evacuation of RE power in Andhra Pradesh

10.5.2 Karnataka

Status of upcoming ISTS network for 26.5 GW solar and wind potential zones in Karnataka is given in Table 10.9 and Figure 10.8.

Table 10.9
Status of upcoming ISTS network in Karnataka

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Under Implementation	a) Gadag	2.5	10.5
	(implementation timeframe by 2026-27)	b) Koppal II	2.5	
		c) Gadag II	2	
		d) Bidar	2.5	
		e) Pavagada	1	
2	Under Tendering	a) Tumkur II	1.5	11.5

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
	(implementation timeframe by 2026-27)	b) Davanagere	2	
		c) Bijapur	2	
		d) Bellary	1.5	
		e) Koppal II/ Gadag II	4.5	
3	Planned *(implementation timeframe by 2026-27)*	a) Bijapur	2.5	4.5
	Planned *(implementation timeframe 2027-32)*	b) Davanagere	2	
	Total			**26.5**

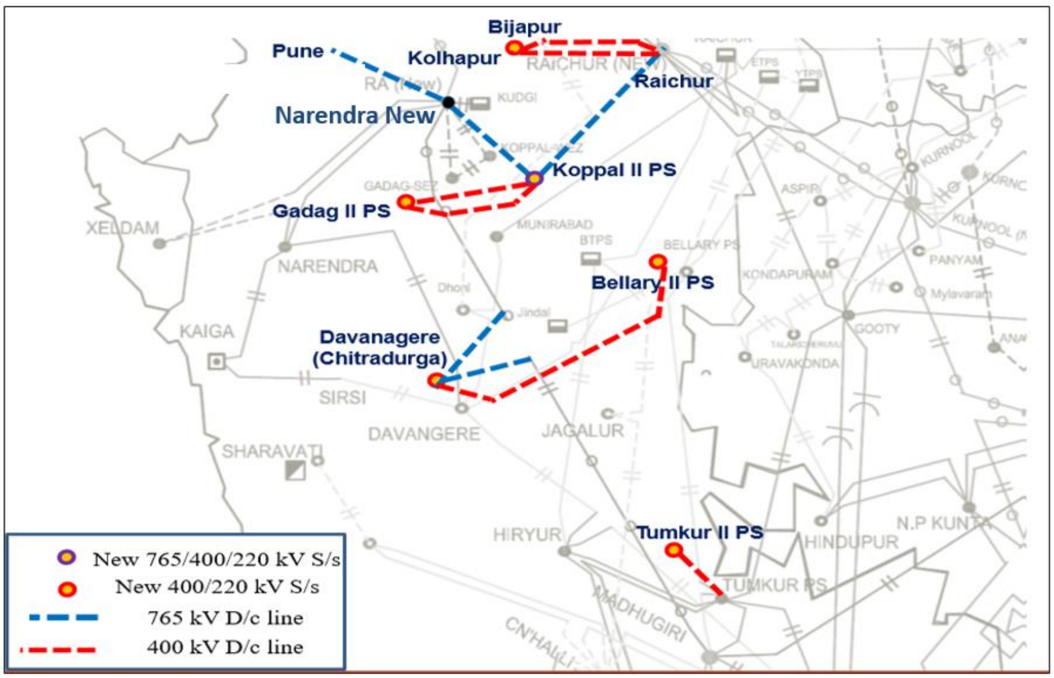


Fig. 10.8: Transmission system for evacuation of RE power in Karnataka

10.5.3 Tamil Nadu

Status of upcoming ISTS network for 6.0 GW solar and wind potential zones in Tamil Nadu is given in Table 10.10 and Figure 10.9.

Table 10.10
Status of upcoming ISTS network schemes in Tamil Nadu

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Under Implementation *(implementation timeframe by 2026-27)*	a) Karur II	0.5	0.5

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
2	Planned *(implementation timeframe by 2026-27)*	a) Karur II	0.5	5.5
	Planned *(implementation timeframe 2027-32)*	b) Offshore wind	5	
	Total			**6**

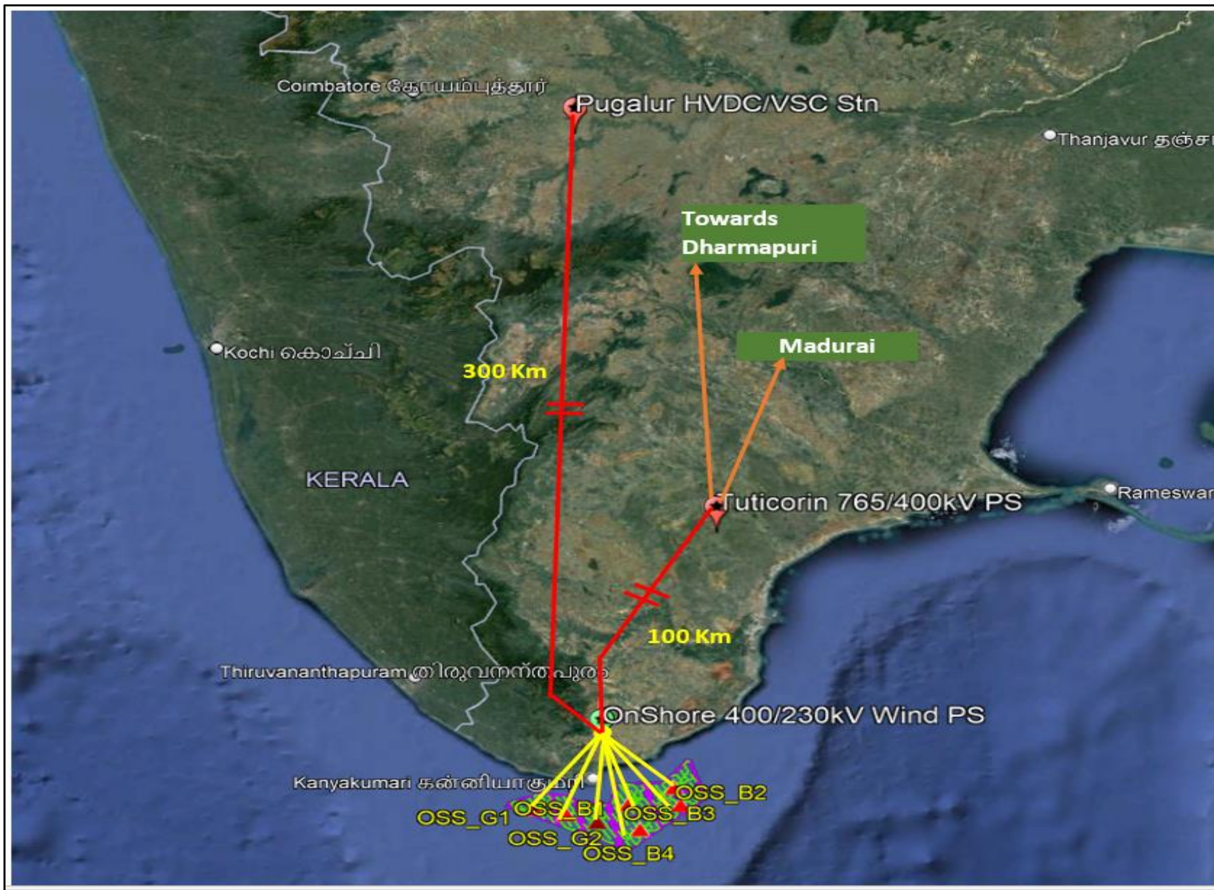


Fig. 10.9: Transmission system for off-shore wind potential zones in Tamil Nadu

10.5.4 Telangana

Status of upcoming ISTS network for 13 GW solar and wind potential zones in Telangana is given in Table 10.11 and Figure 10.10.

Table 10.11
Status of upcoming ISTS network in Telangana

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Planned	a) Nizamabad	3.5	13

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
	(implementation timeframe 2027-32)	b) Medak	3.5	
		c) Rangareddy	3.5	
		d) Karimnagar	2.5	
	Total			**13**

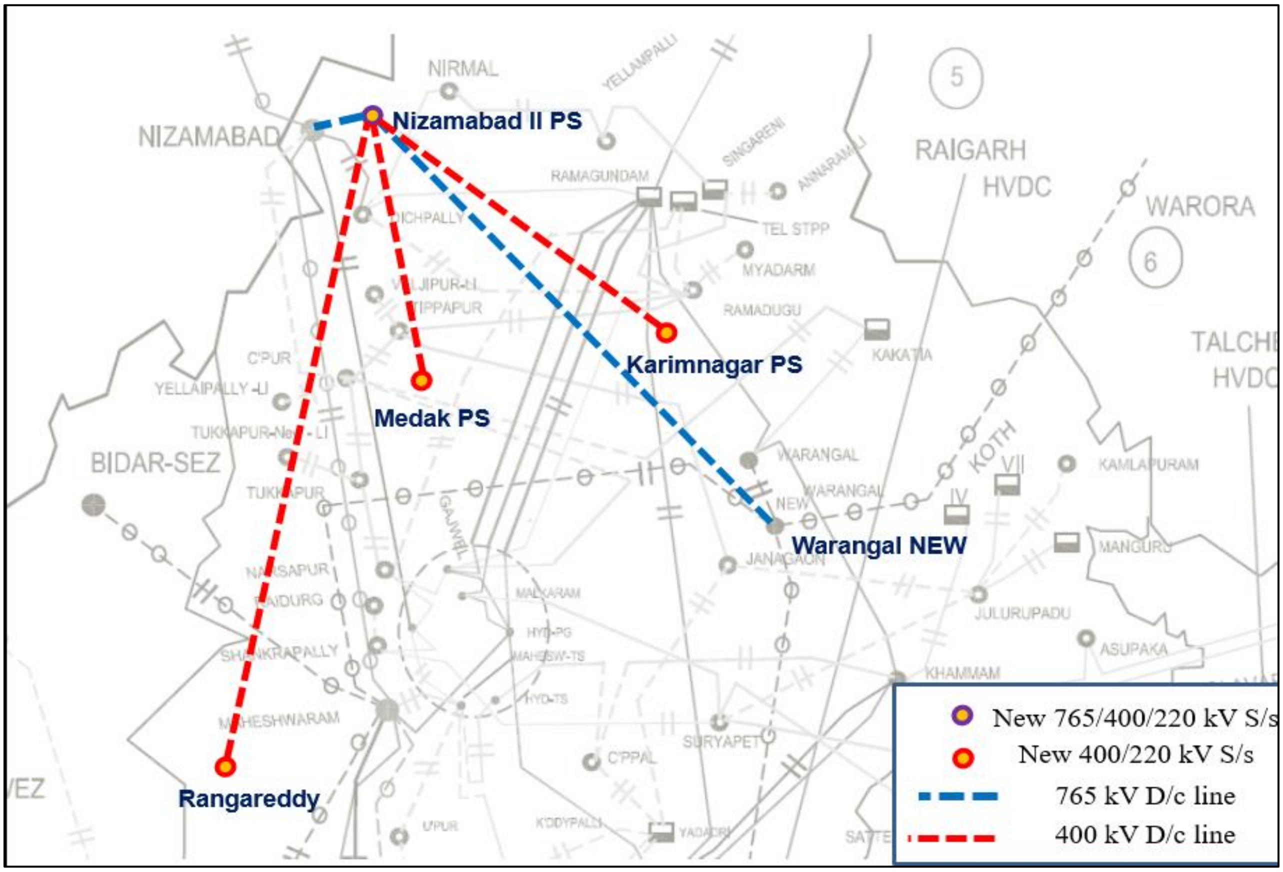


Fig. 10.10: Transmission system for evacuation of RE power in Telangana

Details of ISTS network in Southern Region with broad scope is given at Annex 10.1.

10.6 Transmission scheme for evacuation of power from Solar generation in North Eastern Region

Status of upcoming ISTS network for 1 GW solar capacity in Assam is given in Table 10.12 and Figure 10.11.

Table 10.12

Status of upcoming ISTS network in Assam

Sl. No.	Status of transmission schemes	RE Potential Zone	Identified Potential (GW)	Total (GW)
1	Under Bidding *(implementation timeframe by 2026-27)*	Bokajan (Karbi Anglong)	1	1
	Total			**1**

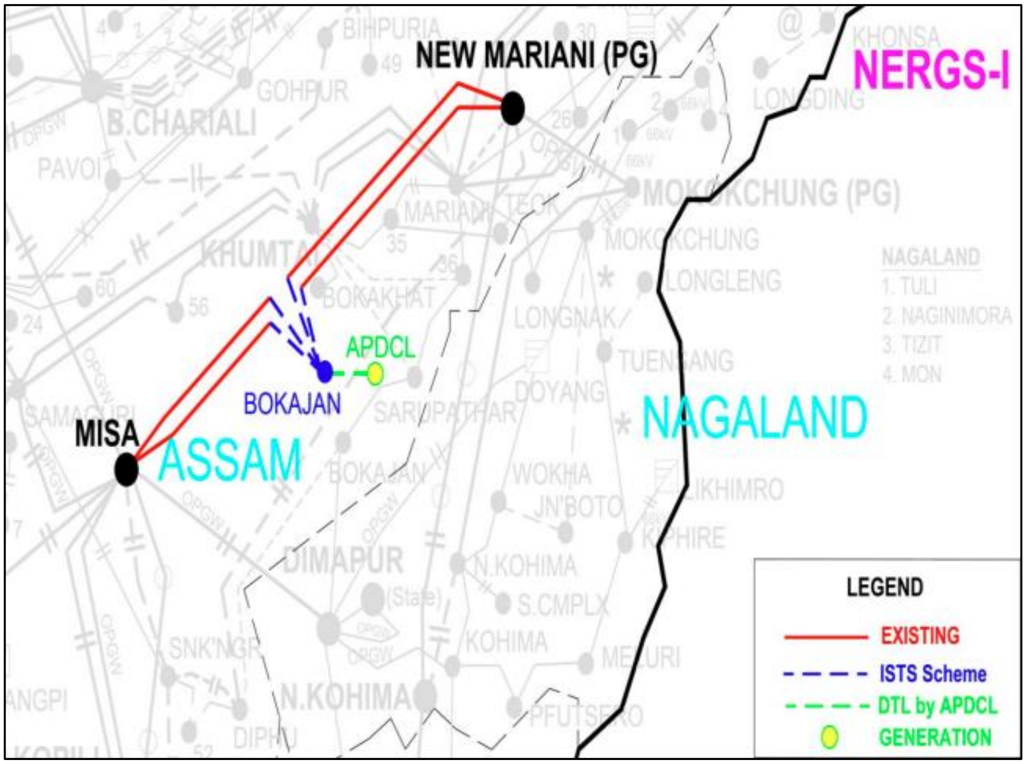


Fig. 10.11: Transmission system for evacuation of RE power in Assam

Details of ISTS network in North-Eastern Region with broad scope is given at Annex 10.1.

10.7 RE capacity to be integrated to intra-state network

10.7.1 RE capacity to be integrated to intra-state network under Green Energy Corridor I & II Schemes

The InSTS GEC scheme with target of 9,700 ckm (approx.) intra-state transmission lines and 22,600 MVA (approx.) transformation capacity (intra-state) was approved by the Cabinet Committee on Economic Affairs (CCEA) in 2015 for development of transmission system in eight RE rich States i.e. Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu.

Under the Green Energy Corridor-I (GEC-I) scheme, about 23 GW of RE capacity was planned to be integrated to the intra-state network, out of which about 18.72 GW of RE capacity has been commissioned (till 31st March, 2024). As on 30th June, 2024, 9,135 ckm of transmission lines have been constructed and 21,313 MVA transformation capacity have been charged. Out of the eight States, four states viz. Rajasthan, Madhya Pradesh, Karnataka and Tamil Nadu have completed all the transmission projects. The remaining four states have requested for further extension. The transmission projects have been delayed mainly due to delay in land acquisition, Right of Way (RoW) issues and forest clearances. State-wise details are given below in Table 10.13.

Table 10.13: State-wise details of RE capacity and associated transmission system under GEC-I (as on 30.06.2024)

State	RE Capacity Addition Envisaged (GW)	RE Capacity Added (as on 31.03.2024) (GW)	Target for Trans. line (ckm)	Trans. line constructed (ckm)	Target for Sub-station (MVA)	Sub-station charged (MVA)	Actual/ Anticipated COD	Remarks
Karnataka	4.50	3.92	618	618	2702	2702	March, 2023	All projects completed
Madhya Pradesh	4.10	4.13	2773	2773	4748	4748	June, 2022	All projects completed
Rajasthan	2.41	2.58	1054	984*	1915	1915	April, 2021	All projects completed
Tamil Nadu	2.20	1.77	1068	1068	2250	1910^	October, 2022	^340 MVA cancelled; Remaining completed
Andhra Pradesh	3.15	1.90	1073	854	2157	1265	June, 2024	RoW in one line
Gujarat	4.00	2.99	1908	1636	7980	7980	June, 2024	RoW issues in four lines; one line stuck up due to GIB issue
Himachal Pradesh	1.00	0.50	502	498	937	793	June, 2024	Approach roads damaged due to heavy rain in July, 23
Maharashtra #	1.86	0.94	771	704	--	--	June, 2024	RoW issue in one line
Total	**23.22**	**18.72**	**9767**	**9135**	**22689**	**21313**		

**Few lines were constructed on shorter route, hence decrease in final length of transmission lines*

 # No substation has been sanctioned in Maharashtra under GEC-I scheme

Note: States have requested for further extension beyond June, 2024, and the same is under consideration.

About 19 GW RE capacity is planned to be integrated to intra-state transmission system under Green Energy Corridor-II (GEC-II) Scheme. DPR of the transmission schemes have already been prepared by the respective states. Earlier, the total project cost was Rs. 12031.33 crore with central financial assistance of Rs. 3970.34 crore (i.e. 33% of project cost). Subsequently, some states had requested for revision of transmission schemes under the GEC-II Scheme and the same has been approved by MNRE, however, the CFA shall be limited to the CFA as approved by CCEA for that particular state. The balance project cost is available as loan from KfW/REC/PFC. State-wise details are given below in Table 10.14.

Table 10.14: State-wise details of RE capacity and associated transmission system under GEC-II Scheme

State	RE capacity addition envisaged (MW)	Target for transmission lines (ckm)	Target for Sub-stations (MVA)	Estimated cost of transmission system (₹ Crore)
Gujarat	5100	2470	7460	3667.29
Himachal	317	62	761	489.49

State	RE capacity addition envisaged (MW)	Target for transmission lines (ckm)	Target for Sub-stations (MVA)	Estimated cost of transmission system (₹ Crore)
Pradesh				
Karnataka	2639	938	1225	1036.25
Kerala	452	224	620	420.32
Rajasthan	2478	659	2191	907.61
Tamil Nadu	4000	624	2200	719.76
Uttar Pradesh	4000	2597	15280	4847.86
Total	**18986**	**7574**	**29737**	**12088.58**

States are in process of issuing tenders for implementing the transmission schemes. List of Packages (Transmission) sanctioned by MNRE under the Green Energy Corridor Phase-II scheme are given at **Annex 10.2.**

(Source: MNRE)

10.7.2 Other RE capacity to be integrated to Intra-State network

In addition, about 47 GW RE capacity (Solar, Wind) has been planned to be integrated to Intra-State network in Rajasthan (10 GW) and Gujarat (37 GW). Details of the associated transmission system is given at Annex **8.2.**

10.8 Transmission plan for additional Hydro Electric Projects likely by 2032

Installed capacity of hydroelectric projects in the country is 46,928.17 MW (as on 31st May, 2024). Transmission system has been planned for 51,661.5 MW additional hydro capacity likely to be commissioned by the year 2032.

Details of additional hydroelectric projects along with broad transmission system for the projects likely to be integrated to ISTS network are given at **Annex 10.3.**

10.9 Conclusions

Transmission system has been planned for evacuation of power from about 613 GW RE capacity by the year 2032. The transmission schemes are under various stages of implementation. Some schemes have been commissioned, some are under construction and some are under bidding process. Other planned transmission schemes would be taken up progressively for implementation commensurate with the RE capacity addition. The transmission plan for Renewable Energy is a major step towards achievement of Government’s energy transition goal.

Chapter - 11

Private Sector Participation In Transmission

11.1 Introduction

Private sector has an important role to play in the development of power sector. Introducing competition in different segments of the electricity industry is one of the key features of the Electricity Act, 2003. The National Electricity Policy, 2005, mentions about encouraging private investment in transmission sector. Tariff Policy mentions about tariff determination through competitive bidding. Government has taken a number of steps for creating an enabling framework for encouraging competition and private sector participation in transmission sector.

11.2 Enabling provisions for private sector participation

11.2.1 Enabling provisions in Electricity Act 2003:

Promotion of competition in the electricity industry in India is one of the key objective of the Electricity Act, 2003. Section 61 and 62 of the Electricity Act, 2003, provides for determination of tariff of generation, transmission, wheeling and retail sale of electricity. Section 63 (Determination of tariff by Bidding process) of the Act states that:

"Notwithstanding anything contained in Section 62, the Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government."

11.2.2 Enabling provisions in National Electricity Policy 2005:

The National Electricity Policy notified on 12th February, 2005, inter-alia states the following:

"5.3.10 Special mechanisms would be created to encourage private investment in transmission sector so that sufficient investments are made……

5.8.1 Considering the magnitude of the expansion of the sector required, a sizeable part of the investments will also need to be brought in from the private sector. The Act creates a conducive environment for investments in all segments of the industry, both for public sector and private sector, by removing barrier to entry in different segments. Section 63 of the Act provides for participation of suppliers on competitive basis in different segments which will further encourage private sector investment."

11.2.3 Provisions in Tariff Policy

Tariff Policy issued by Ministry of Power on 6th January, 2006

5.1 ………..Tariff of all new generation and transmission projects should be decided on the basis of competitive bidding after a period of five years or when the Regulatory Commission is satisfied that the situation is ripe to introduce such competition.

7.1 (6) Investment by transmission developer other than CTU/STU would be invited through competitive bids. The Central Government will issue guidelines in three months for bidding process for developing transmission capacities. The tariff of the projects to be developed by CTU/STU after the period of five years or when the Regulatory Commission is satisfied that the situation is right to introduce such competition (as referred to in para 5.1) would also be determined on the basis of competitive bidding.

7.1 (7) After the implementation of the proposed framework for the inter-State transmission, a similar approach should be implemented by SERCs in next two years for the intra-State transmission, duly considering factors like voltage, distance, direction and quantum of flow."

Revised Tariff Policy issued by Ministry of Power on 28th January, 2016

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

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

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

11.3 Steps taken by Ministry of Power

(i) As per the provisions under Section 63 of the Electricity Act, 2003, and the Tariff Policy dated 6th January, 2006, Ministry of Power, Government of India, issued "Guidelines for Encouraging Competition in Development of Transmission Projects" and "Tariff Based Competitive Bidding Guidelines for Transmission Services" in 2006. These guidelines aimed at laying down a transparent procedure for facilitating competition in the transmission sector through wide participation in providing transmission services and tariff determination through a process of Tariff Based Competitive Bidding (TBCB).

Ministry of Power issued Standard Bidding Documents viz. Request for Qualification (RfQ), Request for Proposal (RfP), Transmission Service Agreement (TSA) and Share Purchase agreement (SPA) in the year 2008.

The guidelines and Standard Bidding Documents have been revised by MoP in August, 2021, after consultation with the stakeholders. Two stage bidding process featuring separate RfQ & RfP, has now been discontinued and single stage two envelope bid process is being followed.

(ii) As provided in the Guidelines, Ministry of Power had appointed PFC Consulting Limited (PFCCL) and REC Power Development and Consultancy Limited (RECPDCL) as the Bid Process Coordinators (BPC) for carrying out the bidding process.

(iii) As envisaged in the Guidelines, Ministry of Power had constituted an Empowered Committee on Transmission to identify inter-state transmission projects to be developed through competitive bidding and to oversee the process of competitive bidding. MoP vide office order no. 15/3/2017-Trans dated 13.04.2018 reconstituted the Empowered Committee on Transmission (ECT) and also constituted the National Committee on Transmission (NCT). Based on the recommendations of NCT, ECT allocated the transmission projects to be implemented through either TBCB route or RTM route.

(iv) The revised Tariff Policy issued by Ministry of Power on 28th January, 2016 has continued to support private sector participation in transmission.

(v) MoP vide office order dated 4th November, 2019, dissolved the ECT and only NCT remained in existence whose terms of reference inter-alia included recommendation of ISTS schemes to MoP for approval.

(vi) To further streamline the process of planning and approval of ISTS schemes, MoP vide its office order dated 28.10.2021 has revised the Terms of Reference of the NCT delegating powers for approval of ISTS system costing between 100 to 500 crores to NCT and for ISTS schemes costing upto Rs. 100 crores to Central Transmission Utility. ISTS schemes costing above Rs. 500 crores have to be recommended by NCT to MoP.

11.4 Overview of ISTS Schemes notified, awarded and commissioned through TBCB route

Till 31st March 2024, total 144 number of ISTS schemes have been identified for implementation through TBCB route. Out of these, 106 ISTS transmission schemes have been awarded through Tariff Based Competitive Bidding route and 38 projects are currently under bidding.

Out of the 106 transmission schemes already awarded for implementation through TBCB route, 53 schemes have already been commissioned and 49 are under implementation by various Transmission Service Providers. Out of the balance 4 projects, one project has been cancelled by CERC, for one project the TSP has requested for closure and construction of two projects could not start due to litigation. The same is summarized in Table -11.1.

Table – 11.1

Status of the ISTS schemes awarded through TBCB route (till 31st March 2024)

Transmission Schemes awarded through TBCB Route	Number of Schemes
Schemes commissioned	53
Schemes under implementation	49
Schemes cancelled by CERC	1
Schemes not taken up and CERC cancelled license	1
Schemes could not start due to litigation	2
Total	**106**

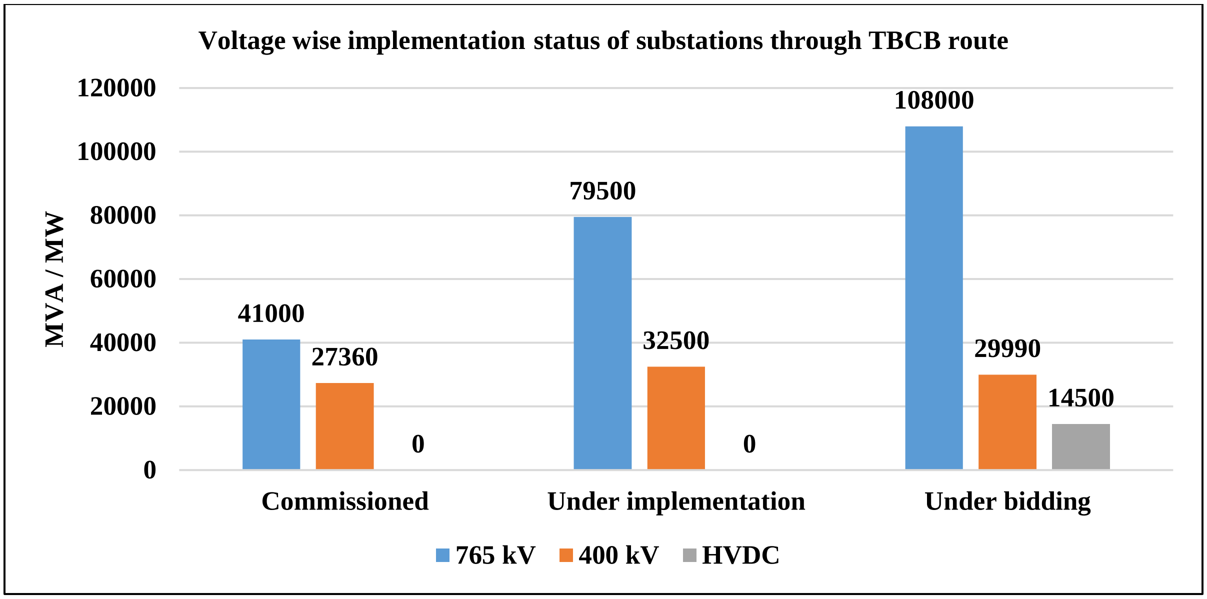
The overall summary of the 140 ISTS schemes (excluding 4 stalled projects) being implemented through TBCB route, in term of ckm and MVA capacity is summarized in Table 11.2.

Table – 11.2

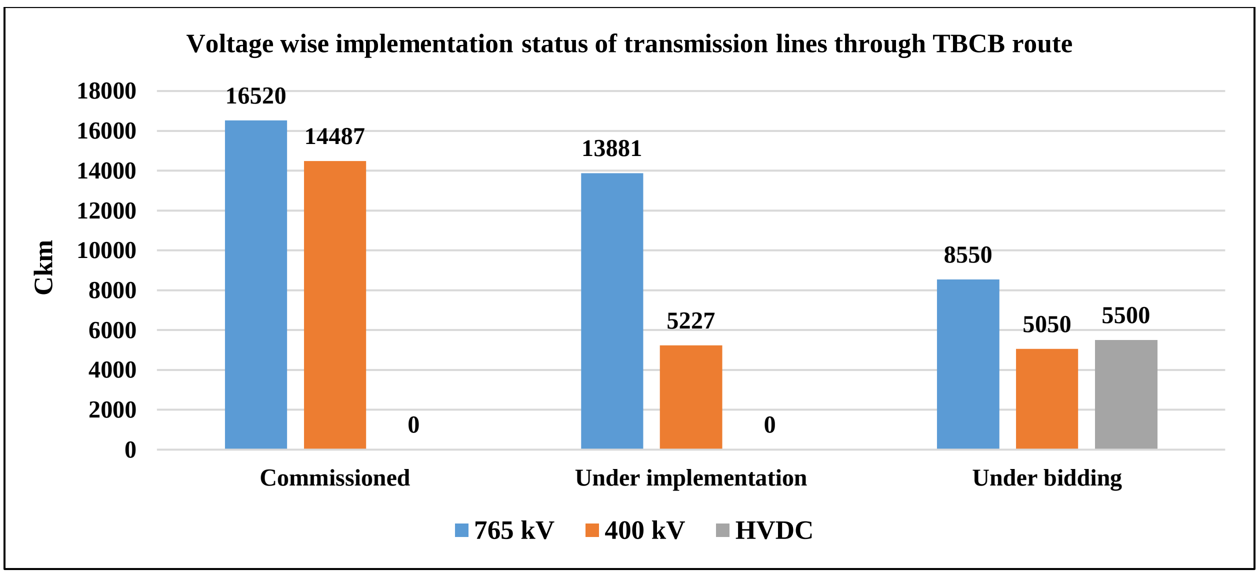
ckm and MVA capacity of transmission schemes recommended through TBCB route

Status of transmission schemes recommended through TBCB route	No. of ISTS Schemes	765/400 kV transformation capacity (MVA)	400/220 kV transformation capacity (MVA)	HVDC ±800, ±500 kV (MW)	765 kV (ckm)	400 kV (ckm)	HVDC ±800, ±500 kV (ckm)
Commissioned	53	41000	27360	0	16520	14487	0
Under implementation	49	79500	32500	0	13881	5227	0
Under bidding	38	108000	29990	14500	8550	5050	5500
Total	**140**	**228500**	**89850**	**14500**	**38951**	**24764**	**5500**

The voltage-wise summary of the substation capacity (MVA) (commissioned, under implementation, under bidding) recommended through TBCB route is given below:



The voltage-wise summary of transmission lines (ckm) (commissioned, under implementation, under bidding) through TBCB route is given below:



11.4.1 ISTS schemes commissioned through TBCB route

Fifty-three (53) transmission schemes have been commissioned by various Transmission Service Providers (TSP) till 31st March 2024. Summary of transformation capacity (765/400 kV, 400/220 kV) and transmission lines commissioned through TBCB route is given in Table 11.3.

Table – 11.3

Sl. No.	Period	Transformation capacity commissioned (MVA)	Transmission lines commissioned (ckm)
1.	2012-17	7000	8999
2.	2017-22	28360	14537
3.	2022-24	33000	7472
Total		**68360**	**31008**

Transmission Schemes Commissioned	Number of ISTS Schemes	765/400 kV MVA capacity	400/220 kV MVA capacity	765 kV ckm	400 kV ckm
Till 31st March 2022	38	21500	13860	12429	11106
1st April, 2022 to 31st March, 2024	15	19500	13500	4091	3381

The TSP wise break up of transmission schemes commissioned is given in Table 11.4:

Table – 11.4

Name of TSP	Number of Transmission Schemes commissioned
POWERGRID	18
Sterlite Power Limited	12
Adani Transmission Ltd	13
Essel Infra	2
Kalpataru	2
L&T	1
Techno Electric	1
RSTCL	1
GR Infra Projects Limited	1
Indi Grid Limited	1
ReNew Transmission Ventures Pvt Ltd.	1
Total	**53**

The list of transmission schemes commissioned through TBCB route is given at Annex-11.1.

11.4.2 ISTS schemes under implementation through TBCB route

Forty- nine (49) ISTS schemes at an estimated cost Rs. 66,395 Crore are under implementation through

TBCB route. The transmission lines and substation capacity under implementation till 31st March, 2024, is 19,108 ckm and 1,12,000 MVA respectively. List of transmission schemes is given at Annex-11.2. The TSP wise break up of transmission schemes is given in Table -11.5:

Table – 11.5

Name of TSP	Number of Transmission Schemes under implementation
POWERGRID	24
Sterlite Power Limited	8
Adani Transmission Limited	4
ReNew Transmission Ventures Pvt. Ltd.	2
Apraava Energy Private Limited	3
Megha Engineering & Infra	2
GR Infra Projects Limited	1
Indi Grid Limited	2
Resurgent Power Venture Pvt Ltd	1
Torrent Power	1
Tata Power Ltd	1
Total	**49**

11.4.3 ISTS Schemes under bidding

Thirty-eight ISTS schemes at an estimated cost Rs. 1,23,886 crores are under bidding (as on 31st March, 2024). 19,100 ckm (including 5500 ckm HVDC line) of transmission lines; 1,37,990 MVA of transformation capacity and 14,500 MW HVDC system are under bidding. The list of transmission schemes under bidding is given at Annex-11.3.

11.5 Progress of TBCB at intra-state level

Revised Tariff Policy, 2016, inter-alia states the following:

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

In line with the above provision, some States have also initiated the competitive bidding process for award of intra-state transmission schemes. Till now, Uttar Pradesh, Rajasthan, Madhya Pradesh and Maharashtra have started the implementation of the transmission projects through TBCB route. Total 22 Nos. of intra-state transmission schemes in Uttar Pradesh, Rajasthan, Madhya Pradesh and Maharashtra has been completed under TBCB route (Table-11.6). Further one (01) intra-state transmission schemes in Odisha, is under bidding to be awarded through TBCB route (Table-11.7). Some intra –state transmission schemes are being planned to be implemented through TBCB route by Jammu & Kashmir, DVC and Rajasthan (Table 11.8).

Table-11.6
Intra-State Transmission Schemes awarded through TBCB route

Sl. No.	Name of Scheme	State	TSP	Date of SPV Transfer	Status
1.	Transmission system for evacuation of Power from 3x660 MW Ghatampur Thermal Power Project	Uttar Pradesh	Adani Transmission Limited	19.06.2018	Commissioned
2.	765 kV S/C Mainpuri-Bara line with 765/400 kV AIS at Mainpuri and associated schemes/work	Uttar Pradesh	South East U.P. Power Transmission Company Ltd. (Acquired by Resurgent Power Ventures Limited through NCLT 2022)	16.12.2011	Under construction
3.	765 kV S/C Mainpuri-Hapur & Mainpuri-Greater Noida Line with 765 kV/400 kV AIS at Hapur & Greater Noida and associated schemes/ work	Uttar Pradesh	Western U.P. Power Transmission Company Ltd.	22.09.2011	Commissioned
4.	Transmission system for evacuation of power from 2x660 MW Jawaharpur Thermal Power Project and construction of 400 kV substation at Firozabad alongwith associated transmission lines	Uttar Pradesh	Power Grid Corporation of India Limited	21.12.2018	Commissioned
5.	Intra-State Transmission work associated with construction of 400 kV substation near Guna (Distt. Guna) and Intra-state Transmission work associated with construction of 220 kV S/s near Bhind (Distt. Bhind)	Madhya Pradesh	Power Grid Corporation of India Limited	11.09.2019	Commissioned
6.	Construction of 765/400/220 kV GIS substation, Rampur, and 400/220/132 kV GIS	Uttar Pradesh	Power Grid Corporation of India Limited	12.12.2019	Commissioned

Sl. No.	Name of Scheme	State	TSP	Date of SPV Transfer	Status
	Substation, Sambhal, with associated transmission lines				
7.	Development of Intra-state Transmission Work in Madhya Pradesh through Tariff Based Competitive Bidding: PACKAGE – I (400/220 kV Mandideep, 220/132/33 kV Bisonikala, 220/132/33 kV Khargone and other 132 kV sub-stations along with associated transmission lines)	Madhya Pradesh	Megha Engineering & Infrastructures Limited	21.01.2023	Under Construction
8.	Development of Intra-state Transmission Work in M.P. through Tariff Based Competitive Bidding: PACKAGE – II (220/132/33 kV Ajaygarh, 220/132/33 kV Begamganj, 220/132 kV Bargawan, 220/33 Manpur (Bijouri) substations and associated transmission lines)	Madhya Pradesh	Adani Transmission Limited	01.11.2021	Under Construction
9.	400 kV Vikhroli Substation and associated transmission lines	Maharashtra	Kharghar Vikhroli Transmission Limited (Adani Transmission Limited)	01.12.2019	Commissioned
10.	Evacuation of power from Obra-C (2x660 MW) Thermal Power Project and construction of 400 kV GIS Substation Badaun with associated transmission lines	Uttar Pradesh	Adani Transmission Limited	21.12.2018	Commissioned
11.	765/400/220 kV Meerut	Uttar	Power Grid	19.12.2019	Commissioned

Sl. No.	Name of Scheme	State	TSP	Date of SPV Transfer	Status
	(GIS) Substation with associated transmission lines and 400/220/132 kV Simbhavali Substation (GIS) with associated transmission lines	Pradesh	Corporation of India Limited		
12.	400/220/132 kV Mohanlalganj (Lucknow) (GIS) Substation with associated 400 kV lines, and other 765 kV and 400 kV LILO lines at 765 kV GIS Substation Rampur and 400 kV LILO at 400 kV GIS substation Sector 123 Noida	Uttar Pradesh	Power Grid Corporation of India Limited	30.05.2022	Commissioned
13.	220/132/33 kV Tirwa (Kannauj) substation with associated lines and LILO of one circuit of Shamli – Aligarh 400 kV D/C Line at Khurja TPS	Uttar Pradesh	Megha Engineering & Infrastructures Ltd	07.03.2024	Under Construction
14.	400/220 kV, 2x500 MVA Jewar (GIS) Substation; 220/33 kV, 2x60 MVA Varanasi Cantt. (Chaukaghat), GIS substation; 220/33 kV, 3x60 MVA GIS substation Vasundhara (Ghaziabad); 220/132/33 kV, 2x160+2x40 MVA substation Khaga (Fatehpur) with associated transmission lines	Uttar Pradesh	Megha Engineering & Infrastructures Ltd	07.03.2024	Under Construction
15.	Construction of Meerut (765 kV) - Shamli 400 kV D/C line	Uttar Pradesh	Megha Engineering & Infrastructure Limited	06.04.2024	Under Construction
16.	Construction of 400/220 kV, 2x500 MVA GIS substation Metro Depot (Gr. Noida) and	Uttar Pradesh	Megha Engineering & Infrastructure	06.04.2024	Under Construction

Sl. No.	Name of Scheme	State	TSP	Date of SPV Transfer	Status
	400/220 kV, 2x500 MVA GIS substation Jalpura with associated lines		Limited		
17.	400 kV Bikaner- Deedwana-Ajmer S/C transmission line with 400/220 kV GSS at Deedwana-(Raj/PPP-1)	Rajasthan	Maru Transmission Service Company Ltd.	15.02.2011	Commissioned
18.	400 kV Hindaun-Alwar S/C line with 400/220 kV GSS at Alwar (Raj/PPP-2)	Rajasthan	Aravali Transmission Service Company Ltd.	19.01.2011	Commissioned
19.	1 No. 220 kV & 4 Nos. 132 kV GSS with associated lines at various places (PPP-8)	Rajasthan	Hadoti Power Transmission Service Limited	11.08.2017	Commissioned
20.	6 Nos. 132 kV GSS with associated lines at various places (PPP-9)	Rajasthan	Barmer Power Transmission Service Limited	04.08.2017	Commissioned
21.	5 Nos. 132 kV GSS with associated lines at various places (PPP-10)	Rajasthan	Thar Power Transmission Service Limited	04.08.2017	Commissioned
22.	Construction of 400/220 kV, 2x500 MVA substation at Sangod along with 220/132 kV, 160 MVA transformer and associated lines i.e. 7.5 km LILO of one circuit of 400 kV Kalisindh – Anta D/c line at 400 kV GSS Sangod	Rajasthan	Sangod Transmission Service Limited	05.10.2023	Under construction

Table-11.7

Intra-State Transmission Schemes to be awarded through TBCB route

Sl. No.	Name of Scheme	State	Bidding Status
1.	400/220/132 kV Sub-station at Joda/Barbil with associated transmission lines and LILO of 400 kV Kaniha-Bisra D/C line at 400 kV Joda Sub-station	Odisha	Under Bidding

Table-11.8

Intra –State Transmission schemes being planned to be implemented through TBCB route

Sl. No.	Name of Scheme	State/Agency
1.	400 kV GSS Dholpur alongwith associated transmission lines	Rajasthan
2.	220 kV GSS Lohawat alongwith associated transmission lines	Rajasthan
3.	Upgrading 400 kV GSS Kankani to 765 kV GSS alongwith associated transmission lines	Rajasthan
4.	765/400 kV Substation Jaisalmer (New Location) alongwith associated Lines	Rajasthan
5.	Downstream transmission network from upcoming 400/220 kV Siot Substation (Rajouri)	J&K
6.	320 MVA, 220/66/11 kV S/s at Baghthali, Kathua along with the LILO of 220 kV S/C Sarna-Hiranagar line and erection of New 220 kV D/c line from 400/220 kV Jatwal S/s	J&K
7.	400/220/132/33 kV SS at Ramakanali-B along with associated transmission lines; 220/33 kV SS at Panagarh along with associated transmission line [Package A (West Bengal)]	DVC
8.	400/220/132/33 kV SS at Gola-B along with associated transmission lines; 220/33 kV SS at Ramgarh along with associated transmission line [Package B (Jharkhand)]	DVC

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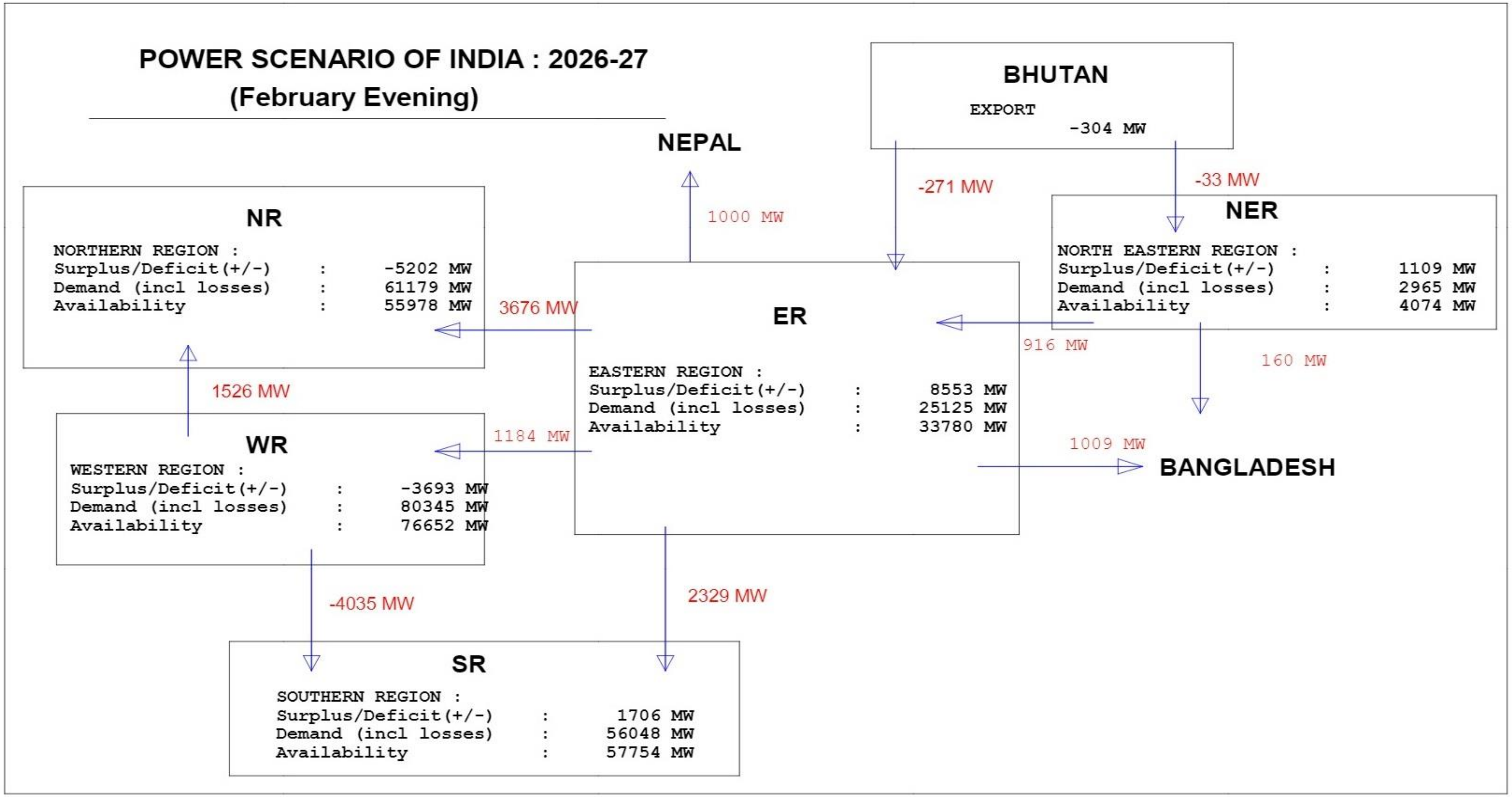
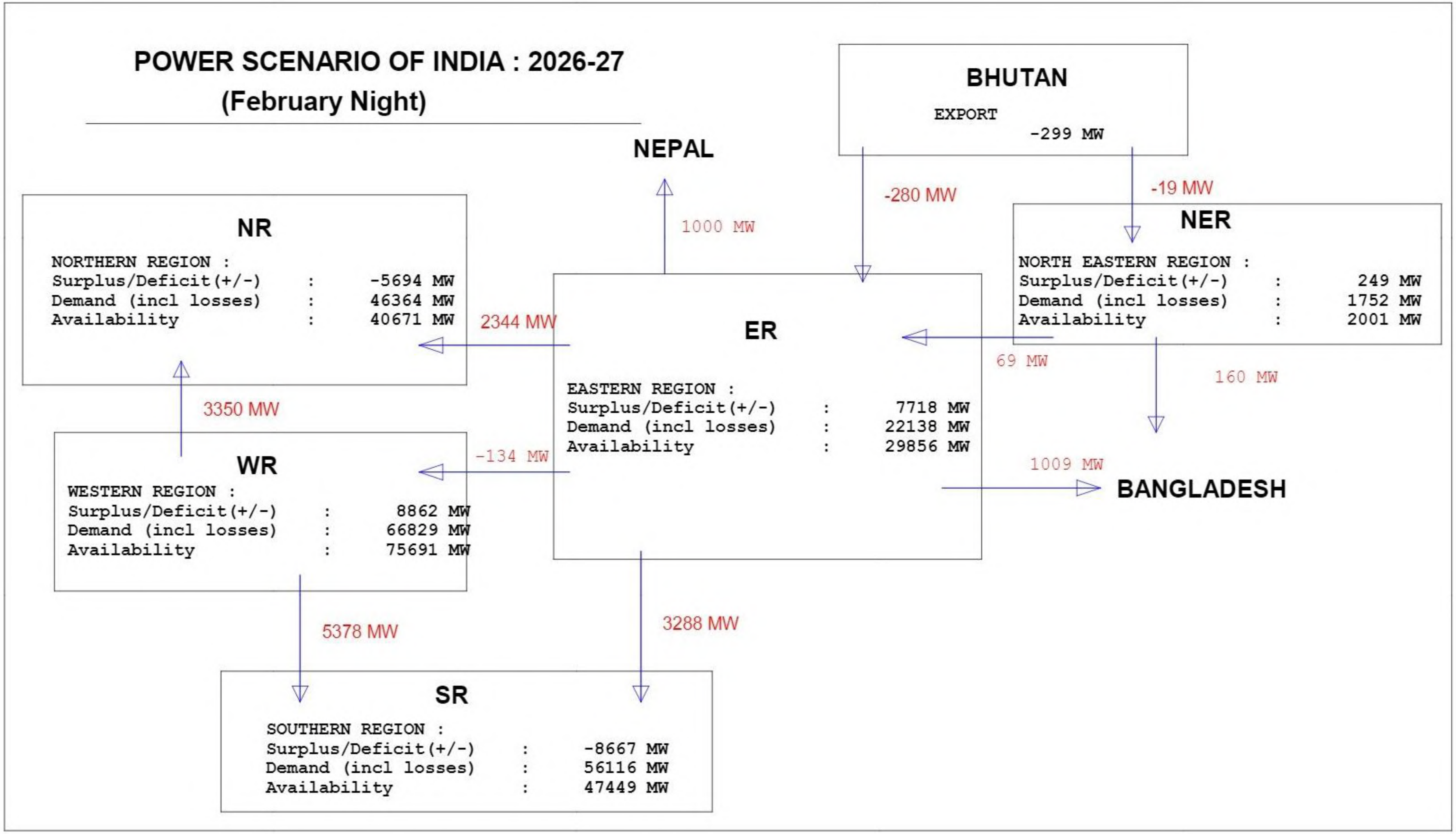
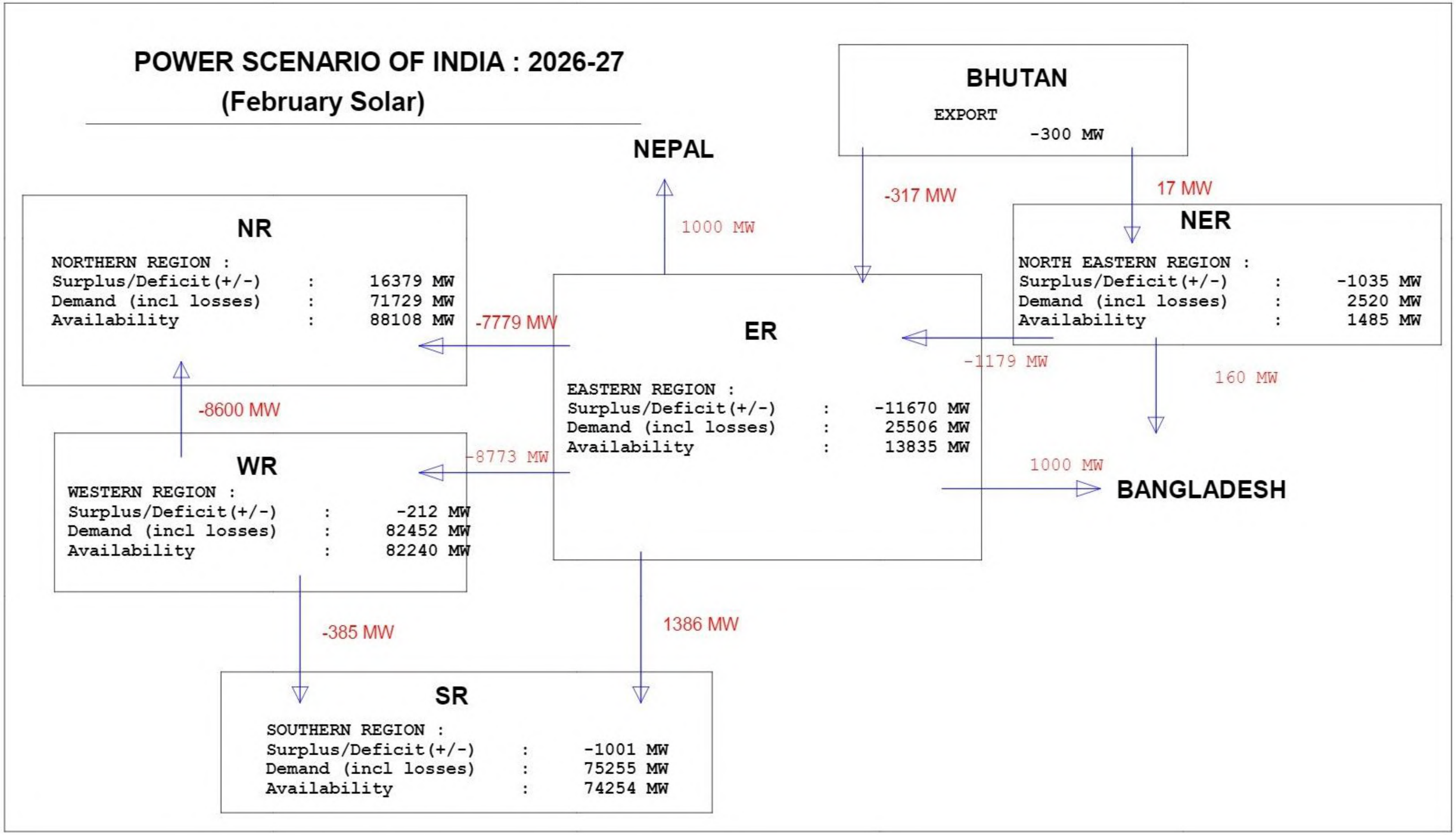
Annex 5.1

Power flow between regions in different scenarios

February Evening **ANNEX: 5.1a**



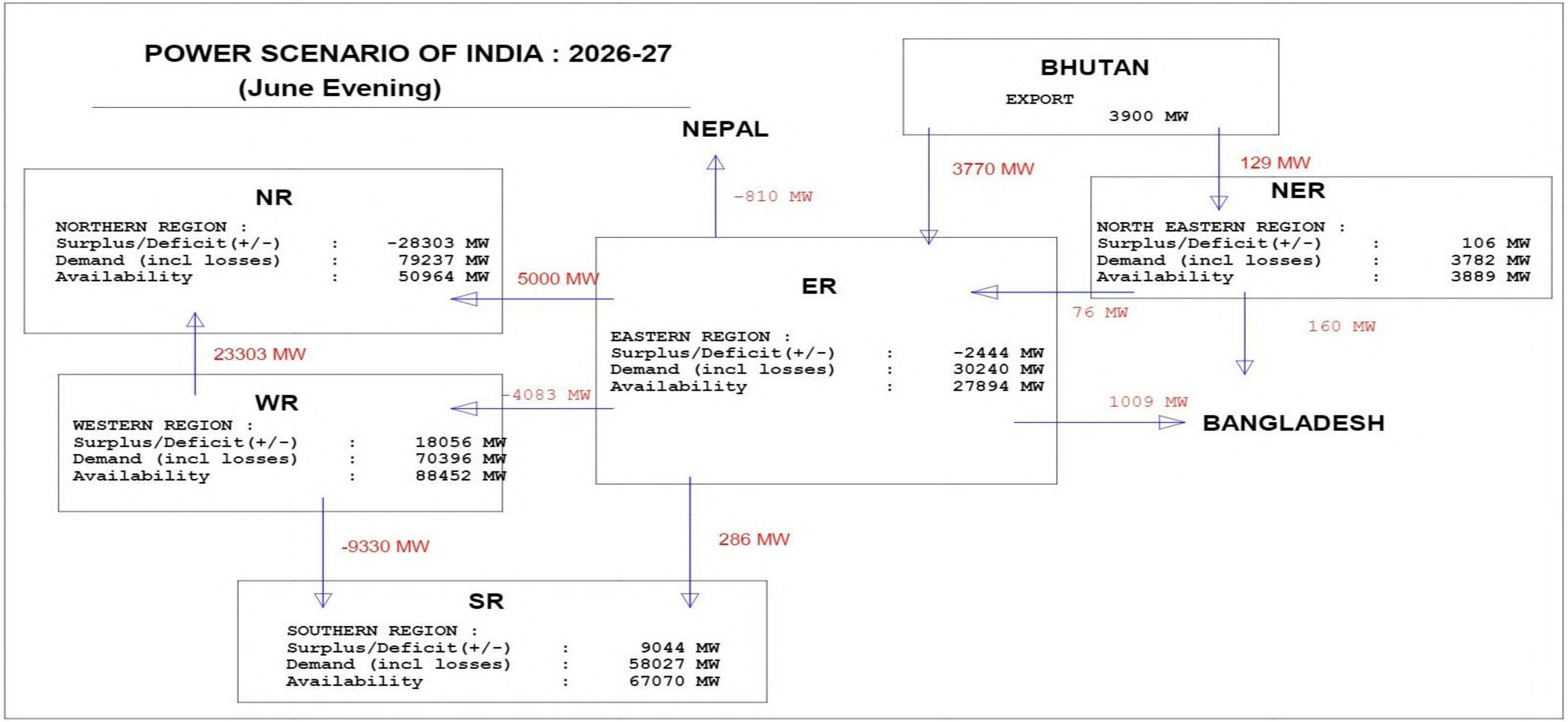

POWER SCENARIO OF INDIA : 2026-27
(February Night)
BHUTAN
EXPORT
-299 MW
NEPAL
-280 MW
-19 MW
1000 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -5694 MW
Demand (incl losses) : 46364 MW
Availability : 40671 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 249 MW
Demand (incl losses) : 1752 MW
Availability : 2001 MW
2344 MW
ER
69 MW
160 MW
EASTERN REGION :
Surplus/Deficit(+/-) : 7718 MW
Demand (incl losses) : 22138 MW
Availability : 29856 MW
3350 MW
WR
-134 MW
1009 MW
BANGLADESH
WESTERN REGION :
Surplus/Deficit(+/-) : 8862 MW
Demand (incl losses) : 66829 MW
Availability : 75691 MW
5378 MW
3288 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -8667 MW
Demand (incl losses) : 56116 MW
Availability : 47449 MW


POWER SCENARIO OF INDIA : 2026-27
(February Solar)
BHUTAN
EXPORT
-300 MW
NEPAL
1000 MW
-317 MW
17 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 16379 MW
Demand (incl losses) : 71729 MW
Availability : 88108 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : -1035 MW
Demand (incl losses) : 2520 MW
Availability : 1485 MW
-7779 MW
ER
-1179 MW
160 MW
EASTERN REGION :
Surplus/Deficit(+/-) : -11670 MW
Demand (incl losses) : 25506 MW
Availability : 13835 MW
-8600 MW
-8773 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : -212 MW
Demand (incl losses) : 82452 MW
Availability : 82240 MW
1000 MW
BANGLADESH
-385 MW
1386 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -1001 MW
Demand (incl losses) : 75255 MW
Availability : 74254 MW

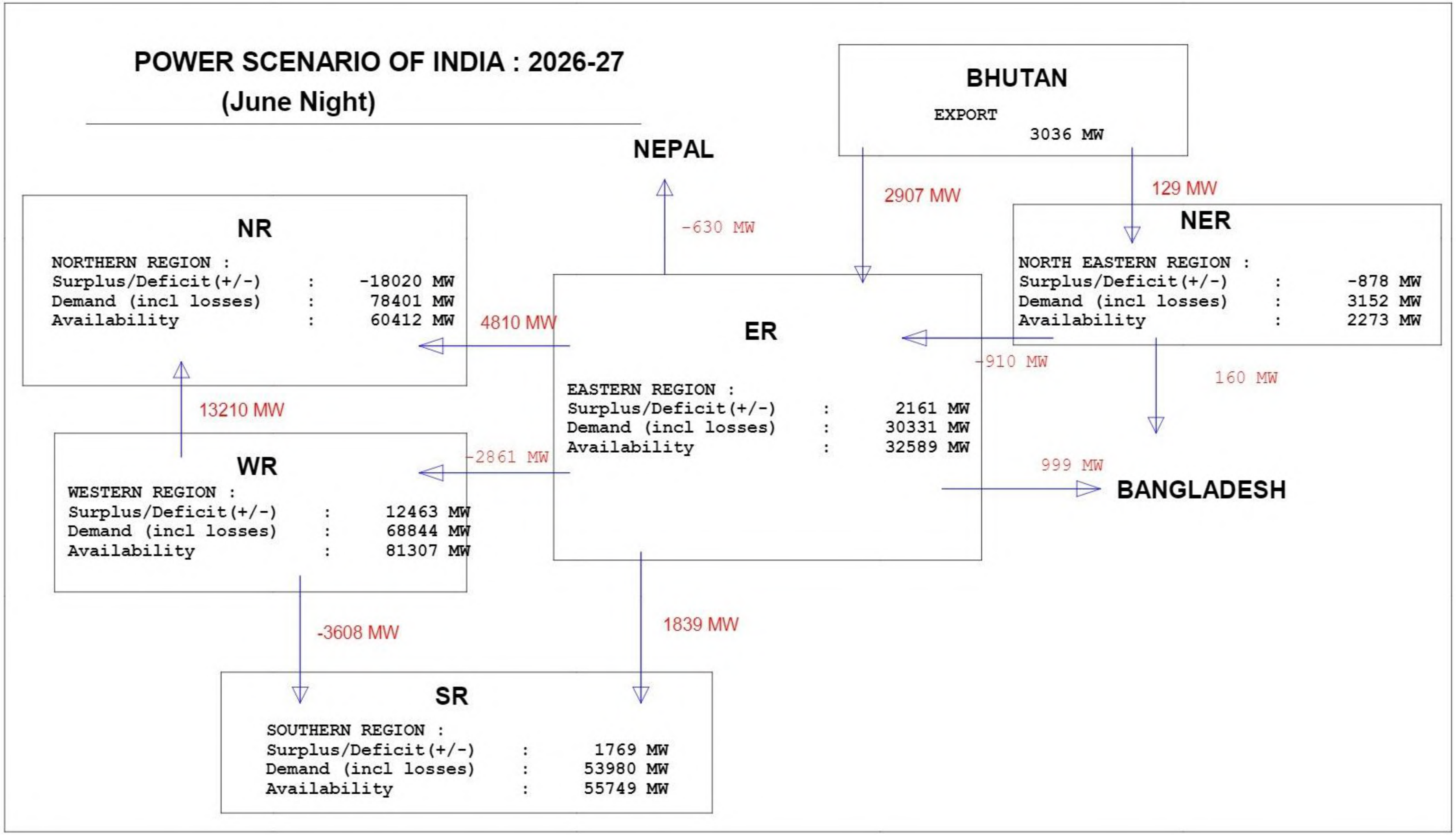
Annex 5.2

Power flow between regions in different scenarios

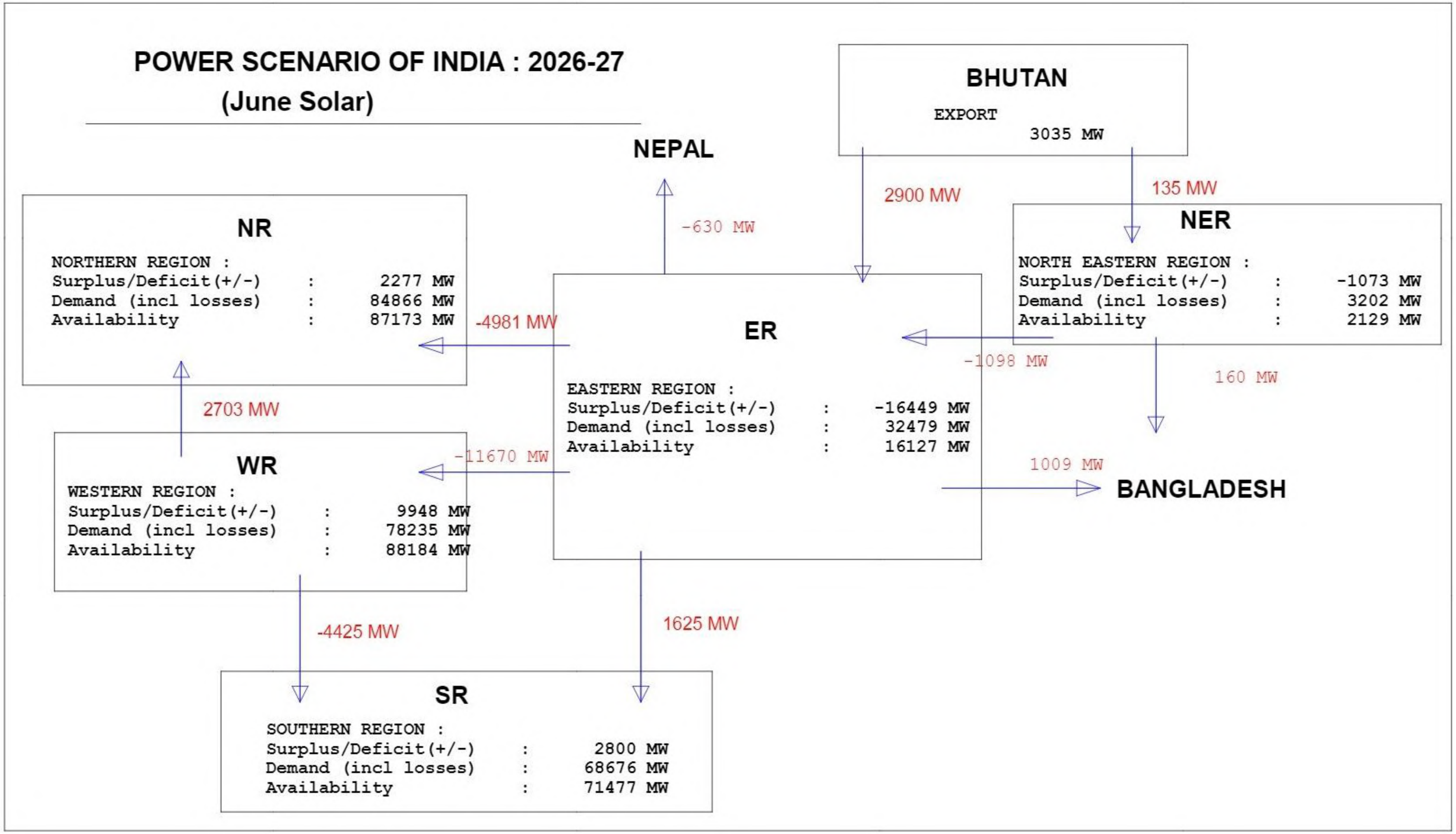
June Evening **ANNEX: 5.2a**



June Night **ANNEX: 5.2b**



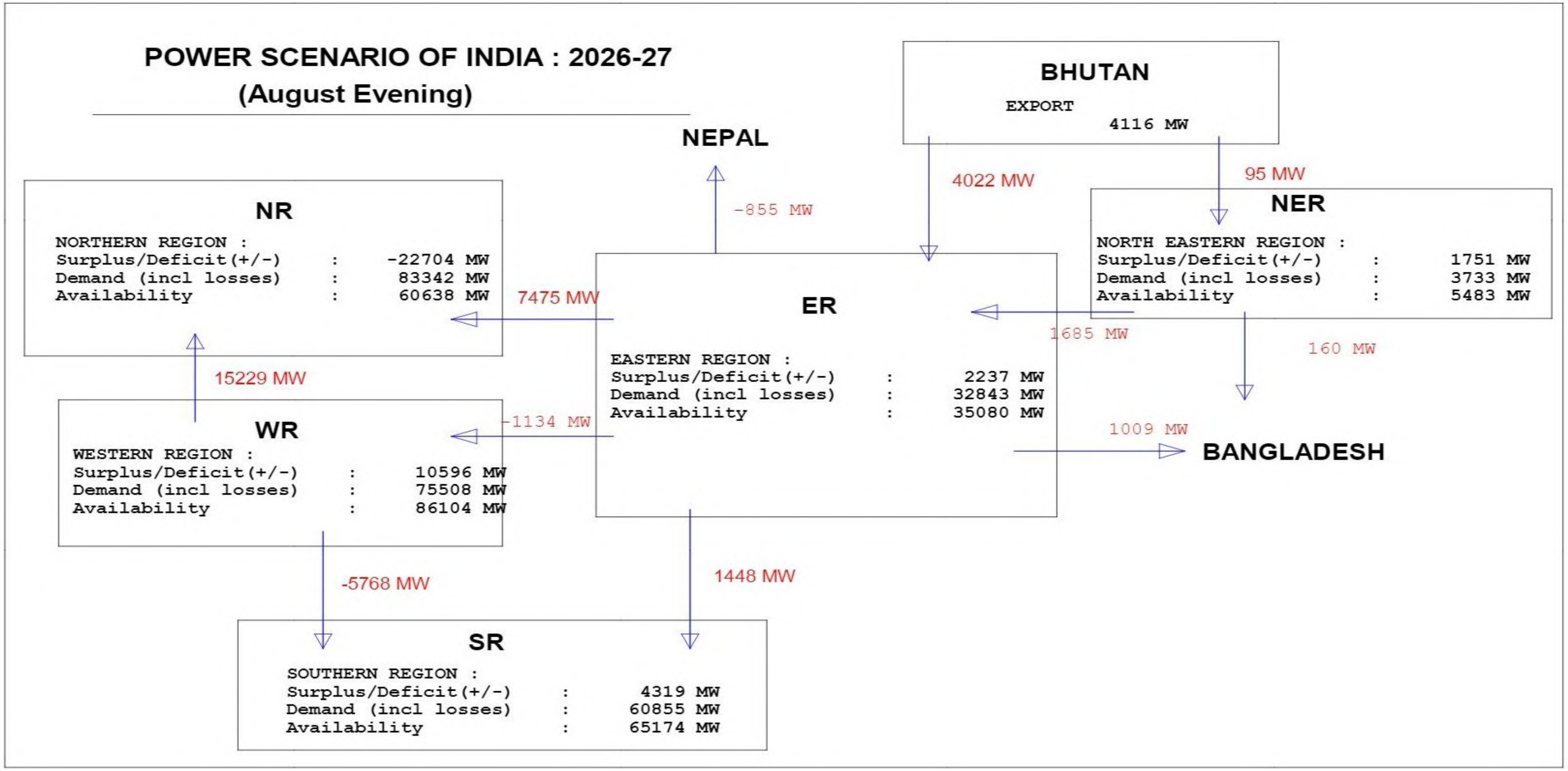
June Solar **ANNEX: 5.2c**



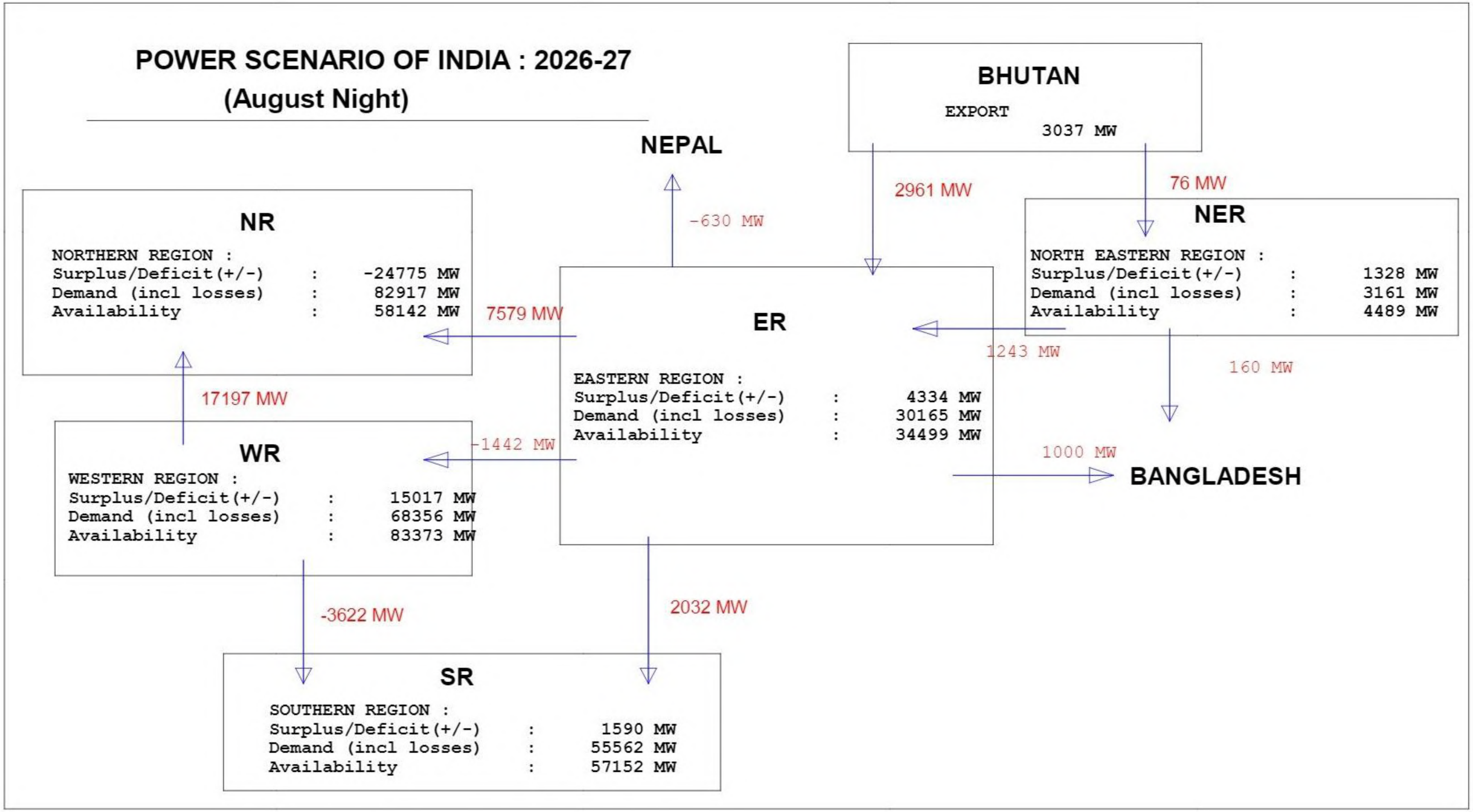
Annex 5.3

Power flow between regions in different scenarios

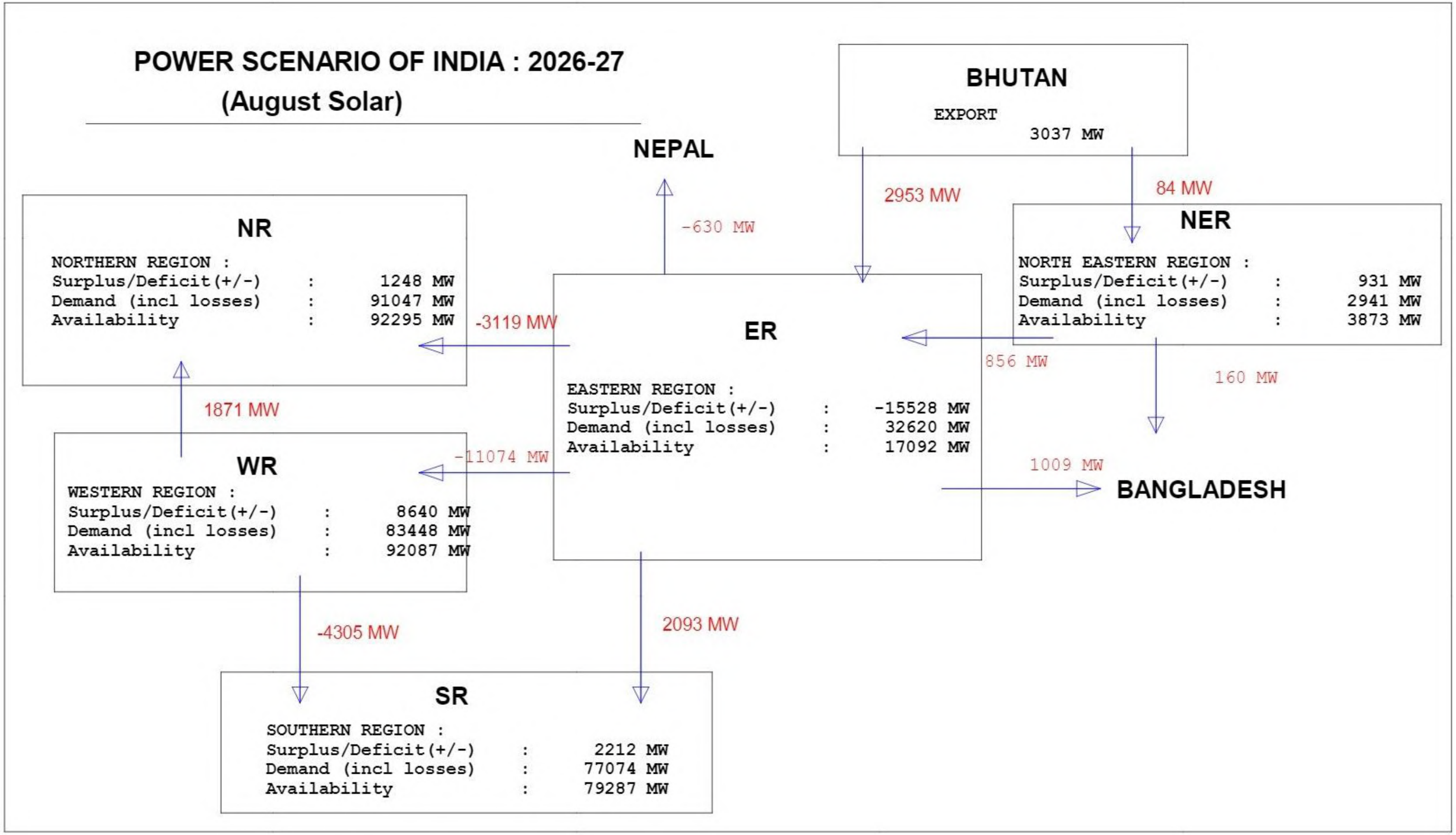
August Evening **ANNEX: 5.3a**



August Night **ANNEX: 5.3b**



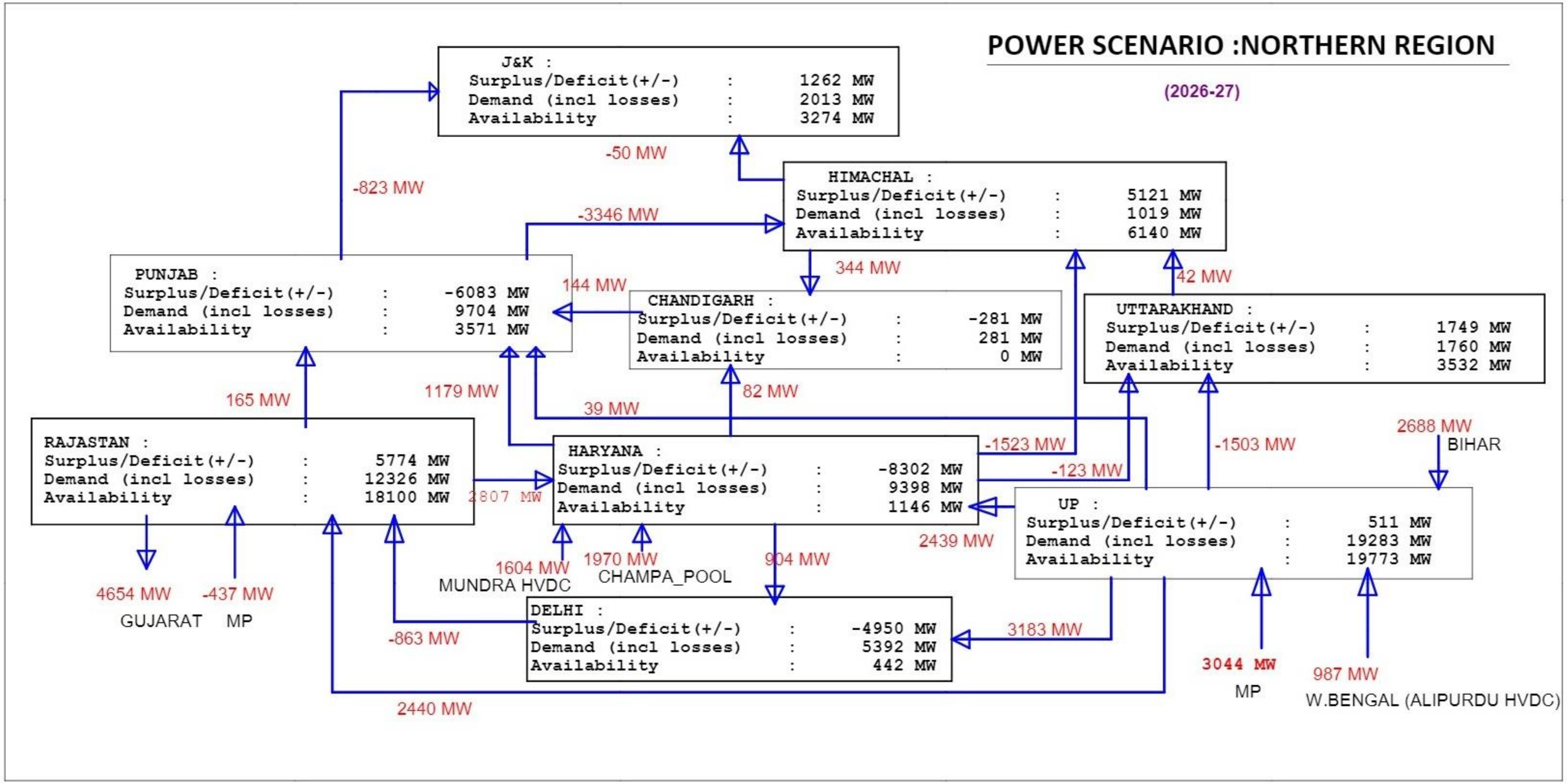
August Solar **ANNEX: 5.3c**



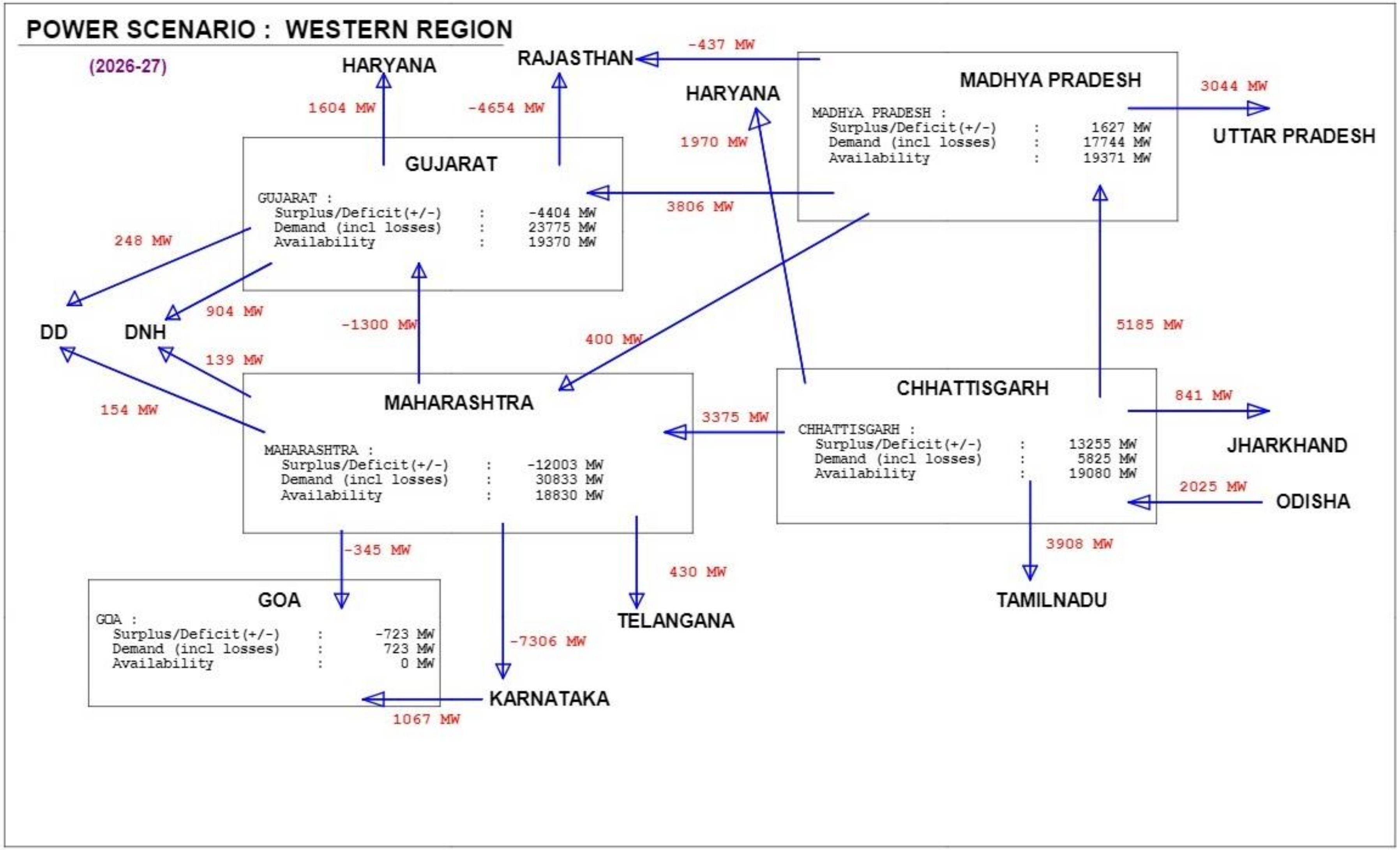
Annex 5.4

Power flow between different states in each region

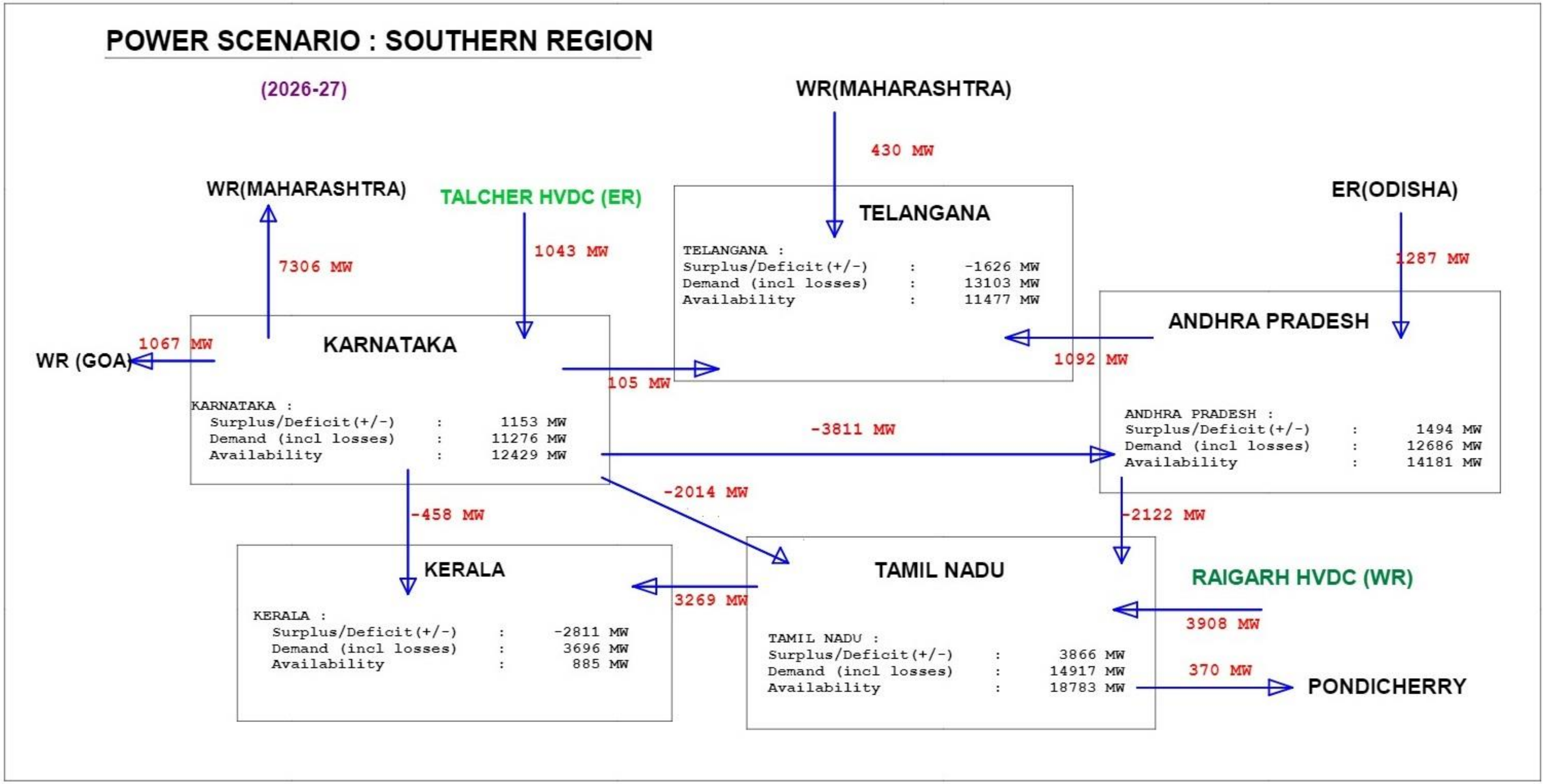
February Evening (Northern region) **ANNEX: 5.4a**



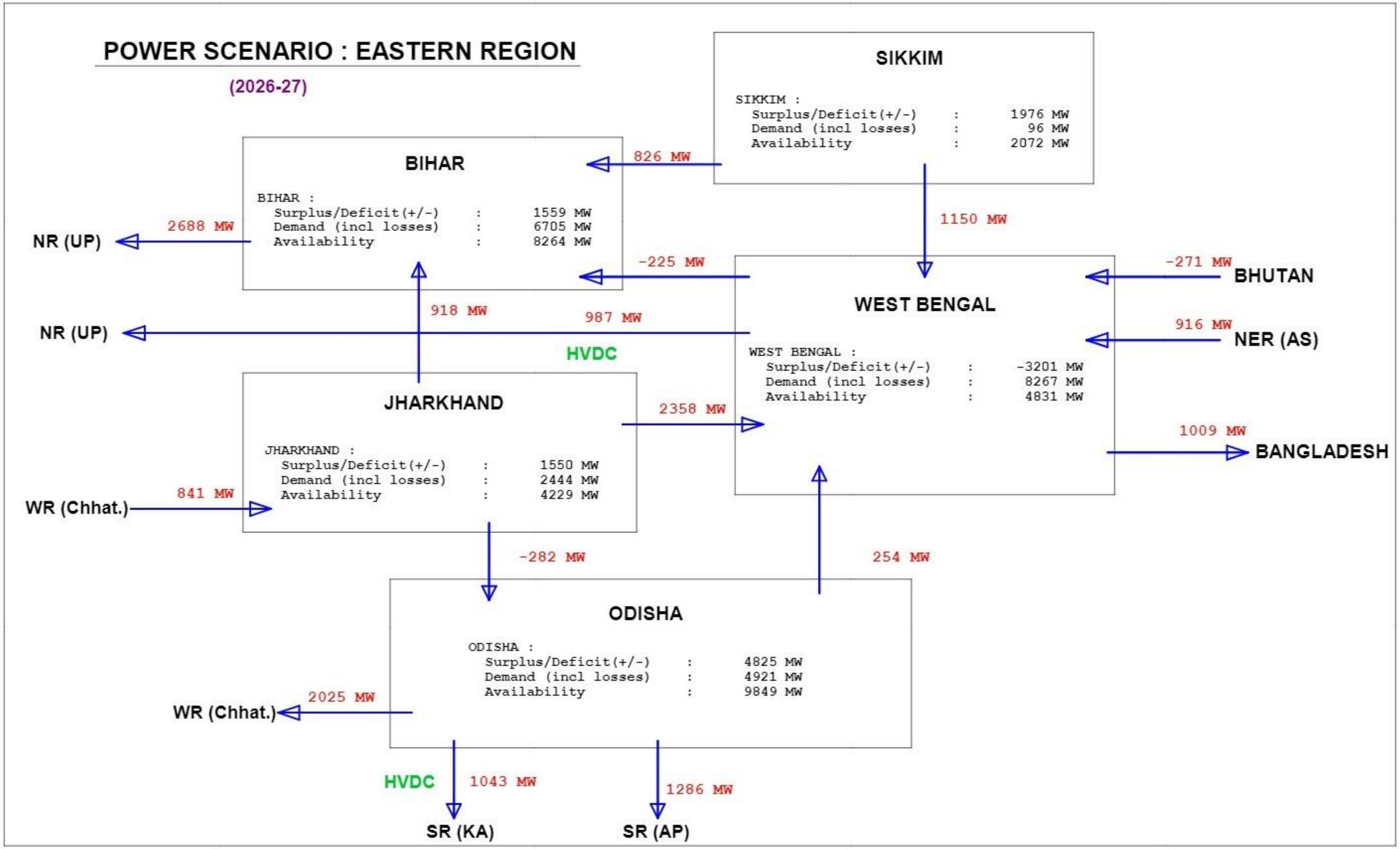
February Evening (Western region) **ANNEX: 5.4b**



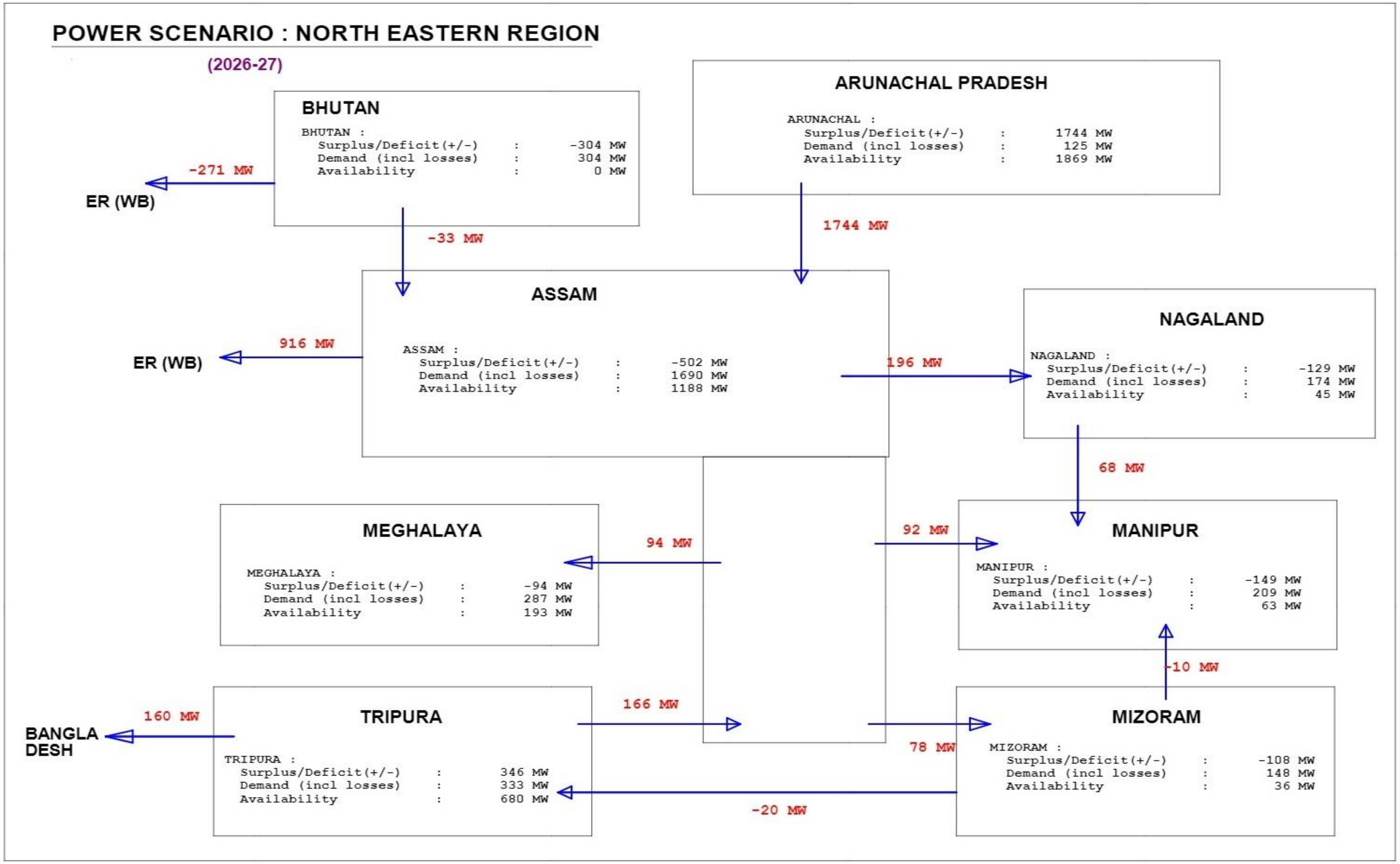
February Evening (Southern region) **ANNEX: 5.4c**



February Evening (Eastern region) **ANNEX: 5.4d**



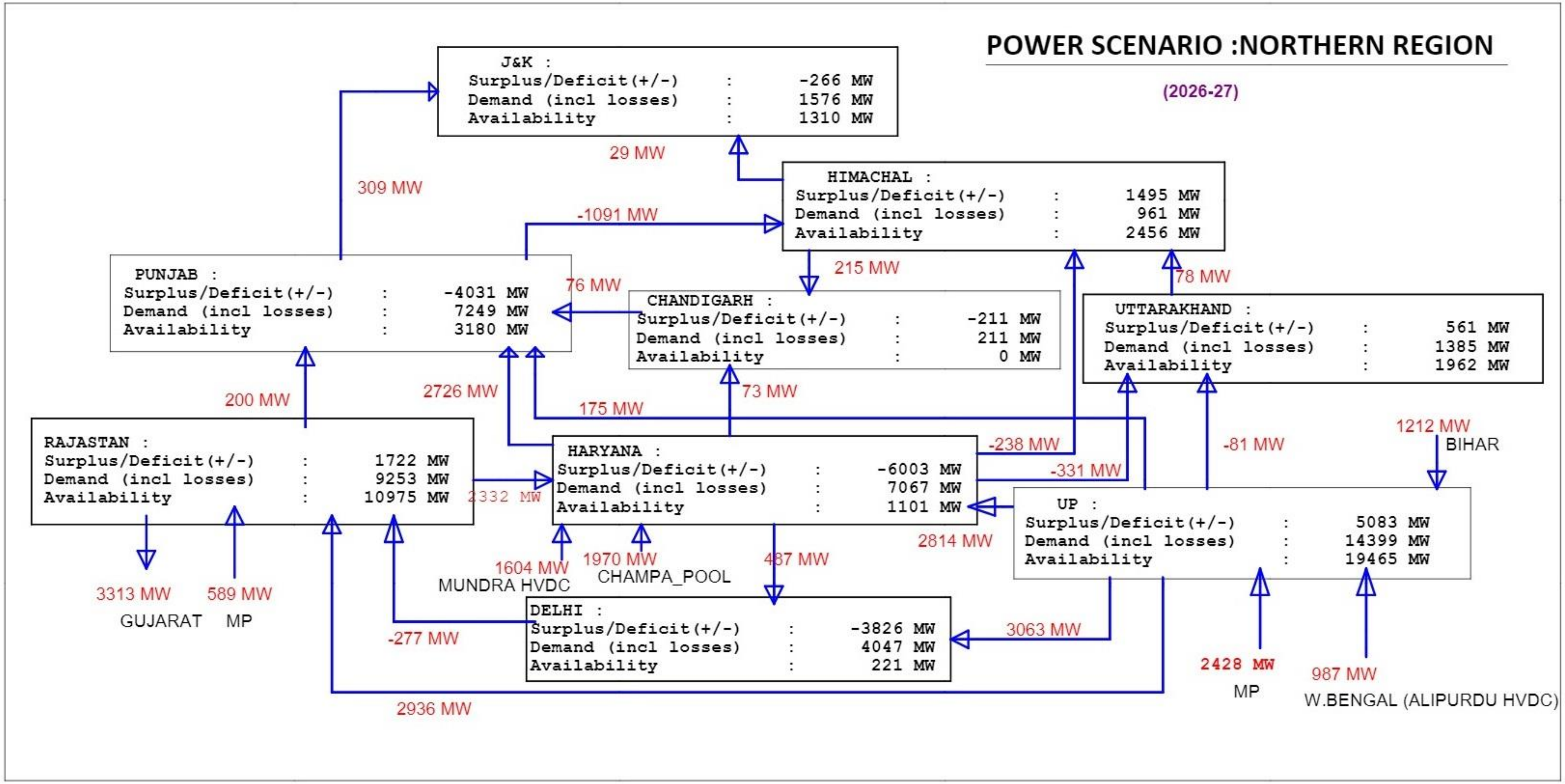
February Evening (North Eastern region) **ANNEX: 5.4e**



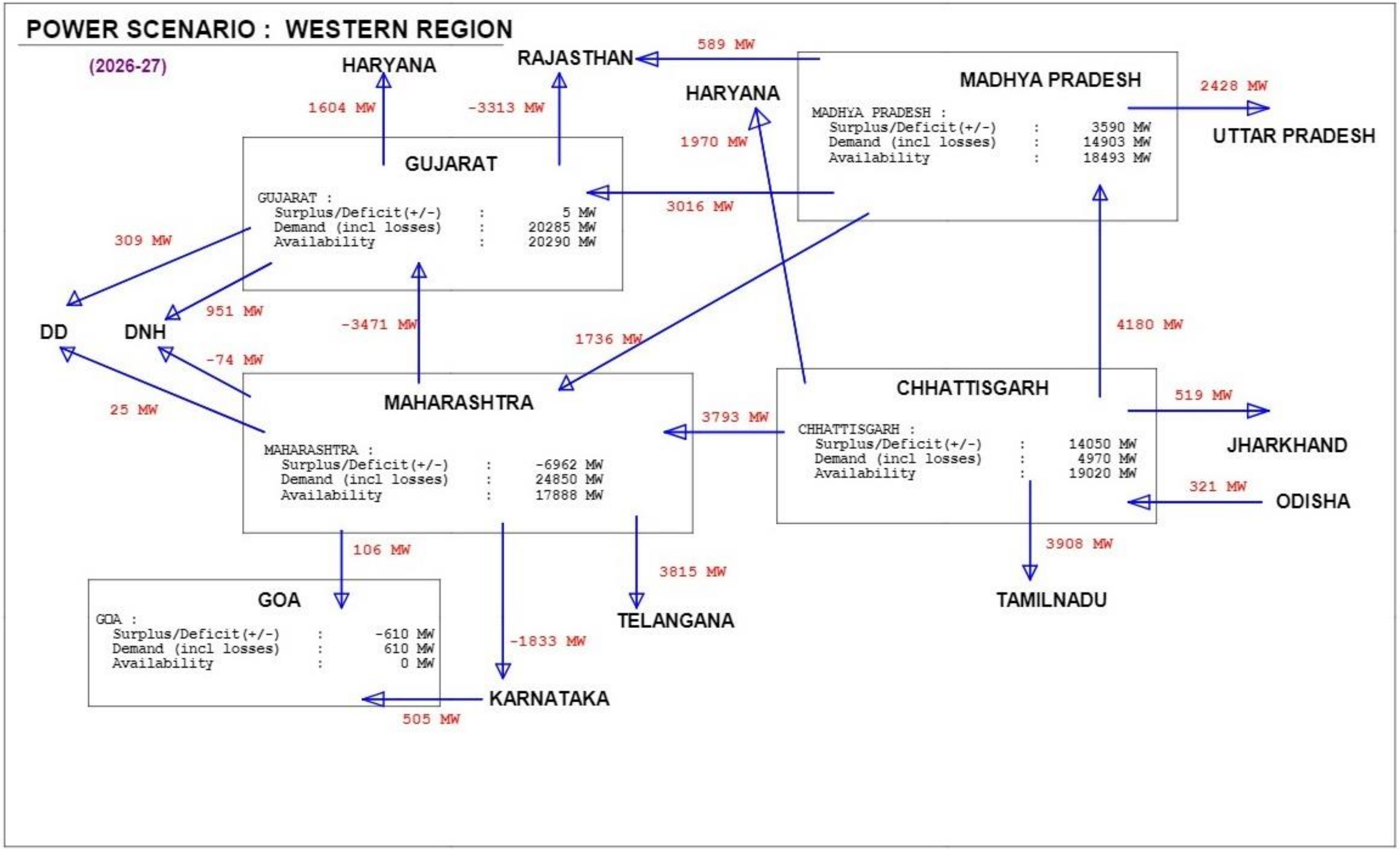
Annex 5.5

Power flow between different states in each region

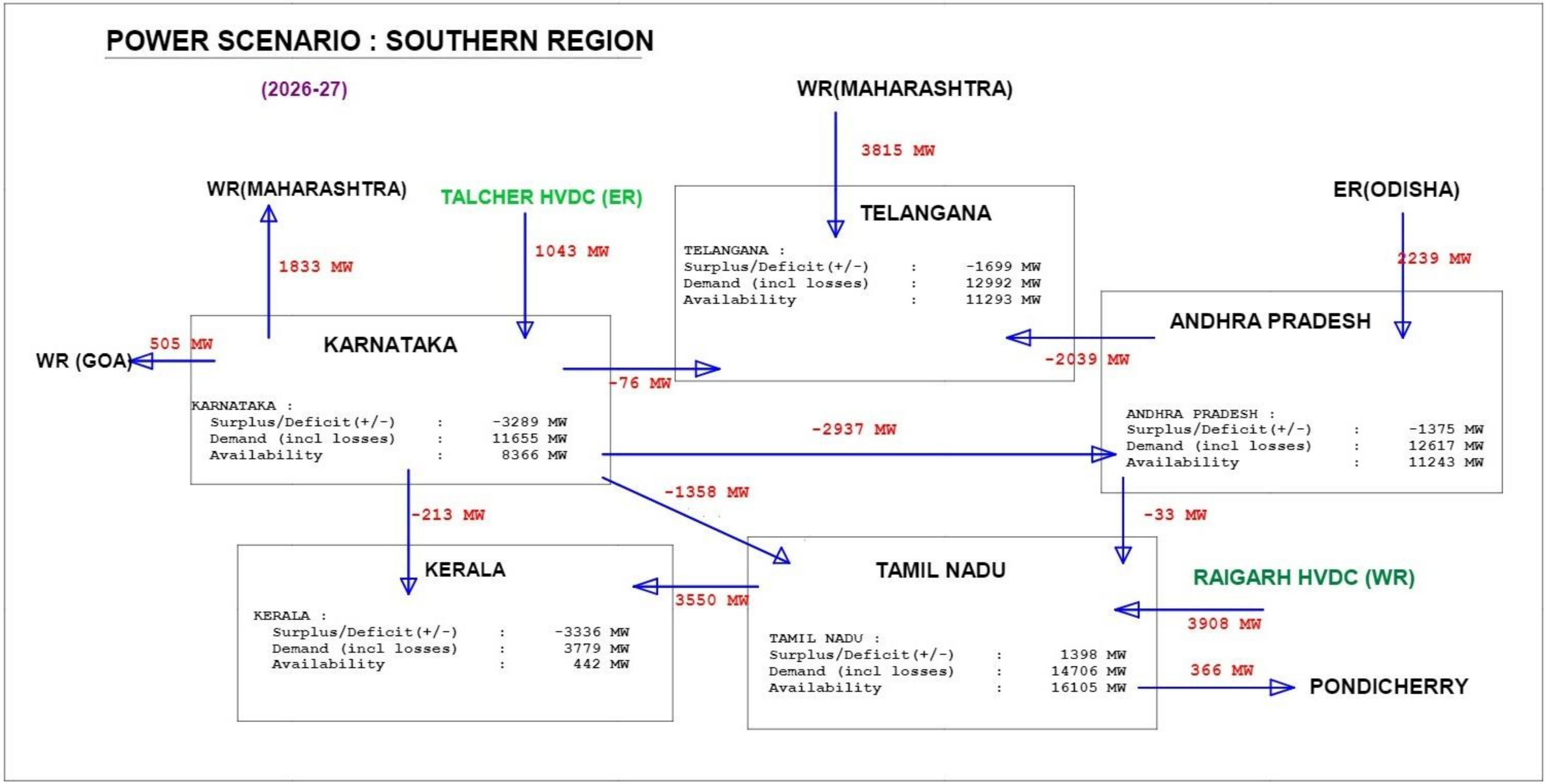
February Night (Northern region) **ANNEX: 5.5a**



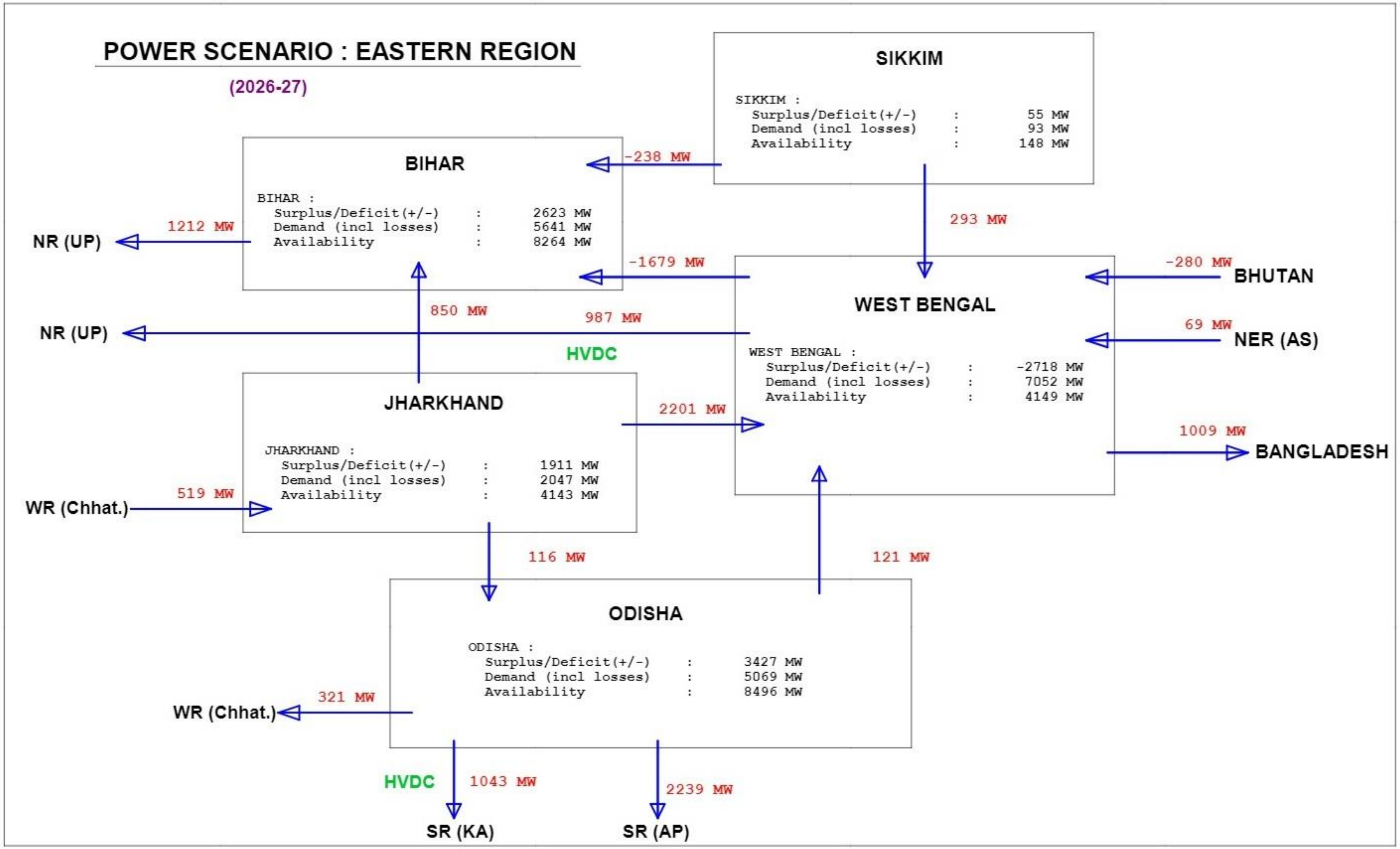
February Night (Western region) **ANNEX: 5.5b**



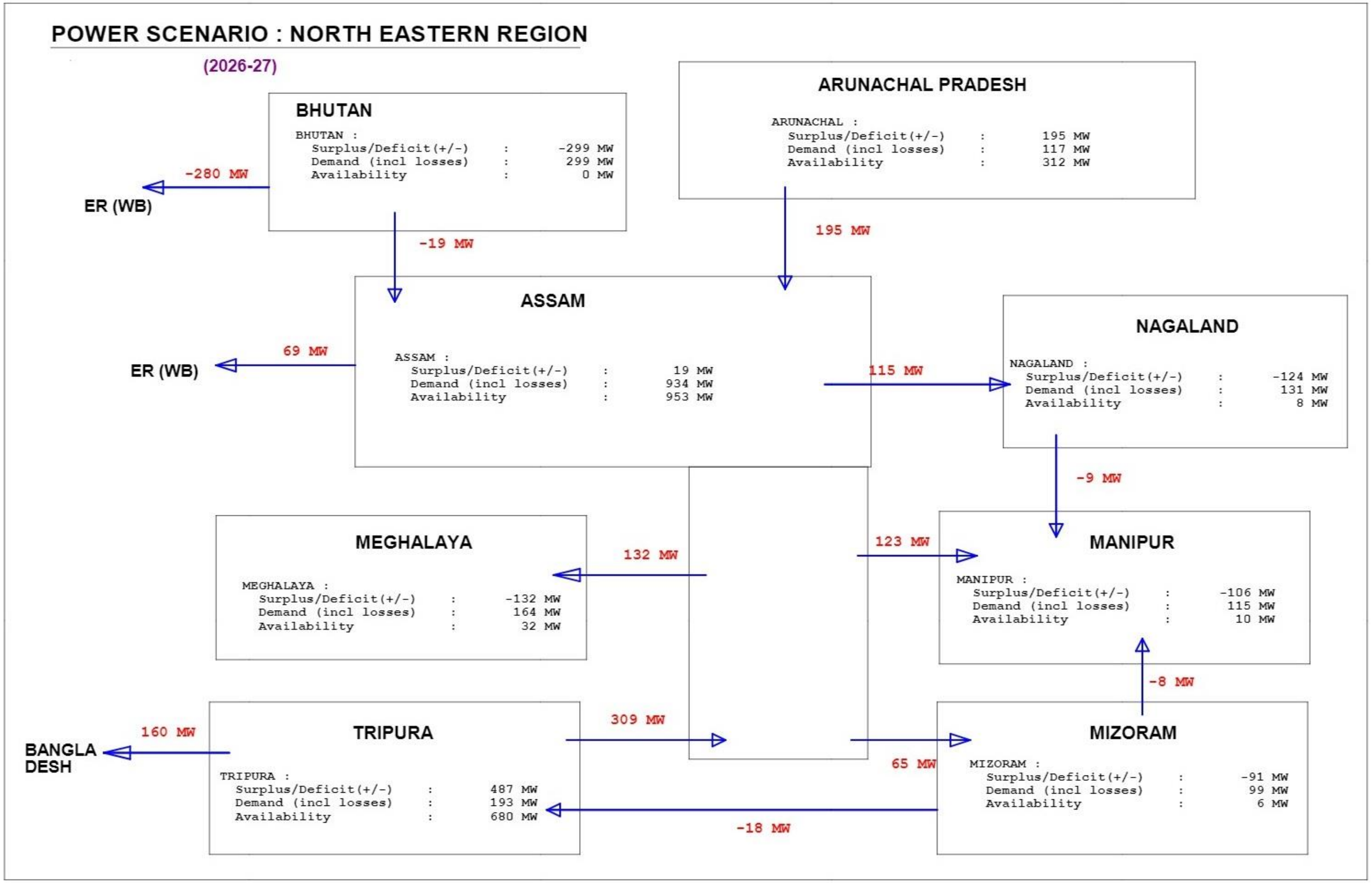
February Night (Southern region) **ANNEX: 5.5c**



February Night (Eastern region) ANNEX: 5.5d



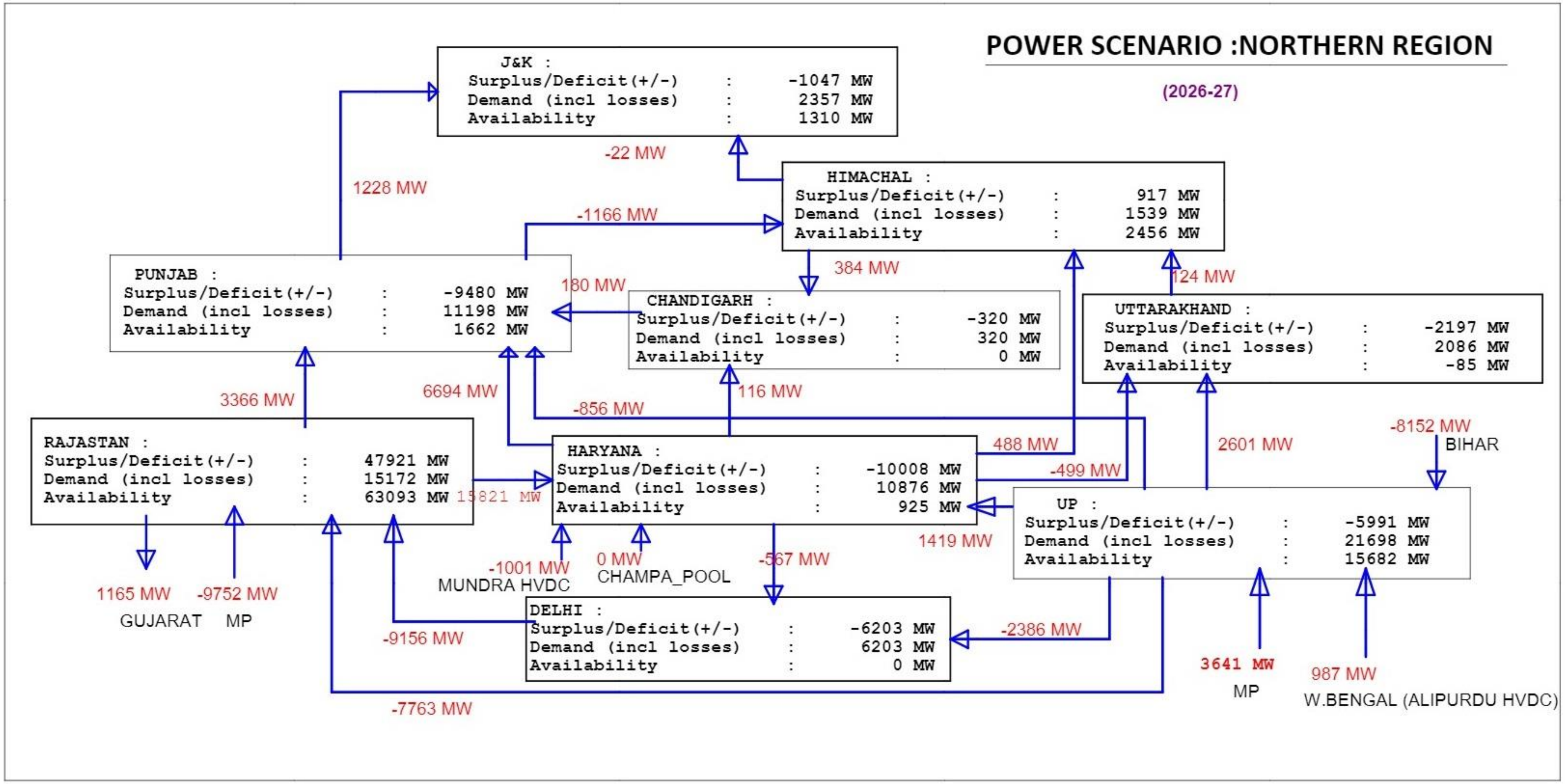
February Night (North Eastern Region) **ANNEX: 5.5e**



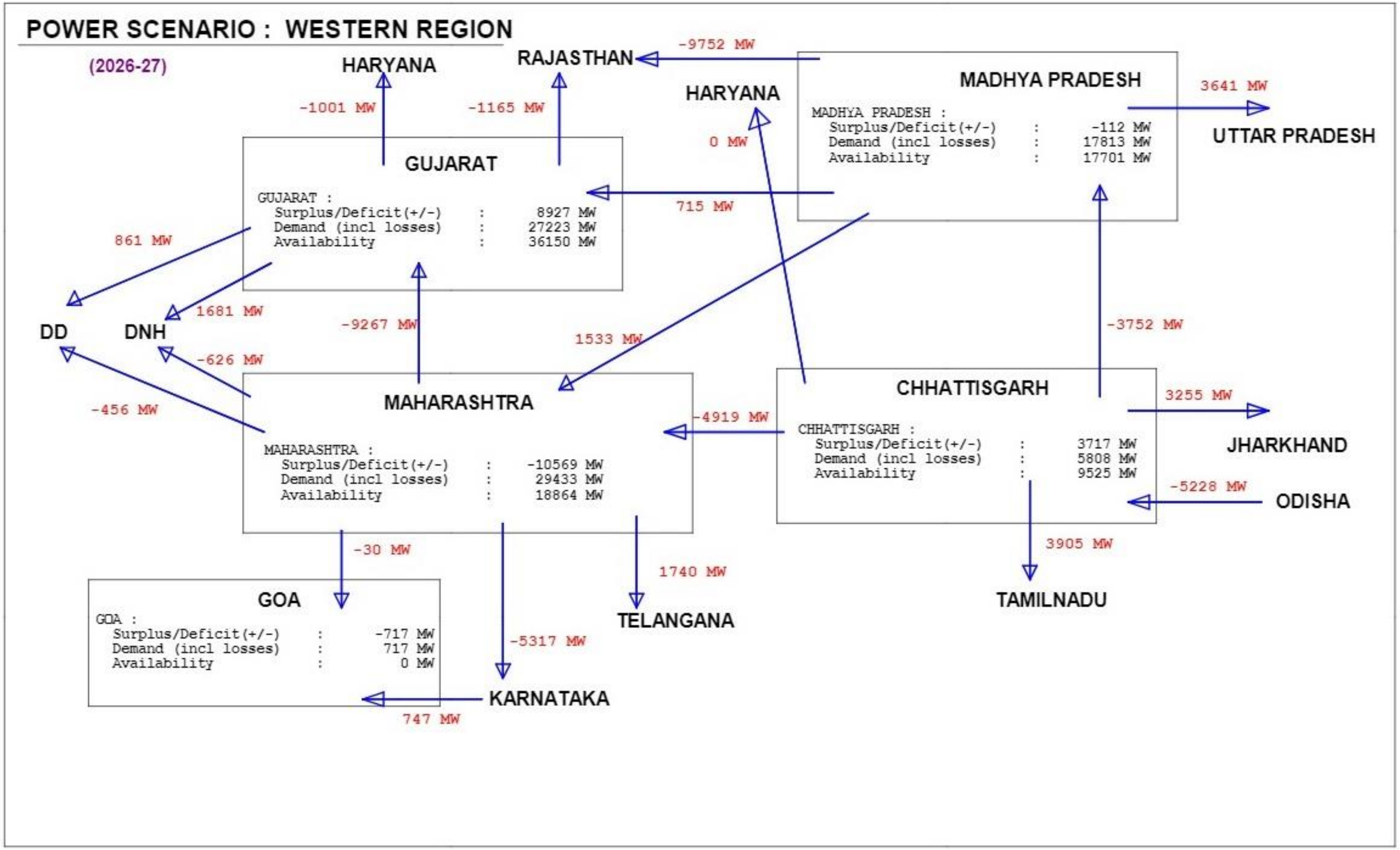
Annex 5.6

Power flow between different states in each region

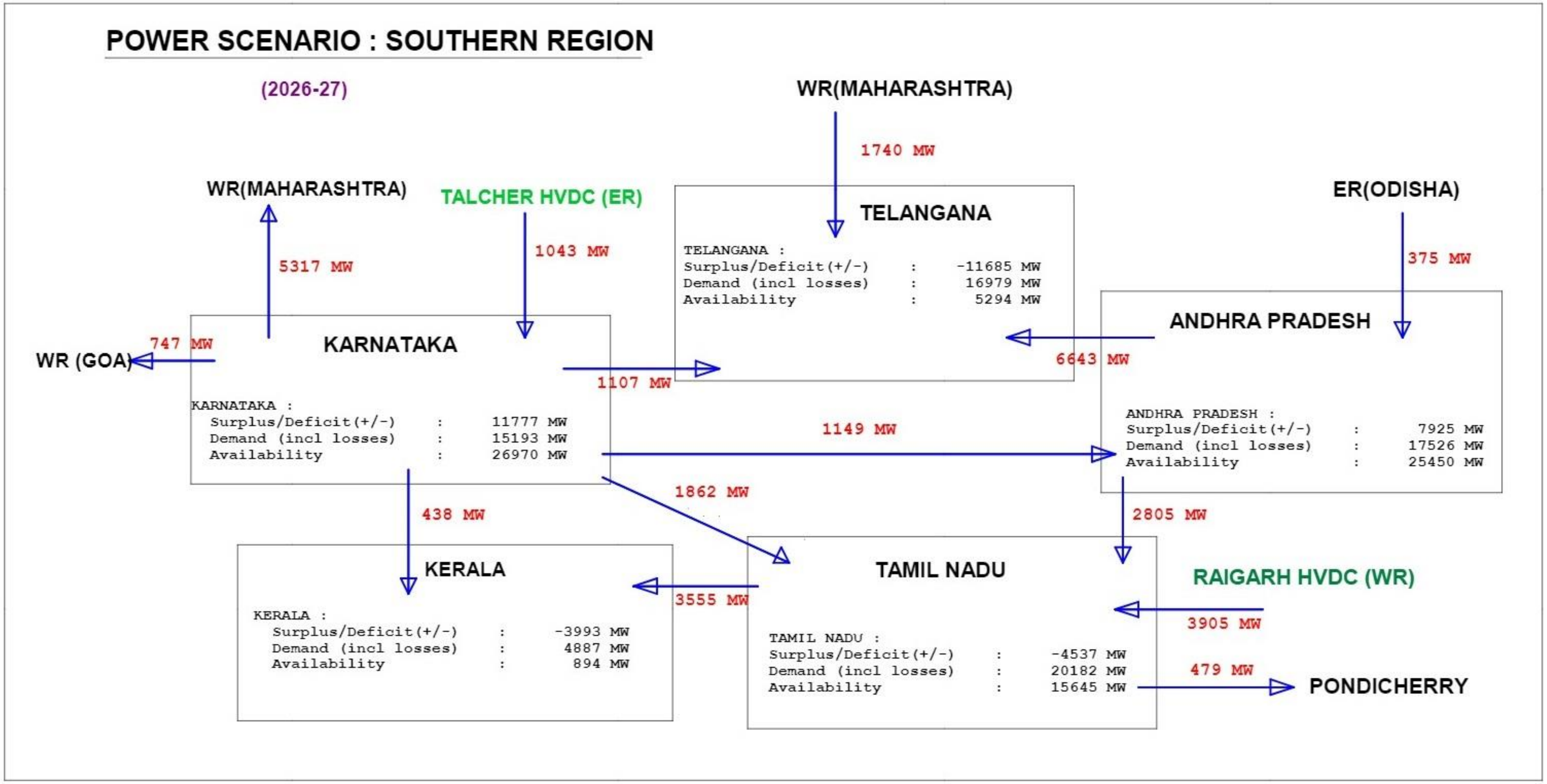
February Solar (Northern region) **ANNEX: 5.6a**



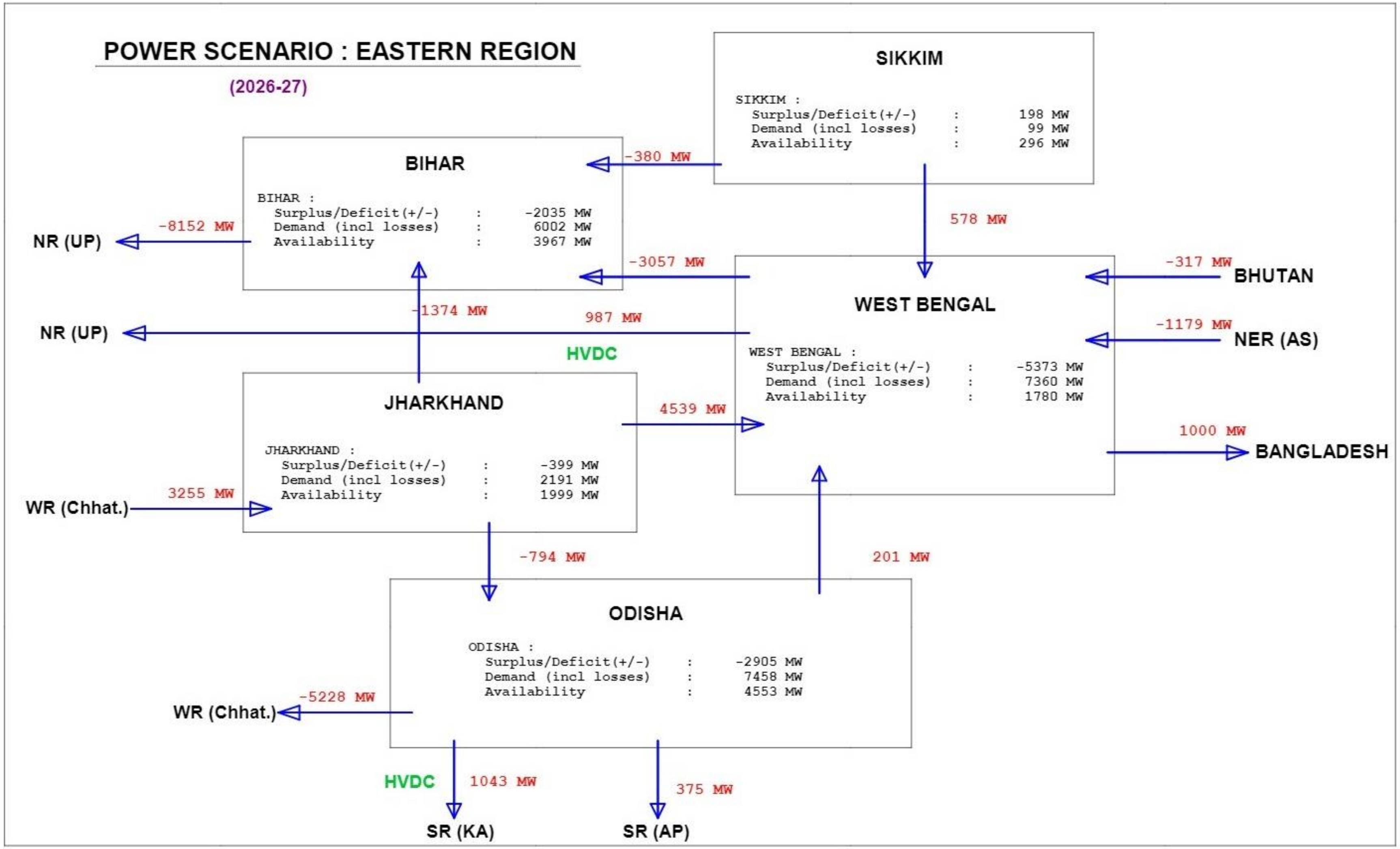
February Solar (Western region) ANNEX: 5.6b



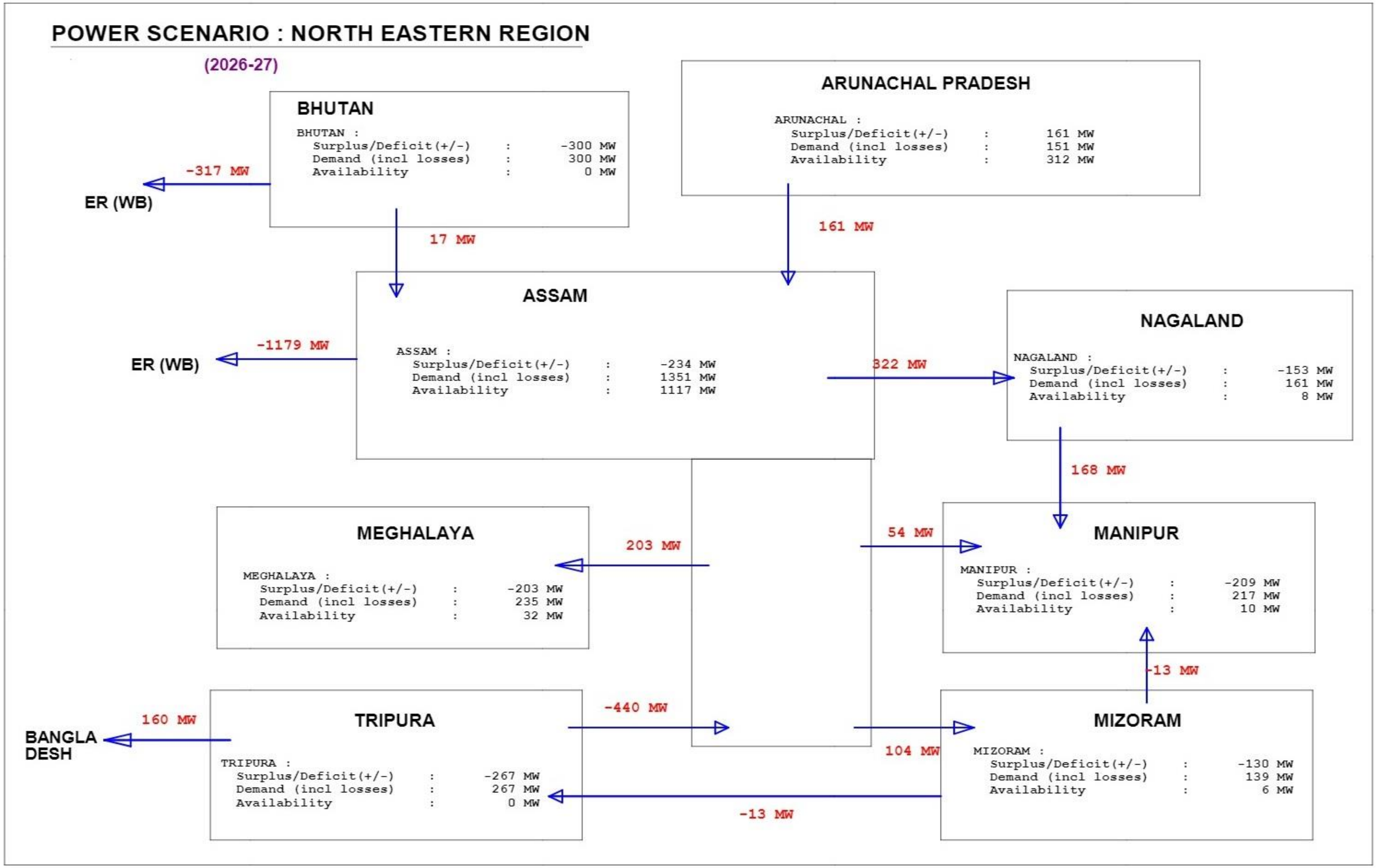
February Solar (Southern region) **ANNEX: 5.6c**



February Solar (Eastern region) **ANNEX: 5.6d**

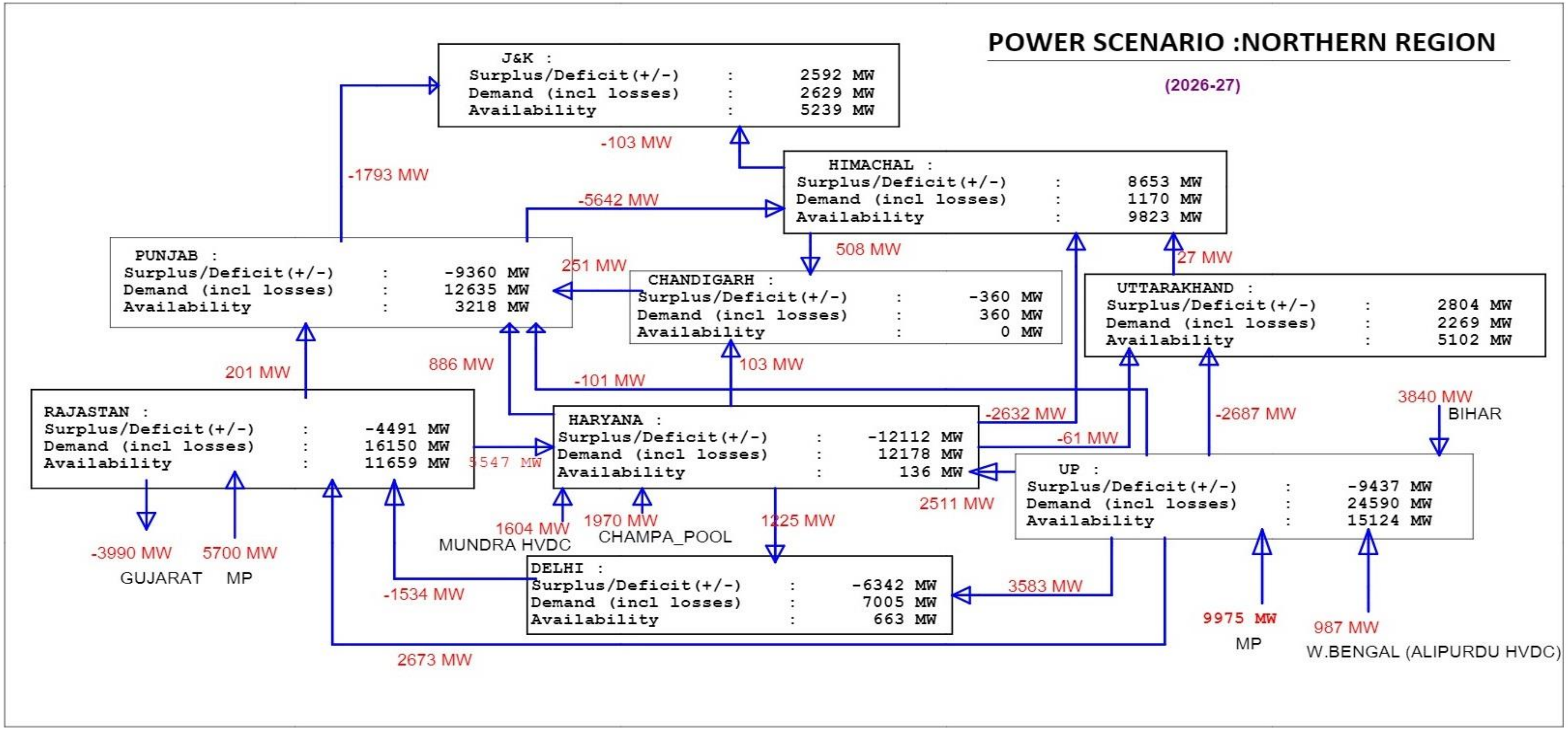


February Solar (North Eastern region) ANNEX: 5.6e

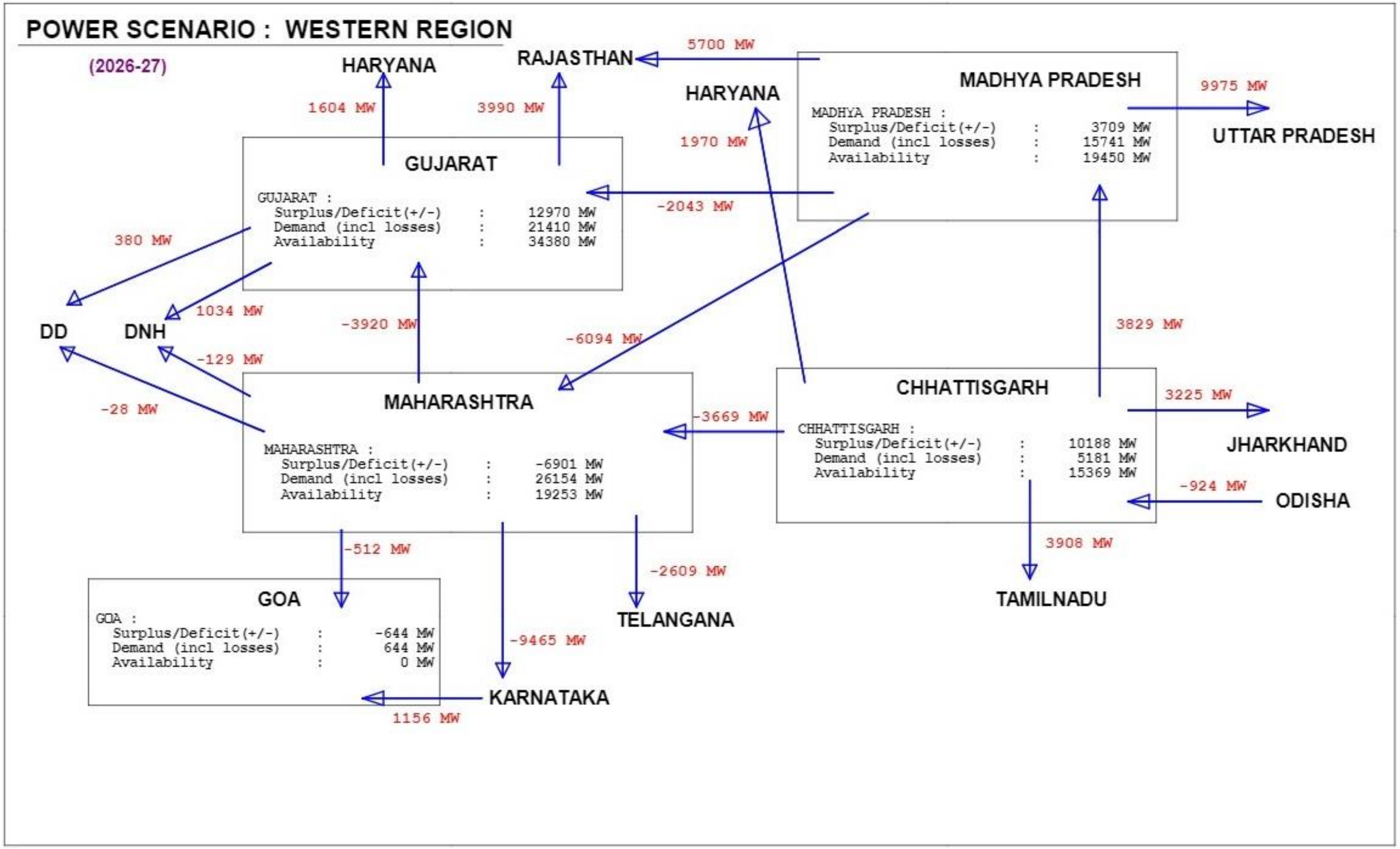


Power flow between different states in each region

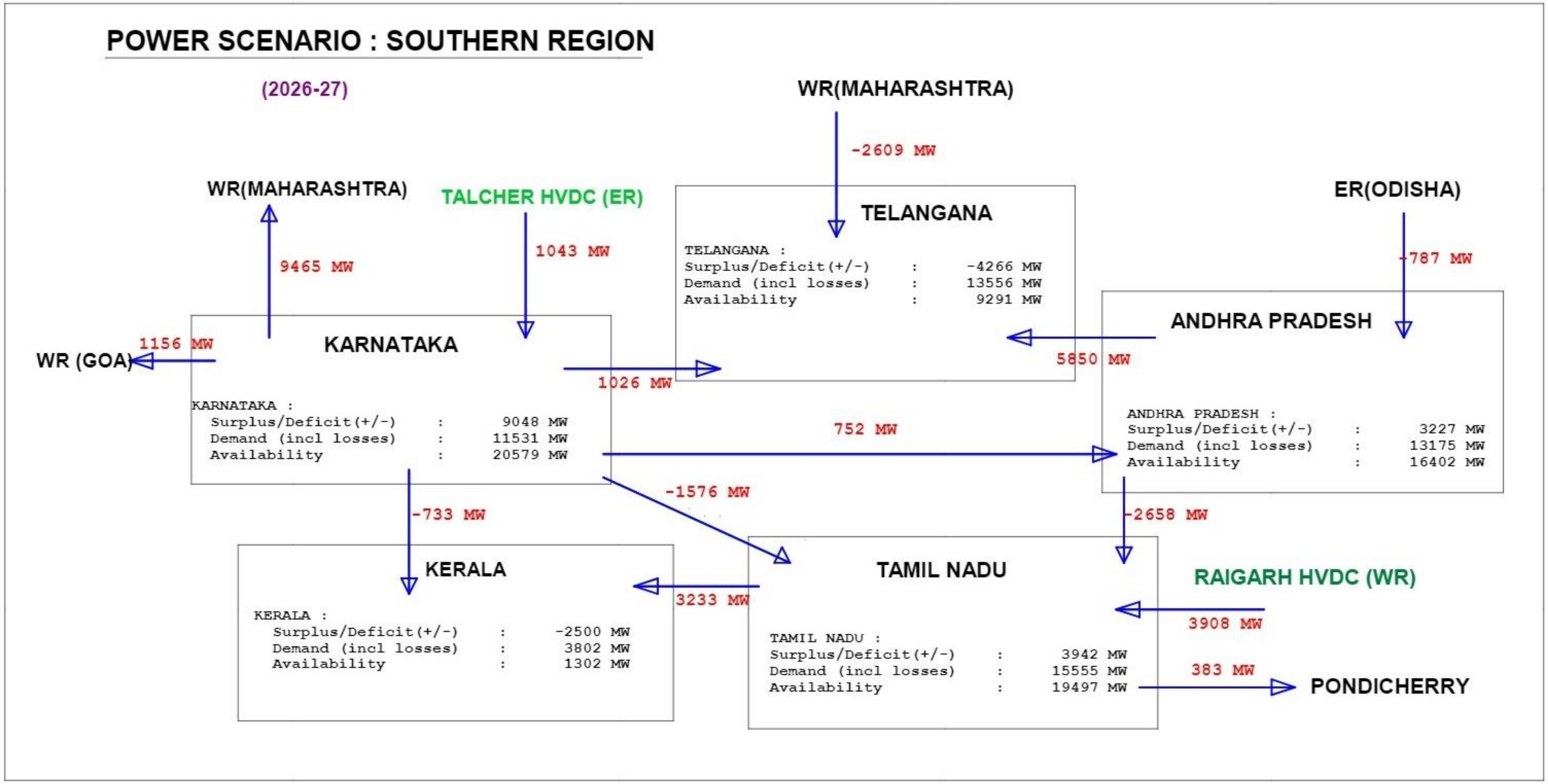
June Evening (Northern Region) **ANNEX: 5.7a**



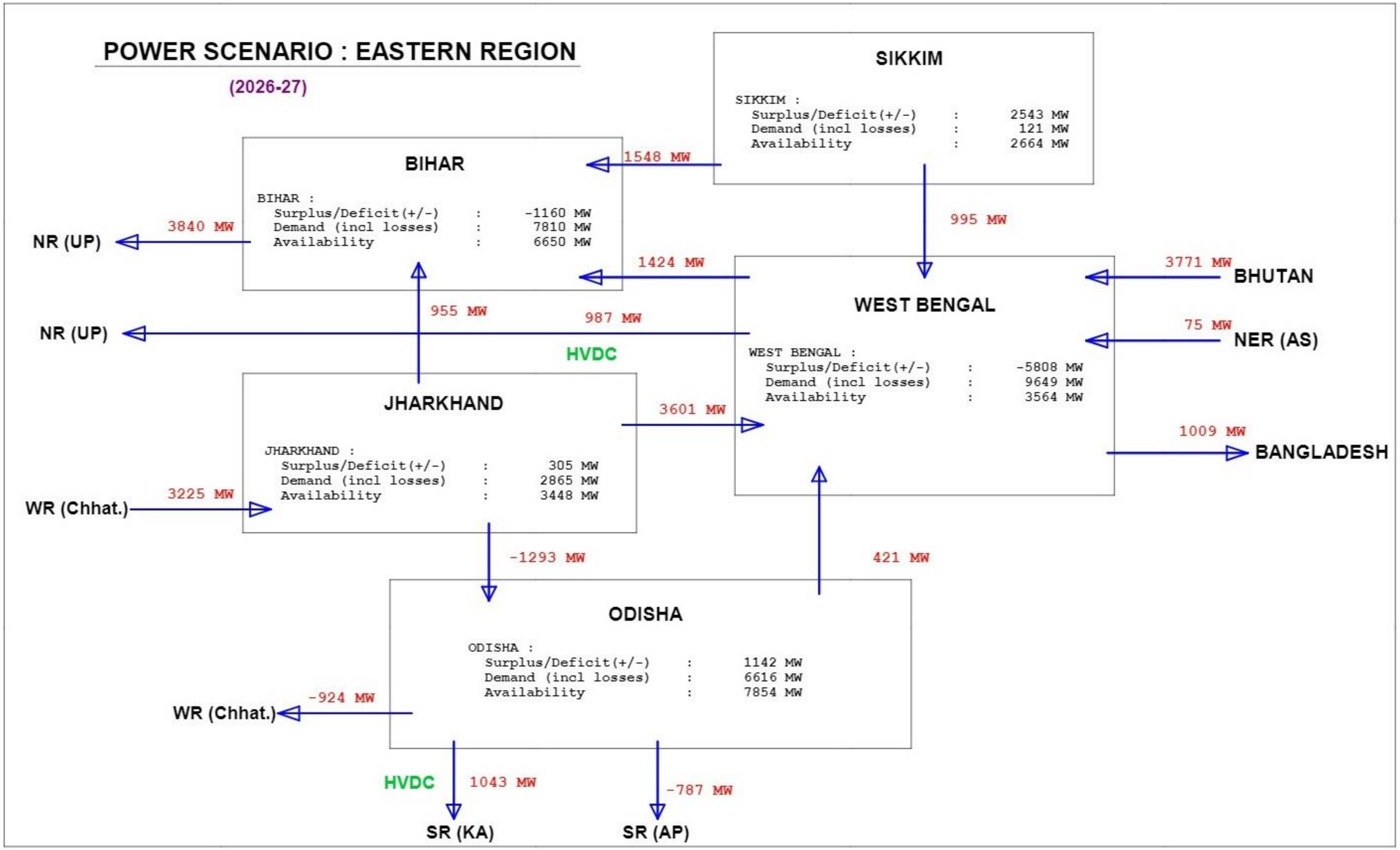
June Evening (Western Region) **ANNEX: 5.7b**



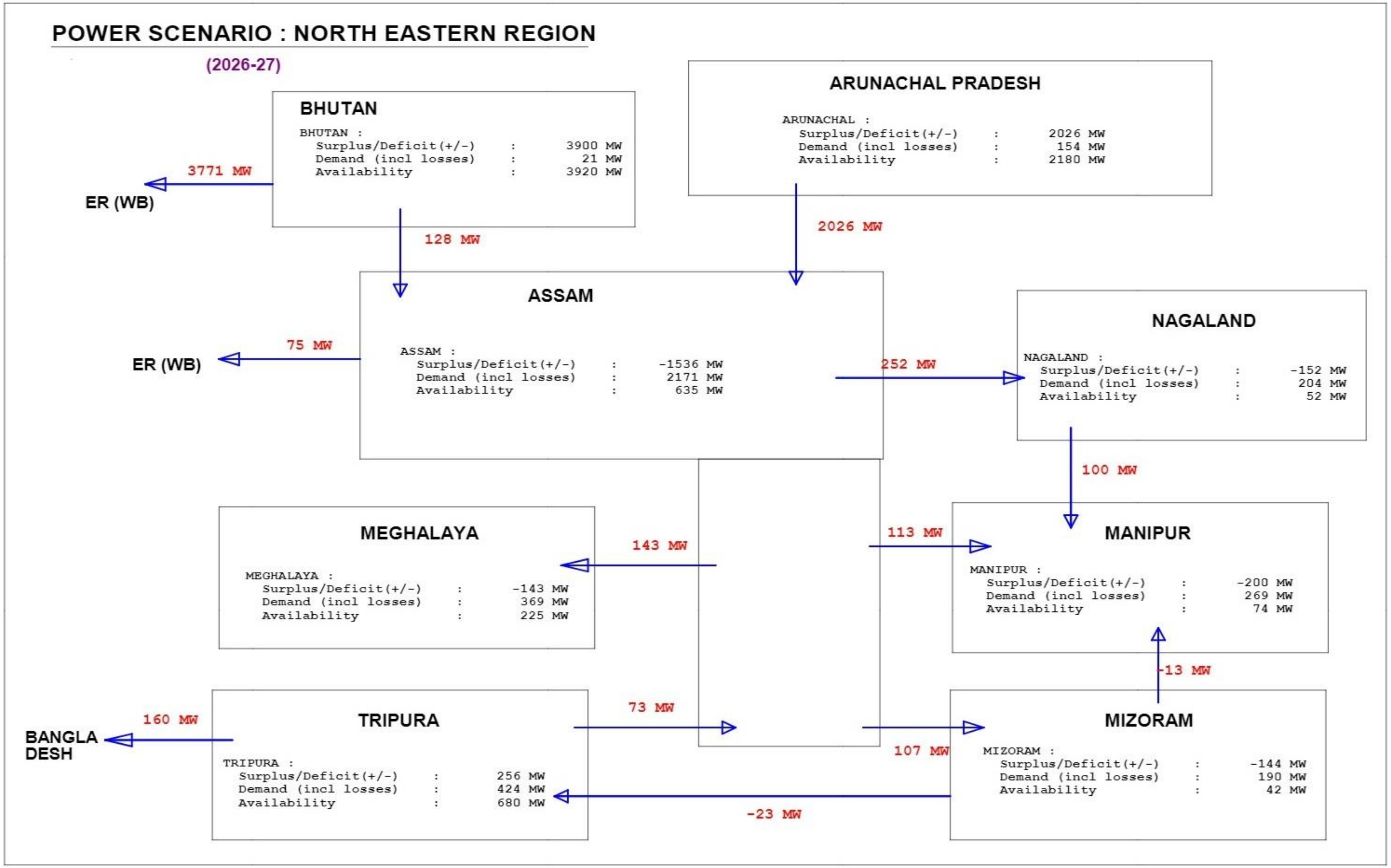
June Evening (Southern Region) **ANNEX: 5.7c**



June Evening (Eastern Region) **ANNEX: 5.7d**



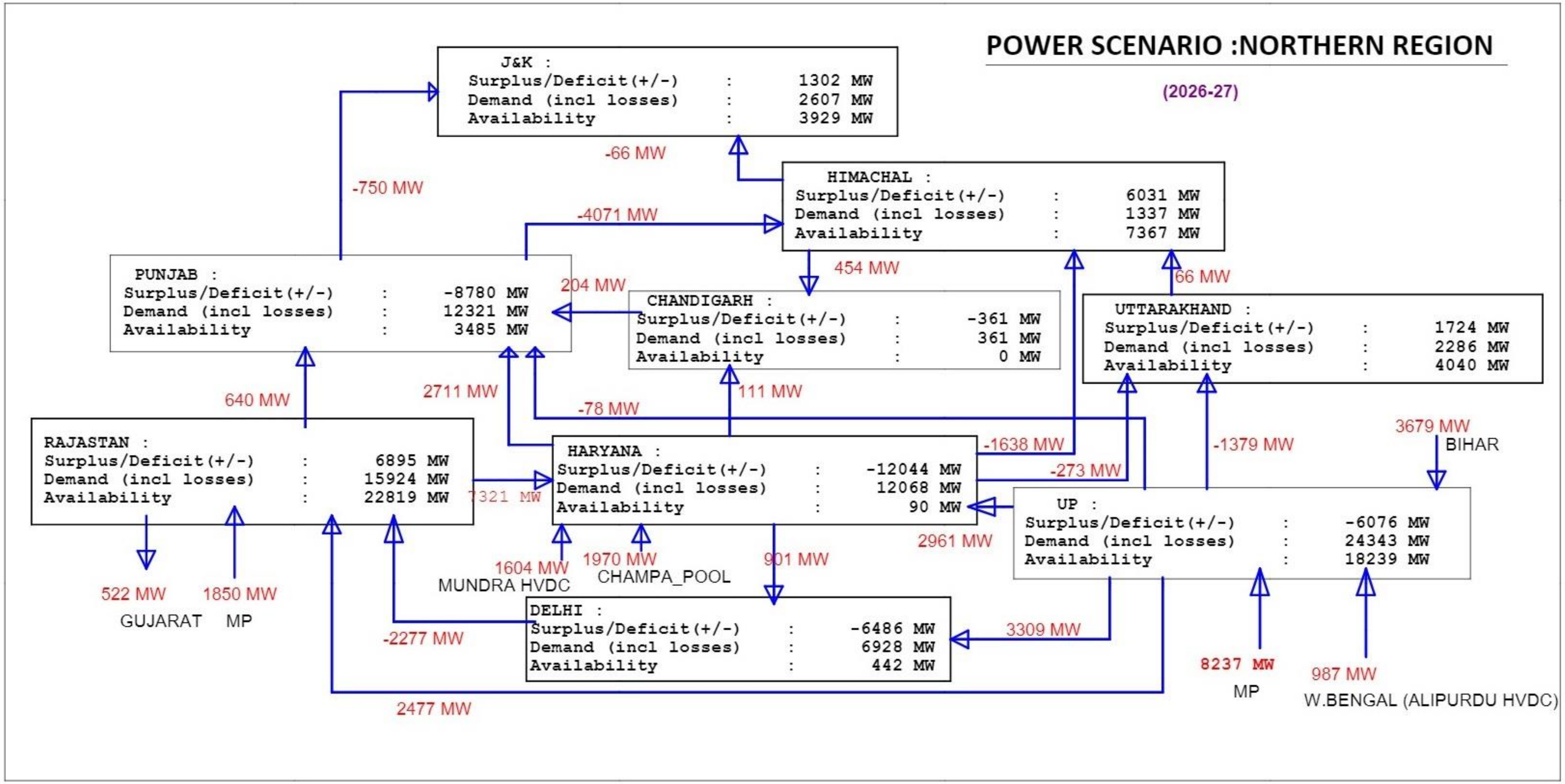
June Evening (North Eastern Region) **ANNEX: 5.7e**



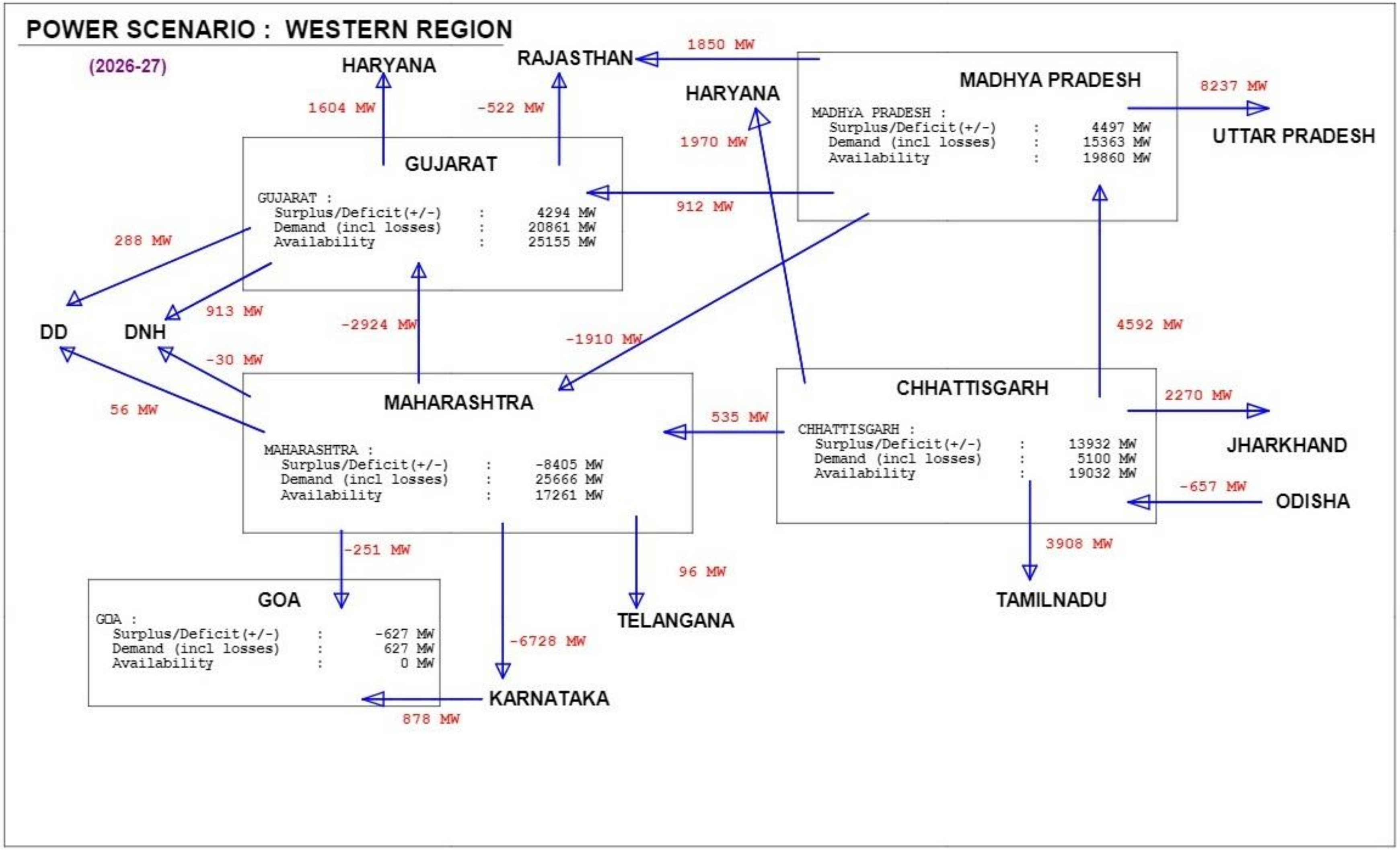
Annex 5.8

Power flow between different states in each region

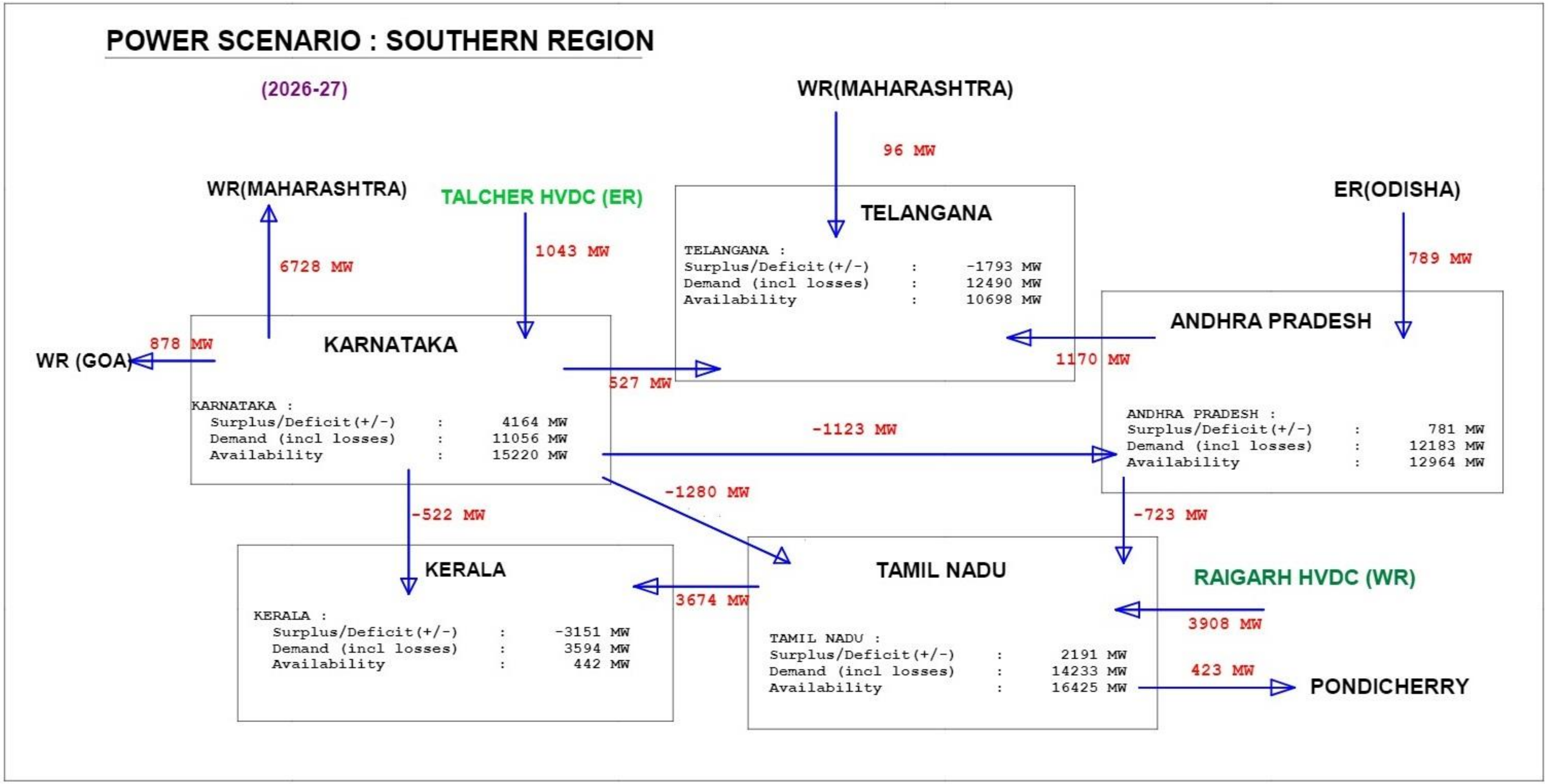
June Night (Northern Region) **ANNEX: 5.8a**



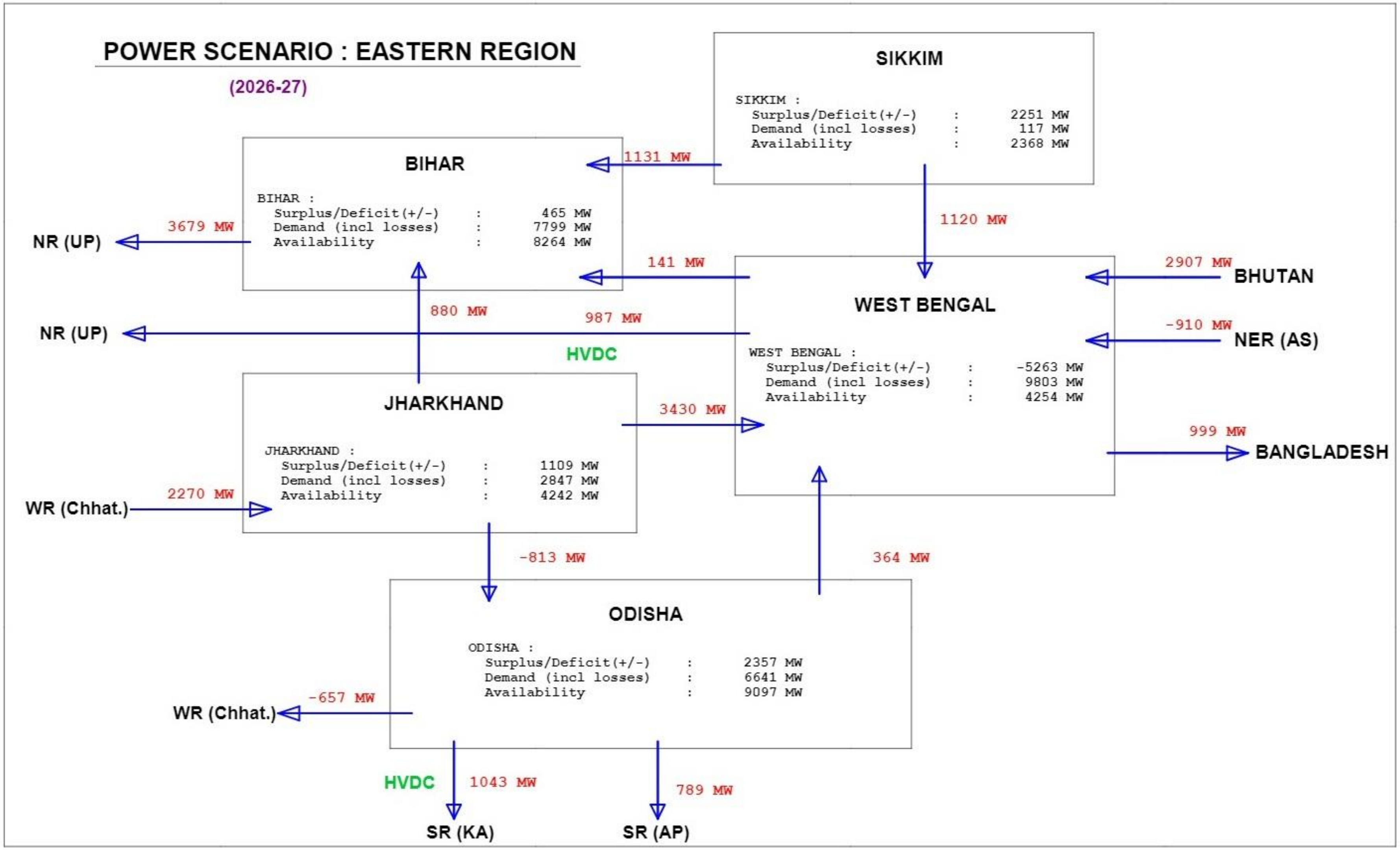
June Night (Western Region) **ANNEX: 5.8b**



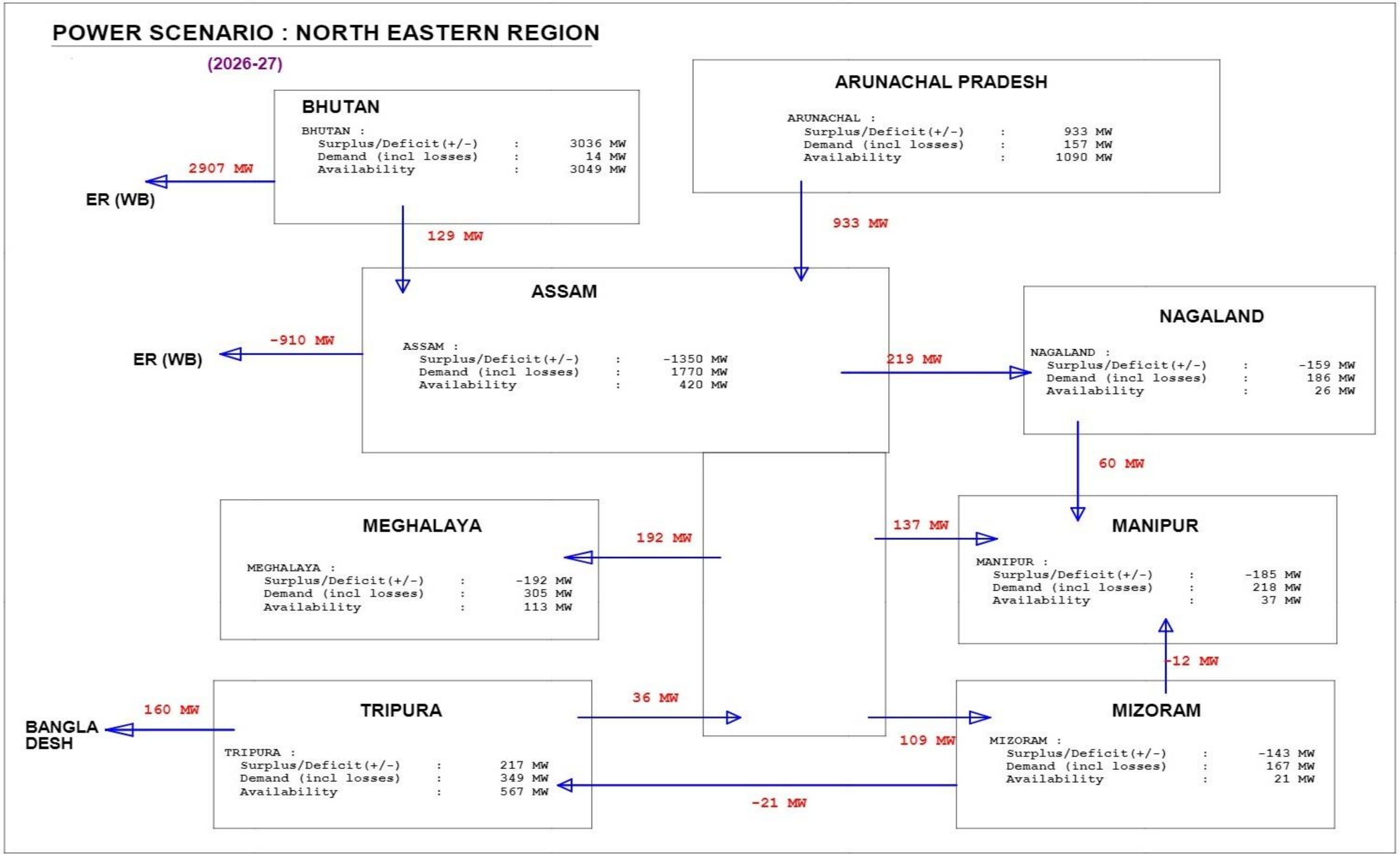
June Night (Southern Region) **ANNEX: 5.8c**



June Night (Eastern Region) **ANNEX: 5.8d**



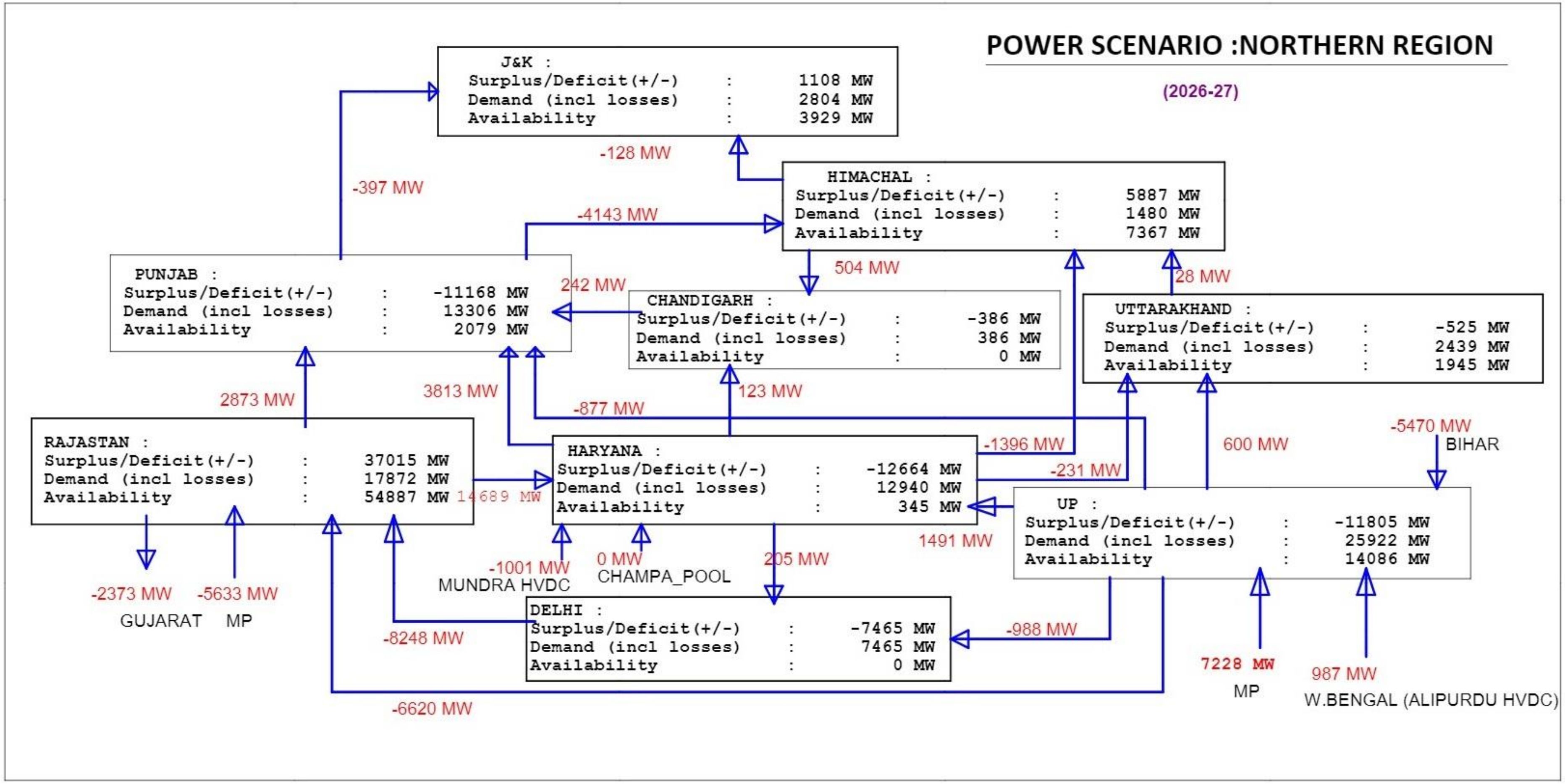
June Night (North Eastern Region) **ANNEX: 5.8e**



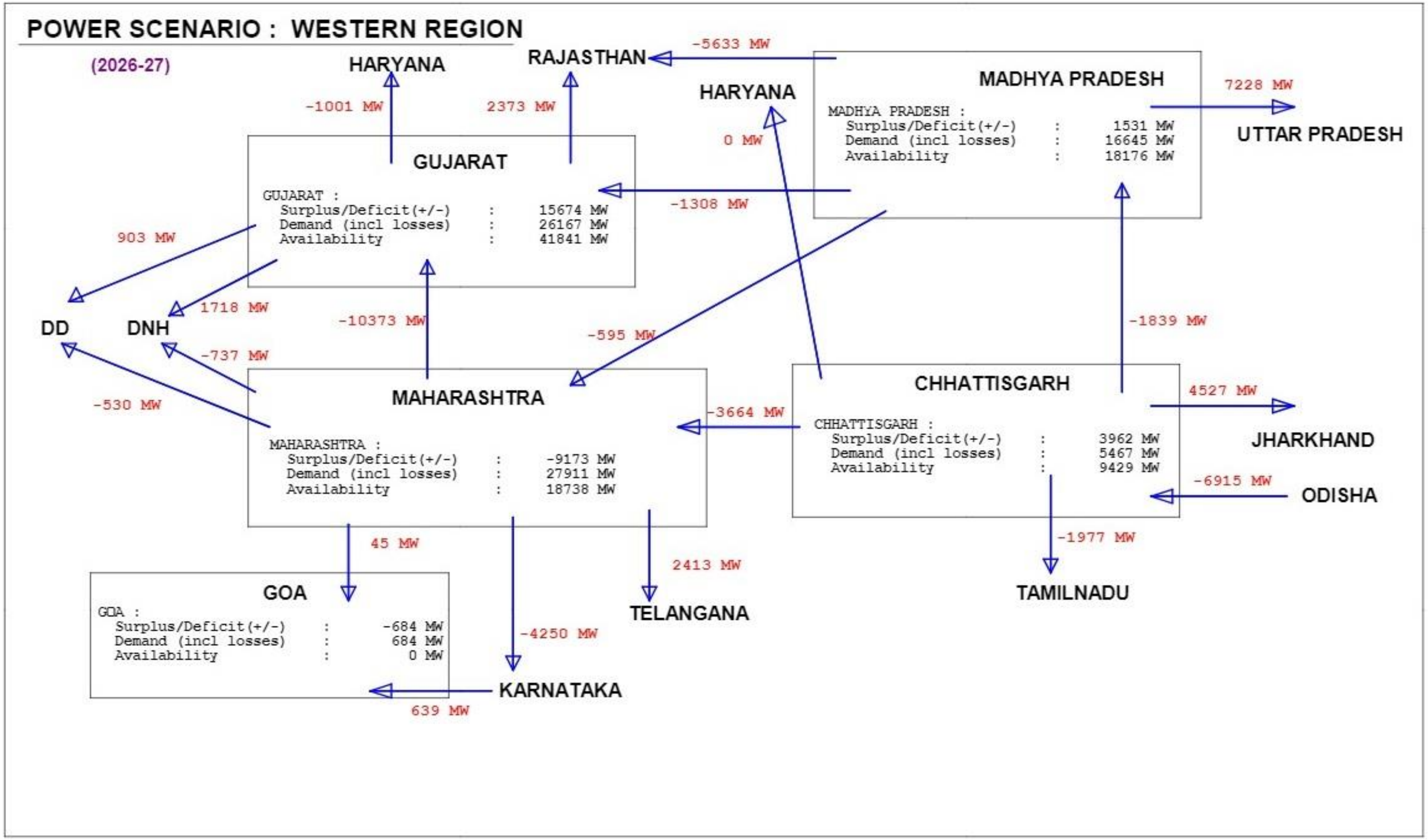
Annex 5.9

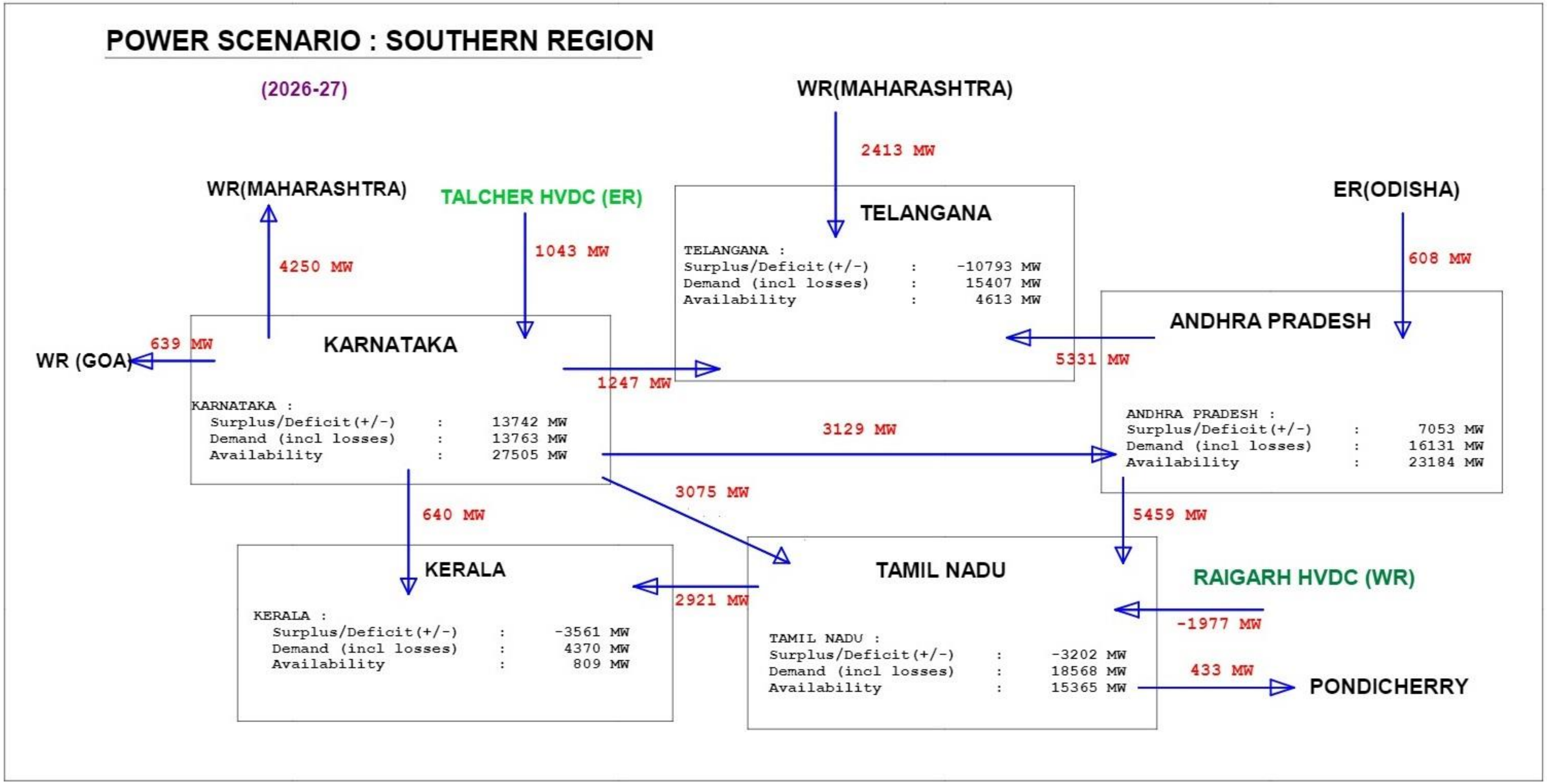
Power flow between different states in each region

June Solar (Northern Region) **ANNEX: 5.9a**

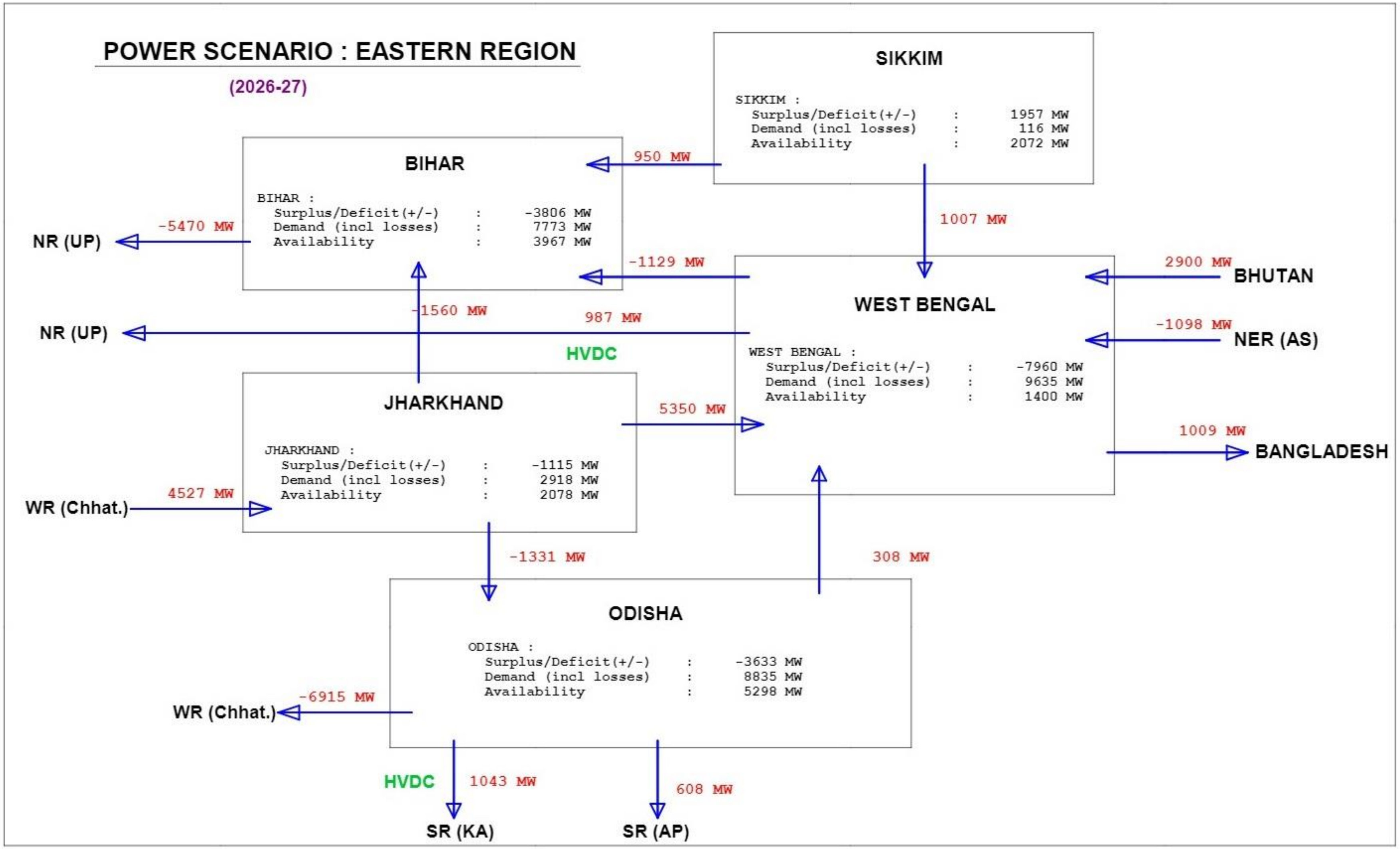


June Solar (Western Region) **ANNEX: 5.9b**

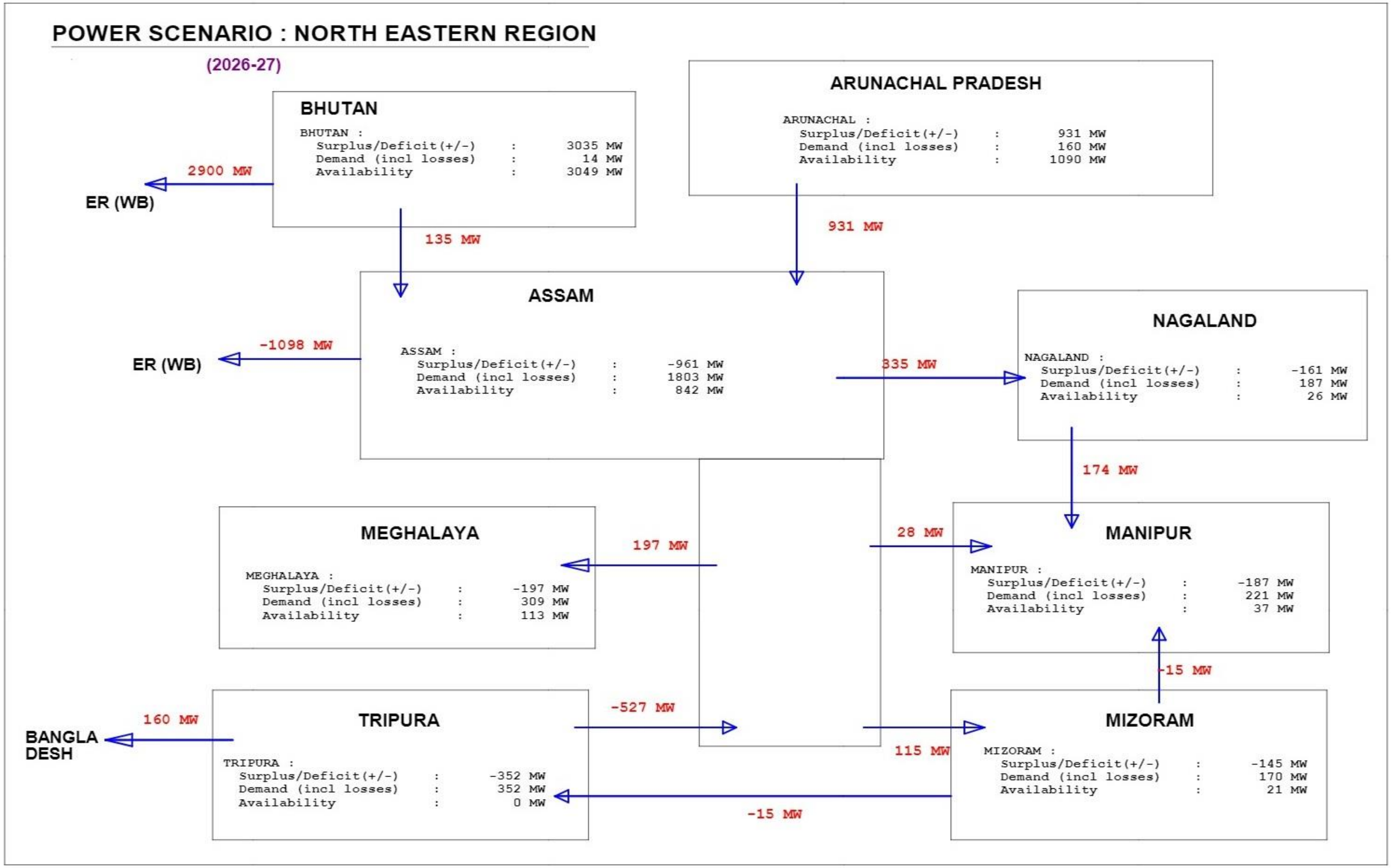



POWER SCENARIO : SOUTHERN REGION
(2026-27)
WR(MAHARASHTRA)
2413 MW
WR(MAHARASHTRA)
TALCHER HVDC (ER)
ER(ODISHA)
4250 MW
1043 MW
TELANGANA
TELANGANA :
Surplus/Deficit(+/-) : -10793 MW
Demand (incl losses) : 15407 MW
Availability : 4613 MW
608 MW
ANDHRA PRADESH
639 MW
WR (GOA)
KARNATAKA
5331 MW
1247 MW
KARNATAKA :
Surplus/Deficit(+/-) : 13742 MW
Demand (incl losses) : 13763 MW
Availability : 27505 MW
3129 MW
ANDHRA PRADESH :
Surplus/Deficit(+/-) : 7053 MW
Demand (incl losses) : 16131 MW
Availability : 23184 MW
3075 MW
640 MW
5459 MW
KERALA
TAMIL NADU
RAIGARH HVDC (WR)
2921 MW
-1977 MW
KERALA :
Surplus/Deficit(+/-) : -3561 MW
Demand (incl losses) : 4370 MW
Availability : 809 MW
TAMIL NADU :
Surplus/Deficit(+/-) : -3202 MW
Demand (incl losses) : 18568 MW
Availability : 15365 MW
433 MW
PONDICHERRY

June Solar (Eastern Region) **ANNEX: 5.9d**



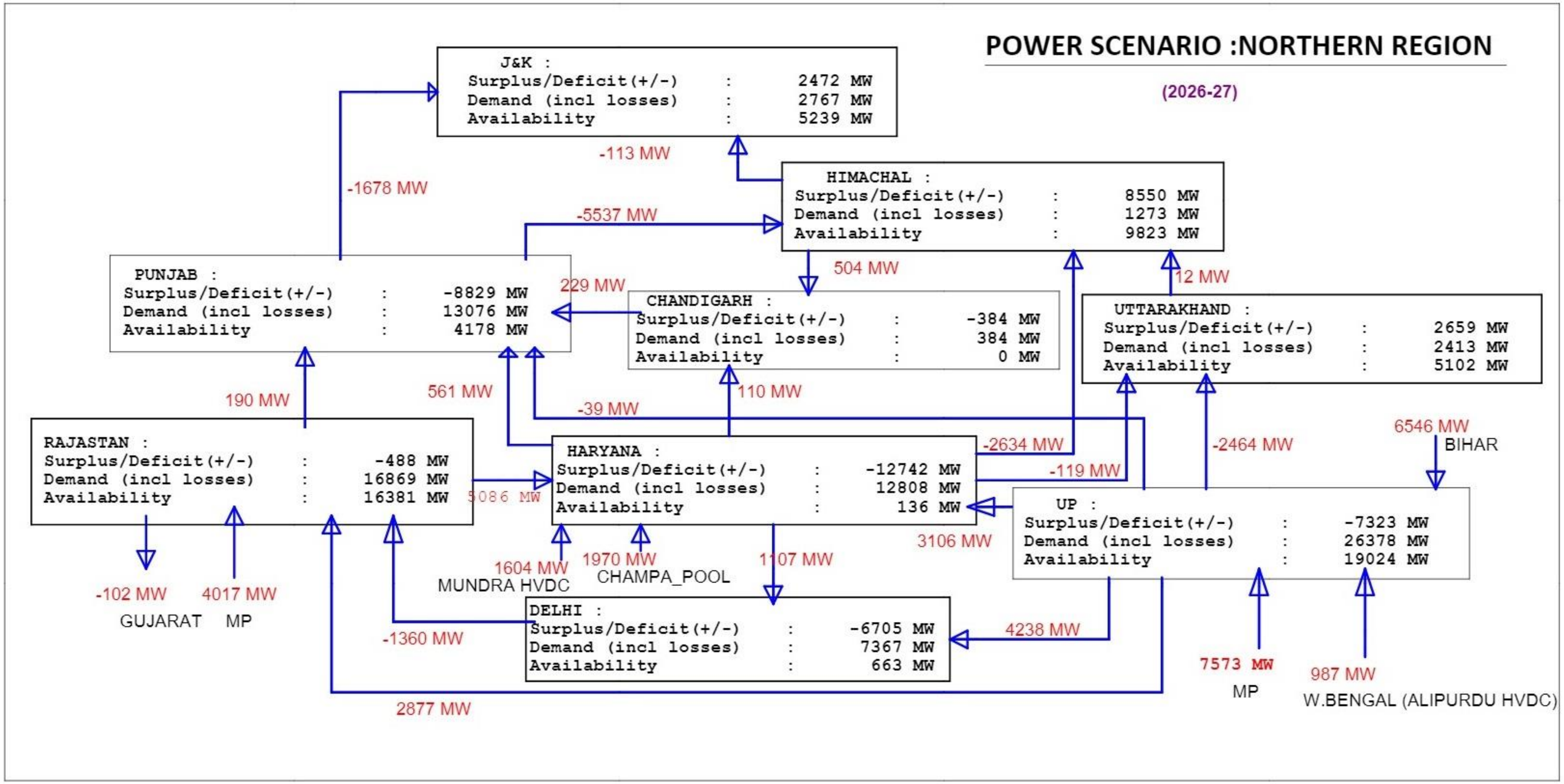
June Solar (North Eastern Region) **ANNEX: 5.9e**



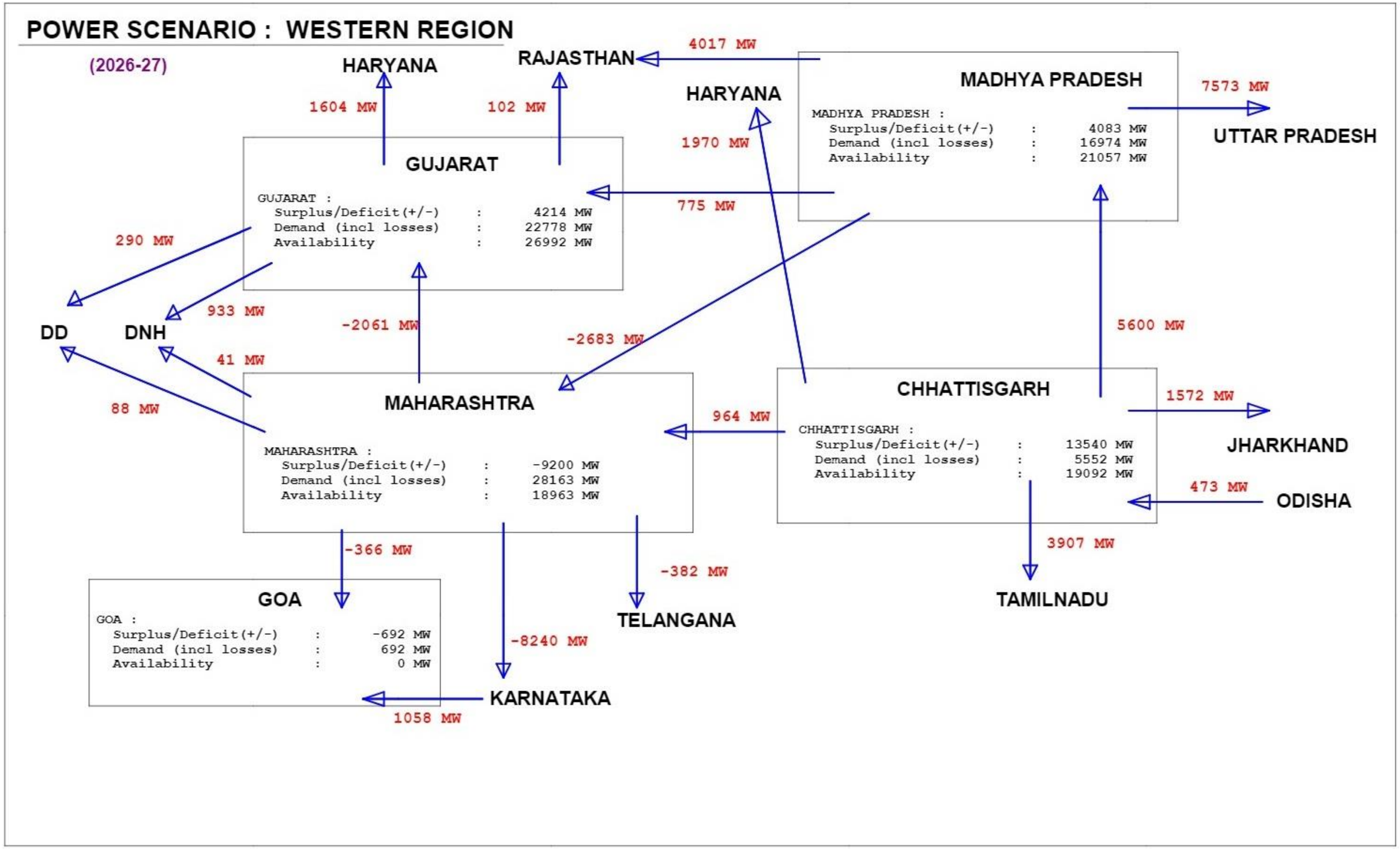
Annex 5.10

Power flow between different states in each region

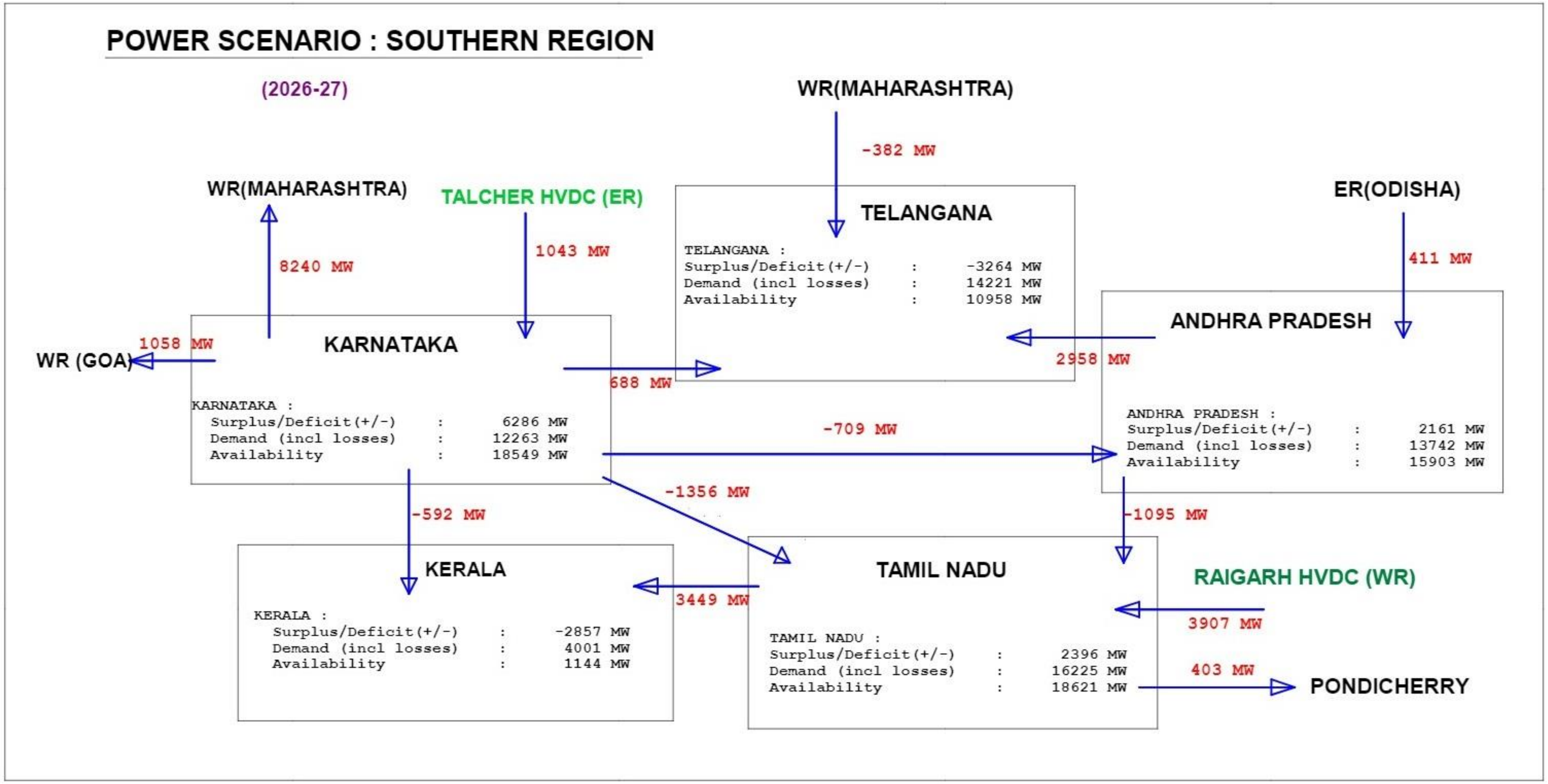
August Evening (Northern Region) **ANNEX: 5.10a**



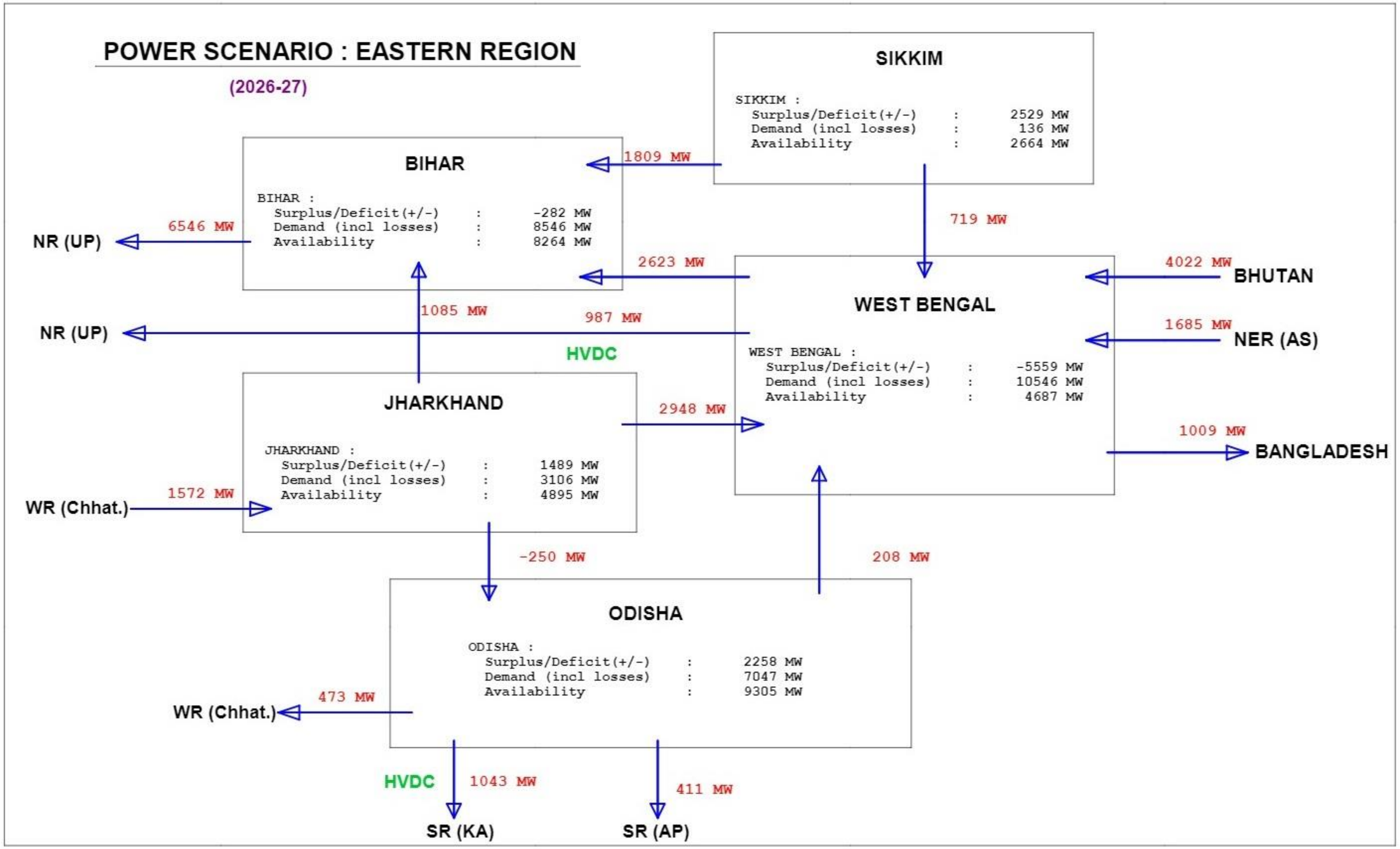
August Evening (Western Region) **ANNEX: 5.10b**



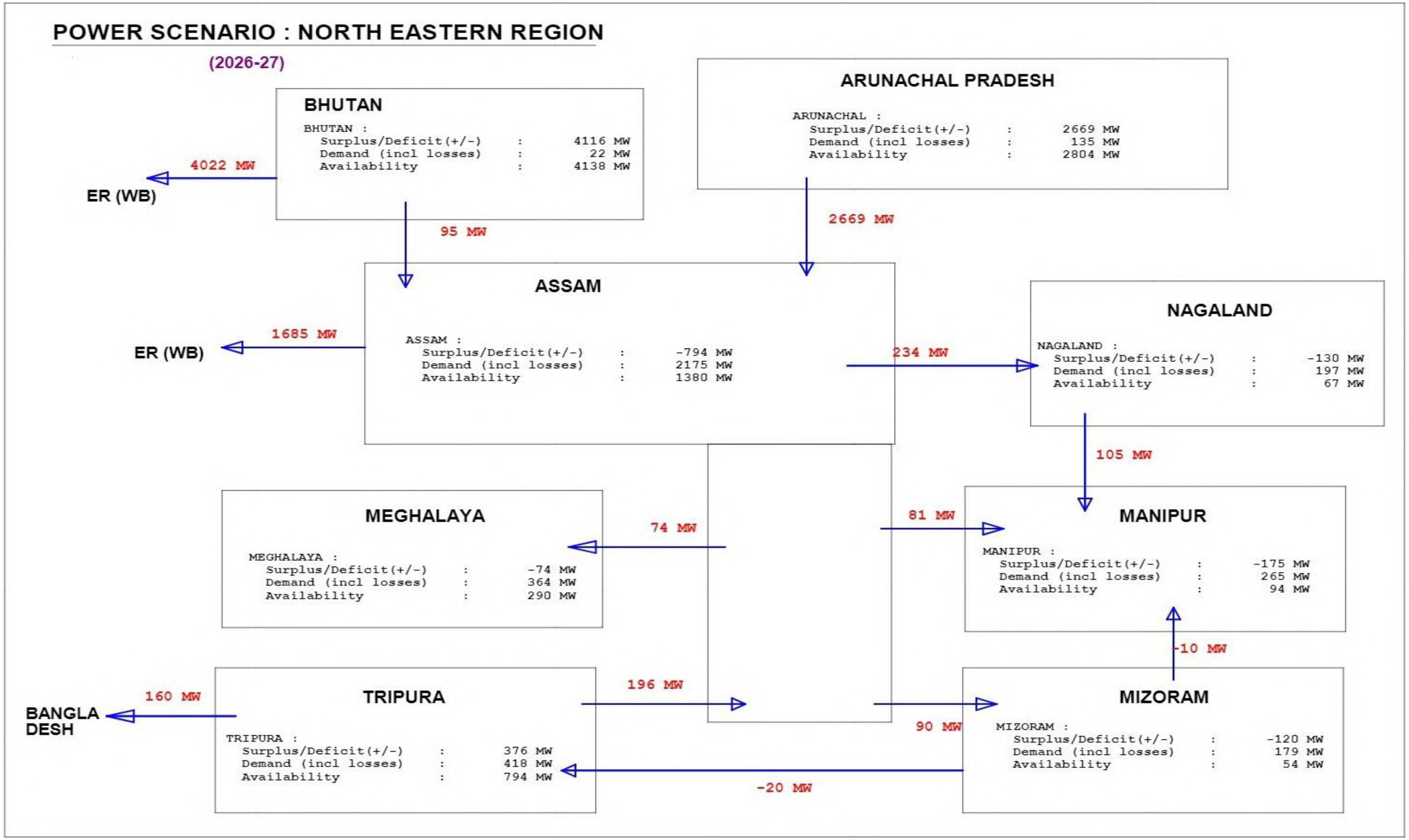
August Evening (Southern Region) **ANNEX: 5.10c**



August Evening (Eastern Region) **ANNEX: 5.10d**



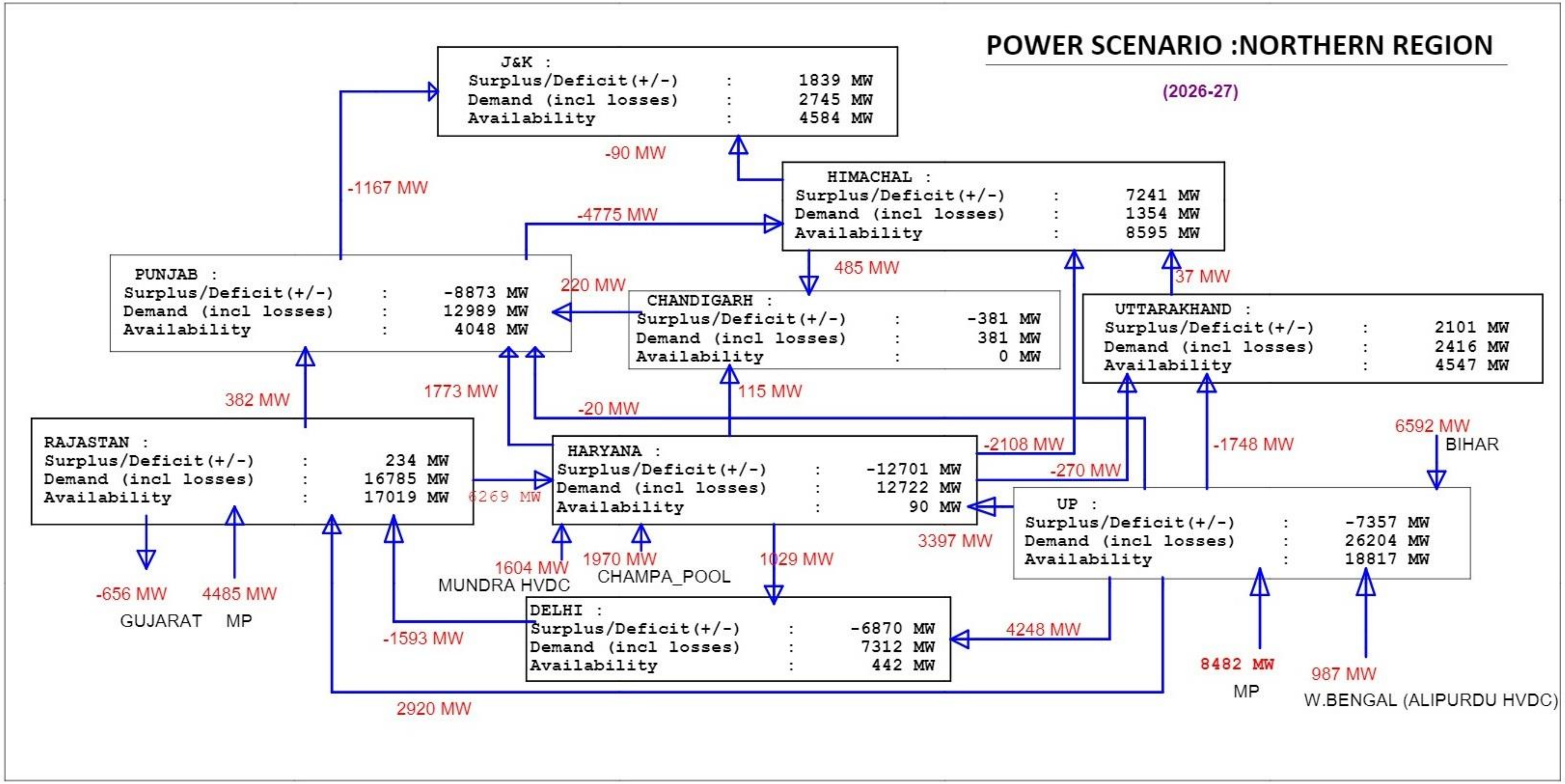
August Evening (North Eastern Region) **ANNEX: 5.10e**



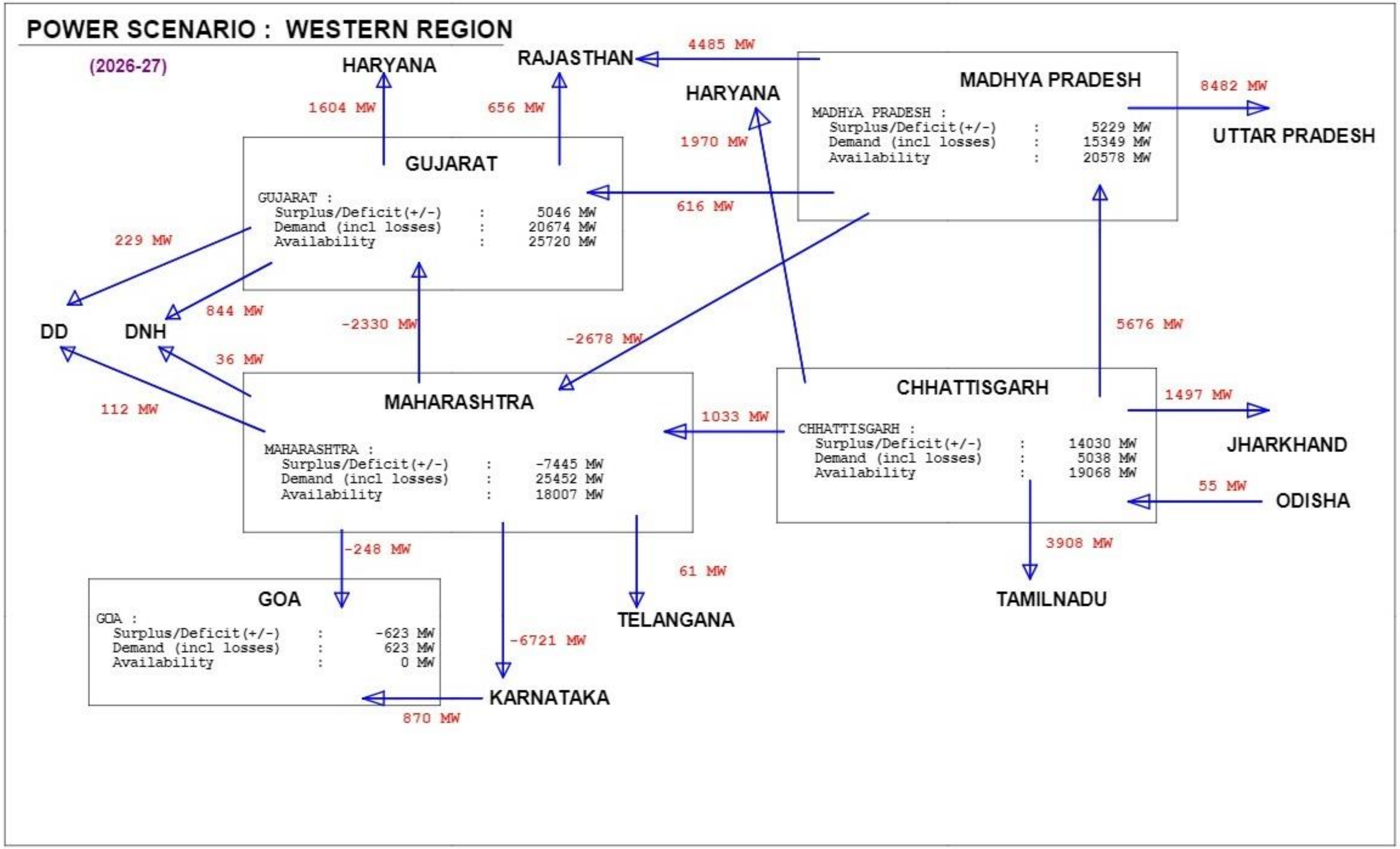
Annex 5.11

Power flow between different states in each region

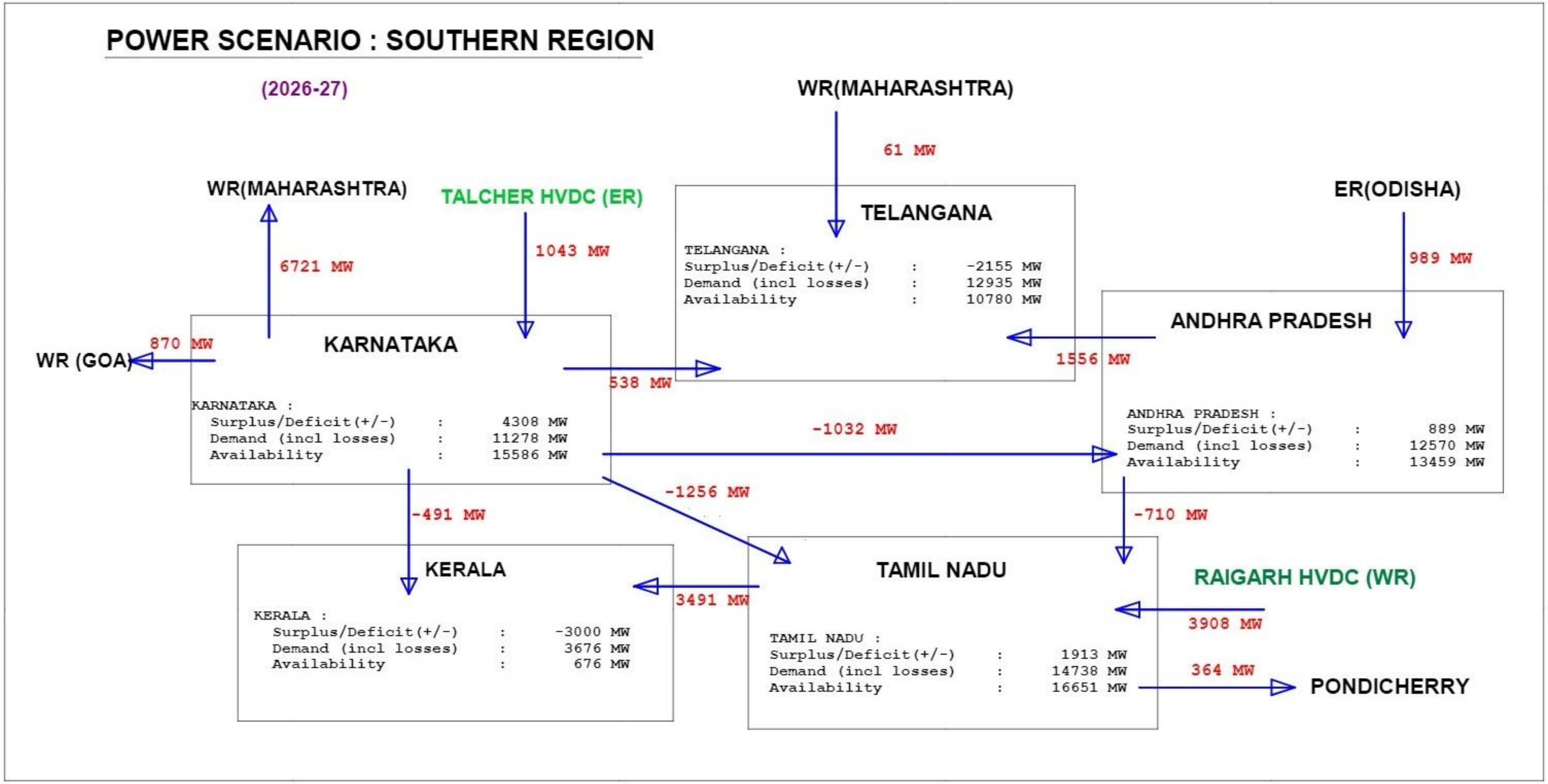
August Night (Northern region) **ANNEX: 5.11a**



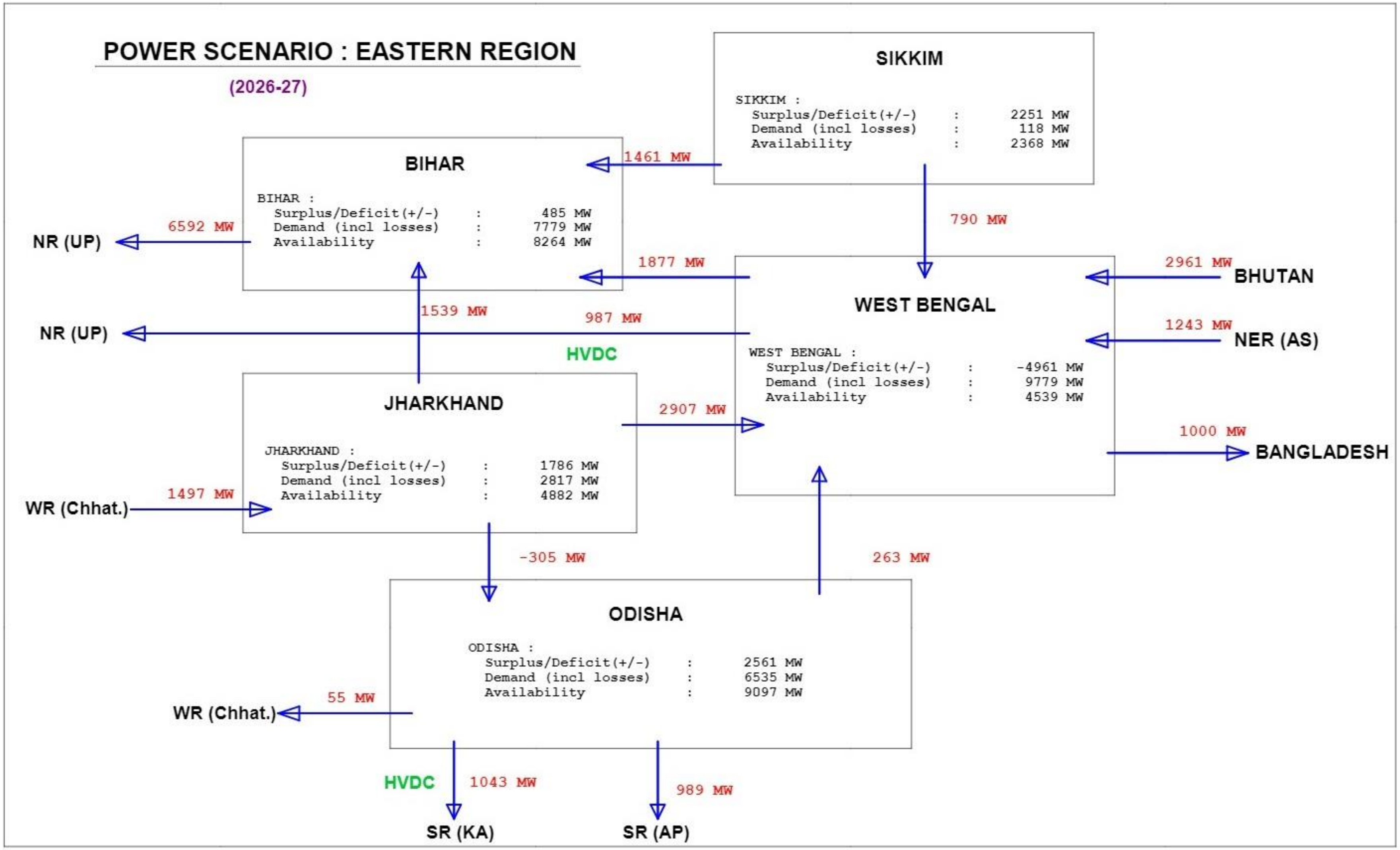
August Night (Western region) **ANNEX: 5.11b**



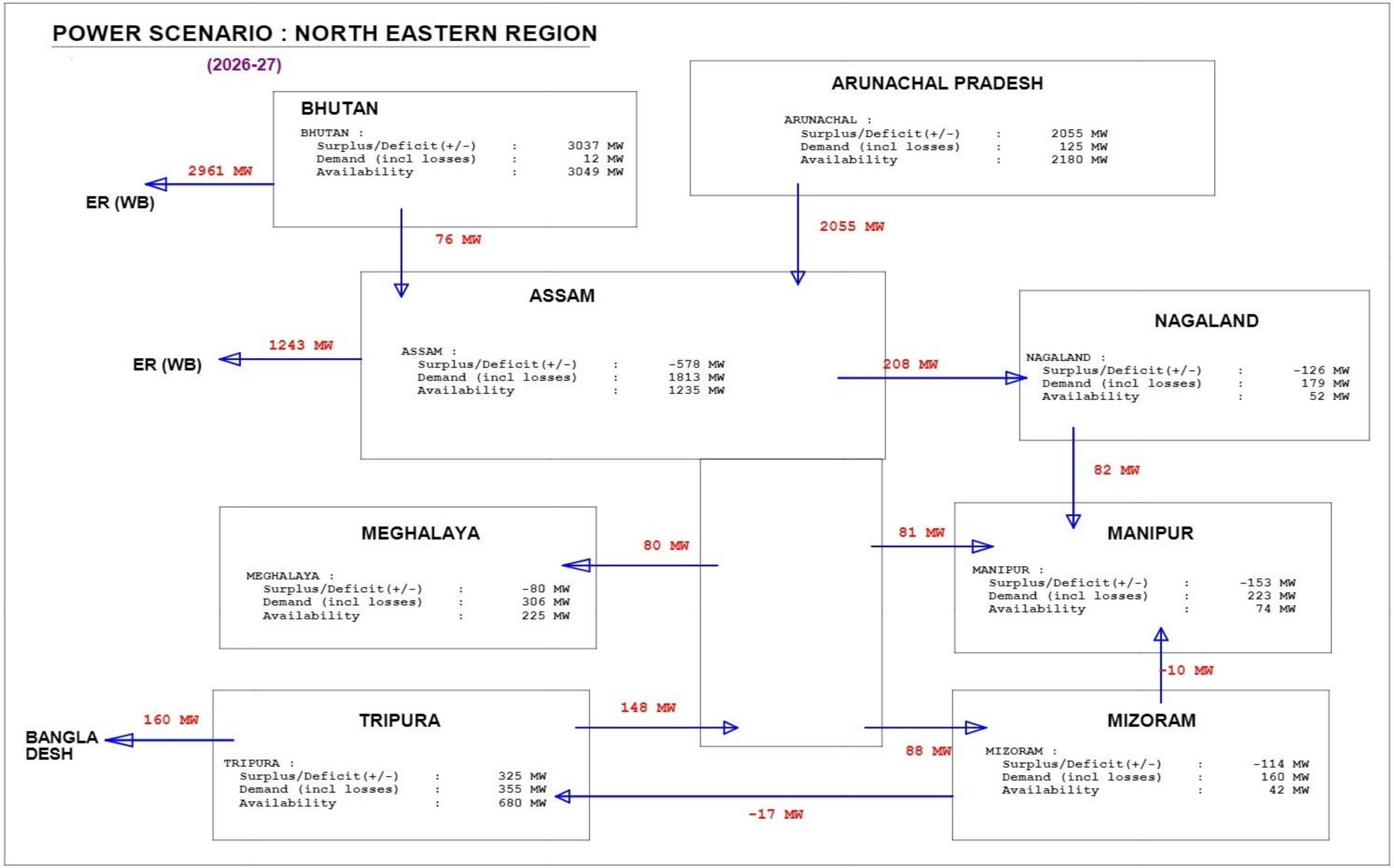
August Night (Southern region) **ANNEX: 5.11c**



August Night (Eastern region) **ANNEX: 5.11d**



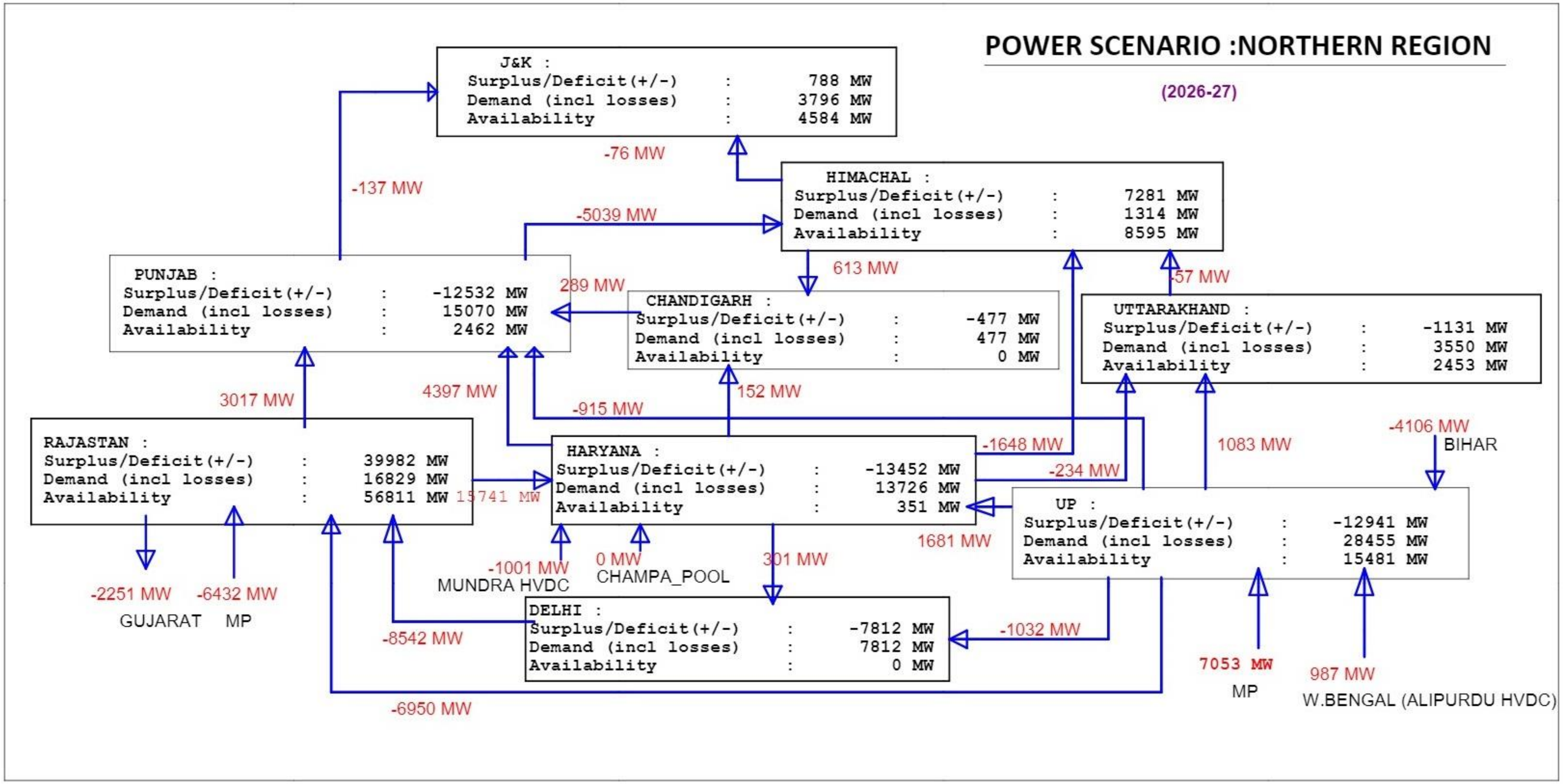
August Night (North Eastern region) **ANNEX: 5.11e**



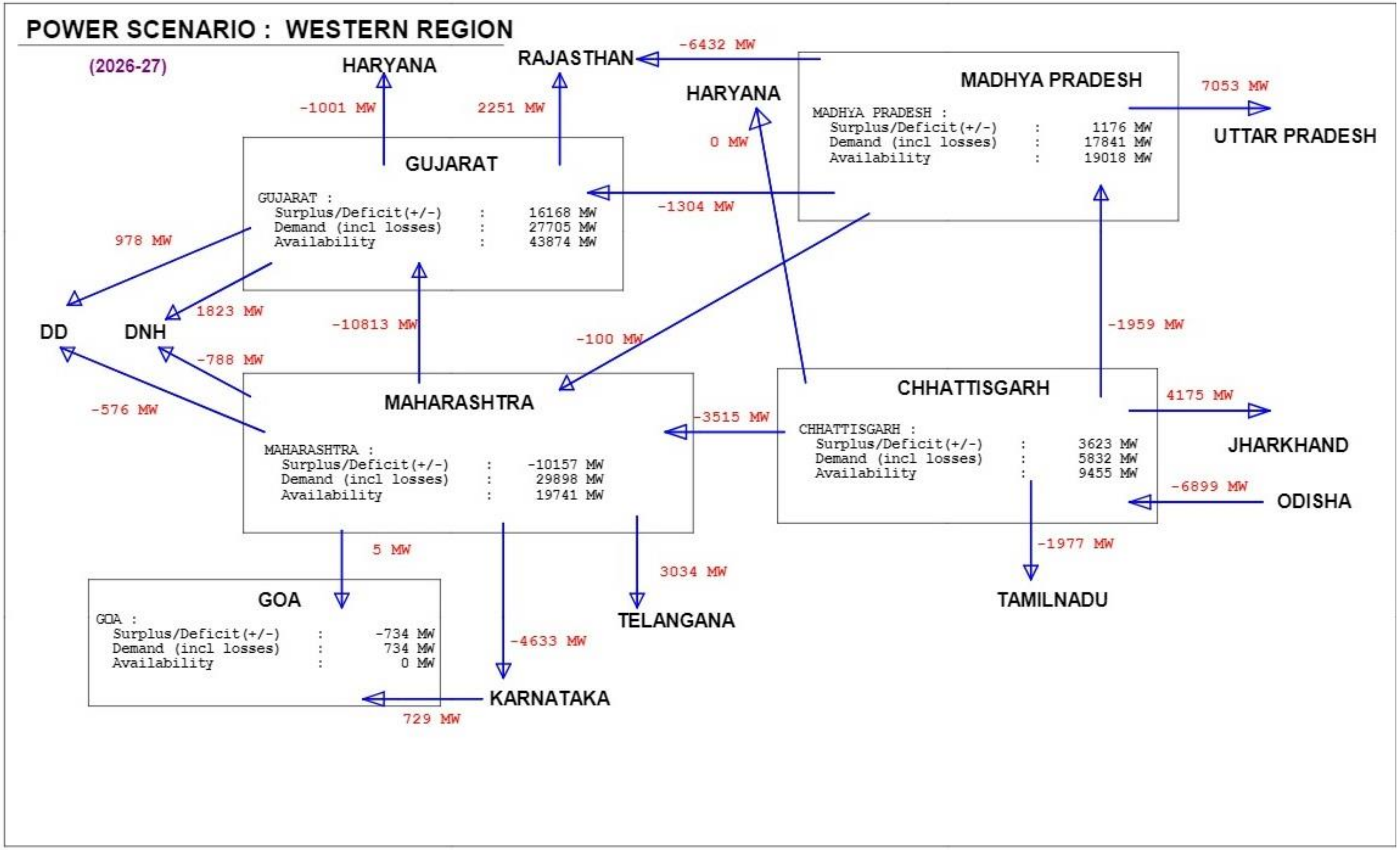
Annex 5.12

Power flow between different states in each region

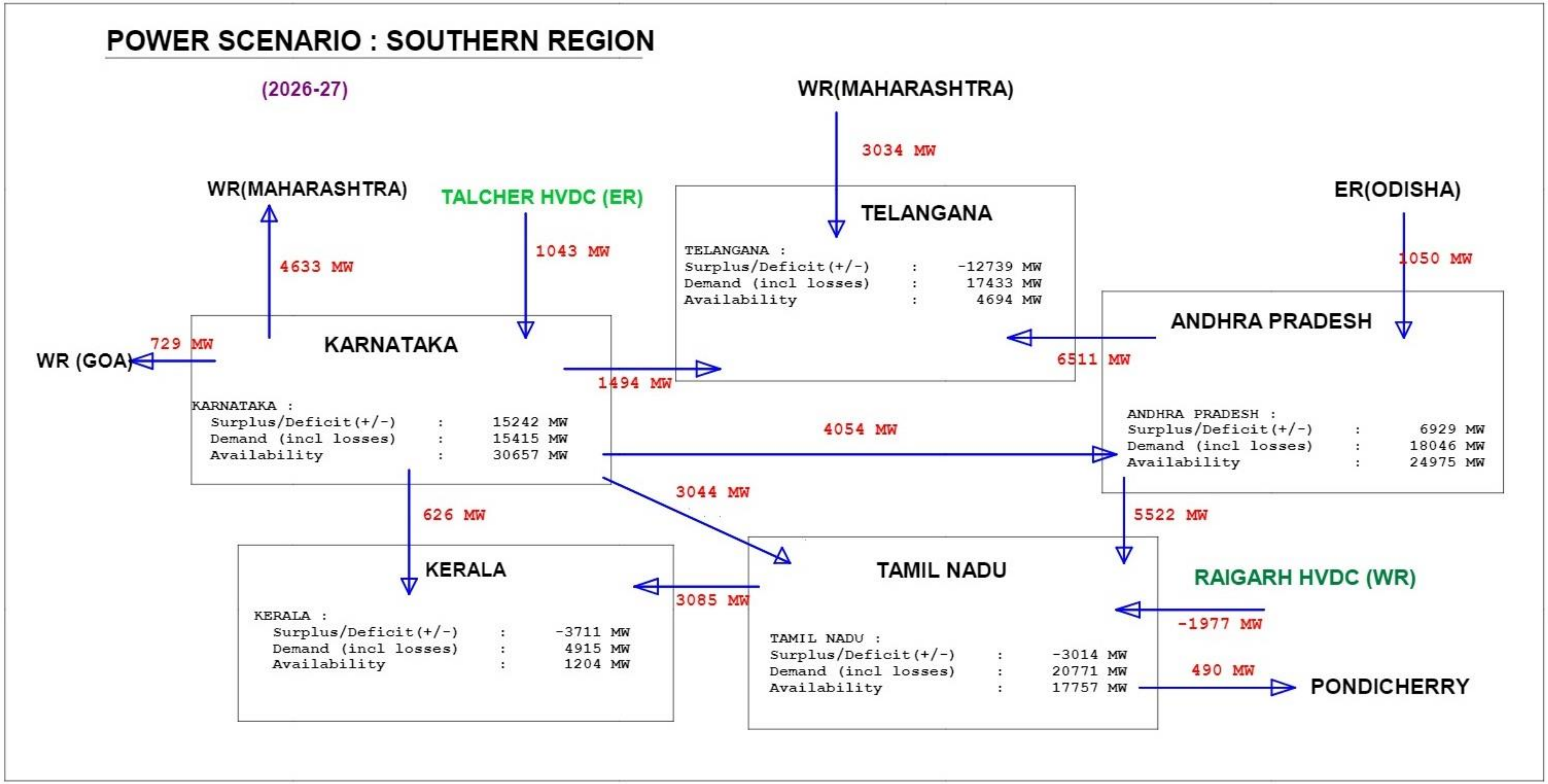
August Solar (Northern region) **ANNEX: 5.12a**



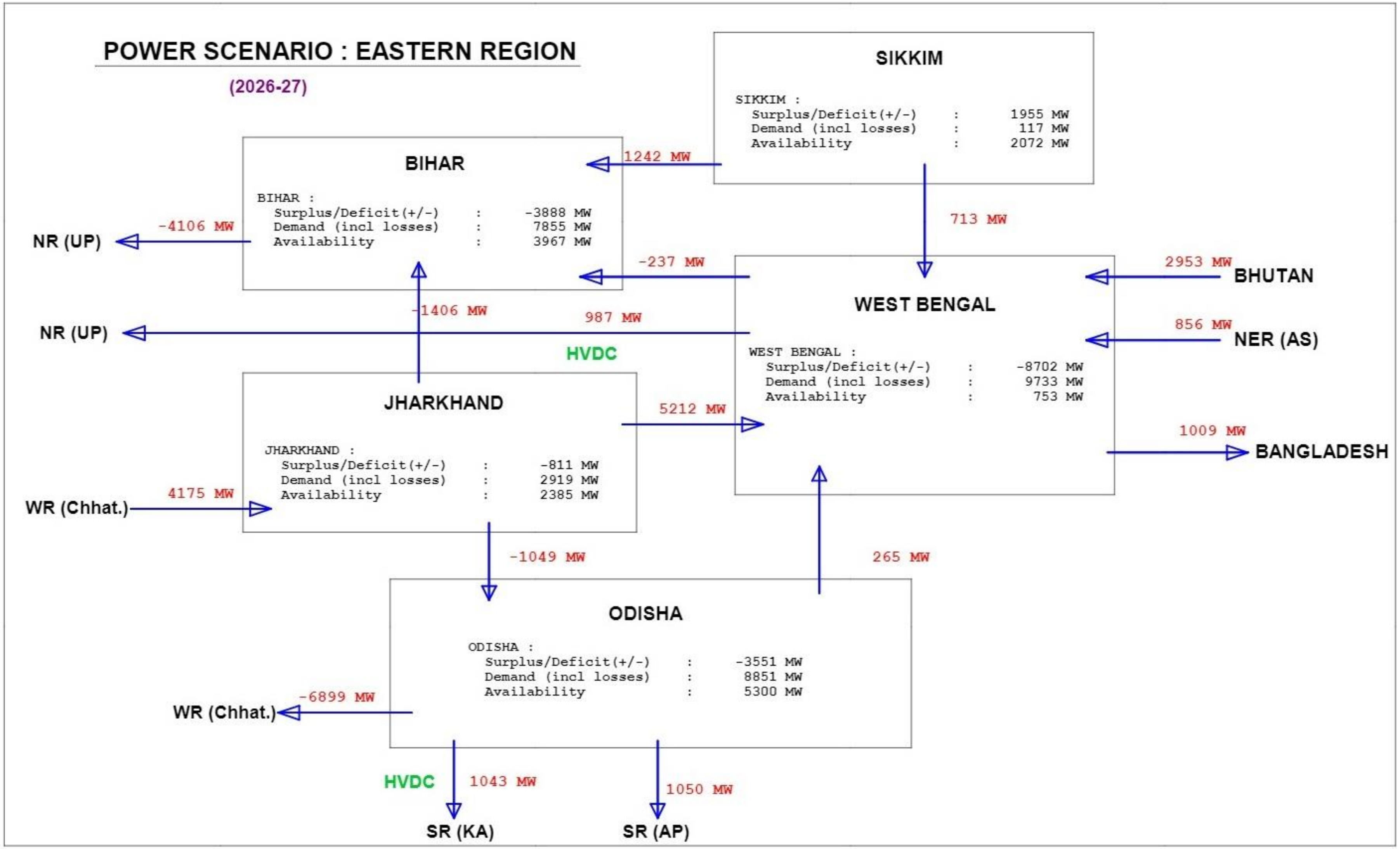
August Solar (Western region) **ANNEX: 5.12b**



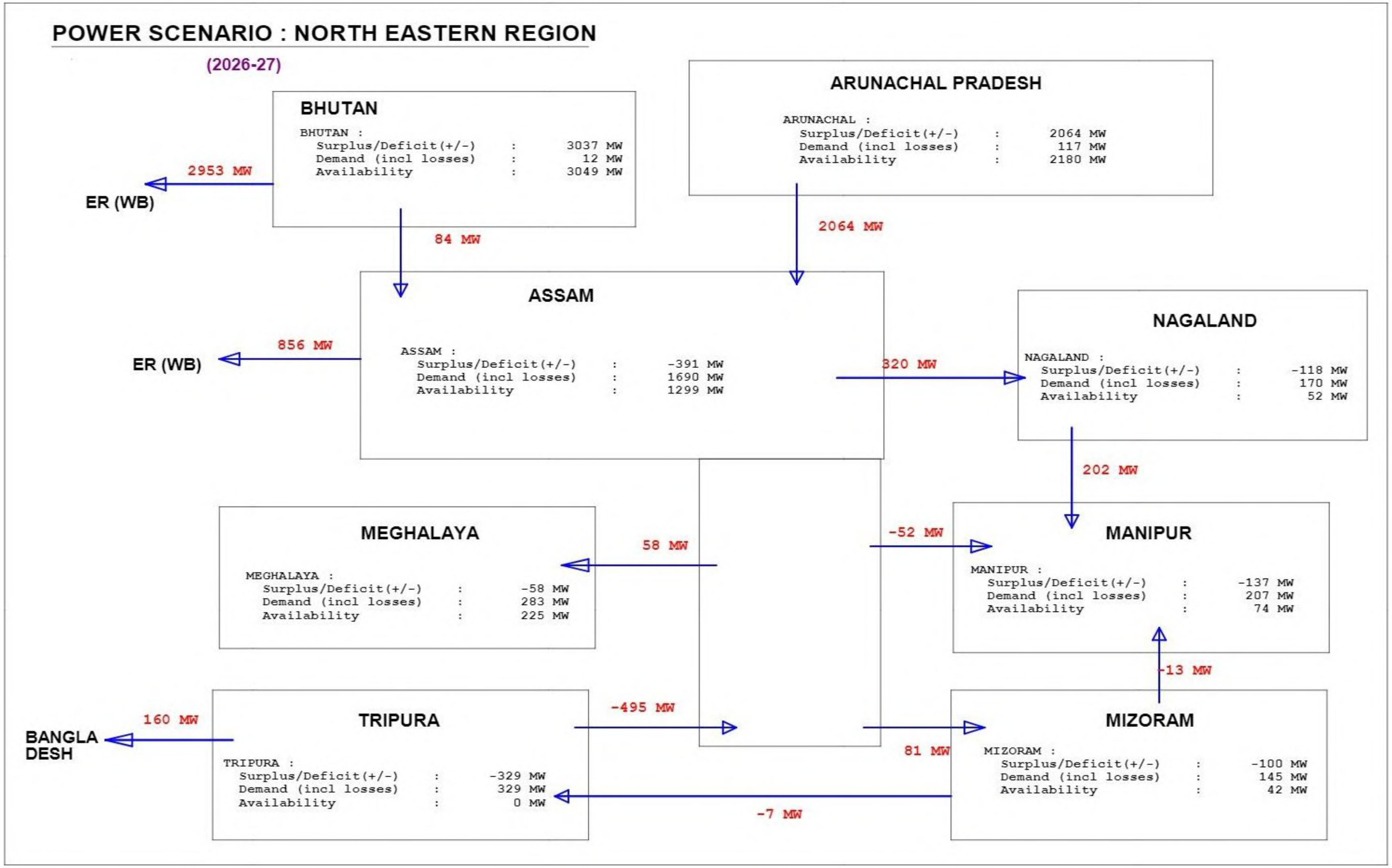
August Solar (Southern region) ANNEX: 5.12c



August Solar (Eastern region) **ANNEX: 5.12d**



August Solar (North Eastern region) ANNEX: 5.12e



Annex 6.1

List of 765 kV Transmission lines and Sub-stations at the end of 2021-22

765 kV Transmission Lines

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Anpara-Unnao	S/C	UPPCL	409		409
Kishenpur-Moga line –I	S/C	PGCIL	275		275
Kishenpur-Moga line- II	S/C	PGCIL	287		287
Tehri-Meerut Line-I	S/C	PGCIL	186		186
Tehri-Meerut Line-II	S/C	PGCIL	184		184
Agra-Gwalior	D/C	PGCIL	256		256
Gwalior-Bina Line-I	S/C	PGCIL	235		235
Gwalior-Bina Line-II	S/C	PGCIL	233		233
Gwalior-Bina Line - III	S/C	PGCIL	231		231
Gaya-Balia	S/C	PGCIL	228		228
Balia-Lucknow	S/C	PGCIL	320		320
Sipat-Seoni Line-I	S/C	PGCIL	351		351
Sipat-Seoni Line-II	S/C	PGCIL	354		354
Seoni – Bina	S/C	PGCIL	293		293
Seoni-Wardha Line-I	S/C	PGCIL	269		269
Seoni-Wardha Line-II	S/C	PGCIL	261		261
LILO of Tehri –Meerut D/C line at Tehri Pooling Point	D/C	PGCIL	21		21
LILO of Sipat - Seoni Line-II at WR Pooling station Near Sipat	D/C	PGCIL	16		16
Sasaram-Fatehpur Line-I	S/C	PGCIL	337		337
Sasaram-Fatehpur Line-II	S/C	PGCIL	355		355
Satna-Bina Line-1	S/C	PGCIL	274		274
Satna - Bina Line -II	S/C	PGCIL	276		276
Bina- Indore	S/C	PGCIL	311		311
Gaya- Sasaram	S/C	PGCIL	148		148
Shifting of Anpara-B -Unnao point from Anpara- B to Anpara-C	S/C	UPPCL	1		1
Shifting of Anpara-B -Unnao termaination point at Unnao	S/C	UPPCL	1		1
Bhiwani - Moga	S/C	PGCIL	273		273
Fatehpur- Agra	D/C	PGCIL	334		668
Jhatikara - Bhiwani	S/C	PGCIL	85		85
Sasan - Satna Line -I	S/C	PGCIL	241		241
Sasan - Satna Line -II	S/C	PGCIL	242		242

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Agra – Jhatikara	S/C	PGCIL	252		252
Meerut – Agra	S/C	PGCIL	268		268
Raigarh PS (Kotra) - Raigarh PS (Tammar)	D/C	PGCIL	98		98
Jabalpur PS - Bina	D/C	PGCIL	459		459
Raichur - Sholapur	S/C	PGCIL	208		208
Raichur - Sholapur	S/C	RSTCL	208		208
Meerut - Bhiwani	S/C	PGCIL	174		174
Raigarh PS (Kotra) - Raipur PS	D/C	PGCIL	480		480
Satna - Gwalior Line-I	S/C	PGCIL	337		337
Satna - Gwalior Line-II (60 Km D/C Portion)	D/C+S/C	PGCIL	300		300
LILO of Ranchi - Dharamjaygarh at Korba.	D/C	PGCIL	10		10
Lucknow - Bareilly	S/C	PGCIL	252		252
Ranchi - Dharamjaygarh	S/C	PGCIL	381		381
Anta - Phagi (Jaipur South) Line -I)	S/C	RVPNL	212		212
Anta - Phagi (Jaipur South) Line -II	S/C	RVPNL	214		214
Champa PS - Dharamjaygarh / Near Korba Switching Station	S/C	PGCIL	62		62
Champa PS - Raipur PS	D/C	PGCIL	298		298
Indore - Vadodara	S/C	PGCIL	320		320
Kurnool - Raichur Line-I	S/C	PGCIL	120		120
Kurnool - Raichur Line - II	S/C	PGCIL	118		118
Rihand - Vindhyachal PS	D/C	PGCIL	62		62
Jharsuguda PS - Dharamjaygarh	D/C	PGCIL	300		300
Wardha – Aurangabad Line-I	D/C	PGCIL	690		690
Wardha - Aurangabad Line-II	D/C	PGCIL	701		701
Kurnool - Nellore	D/C	PGCIL	602		602
Kurnool - Thiruvalam	D/C	PGCIL	710		710
Raipur PS - Wardha	D/C	PGCIL	736		736
Sholapur - Pune	S/C	PGCIL	268		268
Angul - Jharsuguda Line-I	S/C	PGCIL	274		274
Angul - Jharsuguda Line-II	S/C	PGCIL	284		284

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Vindhyachal PS - Satna	D/C	PGCIL	542		542
Akola - Aurangabad Line - I	S/C	APL	219		219
Tiroda - Koradi - Akola - Aurangabad line Line-II	S/C	APL	575		575
Tiroda - Akola Line - I	S/C	APL	361		361
Aurangabad - Dhule	S/C	SGL	192		192
Bhopal - Indore	S/C	SGL	176		176
Dhule - Vadodara	S/C	SGL	263		263
Anpara C - Anpara D	S/C	UPPTCL	3		3
Sasan - Vindhyachal (PS)	S/C	PGCIL	6		6
Meerut - Moga	S/C	PGCIL	337		337
Raigarh PS (Kotra) - Champa PS	S/C	PGCIL	96		96
Gwalior - Jaipur Line-I	S/C	PGCIL	305		305
Gwalior - Jaipur Line -II	S/C	PGCIL	311		311
Jaipur - Bhiwani Line-I	S/C	PGCIL	272		272
Jaipur - Bhiwani Line-II	S/C	PGCIL	277		277
Aurangabad - Solapur	D/C	PGCIL	556		556
Dharamjaygarh - Jabalpur PS	D/C	PGCIL	848		848
Narendra (New) - Kolhapur (New)	D/C	PGCIL	374		374
Ranchi (New) - Dharamjaygarh (Near Korba)	S/C	PGCIL	341		341
Balia - Varanasi	S/C	PGCIL	165		165
LILO of Gaya - Fatehpur at Varanasi	S/C	PGCIL	7		7
Jabalpur - Bhopal	S/C	SGL	274		274
Jabalpur - Bina	S/C	SGL	245		245
Dhramjaygarh - Jabalpur	D/C	SGL	758		758
Gaya - Varanasi	S/C	PGCIL	273		273
Kanpur - Jhatikara	S/C	PGCIL	466		466
Varanasi - Kanpur	D/C	PGCIL	652		652
Srikakulam - Vemagiri	D/C	PGCIL	668		668

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Nagapattinam PS - Salem	D/C	PGCIL	406		406
Tuticorin PS - Salem PS	D/C	PGCIL	731		731
Srikakulam - Angul	D/C	PGCIL	552		552
LILO of Seoni-Bina at Gadarwara STPP	D/C	PGCIL	16		16
Raipur PS - Wardha	D/C	PGCIL	714		714
Wardha - Nizamabad (Part of Wardha - Hyderabad line)	D/C	PGCIL	576		576
LILO of Agra - Meerut line at Greater Noida	2xS/C	WUPPTCL	11		11
Mainpuri-Greater Noida	S/C	WUPPTCL	181		181
Narendra (New) - Madhugiri	D/C	KPTCL	758		758
Mainpuri - Bara Line-II	S/C	SEUPPTCL	377		377
Lalitpur TPS - Fatehabad (Agra (UP)) Line -I	S/C	UPPTCL	337		337
Lalitpur TPS - Fatehabad (Agra (UP)) Line -II	S/C	UPPTCL		335	335
Ghatampur TPS-Hapur	S/C	ADANI		411	411
Khandwa Pool – Dhule	D/C	STERLITE		383	383
Ariyalur - Thiruvalam	D/C	TANTRAN SCO		347	347
North Chennai PS - Ariyalur	D/C	TANTRAN SCO		548	548
LILO of Fatehgarh -Bhadla at Fatehgarh-II PS	D/C	PGCIL		80	80
LILO of Fatehgarh -Bhadla at Fatehgarh-II PS (Loop in of Line-I)	D/C	PGCIL		40	40
LILO of Fatehgarh-Bhadla at Fatehgarh-II PS (Loop in of Line-II)	D/C	PGCIL		39	39
Anpara-D – Unnao line	S/C	UPPTCL		426	426
Ajmer - Bikaner	D/C	PGCIL		526	526
LILO of Ajmer-Bikaner line at Bhadla-II PS	D/C	PGCIL		527	527
Khetri– Jhatikara	D/C	PGCIL		292	292
Medinipur - Jeerat (New)	D/C	PGCIL		338	338
Bikaner (PG) –Khetri S/s	D/C	ADANI		481	481
Fatehgarh - II - Bhadla -II	D/C	PGCIL		374	374

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Vindhyachal - Varansai	D/C	PGCIL		379	379
Ajmer - Phagi	D/C	PGCIL		268	268
Agra (UP)-Greater Noida (WUPPTCL)	S/C	APL		159	159
Fatehgarh PS - Bhadla	D/C	APL		292	292
Ghatampur TPS-Agra (UP)	S/C	APL		229	229
LILO of Anpara D - Unnao (Quad) Line-I at Obra - CTPS	D/C	APL		17	17
Ranchi - Medinipur	D/C	PGCIL		538	538
Part of Tehri PS - Meerut	D/C	PGCIL		2	2
Bikaner - Moga	D/C	PGCIL		734	734
Khandwa Pool - Indore	D/C	SGL		180	180
Chilkaluripeta - Cudappah	D/C	PGCIL		577	577
Vemagiri - Chilkaluripeta	D/C	PGCIL		558	558
Bhadla - Bikaner	D/C	PGCIL		340	340
LILO of one line of Aurangabad - Padghe D/C line at Pune	D/C	APL		129	129
Bilaspur - Rajnandgaon	D/C	APL		324	324
Raipur PS - Rajnandgaon	D/C	APL		80	80
Rajnandgaon - Warora PS	D/C	APL		532	532
Banaskanta - Chittorgarh	D/C	PGCIL		604	604
Bhuj - Banaskanta	D/C	PGCIL		578	578
Salem - Madhugiri Line - I	S/C	PGCIL		219	219
Salem - Madhugiri Line - II	S/C	PGCIL		243	243
Vindhyachal PS - Jabalpur PS	D/C	PGCIL		749	749
Jharsuguda (Sundargarh) - Raipur	D/C	SGL		610	610
Angul - Jharsauguda	D/C	PGCIL		590	590
Jharsuguda - Dharamjaygarh	D/C	PGCIL		296	296
LILO of Kurnool - Thirvualam line at Cuddapah	D/C	PGCIL		190	190
Raigarh (Kotra) - Champa PS	S/C	APL		97	97
Sipat STPS - Bilaspur	S/C	APL		24	24

Name of Transmission Lines	No. of circuits	Executing Agency	At end of 2016-17 (ckm)	Addition during 2017-22 (ckm)	At the end of 2021-22 (ckm)
Champa PS - Dharamiaygarh	S/C	APL		51	51
Gadarwara - Warora PS	D/C	PGCIL		627	627
Warora PS - Parli	D/C	PGCIL		694	694
Parli - Solapur	D/C	PGCIL		236	236
Sasan UMPP - Vindhyachal PS	S/C	APL		6	6
LILO of Agra - Meerut at Aligarh	S/C	PGCIL		22	22
LILO of Kanpur - Jhatikara at Aligarh	S/C	PGCIL		22	22
LILO of one line of Satna-Gwalior 2xS/C line at Orai	2xS/C	PGCIL		73	73
Orai - Aligarh	D/C	PGCIL		664	664
Aurangabad - Padghe	D/C	PGCIL		570	570
Chittorgarh - Ajmer	D/C	PGCIL		422	422
Jabalpur PS - Orai	D/C	PGCIL		714	714
Nizamabad - Hyderabad (Part of Wardha - Hyderabad line)	D/C	PGCIL		486	486
Gadarwara - Jabalpor PS (Balance Portion of LILO of Seoni - Bina at Jabalpur)	D/C	PGCIL		187	187
Hapur-Greater Noida	S/C	WUPPTCL		66	66
Mainpuri-Hapur	S/C	WUPPTCL		217	217
Darlipalli TPS - Jharsuguda (Sundergarh)	D/C	PGCIL		41	41
TOTAL			**31240**	**19783**	**51023**

765 kV Sub-Stations

Name of Sub-stations	Executing agency	At end of 2016-17 (MVA)	Addition during 2017-22 (MVA)	At end of 2021-22 (MVA)
Seoni	PGCIL	4500		4500
Fatehpur	PGCIL	3000		3000
Gaya	PGCIL	4500		4500
Sipat	PGCIL	4500		4500
Balia	PGCIL	3000		3000
Lucknow	PGCIL	3000		3000
Wardha	PGCIL	4500		4500

Name of Sub-stations	Executing agency	At end of 2016-17 (MVA)	Addition during 2017-22 (MVA)	At end of 2021-22 (MVA)
Unnao	UPPTCL	2000		2000
Agra	PGCIL	3000		3000
Bhiwani	PGCIL	2000		2000
Moga	PGCIL	3000		3000
Satna	PGCIL	2000		2000
Bina	PGCIL	2000		2000
Jhatikara	PGCIL	6000		6000
Gwalior	PGCIL	3000		3000
Meerut	PGCIL	3000		3000
Sasaram	PGCIL	1500		1500
Indore	PGCIL	3000		3000
Raigarh Pooling Station (Kotra)	PGCIL	6000		6000
Raigarh Pooling Station(Tamnar)	PGCIL	6000		6000
Raichur	PGCIL	3000		3000
Raipur	PGCIL	3000		3000
Solapur	PGCIL	3000		3000
Jabalpur (ICT-II)	PGCIL	1500		1500
Ranchi	PGCIL	3000		3000
Akola -II	APL	1500		1500
Tiroda	APL	1500		1500
Dharamjaygarh/ Korba Pooling station	PGCIL	3000		3000
Kurnool	PGCIL	3000		3000
Aurangabad (ICT-II)	PGCIL	1500		1500
Jharsuguda (Sundargarh)	PGCIL	3000		3000
Nellore	PGCIL	3000		3000
Sholapur	PGCIL	3000		3000
Angul	PGCIL	6000		6000
Bareilly	PGCIL	3000		3000
Thiruvalam	PGCIL	3000		3000
Vindhyachal Pooling Station	PGCIL	3000		3000
Agaria (Bhopal)	SGL	3000		3000
Dhule (BDTCL)	SGL	3000		3000
Koradi - III	APL	3000		3000
Anpara D.	UPPTCL	1000		1000
Anta	RVPNL	3000		3000
Phagi (Jaipur South)	RVPNL	3000		3000
Champa Pooling Station	PGCIL	9000		9000
Vadodara	PGCIL	3000		3000

Name of Sub-stations	Executing agency	At end of 2016-17 (MVA)	Addition during 2017-22 (MVA)	At end of 2021-22 (MVA)
Varanasi	PGCIL	3000		3000
Aurangabad - III (Ektuni)	MSETCL	3000		3000
Pune	PGCIL	3000		3000
Kanpur	PGCIL	3000		3000
Vemagiri	PGCIL	3000		3000
Nizamabad	PGCIL	1500		1500
Greater Noida	WUPPTCL	1000		1000
Mainpuri	SEUPPTCL	1500		1500
Agra (Fatehabad)	UPPTCL	3000		3000
Bhiwani	PGCIL		1000	1000
Fatehgarh-II	PGCIL		3000	3000
Khetri	PGCIL		3000	3000
Bhadla-II	PGCIL		3000	3000
Jeerat (New)	PGCIL		3000	3000
Extension at 765/400/220 kV Fathehgarh -II PS (Jaisalmer)	PGCIL		1000	1000
Eastablishment of 765/400 Fathehgarh -II PS	PGCIL		1500	1500
Bhuj	PGCIL		6000	6000
Medinipur	PGCIL		3000	3000
Meerut (Addl. ICT)	PGCIL		1500	1500
Tehri	PGCIL		3200	3200
Khandwa	SGL		3000	3000
Chilakaluripeta	PGCIL		3000	3000
Aligarh (PG)	PGCIL		3000	3000
Jharsuguda (Sundargarh) (Addl. ICT)	PGCIL		3000	3000
Bhadla	PGCIL		4500	4500
Bikaner	PGCIL		3000	3000
Lucknow ICT	PGCIL		500	500
Banaskanta	PGCIL		3000	3000
Gaya (Addl. ICT)	PGCIL		1500	1500
Cuddapah	PGCIL		3000	3000
Srikakulam	PGCIL		3000	3000
Warora	PGCIL		3000	3000
Parli	PGCIL		3000	3000
Orai (ICT-II)	PGCIL		2000	2000
Greater Noida (New) ICT-II	UPPTCL		1500	1500
Hapur	WUPPTCL		3000	3000
Chittorgarh	PGCIL		3000	3000
Padghe	PGCIL		3000	3000
Ajmer	PGCIL		3000	3000
Hyderabad (Maheshwaram)	PGCIL		3000	3000
Vindhyachal Pooling Station	PGCIL		1500	1500
Unnao (ICT- III)	UPPTCL		1000	1000

Name of Sub-stations	Executing agency	At end of 2016-17 (MVA)	Addition during 2017-22 (MVA)	At end of 2021-22 (MVA)
Nizamabad (ICT-II)	PGCIL		1500	1500
Anta (ICT-III)	RVPNL		1500	1500
Total		**167500**	**89700**	**257200**

Annex 6.2

List of transmission lines (220 kV and above voltage level) slipped from year wise target during 2017-22 (as on March 2024)

Sl. No.	Name of transmission line	Executing Agency	ckm	Voltage (kV)	Original schedule	Actual/ Anticipated commissioning	Reason for delay
1	Jeerat (New) – Subhasgram 400 kV D/C line	PGCIL	214	400	July’2020/ December, 2020	August, 22	1.Severe RoW 2.Cyclone Amphan in May’20. 3.COVID-19
2	Reconfiguration of Bhuj PS – Lakadia PS 765 kV D/c line so as to establish Bhuj-II –Lakadia 765 kV D/C line as well as Bhuj-Bhuj-II 765 kV D/C line	PGCIL	212	765	December, 20/ August, 21	August, 22	1.Severe RoW 2. Extension of 8 months due to impact of COVID-19
3	LILO of one ckt of Narendra (Existing) - Narendra (New) 400 kV D/C Quad line at Xeldem	Sterlite	187.4	400	November,21/ July,22	May, 25	1. Court case 2. Extension of 8 months due to impact of COVID-19
4	Xeldem - Mapusa 400 kV D/C Quad Line	Sterlite	109.6	400	May, 21 /January, 22	June, 24	1. Court case 2. Extension of 8 months due to impact of COVID-19
5	Dharamjaygarh Pool Section B - Raigarh (Tamnar) Pool 765 kV D/C line	Sterlite	137	765	July ‘21 /March, 22*	June’22	1.Severe RoW 2. Extension of 8 months due to impact of COVID-19
6	Xeldem (existing) – Xeldem (new) 220 kV D/C line	Sterlite	40	220	May’21 /Jan’22*	June, 24	1. Court case 2. Extension of 8 months due to impact of COVID-19
7	Lakadia – Vadodara 765 kV D/c line	Sterlite	658	765	Dec'20 /Aug’21*	January’23	1.Severe RoW 2.Court case 3. Extension of 8 months due to impact of COVID-19
8	Warora (Pool) – Warangal (New) 765 kV D/C line	Adani	664	765	Nov’19	October’23	1.Severe RoW (CIL) 2.Court case 3.COVID-19
9	Warangal (New) – Hyderabad 765 kV D/C line	Adani	268	765	Nov’19	August’23	1.Severe RoW 2.Court case 3.COVID-19
10	Hyderabad- Kurnool 765 kV D/C line	Adani	337	765	Nov’19	July’23	1.Severe RoW 2.Court case 3.COVID-19
11	Warangal (New) – Chilakaluripeta 765 kV D/C line	Adani	390	765	Nov’19	September’23	1.Severe RoW 2.Court case 3.COVID-19
12	Koteshwar Pooling Station - Rishikesh 400 kV D/C (HTLS) line	Essel Infra	81	400	Dec’19	December, 24	1.Severe RoW 2. NoC from IDPL 3. NoC from PTCUL
13	Babai (RRVPNL) – Bhiwani (PG) D/C line	Essel Infra	221	400	June'19	October '23	1.Severe RoW
14	North Karanpura – Chandwa (Jharkhand) Pooling Station 400 kV D/c line	Adani	102	400	Sep'19	October'22	1.Severe RoW (CIL) 2.Delay in grant of forest clearance.
15	North Karanpura – Gaya 400 kV D/C line	Adani	196	400	Sep'19	June'24	1.Severe RoW (CIL) 2.Delay in grant of forest clearance.
16	Bhuj PS – Lakadia PS 765 kV D/C line	Adani	214	765	Dec'20/Aug'21	October'22	1.Severe RoW 2. Extension of 8 months due to impact of COVID-19
17	LILO of Bhachau – EPGL line 400 kV D/C (triple) line at Lakadia PS	Adani	76	400	Dec'20/Aug'21	September'22	1.Severe RoW 2. Extension of 8 months due to impact of COVID-19
18	765 kV Fatehgarh Pooling sub-station - Bhadla (PG)	Adani	292	765	Sep'19	July'21	1. Re-routing on account of GIB area and due to height

Sl. No.	Name of transmission line	Executing Agency	ckm	Voltage (kV)	Original schedule	Actual/ Anticipated commissioning	Reason for delay
	D/C line (to be operated at 400 kV)						restrictions laid in Defence Aviation.
19	400 kV D/C Lower Subhansiri - Biswanath Chariyali line -II	PGCIL	371	400	March'22	February'23	1.Severe RoW
20	400 kV D/C Jigmeling - Alipurduar line (Q) (India Side)	PGCIL	326	400	March'19	June'21	1.Delay in Forest Clearance
21	800 kV Raigarh (HVDC Stn.) - Pugalur (HVDC Stn.) HVDC Bipole link	PGCIL	3531	800	Nov'19	September'20	1.Severe RoW
22	LILO of both ckt of Bawana - Mandola 400 kV D/C line at Maharanibagh	PGCIL	120	400	May'17	March'22	1.Severe RoW 2.Work affected due to Construction Ban in Delhi/ NCR to curb pollution.
23	LILO of one ckt of Bamnauli - Jhattikalan 400 kV D/C line at Dwarka	PGCIL	17	400	May'17	February'22	1.Severe RoW 2.Work affected due to Construction Ban in Delhi/ NCR to curb pollution.
24	400 kV D/C Mohindergarh - Bhiwani line	PGCIL	122	400	Aug'18	March'23	1.Work in progress
25	220 kV D/C UT Chandigarh S/S - Panchkula (PG) S/S line (incl. 9.7 Kms underground cable).	PGCIL	48	220	Feb'19	January'23	1.Severe RoW 2. Court Case
26	LILO of both circuits of 765 kV D/C (op. at 400 kV) Fatehgarh (TBCB)-Bhadla (PG) at Fatehgarh-II PS	PGCIL	158	765	Dec'20	March'22	1.Severe RoW 2. COVID-19
27	220 kV D/C Navsari (PG) – Bhestan line	PGCIL	37	220	Dec'20	February'22	1.Severe RoW 2. COVID-19
28	320 kV Pugalur - North Trichur (Kerala) HVDC line	PGCIL	288	320	April'20	March'21	1.Severe RoW
29	400 kV D/C NNTPS Sw. Yd. - Ariyalur (Villupuram) line	PGCIL	147	400	July'19	July'20	1.Severe RoW
30	400 kV D/C Pugalur HVDC Station - Edayarpalayam (TANTRANSCO) line (Q)	PGCIL	105	400	Feb'20	July'21	1.Severe RoW
31	400 kV D/C Edayarpalayam (TANTRANSCO)-Udumulpet line (Q)	PGCIL	94	400	Feb'20	July'21	1.Severe RoW
32	LILO of 2nd ckt of Teesta III - Kishanganj 400 kV D/C line at Rangpo (Q)-Twin HTLS cond.	PGCIL	24	400	June'20	February'22	1.Severe RoW
33	LILO of Kishanganj (POWERGRID) – Darbhanga (DMTCL) 400 kV D/C (Quad) line at Saharsa (New)	PGCIL	78	400	June'21	October'21	1.Severe RoW
34	Additional 400 kV D/C line at Palatana S/stn. & Surajmaninagar S/stn. end for termination of Palatana - Surajmaninagar 400 kV D/C line	PGCIL	24	400	April'20	July'21	1.Change in location of SS (Under TBCB) 2.COVID-19

Sl. No.	Name of transmission line	Executing Agency	ckm	Voltage (kV)	Original schedule	Actual/ Anticipated commissioning	Reason for delay
35	Additional 400 kV D/C line at P.K.Bari S/stn. & Silchar S/stn. end for termination of P.K. Bari - Silchar 400 kV D/C line	PGCIL	22	400	April'20	March'21	1.Change in location of SS (Under TBCB) 2.COVID-19
36	(Extension of Essar- Lakadia/Bhachau 400 kV D/C (triple snowbird) line up to Jam Khambhaliya PS	Adani	38	400	Nov'21	Apr'22	1.Severe RoW issue
37	Lakadia PS – Banaskantha PS 765kV D/c line	Adani	352	765	Feb'22	Oct'22	1.Severe RoW issue
38	Bikaner II- Khetri 400kV D/C line	PGCIL	550	400	Dec'22	June'23	1.Severe RoW issue
39	Khetri - Bhiwadi 400kV D/C line	PGCIL	251	400	Dec'22	June'23	1.Severe RoW issue

List of sub-stations (220 kV and above voltage level) slipped from year wise target during 2017-22 (as on March 2024)

Sl. No.	Name of Sub-station	Executing Agency	Capacity (MVA)	Voltage Ratio (kV)	Original schedule	Actual/ Anticipated commissioning	Reasons for delay
1	Khandwa (M.P)	Sterlite	3000	765/400 kV	July'19	March'20	Severe RoW issue
2	Xeldem (Goa)	Sterlite	1000	400/220 kV	May'21/ Jan'22	June'24	1.Severe RoW issue 2. Extension of 8 months due to impact of COVID-19
3	Warangal (New)	Adani	3000	765/400 kV	Nov'19	August '23	1.Severe RoW issue 2. COVID-19
4	Dhanbad	Adani	1000	400/220 kV	May'19	September'21	1.Severe RoW issue 2.COVID-19
5	Lakadia PS	Adani	3000	765/400 kV	Dec'20/Aug'21	September'22	1.Severe RoW issue 2. Extension of 8 months due to impact of COVID-19
6	800 kV HVDC Raigarh Station with 6000 MW HVDC Terminal	PGCIL	6000	800 kV	Nov'19	October'21	1.Severe RoW issue 2.COVID-19
7	800 kV HVDC Pugalur Station with 6000 MW HVDC Terminal	PGCIL	6000	800 kV	Nov'19	October'21	1.Severe RoW issue 2.COVID-19
8	Bhadla-II PS	PGCIL	3000	765/400 kV	Dec'20	October'22	1.Severe RoW issue 2.COVID-19
9	Fatehgarh-II PS	PGCIL	3000	765/400 kV	Dec'20	May'22	1.Severe RoW issue 2.COVID-19
10	320 kV VSC based HVDC Terminal at Pugalur (2000 MW)	PGCIL	2000	320 kV	Apr'20	June'21	1.Severe RoW issue 2.COVID-19

Sl. No.	Name of Sub-station	Executing Agency	Capacity (MVA)	Voltage Ratio (kV)	Original schedule	Actual/ Anticipated commissioning	Reasons for delay
11	320 kV VSC based HVDC Terminal at North Trichur (2000 MW)	PGCIL	2000	320 kV	Apr'20	June'21	1.Severe RoW issue 2.COVID-19
12	Mokokchung (PG) GIS S/S	PGCIL	30	220/132 kV	Mar'21	March'22	1.Severe RoW issue 2.COVID-19
13	Jam Khambhaliya PS (GIS)	Adani	2000	400/220 kV	Nov’21	Apr’22	1.Severe RoW issue
14	1x500 MVA, ICT at CGPL Mundra switchyard	Adani	500	400/220 kV	Nov’21	Nov’22	1.RoW issue (in Space constraint issue)

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Annex – 7.1

Inter- State Transmission System planned for the period 2022-27

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR - 1	**NRSS-XXXVI**									
	Koteshwar Pooling Station-Rishikesh 400 kV D/C (HTLS) line	400 kV	Line	D/c	81		TBCB	UC	2024-25	Uttarakhand
	Babai (RRVPNL)- Bhiwani (PG) 400 kV D/c line	400 kV	Line	D/c	222		TBCB	Commissioned	2023-24	Uttarakhand
NR - 2	**Establishment of 220/66 kV, 2x160 MVA GIS S/s at Chandigarh along with 220 kV D/c line from Chandigarh to 400/220 kV Panchkula (PG) substation**									
	Creation of 2x160 MVA, 220/66 kV GIS S/s at Chandigarh	220/66 kV	S/s			320	RTM	Commissioned	2022-23	Chandigarh
	220 kV D/c line from Chandigarh to 400/220 kV Panchkula (PG) substation	220 kV	Line	D/c	48		RTM	Commissioned	2022-23	Chandigarh, Haryana
NR - 3	**NRSS XXXVII**									
	Creation of 400/220kV, 7x105MVA GIS at Jauljivi	400/220 kV	S/s			630	RTM	Commissioned	2022-23	Uttarakhand
	LILO of both ckt. of 400kV Dhauliganga-Bareilly (PG) (presently charged at 220 kV) at 400/220kV Jauljivi S/s	400 kV	Line	D/c	6		RTM	Commissioned	2022-23	Uttarakhand, Uttar Pradesh
	Charging of Jauljivi –Bareilly D/c line at 400 kV level	400 kV	Line	D/c			RTM	Commissioned	2022-23	Uttarakhand, Uttar Pradesh

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Diversion of Dhauliganga-Bareilly 400 kV D/c line (operated at 220 kV) at Bareilly end from CB Ganj to 400 kV Bareilly (PG) S/s	400 kV	Line	D/c	16		RTM	Commissioned	2022-23	Uttarakhand, Uttar Pradesh
	125 MVAr Bus Reactor at 400 kV Jauljivi 400/220 kV S/s	400 kV	S/s				RTM	Commissioned	2022-23	Uttarakhand
	Disconnection of 220 kV LILO arrangement of Dhauliganga-Bareilly at Pithoragarh and connecting it to Jauljivi 400/220 kV S/s	220 kV	Line	D/c	48		RTM	Commissioned	2022-23	Uttarakhand, Uttar Pradesh
	Shifting of 25 MVAr line reactor already available in 220 kV Dhauliganga –Bareilly line at Dhauliganga end, to Jauljivi S/s as a bus reactor	220 kV	S/s				RTM	Commissioned	2022-23	Uttarakhand, Uttar Pradesh
NR - 4	**NR System Strengthening Scheme-XXXV**									
	Mohindergarh – Bhiwani 400 kV D/c line (2nd line)	400 kV	Line	D/c	122		RTM	Commissioned	2023-24	Haryana
NR - 5	**Transmission system for providing connectivity to RE projects in Fatehgarh-II**									
	Additional (4th) 765/400 kV ICT at Fatehgarh-II	765/400 kV	S/s			1500	RTM	Commissioned	2022-23	Rajasthan
NR - 6	**Transmission system for providing connectivity to RE projects in Bhadla-II**									
	Additional (3rd) 765/400 kV ICT at Bhadla-II	765/400 kV	S/s			1500	RTM	Commissioned	2022-23	Rajasthan
NR - 7	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A**									
	Establishment of 400/220 kV, 4x500 MVA S/s at Fatehgarh III with 2x125 MVAR, 420 kV bus reactors (with 0.5 GW BESS)	400/220 kV	S/s			2000	TBCB	Commissioned	2023-24	Rajasthan
	Fatehgarh III – Fatehgarh- II PS 400 kV D/c line	400 kV	Line	D/c	88		TBCB	Commissioned	2023-24	Rajasthan
	Fatehgarh III– JaisalmerII (RVPN) 400 kV D/c line	400 kV	Line	D/c	120		TBCB	Commissioned	2023-24	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR - 8	**Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A1**									
	Augmentation with 765/400 kV, 1x1500 MVA ICT (5th) at Fatehgarh II PS.	765/400 kV	S/s			1500	RTM	UC	2024-25	Rajasthan
NR - 9	**Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B**									
	Fatehgarh-II PS – Bhadla-II PS 765 kV D/c line (2nd)	765 kV	Line	D/c	400		TBCB	Commissioned	2024-25	Rajasthan
	1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765 kV D/c line (2nd)	765 kV	S/s				TBCB	Commissioned	2024-25	Rajasthan
NR- 10	**Transmission system strengthening Scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B1**									
	Augmentation with 765/400 kV, 1x1500 MVA ICT (6th) at Fatehgarh-II PS	765/400 kV	S/s			1500	RTM	Commissioned	2023-24	Rajasthan
	Augmentation with 400/220 kV, 4x500 MVA ICT (6th to 9th) at Fatehgarh-II PS with suitable bus sectionalisation at 400 kV and 220 kV level.	400/220 kV	S/s			2000	RTM	Commissioned	2022-23	Rajasthan
	Augmentation with 400/220 kV, 3x500 MVA ICT (6th to 8th) at Bhadla-II PS with suitable bus sectionalisation at 400 kV and 220 kV level	400/220 kV	S/s			1500	RTM	Commissioned	2023-24	Rajasthan
	Augmentation with 765/400 kV, 1x1500 MVA ICT (4th) at Bhadla-II PS	765/400 kV	S/s			1500	RTM	Commissioned	2024-25	Rajasthan
	STATCOM (2x $\pm$300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Fatehgarh-II S/s		S/s				RTM	Commissioned	2023-24	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	STATCOM (2x $\pm$300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Bhadla–II S/s		S/s				RTM	Commissioned	2023-24	Rajasthan
NR- 11	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under phase-II- Part C**									
	Establishment of 765/400 kV, 2x1500 MVA S/s at Sikar – II with 1x125 MVAR, 420 kV and 2x330 MVAr, 765 kV bus reactor	765/400 kV	S/s			3000	TBCB	UC	2024-25	Rajasthan
	Bhadla-II PS – Sikar-II 765 kV D/c line	765 kV	Line	D/c	620		TBCB	UC	2024-25	Rajasthan
	1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765 kV D/c line	765 kV	S/s				TBCB	UC	2024-25	Rajasthan
	1x240 MVAr switchable line reactor for each circuit at Bhadla-II end of Bhadla II PS – Sikar-II 765 kV D/c line	765 kV	S/s				TBCB	UC	2024-25	Rajasthan
	Sikar-II – Neemrana 400 kV D/c line	400 kV	Line	D/c	280		TBCB	UC	2024-25	Rajasthan
NR- 12	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part D**									
	Sikar-II – Aligarh 765 kV D/c line	765 kV	Line	D/c	512		TBCB	UC	2024-25	Rajasthan, Uttar Pradesh
	1x330 MVAr switchable line reactor for each circuit at each end of Sikar-II – Aligarh 765 kV D/c line	765 kV	S/s				TBCB	UC	2024-25	Rajasthan, Uttar Pradesh
NR- 13	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part E**									
	Bhadla-II PS – Sikar-II 765 kV D/c line (2nd)	765 kV	Line	D/c	620		TBCB	UC	2024-25	Rajasthan
	1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765 kV D/c line	765 kV	S/s				TBCB	UC	2024-25	Rajasthan
	1x240 MVAr switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765 kV D/c line	765 kV	S/s				TBCB	UC	2024-25	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 14	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part F**									
	Establishment of 400/220 kV, 2x500 MVA Pooling Station at Bikaner –II PS with suitable bus sectionalisation at 400 kV and 220 kV level and with 2x125 MVAR, 420 kV bus reactor	400/220 kV	S/s			1000	TBCB	Commissioned	2023-24	Rajasthan
	Bikaner-II PS – Khetri 400 kV 2xD/c line	400 kV	Line	D/c	1102		TBCB	Commissioned	2023-24	Rajasthan
	1x80 MVAr switchable line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line	400 kV	S/s				TBCB	Commissioned	2023-24	Rajasthan
	Khetri- Bhiwadi 400 kV D/c line	400 kV	Line	D/c	240		TBCB	Commissioned	2023-24	Rajasthan
	STATCOM (±300 MVAr) along with MSC (2x125 MVAr) & MSR (1x125 MVAr) at Bikaner–II S/s		S/s				TBCB	Commissioned	2023-24	Rajasthan
NR- 15	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part F1**									
	Removal of LILO of one circuit of Bhadla-Bikaner (RVPN) 400 kV D/c (Quad) line at Bikaner (PG). Extension of above LILO section from Bikaner (PG) up to Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400 kV D/c (Quad) line	400 kV	Line	D/c	50		RTM	Commissioned	2023-24	Rajasthan
NR- 16	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part G**									
	Establishment of 765/400 kV, 3x1500 MVA GIS substation at Narela with 765 kV (2x330 MVAr) bus reactor and 420 kV (1x125 MVAR) bus reactor	765/400 kV	S/s			4500	TBCB	UC	2024-25	Delhi
	Khetri – Narela 765 kV D/c line with 1x330 MVAr Switchable line reactor for each circuit at Narela end of Khetri – Narela 765 kV D/c line	765 kV	Line	D/c	360		TBCB	UC	2024-25	Rajasthan, Delhi

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of 765 kV Meerut-Bhiwani S/c line at Narela	765 kV	Line	D/c	50		TBCB	UC	2024-25	Uttar Pradesh, Haryana, Delhi
NR- 17	**Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part G1 (Maharanibagh/Gopalpur- Narela 765/400 kV substation 400 kV interconnection)**									
	Removal of LILO of Bawana – Mandola 400 kV D/c(Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh/ Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400 kV D/c(Quad) and Maharanibagh -Gopalpur-Narela 400 kV D/c(Quad) lines	400 kV	Line	D/c	28		RTM	UC	2024-25	Delhi
NR- 18	**Additional 1x500 MVA, 400/220 kV ICT (8th) at Bhadla Pooling Station**									
	1x500 MVA, 400/220 kV ICT (8th) at Bhadla Pooling Station	400/220 kV	S/s			500	RTM	Commissioned	2022-23	Rajasthan
NR- 19	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part A1**									
	Establishment of 2x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor	400/220 kV	S/s			1000	TBCB	UC	2024-25	Rajasthan
	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS line	400 kV	Line	D/c	42		TBCB	UC	2024-25	Rajasthan
NR- 20	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part A2**									
	Augmentation with 3x500 MVA, 400/220 kV ICTs at Fatehgarh-4 pooling station	400/220 kV	S/s			1500		Planned	2026-27	Rajasthan
NR- 21	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part A3**									
	Fatehgarh 3- Bhadla-3 400 kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends	400 kV	Line	D/c	450		TBCB	UC	2024-25	Rajasthan
NR- 22	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part B1**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 2x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor	765/400/220 kV	S/s			4500	TBCB	UC	2024-25	Rajasthan
	Bhadla-3 – Sikar-II 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end	765 kV	Line	D/c	650		TBCB	UC	2024-25	Rajasthan
NR- 23	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part C1**									
	Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus reactor (with 1 GW BESS)	765/400/220 kV	S/s			4000	TBCB	UC	2025-26	Rajasthan
	Ramgarh – Bhadla-3 765 kV D/c line along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765 kV D/c line	765 kV	Line	D/c	360		TBCB	UC	2025-26	Rajasthan
	Ramgarh S/s: STATCOM: 2x ±300MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR		S/s				TBCB	UC	2025-26	Rajasthan
NR- 24	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part C2**									
	Augmentation with 1x1500 MVA, 765/400 kV ICT at Ramgarh	765/400 kV	S/s			1500		Planned	2026-27	Rajasthan
NR- 25	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D (Phase I)**									
	Sikar-II – Khetri 765 kV D/c line	765 kV	Line	D/c	152		TBCB	UC	2025-26	Rajasthan
	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	765 kV	Line	D/c	520		TBCB	UC	2025-26	Rajasthan
NR- 26	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D (Phase II)**									
	Jhatikara – Dwarka 400 kV D/c line (Quad)	400 kV	Line	D/c	40		RTM	UC	2025-26	Delhi
NR- 27	**Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 3x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV pooling station at Fatehgarh-3 (new section) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr, 765 kV & 2x125 MVAr, 420 kV Bus Reactors	765/400/220 kV	S/s			6000	RTM	UC	2024-25	Rajasthan
NR- 28	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part E2**									
	Augmentation with 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV ICTs at Fatehgarh-3 (new section)	765/400/220 kV	S/s			5500	RTM	UC	2025-26	Rajasthan
NR- 29	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part F**									
	Establishment of 2x1500 MVA, 765/400 kV Substation at suitable location near Beawar along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV Bus Reactor	765/400 kV	S/s			3000	TBCB	UC	2024-25	Rajasthan
	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c line at Beawar	765 kV	Line	D/c	136		TBCB	UC	2024-25	Rajasthan
	LILO of Kota –Merta 400 kV D/c line at Beawar	400 kV	Line	D/c	64		TBCB	UC	2024-25	Rajasthan
	Fatehgarh-3– Beawar 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	765 kV	Line	D/c	635		TBCB	UC	2024-25	Rajasthan
	Fatehgarh – III S/s: STATCOM: 2x ±300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR		S/s				TBCB	UC	2025-26	Rajasthan
NR- 30	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part G**									
	Fatehgarh-3 – Beawar 765 kV D/c line (2nd) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	765 kV	Line	D/c	700		TBCB	UC	2024-25	Rajasthan
NR- 31	**Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part H**									
	Establishment of 2x1500 MVA, 765/400 kV substation at suitable location near Dausa along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV bus Reactor	765/400 kV	S/s			3000	TBCB	UC	2025-26	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of both circuits of Jaipur (Phagi)-Gwalior 765 kV D/c line at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line	765 kV	Line	D/c	65		TBCB	UC	2025-26	Rajasthan, Madhya Pradesh
	LILO of both circuits of Agra – Jaipur (south) 400 kV D/c line at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400 kV D/c line	400 kV	Line	D/c	120		TBCB	UC	2025-26	Rajasthan, Uttar Pradesh
	Beawar – Dausa 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end	765 kV	Line	D/c	480		TBCB	UC	2025-26	Rajasthan
NR- 32	**Transformer augmentation at various substations for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part J**									
	Augmentation with 400/220 kV, 1x500MVA ICT (10th) at Fatehgarh-2 PS	400/220 kV	S/s			500	RTM	Planned	2026-27	Rajasthan
	Augmentation with 765/400 kV, 1x1500 MVA ICT (5th) at Bhadla-2 PS	765/400 kV	S/s			1500	RTM	UC	2024-25	Rajasthan
	Augmentation with 765/400 kV, 1x1500 MVA ICT (3rd) at Bikaner (PG)	765/400 kV	S/s			1500	RTM	Commissioned	2023-24	Rajasthan
	Augmentation with 1x500 MVA, 400/220 kV ICT (5th) at Fatehgarh-3 Substation (section-1)	400/220 kV	S/s			500	RTM	Planned	2026-27	Rajasthan
	Augmentation with 1x1500 MVA, 765/400 kV ICT (3rd) at Jhatikara Substation (Bamnoli/Dwarka section)	765/400 kV	S/s			1500	RTM	UC	2025-26	Delhi
NR- 33	**ICT augmentation at Bikaner-II PS to cater to N-1 contingency**									
	Implementation of 1x500 MVA, 400/220 kV ICT at Bikaner-II	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Rajasthan
NR- 34	**ICT augmentation at Fatehgarh-II PS to cater to N-1 contingency**									
	Implementation of 1x500 MVA, 400/220 kV ICT (6th) at Fatehgarh-II	400/220 kV	S/s			500	RTM	UC	2024-25	Rajasthan
NR- 35	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) Part A**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	6x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Bikaner-III Pooling Station along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor at a suitable location near Bikaner (with 1 GW BESS)	765/400/220 kV	S/s			11500	TBCB	UC	2025-26	Rajasthan
	LILO of both ckts of Bikaner (PG)-Bikaner-II D/c line at Bikaner-III PS	400 kV	Line	D/c	40		TBCB	UC	2025-26	Rajasthan
	Bikaner-II PS – Bikaner-III PS 400 kV D/c line	400 kV	Line	D/c	30		TBCB	UC	2025-26	Rajasthan
	Bikaner-III - Neemrana-II 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	700		TBCB	UC	2025-26	Rajasthan
NR- 36	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) Part B**									
	Establishment of 765/400 kV, 4x1500 MVA Neemrana-II S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor at a suitable location near Neemrana.	765/400 kV	S/s			6000	TBCB	UC	2025-26	Rajasthan
	Neemrana-II -Kotputli 400 kV D/c line	400 kV	Line	D/c	88		TBCB	UC	2025-26	Rajasthan
	LILO of both ckts of 400 kV Sohna Road (GPTL)-Gurgaon (PG) D/c line at Neemrana-II S/s	400 kV	Line	D/c	397		TBCB	UC	2025-26	Rajasthan, Haryana
NR- 37	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) Part C**									
	Bikaner-III - Neemrana-II 765 kV 2xD/c line (2nd) along with 330 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	700		TBCB	UC	2025-26	Rajasthan
NR- 38	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) Part D**									
	Neemrana-II- Bareilly (PG) 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	700		TBCB	UC	2025-26	Rajasthan, Uttar Pradesh
NR- 39	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) Part E**									
	Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at Kotputli (PG)	400/220 kV	S/s			500	RTM	UC	2024-25	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 400/220 kV, 5x500 MVA ICT at Bikaner -II PS	400/220 kV	S/s			2500	RTM	UC	2025-26	Rajasthan
	Augmentation by 765/400 kV, 1x1500 MVA ICT (4^{th}) at Bikaner (PG)	765/400 kV	S/s			1500	RTM	UC	2024-25	Rajasthan
NR- 40	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part A**									
	Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Fatehgarh- 4 (Section-2) Pooling Station along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor (with 2 GW BESS)	765/400/220 kV	S/s			8500	TBCB	Under Bidding	2026-27	Rajasthan
	Fatehgarh-4(Section-2) – Bhinmal (PG) 400 kV D/c line (Twin HTLS) along with 50 MVAR switchable line reactor on each ckt at each end	400 kV	Line	D/c	400		TBCB	Under Bidding	2026-27	Rajasthan
	LILO of both ckts of 2^{nd} D/c 765 kV Fatehgarh-3-Beawar 2xD/c line at Fatehgarh-4 (Section-2) PS along with 330 MVAR switchable line reactors at Fatehgarh -IV PS	765 kV	Line	D/c	60		TBCB	Under Bidding	2026-27	Rajasthan
NR- 41	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part B**									
	Establishment of 2x1500 MVA, 765/400 kV substation along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor near Sirohi (with 1 GW BESS)	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Rajasthan
	Fatehgarh-IV (Section-2) PS – Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	480		TBCB	Under Bidding	2026-27	Rajasthan
	Sirohi PS-Chittorgarh (PG) 400 kV D/c line along with 80 MVAr switchable line reactor for each circuit at Sirohi PS end (Quad)	400 kV	Line	D/c	320		TBCB	Under Bidding	2026-27	Rajasthan
NR- 42	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part C**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 3x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Mandsaur Pooling Station along with 2x330 MVAR (765 kV) Bus Reactors & 2x125 MVAR, 420 kV Bus Reactor	765/400/220 kV	S/s			7000	TBCB	Under Bidding	2026-27	Madhya Pradesh
	Mandsaur PS – Indore (PG) 765 kV D/c line along with 1x330 MVAr switchable line reactor (SLR) on each ckt at Mandsaur end	765 kV	Line	D/c	400		TBCB	Under Bidding	2026-27	Madhya Pradesh
NR- 43	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part D**									
	Beawar- Mandsaur 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	520		TBCB	Under Bidding	2026-27	Rajasthan, Madhya Pradesh
NR- 44	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part E**									
	Establishment of 765 kV switching station at suitable location near Rishabdeo (Distt. Udaipur) along with 2x240 MVAr (765 kV) Bus Reactor	765 kV	S/s				TBCB	Under Bidding	2026-27	Rajasthan
	Sirohi PS- Rishabdeo 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Sirohi end	765 kV	Line	D/c	340		TBCB	Under Bidding	2026-27	Rajasthan
	Rishabdeo - Mandsaur PS 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Rishabdeo end	765 kV	Line	D/c	320		TBCB	Under Bidding	2026-27	Rajasthan, Madhya Pradesh
	LILO of one circuit of 765 kV Chittorgarh - Banaskanta D/c line at Rishabdeo S/s	765 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Rajasthan, Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 45	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part F**									
	Establishment of 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Barmer-I Pooling Station along with 2x240 MVAR (765 kV), 2x125 MVAr (420 kV) Bus Reactor (with 2 GW BESS)	765/400/220 kV	S/s			5500	TBCB	Under Bidding	2026-27	Rajasthan
	Fatehgarh-III (Section-2) PS – Barmer-I PS 400 kV D/c line (Quad)	400 kV	Line	D/c	100		TBCB	Under Bidding	2026-27	Rajasthan
	Barmer-I PS – Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	400		TBCB	Under Bidding	2026-27	Rajasthan
NR- 46	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part H1**									
	Establishment of 765/400 kV (2x1500 MVA), 400/220 kV (2x500 MVA) and 220/132 kV (3x200 MVA) Kurawar S/s with 2x330 MVAr, 765 kV bus reactor and 1x125 MVAr, 420 kV bus reactors	765/400/220/132 kV	S/s			4600	TBCB	Under Bidding	2026-27	Madhya Pradesh
	Mandsaur – Kurawar 765 kV D/c line with 240 MVAr switchable line reactors at both ends	765 kV	Line	D/c	470		TBCB	Under Bidding	2026-27	Madhya Pradesh
	LILO of Indore – Bhopal 765 kV S/c line at Kurawar	765 kV	Line	D/c	30		TBCB	Under Bidding	2026-27	Madhya Pradesh
	Kurawar – Ashtha 400 kV D/c line	400 kV	Line	D/c	130		TBCB	Under Bidding	2026-27	Madhya Pradesh
	LILO of one circuit of Indore – Itarsi 400 kV D/c line at Astha	400 kV	Line	D/c	60		TBCB	Under Bidding	2026-27	Madhya Pradesh
	Shujalpur – Kurawar 400 kV D/c line	400 kV	Line	D/c	80		TBCB	Under Bidding	2026-27	Madhya Pradesh
NR- 47	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) Part H2**									
	Provision of NGR bypass arrangement and inter tripping scheme on 240 MVAR Switchable Line Reactor at Bhopal end of Kurawar – Bhopal 765 kV S/c line	765 kV	S/s				RTM	Planned	2026-27	Madhya Pradesh

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 48	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part3: 6 GW solar with 1.18 GW BESS) Part A**									
	Establishment of 6x1500 MVA, 765/400 kV & 6x500 MVA, 400/220 kV Bikaner-IV Pooling Station along with 2x240 MVAr (765kV) & 2x125 MVAr (420kV) Bus Reactors at a suitable location near Bikaner	765/400/220 kV	S/s			12000	TBCB	Under Bidding	2026-27	Rajasthan
	STATCOM (2x$\pm$300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Bikaner-IV PS	400 kV	S/s				TBCB	Under Bidding	2026-27	Rajasthan
	LILO of both ckts of Bikaner II PS- Bikaner III PS (Quad) 400 kV D/c line at Bikaner-IV PS	400 kV	Line	D/c	80		TBCB	Under Bidding	2026-27	Rajasthan
	Bikaner-IV PS – Siwani 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	520		TBCB	Under Bidding	2026-27	Rajasthan, Haryana
	Siwani– Fatehabad (PG) 400 kV D/c line (Quad)	400 kV	Line	D/c	160		TBCB	Under Bidding	2026-27	Rajasthan, Haryana
	Siwani – Patran (Indi Grid) 400 kV D/c line (Quad) along with 80 MVAr switchable line reactor for each circuit at Siwani S/s end	400 kV	Line	D/c	320		TBCB	Under Bidding	2026-27	Rajasthan, Punjab
NR- 49	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part3: 6 GW solar with 1.18 GW BESS) Part B**									
	Establishment of 765/400 kV, 6x1500 MVA S/s at suitable location near Siwani (Distt. Bhiwani) along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor	765/400 kV	S/s			9000	TBCB	Under Bidding	2026-27	Haryana
	Bikaner-IV PS – Siwani 765 kV D/c line (2nd) along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	520		TBCB	Under Bidding	2026-27	Rajasthan, Haryana
	STATCOM (2x$\pm$300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Siwani S/s	400 kV	S/s				TBCB	Under Bidding	2026-27	Haryana
	Siwani – Sonipat (PG) 400 kV D/c line (Quad) along with 63 MVAr switchable line reactor for each circuit at Siwani S/s end	400 kV	Line	D/c	300		TBCB	Under Bidding	2026-27	Haryana
	Siwani – Jind (PG) 400 kV D/c line (Quad)	400 kV	Line	D/c	220		TBCB	Under Bidding	2026-27	Haryana

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 50	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW) Part A**									
	Augmentation with 765/400 kV, 2x1500 MVA ICT (4th & 5th) at Barmer-I PS	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Rajasthan
	Augmentation with 5x500 MVA (5th to 9th), 400/220 kV ICTs at Barmer-I PS	400/220 kV	S/s			2500	TBCB	Under Bidding	2026-27	Rajasthan
	STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Barmer-I PS	400 kV	S/s				TBCB	Under Bidding	2026-27	Rajasthan
	Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400 kV D/c line (Quad)	400 kV	Line	D/c	90		TBCB	Under Bidding	2026-27	Rajasthan
	Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactor at Ghiror S/s (UP)	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Uttar Pradesh
	Dausa - Ghiror 765 kV D/c line along with 330 MVAr switchable line reactor at Ghiror end and 240 MVAr switchable line reactor at Dausa end for each circuit of Dausa - Ghiror 765 kV D/c line	765 kV	Line	D/c	610		TBCB	Under Bidding	2026-27	Rajasthan, Uttar Pradesh
	LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line at Ghiror S/s along with 240 MVAr switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror - Orai (PG) D/c line	765 kV	Line	D/c	60		TBCB	Under Bidding	2026-27	Uttar Pradesh
	LILO of one ckt of 765 kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror along with 240 MVAr switchable line reactor at Ghiror end of 765 kV Ghiror -Fatehpur (PG) line	765 kV	Line	D/c	60		TBCB	Under Bidding	2026-27	Uttar Pradesh
	400 kV Ghiror-Firozabad (UPPTCL) D/c line (Quad)	400 kV	Line	D/c	100		TBCB	Under Bidding	2026-27	Uttar Pradesh
NR- 51	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part B**									
	Establishment of 765/400/220 kV, 2x1500 MVA & 400/220 kV, 2x500 MVA S/s at suitable location near Merta (Merta-II Substation) along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors at Merta-II S/s	765/400/220 kV	S/s			4000	TBCB	Under Bidding	2026-27	Rajasthan

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Barmer-I PS – Merta-II 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end of Barmer-I PS – Merta-II 765 kV D/c line	765 kV	Line	D/c	690		TBCB	Under Bidding	2026-27	Rajasthan
	Merta-II – Beawar 400 kV D/c line (Quad)	400 kV	Line	D/c	110		TBCB	Under Bidding	2026-27	Rajasthan
	Merta-II – Dausa 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end of Merta-II – Dausa 765kV D/c line line	400 kV	Line	D/c	500		TBCB	Under Bidding	2026-27	Rajasthan
NR- 52	**Transmission system strengthening for interconnections of Bhadla-III & Bikaner-III complex**									
	Bhadla-III – Bikaner-III 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at Bhadla-III end	765 kV	Line	D/c	300		TBCB	Under Bidding	2026-27	Rajasthan
NR- 53	**Additional Transmission system for evacuation of power from Bhadla-III PS as part of Rajasthan REZ Phase-III scheme (20 GW)**									
	Augmentation with 2x500 MVA, 400/220 kV ICTs (4th & 5th) at Bhadla-III PS	400/220 kV	S/s			1000	TBCB	Under Bidding	2026-27	Rajasthan
	Augmentation with 2x1500 MVA, 765/400 kV ICTs (3rd & 4th) at Bhadla-III PS	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Rajasthan
NR- 54	**Transmission system strengthening to facilitate evacuation of power from Bhadla/ Bikaner complex**									
	Bareilly (765/400 kV) – Bareilly (PG) 400 kV D/c line (Quad) (2nd)	400 kV	Line	D/c	8		TBCB	Under Bidding	2026-27	Uttar Pradesh
	Augmentation with 1x1500 MVA, 765/400 kV ICT (3rd) at Bareilly (765/400 kV) S/s	765/400 kV	S/s			1500	TBCB	Under Bidding	2026-27	Uttar Pradesh
NR- 55	**Augmentation with 400/220 kV 1x500 MVA (9th) ICT at Bikaner-II to meet N-1 compliance**									
	Augmentation with 400/220 kV, 1x500 MVA ICT (9th) at Bikaner-II PS	400/220 kV	S/s			500	RTM	Planned	2025-26	Rajasthan
NR- 56	**Augmentation with 400/220 kV, 3x500 MVA ICTs (6th to 8th) at Fatehgarh-IV PS(Sec-II)**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation with 400/220 kV, 3x500 MVA ICTs (6th ,7th & 8th) at Fatehgarh-IV PS(Sec-II)	400/220 kV	S/s			1500	RTM	Planned	2026-27	Rajasthan
NR- 57	**Augmentation with 400/220 kV, 1x500 MVA ICT (3rd & 4th) at Barmer-I PS**									
	Augmentation with 400/220 kV, 2x500 MVA (3rd & 4th) ICTs at Barmer-I PS	400/220 kV	S/s			1000	RTM	Planned	2026-27	Rajasthan
NR- 58	**Augmentation by 5th ICT at Fatehgarh-III PS (Section 1)**									
	Augmentation by 400/220 kV, 1x500 MVA (5th) ICT at Fatehgarh-III PS (Section-1)	400/220 kV	S/s			500	RTM	UC	2025-26	Rajasthan
NR- 59	**Augmentation with 500 MVA (4th) ICT at 400/220 kV Bhiwadi (Hybrid) substation**									
	Augmentation with 400/220 kV, 500 MVA (4th) ICT at Bhiwadi (PG) S/s	400/220 kV	S/s			500	RTM	Planned	2025-26	Rajasthan
NR- 60	**Augmentation by 500 MVA (4th) ICT at 400/220 kV Bassi substation**									
	Augmentation by 400/220 kV, 500 MVA (4th) ICT at Bassi (PG) S/s	400/220 kV	S/s			500	RTM	UC	2025-26	Rajasthan
NR- 61	**Augmentation by 400/220 kV, 1x500 MVA (4th) ICT at 400/220 kV Kankroli substation**									
	1x500 MVA, 400/220 kV ICT (4th) at Kankroli S/s	400/220 kV	S/s			500	RTM	UC	2025-26	Rajasthan
NR- 62	**Scheme to relieve high loading of WR-NR Inter Regional Corridor (400 kV Bhinmal-Zerda line)**									
	Bypassing of 400 kV Kankroli - Bhinmal-Zerda line at Bhinmal to form 400 kV Kankroli – Zerda (direct) line (with necessary arrangement for bypassing Kankroli- Zerda line at Bhinmal with suitable switching equipment inside the Bhinmal substation)	400 kV	Line	S/c			RTM	Commissioned	2024-25	Rajasthan, Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Reconductoring of 400 kV Jodhpur (Surpura)(RVPN) – Kankroli S/c line with twin HTLS conductor [with minimum capacity of 1940 MVA/ckt at nominal voltage; Upgradation of existing 400 kV bay equipments each at Jodhpur (Surpura)(RVPN) and Kankroli S/s]	400 kV	Line	S/c	188		RTM	Commissioned	2024-25	Rajasthan
NR- 63	**Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley**									
	Establishment of 2x200 MVA, 400/132 kV Pooling Station at Kishtwar (GIS) with 125 MVAR, 420 kV bus reactor	400/132 kV	S/s			400	TBCB	UC	2025-26	J&K
	LILO one circuit of Kishenpur – Dulhasti 400 kV D/c (Quad) line (Single Circuit Strung) at Kishtwar	400 kV	Line	D/c	3		TBCB	UC	2025-26	J&K
	Kishtwar Pooling Station – Kishenpur 400 kV S/c (Quad) line (stringing of second circuit of Dulhasti–Kishenpur 400kV from Kishtwar upto Kishenpur)	400 kV	Line	S/c	15		TBCB	UC	2025-26	J&K
NR- 64	**Transmission system scheme for Ratle HEP (850 MW)**									
	400 kV Kishenpur-Samba D/c line (Quad) (only one circuit is to be terminated at Kishenpur while second circuit would be connected to bypassed circuit of 400 kV Kishtwar – Kishenpur line (Quad))	400 kV	Line	D/c	70			Planned	2026-27	J&K
	Bypassing of one ckt of 400 kV Kishtwar – Kishenpur 400 kV D/c line (Quad) at Kishenpur and connecting it with one of the circuits of Kishenpur-Samba 400 kV D/c line (Quad), thus forming 400 kV Kishtwar - Samba (Quad) direct line (one ckt)	400 kV	Line	D/c				Planned	2026-27	J&K
	1x80 MVAr Switchable line reactor at Samba end of 400 kV Kishtwar-Samba 400 kV line (Quad) [formed after bypassing of 400 kV Kishtwar – Kishenpur line (Quad) at Kishenpur and connecting it with one of the circuits of Kishenpur-Samba 400 kV D/c line (Quad)]	400 kV	S/s					Planned	2026-27	J&K
	Bypassing both ckts of 400 kV Kishenpur – Samba D/c line (Twin) & 400 kV Samba – Jalandhar D/c line (Twin) at Samba and connecting them together to form 400 kV Kishenpur– Jalandhar D/c direct line (Twin)	400 kV	Line	D/c				Planned	2026-27	J&K, Punjab

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	1x63 MVAr Switchable line reactor on each ckt at Jallandhar end of Kishenpur– Jalandhar D/c direct line (Twin) [formed after bypassing both ckts of 400 kV Kishenpur – Samba D/c line (Twin) & 400 kV Samba – Jalandhar D/c line (Twin) at Samba and connecting them together to form Kishenpur– Jalandhar D/c direct line (Twin)]	400 kV	S/s					Planned	2026-27	J&K, Punjab
	400 kV Samba- Jalandhar D/c line (Quad) (only one circuit is to be terminated at Jalandhar while second circuit would be connected to bypassed circuit of Jalandhar –Nakodar 400 kV D/c line)	400 kV	Line	D/c	270			Planned	2026-27	J&K, Punjab
	1x80 MVAr Switchable line reactor at Samba end of Samba – Nakodar direct line (Quad) formed after bypassing of 400 kV Jalandhar – Nakodar line (Quad) at Jalandhar and connecting it with one of the circuits of Samba-Jalandhar 400 kV D/c line (Quad Moose), thus forming Samba – Nakodar line (Quad)	400 kV	S/s					Planned	2026-27	J&K, Punjab
	Bypassing 400 kV Jalandhar – Nakodar line (Quad) at Jalandhar and connecting it with one of the circuits of Samba-Jalandhar 400 kV D/c line (Quad Moose), thus forming 400 kV Samba –Nakodar line	400 kV	Line	D/c				Planned	2026-27	J&K, Punjab
	LILO of 400 kV Kishenpur- Dulhasti line (Twin) at Kishtwar S/s along with associated bays at Kishtwar S/s	400 kV	Line	D/c	20			Planned	2026-27	J&K
	Reconductoring of 400 kV Kishenpur-Kishtwar section with Twin HTLS (minimum 2100 MVA capacity) (formed after LILO of Kishenpur-Dulhasti line at Kishtwar S/s) along with bay upgradation works (2000 A to 3150 A) at Kishenpur end.	400 kV	Line	S/c	132			Planned	2026-27	J&K
NR- 65	**Creation of 400/220 kV, 2x315 MVA S/S at Siot (earlier Akhnoor/Rajouri)**									
	Establishment of 7x105 MVA, 400/220 kV Siot S/s with 1x80 MVAR (420 kV) bus reactors	400/220 kV	S/s			630	TBCB	Under Bidding	2026-27	J&K
	LILO of both circuits of 400 kV D/c Amargarh (Kunzer)-Samba line at 400/220 kV Siot S/s	400 kV	Line	D/c	60		TBCB	Under Bidding	2026-27	J&K

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 66	**Transmission works to be implemented in Jammu and Kashmir Region**									
	Addition of new 1x315 MVA, 400/220 kV ICT (3rd) at Amargarh S/s	400/220 kV	S/s			315	RTM	UC	2024-25	J&K
NR- 67	**Implementation of Transmission System Strengthening for 'Srinagar – Leh Transmission System'**									
	Laying of cable about 15 km between Minamarg and Zojila Top section of Alusteng –Drass 220 kV section	220 kV	Line	S/c	15		RTM	UC	2024-25	J&K, Ladakjh
	2x25 MVAR, 220 kV bus reactors at 220/66 kV Drass S/s	220 kV	S/s				RTM	UC	2024-25	Ladakh
	1x25 MVAR, 220 kV bus reactor at 220/66 kV Alusteng S/s	220 kV	S/s				RTM	UC	2024-25	J&K
NR- 68	**Requirement of 30 MW power supply at eastern portal, Zojila tunnel**									
	50 MVA 220/66 kV ICT augmentation at Drass substation	220/66 kV	S/s			50	RTM	Planned	2025-26	Ladakh
NR- 69	**Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at 400/220 kV New Wanpoh substation**									
	Augmentation by 400/220 kV, 1x315 MVA (3rd) ICT at New Wanpoh S/s	400/220 kV	S/s			315	RTM	UC	2025-26	J&K
NR- 70	**Transmission system for evacuation of power from Shongtong Karcham HEP (450 MW) and Tidong HEP (150 MW)**									
	Establishment of 2x315 MVA (7x105 MVA 1-ph units including a spare unit) 400/220 kV GIS Pooling Station at Jhangi	400/220 kV	S/s			630	TBCB	Under Bidding	2026-27	Himachal Pradesh
	Jhangi PS – Wangtoo 400 kV D/c line (Quad)	400 kV	Line	D/c	108		TBCB	Under Bidding	2026-27	Himachal Pradesh
	LILO of one circuit of Jhangi PS - Wangtoo (HPPTCL) 400 kV D/c (Quad) line at generation switchyard of Shongtong HEP	400 kV	Line	D/c	2		TBCB	Under Bidding	2026-27	Himachal Pradesh
	Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line (Twin HTLS) along with 80 MVAr Switchable line reactor at Panchkula end on each circuit	400 kV	Line	D/c	420		TBCB	Under Bidding	2026-27	Himachal Pradesh, Haryana

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 71	**Establishment of 400/220 kV Nange Pooling Station for Luhri Stage-I, II & Sunni Dam HEPs of SJVN**									
	Establishment of 2x315 MVA, 400/220 kV Nange GIS Pooling Station with 125 MVAR (420 kV) Bus Reactor	400/220 kV	S/s			630	TBCB	Under Bidding	2026-27	Himachal Pradesh
	Nange GIS Pooling Station – Koldam 400 kV D/c line along with associated bays at both ends	400 kV	Line	D/c	140		TBCB	Under Bidding	2026-27	Himachal Pradesh
	Bypassing one ckt of Koldam – Ropar/Ludhiana 400 kV D/c line (Triple snowbird) at Koldam and connecting it with one of the circuit of Nange- Koldam 400 kV D/c line (Triple snowbird), thus forming Nange- Ropar/Ludhiana one line (Triple snowbird)	400 kV	Line	D/c			TBCB	Under Bidding	2026-27	Himachal Pradesh, Punjab
	125 MVAR (420 kV) Bus Reactor at Koldam S/s	400 kV	S/s				TBCB	Under Bidding	2026-27	Himachal Pradesh
NR- 72	**Augmentation by 1x500 MVA (4th) ICT at 400/220 kV Nallagarh substation**									
	400/220 kV, 500 MVA ICT (4th) at Nallagarh (PG) S/s	400/220 kV	S/s			500	RTM	UC	2025-26	Himachal Pradesh
NR- 73	**ICT augmentation at Patran S/s**									
	400/220 kV, 500 MVA ICT (3rd) augmentation at Patran GIS S/s	400/220 kV	S/s			500	RTM	UC	2024-25	Punjab
NR- 74	**Enhancement of ATC/TTC for Punjab due to unprecedented load growth in summer**									
	Augmentation of 1x315 MVA, 400/220 kV ICT to 1x500 MVA at Ludhiana	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Punjab
	Augmentation of 1x315 MVA, 400/220 kV ICT to 1x 500 MVA at Pataila	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Punjab
	400/220 kV, 315 MVA ICT spared from Ludhiana shifted to Bhinmal	400/220 kV	S/s				RTM	Commissioned	2024-25	Punjab, Rajasthan
NR- 75	**ICT augmentation at Moga S/s**									
	Replacement of 1x250 MVA, 400/220 kV ICT at 765/400/220 kV Moga S/s with 1x500 MVA, 400/220 kV ICT	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Punjab

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR- 76	**Augmentation by 400/220 kV, 1x500 MVA (4th) ICT at 400/220 kV Malerkotla substation**									
	Augmentation by 400/220 kV, 1x500 MVA (4th) ICT at Malerkotla S/s	400/220 kV	S/s			500	RTM	UC	2025-26	Punjab
NR- 77	**Additional ICT at Kurukshetra (PG)**									
	Installation of 500 MVA, 400/220 kV ICT (3rd) at Kurukshetra (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Haryana
NR- 78	**400 kV ISTS elements involving inter-connection with HVPNL's Intra-State transmission network**									
	400/220 kV, 500 MVA ICT (3rd) at Bahadurgarh (PG)	400/220 kV	S/s			500	RTM	UC	2024-25	Haryana
	400/220 kV, 500 MVA ICT (3rd) at Jind (PG)	400/220 kV	S/s			500	RTM	UC	2024-25	Haryana
NR- 79	**ICT augmentation at Bhiwani (PG)**									
	Augmentation by 765/400 kV, 1500 MVA ICT at Bhiwani S/s (4th) (3rd in Section-I which have 2x1000 MVA ICTs)	765/400 kV	S/s			1500	RTM	UC	2024-25	Haryana
NR- 80	**400 kV D/c Khandukhal (Srinagar)-Rampura (Kashipur) line (Quad Bersimis)**									
	Khandukhal (Srinagar)-Rampura (Kashipur) 400 kV D/c line (Quad Bersimis)	400 kV	Line	D/c	390		TBCB	UC	2024-25	Uttarakhannd
	1x80 MVAr switchable line reactor at Rampura (Kashipur) end on each ckt of Khandukhal (Srinagar) - Rampura (Kashipur) line	400 kV	S/s				TBCB	UC	2024-25	Uttarakhannd
NR- 81	**Replacement of ICT at Bawana S/s**									
	Replacement of 400/220/33 kV, 1x315 MVA (3rd) ICT by 500 MVA at 400/220 kV Bawana (DTL) S/s	400/220 kV	S/s			500	RTM	UC	2025-26	Delhi
NR- 82	**ICT augmentation**									
	1x500 MVA, 400/220 kV ICT (3rd) at Sohawal (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Uttar Pradesh
NR- 83	**Augmentation by 400/220 kV, 1x500 MVA (4th) ICT at 400/220 kV Allahabad (PG) substation**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 400/220 kV, 500 MVA (4th) ICT at Allahabad S/s	400/220 kV	S/s			500	RTM	UC	2024-25	Uttar Pradesh
NR- 84	**Transmission scheme for evacuation of 4000 MW solar generation in Bundelkhand area of UP**									
	1500 MVA, 765/400 kV ICT (3rd) at Orai (PG) substation	765/400 kV	S/s			1500	RTM	Planned	2026-27	Uttar Pradesh
NR- 85	**Replacement of existing 420 kV, 50 MVAR Bus Reactors at Mandola & Muradnagar substation with 125 MVAr bus reactor**									
	Replacement of 50 MVAr bus reactor each at Mandola (PG) & Muradnagar (UPPTCL) with 125 MVAr (420 kV) bus reactor	400 kV	S/s				RTM	Planned	2025-26	Uttar Pradesh
NR- 86	**Cross Border link with Nepal**									
	Gorakhpur (India) – New Butwal (Nepal) 400 kV D/c (Quad) line (only Indian portion)	400 kV	Line	D/c	240		RTM	UC	2026-27	Uttar Pradesh
NR- 87	**Inter-regional corridor between NR-WR to relieve the loading of Vindhyachal-Varanasi 765 kV D/c line**									
	Establishment of 765 kV Prayagraj S/s near Prayagraj (UP) along with 2x330 MVAr 765 kV bus reactors	765 kV	S/s					Planned	2026-27	Uttar Pradesh
	LILO of 765 kV Fatehpur-Varanasi S/c line at Prayagraj PS	765 kV	Line	D/c	120			Planned	2026-27	Uttar Pradesh
	LILO of 765 kV Fatehpur-Sasaram S/c line at Prayagraj PS	765 kV	Line	D/c	120			Planned	2026-27	Uttar Pradesh
	765 kV Vindhyachal Pool - Prayagraj D/c line along with 240 MVAr line reactor (switchable) at Prayagraj end on each ckt and bypassing of both ckts of 765 kV Sasan – Vindhyachal Pool 2xS/c line at Vindhyachal Pool and connecting it with 765 kV Vindhyachal Pool - Prayagraj D/c line, thus forming 765 kV Sasan - Prayagraj D/c line	765 kV	Line	D/c	360			Planned	2026-27	Uttar Pradesh, Madhya Pradesh
NR- 88	**Transmission scheme for Rajasthan REZ Ph-V (Part-1: 4 GW) (Sirohi/Nagaur Complex) [Sirohi: 2 GW, Nagaur: 2 GW]**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 5x500 MVA, 400/220 kV ICTs at Sirohi S/s	400/220 kV	S/s			2500		Planned	2026-27	Rajasthan
	Sirohi – Mandsaur PS 765 kV D/c line along with 330 MVAr switchable line reactor on each circuit at each end of Sirohi – Mandsaur PS 765 kV D/c line	765 kV	Line	D/c	640			Planned	2026-27	Rajasthan, Madhya Pradesh
	Mandsaur PS – Khandwa (New) 765 kV D/c line along with 240 MVAr switchable line reactor on each circuit at each end of Mandsaur PS – Khandwa (New) 765 kV D/c line	765 kV	Line	D/c	460			Planned	2026-27	Madhya Pradesh
WR-1	**Additional 400 kV feed to Goa**									
	Establishment of 2x500 MVA, 400/220 kV substation at Xeldem	400/220 kV	S/s			1000	TBCB	UC	2024-25	Goa
	LILO of one ckt. of Narendra (existing) – Narendra (New) 400 kV D/c quad line at Xeldem	400 kV	Line	D/c	120		TBCB	UC	2026-27	Karnataka, Goa
	Xeldem – Mapusa 400 kV D/c (quad) line	400 kV	Line	D/c	80		TBCB	UC	2024-25	Goa
	1x80 MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries at Narendra (New) S/s (for Narendra (New) –Xeldem 400 kV (quad) line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400 kV D/c quad line at Xeldem)	400 kV	S/s				TBCB	UC	2024-25	Goa
	Dharamjaygarh Pool (Section B) - Raigarh (Tamnar) Pool 765 kV D/C Line	765 kV	Line	D/c	137		TBCB	Commissioned	2022-23	Chhattisgarh
WR-2	**Transmission System for providing connectivity to RE Projects at Bhuj-II (2000 MW) in Gujarat**									
	Establishment of 2x1500 MVA (765/400 kV), 4x500 MVA (400/220 kV) Bhuj-II PS (GIS) with 1x330 MVAr (765 kV) and 1x125 MVAR (420 kV) bus reactor	765/400/220 kV	S/s			5000	TBCB	Commissioned	2022-23	Gujarat
	Reconfiguration of Bhuj PS – Lakadia PS 765 kV D/c line so as to establish Bhuj-II – Lakadia 765 kV D/C line as well as Bhuj-Bhuj-II 765 kV D/C line	765 kV	Line	D/c	212		TBCB	Commissioned	2022-23	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
WR-3	**Transmission System for Jam Khambaliya Pooling Station and interconnection of Jam Khambaliya Pooling Station for providing connectivity to RE generation projects (1500 MW) in Dwarka (Gujarat) and installation of 400/220 kV ICT along with associated bays at CGPL Switchyard**									
	Establishment of 4x500 MVA, 400/220 kV Jam Khambhaliya PS (GIS) along with 1x125 MVAr, 420 kV Bus reactor at Jam Khabhaliya PS	400/220 kV	S/s			2000	TBCB	Commissioned	2022-23	Gujarat
	Extension of Essar–Lakadia/Bhachau 400 kV D/c (triple) line up to Jam Khambhaliya PS	400 kV	Line	D/c	40		TBCB	Commissioned	2022-23	Gujarat
	63 MVAr switchable line reactor at both ends of Lakadia/Bhachau – Jam Khambhaliya 400 kV D/c line	400 kV	S/s				TBCB	Commissioned	2022-23	Gujarat
WR-4	**Transmission System associated with RE Generation at Bhuj-II, Dwarka & Lakadia**									
	Lakadia PS – Banaskantha PS 765 kV D/c line	765 kV	Line	D/c	400		TBCB	Commissioned	2022-23	Gujarat
	2x240 MVAr switchable line reactor at Banaskantha end of Lakadia PS – Banaskantha PS 765 kV D/c line	765 kV	S/s				TBCB	Commissioned	2022-23	Gujarat
WR-5	**Transmission System for Western Region Strengthening Scheme - 21 (WRSS – 21) Part – A – Transmission System Strengthening for relieving overloading observed in Gujarat intra-State System due to RE injection in Bhuj PS**									
	Establishment of 2x1500 MVA, 765/400 kV Lakadia PS with 1x330 MVAR, 765 kV & 1x125 MVAR, 420 kV bus reactor	765/400 kV	S/s			3000	TBCB	Commissioned	2022-23	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Bhachau – EPGL line 400 kV D/C (triple) line at Lakadia PS	400 kV	Line	D/c	76		TBCB	Commissioned	2022-23	Gujarat
	Bhuj PS – Lakadia PS 765 kV D/C line	765 kV	Line	D/c	200		TBCB	Commissioned	2022-23	Gujarat
WR-6	**Transmission System for Western Region Strengthening Scheme - 21 (WRSS – 21) Part – B – Transmission System Strengthening for relieving overloadings observed in Gujarat intra-State system due to RE injections in Bhuj PS**									
	Lakadia – Vadodara 765 kV D/c line with 330 MVAr switchable line reactors along with 500 ohms NGR on each circuit at both ends	765 kV	Line	D/c	700		TBCB	Commissioned	2022-23	Gujarat
WR-7	**Transmission system for evacuation of power from RE projects in Sholapur (1500 MW) SEZ**									
	Establishment of 400/220 kV, 4x500 MVA Solapur PP (near Mohol)	400/220 kV	S/s			2000	TBCB	UC	2025-26	Maharashtra
	Solapur pooling point - Solapur (PG) 400 kV D/c line (twin HTLS)	400 kV	Line	D/c	60		TBCB	UC	2025-26	Maharashtra
	2x125 MVAR, 420 kV Bus Reactor at Solapur PP	400 kV	S/s				TBCB	UC	2025-26	Maharashtra
WR-8	**Transmission system for evacuation of power from RE projects in wind energy zones in Osmanabad area of Maharashtra (1000 MW)**									
	Establishment of 2x500 MVA, 400/220 kV Kallam PS	400/220 kV	S/s			1000	TBCB	Commissioned	2023-24	Maharashtra
	1x125 MVAr bus reactor at Kallam PS	400 kV	S/s				TBCB	Commissioned	2023-24	Maharashtra

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of both circuits of Parli (PG) – Pune (GIS) 400 kV D/c line at Kallam PS	400 kV	Line	D/c	68		TBCB	Commissioned	2023-24	Maharashtra
WR-9	**Trasnmission System for evacuation of additional 1000 MW of RE power from Osmanabad RE zone**									
	Augmentation by 2x500 MVA, 400/220 kV ICTs at Kallam	400/220 kV	S/s			1000	RTM	UC	2024-25	Maharashtra
WR-10	**Transmission system for evacuation of power from RE projects in Rajgarh (1500 MW) SEZ in Madhya Pradesh: Phase-I**									
	Establishment of 400/220 kV, 3x500 MVA Pachora SEZ PP with 420 kV (125 MVAr) bus reactor	400/220 kV	S/s			1500	TBCB	Commissioned	2023-24	Madhya Pradesh
	Pachora SEZ PP -Bhopal (Sterlite) 400 kV D/c line (Quad/HTLS) along with 80 MVAr switchable line reactors on each circuit at Pachora end	400 kV	Line	D/c	320		TBCB	Commissioned	2023-24	Madhya Pradesh
WR-11	**Transmission system for evacuation of power from RE projects in Rajgarh (1000 MW) SEZ in Madhya Pradesh: Phase- II**									
	Augementation by 400/220 kV, 3x500 MVA ICT at Pachora SEZ PP with 125 MVAR, 420 kV bus reactor	400 kV	S/s			1500	TBCB	UC	2025-26	Madhya Pradesh
	Pachora – Ujjain 400 kV D/c line line (Quad/HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)	400 kV	Line	D/c	120		TBCB	UC	2025-26	Madhya Pradesh
WR-12	**Establishment of Khavda pooling station and associated transmission lines for evacuation of 8 GW RE power**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of Khavda pooling station 1 (KPS1) 3x1500 MVA, 765/400 kV ICT with 1x330 MVAR, 765 kV bus reactor and 1x125 MVAR, 420 kV bus reactor	765/400 kV	S/s			4500	TBCB	Commissioned	2023-24	Gujarat
	KPS1 – Bhuj PS 765 kV D/c line	765 kV	Line	D/c	218		TBCB	Commissioned	2023-24	Gujarat
	Establishment of 765/400 kV, 4x1500 MVA, KPS2 (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor	765/400 kV	S/s			6000	TBCB	UC	2024-25	Gujarat
	Establishment of 765/400 kV, 3x1500 MVA, KPS3 (GIS) with 1x330 MVAR, 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor	765/400 kV	S/s			4500	TBCB	UC	2024-25	Gujarat
	KPS3- KPS2 765 kV D/C line	765 kV	Line	D/c	30		TBCB	UC	2024-25	Gujarat
	KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAR switchable line reactors at KPS2	765 kV	Line	D/c	355		TBCB	UC	2024-25	Gujarat
	Augmentation of Khavda PS1 by 4x1500 MVA, 765/400 kV ICT with 1x330 MVAR, 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus respectively	765/400 kV	S/s			6000	TBCB	UC	2024-25	Gujarat
	KPS1 - KPS2 765 kV D/C line	765 kV	Line	D/c	40		TBCB	UC	2024-25	Gujarat
	Lakadia PS – Ahmedabad 765 kV D/c line with 240 MVAr switchable line reactors on each circuit at both ends	765 kV	Line	D/c	369		TBCB	UC	2024-25	Gujarat
	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR, 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor	765/400 kV	S/s			4500	TBCB	UC	2024-25	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Pirana (PG) – Pirana (T) 400 kV D/c line at Ahmedabad S/s with twin HTLS along with reconductoring of Pirana (PG) – Pirana (T) line with twin HTLS conductor with minimum capacity of 2100 MVA per circuit at nominal voltage and bay upgradation works at Pirana (PG) and Pirana (T).	400 kV	Line	D/c	88		RTM	UC	2024-25	Gujarat
	Ahemdabad-South Gujrat (New Navsari) 765 kV D/C line along with 240 MVAr Line Reactor on each ckt at each end	765 kV	Line	D/c	580		TBCB	UC	2024-25	Gujarat
WR-13	**Transmission system for evacuation of power from Neemuch SEZ (1000 MW)**									
	Establishment of 2x500 MVA, 400/220 kV Pooling Station at Neemuch with 1x125 MVAr Bus Reactor	400/220 kV	S/s			1000	TBCB	Commissioned	2023-24	Madhya Pradesh
	Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV	Line	D/c	260		TBCB	Commissioned	2023-24	Madhya Pradesh
	Neemuch PS- Mandsaur S/s 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV	Line	D/c	240		TBCB	Commissioned	2023-24	Madhya Pradesh
WR-14	**System Strengthening at Shujalpur on account of operational constraints ('N-1' non-compliance)**									
	1x500 MVA, 400/220 kV ICT augmentation at Shujalpur (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Madhya Pradesh
WR-15	**Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line**									
	Re-conductoring of Kolhapur (PG) – Kolhapur (MSETCL) 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at nominal voltage along with bay upgradation work at Kolhapur (MSETCL)	400 kV	Line	D/c	40		RTM	Commissioned	2023-24	Maharashtra

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
WR-16	**Augmentation by 1x500 MVA, 400/220 kV ICT at Bhatapara (PG)**									
	1x500 MVA, 400/220 kV ICT at Bhatapara (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Chhattisgarh
WR-17	**Scheme to control fault level at Indore S/s**									
	Splitting the 400 kV bus of 765/400/220 kV Indore S/s into two sections (A&B) through 400 kV Bus Sectionalizer bays (GIS) & GIS Bus duct	400 kV	S/s				RTM	UC	2024-25	Madhya Pradesh
WR-18	**Transmission Network Expansion in Gujarat to increase its ATC from ISTS: Part A**									
	Augmentation of transformation capacity at Vadodara 765/400/220 kV S/s by 1x1500 MVA, 765/400 kV ICT (3rd)	765 kV	S/s			1500	RTM	Commissioned	2023-24	Gujarat
WR-19	**Transmission Network Expansion in Gujarat to increase its ATC from ISTS: Part B**									
	Establishment of 2x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV Navsari (New) (South Gujarat) S/s (GIS) with 2x330 MVAr (765 kV) and 1x125 MVAr (420 kV) Bus reactors.	765/400/220 kV	S/s			4500	RTM	UC	2024-25	Gujarat
	Navsari (New) (South Gujarat) (GIS) - Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) with 63 MVAr switchable line reactor on each ckt at Kala (GIS) end	400 kV	Line	D/c	220		RTM	UC	2024-25	Gujarat, Dadra & Nagar Haveli
	Navsari (New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV	Line	D/c	160		RTM	UC	2024-25	Gujarat, Daman & Diu

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Navsari (New) (South Gujarat) (GIS) – Padghe (GIS) 765 kV D/c line with 330 MVAr, 765 kV Switchable line reactor on each ckt at Navsari (New) (South Gujarat) end.	765 kV	Line	D/c	400		RTM	UC	2024-25	Gujarat, Maharashtra
	Augmentation of ICT at Padghe (GIS) 765/400 kV substation by 1x1500 MVA	765/400 kV	S/s			1500	RTM	UC	2024-25	Maharashtra
WR-20	**Transmission Network Expansion in Gujarat to increase its ATC from ISTS: Part C**									
	Banaskantha to Sankhari portion of Banaskantha – Prantij 400 kV D/c line	400 kV	Line	D/c	52		RTM	UC	2024-25	Gujarat
	Augmentation of ICT at Banaskantha 765/400 kV S/s by 1x1500 MVA	765/400 kV	S/s			1500	RTM	UC	2024-25	Gujarat
WR-21	**Transmission Network Expansion in Gujarat associated with integration of RE projects in Khavda potential RE zone**									
	Banaskantha – Ahmedabad 765 kV D/c line with 330 MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end	765 kV	Line	D/c	269		TBCB	UC	2024-25	Gujarat
WR-22	**Western Region Expansion Scheme-XXIV (WRES-XXIV)**									
	Jeypore – Jagdalpur 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) with associated bays at both ends	400 kV	Line	D/c	160		TBCB	UC	2024-25	Chhattisgarh, Orissa
WR-23	**ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region**									
	Narendra (New) – Pune (PG) GIS 765 kV D/c line	765 kV	Line	D/c	680		TBCB	UC	2024-25	Karnataka, Maharashtra

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Upgradation of Narendra (New) (GIS) to its rated voltage of 765 kV level alongwith 4x1500 MVA ICT and 2x330 MVAr Bus Reactor.	765/400 kV	S/s			6000	TBCB	UC	2024-25	Karnataka
WR-24	**Western Region Expansion Scheme-XXV (WRES-XXV)**									
	Augmentation of transformation capacity at Raigarh (Kotra) by 1x1500 MVA, 765/400 kV ICT at Section-A (3rd ICT on Section A) and by 2x1500 MVA, 765/400 kV ICTs at Section-B (3rd & 4th ICTs on Section B)	765/400 kV	S/s			4500	RTM	UC	2024-25	Chhattisgarh
WR-25	**Western Region Expansion Scheme-XXVI (WRES-XXVI)**									
	Creation of 220 kV level (GIS) at 765/400 kV Shikrapur (PGCIL) Substation with 2x500 MVA, 400/220 kV ICTs and 4 Nos. of 220 kV line bays	400/220 kV	S/s			1000	RTM	UC	2024-25	Maharashtra
WR-26	**Western Region Expansion Scheme-XXVII (WRES-XXVII)**									
	Raipur Pool – Dhamtari 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV	Line	D/c	160		TBCB	UC	2024-25	Chhattisgarh
WR-27	**Scheme for fault level control at Dehgam (PG) & Ranchhodpura (GETCO) S/s**									
	Bypassing of Rachhodpura (GETCO) – Dehgam (PG) 400 kV D/c line at Dehgam (PG) S/s and connecting it with Dehgam (PG) – Pirana 400 kV D/c line (one circuit via Nicol) so as to form Ranchhodpura (GETCO) – Pirana (PG) 400 kV D/c line (one circuit via Nicol).	400 kV	Line				RTM	Commissioned	2023-24	Gujarat
WR-28	**Western Region Expansion Scheme-XXVIII (WRES-XXVIII)**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Creation of 220 kV level (GIS) at 765/400 kV Raipur Pool S/s with installation of 2x500 MVA, 400/220 kV ICTs	400/220 kV	S/s			1000	TBCB	UC	2024-25	Chhattisgarh
	2 Nos. 220 kV line bays (GIS) at Raipur Pool S/s for termination of Raipur Pool – Rajnandgaon 220 kV D/c line	220 kV	S/s				TBCB	UC	2024-25	Chhattisgarh
	Augmentation by 1x500 MVA, 400/220 kV ICT at Raipur Pool S/s	400/220 kV	S/s			500	TBCB	UC	2024-25	Chhattisgarh
	6 Nos. 220 kV line bays (GIS) at Raipur Pool S/s for termination of various lines planned by CSPTCL	220 kV	S/s				TBCB	UC	2024-25	Chhattisgarh
	Conversion of 2x240 MVAr Non-switchable line reactors at Raipur PS (associated with Raipur PS – Champa PS 765 kV ckts 1 & 2) into Switchable line reactors along with NGR bypass arrangement	765 kV	S/s				TBCB	UC	2024-25	Chhattisgarh
WR-29	**Western Region Expansion Scheme-XXIX (WRES-XXIX)**									
	Creation of 220 kV level at 765/400 kV Dharamjaigarh S/s with installation of 2x500 MVA, 400/220 kV ICTs	400/220 kV	S/s			1000	TBCB	UC	2024-25	Chhattisgarh
	2 Nos. 220 kV line bays at Dharamjaigarh S/s (for termination of Dharamjaigarh – Chhuri 220 kV D/c line)	220 kV	S/s				TBCB	UC	2024-25	Chhattisgarh
	2 Nos. 220 kV line bays at Dharamjaigarh S/s (for termination of Dharamjaigarh – Dharamjaigarh CSP 220 kV D/c line)	220 kV	S/s				TBCB	UC	2024-25	Chhattisgarh
WR-30	**Augmentation of Transformation capacity at Raigarh (PG) S/s**									
	Augmentation by 1x500 MVA, 400/220 kV ICT (3rd) at Raigarh (PG) S/s	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Chhattisgarh
WR-31	**Western Region Expansion Scheme-XXX (WRES-XXX)**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Bypassing of Parli (PG) – Parli(M) 400 kV D/c line and Parli (PG) – Parli (New) 400 kV D/c (quad) line at Parli (PG) S/s at outskirts of the Parli (PG) S/s so as to form Parli(M) – Parli (New) 400 kV D/c direct line	400 kV	Line				RTM	Commissioned	2023-24	Maharashtra
	Reconductoring of Parli (PG) – Parli(M) 400 kV D/c line section of above line with twin HTLS conductor with minimum capacity of 1940 MVA per circuit at nominal voltage	400 kV	Line	D/c	10		RTM	Commissioned	2023-24	Maharashtra
	400 kV Bay Upgradation work at Parli(M) S/s (Parli(M) S/s has DMT scheme. Current rating of existing bays is 2000A which would be upgraded to 3150A to suit the re-conductoring with Twin HTLS conductor	400 kV	S/s				RTM	Commissioned	2023-24	Maharashtra
WR-32	**Western Region Expansion Scheme XXXI (WRES-XXXI): Part B**									
	Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT (4th)	765/400 kV	S/s			1500		Planned	2026-27	Maharashtra
WR-33	**Western Region Expansion Scheme XXXI (WRES-XXXI): Part C**									
	Augmentation of transformation capacity at Pune (GIS) 765/400 kV substation by 1x1500 MVA ICT (3rd)	765/400 kV	S/s			1500	RTM	UC	2024-25	Maharashtra
WR-34	**Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part A**									
	Creation of 220 kV level at 765/400 kV Jabalpur PS with installation of 2x500 MVA, 400/220 kV ICTs along with 4 Nos. of 220 kV line bays	400/220 kV	S/s			1000	RTM	UC	2024-25	Madhya Pradesh
WR-35	**Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part B**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 765/400 kV, 2x1500MVA ICTs & 400/220 kV, 2x500 MVA ICTs at Karera (near Datiya) along with 1x330 MVAr (765 kV)) & 1x125 MVAr, 420 kV bus reactor	765/400/220 kV	S/s			4000	TBCB	UC	2025-26	Madhya Pradesh
	LILO of Satna-Gwalior 765 kV S/c line at Karera	765 kV	Line	D/c	80		TBCB	UC	2025-26	Madhya Pradesh
	Conversion of 1x240 MVAr, 765 kV Fixed line reactor at Gwalior end to Switchable line reactor (with NGR bypass arrangement) along with implementation of Inter-tripping scheme (for tripping of the switchable shunt reactor at Gwalior end along with the main line breaker)	765 kV	S/s				RTM	UC	2025-26	Madhya Pradesh
	Installation of 1x330 MVAr, switchable line reactor at Karera end of Karera– Satna 765 kV line	765 kV	S/s				TBCB	UC	2025-26	Madhya Pradesh
WR-36	**Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part C**									
	Establishment of Ishanagar (New) S/s with 765/400 kV, 2x1500 MVA ICT and 400/220 kV, 2x500 MVA ICT along with 1x330 MVAr (765 kV) & 1x125 MVAr, 420 kV bus reactor	765/400/220 kV	S/s			4000	TBCB	UC	2025-26	Madhya Pradesh
	LILO of Jabalpur - Orai 765 kV S/c line at Ishanagar 765 kV S/s (New)	765 kV	Line	D/c	80		TBCB	UC	2025-26	Madhya Pradesh
	Conversion of 1x330 MVAr, 765 kV fixed line reactor at Orai end to Switchable line reactor (with NGR bypass arrangement) along with implementation of inter-tripping scheme (for tripping of the switchable shunt reactor at Orai end along with the main line breaker)	765 kV	S/s				RTM	UC	2025-26	Madhya Pradesh
WR-37	**Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part D**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Installation of 1x500 MVA, 400/220 kV ICT (4th) along with 2 Nos. of 220 kV line bays at Satna	400/220 kV	S/s			500	RTM	UC	2024-25	Madhya Pradesh
WR-38	**Transmission scheme for evacuation of power from Dhule 2 GW REZ**									
	Establishment of 4x500 MVA, 400/220 kV Pooling Station near Dhule along with 2x125 MVAr (420 kV) Bus Reactor	400/220 kV	S/s			2000	TBCB	UC	2025-26	Maharashtra
	Dhule PS – Dhule (BDTCL) 400 kV D/c Line	400 kV	Line	D/c	120		TBCB	UC	2025-26	Maharashtra
WR-39	**Western Region Network Expansion scheme in Kallam area of Maharashtra**									
	LILO of both circuits of Parli(M) – Karjat(M)/Lonikand-II (M) 400 kV D/c line at Kallam PS along with 63 MVAR, 420 kV switchable line reactor (with NGR bypassing arrangement) on each ckt at Kallam PS end of Karjat – Kallam 400 kV D/c line	400 kV	Line	D/c	60		TBCB	UC	2026-27	Maharashtra
WR-40	**Transmission system for evacuation of additional 7 GW RE power from Khavda RE park (Phase-III)**									
	Establishment of 765 kV Halvad switching station with 2x330 MVAr, 765 kV bus reactors	765 kV	S/s				TBCB	UC	2025-26	Gujarat
	KPS2- Halvad 765 kV D/c line with 240 MVAr switchable line reactor at both ends	765 kV	Line	D/c	440		TBCB	UC	2025-26	Gujarat
	LILO of Lakadia – Ahmedabad 765 kV D/c line at Halvad	765 kV	Line	D/c	200		TBCB	UC	2025-26	Gujarat
	240 MVAr, 765 kV switchable line reactor on each ckt at Halvad end of Halvad – Ahmedabad 765 kV D/c line	765 kV	S/s				TBCB	UC	2025-26	Gujarat
	Halvad – Vataman 765 kV D/c line with 1x330 MVAr switchable line reactor at Vatman end on each ckt.	765 kV	Line	D/c	258		TBCB	UC	2025-26	Gujarat
	Establishment of 765 kV switching station near Vataman with 2x330 MVAr, 765 kV bus reactor	765 kV	S/s				TBCB	UC	2025-26	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Lakadia – Vadodara 765 kV D/c line at Vataman 765 kV switching station	765 kV	Line	D/c	40		TBCB	UC	2025-26	Gujarat
	Vataman switching station – Navsari (New) 765 kV D/c line with 330 MVAr switchable line reactors on each ckt at Kosamba end.	765 kV	Line	D/c	400		TBCB	UC	2025-26	Gujarat
	Conversion of 330 MVAr, 765 kV switchable line reactor on each ckt at Vadodara end of Lakadia – Vadodara 765 kV D/c line (being LILOed at Vataman) into bus reactors with NGR bypassing arrangement.	765 kV	S/s				RTM	UC	2025-26	Gujarat
	Augmentation of transformation capacity at Navsari (New) by 1x1500 MVA, 765/400 kV ICT (4^{th})	765/400 kV	S/s			1500	RTM	UC	2025-26	Gujarat
WR-41	**Provision of Dynamic Reactive Compcnsation at KPS1 and KPS3**									
	± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS1 400 kV Bus section-1	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
	± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS1 400 kV Bus section-2	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
	± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400 kV Bus section-1	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
WR-42	**Transmission System for evacuation of additional 7 GW of RE power from Khavda RE Park (Phase-IV)**									
	Creation of 765 kV bus section-II at KPS3 (GIS) along with 765 kV Bus Sectionaliser & 1x330 MVAr, 765 kV Bus Reactors on Bus Section-II (Bus section – II shall be created at 765 kV & 400 kV level both with 3x1500 MVA, 765/400 kV ICTs at Bus Section-II)	765/400 kV	S/s			4500	TBCB	Under Bidding	2026-27	Gujarat
	Creation of 400 kV bus section-II at KPS3 (GIS) along with 400 kV Bus Sectionaliser & 1x125 MVAr, 400 kV Bus Reactors on Bus Section-II	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	KPS3 (GIS) – Lakadia 765 kV D/c line along with 330 MVAR switchable line reactors at KPS3 end of KPS3 (GIS) – Lakadia 765 kV D/c line (with NGR bypass arrangement)	765 kV	Line	D/c	370		TBCB	Under Bidding	2026-27	Gujarat
	±300 MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400 kV Bus section-2	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
	KPS1 – Bhuj 765 kV 2nd D/c line	765 kV	Line	D/c	220		TBCB	Under Bidding	2026-27	Gujarat
	Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV GIS S/s at a suitable location South of Olpad (between Olpad and Ichhapore) with 2x330 MVAR, 765 kV & 1x125 MVAR, 420 kV bus reactors	765/400/220 kV	S/s			4000	TBCB	Under Bidding	2026-27	Gujarat
	Vadodara – South Olpad 765 kV D/c line with 240 MVAR switchable line reactors at Vadodara (GIS) end of Vadodara (GIS) – Navsari (New)(GIS) 765 kV D/c line (with NGR bypass arrangement)	765 kV	Line	D/c	240		TBCB	Under Bidding	2026-27	Gujarat
	LILO of Gandhar – Hazira 400 kV D/c line at South Olpad (GIS) using twin HTLS conductor with minimum capacity of 1700 MVA per ckt at nominal voltage	400 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Gujarat
	Ahmedabad – South Olpad (GIS) 765 kV D/c line along with 240 MVAR switchable line reactors on each ckt at Ahmedabad & South Olpad (GIS) end (with NGR bypass arrangement)	765 kV	Line	D/c	500		TBCB	Under Bidding	2026-27	Gujarat
	Establishment of 765/400/220 kV Boisar-II (GIS) S/s (4x1500, 765/400 kV & 2x500 MVA, 400/220 kV ICTs) with 2x330 MVAr, 765kV and 2x125 MVAr, 420 kV bus reactors	765/400/220 kV	S/s			7000	TBCB	Under Bidding	2026-27	Maharashtra
	South Olpad – Boisar-II 765 kV D/c line with 240 MVAR switchable line reactors on each circuit at South Olpad and Boisar-II end (with NGR bypass arrangement)	765 kV	Line	D/c	450		TBCB	Under Bidding	2026-27	Gujarat, Maharashtra

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Navsari (New) – Padghe (PG) 765 kV D/c line at Boisar-II	765 kV	Line	D/c	100		TBCB	Under Bidding	2026-27	Maharashtra
	Boisar-II – Velgaon (MH) 400 kV D/c line	400 kV	Line	D/c	20		TBCB	Under Bidding	2026-27	Maharashtra
	LILO of Babhaleswar – Padghe(M) 400 kV D/c line at Boisar-II using twin HTLS conductor with minimum capacity of 1700 MVA per ckt at nominal voltage and with 80 MVAR switchable line reactors at Bosar-II end of Boisar-II – Babhaleswar 400 kV D/c line (with NGR bypass arrangement)	400 kV	Line	D/c	260		TBCB	Under Bidding	2026-27	Maharashtra
	±200 MVAR STATCOM with 2x125 MVAR MSC, 1x125 MVAR MSR at 400 kV bus section-I of Boisar-II and ±200 MVAR STATCOM with 2x125 MVAR MSC, 1x125 MVAR MSR at 400 kV bus section-II of Boisar-II	400 kV	S/s				TBCB	Under Bidding	2026-27	Maharashtra
	± 300 MVAR STATCOM with 3x125 MVAr MSC, 1x125 MVAr MSR at 400 kV level of Navsari (New)(PG) S/s	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
	Establishment of 765/400/220 kV Pune-III (GIS) S/s (2x1500, 765/400 kV & 3x500 MVA, 400/220 kV ICTs) with 2x330 MVAr 765 kV and 2x125 MVAr 420 kV bus reactors	765/400/220 kV	S/s			4500	TBCB	Under Bidding	2026-27	Maharashtra
	Boisar-II – Pune-III 765 kV D/c line along with 330 MVAR switchable line reactors at Pune-III end of Boisar-II – Pune-III 765 kV D/c line (with NGR bypass arrangement)	765 kV	Line	D/c	400		TBCB	Under Bidding	2026-27	Maharashtra
	LILO of Narendra (New) – Pune (GIS) 765 kV D/c line at Pune-III along with 330 MVAR switchable line reactors at Pune-III end of Narendra (New) – Pune-III (GIS) 765 kV D/c line (with NGR bypass arrangement)	765 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Maharashtra

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Hinjewadi-Koyna 400 kV S/c line at Pune-III(GIS) S/s along with 80 MVAr, 420 kV switchable line Reactors on each ckt at Pune-III (GIS) end of Pune-III(GIS) – Koyna 400 kV line	400 kV	Line	D/c	160		TBCB	Under Bidding	2026-27	Maharashtra
	Augmentation of transformation capacity at KPS1(GIS) by 1x1500 MVA, 765/400 kV ICT (8^{th})	765/400 kV	S/s			1500	RTM	UC	2025-26	Gujarat
	Augmentation of transformation capacity at KPS2 (GIS) by 4x1500 MVA, 765/400 kV ICT (5^{th}, 6^{th}, 7^{th} & 8^{th}) on Bus section-II	765/400 kV	S/s			6000	TBCB	Under Bidding	2026-27	Gujarat
	Augmentation of transformation capacity at KPS3(GIS) by 1x1500 MVA, 765/400 kV ICT (7^{th}) on Bus section-I	765/400 kV	S/s			1500	RTM	UC	2025-26	Gujarat
	Augmentation of transformation capacity at Padghe (PG) (GIS) by 1x1500 MVA, 765/400 kV ICT (4^{th})	765/400 kV	S/s			1500	RTM	UC	2025-26	Maharashtra
WR-43	**Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW)**									
	Establishment of 3x500 MVA, 400/220 kV Pooling Station at Chhatarpur	400/220 kV	S/s			1500	TBCB	Under Bidding	2026-27	Madhya Pradesh
	LILO of Satna - Bina 400 kV D/c line (1^{st}) at Chhatarpur PS	400 kV	Line	D/c	240		TBCB	Under Bidding	2026-27	Madhya Pradesh
WR-44	**Network Expansion Scheme in Navinal (Mundra) area of Gujarat for drawal of power in the area (including 1.5 GW of Green Hydrogen load in Navinal (Mundra) under Phase-I Part A)**									
	Establishment of 4x1500 MVA, 765/400 kV Navinal (Mundra) (GIS) S/s with 2x330 MVAr, 765 kV & 1x125 MVAr, 420 kV bus reactors	765/400 kV	S/s			6000	TBCB	Under Bidding	2026-27	Gujarat
	LILO of Bhuj-II – Lakadia 765 kV D/c line at Navinal (Mundra) (GIS) S/s	765 kV	Line	D/c	280		TBCB	Under Bidding	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Installation of 1x330 MVAr switchable line reactor on each ckt at Navinal end of Lakadia – Navinal 765 kV D/c line (formed after above LILO)	765 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat
WR-45	**Network Expansion scheme in Gujarat for drawl of about 3.6 GW load under Phase-I in Jamnagar area**									
	Establishment of 2x1500 MVA, 765/400 kV Jamnagar (GIS) PS with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 420 kV bus reactor	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Gujarat
	Halvad – Jamnagar 765 kV D/c line along with 330 MVAr switchable line reactors on each ckt at Jamnagar end of Halvad – Jamnagar 765 kV D/c line (with NGR bypass arrangement)	765 kV	Line	D/c	340		TBCB	Under Bidding	2026-27	Gujarat
	LILO of Jam Khambhaliya PS – Lakadia 400 kV D/c (triple snowbird) line at Jamnagar along with 50 MVAr, 420 kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – Lakadia 400kV D/c line (with NGR bypass arrangement)	400 kV	Line	D/c	20		TBCB	Under Bidding	2026-27	Gujarat
	Jamnagar – Jam Khambhaliya 400 kV D/c line	400 kV	Line	D/c	100		TBCB	Under Bidding	2026-27	Gujarat
	LILO of CGPL – Jetpur 400 kV D/c (triple snowbird) line at Jamnagar along with 80 MVAr, 420 kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – CGPL 400 kV D/c line (with NGR bypass arrangement)	400 kV	Line	D/c	260		TBCB	Under Bidding	2026-27	Gujarat
	LILO of both ckts of Kalavad – Bhogat 400 kV D/c line (Twin AL-59) at Jam Khambhaliya PS	400 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Gujarat
	±400 MVAr STATCOM with 3x125 MVAr MSC & 2x125 MVAr MSR at Jamnagar 400 kV Bus section	400 kV	S/s				TBCB	Under Bidding	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
WR-46	**Augmentation of transformation capacity at 765/400 kV Indore S/s in Madhya Pradesh**									
	Augmentation of Transformation capacity at 765/400 kV Indore S/s by 1x1500 MVA ICT (3rd) [terminated on 400 kV Bus section A with Indore & Khandwa 400 kV D/c lines]	765/400 kV	S/s			1500	RTM	UC	2025-26	Madhya Pradesh
WR-47	**Augmentation of transformation capacity at Bhuj-II PS**									
	Augmentation of transformation capacity at Bhuj-II PS (GIS) by 2x500 MVA, 400/220 kV ICT (5th & 6th) (Terminated at New 220 kV Bus Section-II) and by 1x1500 MVA, 765/400 kV ICT (3rd)	765/400/220 kV	S/s			2500	TBCB	Under Bidding	2026-27	Gujarat
WR-48	**Augmentation of transformation capacity at Jam Khambhaliya PS (JKTL)**									
	Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 2x500 MVA, 400/220 kV ICT (5th & 6th) (terminated on New 220 kV bus section-II)	400/220 kV	S/s			1000	TBCB	Under Bidding	2026-27	Gujarat
WR-49	**Augmentation of transformation capacity at 765/400 kV Lakadia S/s (WRSS XXI (A) Transco Ltd) in Gujarat**									
	Creation of 220 kV switchyard at Lakadia 765/400 kV S/s along with 220 kV line bays for RE Interconnection	765 kV	S/s				RTM	UC	2025-26	Gujarat
	Installation of 2x500 MVA, 400/220 kV ICTs (1st & 2nd) at Lakadia PS along with associated ICT bays	765 kV	S/s			1000	RTM	UC	2025-26	Gujarat
WR-50	**Augmentation of transformation capacity at Bachau S/s**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation of transformation capacity at 400/220 kV Bachau S/s by 1x500 MVA (3rd) ICT	400/220 kV	S/s			500	RTM	UC	2025-26	Gujarat
WR-51	**Augmentation of transformation capacity at Magarwada S/s**									
	Augmentation of transformation capacity at 400/220 kV Magarwada S/s by 1x500 MVA (3rd) ICT	400/220 kV	S/s			500	RTM	UC	2025-26	Gujarat
WR-52	**Replacement of Reactor at Jabalpur S/s**									
	Replacement of 63 MVAr Bus reactor with 125 MVAr Bus reactor at 400 kV level of Jabalpur S/s	400 kV	S/s				RTM	UC	2025-26	Madhya Pradesh
WR-53	**Augmentation of transformation capacity at Rajgarh S/s**									
	Augmentation of transformation capacity at 400/220 kV Rajgarh S/s by 1x500 MVA (3rd) ICT	400/220 kV	S/s			500	RTM	UC	2025-26	Madhya Pradesh
WR-54	**Augmentation of transformation capacity at Boisar S/s**									
	Augmentation of transformation capacity at 400/220 kV Boisar S/s by 1x500 MVA (5th) ICT	400/220 kV	S/s			500	RTM	UC	2025-26	Gujarat
WR-55	**Provision of ICT Augmentation & Bus Reactor at Bhuj-II PS**									
	Augmentation of transformation capacity at Bhuj-II PS (GIS) by 3x500 MVA, 400/220 kV ICT (7th, 8th & 9th)	400/220 kV	S/s			1500		Planned	2026-27	Gujarat
	Augmentation of transformation capacity at Bhuj-II PS (GIS) by 1x1500 MVA, 765/400 kV ICT (4th)	765/400 kV	S/s			1500		Planned	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Installation of 1x330 MVAr, 765kV Bus Reactor (2nd)	765 kV	S/s					Planned	2026-27	Gujarat
WR-56	**Transmission System for evacuation of power from Mahan Energen Limited Generating Station in Madhya Pradesh**									
	Mahan (existing bus) – Rewa PS (PG) 400 kV D/c (quad) line	400 kV	Line	D/c	220			Planned	2026-27	Madhya Pradesh
WR-57	**Augmentation of transformation capacity at 765/400 kV Lakadia S/s (WRSS XXI(A) Transco Ltd) in Gujarat – Part B**									
	Installation of 2x500 MVA, 400/220 kV ICTs (3rd & 4th) at Lakadia PS along with associated ICT bays	400/220 kV	S/s			1000		Planned	2026-27	Gujarat
	Augmentation of transformation capacity at Lakadia PS by 4x500 MVA, 400/220 kV ICTs (5th 6th, 7th & 8th) terminated on new 220 kV Bus Section-II	400/220 kV	S/s			2000		Planned	2026-27	Gujarat
	Augmentation of transformation capacity at Lakadia PS by 1x1500 MVA, 765/400 kV ICTs (3rd)	765/400 kV	S/s			1500		Planned	2026-27	Gujarat
	Installation of 1x330 MVAr, 765 kV Bus Reactor (2nd) at Lakadia PS	765 kV	S/s					Planned	2026-27	Gujarat
WR-58	**Transmission System for evacuation of RE power from Raghanesda area of Gujarat – 3 GW under Phase-I**									
	Establishment 3x1500 MVA, 765/400 kV Substation near Raghanesda (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor	765/400 kV	S/s			4500		Planned	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Raghanesda (GIS) – Banaskantha (PG) 765 kV D/c line	765 kV	Line	D/c	190			Planned	2026-27	Gujarat
WR-59	**ICT Augmentation at 765/400/220 kV Mandsaur S/s in MP**									
	Augmentation of transformation capacity at Mandsaur S/s by 1x1500 MVA, 765/400 kV ICT (4^{th})	765/400 kV	S/s			1500		Planned	2026-27	Madhya Pradesh
WR-60	**Transmission Schemes for evacuation of power from 2.5 GW REZ from Morena REZ**									
	Establishment of 6x500 MVA, 400/220 kV Pooling Station along with 1x125 MVAr (420 kV) Bus Reactor near Morena	400/220 kV	S/s			3000		Planned	2026-27	Madhya Pradesh
	Morena PS – South Gwalior (near Datia) 400 kV D/c line with 50 MVAr switchable line reactors on each ckt at Morena PS end	400 kV	Line	D/c	200			Planned	2026-27	Madhya Pradesh
WR-61	**Transmission System for supply of power to Green Hydrogen/Green Ammonia manufacturing hub in Kandla area of Gujarat (Phase-I: 3 GW)**									
	Establishment of 3x1500 MVA, 765/400 kV Kandla S/s along with 1x330 MVAr (765 kV) & 1x125 MVAr (420 kV) Bus reactor	765/400 kV	S/s			4500		Planned	2026-27	Gujarat
	Halvad – Kandla 765 kV D/c line alongwith 330 MVAr line reactor on both circuits at Kandla end	765 kV	Line	D/c	280			Planned	2026-27	Gujarat
WR-62	**Transmission System for supply of power to Green Hydrogen/Green Ammonia manufacturing hub otential in Mundra area of Gujarat under Phase-I: Part B scheme (3 GW at Navinal S/s)**									
	Augmentation of ICTs by 2x1500 MVA at Navinal (Mundra) 765/400 kV GIS S/s	765/400 kV	S/s			3000		Planned	2026-27	Gujarat

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
WR-63	**Transmission System Strengthening Scheme in Bhopal, Madhya Pradesh**									
	400 kV Bhopal – Bhopal (TBCB) D/c line (2nd)	400 kV	Line	D/c	10			Planned	2026-27	Madhya Pradesh
WR-64	**Augmentation of Transformation Capacity at 765/400/220 kV Vadodara (GIS) S/s in Gujarat by 400/220 kV, 1x500 MVA ICT (3rd)**									
	Augmentation of transformation capacity at 400/220 kV Vadodara S/s by 1x500 MVA ICT (3rd)	400/220 kV	S/s			500	RTM	UC	2025-26	Gujarat
WR-65	**Augmentation of Transformation Capacity at Indore (PG) by 400/220 kV, 1x500 MVA ICT**									
	Augmentation of transformation capacity at Indore (PG) by 1x500 MVA ICT	400/220 kV	S/s			500	RTM	Commissioned	2022-23	Madhya Pradesh
SR-1	**Additional inter-regional AC link for import into SR i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link**									
	Establishment of 765/400 kV substation at Warangal (New) with 2x1500 MVA ICT and 2x240 MVAR bus reactors	765/400 kV	S/s			3000	TBCB	Commissioned	2023-24	Telangana
	Warora Pool -Warangal (New) 765 kV DC line with 240 MVAR switchable line reactor on each circuit at both ends	765 kV	Line	D/C	666		TBCB	Commissioned	2023-24	Maharashtra,Telangana
	Warangal (New) –Hyderabad 765 kV DC line with 240 MVAR switchable line reactor on each circuit at Warangal end	765 kV	Line	D/C	270		TBCB	Commissioned	2023-24	Telangana
	Warangal (New) – Warangal (existing) 400 kV (quad) D/C line.	400 kV	Line	D/C	100		TBCB	Commissioned	2023-24	Telangana
	Hyderabad– Kurnool 765 kV D/c line with 240 MVAR switchable line reactor on each circuit at Kurnool end	765 kV	Line	D/C	370		TBCB	Commissioned	2023-24	Telangana, Andhra Pradesh

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Warangal (New) – Chilakaluripeta 765 kV D/C line with 240 MVAr switchable line reactor on each circuit at both ends	765 kV	Line	D/C	478		TBCB	Commissioned	2023-24	Telangana, Andhra Pradesh
SR-2	**Mangalore (UPCL)–Kasargode-Kozhikode 400 kV line**									
	Mangalore (UPCL)–Kasargode 400 kV D/c line	400 kV	Line	D/C	220		TBCB	UC	2025-26	Karnataka, Kerala
	Establishment of 2x500 MVA, 400/220 kV GIS substation at Kasargode	400/220 kV	S/s			1000	TBCB	UC	2025-26	Kerala
SR-3	**Augmentation of Transformation capacity in Southern Region**									
	400/220 kV, 1x500 MVA ICT (3rd) at Kochi (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Kerala
	400/220 kV, 1x500 MVA ICT (3rd) at Hiriyur (PG)	400/220 kV	S/s			500	RTM	Commissioned	2022-23	Karnataka
	400/220 kV, 1x500 MVA ICT (3rd) at Palakkad (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Kerala
	400/220 kV, 1x500 MVA ICT (3rd) at Kolar (PG)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Karnataka
	765/400 kV, 1x1500 MVA ICT (3rd) at Nizamabad (PG)	765/400 kV	S/s			1500	RTM	Commissioned	2023-24	Telangana
	400/220 kV, 1x500 MVA ICT (4th) at Arasur	400/220 kV	S/s			500	RTM	Commissioned	2024-25	Tami Nadu
	400/220 kV, 1x500 MVA ICT (4th) at Hosur	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Tamil Nadu
	400/220 kV, 1x500 MVA ICT (4th) at Mysore	400/220 kV	S/s			500	RTM	UC	2024-25	Karnataka
	400/220 kV, 1x 500 MVA ICT (6th) at Pavagada (Tumkur)	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Karnataka
	765/400 kV, 1x1500 MVA ICT (3rd) at Maheshwaram (PG)	765/400 kV	S/s			1500	RTM	UC	2025-26	Telangana
	400/220 kV, 1x500 MVA ICT (3rd) ICT at Hassan	400/220 kV	S/s			500	RTM	UC	2025-26	Karnataka

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	765/400 kV, 1x1500 MVA ICT (3rd) at Kurnool NEW	765/400 kV	S/s			1500	RTM	UC	2025-26	Andhra Pradesh
	400/220 kV, 1x500 MVA ICT (6th) ICT at Koppal PS	400/220 kV	S/s			500	RTM	UC	2025-26	Karnataka
	400/220 kV, 1x500 MVA ICT (6th) ICT at Gadag PS	400/220 kV	S/s			500	RTM	UC	2025-26	Karnataka
	400/220 kV, 1x500 MVA ICT (6th) ICT at Tuticorin-II	400/220 kV	S/s			500	RTM	UC	2025-26	Tamil Nadu
	400/220 kV, 1x500 MVA ICT (6th) ICT at NP Kunta	400/220 kV	S/s			500	RTM	UC	2025-26	Andhra Pradesh
SR-4	**Transmission scheme for Solar & Wind Energy Zone in Andhra Pradesh (3500 MW), Ananthpuram SEZ (2500 MW) & Kurnool SEZ (1000 MW), AP**									
	Establishment of 400/220 kV, 7x500 MVA Pooling station at suitable border location between Ananthpuram & Kurnool Distt with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			3500	TBCB	UC	2025-26	Andhra Pradesh
	Ananthpuram PS- Kurnool III PS 400 kV (Quad) D/c line	400 kV	Line	D/c	166		TBCB	UC	2025-26	Andhra Pradesh
	Ananthpuram PS- Cuddapah 400 kV (Quad) D/c line with 80 MVar Switchable line reactor in each circuit at Ananthpuram PS end	400 kV	Line	D/c	368		TBCB	UC	2025-26	Andhra Pradesh
SR-5	**Transmission scheme for RE Zone in Koppal, Karnataka (2500 MW)**									
	Establishment of 400/220 kV, 5x500 MVA pooling Substation in Koppal Distt with 2x125 MVAr (420 kV) bus reactors.	400/220 kV	S/s			2500	TBCB	Commissioned	2023-24	Karnataka
	Koppal PS - Narendra (New) 400 kV D/c (Quad) line	400 kV	Line	D/c	250		TBCB	Commissioned	2023-24	Karnataka
SR-6	**Transmission scheme for Wind Energy Zone in Tamil Nadu (2500 MW)**									
	(a) Karur WEZ (1000 MW) Phase-I, Tamil Nadu									
	Establishment of 2x500 MVA, 400/230 kV Karur Pooling Station with 2x125 MVAr (420 kV) bus reactors.	400/220 kV	S/s			1000	TBCB	Commissioned	2023-24	Tamil Nadu

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of Pugalur – Pugalur (HVDC) 400 kV D/c (Quad) line at Karur PS	400 kV	Line	2xD/c	70		TBCB	Commissioned	2023-24	Tamil Nadu
	(b) Karur WEZ (1500 MW) Phase-II, Tamil Nadu									
	Augmentation by 2x500 MVA, 400/230 kV ICT at Karur Pooling Station	400/230 kV	S/s			1000	RTM	UC	2025-26	Tamil Nadu
	Augmentation by 1x500 MVA, 400/230 kV ICT at Karur Pooling Station	400/230 kV	S/s			500		Planned	2026-27	Tamil Nadu
SR-7	**Transmission scheme for Wind Energy Zones in Tamil Nadu (500 MW)**									
	Augmentation of transformation capacity with 400/230 kV, 1x500 MVA ICT at Tirunelveli Pool	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Tamil Nadu
SR-8	**Transmission scheme for Solar Energy Zone in Karnataka (2500 MW) at Gadag SEZ**									
	Phase I									
	Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station with 1x125 MVAr bus reactor	400/220 kV	S/s			1000	TBCB	UC	2024-25	Karnataka
	Gadag PS-Narendra (New) PS 400 kV D/c line	400 kV	Line	D/c	200		TBCB	UC	2024-25	Karnataka
	Phase II									
	400/220 kV, 3x500 MVA ICT augmentation at Gadag Pooling Station	400/220 kV	S/s			1500	TBCB	UC	2024-25	Karnataka
	Gadag PS - Koppal PS 400 kV D/c line	400 kV	Line	D/c	120		TBCB	UC	2024-25	Karnataka
SR-9	**Transmission scheme for RE initegartion at Bidar SEZ (2500 MW)**									
	Establishment of 765/400/220 kV Bidar Pooling Station (3x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV ICTs) with 1x240 MVAr (765 kV) and 1x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			7000	TBCB	UC	2025-26	Karnataka
	Bidar PS - Maheshwaram (PG) 765 kV D/c line with 240 MVAr switchable line reactor on each circuit at both ends.	765 kV	Line	D/c	500		TBCB	UC	2025-26	Karnataka
SR-10	**Additional strengthening schemes**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Re-conductoring of NP Kunta - Kolar 400 kV S/c (Twin Moose) line with high capacity conductor (twin HTLS or Quad Moose)	400 kV	Line	S/c	131		RTM	Commissioned	2023-24	Andhra Pradesh, Karnataka
	Reconductoring of Raichur -Veltoor (Mahabubnagar) 400 kV S/c line with HTLS conductor	400 kV	Line	S/c	74		RTM	UC	2025-26	Karnataka, Telangana
	Re-conductoring of Somanahalli-Bidadi 400 kV D/c line with HTLS condutor	400 kV	Line	D/c	34		RTM	UC	2025-26	Karnataka
	Re-conductoring of Maheshwaram (PG) - Hyderabad 400 kV S/c line with HTLS condutor	400 kV	Line	S/c	56		RTM	UC	2025-26	Telangana
SR-11	**Transmission Scheme for evacuation of power from RE sources in Kurnool Wind Energy Zone (3000 MW)/ Solar Energy Zone (AP) (1500MW) - Part-A & B**									
	Establishment of 765/400/220 kV Kurnool-III Pooling Station with 3x1500 MVA, 765/400 kV & 9x500 MVA, 400/220 kV ICTs and with 1x330 MVAr (765 kV) and 1x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			9000	RTM	UC	2024-25	Andhra Pradesh
	Kurnool–III PS – Kurnool (New) 765 kV D/c Line	765 kV	Line	D/C	200		RTM	UC	2024-25	Andhra Pradesh
	Kurnool- III PS – Maheshwaram (PG) 765 kV D/c line with 240 MVAr switchable line reactor on each circuit at both ends	765 kV	Line	D/C	500		RTM	UC	2024-25	Andhra Pradesh, Telangana
SR-12	**Transmission system strengthening at Kurnool-III PS for integration of additional RE generation projects**									
	Augmentation of transformation capacity by 3x1500 MVA, 765/400 kV ICTs at Kurnool-III PS	765 kV	S/s			4500		Planned	2026-27	Andhra Pradesh
	Kurnool-III PS – Chilakaluripeta 765 kV D/c line with 240 MVAr switchable line reactor on each circuit at both ends	765 kV	Line	D/c	520			Planned	2026-27	Andhra Pradesh
	Augmentation by 1x1500 MVA, 765/400 kV ICT (7th) at Kurnool-II PS	765 kV	S/s			1500		Planned	2026-27	Andhra Pradesh
SR-13	**Transmission Schemes for evacuation of power from Kurnool REZ-I, Andhra Pradesh**									
	Phase-I: Transmission System for integration of Kurnool REZ-I 4.5 GW (2.5 GW Solar, 2 GW Wind)									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 765/400/220 kV Kurnool-IV Pooling Station (4x1500 MVA, 765/400 kV & 4x500 MVA, 400/220 kV ICTs) with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			8000		Planned	2026-27	Andhra Pradesh
	Kurnool-IV – Kurnool-III PS 765 kV D/c line	765 kV	Line	D/c	300			Planned	2026-27	Andhra Pradesh
	±300 MVAR STATCOM at Kurnool-IV with 2x125 MVAr MSR	765 kV	S/s					Planned	2026-27	Andhra Pradesh
	Kurnool-IV – Bidar PS 765 kV D/c line with 240 MVAr SLR on each circuit at both ends	765 kV	Line	D/c	660			Planned	2026-27	Andhra Pradesh, Karnataka
	Augmentation by 1x1500 MVA, 765/400 kV ICT at C'Peta	765 kV	S/s			1500		Planned	2026-27	Andhra Pradesh
	Phase-II: Transmission System for integration of Kurnool REZ-I (3 GW)									
	Augmentation of transformation capacity at Kurnool-IV Pooling Station by 2x1500 MVA, 765/400 kV & 6x500 MVA, 400/220 kV ICTs	765/400 kV	S/s			6000		Planned	2026-27	Andhra Pradesh
	Establishment of 3x1500 MVA, 765/400 kV Veltoor-II Station with 2x330 MVAr (765 kV) bus reactor	765/400 kV	S/s			4500		Planned	2026-27	Telangana
	LILO of Kurnool-IV – Bidar PS 765 kV D/c line at Veltoor-II	765 kV	Line	2xD/c	240			Planned	2026-27	Andhra Pradesh, Karnataka, Telangana
	Veltoor-II– Veltoor (TS) 400 kV D/c (quad) line	400 kV	Line	D/C	120			Planned	2026-27	Telangana
	Veltoor-II– Udandpur 400 kV D/c (quad) line	400 kV	Line	D/C	60			Planned	2026-27	Telangana
	LILO of Vijayawada-Nellore 400 kV D/c line at C'Peta	400 kV	Line	2xD/c	80			Planned	2026-27	Andhra Pradesh
SR-14	**Transmission System for integration of RE at Anantapur REZ**									
	Transmission System for integration of 1.5 GW RE at Anantapur PS									
	Augmentation by 3x500 MVA, 400/220 kV ICTs at Anantapur PS	400/220 kV	S/s			1500		Planned	2026-27	Andhra Pradesh

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Phase I: Transmission System for integration of 4 GW RE at Anantapur REZ									
	Establishment of 765/400/220 kV Anantapur-II Pooling Station near Kurnool, Andhra Pradesh with 4x1500 MVA, 765/400 kV & 4x500 MVA, 400/220 kV ICTs and with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			8000		Planned	2026-27	Andhra Pradesh
	± 300 MVAR STATCOM at Ananthpur-II with 2x125 MVAr MSR	400 kV	S/s					Planned	2026-27	Andhra Pradesh
	Anantapur-II – Cuddapah 765 kV D/c line with 240 MVAr SLR on each circuit at Anantapur-II PS	765 kV	Line	D/c	500			Planned	2026-27	Andhra Pradesh
	Anantapur-II – Davangere 765 kV D/c line with 240 MVAR SLR on each circuit at Anantapur-II end	765 kV	Line	D/c	300			Planned	2026-27	Andhra Pradesh, Karnataka
SR-15	**Transmission System for integration of RE generation at Koppal REZ**									
	Establishment of 765/400/220 kV Pooling Station near Koppal, Karnataka, with 4x1500 MVA, 765/400 kV & 4x500 MVA, 400/220 kV ICTs and with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			8000	TBCB	UC	2025-26	Karnataka
	Koppal-II PS – Narendra (New) 765 kV D/c line with 330 MVAr SLR on each circuit at Koppal-II PS end	765 kV	Line	D/c	250		TBCB	UC	2025-26	Karnataka
	Koppal-II PS – Raichur 765 kV D/c line with 330 MVAr SLR on each circuit at Koppal-II PS end	765 kV	Line	D/c	312		TBCB	UC	2025-26	Karnataka
SR-16	**Transmission System for integration of RE at Gadag REZ**									
	Establishment of 400/220 kV, 2x500 MVA Pooling Station near Gadag (Gadag-II), Karnataka, with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			1000	TBCB	UC	2025-26	Karnataka
	Gadag-II PS – Koppal-II PS 400 kV D/c line	400 kV	Line	D/c	130		TBCB	UC	2025-26	Karnataka
SR-17	**System strengthening at Koppal-II and Gadag-II for integration of RE generation projects**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 3x1500 MVA 765/400 kV ICTs (5th, 6th & 7th) at Koppal-II PS	765 kV	S/s			4500	TBCB	Under Bidding	2026-27	Karnataka
	Augmentation by 5x500 MVA 400/220 kV ICTs (5th, 6th, 7th, 8th & 9th) at Koppal-II PS	400/220 kV	S/s			2500	TBCB	Under Bidding	2026-27	Karnataka
	Augmentation by 7x500 MVA, 400/220 kV ICTs (3rd, 4th, 5th, 6th, 7th, 8th & 9th) at Gadag-II PS	400/220 kV	S/s			3500	TBCB	Under Bidding	2026-27	Karnataka
	Gadag-II PS – Koppal-II PS 400 kV (Quad) D/c line (2^{nd})	400 kV	Line	D/c	90		TBCB	Under Bidding	2026-27	Karnataka
SR-18	**Transmission System for integration of RE generation at Devanagere/Chitragurga REZ**									
	Phase I									
	Establishment of 4x1500 MVA, 765/400 kV & 4x500 MVA, 400/220 kV Pooling Station near Davanagere / Chitradurga with 2x330 MVAr (765 kV) bus reactors at Davanagere/ Chitradurga PS	765/400/220 kV	S/s			8000	TBCB	Under Bidding	2026-27	Karnataka
	LILO of Narendra New – Madhugiri 765 kV D/c line at Davanagere / Chitradurga PS with 240 MVAr SLR at both ends on Narendra New–Davanagere section and 330 MVAr SLR at Davanagere end on Davanagere – Madhugiri section	765 kV	Line	2xD/c	160		TBCB	Under Bidding	2026-27	Karnataka
	Upgradation of Narendra New – Madhugiri 765 kV D/c line (presently charged at 400 kV level) at its rated 765 kV voltage level	765 kV	S/s				TBCB	Under Bidding	2026-27	Karnataka
	Upgradation of Madhugiri [Tumkur (Vasantnarsapura)] to its rated voltage of 765 kV level alongwith 3x1500 MVA, 765/400 kV ICTs and 2x330 MVAr, 765 kV bus reactors	765/400 kV	S/s			4500	TBCB	Under Bidding	2026-27	Karnataka
SR-19	**Transmission System for integration of Bijapur REZ (4.5 GW)**									
	Phase I: Transmission System for integration of Bijapur REZ (2 GW Wind)									
	Establishment of 400/220 kV, 5x500 MVA Pooling Station near Bijapur (Vijayapura), Karnataka, with 2x125 MVAr (420 kV) bus reactors.	400/220 kV	S/s			2500	TBCB	Under Bidding	2026-27	Karnataka

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Bijapur PS – Raichur New 400 kV (Quad ACSR moose) D/c line	400 kV	Line	D/c	300		TBCB	Under Bidding	2026-27	Karnataka
	Phase II: Transmission System for integration of Bijapur REZ (2.5 GW Wind)									
	Augmentation of Bijapur PS by 5x500 MVA, 400/220 kV ICTs	400 kV	S/s			2500		Planned	2026-27	Karnataka
	Bijapur PS – Raichur New 400 kV (Quad ACSR moose) D/c line (2^{nd})	400 kV	Line	D/c	300			Planned	2026-27	Karnataka
SR-20	**Transmission System for integration of RE at Tumkur REZ (1.5 GW Solar)**									
	Establishment of 4x500 MVA, 400/220 kV Pooling Station near Tumkur, Karnataka, with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			2000	TBCB	Under Bidding	2026-27	Karnataka
	Tumkur-II PS – Tumkur (Pavagada) 400 kV (QM equivalent) D/c line	400 kV	Line	D/c	54		TBCB	Under Bidding	2026-27	Karnataka
SR-21	**Transmission System for integration of Bellary REZ (1.5 GW Solar)**									
	Establishment of 4x500 MVA, 400/220 kV Pooling Station near Bellary, Karnataka, with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			2000	TBCB	Under Bidding	2026-27	Karnataka
	Bellary PS – Davanagere / Chitradurga 400kV (Quad ACSR moose) D/c line	400 kV	Line	D/c	200		TBCB	Under Bidding	2026-27	Karnataka
SR-22	**Transmission System under ISTS for evacuation of power from Kudankulam Unit - 3 & 4 (2x1000 MW)**									
	KNPP 3&4 – Tuticorin-II GIS PS 400 kV (quad) D/c line	400 kV	Line	D/c	240		TBCB	Under Bidding	2026-27	Tami Nadu
SR-23	**Transmission system for meeting electricity demand of Green Hydrogen/Green Ammonia manufacturing hub at Kakinada (upto 1500 MW)**									
	Establishment of 2x1500 MVA, 765/400 kV Kakinada (GH) S/s with 2x330 MVAr (765 kV) bus reactors	765/400 kV	S/s			3000		Planned	2026-27	Andhra Pradesh
	LILO of Vemagiri – Srikakulam 765 kV D/c line at Kakinada (GH) S/s	765 kV	Line	2xD/c	200			Planned	2026-27	Andhra Pradesh

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
SR-24	**Transmission system for meeting electricity demand of Green Hydrogen/Green Ammonia manufacturing hub at Tuticorin**									
	Establishment of 2x1500 MVA, 765/400 kV Tuticorin (GH) S/s with 1x240 MVAr (765 kV) bus reactor	765/400 kV	S/s			3000		Planned	2026-27	Tamil Nadu
	Tuticorin Pool – Tuticorin (GH) 765 kV D/c line	765 kV	Line	D/c	100			Planned	2026-27	Tamil Nadu
	Upgradation of Tuticorin PS to its rated voltage of 765 kV alongwith 2x1500 MVA, 765/400 kV ICT and 1x330 MVAr (765 kV) Bus Reactor	765/400 kV	S/s			3000		Planned	2026-27	Tamil Nadu
	Upgradation of Dharmapuri (Salem) to its rated voltage 765 kV alongwith 2x1500 MVA, 765/400 kV ICT and 1x330 MVAr (765 kV) Bus Reactor	765/400 kV	S/s			3000		Planned	2026-27	Tamil Nadu
	Upgradation of Tuticorin PS - Dharmapuri D/c line to its rated voltage 765 kV with 1x330 MVAr line reactor on each circuit at each end	765 kV	Line	D/c				Planned	2026-27	Tamil Nadu
	Upgradation of Dharmapuri - Madhaugiri D/c line to its rated voltage 765 kV with 1x330 MVAr line reactor on each circuit at Dharmapuri end	765 kV	Line	D/c				Planned	2026-27	Tamil Nadu
	For load upto 3000 MW									
	Augmentation by 1x1500 MVA, 765/400 kV ICT at Tuticorin (GH) S/s	765 kV	S/s			1500		Planned	2026-27	Tamil Nadu
ER-1	**ERSS-XVII (Part-B)**									
	Reconductoring of Maithon RB - Maithon 400 kV D/c line	400 kV	Line	D/c	64		RTM	Commissioned	2023-24	West Bengal
ER-2	**Immediate evacuation for North Karanpura (3x660 MW) generation project of NTPC**									
	NKSTPP – Jharkhand Pool 400kV D/c (quad) line	400 kV	Line	D/c	76		TBCB	Commissioned	2023-24	Jharkhand
	NKSTPP – Gaya 400kV D/c (quad) line	400 kV	Line	D/c	185		TBCB	UC	2025-26	Jharkhand, Bihar
ER-3	**ERSS-XXII**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Modification of 132 kV SMT bus scheme to DM bus scheme in GIS and 2 No. additional 132 kV GIS line bays at Malda (400/220/132 kV)	132 kV	S/s				RTM	UC	2025-26	West Bengal
ER-4	**Transmission system for power evacuation from Arun-3 (900 MW) HEP, Nepal of M/s SAPDC - Indian Portion**									
	Sitamarhi (POWERGRID) - Dhalkebar (Nepal) 400 kV D/c (Quad) line (Indian portion)	400 kV	Line	D/c	80		RTM	Commissioned	2023-24	Bihar
ER-5	**ERSS-XXIV**									
	Shifting of 400 kV side of 400/220 kV, 1x315 MVA ICT-l from Durgapur-A section to Durgapur-B section without physical shifting of ICT such that all three ICTs are on same 400 kV bus section	400/220 kV	S/s				RTM	Commissioned	2023-24	West Bengal
ER-6	**ERSS-XXV**									
	400/220 kV, 2x500 MVA ICTs along with associated bays (220 kV bays in GIS and 400 kV bays in AIS) at Banka	400/220 kV	S/s			1000	TBCB	UC	2025-26	Bihar
	Creation of 220 kV GIS bus at Banka (POWERGRID) S/s	220 kV	S/s				TBCB	UC	2025-26	Bihar
	400 kV Bus extension works at Banka (PGCIL) 400/132 kV S/s	400 kV	S/s				TBCB	UC	2025-26	Bihar
ER-7	**ERSS-XXVI**									
	400/220 kV, 500MVA ICT (3rd) at Ranchi New S/s	400/220 kV	S/s			500	RTM	Commissioned	2023-24	Jharkhand
ER-8	**ERSS-XXVII**									
	Installation of 420 kV, 63 MVAr switchable line reactor with 500 Ohm NGR at Kahalagaon (NTPC) end, one each in both circuits of Kahalgaon (NTPC) – Durgapur (POWERGRID) 400 kV D/c line.	400 kV	S/s				RTM	UC	2024-25	Bihar
	1x125 MVAr Bus Reactor at Alipurduar (3rd)	400 kV	S/s				RTM	UC	2023-24	West Bengal
ER-9	**Eastern Region Expansion Scheme-XXVIII (ERES-XXVIII)**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Installation of 420 kV, 1x125 MVAr bus reactor at Biharsharif (POWERGRID) S/s in the bus section having 1x80 MVAr existing bus reactor.	400 kV	S/s				RTM	UC	2023-24	Bihar
ER-10	**Eastern Region Expansion Scheme-XXIX- (ERES-XXIX)**									
	Reconductoring of Jharsuguda/Sundargarh (POWERGRID) – Rourkela (PG) 400 kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1228A at nominal voltage).	400 kV	Line	D/c	572		RTM	UC	2025-26	Odisha
ER-11	**Eastern Region Expansion Scheme-XXX- (ERES-XXX)**									
	Installation of existing spare 132/66 kV, 1x50 MVA ICT (already stationed at Gangtok) as 3rd ICT at Gangtok (POWERGRID) S/s along with conversion of existing 132 kV TBC bay as 132 kV ICT bay for 3rd ICT and construction of new 66 kV ICT bay in Hybrid/Outdoor GIS with suitable modification in the gantry structure of 66 kV side.	132 kV	S/s			50	RTM	UC	2024-25	Sikkim
	Construction of new 132 kV TBC bay in Hybrid/Outdoor GIS.	132 kV	S/s				RTM	UC	2024-25	Sikkim
ER-12	**Eastern Region Expansion Scheme-XXXI- (ERES-XXXI)**									
	Installation of new 420 kV, 1x125 MVAr bus reactor along with associated bay at Jamshedpur (POWERGRID) S/s	400 kV	S/s				RTM	UC	2024-25	Jharkhand
	Installation of new 420 kV, 1x63 MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400 kV line along with new 500 ohm NGR (with NGR bypass arrangement)	400 kV	S/s				RTM	UC	2024-25	West Bengal
ER-13	**Eastern Region Expansion Scheme-XXXIII- (ERES-XXXIII)**									
	Reconductoring of Rangpo-Gangtok 132 kV D/c line and associated works	132 kV	Line	D/c	50		RTM	UC	2024-25	Sikkim

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
ER-14	**Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV): for supply of power to Green Hydrogen/Green Ammonia manufacturing hub at Paradeep**									
	Phase I: 1500 MW load									
	Establishment of 2x1500 MVA, 765/400 kV Paradeep GIS substation with 2x330 MVAr (765 kV) and 2x125 MVAr (420 kV) bus reactors.	765/400 kV	S/s			3000	TBCB	Under Bidding	2026-27	Odisha
	Angul (POWERGRID) – Paradeep 765 kV D/c line along with 1x330 MVAr (765 kV) switchable line reactor with 500ohm NGR (with NGR bypass arrangement) at Paradeep end in both circuits	765 kV	Line	D/c	380		TBCB	Under Bidding	2026-27	Odisha
	Paradeep–Paradeep (OPTCL) 400 kV D/c (Quad) line	400 kV	Line	D/c	20		TBCB	Under Bidding	2026-27	Odisha
ER-15	**Eastern Region Expansion Scheme-XXXVII (ERES-XXXVII)**									
	Creation of 220 kV level in GIS at Lakhisarai (POWERGRID) 400/132 kV S/s along with 2 no. 220 kV line bays [for termination of Lakhisarai – Haveli Kharagpur 220 kV D/c line to be implemented by BSPTCL under intra-state]	220 kV	S/s				RTM	UC	2025-26	Bihar
	Installation of 400/220 kV, 2x500 MVA ICTs along with associated bays at Lakhisarai (POWERGRID) 400/132 kV S/s	400/220 kV	S/s			1000	RTM	UC	2025-26	Bihar
ER-16	**Eastern Region Expansion Scheme-XXXIX (ERES-XXXIX): for supply of power to Green Hydrogen/Green Ammonia manufacturing hub at Gopalpur**									
	Phase I: 1500 MW load									
	Establishment of 2x1500 MVA, 765/400 kV GIS substation at Gopalpur in Odisha with 2x330 MVAr (765 kV) and 2x125 MVAr (420 kV) bus reactors.	765/400 kV	S/s			3000	TBCB	UC	2026-27	Odisha
	Angul – Gopalpur 765 kV D/c line	765 kV	Line	D/c	410		TBCB	UC	2026-27	Odisha
	Extension at 765 kV level at Angul (POWERGRID) S/s including bus extension in GIS	400 kV	S/s				TBCB	UC	2026-27	Odisha
	Gopalpur – Gopalpur (OPTCL) 400 kV D/c (Quad) line	400 kV	Line	D/c	60		TBCB	UC	2026-27	Odisha

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Extension at 400 kV level at Gopalpur (OPTCL) GIS S/s	400 kV	S/s							Odisha
ER-17	**Eastern Region Expansion Scheme-XXXII (ERES-XXXII)**									
	Installation of new 420 kV, 1x125 MVAr bus reactor along with associated bay at Durgapur (POWERGRID) S/s in split bus section-A	400 kV	S/s				RTM	UC	2024-25	West Bengal
ER-18	**Eastern Region Expansion Scheme-XXXVI (ERES-XXXVI)**									
	Installation of new 220/132 kV, 1x200 MVA (4th) ICT at Ara (POWERGRID) S/s with associated works	220/132 kV	S/s			200	RTM	UC	2024-25	Bihar
ER-19	**Eastern Region Expansion Scheme-XXXVIII (ERES-XXXVIII)**									
	Installation of 420 kV, 1x80 MVAr switchable line reactor, one each in both circuits of Raghunathpur (DVC) – Ranchi-New (POWERGRID) 400 kV D/c (Quad) line [formed after bypassing of Ranchi (POWERGRID) – Raghunathpur (DVC) and Ranchi (POWERGRID) – Ranchi-New (POWERGRID) ckt-3 & ckt-4, 400 kV D/c (Quad) lines at Ranchi (POWERGRID) through tie circuit breaker in diameters 431-432-433 and 434-435-436] at Ranchi-New (POWERGRID) end along 400 ohm NGR (including NGR bypass scheme)	400 kV	S/s				RTM	UC	2025-26	Jharkhand, West Bengal
ER-20	**Eastern Region Expansion Scheme-XL (ERES-XL)**									
	Decommissioning of existing 1x63 MVAr line reactor (along with associated 542 ohm NGR) at Malda end installed in each circuit of Purnea – Malda 400 kV D/c line, and installation of new 1x63 MVAr switchable line reactor [along with 450 ohm NGR (including NGR bypassing scheme)] in each circuit of Purnea – Malda 400 kV D/c line upon decommissioning of line reactors.	400 kV	S/s				RTM	UC		West Bengal
ER-21	**Eastern Region Expansion Scheme-41 (ERES-41)**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Installation of 400/220 kV, 1x500 MVA (3rd) ICT at Rajarhat GIS (POWERGRID) 400 kV S/s	400/220 kV	S/s			500	RTM	UC	2025-26	West Bengal
ER-22	**Eastern Region Expansion Scheme-XXXV(ERES-XXXV)**									
	Switching arrangement within the Rangpo (POWERGRID) GIS S/s premises such that Rangpo-Melli and Rangpo-Rangit 132 kV S/c lines can be bypassed at Rangpo S/s end, such that the lines can either be terminated at Rangpo 132 kV bus or bypassed, as per operational requirement.	132 kV	S/s				RTM	UC	2024-25	Sikkim
ER-23	**Eastern Region Bay Scheme-I (ERBS-I)**									
	Extension at Pandiabili 400/220 kV GIS substation (400 kV GIS line bays: 2 Nos., 400 kV GIB: 600m approx.)	400/220 kV	S/s				RTM	UC	2026-27	Odisha
ER-24	**Eastern Region Bay Scheme-I (ERBS-II)**									
	Extension at Rangpo 400/220/132 kV GIS substation (132 kV GIS Line bays: 2 Nos, 145 kV GIB: 150 m approx.)	400/220 kV	S/s				RTM	UC	2026-27	Sikkim
ER-25	**ICT augmentation at Muzaffarpur substation**									
	400/220 kV, 500 MVA ICT augmentation at Muzaffarpur substation	400/220 kV	S/s			500	RTM	Commissioned	2022-23	Bihar
ER-26	**ICT augmentation at Farakka substation**									
	400/220 kV, 500 MVA ICT augmentation at Farakka substation	400/220 kV	S/s			315	RTM	Commissioned	2022-23	West Bengal
NER-1	**NER System Strengthening-III**									
	Replacement of existing 60 MVA, 220/132 kV ICT by 1x160 MVA, 220/132 kV ICT at Kopili HEP	220/132 kV	S/s			160	RTM	UC	2024-25	Assam
NER-2	**North East - Northern / Western Interconnector - I (Part-C)**									
	Lower Subansiri – Biswanath Chariyali 400 kV, 2 x D/c (Twin Lapwing) line: Matching with Lower Subansiri (2000 MW) HEP	400 kV	Line	D/c	730		RTM	Commissioned	2023-24	Arunanchal Pradesh, Assam
NER-3	**NER System Strengthening-IX**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Pare HEP – North Lakhimpur (AEGCL) 132 kV D/c line (with ACSR Zebra conductor)	132 kV	Line	D/c	110		TBCB	Commissioned	2023-24	Arunanchal Pradesh, Assam
	LILO of one circuit of Pare HEP – North Lakhimpur (AEGCL) 132 kV D/c line at Nirjuli	132 kV	Line	D/c	10		TBCB	Commissioned	2023-24	Arunanchal Pradesh
	Reconductoring of LILO portion at Pare end (of Ranganadi – Naharlagun / Nirjuli 132 kV S/c line) with HTLS (HTLS equivalent to ACSR Zebra) along with modification of 132 kV bay equipments at Pare HEP.	132 kV	Line	D/c	20		TBCB	Commissioned	2023-24	Arunanchal Pradesh
NER-4	**NER System Strengthening-X**									
	Roing (POWERGRID) – Chapakhowa (Assam) 132 kV D/c line	132 kV	Line	D/c	67		RTM	Commissioned	2023-24	Arunanchal Pradesh, Assam
NER-5	**NER System Strengthening-XI**									
	Installation of 400 kV, 2x63 MVAr switchable line reactors, one in each circuit of Silchar (POWERGRID) – Imphal (POWERGRID) 400 kV D/c line at Imphal end	400 kV	S/s				RTM	Commissioned	2023-24	Assam, Manipur
	Installation of 3rd ICT of 220/132 kV, 1x100 MVA at Salakati alongwith associated bays at both levels	220/132 kV	S/s			100	RTM	Commissioned	2023-24	Assam
NER-6	**NER System Strengthening-XII**									
	Reconductoring of Siliguri-Bongaigaon 400 kV D/C line (with high capacity conductor)	400 kV	Line	D/c	432		RTM	Commissioned	2023-24	Assam
	Reconductoring of Alipurduar-Salakati 220 kV D/C line (with high capacity conductor)	220 kV	Line	D/c	200		RTM	Commissioned	2023-24	Assam
	220 kV D/C BPTS-Salakati line (Single ACSR Zebra)	220 kV	Line	D/c	5.4		RTM	Commissioned	2023-24	Assam
	132 kV S/C Dimapur-Imphal line (Single ACSR Panther)	132 kV	Line	S/c	168		RTM	Commissioned	2023-24	Nagaland, Manipur
	132 kV S/C Loktak-Jiribam line (Single ACSR Panther)	132 kV	Line	S/c	82		RTM	Commissioned	2023-24	Manipur
NER-7	**NERSS-XIII**									

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Conversion of 132 kV level of 400/132 kV Imphal S/s to Double Main Transfer Bus Scheme preferably with Bus Sectionalisation on AIS depending on layout or alternatively on GIS/ Hybrid GIS if layout does not permit AIS Bus sectionalisation	132 kV	S/s				RTM	UC	2024-25	Manipur
	Conversion of 132 kV level of 132/33 kV Nirjuli S/s to Double Main Transfer Bus Scheme preferably with Bus Sectionalisation on AIS depending on layout or alternatively on GIS/ Hybrid GIS if layout does not permit AIS Bus sectionalisation	132 kV	S/s				RTM	Commissioned	2023-24	Arunanchal Pradesh
NER-8	**NERSS-XIV**									
	LILO of Palatana – Surajmaninagar (ISTS) 400 kV D/c line at 400/132 kV Surajmaninagar (TSECL) S/s – in matching timeframe of upgradation of 400/132 kV Surajmaninagar (TSECL) substation	400 kV	Line	D/c	12		RTM	Commissioned	2023-24	Tripura
NER-9	**NER System Strengthening-XV**									
	Upgradation of existing 132 kV Namsai (POWERGRID) S/s to 220 kV (with 220 kV side as GIS) with 2x160 MVA ICTs and 1x50 MVAr bus reactor	220/132 kV	S/s			320	TBCB	UC	2025-26	Arunanchal Pradesh
	Kathalguri (NEEPCO) – Namsai (POWERGRID) 220 kV D/c line	220 kV	Line	D/c	150		TBCB	UC	2025-26	Assam, Arunanchal Pradesh
NER-10	**Establishment of new 220/132 kV substation at Nangalbibra**									
	Establishment of new 220/132 kV, 2x160 MVA substation at Nangalbibra with 2x31.5 MVAr bus reactors	220/132 kV	S/s			320	TBCB	UC	2024-25	Meghalaya
	Bongaigaon (POWERGRID) – Nangalbibra 400 kV D/c line (initially operated at 220 kV)	400 kV	Line	D/c	280		TBCB	UC	2024-25	Assam, Meghalaya
	Hatsinghmari (Assam) – Ampati (Meghalaya) 132 kV D/c line	132 kV	Line	D/c	60		TBCB	UC	2024-25	Assam, Meghalaya
NER-11	**NERES-XVI**									
	Gogamukh - Gerukamukh 132 kV D/c line	132 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Assam

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	LILO of one D/c (ckt-1 & ckt-2 of line-1) of Lower Subansiri – Biswanath Chariali 400 kV (Twin Lapwing) 2xD/c lines at Gogamukh S/s	400 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Assam
	2x500 MVA, 400/220 kV ICTs at Gogamukh with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			1000	TBCB	Under Bidding	2026-27	Assam
	2x200 MVA, 220/132 kV ICTs at Gogamukh	220/132 kV	S/s			400	TBCB	Under Bidding	2026-27	Assam
NER-12	**North Eastern Region Expansion Scheme-XVII (NERES-XVII)**									
	Upgradation of 33 kV system of 400/132/33 kV Imphal (POWERGRID) S/s to handle 20 MW per feeder	33 kV	S/s				RTM	UC	2024-25	Manipur
NER-13	**North Eastern Region Expansion Scheme-XVIII (NERES-XVIII)**									
	Reconductoring of Melriat (POWERGRID) – Zuangtui (Mizoram) 132 kV ACSR Panther S/c line with Single HTLS rating of HTLS conductor of 900A (at nominal voltage level) along with new one (1) 132kV line bay at Melriat (POWERGRID) S/s (of rating commensurate with rating of HTLS) for termination of this HTLS line	132 kV	Line	S/c	10		RTM	UC	2025-26	Mizoram
	Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132 kV ACSR Panther S/c line with Single HTLS conductor of rating 800 A (at nominal voltage level) along with upgradation of line bay equipment at Aizawl (POWERGRID) end commensurate with rating of HTLS, as required	132 kV	Line	S/c	0.8		RTM	UC	2025-26	Mizoram
NER-14	**North Eastern Region Expansion Scheme-XIX (NERES-XIX)**									
	Reconductoring of Loktak (NHPC) – Imphal (POWERGRID) 132 kV S/c line with HTLS conductor (with Ampacity of single HTLS as 800 A at nominal voltage) along with strengthening of associated structure in NHPC switchyard, if necessary	132 kV	Line	S/c	35		RTM	UC	2025-26	Mizoram

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NER-15	**North Eastern Region Generation Scheme-I (NERGS-I)**									
	Establishment of new 400 kV switching station (to be upgraded to 400/220 kV level in future) at Bokajan in Assam	400 kV	S/s				TBCB	Under Bidding	2026-27	Assam
	LILO of both circuits of Misa (POWERGRID) – New Mariani (POWERGRID) 400 kV D/c line at Bokajan	400 kV	Line	D/c	40		TBCB	Under Bidding	2026-27	Assam
NER-16	**North Eastern Region Expansion Scheme-XXI (NERES-XXI)**									
	Upgradation of Single Main and Transfer Bus to Double Bus arrangement with GIS at 132 kV Khliehriat (POWERGRID) switching station	132 kV	S/s				RTM	UC	2025-26	Meghalaya
	Upgradation of Single Main and Transfer Bus to Double Bus arrangement with Green GIS at 132 kV Badarpur (POWERGRID) switching station	132 kV	S/s					Planned	2025-26	Assam
NER-17	**North Eastern Region Expansion Scheme-XXII (NERES-XXII)**									
	Installation of 1x125 MVAr (420 kV) bus reactor at Bongaigaon (POWERGRID) S/s after decommissioning of 2x50 MVAr bus reactors	400 kV	S/s				RTM	UC	2025-26	Assam
	One of the existing 2x80 MVAr bus reactors (presently installed in parallel in same bay) may be installed at Bongaigaon (POWERGRID) S/s in other vacated bay after decommissioning of 2x50 MVAr bus reactors	400 kV	S/s				RTM	UC	2025-26	Assam
NER-18	**North Eastern Region Expansion SchemeXXIV (NERES-XXIV)**									
	Reconductoring of Khandong (NEEPCO) – Halflong (POWERGRID) 132 kV S/c line [excluding the LILO portion of this line at Umrangshu (AEGCL) S/s, which is owned by AEGCL] with Single HTLS conductor of ampacity 600 A (at nominal voltage level)	132 kV	Line	S/c	63		RTM	UC	2025-26	Assam

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Reconductoring of Halflong (POWERGRID) – Jiribam (POWERGRID) 132 kV S/c line with Single HTLS conductor of ampacity 600 A (at nominal voltage level)	132 kV	Line	S/c	100		RTM	UC	2025-26	Assam
NER-19	**North Eastern Region Expansion Scheme-XXIII (NERES-XXIII)**									
	Stringing of 2nd circuit of Pasighat (Arunachal Pradesh) – Roing (POWERGRID) 132 kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit	132 kV	Line	S/c	103		RTM	UC	2026-27	Arunachal Pradesh
	Stringing of 2nd circuit of Roing (POWERGRID) – Tezu (POWERGRID) 132 kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit	132 kV	Line	S/c	73		RTM	UC	2026-27	Arunachal Pradesh
	Stringing of 2nd circuit of Tezu (POWERGRID) – Namsai (POWERGRID) 132 kV S/c on D/c line with ACSR Panther conductor commensurate with rating and maximum operating temperature of 1st circuit	132 kV	Line	S/c	95		RTM	UC	2026-27	Arunachal Pradesh
NER-20	**North Eastern Region Expansion Scheme-XXVI**									
	Decommissioning of existing 420 kV, 50 MVAr (bus reactor-1) and installation of new 420 kV, 125 MVAr bus reactor in its place along with replacement of associated main and tie bay equipment at Balipara (POWERGRID) S/s	400 kV	S/s				RTM	UC	2025-26	Assam
NER-21	**North Eastern Region Expansion Scheme-XXVII (NERES-XXVII)**									
	Reconductoring of ISTS portion of Dimapur (POWERGRID) – Dimapur (DoP, Nagaland) 132 kV (ckt-2) ACSR Panther S/c line with Single HTLS conductor of 800 A rating (at nominal voltage)	132 kV	Line		0.34		RTM	UC	2025-26	Nagaland
	Reconductoring of ISTS portion of Dimapur (POWERGRID) – Kohima (DoP, Nagaland) 132 kV ACSR	132 kV	Line		0.34		RTM	UC	2025-26	Nagaland

Sl. No.	Transmission Scheme /details	Voltage (kV)	Type of Work	No. of Circuits	ckm	MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Panther S/c line with Single HTLS conductor of 800 A rating (at nominal voltage)									
NER-22	**North Eastern Region Expansion Scheme-XXVIII (NERES-XXVIII)**									
	Installation of new 420 kV, 1x125 MVAr bus reactor along with associated GIS bay at Misa (POWERGRID) S/s	400 kV	S/s				RTM	UC	2025-26	Assam
NER-23	**North Eastern Region Expansion Scheme-XXIX (NERES-XXIX)**									
	Installation of new 1x31.5 MVA, 132/33 kV (3rd) ICT at Namsai (POWERGRID) S/s along with associated bays.	132/33 kV	S/s			31.5		Planned	2026-27	Arunachal Pradesh
	Installation of new 420 kV, 125 MVAr Bus Reactor at Biswanath Chariali (POWERGRID) S/s along with associated bays.	400 kV	S/s					Planned	2026-27	Assam

Annex – 7.2

Summary of Intra State Transmission system planned for the period 2022-27 (220 kV & above)

State/UT	Transmission lines (ckm)	Transformation Capacity (MVA)	Likely Investment (Rs. Cr)
Delhi	254	13995	3098
Haryana	1934	14805	4767
Himachal Pradesh	393	2521	1041
Jammu & Kashmir	1054	3590	1745
Ladakh	267	100	550
Punjab	656	8725	2364
Uttar Pradesh	9858	50205	22386
Uttarakhand	294	2660	1089
Rajasthan	3932	21720	14537
Maharashtra	6705	31950	19959
Gujarat	10449	37445	22859
Madhya Pradesh	2923	10525	5900
Chhattisgarh	1497	5090	2615
Goa	40	581	169
DNH & DD	0	0	0
Tamil Nadu	4940	32857	16993
Karnataka	702	14800	2938
Andhra Pradesh	4005	13040	8176
Kerala	1303	4093	2373
Telangana	3011	16108	8119
Bihar	1539	2200	1905
West Bengal	3296	7120	5080
Jharkhand	708	2475	1708

State/UT	Transmission lines (ckm)	Transformation Capacity (MVA)	Likely Investment (Rs. Cr)
Odisha	2143	5000	3750
Arunachal Pradesh	0	0	0
Assam	725	2780	1102
Meghalaya	659	320	551
Nagaland	214	400	300
Manipur	0	0	0
Tripura	0	0	0
Mizoram	0	0	0
Sikkim	0	0	0
Total (Intra-state)	**63,502**	**3,05,105**	**1,56,072**

Summary of Intra State Transmission system planned for the period 2022-27 (132 kV) in North Eastern Region

State	ckm	MVA
Arunachal Pradesh	824	641
Assam	1286	2264
Meghalaya	211	475
Nagaland	193	413
Manipur	102	0
Tripura	545	163
Mizoram	442	406
Total	**3603**	**4362**

Intra State Transmission system planned for the period 2022-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Delhi								
(A)	**New sub-stations / ICT augmentation**								
1	Dev Nagar 220 kV GIS S/s (Central Delhi)	Delhi	220/33 kV	S/s			400	Commissioned	2022-23
2	Timarpur 220 kV GIS S/s (Central Delhi)	Delhi	220/33 kV	S/s			300	Commissioned	2023-24
3	Budella 220 kV GIS S/s (Central West Delhi)	Delhi	220/66 kV	S/s			480	Planned	2025-26
4	Sarojini Nagar 220 kV GIS S/s (Central Delhi)	Delhi	220/33 kV	S/s			300	Planned	2025-26
5	ICT augmentation at BTPS 220 kV S/s	Delhi	220/66 kV	S/s			480	Planned	2025-26
6	ICT augmentation at Dwarka 220 kV S/s	Delhi	220/66kV	S/s			480	Planned	2025-26
7	ICT augmentation at Mundka (Tikri Kalan) S/s	Delhi	400/220 kV	S/s			1005	Planned	2025-26
8	ICT augmentation at Bamnauli S/s (Hot Reserve)	Delhi	400/220 kV	S/s			500	Planned	2025-26
9	2x315 MVA ICT replacement with 2x500 MVA at Bawana S/s	Delhi	400/220 kV	S/s			370	Planned	2025-26
10	Installation of new 220/33 kV, 100 MVA ICT at Shalimar Bagh S/s	Delhi	220/33 kV	S/s			100	Planned	2025-26
11	Installation of new 220/66 kV, 160 MVA ICT at Mundka S/s (Tikri Kalan) (Hot reserve)	Delhi	220/66 kV	S/s			160	Planned	2025-26
12	Installation of new 220/66 kV, 160 MVA ICT at Mehrauli S/s (Hot reserve)	Delhi	220/66 kV	S/s			160	Planned	2025-26
13	Installation of new 220/33 kV, 100 MVA ICT at Okhla S/s (Hot reserve)	Delhi	220/33 kV	S/s			100	Planned	2025-26
14	Installation of new 220/66 kV, 160 MVA ICT at PPK-I (Hot reserve)	Delhi	220/66 kV	S/s			160	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
15	Installation of new 220/66 kV, 160 MVA ICT at PPK-III S/s	Delhi	220/66 kV	S/s			160	Planned	2025-26
16	Installation of new 220/33 kV, 100 MVA ICT at Geeta colony S/s	Delhi	220/33 kV	S/s			100	Planned	2025-26
17	Installation of new 220/33 kV, 100 MVA ICT at AIIMS with associated GIS Bays	Delhi	220/33 kV	S/s			100	Planned	2025-26
18	100 MVA ICT to 160 MVA ICT capacity augmentation at Narela S/s	Delhi	220/66 kV	S/s			60	Planned	2025-26
19	02 Nos. 100 MVA ICT to 160 MVA ICT capacity augmentation at Shalimar Bagh S/s	Delhi	220/66 kV	S/s			120	Planned	2025-26
20	02 Nos. 100 MVA ICT to 160 MVA ICT capacity augmentation at Mehrauli S/s	Delhi	220/66 kV	S/s			120	Planned	2025-26
21	02 Nos. 100 MVA ICT to 160 MVA ICT capacity augmentation at Park Street S/s	Delhi	220/66 kV	S/s			120	Planned	2025-26
22	02 Nos. 100 MVA ICT to 160 MVA ICT capacity augmentation at Rohini-I S/s	Delhi	220/66 kV	S/s			120	Planned	2025-26
23	Gopalpur 400 kV GIS S/s (Central Delhi)	Delhi	400/220 kV	S/s			2000	Planned	2026-27
24	Tikri Khurd 400 kV GIS S/s (North Delhi)	Delhi	400/220/66 kV	S/s			1980	Planned	2026-27
25	Maharanibagh 220 kV (South Delhi)	Delhi	220/66/33 kV	S/s			620	Planned	2026-27
26	Bharthal 220 kV GIS S/s (West Delhi)	Delhi	220/66 kV	S/s			480	Planned	2026-27
27	Mangol Puri 220 kV GIS S/s	Delhi	220/66/33 kV	S/s			780	Planned	2026-27
28	Punjabi Bagh 220 kV GIS S/s(Vishal) (Central -West Delhi)	Delhi	220/66 kV	S/s			300	Planned	2026-27
29	Nehru Place 220 kV GIS S/s (South Delhi)	Delhi	220/33 kV	S/s			300	Planned	2026-27
30	Dilshad Garden 220 kV GIS S/s (East Delhi)	Delhi	220/66 kV	S/s			480	Planned	2026-27
31	Seelam Pur/Rathi Mill/Dwarka Puri 220 kV GIS S/s (East Delhi)	Delhi	220/33 kV	S/s			300	Planned	2026-27
32	Maidan Garhi 220 kV GIS S/s (South Delhi)	Delhi	220/66 kV	S/s			480	Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
33	Installation of new 160 MVA ICT at 220/66 kV SGTN	Delhi	220/66 kV	S/s			160	Planned	2026-27
34	Installation of new 160 MVA ICT at 220/66 kV Rohini-II S/s	Delhi	220/66 kV	S/s			160	Planned	2026-27
35	100 MVA ICT to 160 MVA ICT capacity augmentation at Wazirabad S/s	Delhi	220/66 kV	S/s			60	Planned	2026-27
(B)	**Transmission Lines**								
1	Dwarka S/s - PPK-II S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	11.0		Commissioned	2022-23
2	Tughlakabad S/s - Masjid Moth S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	14.0		Commissioned	2022-23
3	Tuglakabad S/s - R.K Puram S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	27.0		Commissioned	2022-23
4	Lodhi Road S/s - Park Street S/s - Electric Lane S/s -Lodhi Road S/s 220 kV S/c line	Delhi	220 kV	Line	S/c	18.0		Under Construction	2024-25
5	LILO of Electric Lane S/s -Park Street S/s 220 kV S/c line at Dev Nagar S/s	Delhi	220 kV	Line	D/c	10.0		Under Construction	2024-25
6	Kashmirigate S/s – Timarpur S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	10.0		Under Construction	2024-25
8	IP to New Rajghat GIS Substation 220kV D/C U/G Cable	Delhi	220 kV	Line	D/c	2.0		Planned	2024-25
9	Kashmere Gate S/s to New Rajghat GIS S/s 220 kV D/C U/G Cable	Delhi	220 kV	Line	2xD/c	5.0		Planned	2025-26
10	Dev Nagar S/s - Subzi Mandi S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	10.0		Planned	2025-26
11	Ridge Valley S/s – Naraina S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	9.0		Planned	2025-26
12	LILO of both circuits AIIMS - R.K. Puram S/s 220 kV D/c line (underground cable) at Sarojini Nagar	Delhi	220 kV	Line	2xD/c	6.0		Planned	2025-26
13	Punjabi Bagh (Vishal) S/s - Dev Nagar S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	20.0		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
14	LILO of Bawana S/s – Maharanibagh S/s 400 kV D/c line at Gopalpur	Delhi	400 kV	Line	2xD/c	14.0		Planned	2026-27
15	LILO of Bawana S/s -Maharanibagh S/s 400 kV D/c line at Tikri Khurd	Delhi	400 kV	Line	2xD/c	1.0		Planned	2026-27
16	LILO of both circuits of Bamnauli S/s - DIAL S/s 220 kV D/c line at Bharthal	Delhi	220 kV	Line	2xD/c	0.8		Planned	2026-27
17	Tikri Kalan S/s - Mangol Puri S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	26.0		Planned	2026-27
18	LILO of both circuits of Peera Garhi S/s - Wazir Pur S/s 220 kV D/c line (underground cable) at Mangol Puri	Delhi	220 kV	Line	2xD/c	6.0		Planned	2026-27
19	Budella S/s -Punjabi Bagh (Vishal) S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	20.0		Planned	2026-27
20	LILO of one circuit of Maharanibagh S/s - Masjid Moth S/s 220 kV D/c line (underground cable) at Nehru Place S/s	Delhi	220 kV	Line	D/c	4.0		Planned	2026-27
21	Seelam Pur/Rathi Mill/Dwarka Puri S/s - Geeta Colony S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	6.0		Planned	2026-27
22	Harsh Vihar S/s - Dilshad Garden S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	11.0		Planned	2026-27
23	Dilshad Garden S/s - Seelam Pur/Rathi Mill/Dwarka Puri S/s 220 kV D/c line (underground cable)	Delhi	220 kV	Line	D/c	11.0		Planned	2026-27
24	LILO of both circuits of Tuglakhabad S/s – Mehrauli S/s 220 kV D/c line at Maidan Garhi	Delhi	220 kV	Line	2xD/c	12.0		Planned	2026-27
(C)	**Bus Reactors**								
1	Harsh Vihar S/s	Delhi	400 kV	S/s				Commissioned	2022-23
2	Peeragarhi S/s	Delhi	220 kV	S/s				Commissioned	2023-24
3	Indraprashtha S/s	Delhi	220 kV	S/s				Planned	2026-27
4	DIAL S/s	Delhi	220 kV	S/s				Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
5	Electric Lane S/s	Delhi	220 kV	S/s				Planned	2026-27
	Haryana								
(A)	**New sub-stations / ICT augmentation**								
1	ICT augmentation at Kaboolpur 400 Kv S/s	Haryana	400/220 kV	S/s			315	Planned	2026-27
2	Sector 69, Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
3	Bakana 220 kV S/s	Haryana	220/66 kV	S/s			320	Commissioned	2022-23
4	METL Dadri Toe 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
5	Sector-78 Faridabad 220 kV S/s	Haryana	220/33 kV	S/s			200	Commissioned	2022-23
6	Sadhaura S/s (upgradation from 66 kV to 220 kV)	Haryana	220/66 kV	S/s			200	Under Construction	2024-25
7	Sadhaura S/s (upgradation from 66 kV to 220 kV)	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
8	Nain 220 kV S/s	Haryana	220/132 kV	S/s			320	Planned	2026-27
9	Nain 220 kV S/s	Haryana	220/33 kV	S/s			100	Planned	2026-27
10	HSIIDC Rai substation 220 kV GIS S/s	Haryana	220/132 kV	S/s			320	Under Construction	2024-25
11	HSIIDC Rai substation 220 kV GIS S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
12	Chickenwas 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
13	Transport Hub Sector-8 IMT Manesar 220 kV S/s	Haryana	220/66 kV	S/s			320	Under Construction	2024-25
14	Sector-15 II 220 kV GIS S/s	Haryana	220/66kV	S/s			320	Under Construction	2024-25
15	Roj-Ka-Meo 220 kV S/s	Haryana	220/66kV	S/s			320	Under Construction	2024-25
16	Roj-Ka-Meo 220 kV S/s	Haryana	220/33kV	S/s			100	Under Construction	2024-25
17	Sector-89, Faridabad 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
18	Harfali (AIS) 220 kV S/s	Haryana	220/66 kV	S/s			200	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
19	Ramana-Ramani 220 kV S/s	Haryana	220/132 kV	S/s			320	Under Construction	2024-25
20	Ramana-Ramani 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
21	THUA 220 kV S/s	Haryana	220/132 kV	S/s			320	Planned	2026-27
22	GIS Pocket-A IMT Kharkhoda 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
23	GIS Pocket-B IMT Kharkhoda 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
24	Petwar 220 kV S/s	Haryana	220/132 kV	S/s			320	Planned	2025-26
25	GIS Sector-75 A, Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			200	Planned	2025-26
26	Sector-99, GIS, Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
27	Phase-III IMT HSIIDC Rohtak 220 kV S/s	Haryana	220/132 kV	S/s			320	Planned	2026-27
28	Phase-III IMT HSIIDC Rohtak 220 kV S/s	Haryana	220/33 kV	S/s			200	Planned	2026-27
29	India International Horticulture Market, Ganaur 220 kV GIS S/s	Haryana	220/33kV	S/s			200	Planned	2025-26
30	HSIIDC Bawal 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
31	Sec 72 Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
32	Rangla Rajpur 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
33	Rampur kamboyan(Hot T/F) 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
34	Chormar 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
35	Masudpur 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
36	Mau 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2022-23
37	Safidon 220 kV S/s	Haryana	220/132 kV	S/s			60	Commissioned	2023-24
38	Chhajpur 220 kV S/s	Haryana	220/132 kV	S/s			60	Commissioned	2023-24
39	Pinjore 220 kV S/s	Haryana	220/66 kV	S/s			100	Commissioned	2023-24
40	Sector-69 Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2023-24
41	Salempur 220 kV S/s	Haryana	220/66 kV	S/s			160	Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
42	Shahabad 220 kV S/s	Haryana	220/66 kV	S/s			100	Commissioned	2023-24
43	Bastara 220 kV S/s	Haryana	220/132 kV	S/s			160	Commissioned	2023-24
44	Kaithal 220 kV S/s	Haryana	220/132 kV	S/s			60	Commissioned	2023-24
45	Bastara 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2023-24
46	Raiwali 220 kV S/s	Haryana	220/66 kV	S/s			100	Commissioned	2023-24
47	Bastara 220 kV S/s	Haryana	220/132 kV	S/s			60	Commissioned	2023-24
48	Sangwan 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2023-24
49	Sonta 220 kV S/s	Haryana	220/66 kV	S/s			60	Commissioned	2024-25
50	Kaul 220 kV S/s	Haryana	220/132 kV	S/s			160	Under Construction	2024-25
51	Durala 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
52	BBMB Kurukshetra 220 kV S/s	Haryana	220/132 kV	S/s			55	Under Construction	2024-25
53	Karnal 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
54	PTPS Panipat 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
55	Samalkha 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
56	Mundh 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
57	Mohana 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
58	Sampla 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
59	Rohtak 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
60	Badhana 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
61	Masudpur 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
62	I.A. Hisar 220 kV S/s	Haryana	220/132 kV	S/s			60	Commissioned	2024-25
63	Samain 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
64	Fatehabad 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
65	Sangwan 220 kV S/s	Haryana	220/132 kV	S/s			100	Commissioned	2023-24
66	Dadibana 220 kV S/s	Haryana	220/33 kV	S/s			100	Commissioned	2023-24
67	BBMB Charkhi Dadri- 2 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
68	Bhiwani 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
69	Chormar (HOT) 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
70	Chormar 220 kV S/s	Haryana	220/132 kV	S/s			100	Commissioned	2024-25
71	Mehna khera 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
72	Hukmawali 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
73	Nuhiyanwali 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
74	Dhanonda 220 kV S/s	Haryana	220/132 kV	S/s			160	Under Construction	2024-25
75	Deroli Ahir 220 kV S/s	Haryana	220/132 kV	S/s			100	Under Construction	2024-25
76	HSIIDC Bawal 220 kV S/s	Haryana	220/132 kV	S/s			160	Under Construction	2024-25
77	Lula Ahir 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
78	Lula Ahir 220 kV S/s	Haryana	220/132 kV	S/s			60	Under Construction	2024-25
79	HSIIDC Bawal 220 kV S/s	Haryana	220/132 kV	S/s			160	Under Construction	2024-25
80	Mau 220 kV S/s	Haryana	220/66 kV	S/s			160	Under Construction	2024-25
81	GIS S/Stn A-4 (In principle) 220 kV S/s	Haryana	220/33 kV	S/s			200	Under Construction	2024-25
82	A-5, Faridabad 220 kV S/s	Haryana	220/66 kV	S/s			60	Under Construction	2024-25
83	Palla 220 kV S/s	Haryana	220/66 kV	S/s			60	Under Construction	2024-25
84	A-4 220 kV S/s	Haryana	220/66 kV	S/s			60	Under Construction	2024-25
85	A-4 220 kV S/s	Haryana	220/66 kV	S/s			60	Under Construction	2024-25
86	Sector-46, Faridabad 220 kV S/s	Haryana	220/66 kV	S/s			160	Under Construction	2024-25
87	Palwal 220 kV S/s	Haryana	220/66 kV	S/s			60	Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
88	Meerpur Kurali 220 kV S/s	Haryana	220/66 kV	S/s			60	Under Construction	2024-25
89	Sector-57, Gurugram 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
90	Rangala Rajpur 220 kV S/s	Haryana	220/66 kV	S/s			100	Under Construction	2024-25
91	400 kV S/Stn Nawada 220 kV S/s	Haryana	220/33 kV	S/s			100	Under Construction	2024-25
92	400 kV Farukhnagar 400 kV S/s	Haryana	400/220 kV	S/s			630	Planned	2026-27
93	400 kV substation Dhanonda 400 kV S/s	Haryana	400/220 kV	S/s			185	Planned	2026-27
94	400 kV S/Stn Nawada 400 kV S/s	Haryana	400/220 kV	S/s			500	Planned	2026-27
95	400 kV substation Kirori 400 kV S/s	Haryana	400/220 kV	S/s			500	Planned	2026-27
96	Tepla 220 kV S/s	Haryana	220/66 kV	S/s			60	Planned	2025-26
97	DadhiBana 220 kV S/s	Haryana	220/132 kV	S/s			60	Planned	2026-27
98	Dhanonda 220 kV S/s	Haryana	220/33 kV	S/s			100	Planned	2026-27
99	Deroli Ahir 220 kV S/s	Haryana	220/33 kV	S/s			100	Planned	2026-27
100	Sector-20, Gurugram 220 kV S/s	Haryana	220/66 kV	S/s			60	Planned	2024-25
101	Sector-6. Sonepat 220 kV S/s	Haryana	220/33 kV	S/s			100	Planned	2024-25
(B)	**Transmission Lines**								
1	LILO of both circuits of Badshahpur S/s - Panchgaon (PGCIL) S/s 220 kV D/c line (Now Sohna Road - Panchgaon 220 kV D/c Line) at Gurgaon Sector-75 A	Haryana	220 kV	Line	2xD/c	16.2		Planned	2025-26
2	LILO of both the circuits of Narwana S/s – Mund S/s 220 kV D/c line at Jind PGCIL	Haryana	220 kV	Line	2xD/c	176.0		Planned	2025-26
3	Bhadana S/s - M/S METL S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	43.1		Commissioned	2022-23
4	Bhiwani S/s (765 kV PGCIL) - Isharwal S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	130.0		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
5	Bhiwani (765 kV PGCIL) S/s - Bhiwani (220 kV HVPNL) S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	30.0		Commissioned	2022-23
6	Panchgaon (400 kV PGCIL) S/s - Panchgaon (220 kV HVPNL) S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	0.2		Commissioned	2022-23
7	LILO of 220 kV Madanpur S/s -Kunihar S/s D/c line at Sector-32 and Naggal (400 kV PGCIL).	Haryana	220 kV	Line	D/c	39.3		Commissioned	2023-24
8	LILO of both circuits of DCRTPP S/s – Salempur S/s 220 kV D/c line at Bakana	Haryana	220 kV	Line	2xD/c	60.0		Commissioned	2022-23
9	Mund S/s -IOCL S/s 220 kV D/c line.	Haryana	220 kV	Line	D/c	84.0		Commissioned	2023-24
10	LILO of both circuits of Mohana S/s – Samalkha S/s 220 kV D/c Line at Jajji (PGCIL) substation	Haryana	220 kV	Line	2xD/c	12.0		Under Construction	2024-25
11	LILO of one circuit of Nuna Majra S/s - Daultabad S/s 220 kV D/c line at Bahadurgarh (PGCIL) S/s	Haryana	220 kV	Line	D/c	4.0		Planned	2025-26
12	LILO of one circuit of Hukmawali S/s - Chormar S/s 220 kV D/c line at Sirsa	Haryana	220 kV	Line	D/c	26.0		Planned	2025-26
13	LILO of both circuit of Daultabad S/s – Mau S/s 220 kV D/c line at Transport Hub Gurgaon.	Haryana	220 kV	Line	2xD/c	20.0		Under Construction	2024-25
14	LILO of both circuits of Pali S/s -Sector-56 S/s 220 kV D/c line at Kadarpur	Haryana	220 kV	Line	2xD/c	74.0		Under Construction	2025-26
15	LILO of both circuits of Sector-65 S/s -Pali S/s D/c line at Kadarpur	Haryana	220 kV	Line	2xD/c	58.0		Under Construction	2024-25
16	LILO of both circuit of Sector-72 S/s - Rangla Rajpur S/s 220 kV D/c line at Roj-ka-Meo	Haryana	220 kV	Line	2xD/c	6.9		Commissioned	2023-24
17	Transport Hub IMT Manesar S/s - MSIL S/s 220 kV D/c line.	Haryana	220 kV	Line	D/c	9.0		Under Construction	2024-25
18	Prithla S/s - Sector-78 Faridabad S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	44.0		Under Construction	2024-25
19	LILO of one circuit of A-4 to A-5 220 kV D/c line at NTPC Faridabad	Haryana	220 kV	Line	D/c	7.4		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
20	Augmentation of Badshapur S/s - Sohna Road S/s 220 kV D/c line (created after LILO of both ckt. of Badshahpur-Sector-77 220 kV D/c line at Sohna Road) from ACSR conductor to AL-59 conductor.	Haryana	220 kV	Line	D/c	10.0		Planned	2025-26
21	Prithla S/s –Harfali S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	80.0		Under Construction	2024-25
22	LILO of one circuit Prithla S/s -Harfali S/s 220 kV D/c line at Meerpur Kurali	Haryana	220 kV	Line	D/c	30.0		Under Construction	2024-25
23	LILO of one Circuit of Samaypur S/s - Palwal S/s 220 kV D/c line at Harfali	Haryana	220 kV	Line	D/c	2.0		Under Construction	2024-25
24	Connectivity of one circuit of 220 kV Sec 72 S/s -Sec 69 S/s 220 kV D/c line to one circuit of existing Sec 72 S/s -Sec 20 S/s 220 kV D/c line	Haryana	220 kV	Line	S/c	2.0		Commissioned	2022-23
25	Sector 69 S/s -Sector 72 S/s 220 kV D/c line (Ckt-II)	Haryana	220 kV	Line	S/c	2.2		Commissioned	2022-23
26	LILO of one ckt. of FGPP S/s –Palla S/s 220 kV D/c line at Sector-78, Faridabad	Haryana	220 kV	Line	D/c	4.2		Commissioned	2022-23
27	LILO of Sector-72 S/s –Sohna S/s 220 kV line (Ckt-I) at 220 kV S/Stn. Sector-69, Gurugram	Haryana	220 kV	Line	D/c	0.1		Commissioned	2022-23
28	Sector-6 Sonipat S/s - Sonipat S/s 220 kV D/c line (ACSR Moose conductor)	Haryana	220 kV	Line	D/c	6.0		Under Construction	2024-25
29	Bahadurgarh (PGCIL) - METL Dadri Toe S/s 220 kV D/c line (ACSR Moose Conductor)	Haryana	220 kV	Line	D/c	44.0		Planned	2025-26
30	LILO of both circuits of PGCIL Hisar S/s –Fatehabad S/s 220 kV D/c line at 220 kV S/Stn. Chickenwas S/s (approx. 3.7 km)	Haryana	220 kV	Line	2xD/c	14.8		Under Construction	2024-25
31	Meerpur Kurali S/s -TSS Rundhi S/s 220 kV D/c line with ACSR zebra conductor	Haryana	220 kV	Line	D/c	30.0		Under Construction	2024-25
32	Nain S/s - M/s IOCL S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	45.0		Planned	2025-26
33	LILO of PTPS S/s –Jind S/s 220 kV D/c line220 kV AIS substation Nain	Haryana	220 kV	Line	D/c	44.0		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
34	LILO of both circuits of PTPS S/s -Jind S/s 220 kV D/c line at 400 kV PGCIL Jind Khatkar	Haryana	220 kV	Line	2xD/c	18.0		Under Construction	2024-25
35	Panchkula (PGCIL) S/s – Sadhaura S/s 220 kv D/c line	Haryana	220 kV	Line	D/c	80.0		Under Construction	2024-25
36	LILO of Tepla S/s -Madanpur S/s 220 kV S/c line at Sadhaura	Haryana	220 kV	Line	D/c	54.0		Under Construction	2024-25
37	LILO of Tepla S/s –Raiwali S/s 220 kV S/c line at Sadhaura	Haryana	220 kV	Line	D/c	54.0		Under Construction	2024-25
38	LILO of 220 kV circuit no. 04 of 400 kV Substation Sector-72 Gurgaon (PGCIL) to Substation Sector-72 Gurgaon (HVPNL) 220 kV 2xD/c line at 220 kV Substation Sector-15-II, Gurgaon S/s	Haryana	220 kV	Line	D/c	14.0		Under Construction	2024-25
39	LILO of one circuit of Cheeka S/s -Sonta S/s 220 kV D/c line at 220 kV Neemwala S/s	Haryana	220 kV	Line	D/c	6.0		Planned	2025-26
40	Bhadson S/s - Ramana Ramani S/s 220 kv D/c line	Haryana	220 kV	Line	D/c	48.0		Under Construction	2025-26
41	LILO of one circuit of Nissing S/s -Salempur S/s 220 kV D/c line at Ramana Ramani	Haryana	220 kV	Line	D/c	20.0		Under Construction	2025-26
42	LILO of both circuits of PGCIL Jind S/s - Narwana S/s 220 kV D/c line 220 kV substation Thua	Haryana	220 kV	Line	2xD/c	16.0		Planned	2026-27
43	Jajji Sonipat (PGCIL) S/s - Pocket-A, IMT Kharkhoda S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	56.0		Under Construction	2024-25
44	Bahadurgarh S/s (PGCIL) - Pocket-B, IMT Kharkhoda S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	60.0		Under Construction	2024-25
45	Pocket-A, IMT Kharkhoda S/s - Pocket-B, IMT Kharkhoda S/s 220 kv D/c line	Haryana	220 kV	Line	D/c	12.0		Planned	2025-26
46	Pocket-A, IMT Kharkhoda S/s - M/s MSIL plant 220 kv D/c line	Haryana	220 kV	Line	D/c	6.0		Planned	2025-26
47	LILO of both circuits of Kirori S/s – Jind S/s 220 kV D/c line at Petwar	Haryana	220 kV	Line	2xD/c	80.0		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
48	PGCIL Bhiwani S/s -Dadhibana S/s 220 kV D/c Line	Haryana	220 kV	Line	D/c	58.0		Planned	2025-26
49	LILO of 2nd circuit of Mau S/s – Bhiwadi S/s 220 kV D/c line at 220 kV IMT Bawal S/s	Haryana	220 kV	Line	D/c	42.0		Planned	2025-26
50	LILO of one ckt. of Daultabad S/s -IMT Manesar S/s 220 kV D/c line at 220 kV Substation Sector-99, Gurugram S/s	Haryana	220 kV	Line	D/c	5.1		Planned	2025-26
51	Prithla (400 kV) S/s - Sector-89, Faridabad S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	76.5		Under Construction	2025-26
52	Sector-58 Faridabad S/s -TSS Ballabhgarh S/s 220 kV D/c line	Haryana	220 kV	Line	D/c	4.5		Under Construction	2025-26
53	LILO of Palla S/s – Sector-78 S/s 220 kV S/c line at 220 kV Sector-89 S/s	Haryana	220 kV	Line	D/c	8.1		Under Construction	2025-26
54	LILO of one circuit Samalkha S/s - Jajji S/s 220 kV D/c line at 220 kV GIS S/s, IIHM Gannaur.	Haryana	220 kV	Line	D/c	28.0		Planned	2025-26
55	LILO of 220 kV Fatehabad (PGCIL Matana) S/s –Bhuna S/s S/c line at Gorakhpur Haryana Anu Vidyut Pariyojna by HVPNL as 2xS/C line	Haryana	220 kV	Line	D/c	22.0		Planned	2025-26
56	LILO of Kabulpur S/s - Sampla S/s 220 kV S/c line at proposed 220 kV GIS substation IMT Phase-III HSIIDC Rohtak	Haryana	220 kV	Line	D/c	6.0		Planned	2025-26
57	LILO of Kabulpur S/s - Rohtak S/s 220 kV S/c line at proposed 220 kV GIS substation IMT Phase-III HSIIDC Rohtak	Haryana	220 kV	Line	D/c	6.0		Planned	2025-26
	Himachal Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	Sunda 220 kV S/s	Himachal Pradesh	220/132 kV	S/s			200	Commissioned	2022-23
2	Sunda 220 kV S/s	Himachal Pradesh	220/66 kV	S/s			100	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
3	Charor 220 kV S/s	Himachal Pradesh	220/132 kV	S/s			100	Commissioned	2023-24
4	Charor 220 kV S/s	Himachal Pradesh	220/33 kV	S/s			100	Commissioned	2023-24
5	Dehan 220 kV S/s	Himachal Pradesh	220/132 kV	S/s			200	Commissioned	2022-23
6	220/33 kV Transformer in the yard of AD Hydro at Prini.	Himachal Pradesh	220/33 kV	S/s			31.5	Commissioned	2023-24
7	Heiling 220 kV S/s Substation	Himachal Pradesh	220/66 kV	S/s			100	Under Construction	2024-25
8	Mazra 220 kV S/s	Himachal Pradesh	220/132 kV	S/s			200	Commissioned	2023-24
9	Kangoo 220 kV S/s	Himachal Pradesh	220/132/33 kV	S/s			200	Under Construction	2024-25
10	Kala Amb 220 kV S/s Substation	Himachal Pradesh	220/132/33 kV	S/s			200	Commissioned	2024-25
11	Paonta Sahib 220 kV S/s S/Stn	Himachal Pradesh	220/132 kV	S/s			200	Planned	2026-27
12	Tahliwal 220 kV S/s	Himachal Pradesh	220/132 kV	S/s			200	Under Construction	2024-25
13	220/132 kV, 2x80/100 MVA Sub-Station nearby Una	Himachal Pradesh	220/132 kV	S/s			200	Planned	2026-27
14	220/132 kV, 80/100 MVA Additional Transformer at 220/132kV 80/100 MVA GIS Charor Substation, Distt. Kullu.	Himachal Pradesh	220/132 kV	S/s			100	Planned	2025-26
15	220 kV Pooling Station at Sujanpur	Himachal Pradesh	220 kV	S/s				Planned	2025-26
16	220/33 kV, 50/63 MVA Additional Transformer at 220/33kV 50/63 MVA GIS Karian Substation	Himachal Pradesh	220/33 kV	S/s			63	Planned	2025-26
17	220/33 kV, 2x50/63 MVA Majholi	Himachal Pradesh	220/33 kV	S/s			126	Planned	2026-27
18	220/132 kV, 200 MVA Transformer bank at Kala Amb Substation at Andheri.	Himachal Pradesh	220/132 kV	S/s			200	Planned	2026-27
(B)	**Transmission Lines**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	Lahal S/s - Chamera Pooling S/s 400 kV D/c line	Himachal Pradesh	400 kV	Line	D/c	70.0		Commissioned	2022-23
2	Dehan S/s - Hamirpur (PG) S/s 220 kV D/c line	Himachal Pradesh	220 kV	Line	D/c	115.0		Commissioned	2022-23
3	Mazra S/s - Karian S/s 220 kV D/c line	Himachal Pradesh	220 kV	Line	D/c	36.0		Commissioned	2024-25
4	Kala Amb (PG) S/s - Kala Amb (HP) S/s 220 kV D/c line	Himachal Pradesh	220 kV	Line	D/c	5.6		Under Construction	2024-25
5	LILO of one circuit of Lahal S/s - Rajera S/s 400 kV D/c line at Kutehar.	Himachal Pradesh	400 kV	Line	S/c	0.6		Under Construction	2024-25
6	LILO of one circuit of 220 kV D/C Bhakhra S/s -Jamalpur S/s at 220/132kV Tahliwal Substation	Himachal Pradesh	220 kV	Line	D/c	0.5		Planned	2024-25
7	LILO of Khodri S/s - Mazri S/s 220 kV S/c line at Paonta Sahib	Himachal Pradesh	220 kV	Line	D/c	4.0		Planned	2026-27
8	220 kV D/c line from (Tower No. 61) of Jamta to Giri transmission line by dismantling of existing 132 kV S/c Jamta LILO Point (T.No.-61) to Giri Transmission line.	Himachal Pradesh	220 kV	Line	D/c	46.0		Planned	2026-27
9	Nehrian S/s - Una S/s 220 kV D/c line	Himachal Pradesh	220 kV	Line	D/c	76.0		Planned	2026-27
10	LILO of both circuits of Reru (400 kV) S/s - Kunihar S/s 220 kV D/c line at Upperla Nangal	Himachal Pradesh	220 kV	Line	2xD/c	1.0		Planned	2026-27
11	Reru (Nalagarh) S/s -220/33 kV Majholi S/s (proposed) 220 kV D/c line	Himachal Pradesh	220 kV	Line	D/c	38.0		Planned	2026-27
	Rajasthan								
(A)	**New sub-stations / ICT augmentation**								
1	Chittorgarh 400 kV S/s	Rajasthan	400/220 kV	S/s			315	Commissioned	2023-24
2	Kankani 765 kV S/s (Upgradation from 400 kV)	Rajasthan	765/400 kV	S/s			3000	Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
3	Sawa 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
4	Panchu 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
5	Lohawat 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
6	Rayla 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2024-25
7	Lakhni 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
8	Menar 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
9	Udaipur 220 kV S/s	Rajasthan	400/220 kV	S/s			1000	Planned	2026-27
10	Dungarpur 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
11	Dholpur 400 kV S/s	Rajasthan	400/220 kV	S/s			1000	Planned	2026-27
12	Jaisalmer 765 kV S/s	Rajasthan	765/400 kV	S/s			4500	Planned	2026-27
13	Bhadla 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2026-27
14	Ramgarh 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2026-27
15	Jaisalmer-II 400 kV S/s	Rajasthan	400/220 kV	S/s			1500	Under Construction	2024-25
16	Pathredi 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
17	Reodar 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Commissioned	2023-24
18	Karoli 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2024-25
19	Sangod 400 kV S/s	Rajasthan	400/220 kV	S/s			1000	Under Construction	2025-26
20	Sangod 400 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2025-26
21	ICT augmentation at Kalisindh TPS	Rajasthan	400/220 kV	S/s			185	Under Construction	2025-26
22	Dholpur 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Commissioned	2023-24
23	Bap 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Commissioned	2024-25
24	Pindwara 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Commissioned	2023-24
25	Goner 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
26	Khetri 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Planned	2025-26
27	Banar (Up-gradation) 220 kV S/s	Rajasthan	220/132 kV	S/s			200	Under Construction	2024-25
28	Hanumangarh 400 kV S/s	Rajasthan	400/220 kV	S/s			1000	Planned	2026-27
29	Kolayat 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
30	Raipur 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2026-27
31	Sheo 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2025-26
32	Kelwara 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2025-26
33	Sikri 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Under Construction	2024-25
34	Chaksu 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Commissioned	2023-24
35	Nimbahera 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
36	Khinvsar 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
37	Jhunjhunu 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
38	Sri Dungargarh 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Commissioned	2023-24
39	Dhorimanna 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Commissioned	2023-24
40	Balotra 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
41	Barmer 400 kV S/s	Rajasthan	220/132 kV	S/s			100	Planned	2025-26
42	Suratgarh 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
43	Halasar 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Commissioned	2023-24
44	Chirwa 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
45	Sayla 220 kV S/s	Rajasthan	220/132 kV	S/s			160	Planned	2025-26
46	Laxmangarh 220 kV S/s	Rajasthan	220/132 kV	S/s			100	Commissioned	2022-23
47	Ajmer 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2025-26
48	Merta 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
49	Jodhpur 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2025-26
50	Bikaner 400 kV S/s	Rajasthan	400/220 kV	S/s			500	Planned	2025-26
(B)	**Transmission Lines**								
1	Jodhpur S/s - Phagi S/s 765 kV D/c line	Rajasthan	765 kV	Line	D/c	600.0		Planned	2026-27
2	Barmer S/s – Sawa S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	200.0		Planned	2026-27
3	LILO of Dhorimanna -Sanchore 220 kV S/c line at 220 kV Sawa S/s	Rajasthan	220 kV	Line	D/c	100.0		Planned	2026-27
4	LILO of BLTPS S/s –Khinvsar S/s 220 kV S/c line at 220 kVPanchu S/s	Rajasthan	220 kV	Line	D/c	6.0		Planned	2026-27
5	Badisid S/s - Lohawat S/s 220 kV D/c line (HTLS)	Rajasthan	220 kV	Line	D/c	140.0		Planned	2026-27
6	LILO of Phalodi -Tinwari 220 kV S/c line at 220 kV S/s Lohawat S/s	Rajasthan	220 kV	Line	D/c	10.0		Planned	2026-27
7	Dechu S/s -Tinwari S/s 220 kV S/c line	Rajasthan	220 kV	Line	S/c	72.0		Planned	2026-27
8	LILO of one circuit of Kalisindh TPS (400 kV)-Anta (765 kV) 400 kV D/c line at 400 kV S/s Sangod S/s	Rajasthan	400 kV	Line	D/c	40.0		Under Construction	2025-26
9	Sangod (400 kV S/s)-Baran S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	70.0		Under Construction	2025-26
10	LILO of Aklera -Jhalawar 220 kV S/c line at 400 kV S/s Sangod S/s	Rajasthan	220 kV	Line	D/c	80.0		Under Construction	2025-26
11	LILO of Bhiwadi (400 kV S/s)-Neemrana (220 kV S/s) 220 kV S/c line at PGCIL’s 400 kV S/s Neemrana S/s	Rajasthan	220 kV	Line	D/c	12.0		Planned	2025-26
12	LILO of Bhiwadi (400 kV S/s)-Neemrana (220 kV S/s) 220 kV S/c line at proposed 220 kV S/s Karoli S/s	Rajasthan	220 kV	Line	D/c	12.0		Planned	2025-26
13	LILO of Kushkhera –Alwar 220 kV S/c line at proposed 220 kV S/s Karoli S/s	Rajasthan	220 kV	Line	D/c	0.4		Planned	2025-26
14	Kotputli (Khelna) -Pathredi 220 kV D/c line	Rajasthan	220 kV	Line	D/c	40.0		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
15	LILO of Bhinmal (PG) –Sirohi 220 kV S/c line at 220 kV S/s Reodar	Rajasthan	220 kV	Line	D/c	56.0		Commissioned	2023-24
16	Kolayat S/s - Panchu S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	52.0		Planned	2026-27
17	Kolayat S/s - Bhadla S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	77.0		Planned	2026-27
18	LILO of one circuit of STPS-Bikaner (Twin Moose) 400 kV D/c line at 400 kV S/s Hanumangarh	Rajasthan	400 kV	Line	D/c	100.0		Planned	2026-27
19	LILO of Hanumangarh (220 kV S/s)-Udhyog Vihar (220 kV S/s) 220 kV S/c line at proposed 400 kV S/s Hanumangarh S/s	Rajasthan	220 kV	Line	D/c	30.0		Planned	2026-27
20	LILO of Suratgarh (220 kV S/s) -Padampur (220 kV S/s) 220 kV S/c line at proposed 400 kV S/s Hanumangarh S/s	Rajasthan	220 kV	Line	D/c	25.0		Planned	2026-27
21	Hanumangarh S/s - Rawatsar (220 kV S/s) 220 kV S/c line	Rajasthan	220 kV	Line	S/c	85.0		Planned	2026-27
22	LILO of Bhilwara (400 kV S/s)- Baman Ka Tukda 220 kV S/c line at 220 kV S/s Raipur	Rajasthan	220 kV	Line	D/c	35.0		Planned	2025-26
23	LILO of Akal -Giral 220 kV S/c line at 220 kV Sheo S/s	Rajasthan	220 kV	Line	D/c	20.0		Planned	2025-26
24	LILO of Akal -Barmer 220 kV S/c line at 220 kV S/s Sheo S/s	Rajasthan	220 kV	Line	D/c	20.0		Planned	2025-26
25	Alwar (400 kV) S/s - Sikri S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	106.0		Under Construction	2025-26
26	Sikri S/s - Bharatpur S/s 220 kV S/c line	Rajasthan	220 kV	Line	S/c	69.0		Under Construction	2025-26
27	LILO of Sikar - Dhod 220 kV S/c line at 400 kV Sikar (PGCIL) S/s	Rajasthan	220 kV	Line	D/c	40.0		Commissioned	2022-23
28	Soorpura S/s - Banar S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	23.0		Commissioned	2022-23
29	LILO of Bhilwara (220 kV S/s)-Beawer 220 kV S/c line at 220 kV S/s Rayla	Rajasthan	220 kV	Line	D/c	20.0		Under Construction	2024-25
30	LILO of Bhinmal –Dhorimanna 220 kV S/c line at 220 kV S/s Lakhni S/s	Rajasthan	220 kV	Line	D/c	20.0		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
31	LILO of Debari -Chittorgarh 220 kV S/c line at 220 kV S/s Menar S/s	Rajasthan	220 kV	Line	D/c	40.0		Planned	2026-27
32	LILO of one circuit of Chittorgarh – Bhilwara 400 kV D/c line (Twin Moose) at 400 kV S/s Udaipur S/s	Rajasthan	400 kV	Line	D/c	180.0		Planned	2026-27
33	LILO of Debari -Amberi 220 kV S/c line at 400 kV S/s Udaipur S/s	Rajasthan	220 kV	Line	D/c	5.0		Planned	2026-27
34	LILO of Madri -Banswara 220 kV S/c line at 400 kV S/s Udaipur S/s	Rajasthan	220 kV	Line	D/c	22.0		Planned	2026-27
35	Udaipur (400 kV S/s)-Dungarpur S/s 220 kV D/c line	Rajasthan	220 kV	Line	D/c	204.0		Planned	2026-27
36	400 meter 400 kV S/c line from location no. 780 of existing 400 kV S/c Hindaun-DCCP line to 400 kV Dholpur S/s	Rajasthan	400 kV	Line	S/c	0.4		Planned	2026-27
37	LILO of Saipau -Bharatpur 220 kV S/c line at 400 kV S/s Dholpur S/s	Rajasthan	220 kV	Line	D/c	60.0		Planned	2026-27
38	400 meter 220 kV S/c line from location no. 781 of existing 400 kV S/c Hindaun-DCCP line to 400 kV S/s Dholpur to charge on 220 kV voltage level	Rajasthan	220 kV	Line	S/c	0.4		Planned	2026-27
39	LILO of Bassi -Agra 400 kV S/c line at 400 kV S/s Dholpur	Rajasthan	400 kV	Line	D/c	130.0		Planned	2026-27
40	Jaisalmer S/s – Kankani S/s 765 kV D/c line	Rajasthan	765 kV	Line	D/c	450.0		Planned	2026-27
41	Jaisalmer II S/s - Jaisalmer (765 kV) S/s 400 kV D/c line	Rajasthan	400 kV	Line	D/c	140.0		Planned	2026-27
42	LILO of Ramgarh-Akal 400 kV D/c line at 765 kV S/s Jaisalmer	Rajasthan	400 kV	Line	2xD/c	100.0		Planned	2026-27
43	LILO of Bhadla -Merta 400 kV S/c line at 400 kV S/s Bhadla (new) S/s	Rajasthan	400 kV	Line	D/c	12.0		Planned	2026-27
44	LILO of Bhadla-Jodhpur (Surpura) 400 kV S/c line at 400 kV S/s Bhadla (new) S/s	Rajasthan	400 kV	Line	D/c	12.0		Planned	2026-27
45	Bhadla (new)-Bikaner (new) 765 kV D/c line	Rajasthan	765 kV	Line	D/c	360.0		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
46	LILO of Suratgarh SCTPS-Bikaner S/s 400 kV D/c line at 400 kV S/s Bikaner (new)	Rajasthan	400 kV	Line	D/c	56.0		Planned	2026-27
(C)	**Bus Reactors**								
1	Anta	Rajasthan	765 kV	S/s				Planned	2026-27
2	Heerapura	Rajasthan	400 kV	S/s				Planned	2026-27
3	Bhilwara	Rajasthan	400 kV	S/s				Planned	2026-27
4	Babai	Rajasthan	400 kV	S/s				Planned	2026-27
5	Chittorgarh	Rajasthan	400 kV	S/s				Planned	2026-27
6	Pachpadra	Rajasthan	400 kV	S/s				Under Construction	2024-25
7	Akal	Rajasthan	400 kV	S/s				Commissioned	2022-23
8	Ratangarh	Rajasthan	220 kV	S/s				Commissioned	2024-25
9	Phalodi	Rajasthan	220 kV	S/s				Commissioned	2023-24
10	Sanchore	Rajasthan	220 kV	S/s				Commissioned	2024-25
11	Dechu	Rajasthan	220 kV	S/s				Commissioned	2024-25
12	Amarsagar	Rajasthan	220 kV	S/s				Commissioned	2024-25
13	Tinwari	Rajasthan	220 kV	S/s				Commissioned	2023-24
14	Badisid	Rajasthan	220 kV	S/s				Commissioned	2023-24
	Uttar Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	Dataganj 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
2	Sangipur (Pratapgarh) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
3	Nirpura(Hybrid)/Chhaprauli 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
4	Khatauli 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
5	Vasundhara GIS 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
6	Anandnagar (Gorakhpur) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
7	Maharajganj 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
8	Faridpur (Bareilly) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			100	Commissioned	2022-23
9	Faridpur (Bareilly) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			100	Under Construction	2024-25
10	Modipuram-II 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
11	Balrampur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
12	Azizpur (Shahjahanpur) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
13	Ayodhya GIS 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
14	Babina(jhansi) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
15	Mallawan (Hardoi) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
16	Vrindavan, Mathura 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
17	Badaikala (Muzaffarnagar) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
18	Deoband 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
19	Jewar (Hybrid) 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Commissioned	2022-23
20	Amariya (Pilibhit) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			200	Commissioned	2022-23
21	Farukkhabad (Bhojpur) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
22	Dulhipar 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
23	IITGNL 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Commissioned	2023-24
24	Bhadohi (GIS) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			400	Commissioned	2023-24
25	Morta, Gaziabad 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Commissioned	2023-24
26	Khaga 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
27	Kidwainagar GIS 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
28	Chandpur (Bijnor) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
29	Kirawali (Agra) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			200	Commissioned	2023-24
30	Bijnore (Lucknow) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
31	Noida Sec-123 400 kV S/s	Uttar Pradesh	400/132 kV	S/s			400	Under Construction	2024-25
32	Sahupuri(Chandauli) 400 kV GIS S/s	Uttar Pradesh	400/220 kV	S/s			500	Commissioned	2023-24
33	Sahupuri(Chandauli) 400 kV GIS S/s	Uttar Pradesh	400/220 kV	S/s			500	Under Construction	2024-25
34	Bhaukhari (Basti) 400 kV GIS S/s	Uttar Pradesh	220/132 kV	S/s			400	Commissioned	2022-23
35	Machlishear (Jaunpur) 400 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			475	Commissioned	2022-23
36	Machlishear (Jaunpur) 400 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			790	Under Construction	2024-25
37	Shamli 400 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			700	Commissioned	2022-23
38	Shamli 400 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			500	Under Construction	2024-25
39	Raebareli 400 kV GIS S/s	Uttar Pradesh	400/220/132 kV	S/s			1320	Under Construction	2025-26
40	Rasra GIS 400 kV GIS S/s	Uttar Pradesh	400/220/132 kV	S/s			820	Commissioned	2022-23
41	Rasra GIS 400 kV GIS S/s		400/220 kV	S/s			500	Commissioned	2023-24
42	Khorabar,Gorakhpur 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Commissioned	2024-25
43	Dibiyapur (Auraiya) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2026-27
44	Varanasi Cantt. 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Under Construction	2025-26
45	Mathura New 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Planned	2026-27
46	Gharbara(Gautam Budh Nagar) 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Under Construction	2024-25
47	YEIDA Sec.-18 (Gautam Budh Nagar) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			180	Commissioned	2023-24
48	YEIDA Sec.-24 (Gautam Budh Nagar) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
49	Noida Sec.-45 (Gautam Budh Nagar) 220 kV GIS S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
50	Kunduni (Sitapur) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			400	Commissioned	2023-24
51	Mohanlalganj (Lucknow) 400 kV GIS S/s	Uttar Pradesh	400/220/132 kV	S/s			1400	Commissioned	2023-24
52	Rampur (Moradabad) 765 kV S/s	Uttar Pradesh	765/400/220 kV	S/s			4000	Commissioned	2022-23
53	Modipuram (Meerut) 765 kV GIS S/s	Uttar Pradesh	765/400/220 kV	S/s			4000	Commissioned	2022-23
54	Simbholi 400 kV GIS S/s	Uttar Pradesh	400/220/132 kV	S/s			1400	Commissioned	2022-23
55	Sambhal 400 kV GIS S/s	Uttar Pradesh	400/220/132 kV	S/s			1320	Commissioned	2022-23
56	Lucknow Awas Vikas Sultanpur Road 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			240	Under Construction	2024-25
57	Mawana 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
58	Naini UPSIDC 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Under Construction	2025-26
59	Meerut By Pass 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Planned	2025-26
60	Tirwa, Kannauj 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2025-26
61	Badaun Road 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Under Construction	2024-25
62	Ranipur(Mau) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2025-26
63	Deoria New, Narayanpur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2025-26
64	Kasganj 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
65	Malwan (Fatehpur) 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
66	Chunar 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2025-26
67	Moth 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
68	Garautha 400/220 kV S/s	Uttar Pradesh	400/220 kV	S/s			1500	Under Construction	2025-26
69	Talbehat 765/400/220 kV S/s	Uttar Pradesh	765/400/220 kV	S/s			2500	Under Construction	2025-26
70	Maheba 400/220/132 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			1320	Under Construction	2025-26
71	Farrukhabad 400/220/132 kV S/s	Uttar Pradesh	400/220/132 kV	S/s			1320	Under Construction	2025-26
72	Banda 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
73	Hamirpur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
74	Charkhari 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
75	Jaitpur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
76	Birdha 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
77	Mandwara 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
78	Dakaur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
79	Bamaur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
80	Bangra 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
81	Kabrai 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2025-26
82	Darshan Nagar 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			160	Under Construction	2024-25
83	Metro Depo 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
84	Jalpura 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
85	Knowledge Park V 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Commissioned	2023-24
86	Jewar 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
87	Sec-62 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
88	Sec-28 YEIDA 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
89	Trans ganga city 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			180	Under Construction	2025-26
90	Karhal 220 kV S/s*	Uttar Pradesh	220/132 kV	S/s			320	Under Construction	2025-26
91	Chitrkoot GEC-II 400 kV S/s	Uttar Pradesh	400/220 kV	S/s			1000	Under Construction	2025-26
92	Sec-28 YEIDA 400 kV S/s	Uttar Pradesh	400/220 kV	S/s			1500	Under Construction	2025-26
93	Metro Depo 400 kV S/s	Uttar Pradesh	400/220 kV	S/s			1000	Under Construction	2025-26
94	Jalpura 400 kV S/s	Uttar Pradesh	400/220 kV	S/s			1000	Under Construction	2025-26
95	Jewar 400 kV S/s	Uttar Pradesh	400/220 kV	S/s			1000	Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
96	Amra 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2026-27
97	Shravasti 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2026-27
98	Surajpur-II 220 kV S/s	Uttar Pradesh	220/33 kV	S/s			120	Planned	2026-27
99	Shahpur 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2026-27
100	Bangermau 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			200	Planned	2026-27
101	Morawa 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2026-27
(B)	**Transmission Lines**								
1	Badaun S/s -Dataganj S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	56.0		Commissioned	2023-24
2	LILO one circuit of Roja-(TPS) – Badaun 220 kV D/c line at Dataganj S/s	Uttar Pradesh	220 kV	Line	D/c	24.0		Commissioned	2022-23
3	Noida-148 - Noida -38 (A) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	47.0		Under Construction	2024-25
4	LILO of Sarnath -Sahupuri 220 kV D/c line at Bhadaura S/s	Uttar Pradesh	220 kV	Line	D/c	170.0		Commissioned	2022-23
5	Sultanpur -Sangipur 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Commissioned	2022-23
6	Raebarielly UPPTCL(400 kV) -Sangipur S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	120.0		Commissioned	2022-23
7	LILO of one circuit of Muzaffarnagar – Shamli 220 kV D/c line at Khatauli S/s	Uttar Pradesh	220 kV	Line	D/c	24.0		Under Construction	2024-25
8	LILO of one circuit of Muzaffarnagar - Modipuram 220 kV D/c line at Khatauli S/s	Uttar Pradesh	220 kV	Line	D/c	2.0		Commissioned	2022-23
9	Vasundhara S/s –Indirapuram S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	10.0		Planned	2025-26
10	LILO of one circuit of Muradnagar(400) - Sahibabad 220 kV D/c line at Vasundhara S/s	Uttar Pradesh	220 kV	Line	D/c	4.0		Planned	2025-26
11	LILO of one ckt Gorakhpur (PG) - Maharajganj line at 220 kV D/c line at Ananadnagar S/s	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2023-24
12	Sec-148(400)-Sec-45 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	50.0		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
13	Anandnagar S/s -Maharajganj S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2023-24
14	Satrikh Road S/s -Barabanki S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	50.0		Commissioned	2022-23
15	Modipuram-II S/s –Shamli S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	128.0		Under Construction	2024-25
16	Modipuram-II S/s -Baghpat S/s 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	70.0		Commissioned	2022-23
17	LILO of one circuit of Modipuram - Faridnagar 220 kV D/c line at Modipuram-II S/s	Uttar Pradesh	220 kV	Line	D/c	10.0		Commissioned	2023-24
18	LILO of one circuit of Gonda - Behraich 220 kV D/c line at Balrampur S/s	Uttar Pradesh	220 kV	Line	D/c	92.0		Commissioned	2022-23
19	LILO of Sohawal (PG)- New Tanda 220 kV D/c line at Ayodhya GIS S/s	Uttar Pradesh	220 kV	Line	D/c	40.0		Commissioned	2022-23
20	Gola -Shahjahanpur (PG) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	130.0		Commissioned	2023-24
21	Mallawan -Hardoi 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	112.0		Commissioned	2022-23
22	Mallawan -Jehta (400 kV) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	90.0		Commissioned	2023-24
23	Badaikala (220)-Shamli (400 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Under Construction	2024-25
24	Deoband -Saharanpur (400 kV) PG 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2023-24
25	Deoband -Shamli (400 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	110.0		Under Construction	2024-25
26	LILO of Jahangirpur (765 kV G.Noida) - IITGNL 220 kV D/c line at Jewar S/s	Uttar Pradesh	220 kV	Line	D/c	14.0		Commissioned	2022-23
27	Amriya -Bareilly (400 kV) - Amariya (Pilibhit) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Commissioned	2022-23
28	Farukkhabad -Chibra Mau (kanauj) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2022-23
29	LILO of Gorakhpur (PG) - Bansi (Siddharthnagar 220 kV D/c line at Dulhipar S/s	Uttar Pradesh	220 kV	Line	D/c	30.0		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	IITGNL-Sikandrabad (400 kV) WUPPTCL 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	84.0		Under Construction	2024-25
31	Bhadohi -Aurai (400 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	10.0		Commissioned	2023-24
32	Extension of U/c Mirzapur - Aurai (400 kV) 220 kV S/c line upto -Bhadohi	Uttar Pradesh	220 kV	Line	S/c	6.0		Under Construction	2024-25
33	Extension of U/c Phoolpur - Aurai (400) 220 kV S/c line upto Bhadohi	Uttar Pradesh	220 kV	Line	S/c	16.0		Under Construction	2024-25
34	Stringing of II ckt of Sahupuri - Raja ka Talab - Chandauli (400 kV) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	63.0		Under Construction	2024-25
35	Stringing of II ckt of U/c Raja ka Talab - Aurai (400 kV) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	17.0		Commissioned	2023-24
36	Bhadohi -Extension of Raja ka Talab - Aurai (400 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	10.0		Commissioned	2023-24
37	LILO of one circuit of Muradnagar II (400 kV) - Madhuban Bapudham 220 kV D/c line at Morta S/s	Uttar Pradesh	220 kV	Line	D/c	1.6		Commissioned	2023-24
38	Fatehpur PG-Khaga 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	100.0		Planned	2025-26
39	LILO of Panki - Bhaunti, Kanpur (PG) 220 kV D/c line at Kidwai Nagar GIS S/s	Uttar Pradesh	220 kV	Line	D/c	12.0		Commissioned	2023-24
40	LILO of Meerut- Amroha 220 kV D/c line at Chandpur S/s	Uttar Pradesh	220 kV	Line	D/c	54.0		Commissioned	2022-23
41	LILO of Agra(765 kV) PGCIL- Sikandra 220 kV S/c line at Kirawali S/s	Uttar Pradesh	220 kV	Line	D/c	26.0		Commissioned	2023-24
42	LILO of Sarojninagar –Bachrawan 220 kV D/c line at Bijnore, Lucknow S/s	Uttar Pradesh	220 kV	Line	D/c	2.0		Commissioned	2022-23
43	Obra TPS -Myorpur 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	150.0		Under Construction	2024-25
44	LILO of Ataur - Indirapuram 400 kV D/c line at Noida Sec-123 S/s	Uttar Pradesh	400 kV	Line	D/c	40.0		Commissioned	2023-24
45	LILO of both ckt Thathra,Varanasi PG (765 kV)- Bihar Shariff (Bihar) (400 kV) 400 kV D/c line at Sahupuri S/s	Uttar Pradesh	220 kV	Line	2xD/c	60.0		Commissioned	2024-25
46	Machlishear, Jaunpur -Varanasi (765 kV) PG 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	150.0		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
47	LILO of Obra C - Obra B 400 kV D/c line at Machlishear, Jaunpur S/s	Uttar Pradesh	400 kV	Line	D/c	380.0		Commissioned	2023-24
48	LILO of Jaunpur -Gajokhar 220 kV D/c line at Machlishear, Jaunpur (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	90.0		Commissioned	2022-23
49	LILO of Azamgarh II - Bhadohi 220 kV D/c line at Machlishear, Jaunpur(400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	100.0		Commissioned	2022-23
50	Shamli -Aligarh 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	470.0		Under Construction	2024-25
51	Shamli- Meerut (765 kV) 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	150.0		Under Construction	2025-26
52	LILO of Unchahaar (NTPC) -Fatehpur 400 kV D/c line at Raebareli S/s	Uttar Pradesh	400 kV	Line	D/c	76.0		Commissioned	2022-23
53	Raebareli(400 kV) GIS-Bachrawn (220) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	70.0		Under Construction	2024-25
54	Rasra (400 kV)-Bhadaura (Gazipur) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	94.0		Commissioned	2022-23
55	Firozabad -Jawaharpur (TPS) 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	160.0		Commissioned	2022-23
56	Badaun -Roja TPS B 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	134.0		Commissioned	2022-23
57	LILO of CBGanj -Badaun 220 kV D/c line at Badaun (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	10.0		Commissioned	2022-23
58	LILO of Pura Chandausi - Badaun 220 kV D/c line at Badaun (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	70.0		Commissioned	2022-23
59	LILO of Auraiya (TPS) - Sikandra (Agra) 220 kV D/c line at Dibiyapur, Auraiya S/s	Uttar Pradesh	220 kV	Line	D/c	40.0		Planned	2026-27
60	LILO of one ckt of Sarnath(400)-Gajokhar line at Varanasi Cantt.	Uttar Pradesh	220 kV	Line	D/c	84.0		Planned	2025-26
61	Yeida Sector-24 -Greater Noida (765 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	52.0		Commissioned	2023-24
62	Greator Noida 765 - Yeida Sector 24 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	48.0		Commissioned	2023-24
63	Greator Noida -Yeida Sector 18 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	48.0		Commissioned	2023-24
64	Noida Sec.148 -38A Botanical Garden 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	44.0		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
65	LILO of Sarojni Nagar - Hardoi Road 220 kV D/c line at Mohan Road S/s	Uttar Pradesh	220 kV	Line	D/c	6.0		Under Construction	2024-25
66	LILO of Sitapur (220)-Nighasan (220) 220 kV D/c line at Kanduni S/s	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2023-24
67	Kanduni -Kursi road Lucknow PG (400 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	120.0		Commissioned	2023-24
68	LILO of one circuit of Sarojni Nagar – Unnao 400 kV D/c line at Mohanlalganj S/s	Uttar Pradesh	400 kV	Line	D/c	74.0		Commissioned	2023-24
69	LILO of Lucknow PG - Sultanpur 400 kV D/c line at Mohanlalganj S/s	Uttar Pradesh	400 kV	Line	D/c	12.0		Commissioned	2023-24
70	LILO of Chinhat - C.G. City 220 kV D/c line at Mohanlalganj (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	62.0		Under Construction	2024-25
71	LILO of I ckt of Barabanki - Satrikh Road Lko 220 kV D/c line at Mohanlalganj(400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	40.0		Under Construction	2024-25
72	Mohanlalganj (400 kV)-Bijnaur Road 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	40.0		Under Construction	2025-26
73	LILO of Ghatampur (TPS) kanpur – Hapur 765 kV D/c line at Rampur S/s	Uttar Pradesh	765 kV	Line	D/c	110.0		Commissioned	2023-24
74	LILO of one circuit of Bareilly PG - Moradabad 400 kV D/c line at Rampur (765 kV) S/s	Uttar Pradesh	400 kV	Line	D/c	6.0		Commissioned	2022-23
75	LILO of one circuit of Moradaba - Rampur 765 kV D/c line at Rampur S/s	Uttar Pradesh	765 kV	Line	D/c	20.0		Commissioned	2022-23
77	LILO of one circuit of G. Noida - Hapur 765 kV D/c line at Modipuram, Meerut	Uttar Pradesh	765 kV	Line	D/c	90.0		Commissioned	2023-24
78	LILO of 220kV Nara-Jansath line at Meerut (765 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	110.0		Under Construction	2024-25
79	Modipuram, Meerut (765 kV)-Amroha 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	90.0		Commissioned	2022-23
80	Modipuram, Meerut (765 kV)-G. Noida-II 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	100.0		Planned	2026-27
81	Simbhaoli -Moradnagar-II 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	190.0		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
82	Simbhaoli -Meerut 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	80.0		Commissioned	2022-23
83	LILO of one circuit of Hapur Hybrid-Simbhaoli 220 kV D/c line at Simbhaoli (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	60.0		Commissioned	2023-24
84	Sambhal(400 kV) -Rampur(765 kV) 400 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	160.0		Commissioned	2022-23
85	LILO of one circuit of Chandausi -Sambhal 220 kV D/c line at Sambhal (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	40.0		Commissioned	2022-23
86	LILO of one circuit of Sambhal -Gajraula (Amroha) 220 kV D/c line at Sambhal (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	100.0		Commissioned	2022-23
87	Sambhal -Badaun 400 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	134.0		Commissioned	2022-23
88	Mawana -Modipuram(765) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	38.0		Under Construction	2024-25
89	LILO of one ckt 220kV Obra(400)-Rewa Road (400 kV) D/c line at Naini UPSID	Uttar Pradesh	220 kV	Line	D/c	50.0		Planned	2025-26
90	Meerut by Pass -Modipuram(765 kV) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	70.0		Planned	2025-26
91	LILO of Mainpuri(220)-Bhaunti PG at Tirwa S/s	Uttar Pradesh	220 kV	Line	D/c	26.0		Planned	2025-26
92	LILO of Rasra -Deoria 220 kV S/c line at Rasra (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	30.0		Under Construction	2024-25
93	Deoria New-Moti Ram Adda(400) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	116.0		Planned	2025-26
94	LILO of Fatehpur - Unchahar 220 kV S/c line at Malwan S/s	Uttar Pradesh	220 kV	Line	D/c	30.0		Commissioned	2022-23
95	LILO of Paricha (TPS) - Orai 220 kV S/c line at Moth S/s	Uttar Pradesh	220 kV	Line	D/c	40.0		Commissioned	2023-24
96	LILO of both circuits of Orai PG- Orai UPPTCL 400 kV D/c line (Quad Moose) at Garautha S/s	Uttar Pradesh	400 kV	Line	2xD/c	212.0		Under Construction	2025-26
97	LILO of one circuit of Lalitpur TPS – Agra 765 kV D/c line at Talbehat(765) S/s	Uttar Pradesh	765 kV	Line	D/c	37.0		Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
98	Talbehat(765 kV) – Lalitpur TPS (HTLS) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	72.0		Under Construction	2025-26
99	400kV Talbaehat-Garautha DC line	Uttar Pradesh	400 kV	Line	D/c	260.0		Under Construction	2025-26
100	LILO of one ckt of Banda (400 kV)-Orai (400 kV) 400 kV D/c line (Quad Moose) at Maheba (Jalaun) S/s	Uttar Pradesh	400 kV	Line	D/c	40.0		Under Construction	2025-26
101	Maheba – Hamirpur (Sarila) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	208.0		Under Construction	2025-26
102	Maheba (Jalaun) - Farrukhabad 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	316.0		Under Construction	2025-26
103	Farrukhabad - Badaun 400 kV D/c line	Uttar Pradesh	400 kV	Line	D/c	180.0		Under Construction	2025-26
104	LILO of Chhibramau- Farrukhabad (220 kV) 220 kV S/c line at Farrukhabad (400 kV) S/s	Uttar Pradesh	220 kV	Line	D/c	30.0		Under Construction	2025-26
105	LILO of Mahoba- Banda 220 kV S/c line at Hamirpur S/s	Uttar Pradesh	220 kV	Line	D/c	70.0		Under Construction	2025-26
106	Charkhari (Mahoba) - Garotha (Jhansi) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	134.0		Under Construction	2025-26
107	Jaitpur (Mahoba) – Charkhari (Mahoba) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	40.0		Under Construction	2025-26
108	Birdha (Lalitpur) – Lalitpur 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	30.0		Under Construction	2025-26
109	Mandawra (Lalitpur)- Lalitpur 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	55.0		Under Construction	2025-26
110	Dakaur- Maheba 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	42.0		Under Construction	2025-26
111	Bamaur (Jhansi)-Garautha 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	34.0		Under Construction	2025-26
112	Bangra(Jhansi)- Gurusarai(Jhansi) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	45.0		Under Construction	2025-26
113	Kabrai (Mahoba) – Charkhari (Mahoba) 220 kV S/c line	Uttar Pradesh	220 kV	Line	S/c	40.0		Under Construction	2025-26
114	Ranipur(mau)-Rasra(400) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	132.0		Planned	2025-26
115	LILO of Obra(400)-Sahupuri 220 kV line at Chunar S/s	Uttar Pradesh	220 kV	Line	D/c	36.0		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
116	LILO of Sohawal- Gonda 220 kV S/c line at Darshan Nagar S/s	Uttar Pradesh	220 kV	Line	D/c	1.0		Commissioned	2024-25
117	LILO of 220 kV G. Noida (400)- RC Green line at Metro Depo (220) S/s	Uttar Pradesh	220 kV	Line	D/c	2.0		Commissioned	2024-25
118	LILO of RC Green-Sec-148(400) line at Knowledge Park –V S/s	Uttar Pradesh	220 kV	Line	D/c	14.0		Commissioned	2023-24
119	LILo of RC Green-Gr. Noida(400) at Jalpura	Uttar Pradesh	220 kV	Line	D/c	28.0		Commissioned	2023-24
120	Indirapuram (400) - Noida Sec _62(GIS) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	5.0		Planned	2024-25
121	Jewar(400)-Sector-28 YEIDA 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	4.0		Planned	2024-25
122	LILO of Unnao(400)-Bithoor(220) 220 kV S/c line at Kidwai Nagar	Uttar Pradesh	220 kV	Line	D/c	24.0		Planned	2024-25
123	Karhal-Mainpuri PG 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	50.0		Planned	2025-26
124	Chitrakut - Banda 400 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	260.0		Planned	2025-26
125	Aligarh PG(765)-YEIDA Sec-28 400 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Planned	2026-27
126	LILO of one circuit of 400 kV Greater Noida (765 kV)-Pali, Greater Noida D/c line at 400/220 kV Metro Depot S/s	Uttar Pradesh	220 kV	Line	D/c	4.0		Planned	2026-27
127	Jalpura S/s – THDC Thermal project Khurja 400 kV D/c Line	Uttar Pradesh	400 kV	Line	D/c	140.0		Planned	2026-27
128	LILO of one circuit of Gr. Noida (765) – sector 148 (400), Noida 400 kV D/c line at 400/220 Jewar S/s	Uttar Pradesh	220 kV	Line	D/c	4.0		Planned	2026-27
129	Sahupuri (400) - Amra 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Planned	2026-27
130	Gonda-Shrawasti 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	80.0		Planned	2026-27
131	LILO of Botanical Garden(220)- Sec-20(220) 220 kV S/c line at Surajpur II S/s	Uttar Pradesh	220 kV	Line	D/c	20.0		Planned	2026-27
132	Fatehpur – Kurshi Road (400 kV PGCIL) 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	40.0		Planned	2026-27
133	Unnao - Bangarmau 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	70.0		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
134	Maurawa - Unnao 220 kV D/c line	Uttar Pradesh	220 kV	Line	D/c	50.0		Planned	2026-27
	Uttarakhand								
(A)	**New sub-stations / ICT augmentation**								
1	Baram 220 kV GIS S/s	Uttarakhand	220/33 kV	S/s			50	Under Construction	2025-26
2	400/220 kV S/s, Roorkee	Uttarakhand	400/220 kV	S/s			1000	Planned	2026-27
3	220/132/33 kV S/S, Manglore	Uttarakhand	220/132 kV	S/s			320	Under Construction	2026-27
4	Selaqui (Dehradun) 220 kV GIS S/s	Uttarakhand	220/33 kV	S/s			100	Under Construction	2026-27
5	Barahmwari 220 kV S/s	Uttarakhand	220/33kV	S/s			60	Planned	2026-27
6	Ghansali 220 kV S/s	Uttarakhand	220/33kV	S/s			60	Planned	2026-27
7	Pipalkoti 400 kV Switching S/s	Uttarakhand	400 kV	S/s				Planned	2026-27
8	ICT augmentation at Kashipur 400 kV S/s (from 2x315 MVA to 3x315 MVA)	Uttarakhand	400/220 kV	S/s			500	Planned	2026-27
9	ICT augmentation at SIDCUL (Haridwar) (from 50+25 MVA to 2x50 MVA)	Uttarakhand	220/33 kV	S/s			25	Planned	2026-27
10	ICT augmentation at Jhajra (from 2x160 MVA to 3x160 MVA)	Uttarakhand	220/132 kV	S/s			160	Planned	2026-27
11	ICT augmentation at Roorkee (from 2x50 MVA to 2x100 MVA)	Uttarakhand	220/132 kV	S/s			100	Planned	2026-27
12	ICT augmentation at Chamba (from 25+50 MVA to 2x50 MVA)	Uttarakhand	220/132 kV	S/s			25	Planned	2026-27
13	ICT augmentation at Pantnagar (from 2X160 MVA to 3x 160 MVA)	Uttarakhand	220/132 kV	S/s			160	Planned	2026-27
14	Banbasa Tanakpur (Phase-I) S/s	Uttarakhand	220/33 kV	S/s			100	Planned	2026-27
(B)	**Transmission Lines**								
1	Baram-Jauljivi 220 kV D/c line	Uttarakhand	220 kV	Line	D/c	24.3		Under Construction	2025-26
2	LILO of Kashipur-Puhana 400 kV line at Roorkee S/s	Uttarakhand	400 kV	Line	D/c	6.0		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
3	LILO of Manglore-Nara 220 kV line at 400/220kV Roorkee S/s	Uttarakhand	220 kV	Line	D/c	50.0		Planned	2026-27
4	LILO of Roorkee-Nara 220 kV line at 220 kV Manglore S/s	Uttarakhand	220 kV	Line	D/c	2.0		Planned	2026-27
5	LILO of Khodri - Jhajra 220 kV S/c line at proposed 220 kV Selaqui (Dehradun) substation	Uttarakhand	220 kV	Line	D/c	1.4		Planned	2026-27
6	Pipalkoti-Srinagar 400 kV D/c line	Uttarakhand	400 kV	Line	D/c	173.0		Under Construction	2024-25
7	Vishnugad-Pipalkoti 400 kV D/c line	Uttarakhand	400 kV	Line	D/c	36.0		Under Construction	2025-26
8	Pipalkoti(THDC)-Pipalkoti 400 kV D/c line	Uttarakhand	400 kV	Line	D/c	1.0		Planned	2026-27
	Jammu & Kashmir								
(A)	**New sub-stations / ICT augmentation**								
1	Rajouri-II 220 kV S/s	Jammu & Kashmir	220/132 kV	S/s			320	Planned	2026-27
2	Katra-II 220 kV S/s	Jammu & Kashmir	220/132 kV	S/s			320	Planned	2026-27
3	Akhnoor-II (Domana) 220 kV S/s	Jammu & Kashmir	220/132 kV	S/s			320	Planned	2026-27
4	Gurah Karyal 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			100	Planned	2026-27
5	Ramgarh 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			100	Planned	2026-27
6	Ramnagar 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
7	Chowadi 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			160	Commissioned	2022-23
8	Hiranagar 220 kV S/s	Jammu & Kashmir	220/132 kV	S/s			80	Planned	2026-27
9	ICT augmentation at Udhampur	Jammu & Kashmir	220/132 kV	S/s			160	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
10	Wahipora 220 kV S/s	Jammu & Kashmir	220/132 kV	S/s			160	Planned	2026-27
11	Badampora 220 kV GIS S/s	Jammu & Kashmir	220/132 kV	S/s			160	Planned	2026-27
12	Mattan 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			160	Planned	2026-27
13	Nillow (Kapren) Kulgam 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			160	Planned	2026-27
14	ICT augmentation at Budgam	Jammu & Kashmir	220/132 kV	S/s			150	Planned	2026-27
15	ICT augmentation at Mirbazar	Jammu & Kashmir	220/132 kV	S/s			155	Planned	2026-27
16	ICT augmentation at Zainkote	Jammu & Kashmir	220/132 kV	S/s			165	Planned	2026-27
17	Sheeri 220 kV GIS S/s	Jammu & Kashmir	220/33 kV	S/s			160	Planned	2026-27
18	Batkote (Pahalgam) 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
19	Gulmarg 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
20	Tral 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			100	Planned	2026-27
21	Piglena (Pulwama) 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			160	Planned	2026-27
22	Bijbehara 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			100	Planned	2026-27
23	Qazigund 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
24	Gagangeer (Nilgrar) 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
25	Khan Sahib (Beerwah) 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			50	Planned	2026-27
26	Lollipora (Budgam) 220 kV S/s	Jammu & Kashmir	220/33 kV	S/s			100	Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(B)	**Transmission Lines**	Jammu & Kashmir							
1	Siot - Rajouri-II 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	110.0		Planned	2026-27
2	Siot - Katra-II 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	110.0		Planned	2026-27
3	Siot - Akhnoor-II 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	120.0		Planned	2026-27
4	Akhnoor-II - Barn 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	30.0		Planned	2026-27
5	Samba-II - Chowadi 220 kV D/c line along with S/c LILO of above line at Ramgarh S/s	Jammu & Kashmir	220 kV	Line	D/c	40.0		Planned	2026-27
6	Chowadi - Nagrota - Katra-II 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	110.0		Planned	2026-27
7	LILO of Gladni - Udhampur 220 kV S/c line at Nagrota S/s	Jammu & Kashmir	220 kV	Line	D/c	10.0		Planned	2026-27
8	LILO of Sarna - Udampur 220 kV S/c line at Gurah Karyal S/s	Jammu & Kashmir	220 kV	Line	D/c	4.0		Planned	2026-27
9	LILO of Sarna - Udampur 220 kV S/c line at Ramnagar S/s	Jammu & Kashmir	220 kV	Line	D/c	48.0		Planned	2026-27
10	LILO of both ckts of Delina - Kishanganga 220 kV D/c line (PGCIL) at Wahipora S/s	Jammu & Kashmir	220 kV	Line	2xD/c	140.0		Planned	2026-27
11	Kunzar- Sheeri 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	80.0		Planned	2026-27
12	LILO of one circuit of Mirbazar - Wagoora 220 kV D/c line at (Pinglena) Pulwama S/s	Jammu & Kashmir	220 kV	Line	D/c	24.0		Planned	2026-27
13	New Wanpoh - Mattan 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	30.0		Planned	2026-27
14	LILO of one circuit of New Wanpoh - Alusteng 220 kV D/c line at Tral S/s	Jammu & Kashmir	220 kV	Line	D/c	40.0		Planned	2026-27
15	LILO of Alusteng - Leh 220 kV S/c line at Gangangeer(Sonamarg)(Nilgrar) S/s	Jammu & Kashmir	220 kV	Line	D/c	5.0		Planned	2026-27
16	LILO of both ckts of 220 kV Wagoora - Kishenganga 220 kV D/c line at Khansahib (Beerwah) S/s	Jammu & Kashmir	220 kV	Line	2xD/c	48.0		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
17	LILO of 1st ckt. of Kishenpur - Pampore 220 kV D/c line at Nillow (New Kulgam) S/s	Jammu & Kashmir	220 kV	Line	D/c	30.0		Planned	2026-27
18	LILO of 2nd ckt. of Kishenpur - Pampore 220 kV D/c line at Qazigund S/s	Jammu & Kashmir	220 kV	Line	D/c	6.0		Planned	2026-27
19	LILO of 1st ckt. of proposed Kunzer - Sheeri 220 kV D/c line at Gulmarg S/s	Jammu & Kashmir	220 kV	Line	D/c	16.0		Planned	2026-27
20	LILO of 2nd ckt. of proposed Kunzer - Sheeri 220 kV D/c line at Loolipora S/s	Jammu & Kashmir	220 kV	Line	D/c	8.0		Planned	2026-27
21	Mattan - Bijbehara (Sallar) 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	30.0		Planned	2026-27
22	Sallar (Bijbehara) - Pahalgam (Batkote) 220 kV D/c line	Jammu & Kashmir	220 kV	Line	D/c	10.0		Planned	2026-27
23	LILO of one ckt. of Zainkote – Alusteng 220 kV line at Badampora GIS S/s	Jammu & Kashmir	220 kV	Line	D/c	4.8		Planned	2026-27
	Punjab								
(A)	**New sub-stations / ICT augmentation**								
1	Doraha (Dhanansu) 400 kV S/s	Punjab	400/220 kV	S/s			500	Commissioned	2023-24
2	Doraha (Dhanansu) 400 kV S/s	Punjab	400/220 kV	S/s			500	Under Construction	2024-25
3	Nakodar 400 kV S/s (Aug of 315 MVA by 500 MVA)	Punjab	400/220 kV	S/s			185	Commissioned	2023-24
4	Nakodar 400 kV S/s	Punjab	400/220 kV	S/s			500	Under Construction	2024-25
5	Rajpura 400 kV S/s	Punjab	400/220 kV	S/s			500	Commissioned	2022-23
6	Rajpura 400 kV S/s	Punjab	400/220 kV	S/s			500	Under Construction	2025-26
7	Behman Jassa Singh 400 kV S/s	Punjab	400/220 kV	S/s			1000	Under Construction	2025-26
8	Ropar (New) 400 kV S/s	Punjab	400/220 kV	S/s			1000	Under Construction	2024-25
9	220 KV S/s Patti (Augmentation of 100 to 160 MVA)	Punjab	220/66 kV	S/s			60	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
10	220 kV S/S BBMB Jamalpur (Augmentation of 100 to 160 MVA)	Punjab	220/66 kV	S/s			100	Commissioned	2022-23
11	220 kV S/S Amloh (Augmentation of 100 to 160 MVA)	Punjab	220/66 kV	S/s			100	Commissioned	2022-23
12	220 kV S/S Malerkotla (Augmentation of 100 to 160 MVA)	Punjab	220/66 kV	S/s			100	Commissioned	2022-23
13	220 KV S/s Ladhowal (Addl. T/f)	Punjab	220/66 kV	S/s			160	Commissioned	2022-23
14	220 KV S/s Bhawanigarh (Addl. T/F)	Punjab	220/66 kV	S/s			100	Commissioned	2022-23
15	220 KV S/s Majra (Addl. T/F)	Punjab	220/66 kV	S/s			100	Commissioned	2022-23
16	220 kV S/S G-1. (Aug. of 2x100 MVA T/F with 2x160 MVA)	Punjab	220/66 kV	S/s			120	Commissioned	2023-24
17	220 kV S/S Sahnewal (Augmentation of 100 MVA 220/66 to 160 MVA)	Punjab	220/66 kV	S/s			100	Commissioned	2023-24
18	220 KV S/s Udhoke (Addl. T/F)	Punjab	220/66 kV	S/s			100	Commissioned	2023-24
19	220 kV S/S Banga (Addl. 100 MVA T/F)	Punjab	220/132 kV	S/s			100	Commissioned	2023-24
20	220 kV S/S Dhandari Kalan-1 (Aug. of 1x100 MVA T/F with 1x160 MVA T/F)	Punjab	220/66 kV	S/s			60	Commissioned	2023-24
21	220 kV S/S Kharar (Aug. of 1x100 MVA T/F with 1x160 MVA T/F)	Punjab	220/66 kV	S/s			60	Commissioned	2023-24
22	220 kV S/S Dhandari Kalan-2 (Aug. of 1x100 MVA T/F with 1x160 MVA T/F)	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
23	220 kV S/S Gurdaspur (1x100 MVA) (Upgraded from 132 kV to 220 kV)	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
24	220 kV S/S Banur (Aug. of 1x100 MVA T/F with 1x160 MVA T/F)	Punjab	220/66 kV	S/s			60	Commissioned	2024-25
25	220 kV S/S Budhlada (1x160 MVA T/F) (Upgraded from 66 kV to 220 kV)	Punjab	220/66 kV	S/s			160	Under Construction	2024-25
26	220 kV S/S Naraingarh (Addl. 100 MVA T/F)	Punjab	220/66 kV	S/s			100	Commissioned	2024-25
27	Sherpur 220kV S/s (u/g from 66kV)	Punjab	220/66 kV	S/s			160	Under Construction	2024-25
28	Sherpur 220kV S/s Addl. 160 MVA	Punjab	220/66 kV	S/s			160	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
29	Augmentation of 1X100 MVA with 1X160 MVA at 220kV MGG-3	Punjab	220/66 kV	S/s			60	Commissioned	2024-25
31	Addl 100 MVA 220/66 KV T/F at 220 KV S/S Majitha (N-1)	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
32	Aug. 100 MVA 220/666 T/F to 160 MVA 220/66 T/F at 220 KV S/S Ghulal.	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
33	Aug 100 to 160 MVA at 220 KV S/S Kartarpur	Punjab	220/66 kV	S/s			60	Commissioned	2024-25
34	Addl 100 MVA at 220 KV S/S Goraya	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
35	Addl 100 MVA 220/66 KV T/F at 220 KV S/S Badhshahpur	Punjab	220/66 kV	S/s			100	Commissioned	2024-25
36	Aug of 100 MVA to 160 MVA at 220KV Humbran	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
37	Addl. 100MVA 220/66kV T/F at 220kV S/Stn Maur.	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
38	Addl. 100MVA 220/66kV T/F at 220kV S/Stn Badni Kalan.	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
39	Aug. of 100MVA 220/66kV T/F to 160MVA 220/66kV T/F at 220kV S/Stn Bajakhana	Punjab	220/66 kV	S/s			60	Commissioned	2024-25
40	Aug of 100 MVA to 160 MVA at GNDTP Bathinda	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
41	Aug 100 to 160 MVA at 220 KV S/S Bassi Pathana	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
42	Aug 100 to 160 MVA at 220 KV S/S Mandi Gobindgarh G-2	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
43	Aug 100 to 160 MVA at 220 KV S/S Rajpura	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
44	Add. 100 MVA 220/66 Kv P/T/F at 220 kv s/s Sandhaur	Punjab	220/66 kV	S/s			100	Under Construction	2024-25
45	Aug 100 to 160 MVA at 220 KV S/S Dhanaula	Punjab	220/66 kV	S/s			60	Under Construction	2024-25
46	Upgradation of 66 kV Ajnala to 220 kV level	Punjab	220/66 kV	S/s			260	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
47	Upgradation of 132 kV Jandiala Guru to 220 kV level	Punjab	220/132 kV	S/s			200	Under Construction	2024-25
48	220 kV Gobindgarh S/s (New Grid in the near by area of existing 220 kV S/s Gobindgarh-I). Includind SAS for RS 1cr. (Pharmaceuticals Wazirabad new)	Punjab	220/66 kV	S/s			320	Under Construction	2024-25
(B)	**Transmission Lines**								
1	Malout-Abohar 220 kV D/c line	Punjab	220 kV	Line	D/c	30.0		Commissioned	2022-23
2	Passiana-Dhablan line (Railway) 220 kV D/c line	Punjab	220 kV	Line	D/c	26.5		Commissioned	2023-24
3	Tibber -Sohal 220 kV D/c line	Punjab	220 kV	Line	D/c	7.4		Commissioned	2022-23
4	Verpal - Dhukhniwaran 220 kV D/c line	Punjab	220 kV	Line	D/c	6.3		Commissioned	2022-23
5	Barnala -Handiaya Rly. S/Stn (Railway Deptt.) 220 kV D/c line	Punjab	220 kV	Line	D/c	1.6		Commissioned	2022-23
6	LILO of one ckt of 220 KV Jamalpur - Dhandari Kalan by replacing 66 KV Existing M Ckt line from TL No.03 upto 66 KV Sherpur to be upgraded to 220 KV. (1.88.*2=3.76)	Punjab	220 kV	Line	D/c	3.8		Under Construction	2024-25
7	Mansa - Budhlada 220 kV D/c line (25.5*2=51)	Punjab	220 kV	Line	D/c	51.0		Under Construction	2024-25
8	LILO of Sarna -Wadala Granthian 220 kV line at Gurdaspur S/s	Punjab	220 kV	Line	D/c	15.7		Commissioned	2024-25
9	Bhari -Daheru Railway TSS.(DFCCIl Deposit Work) 220 kV D/c line	Punjab	220 kV	Line	D/c	26.5		Commissioned	2023-24
10	LILO of Mansa - Sunam 220 kV S/c line at 400 kV S/Stn Patran S/s	Punjab	220 kV	Line	D/c	85.5		Commissioned	2024-25
11	LILO of one ckt. of Jalandhar-Kurukshetra 400 kV D/c line at Dhanansu S/s	Punjab	400 kV	Line	D/c	10.0		Commissioned	2023-24
12	LILO of Kohara – Sahnewal 220 kV S/c line at Dhanansu S/s	Punjab	220 kV	Line	D/c	24.0		Commissioned	2022-23
13	Doraha (400 kV) – Doraha (220 kV) 220 kV D/c line	Punjab	220 kV	Line	D/c	20.0		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
14	LILO of one ckt of Jamalpur (BBMB)-Ganguwal 220 kV D/c line at Dhanansu S/s	Punjab	220 kV	Line	D/c	16.0		Under Construction	2024-25
15	Gaunsgarh – Ladhowal 220 kV D/c line	Punjab	220 kV	Line	D/c	36.0		Commissioned	2022-23
16	Mukatsar -Fazilka 220 kV D/c line	Punjab	220 kV	Line	D/c	50.0		Under Construction	2025-26
17	LILO of both ckt of Ludhina PGCIL– Koldam 400 kV D/c line at Ropar S/s	Punjab	400 kV	Line	2xD/c	60.0		Under Construction	2025-26
18	LILO of 2nd ckt of Jallandhar–Kurukshetra 400 kV D/c line at Dhanansu S/s	Punjab	400 kV	Line	D/c	10.0		Planned	2025-26
19	LILO of Gobindgarh-I - Bassi Pathana 220 kV S/c line at Gobindgarh S/s	Punjab	220 kV	Line	D/c	14.0		Under Construction	2025-26
20	LILO of GS/sTP - Gobindgarh-I 220 kV S/c line at Gobindgarh (new) S/s	Punjab	220 kV	Line	D/c	14.0		Under Construction	2025-26
21	LILO of Verpal – Wadala Granthian & Verpal-Udhoke 220 kV S/c lines at Nawanpind S/s	Punjab	220 kV	Line	2xD/c	4.0		Planned	2025-26
	Ladakh								
(A)	**New sub-stations / ICT augmentation**								
1	Padum 220 kV S/s	Ladakh	220/33 kV	S/s			50	Under Construction	2025-26
2	Diskit 220 kV S/s	Ladakh	220/33 kV	S/s			50	Under Construction	2025-26
(B)	**Transmission Lines**								
1	Phyang - Diskit (Nubra) 220 kV S/c line on D/c Towers	Ladakh	220 kV	Line	S/c	78.0		Under Construction	2025-26
2	Drass - Padum (Zanaskar) 220 kV S/c line on D/c Towers	Ladakh	220 kV	Line	S/c	189.0		Under Construction	2025-26
	Maharashtra								
(A)	**New sub-stations / ICT augmentation**								
1	Lonar 220 kV S/s	Maharashtra	220/132/33 kV	S/s			250	Planned	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
2	Nandgaon Peth 400 kV S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2026-27
3	Kurunda 220 kV S/s	Maharashtra	220/132 kV	S/s			200	Commissioned	2022-23
4	Shendra DMIC 220 kV GIS S/s	Maharashtra	220/33 kV	S/s			100	Commissioned	2023-24
5	Bidkin DMIC 220 kV GIS	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
6	Sarul 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
7	Kesurdi MIDC 220 kV S/s	Maharashtra	220/132/33 kV	S/s			100	Planned	2024-25
8	Kasbe Digraj (MIDC) 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
9	Uppalwadi 220 kV S/s	Maharashtra	220/33 kV	S/s			300	Commissioned	2022-23
10	New Pardi 220 kV S/s	Maharashtra	220/33 kV	S/s			350	Commissioned	2022-23
11	Mankapur 220 kV S/s	Maharashtra	220/33 kV	S/s			300	Under construction	2024-25
12	Kadholi 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
13	Pachgaon (Kuhi) 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Under construction	2024-25
14	Sakoli 220 kV S/s	Maharashtra	220/33 kV	S/s			50	Planned	2024-25
15	Yenwa 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
16	Pimpalgaon 220 kV S/s	Maharashtra	220/132 kV	S/s			200	Commissioned	2022-23
17	Pimpalgaon 400 kV S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26
18	Deosane 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
19	Balsane 400 kV S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26
20	Nandurbar 220 kV S/s	Maharashtra	220/132 kV	S/s			200	Planned	2024-25
21	Malegaon (Saundane) 400 kV S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26
22	Supa MIDC 220 kV S/s	Maharashtra	220/33 kV	S/s			300	Planned	2024-25
23	Upgradation of 132 kV Igatpuri to 220 kV GIS	Maharashtra	220/132 kV	S/s			200	Planned	2024-25
24	Akarale (Lakhmapur) 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
25	Shrirampur 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
26	Adawadi 220 kV S/s	Maharashtra	220/33 kV	S/s			200	Planned	2024-25
27	Khed City (Retwadi) 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Commissioned	2023-24
28	Mundhale 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
29	Waghdari 220 kV S/s	Maharashtra	220/132 kV	S/s			200	Planned	2024-25
30	Diva (Saswad) New Scheme 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
31	Talegaon MIDC Phase II 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2024-25
32	Marunje / Balewadi 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
33	Watwate 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
34	Bhugaon 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2024-25
35	New Timber Market GIS / Panvel-II 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Commissioned	2024-25
36	Pawane (MIDC) 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Commissioned	2022-23
37	Palghar 220 kV S/s	Maharashtra	220/33 kV	S/s			300	Commissioned	2022-23
38	Ulwe Node GIS 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Commissioned	2022-23
39	Abhitghar (Wada) 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Under construction	2024-25
40	Mankoli / Bhiwandi 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Under construction	2024-25
41	Virar (West) / Chikhal Dongri 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
42	Virar (East) (Kopari)/HDIL 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
43	Kaman (Vasai)/Kharbahv 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
44	Kalwa -II 400 kV S/s GIS S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26
45	Velgaon 400 kV S/s	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26
46	Neral 400 kV Switching station	Maharashtra	400 kV	S/s				Planned	2025-26
47	Mukund 400 kV S/S	Maharashtra	400/220 kV	S/s			1000	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
48	Manor 220 kV	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
49	Goregaon Filmcity 220 kV GIS S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
50	Panchanand/Taloja 220 kV S/s	Maharashtra	220/33 kV	S/s			100	Planned	2025-26
51	Coromondal 400 kV S/S	Maharashtra	400/220 kV	S/s			2000	Planned	2025-26
52	Palaspe 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2026-27
53	Horizon Devlopers (W) 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
54	Dhokali/Pachpakhadi 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
55	Pale 220 kV S/s	Maharashtra	220/22 kV	S/s			100	Planned	2025-26
56	220 kV Switching S/s at Ghodbunder (Augmentation of Borivali-Ghodbunder-Boisar LILO line)	Maharashtra	220 kV	S/s				Planned	2025-26
57	BKC (Golibar) 220 kV GIS S/s	Maharashtra	220/33 kV	S/s			250	Under construction	2024-25
58	Chandivali 220 kV GIS S/s	Maharashtra	220/33 kV	S/s			250	Under construction	2025-26
59	Kandivali 220 kV GIS S/s	Maharashtra	220/33 kV	S/s			250	Planned	2026-27
60	Dahisar 220 kV GIS S/s	Maharashtra	220/33 kV	S/s			250	Planned	2026-27
61	220 kV Scheme at Uttan/ Rai Village(New Scheme)	Maharashtra	220/33 kV	S/s			250	Planned	2026-27
62	1000 MW, HVDC VSC based Convertor station each at Array & Kudus	Maharashtra	320 kV	HVDC			1000	Under Construction	2025-26
63	Vile Parle 220 kV S/s	Maharashtra	220/33 kV	S/s			180	Planned	2026-27
64	400 kV Level Creation at Dharavi	Maharashtra	400/220 kV	S/s			1000	Planned	2026-27
65	220/132 kV at 220/33 kV S/S Dhamangaon	Maharashtra	220/33 kV	s/s			200	Planned	2024-25
66	GMR 400 kV S/s	Maharashtra	400/220 kV	s/s			315	Under construction	2024-25
67	Akola 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Commissioned	2022-23
68	Balapur 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Commissioned	2022-23
69	Anjangaon 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
70	Malegaon 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Commissioned	2022-23
71	Malkapur 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Under construction	2024-25
72	Nandgaon Peth 2nd ICT (1x100) MVA 220/132 kV	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
73	Thaptitanda 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Planned	2025-26
74	Ektuni 765 kV S/s	Maharashtra	765/400 kV	S/s			1500	Planned	2025-26
75	Kumbhargaon 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Planned	2025-26
76	Paranda 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
77	Jalkot 220 kV (RE) S/s	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
78	Narangwadi 220 kV (RE) S/s	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
79	Tuljapur 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
80	New Koyna 400 kV S/s	Maharashtra	400/220 kV	S/s			315	Commissioned	2022-23
81	Satara MIDC 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Commissioned	2022-23
82	Niwali 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Commissioned	2022-23
83	Alkud 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Planned	2024-25
84	Kolhapur 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Planned	2024-25
85	Sicom 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Planned	2024-25
86	Khadka 400 kV S/s	Maharashtra	400/220 kV	S/s			315	Under construction	2024-25
87	Babhaleshwar 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Commissioned	2023-24
88	Chalisgaon 220 kV S/s	Maharashtra	220/132 kV	S/s			200	Commissioned	2024-25
89	Shivajinagar 220 kV S/s	Maharashtra	220/132 kV	S/s			100	Under construction	2024-25
90	Lamboti 400 kV S/s	Maharashtra	400/220 kV	S/s			500	Planned	2025-26
91	Nagothane 1x500MVA 400/220 kV ICT	Maharashtra	400/220 kV	S/s			500	Planned	2025-26
92	Kharghar 1x500MVA 400/220 kV ICT	Maharashtra	400/220 kV	S/s			500	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
93	Vikhroli 2 x 250 MVA 220 / 110 kV ICTs with 220 kV Cable	Maharashtra	220/110 kV	S/s			500	Commissioned	2024-25
94	Waghivali 2 x 250 MVA 220 / 110 kV ICTs with 220 kV Cable	Maharashtra	220/110 kV	S/s			500	Commissioned	2024-25
95	Butibori I 2 X (200-100)MVA, 220/132 kV	Maharashtra	220/132 kV	S/s			200	Planned	2024-25
96	Babhleshwar 400/220 kV (4th ICT)	Maharashtra	400/220 kV	S/s			500	Commissioned	2023-24
97	Dhule 3 x (167-105)MVA 400/220 kV (third ICT replacement existing 2x500MVA +1x315)	Maharashtra	400/220 kV	S/s			185	Planned	2025-26
98	220 kV Babhaleshwar 1x(200-100)MVA 220/132 kV	Maharashtra	220/132 kV	S/s			100	Planned	2025-26
99	220 kV Kekatnimbhora 1X100 MVA 220/132 kV ICT (RE)	Maharashtra	220/132 kV	S/s			100	Planned	2024-25
100	Lonikand II 2X(200-100)MVA 220/132 kV (New scheme)	Maharashtra	220/132 kV	S/s			200	Planned	2024-25
101	Jeur 1X(200-100)MVA 220/132 kV	Maharashtra	220/132 kV	S/s			100	Under construction	2024-25
102	Walchandnagar 1X(200-100)MVA 220/132 kV	Maharashtra	220/132 kV	S/s			100	Under construction	2024-25
103	Pandharpur 1X(200-100)MVA 220/132-100kV	Maharashtra	220/132 kV	S/s			100	Commissioned	2023-24
104	Chakan Phase II 2X(200-100) MVA 220/132 kV	Maharashtra	220/132 kV	S/s			200	Under construction	2024-25
105	Nagothane 500 MVA (ICT)	Maharashtra	400/220 kV	S/s			500	Under Construction	2024-25
106	Boisar -II 1x(200-150)MVA 220/132 kV	Maharashtra	220/132 kV	S/s			50	Commissioned	2023-24
107	Padgha 1 X(500-315)MVA 400/220 kV	Maharashtra	400/220 kV	S/s			185	Under Construction	2024-25
108	Nagothane 1 x (500-315)MVA 400/220 kV (Second ICT)	Maharashtra	400/220 kV	S/s			185	Planned	2025-26
109	Kharghar 2 x (500-315)MVA 400/220 kV	Maharashtra	400/220 kV	S/s			370	Planned	2025-26
110	Tambati 2x(200-100)MVA 220/132 kV	Maharashtra	220/132 kV	S/s			200	Planned	2025-26
111	Salsette 2 x 250 MVA, 220 kV / 110 kV / 22 kV ICT 1 & 2	Maharashtra	220/110 kV	S/s			250	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(B)	**Reactors**								
1	1x125 MVAR at Akola	Maharashtra	400 kV	S/s				Commissioned	2022-23
2	5x50MVAR, Line Reactors at 400 kV Girwali Substation	Maharashtra	400 kV	S/s				Planned	2024-25
3	1x125MVAR 400 kV Nanded	Maharashtra	400 kV	S/s				Commissioned	2023-24
4	1X125 MVAr 400 kV at Thaptitanda	Maharashtra	400 kV	S/s				Under construction	2024-25
5	1X125 MVAr 400 kV at Waluj	Maharashtra	400 kV	S/s				Planned	2024-25
6	Replacement of 1 x (125-50) MVAr 400 kV at Girawali	Maharashtra	400 kV	S/s				Under construction	2024-25
7	New 125 MVAr bus reactor at 400 kV New Koyna	Maharashtra	400 kV	S/s				Planned	2024-25
8	1X125 MVAr, Koradi -II	Maharashtra	400 kV	S/s				Commissioned	2022-23
9	1x125MVAR Chandrapur Switching	Maharashtra	400 kV	S/s				Planned	2024-25
10	3 x 50 MVAR Shunt reactor for Chandrapur -Parli/Nanded T/c (Line Reactor)	Maharashtra	400 kV	S/s				Commissioned	2023-24
11	Replacement of 1 X (125 - 50) MVAr, Khadka	Maharashtra	400 kV	S/s				Planned	2024-25
12	Replacement of 1 X (125 - 80) MVAr, Babhaleshwar	Maharashtra	400 kV	S/s				Commissioned	2023-24
13	1X125 MVAr, Jejuri	Maharashtra	400 kV	S/s				Planned	2024-25
14	1x125 MVAr Chakan	Maharashtra	400 kV	S/s				Planned	2024-25
15	Replacement of 1x(125-50)MVAr Lonikand I	Maharashtra	400 kV	S/s				Planned	2024-25
16	400 kV, (1 X 125 MVAr at Kalwa)	Maharashtra	400 kV	S/s				Under construction	2024-25
17	400 kV, (1 X 125 MVAr at Kudus)	Maharashtra	400 kV	S/s				Planned	2024-25
18	220 kV, 1 x 125 MVAR at Mahalaxmi	Maharashtra	220 kV	S/s				Under construction	2024-25
19	220 kV, 1 x 125 MVAR at Salsette	Maharashtra	220 kV	S/s				Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
20	220 kV, 1 x 125 MVAR Trombay	Maharashtra	220 kV	S/s				Under construction	2024-25
21	220 kV, 1x125 MVAR Reactor at Chembur	Maharashtra	220 kV	S/s				Under construction	2025-26
(C)	**Transmission Lines**								
1	220 kV Kalmeshwar - Warud D/c Line	Maharashtra	220 kV	Line	D/c	171.3		Commissioned	2023-24
2	220 kV Wani – Pandharkawada D/c Line	Maharashtra	220 kV	Line	D/c	120		Commissioned	2023-24
3	220 kV Malegaon - Lonar D/c line	Maharashtra	220 kV	Line	D/c	144		Planned	2024-25
4	LILO of 400 kV Koradi-M/s RIPL S/c line at Nandgaonpeth S/s	Maharashtra	400 kV	Line	D/c	10		Planned	2026-27
5	220 kV Nandgaonpeth-Nandgaonpeth D/c line	Maharashtra	220 kV	Line	D/c	2		Planned	2026-27
6	220 kV Nandgaonpeth - Anjangaon D/c line	Maharashtra	220 kV	Line	D/c	120		Planned	2026-27
7	220 kV Nandgaonpeth - Warud D/c line	Maharashtra	220 kV	Line	D/c	120		Planned	2026-27
8	220 kV Nanded (Kumbhargaon) - Kurunda D/c line	Maharashtra	220 kV	Line	D/c	100		Commissioned	2023-24
9	LILO of one circuit of 220 kV Aurangabad (PG) – Shendra D/c line at 220 kV Shendra (AURIC) (DMIC Project)	Maharashtra	220 kV	Line	D/c	16		Under construction	2024-25
10	LILO of 220 kV Chitepimpalgaon - Chitegaon S/c line at Bidkin DMIC S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2024-25
11	LILO of 220 kV Beed-Manjarsumbha S/c line at Sarul S/s	Maharashtra	220 kV	Line	D/c	40		Planned	2025-26
12	220 kV Jejuri –Kesurdi S/c line	Maharashtra	220 kV	Line	S/c	25		Planned	2025-26
13	LILO of 220 kV Karad - Miraj S/c line at Kasbe Digraj S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2024-25
14	220 kV Koradi-II - Uppalwadi D/c line	Maharashtra	220 kV	Line	D/c	15		Commissioned	2022-23
15	220 kV Uppalwadi - Pardi D/c UG cable line	Maharashtra	220 kV	Line	D/c	25		Under construction	2024-25
16	220 kV Umred - Nagbhid D/c line	Maharashtra	220 kV	Line	D/c	92		Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
17	220 kV Uppalwadi-Mankapur D/c U/G cable	Maharashtra	220 kV	Line	D/c	18		Under construction	2024-25
18	LILO of one ckt of 220 kV Kanhan - Bhandara line at 220 kV Kadholi S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2025-26
19	LILO of one ckt of 220 kV Kanhan – Umred D/c Line at Pachgaon s/s	Maharashtra	220 kV	Line	D/c	30		Planned	2025-26
20	220 kV Sakoli Bhandara D/c line	Maharashtra	220 kV	Line	D/c	80		Planned	2024-25
21	LILO of one circuit of 220 kV Kalmeshwar-Warud D/c line at 220 kV Yenwa S/s	Maharashtra	220 kV	Line	D/c	1		Planned	2025-26
22	220 kV Koradi - Mankapur D/c line	Maharashtra	220 kV	Line	D/c	6		Planned	2025-26
23	LILO of one ckt of Nagar - Bhose 220 kV line at 400 kV Karjat S/s	Maharashtra	400 kV	Line	D/c	76		Commissioned	2022-23
24	220 kV Pimpalgaon - GCR & ECR Eklahre D/c line	Maharashtra	220 kV	Line	D/c	88		Commissioned	2022-23
25	LILO of 400 kV A'bad PG-Boisar (PG) DC line at 400 kV Pimpalgaon S/s	Maharashtra	400 kV	Line	D/c	3		Planned	2025-26
26	220 kV Pimpalgaon New - Pipalgaon DC line	Maharashtra	220 kV	Line	D/c	1		Planned	2025-26
27	Reorientation of 220 kV Eklahre - Pimpalgaon line to form 220 kV Eklahare - Pimpalgaon New line	Maharashtra	220 kV	Line	D/c	1		Planned	2025-26
28	LILO on one circuit of 220 kV Nashik (OCR) – Navsari D/c line at proposed 220/33 kV Deosane S/s	Maharashtra	220 kV	Line	D/c	30		Planned	2025-26
29	LILO of one circuit of 220 kV Ahmednagar - Bhose D/c line at Supa S/s	Maharashtra	220 kV	Line	D/c	40		Planned	2024-25
30	LILO of 220 kV Babhaleshwar – Bhenda S/c line at 220 kV Shrirampur S/s	Maharashtra	220 kV	Line	D/c	5		Planned	2025-26
31	LILO of 220 kV GCR Nashik - Ghatghar S/c line at 220 kV Adwadi S/s	Maharashtra	220 kV	Line	D/c	18		Planned	2025-26
32	220 kV Babhleshwar-Adwadi D/c line	Maharashtra	220 kV	Line	D/c	126		Planned	2025-26
33	LILO of both ckt 400 kV Sardarsrovar-Dhule D/c line at Balsane S/s	Maharashtra	400 kV	Line	D/c	36		Planned	2025-26

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34	220 kV Balsane -Shivajinagar D/c line	Maharashtra	220 kV	Line	D/c	36		Planned	2025-26
35	220 kV Balsane -Vikharan D/c line	Maharashtra	220 kV	Line	D/c	24		Planned	2025-26
36	LILO of one ckt. of 220 kV Dondaicha - Jamde D/c line at Nandurbar MIDC S/s	Maharashtra	220 kV	Line	D/c	50		Planned	2024-25
37	LILO of Eklahare - AKP 220 kV S/c line proposed 220 kV Igartpuri S/s	Maharashtra	220 kV	Line	D/c	30		Planned	2024-25
38	LILO of both ckts of Dhule-Babhaleshwar 400 kV DC line at proposed 400 kV Malegaon (Saundane) S/s	Maharashtra	400 kV	Line	D/c	92		Planned	2025-26
39	LILO of both circkuits of 220 kV Malegaon-Kalwan Line at new proposed 400 kV Malegaon (Saundane) S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2025-26
40	LILO of both circkuits of 220 kV Malegaon-Manmad at new proposed Soundane S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26
41	LILO of both ckt of 220 kV Malegaon-Satana at new proposed Soundane S/s	Maharashtra	220 kV	Line	D/c	30		Planned	2025-26
42	LILO of 400 kV Lonikand I - Koyna Stage IV at Hinjewadi S/s	Maharashtra	400 kV	Line	S/c	195		Under construction	2024-25
43	LILO of one ckt. of 220 kV Lonikand-I – Kathapur D/c line at Khed City S/s	Maharashtra	220 kV	Line	D/c	10		Commissioned	2023-24
44	LILO of 220 kV Lonand-Baramati S/c line at Mundhale S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26
45	LILO of one ckt of 220 kV Solapur PG - Narangwadi D/c line at 220 kV Waghdari S/s	Maharashtra	220 kV	Line	D/c	80		Planned	2025-26
46	LILO of 220 kV Theur-Jejuri S/c line at Diwa S/s	Maharashtra	220 kV	Line	D/c	6		Planned	2024-25
47	220 kV Bhugaon - Pirangut D/c line	Maharashtra	220 kV	Line	D/c	30		Planned	2024-25
48	220 kV Talegaon PG - Talegan MIDC D/c line	Maharashtra	220 kV	Line	D/c	6		Planned	2024-25
49	LILO of 220 kV Chinchwad - Parvati S/c line at 220 kV Marunje S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
50	LILO of 220 kV Lamboti-Pandharpur S/c line at Mangalwedha S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2025-26
51	400 kV Babhaleshwar-Kudus D/c line	Maharashtra	400 kV	Line	D/c	400		Under construction	2024-25
52	LILO of both ckts of 400 kV Tarapur-Padghe line at Kudus S/s	Maharashtra	400 kV	Line	D/c	30		Planned	2025-26
53	LILO of 220 kV Tarapur-Borivali S/c line & Boisar- Ghodbunder S/c line at Kudus S/s	Maharashtra	220 kV	Line	D/c	20		Under construction	2024-25
54	LILO of 220 kV Padghe-Wada S/c line & 220 kV Kolshet-Wada S/c line at 400 kV Kudus S/s	Maharashtra	220 kV	Line	D/c	20		Under construction	2024-25
55	LILO of 220 kV Kandalgaon-Kharghar U/G cable at 220 kV Timber Market S/s	Maharashtra	220 kV	Line	D/c	6		Commissioned	2022-23
56	LILO of one ckt of 220 kV TIFIL-Kalwa U/G cable at 220 kV Pawane S/s	Maharashtra	220 kV	Line	D/c	0.7		Commissioned	2022-23
57	LILO of 220 kV Padghe-Wada S/c line at 220 kV Abhitghar S/s	Maharashtra	220 kV	Line	D/c	9		Under construction	2024-25
58	LILO at Ulwe end on both ckt of UG cable sec. of 220 kV Uran-Kharghar line for 220 kV Ulwe Node S/s	Maharashtra	220 kV	Line	D/c	6		Commissioned	2023-24
59	LILO of 220 kV Boisar (PG)-Nalasopara S/c line at Palghar S/s	Maharashtra	220 kV	Line	D/c	20		Commissioned	2022-23
60	LILO of 220 kV Boisar (PG)-Vasai S/c line on D/c / M/C towers at 220 kV Kopari S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26
61	LILO of 220 kV Boisar (PG)-Vasai S/c line at 220 kV Chikhal Dongari S/s	Maharashtra	220 kV	Line	D/c	8		Planned	2025-26
62	LILO of 220 kV Kalwa-Bapgaon S/c line at Mankoli S/s	Maharashtra	220 kV	Line	D/c	0.6		Under construction	2024-25
63	LILO of 220 kV Kamba-Vasai S/c line at Kaman S/S S/s	Maharashtra	220 kV	Line	D/c	2		Planned	2025-26
64	LILO of both circuits of 200 kV Tarapur-Kudus II D/c line at Velgaon S/s	Maharashtra	220 kV	Line	D/c	40		Planned	2024-25
65	LILO of 400 kV Kalwa-Padghe Ckt I at 400 kV Estela Mukund S/s	Maharashtra	400 kV	Line	D/c	8		Planned	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
66	LILO 220 kV Boisar-Borivali S/c line at Velgaon S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2024-25
67	LILO of one ckt. of 220 kV Dahanu-Ghodbundre D/c line at Velgaon S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2024-25
68	LILO of 220 kV Dahanu-Versova S/c line at Velgaon S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2024-25
69	LILO of 220 kV Boisar-Versova S/c line at Velgaon S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2024-25
70	LILO of 400 kV Kalwa – Kharghar S/c line at 400 kV Estela Coromandel S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26
71	LILO of 220 kV Baapgaon - Kalwa S/c line at Horizon Developers /Dombivali S/s	Maharashtra	220 kV	Line	D/c	20		Planned	2025-26
72	LILO of 220 kV Temghar - Colourchem S/c line at 220 kV Dhokali /PachpakhdaiS/s	Maharashtra	220 kV	Line	D/c	10		Planned	2025-26
73	220 kV Jambhul - Pale D/c line	Maharashtra	220 kV	Line	D/c	50		Planned	2025-26
74	LILO of 220 kV Kharghar - Kandalgaon S/c line at 220 kV Palaspe S/s	Maharashtra	220 kV	Line	D/c	10		Planned	2026-27
75	220 kV Chembur - BKC EHV D/c Line (U/G cable)	Maharashtra	220 kV	Line	D/c	24		Under construction	2024-25
76	LILO of 220 kV TPC Salsette – Saki S/c line at Chandivali EHV S/s	Maharashtra	220 kV	Line	D/c	1		Under construction	2025-26
77	LILO of 220 kV Boisar-Versova Line at Kandivali S/s	Maharashtra	220 kV	Line	D/c	8.4		Planned	2026-27
78	220 kV Ghodbunder - Dahisar D/c Line (U/G cable)	Maharashtra	220 kV	Line	D/c	13		Planned	2026-27
79	220 kV Versova - Khardanda D/c UG cable	Maharashtra	220 kV	Line	D/c	18		Planned	2025-26
80	1000 MW HVDC Terminal Stations at Kudus & Aarey and HVDC line	Maharashtra	320 kV	Line	D/c	80		Under Construction	2025-26
81	220 kV Versova-Vile Parle D/c U/G cable	Maharashtra	220 kV	Line	D/c	4		Planned	2026-27
82	400 kV Vikhroli - Dharavi S/c line	Maharashtra	400 kV	Line	S/c	13		Planned	2026-27
83	220 kV line from Wardha PG to Yavatmal LILO Point (Part A)	Maharashtra	220 kV	Line	D/c	50		Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
84	220 kV Yavatmal LILO pt -Ghatodi D/c line (Balance work of Deoli-Ghatodi)	Maharashtra	220 kV	Line	D/c	116		Commissioned	2023-24
85	LILO of 400 kV Bhusawal-II - Waluj S/c line at Tapthitanda S/s	Maharashtra	400 kV	Line	D/c	177		Under construction	2024-25
86	220 kV Nagewadi - Bhokardan D/c	Maharashtra	220 kV	Line	D/c	100		Under construction	2024-25
87	220 kV Interconnection between 220 kV Murud -Tuljapur and Barshi Osmanabad	Maharashtra	220 kV	Line	S/c	0.5		Planned	2025-26
88	LILO on one circuit of 220 kV Chikhali - Jalna line at Nagewadi S/s	Maharashtra	220 kV	Line	D/c	30		Under construction	2024-25
89	220 kV Jeur - Paranda D/c line	Maharashtra	220 kV	Line	D/c	70		Planned	2024-25
90	220 kV Patoda-Sonewadi D/c line	Maharashtra	220 kV	Line	D/c	160		Planned	2025-26
91	220 kV Georai-Partur D/c line	Maharashtra	220 kV	Line	D/c	160		Planned	2026-27
92	220 kV Karad - Koyna (KDPH) S/c line	Maharashtra	220 kV	Line	S/c	7		Under construction	2024-25
93	LILO of one ckt of 220 kV Mhaishal - Jath line at Alkud S/s	Maharashtra	220 kV	Line	D/c	46		Under construction	2024-25
94	220 kV GMR - Sai Wardha D/c UG cable	Maharashtra	220 kV	Line	D/c	7		Under construction	2024-25
95	220 kV Koradi -II - Buttibori - III D/c Line	Maharashtra	220 kV	Line	D/c	105		Planned	2026-27
96	LILO of one circuit of 220 kV Koradi- II - Kaluwada D/c line at Ultratech S/s.	Maharashtra	220 kV	Line	D/c	34		Planned	2026-27
97	220 kV Taptitanda - Amrapur D/c line	Maharashtra	220 kV	Line	D/c	150		Commissioned	2022-23
98	220 kV Jeur - Karajat D/c line	Maharashtra	220 kV	Line	D/c	104		Under construction	2024-25
99	LILO of one circuit of 220 kV Bhigwan-Kurkumb line at 400 kV Karjat S/s	Maharashtra	220 kV	Line	D/c	36		Under construction	2024-25
100	220 kV Bhenda - Vishwind D/c line	Maharashtra	220 kV		D/c	140		Under construction	2024-25
101	220 kV Babhaleswar - Kopargaon S/c line	Maharashtra	220 kV	Line	S/c	36		Planned	2024-25
102	LILO of 400 kV Karad - Lonikand S/c line at Jejuri S/s	Maharashtra	400 kV	Line	D/c	1.7		Commissioned	2022-23
103	220 kV Jejuri - Lonand & Lonand-Baramati S/c line	Maharashtra	220 kV	Line	S/c	14		Under construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
104	220 kV Solapur (PG) - Bale D/c Line	Maharashtra	220 kV	Line	D/c	80		Under construction	2024-25
105	LILO of 220 kV Chinchwad - Telco S/c line at Chakan II S/s	Maharashtra	220 kV	Line	D/c	18		Planned	2024-25
106	220 kV TalegaonPG-Chakan D/c line	Maharashtra	220 kV	Line	D/c	12		Planned	2024-25
107	220 kV Shikrapur PG - Khed City D/c line	Maharashtra	220 kV	Line	D/c	20		Under Construction	2024-25
108	220 kV Shikrapur PG- Ranjangaon D/c line	Maharashtra	220 kV	Line	D/c	10		Under Construction	2024-25
109	Reorientation of 220 kV Babhleshwar - Ranjagaon ckt & Lonikand - Ranjangaon Ckt at Khed City	Maharashtra	220 kV	Line	D/c	10		Under Construction	2024-25
110	220 kV Urse - Chinchwad S/c line	Maharashtra	220 kV	Line	S/c	20		Under construction	2024-25
111	220 kV Chinchwad - Kandalgaon S/c line	Maharashtra	220 kV	Line	S/c	28		Under construction	2024-25
112	LILO of 400 kV Lonikand-I Jejuri at 765kV Shikrapur PG S/s	Maharashtra	400 kV	Line	D/c	60		Planned	2024-25
113	220 kV Nagothane-Wadkhal D/c line (2nd)	Maharashtra	220 kV	Line	D/c	54		Planned	2024-25
114	220 kV Padghe - Padghe PG D/c Line	Maharashtra	220 kV	Line	D/c	14		Planned	2024-25
115	LILO of 220 kV Bombay Dyeing-Sahara S/c line at 220 kV Tambati S/s	Maharashtra	220 kV	Line	D/c	2		Planned	2024-25
116	Conversion of 400 kV S/c to D/c Kalwad-Padghe Ckt I & II	Maharashtra	400 kV	Line	D/c	104		Planned	2025-26
117	220 kV Trombay to Dharavi and Salsette (Interconnection with Saki) (Multi-circuit)	Maharashtra	220 kV	Line	M/c	59		Commissioned	2023-24
118	220 kV Kalwa - Salsette line # 5	Maharashtra	220 kV	Line	S/c	10		Commissioned	2023-24
119	220 kV Tata Waghivli - MSETCL's Waghivli D/c line	Maharashtra	220 kV	Line	D/c	0.8		Commissioned	2024-25
	2nd ckt stringing								
120	220 kV Badnera-Ner S/c on D/c line	Maharashtra	220 kV	Line	S/c	43		Planned	2024-25
121	220 kV Ghatodi - Hingoli S/c on D/c line	Maharashtra	220 kV	Line	S/c	86		Planned	2025-26
122	220 kV Dondaicha - Shahada S/c on D/c line	Maharashtra	220 kV	Line	S/c	27		Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
123	220 kV Theur-Magarpatta S/c on D/c line	Maharashtra	220 kV	Line	S/c	16.5		Planned	2024-25
124	220 kV Lamboti-Vairag S/c on D/c line	Maharashtra	220 kV	Line	S/c	35		Planned	2024-25
125	220 kV Salsette - Backbay (Carnac) S/c on D/c line	Maharashtra	220 kV	Line	S/c	35		Planned	2024-25
	Reconductoring								
126	Reconductoring of 220 kV Beed-Patoda/Manjarsumbha D/c line	Maharashtra	220 kV	Line	D/c	75		Planned	2024-25
127	Reconductoring of 220 kV Talandage - Tilawani D/c line	Maharashtra	220 kV	Line	D/c	13		Planned	2025-26
128	Reconductoring of 400 kV Chandrapur GCR - Chandrapur - II DC Line	Maharashtra	400 kV	Line	D/c	5		Planned	2024-25
129	Reconductoring of 220 kV Khaparkheda-Kanhan S/c line	Maharashtra	220 kV	Line	S/c	64		Planned	2024-25
130	Reconductoring of 220 kV Dhule-Malegaon S/c line	Maharashtra	220 kV	Line	D/c	80.5		Planned	2025-26
131	Reconductoring of 220 kV Babhaleshwar - GCR D/c line	Maharashtra	220 kV	Line	D/c	80		Planned	2024-25
132	Reconductoring of 220 kV Gangapur - Satana S/c line	Maharashtra	220 kV	Line	S/c	110		Planned	2024-25
133	Reconductoring of 220 kV Gangapur - Shivajinagar S/c line	Maharashtra	220 kV	Line	S/c	96		Planned	2024-25
134	Reconductoring of 220 kV Shivajinagar - Malegaon S/c line	Maharashtra	220 kV	Line	S/c	110		Planned	2025-26
135	Reconductoring of 220 kV Gangapur - Valve S/c line	Maharashtra	220 kV	Line	S/c	96		Planned	2025-26
136	Reconductoring of 220 kV Phursungi-Parvati S/c line	Maharashtra	220 kV	Line	S/c	26		Planned	2025-26
137	Reconductoring of 220 kV South Solapur-Solapur PG D/c line	Maharashtra	220 kV	Line	D/c	6		Planned	2024-25
138	Reconductoring of 400 kV Kalwa-Padgha DC line (ckt -I & II)	Maharashtra	400 kV	Line	D/c	104		Under construction	2024-25
139	Reconductoring of 220 kV Mulund - Trombay S/c line	Maharashtra	220 kV	Line	S/c	24		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
140	Reconductoring of 220 kV BoisarPG-Nalasopara S/c line	Maharashtra	220 kV	Line	S/c	57		Planned	2024-25
141	Reconductoring of 220 kV Nalasopara-Padgha line S/c line	Maharashtra	220 kV	Line	S/c	54		Planned	2024-25
142	Reconductoring of 220 kV Kalwa-Apta, Kalwa-Taloja & Apta-Taloja link	Maharashtra	220 kV	Line	D/c	25		Planned	2024-25
143	Reconductoring of 220 kV Kalwa-Colorchem S/c line	Maharashtra	220 kV	Line	S/c	14.4		Planned	2024-25
144	Reconductoring of 220 kV Colorchem-Temghar S/c line	Maharashtra	220 kV	Line	S/c	17.3		Planned	2024-25
145	Reconductoring of 220 kV Kalwa-Temghar S/c line	Maharashtra	220 kV	Line	S/c	16.5		Planned	2024-25
146	Reconductoring of 220 kV Boisar (M)-Boisar PG D/c line	Maharashtra	220 kV	Line	D/c	9		Commissioned	2022-23
147	Reconductoring of 220 kV Padghe-Jambhul & Jambhul-Anandnagar & Padghe-Pal S/c lines	Maharashtra	220 kV	Line	S/c	22		Planned	2024-25
148	Reconductoring of 220 kV Kandalgan-ONGC-Vilebagad-Topworth S/c link	Maharashtra	220 kV	Line	S/c	120		Planned	2024-25
149	Reconductoring of 220 kV Salsette - Borivli (ckt 1 and 2) HTLS upgradation	Maharashtra	220 kV	Line	D/c	22.2		Planned	2026-27
	Gujarat								
(A)	**New sub-stations / ICT augmentation**								
1	Bhachunda 400 kV S/s (3rd ICT)	Gujarat	400/220 kV	S/s			500	Commissioned	2022-23
2	Bhogat 400 kV S/s	Gujarat	400/220 kV	S/s			1000	Commissioned	2022-23
3	Ukai TPS 400 kV S/s	Gujarat	400/220 kV	S/s			1000	Under Construction	2024-25
4	Sankhari (Veloda) 400 kV S/s	Gujarat	220/66 kV	S/s			300	Commissioned	2022-23
5	Mera 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
6	Ghodasar (Rah) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
7	Bhildi 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25
8	Avana 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
9	Sisrana/Satlasana 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25
10	Bhesan 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25
11	Patkhilori 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
12	Rajsitapur (Khodu/Dudhrej) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
13	Babarzar 220 kV S/s	Gujarat	220/66 kV	S/s			480	Under Construction	2024-25
14	Kalavad 400 kV S/s	Gujarat	400/220 kV	S/s			1000	Under Construction	2024-25
15	Khajod 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
16	Metoda 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
17	Maglana 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2025-26
18	Kamlapur 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2024-25
19	Sevalia 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
20	Prantij 400 kV S/s	Gujarat	400/220/66 kV	S/s			1320	Under Construction	2025-26
21	Kundiyana (Olpad) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
22	Veraval 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
23	Halol 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2025-26
24	Giyavad 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
25	Siddheshwar 220 kV S/s	Gujarat	220/66 kV	S/s			480	Planned	2025-26
26	Shivlakha 400 kV S/s	Gujarat	400/220/66 kV	S/s			1320	Planned	2025-26
27	Dholera 400 kV S/s	Gujarat	400/220 kV	S/s			1500	Planned	2026-27
28	Samadhiyala (Bagasara) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
29	Velanja 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	Dhama 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
31	Avaniya 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
32	Kanbha 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2026-27
33	Balethi 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
34	Saykha 400 kV S/s	Gujarat	400/220/66 kV	S/s			1820	Planned	2026-27
35	Kheradi 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
36	Nichi Mandal (Vankda) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
37	Dumas 220 kV S/s	Gujarat	220/66 kV	S/s			480	Planned	2026-27
38	Gela Somnath 765 kV S/s	Gujarat	765/400 kV	S/s			3000	Planned	2026-27
39	Upgradation of Babarzar substation to 400 kV level (GIS)	Gujarat	400/220 kV	S/s			1000	Planned	2025-26
40	Near Thavar 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
41	Nagor 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
42	Munjpur substation (Dist. Patan) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
43	Mandan 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
44	Upgradation of 66 kV Mahuva S/S to 220 kV level	Gujarat	220/66 kV	S/s			320	Planned	2025-26
45	Mahudha 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
46	Kutiyana 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
47	Khimat 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
48	Jantral 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
49	Hathsani 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
50	Hajipir / Dhordo 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
51	Gadhsisa 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
52	Gadhada 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
53	Dhank 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
54	Bhalgamda 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
55	Bangavadi 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2025-26
56	400/220 kV ICT augmentation at Veloda 400 kV S/s	Gujarat	400/220 kV	S/s			500	Planned	2025-26
57	400/220 kV ICT augmentation at Zerda(Kansari) 400 kV S/s	Gujarat	400/220 kV	S/s			500	Planned	2024-25
58	400/220 kV, 1x(500-315) MVA ICT augmentation at Jetpur 400 kV S/s	Gujarat	400/220 kV	S/s			185	Planned	2024-25
59	400/220 kV ICT augmentation at Asoj 400 kV S/s	Gujarat	400/220 kV	S/s			500	Planned	2024-25
60	220/132 kV ICT augmentation at Ranavav 220 kV S/s	Gujarat	220/132 kV	S/s			100	Planned	2025-26
61	220/132 kV ICT augmentation at Gondal 220 kV S/s	Gujarat	220/132 kV	S/s			50	Planned	2025-26
62	220/66 kV ICT augmentation at Timbdi 220 kV S/s	Gujarat	220/66 kV	S/s			50	Planned	2024-25
63	220/66 kV ICT augmentation at Salejada 220 kV S/s	Gujarat	220/66 kV	S/s			160	Commissioned	2024-25
64	220/66 kV ICT augmentation at Kansari 220 kV S/s	Gujarat	220/66 kV	S/s			50	Planned	2024-25
65	220/66 kV ICT augmentation at Jambuva 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2024-25
66	220/66 kV ICT augmentation at Kim 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2025-26
67	220/66 kV ICT augmentation at Sadla 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2025-26
68	220/66 kV ICT augmentation at Karamsad 220 kV S/s	Gujarat	220/66 kV	S/s			170	Commissioned	2023-24
69	220/66 kV ICT augmentation at Asoj 400 kV S/s	Gujarat	220/66 kV	S/s			120	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
70	220/66 kV ICT augmentation at Kosamba 400 kV S/s	Gujarat	220/66 kV	S/s			120	Planned	2025-26
71	220/66 kV ICT augmentation at Popada 220 kV S/s	Gujarat	220/66 kV	S/s			120	Planned	2024-25
72	220/66 kV ICT augmentation at Jetpur 400 kV S/s	Gujarat	220/66 kV	S/s			120	Planned	2024-25
73	220/66 kV ICT augmentation at Kangashiyali 220 kV S/s	Gujarat	220/66 kV	S/s			60	Planned	2024-25
74	220/66 kV ICT augmentation at Sankhari 220 kV S/s	Gujarat	220/66 kV	S/s			110	Commissioned	2022-23
75	220/66 kV ICT augmentation at Khanpur 220 kV S/s	Gujarat	220/66 kV	S/s			60	Planned	2025-26
76	220/66 kV ICT augmentation at Vallabhipur 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2025-26
77	220/66 kV ICT augmentation at Suva (HGIS) 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2025-26
78	220/66 kV ICT augmentation at Sartanpar(HGIS) 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2024-25
79	220/66 kV ICT augmentation at Bhat 220 kV S/s	Gujarat	220/66 kV	S/s			60	Commissioned	2023-24
80	220/66 kV ICT augmentation at Talangpur 220 kV S/s	Gujarat	220/66 kV	S/s			530	Planned	2024-25
81	220/66 kV ICT augmentation at Mota 220 kV S/s	Gujarat	220/66 kV	S/s			60	Commissioned	2022-23
82	220/66 kV ICT augmentation at Vav 220 kV S/s	Gujarat	220/66 kV	S/s			110	Planned	2024-25
83	220/66 kV ICT augmentation at Vartej 220 kV S/s	Gujarat	220/66 kV	S/s			60	Planned	2024-25
84	220/66 kV ICT augmentation at Ambhetha (Chikhali) 220 kV S/s	Gujarat	220/66 kV	S/s			110	Planned	2024-25
85	220/66 kV ICT augmentation at Anjar 220 kV S/s	Gujarat	220/66 kV	S/s			120	Planned	2024-25
86	220/66 kV ICT augmentation at Bhilad 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
87	220/66 kV ICT augmentation at Agiyol 220 kV S/s	Gujarat	220/66 kV	S/s			100	Planned	2025-26
88	220/66 kV ICT augmentation at Jamla 220 kV S/s	Gujarat	220/66 kV	S/s			160	Planned	2024-25
89	220/66 kV ICT augmentation at Ukai Hydro (GSECL) 220 kV S/s	Gujarat	220/66 kV	S/s			210	Planned	2024-25
90	Rajula (Sintex) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2023-24
91	Kalavad 220 kV S/s	Gujarat	220/66 kV	S/s			480	Commissioned	2022-23
92	Talaja 220 kV S/s	Gujarat	220/66 kV	S/s			320	Commissioned	2022-23
93	Sarigam 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25
94	Dholera 220/33 kV S/s	Gujarat	220/66 kV	S/s			1000	Under Construction	2024-25
95	Raghanesda 220 kV S/s	Gujarat	220/66 kV	S/s			750	Under Construction	2025-26
96	Khambhalia 220 kV S/s	Gujarat	220/66 kV	S/s			320	Under Construction	2024-25
(B)	**Transmission Lines**								
1	Essar - Amreli 400 kV S/c line	Gujarat	400 kV	Line	S/c	356		Commissioned	2023-24
2	Vadavi - Halvad 400 kV D/c line	Gujarat	400 kV	Line	D/c	290		Under Construction	2024-25
3	Varsana - Halvad 400 kV D/c line	Gujarat	400 kV	Line	D/c	237		Under Construction	2024-25
4	Soja - Zedra 400 kV D/c line	Gujarat	400 kV	Line	D/c	268		Commissioned	2023-24
5	Bhachunda - Varsana 400 kV D/c line	Gujarat	400 kV	Line	D/c	280		Under Construction	2024-25
6	Shapar - Fedra 400 kV D/c line	Gujarat	400 kV	Line	D/c	200		Under Construction	2024-25
7	Hadala - Shapar 400 kV D/c line	Gujarat	400 kV	Line	D/c	130		Commissioned	2022-23
8	Bhogat - Kalavad 400 kV D/c line	Gujarat	400 kV	Line	D/c	270		Commissioned	2023-24
9	LILO of one ckt. of Wanakbori-Soja 400 kV D/c line at Prantij S/s	Gujarat	400 kV	Line	D/c	80		Under Construction	2025-26
10	Shapar - Chharodi (Sanand) 400 kV D/c line	Gujarat	400 kV	Line	D/c	180		Under Construction	2026-27
11	Veloda (Sankhari) - Prantij 400 kV D/c line	Gujarat	400 kV	Line	D/c	300		Under Construction	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
12	LILO of Soja-Zerda 400 kV D/c line at Veloda S/s	Gujarat	400 kV	Line	D/c	60		Under Construction	2024-25
13	Gavasad - Salejda 220 kV D/c line	Gujarat	220 kV	Line	D/c	194		Under Construction	2024-25
14	LILO of Jetpur-Sardargadh 220 kV D/c line Shapur S/s	Gujarat	220 kV	Line	2xD/c	24		Commissioned	2022-23
15	LILO of Kawas-Navsari 220 kV D/c line at Khajod S/s	Gujarat	220 kV	Line	2xD/c	40		Under Construction	2025-26
16	LILO of Ichhapore-Talangpore 220 kV S/c line at Khajod S/s	Gujarat	220 kV	Line	D/c	8		Under Construction	2025-26
17	BECL - Botad 220 kV D/c line	Gujarat	220 kV	Line	D/c	190		Under Construction	2024-25
18	Chorania - Salejda 220 kV D/c line	Gujarat	220 kV	Line	D/c	134		Commissioned	2024-25
19	Bhatia - Kalavad 220 kV D/c line	Gujarat	220 kV	Line	D/c	238		Under Construction	2025-26
20	Kalavad - Kangasiyali 220 kV D/c line	Gujarat	220 kV	Line	D/c	112		Commissioned	2022-23
21	Chorania - Botad 220 kV D/c line	Gujarat	220 kV	Line	D/c	104		Under Construction	2024-25
22	LILO of Amreli-Dhasa 220 kV D/c line at Gariyadhar S/s	Gujarat	220 kV	Line	D/c	160		Under Construction	2024-25
23	LILO of GSEG-Kim 220 kV S/c line and Mora-Kim 220 kV S/c line at Velanja	Gujarat	220 kV	Line	2xD/c	10		Under Construction	2024-25
24	LILO of both circuits of Mota - Chikhli (Ambheta) 220 kV D/c line at Mahuva S/s	Gujarat	220 kV	Line	2xD/c	40		Commissioned	2024-25
25	Bhogat - Moti Gop 220 kV D/c line	Gujarat	220 kV	Line	D/c	139		Under Construction	2024-25
26	LILO of Lalpar - Sartanpar 220 kV S/c line at 220 kV Wankaner substation on M/c tower by dismentalling of existing 132 kV S/c Lalpar - Wankaner line	Gujarat	220 kV	Line	D/c	80		Commissioned	2022-23
27	LILO of one circuit of Kasor - Gavasad 220 kV D/c line at 220 kV Gotri substation	Gujarat	220 kV	Line	D/c	88		Under Construction	2026-27
28	LILO of both circuits of GSEG – Kosamba 220 kV line at 220 kV Kudiyana S/s with pile foundation	Gujarat	220 kV	Line	2xD/c	140		Under Construction	2025-26
29	LILO of Savarkundla - Visavadar of 220 kV S/c at Bagasara s/s	Gujarat	220 kV	Line	D/c	20		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	LILO of Jetpur - Rajkot 220 kV S/c line at Metoda S/s	Gujarat	220 kV	Line	D/c	8		Commissioned	2024-25
31	LILO of Chorania - Sarla 220 kV S/c line & Sarla - Gondal 220 kV S/c line (due to LILO of Chorania - Gondal 220 kV S/c line at Sarla S/s) at Shapar S/s	Gujarat	220 kV	Line	D/c	240		Commissioned	2022-23
32	Bhogat - Ranavav 220 kV D/c line	Gujarat	220 kV	Line	D/c	138		Under Construction	2024-25
33	Pirana - Barejadi 220 kV D/c line	Gujarat	220 kV	Line	D/c	45		Commissioned	2022-23
34	Babara - Shapar 220 kV D/c line	Gujarat	220 kV	Line	D/c	141		Commissioned	2022-23
35	Talaja - Maglana 220 kV D/c line	Gujarat	220 kV	Line	D/c	120		Under Construction	2025-26
36	Maglana - Pachchham 220 kV D/c line	Gujarat	220 kV	Line	D/c	200		Under Construction	2025-26
37	Prantij - Agiyol 220 kV D/c line	Gujarat	220 kV	Line	D/c	60		Planned	2025-26
38	Prantij - Dhansura 220 kV D/c line	Gujarat	220 kV	Line	D/c	70		Planned	2025-26
39	LILO of Keshod - Timbdi 220 kV S/c line at 220 kV Veraval S/s	Gujarat	220 kV	Line	D/c	32		Planned	2026-27
40	LILO of one circuit of Chandrapura - Godhara 220 kV D/c line at 220 kV Halol S/s	Gujarat	220 kV	Line	D/c	10		Planned	2025-26
41	Vyankatpura – Halol 220 kV D/c line	Gujarat	220 kV	Line	D/c	50		Planned	2025-26
42	LILO of both circuit of Visavadar - Timbdi 220 kV D/c line at 400 kV Keshod substation	Gujarat	220 kV	Line	2xD/c	24		Planned	2025-26
43	Keshod(400 kV) - Keshod 220 kV D/c line	Gujarat	220 kV	Line	D/c	50		Planned	2025-26
44	Dhama - Bechraji 220 kV D/c line	Gujarat	220 kV	Line	D/c	220		Planned	2025-26
45	LILO of both ckt of Tappar - Shivlakha 220 kV D/c line at Shivlakha (400 kV) S/s	Gujarat	220 kV	Line	2xD/c	100		Planned	2025-26
46	LILO of both ckt of Shapar - Babra 220 kV D/c line at Kamlapur (M/c) S/s	Gujarat	220 kV	Line	2xD/c	60		Under Construction	2025-26
47	LILO of Gondal – Sadla 220 kV S/c line at 220 kV Kamlapur S/s	Gujarat	220 kV	Line	D/c	100		Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
48	Gomta - Kamlapur 220 kV D/c line	Gujarat	220 kV	Line	D/c	220		Planned	2025-26
49	LILO of both ckts of Jambuva - Karamsad 220 kV D/c line at Dhuvaran CCPP (by using existing LILO portion and through Pachham - Kasor 220 kV D/c line) S/s	Gujarat	220 kV	Line	2xD/c	80		Under Construction	2024-25
50	LILO of Chikhli (Ambetha) – Vapi (GETCO) 220 kV S/c line at Vapi-II (ISTS substation) (AL-59 conductor) S/s	Gujarat	220 kV	Line	D/c	40		Under Construction	2025-26
51	Keshod - Veraval 220 kV D/c line	Gujarat	220 kV	Line	D/c	90		Planned	2025-26
52	LILO of Bhatia - Kalavad 220 kV D/c line at Khambhalia-II S/s	Gujarat	220 kV	Line	D/c	40		Under Construction	2025-26
53	LILO of one circuit of Tharad-Deodar 220 kV D/c line at 220 kV Mera S/s	Gujarat	220 kV	Line	D/c	20		Commissioned	2022-23
54	LILO of both circuits of Anjar – Welspun 220 kV S/c line and Shivlakha – Welspun 220 kV S/c line at Gandhidham B S/s	Gujarat	220 kV	Line	2xD/c	20		Planned	2025-26
55	LILO of both ckt of Bhimasar - Morbi 220 kV S/c line and Bhimasar - Sartanpar 220 kV S/c at Gandhidham B (Padana)	Gujarat	220 kV	Line	2xD/c	20		Planned	2025-26
56	Bhimsar - Gandhidham 220 kV D/c line	Gujarat	220 kV	Line	D/c	20		Planned	2025-26
57	Gandhidham - Sartanpar 220 kV D/c line	Gujarat	220 kV	Line	D/c	300		Planned	2025-26
58	LILO of both ckt of BECL - Botad 220 kV D/c line at Avaniya S/s	Gujarat	220 kV	Line	2xD/c	60		Planned	2026-27
59	LILO of Wanakbori - Asoj 220 kV S/c line & Wanakbori - Vyankatpura 220 kV S/c line at 220 kV Sevalia substation with M/C tower or 2 X D/c Tower	Gujarat	220 kV	Line	2xD/c	80		Commissioned	2023-24
60	LILO of both circuit of Tharad-Dhanera 220 kV D/c at 220 kV Rah S/s	Gujarat	220 kV	Line	2xD/c	40		Commissioned	2023-24
61	LILO of one circuit of Ranasan – Karamsad 220 kV D/c line at Kanbha substation	Gujarat	220 kV	Line	D/c	1		Planned	2026-27
62	Dehgam - Kanbha 220 kV D/c line	Gujarat	220 kV	Line	D/c	50		Planned	2026-27

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63	LILO of both circuit of Kalavad - Kangashiyali 220 kV D/c line at Siddheshwar S/s	Gujarat	220 kV	Line	2xD/c	22		Planned	2025-26
64	Kosamba - Balethi 220 kV D/c line	Gujarat	220 kV	Line	D/c	70		Planned	2025-26
65	LILO of both circuit of Palanpur - Kheralu 220 kV D/c line at 220 kV Sisrana/Satlasana S/s (2x D/c or M/C tower)	Gujarat	220 kV	Line	2xD/c	48		Commissioned	2023-24
66	LILO of Jetpur – Visavadar 220 kV S/c line at 220 kV Bhesan substation	Gujarat	220 kV	Line	D/c	16		Commissioned	2022-23
67	Jetpur - Bhesan 220 kV S/c line	Gujarat	220 kV	Line	S/c	35		Under Construction	2024-25
68	LILO of one circuit of Amreli – Babara 220 kV line at 220 kV Patkhilori S/s	Gujarat	220 kV	Line	D/c	80		Commissioned	2022-23
69	LILO of both Ckt of Motigop - Kalawad 220 kV D/c line at 220 kV Babarzar substation	Gujarat	220 kV	Line	2xD/c	60		Under Construction	2024-25
70	LILO of Sartanpar – Wankaner 220 kV S/c line at 220 kV Makansar substation	Gujarat	220 kV	Line	D/c	4		Planned	2026-27
71	LILO of both ckts of Bhimasar – Charadva 220 kV D/c line at Vankda (Nichimandal), (Shapar)	Gujarat	220 kV	Line	2xD/c	40		Commissioned	2022-23
72	Ghiyavad – Shapar 220 kV D/c line	Gujarat	220 kV	Line	D/c	100		Under Construction	2024-25
73	LILO of one circuit of Bhutiya - Agiyol 220 kV D/c line at 220 kV Kheradi S/s	Gujarat	220 kV	Line	D/c	40		Planned	2025-26
74	LILO of one circuit of Agiyol - Dhansura 220 kV D/c line at 220 kV Kheradi S/s	Gujarat	220 kV	Line	D/c	56		Planned	2025-26
75	LILO of Haldarwa – Dahej 220 kV S/c line and Wagra-Dahej 220 kV S/c line at 400 kV Saykha (Both ckt on M/C Tower) S/s	Gujarat	220 kV	Line	2xD/c	4		Planned	2026-27
76	Saykha - Suva 220 kV D/c line	Gujarat	220 kV	Line	D/c	20		Planned	2026-27
77	LILO of Ichhapore - Talangpore 220 kV S/c line at 220 kV Dumas	Gujarat	220 kV	Line	D/c	10		Planned	2026-27

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78	LILO of GSEG - Talanpore 220 kV S/c line at 220 kV Dumas S/s	Gujarat	220 kV	Line	D/c	10		Planned	2026-27
79	765 kV Gela Somnath - Vataman D/C line	Gujarat	765 kV	Line	D/c	400		Planned	2026-27
80	400 kV Kalavad - Saurastra D/c Line	Gujarat	400 kV	Line	D/c	400		Planned	2026-27
81	LILO of Both ckts of 400 kV D/c CGPL - Jetpur Line at Saurashtra substation (M/C line)	Gujarat	400 kV	Line	D/c	400		Planned	2026-27
82	LILO of both circuit of 400 kV D/c Mundra – Zerda line at Shivlakha (400 kV) substation (M/C 25RKM Line)	Gujarat	400 kV	Line	D/c	50		Planned	2025-26
83	765 kV Pachchham (Fedra) - Saykha line (765 kV line initially to be charged at 400 kV level))	Gujarat	765 kV	Line	D/c	320		Planned	2026-27
84	400 kV D/c Saykha - Jhanor (NTPC) line OR LILO of 400 kV S/C Jhanor - Sugen (TPGL) line at 400 kV Sayakha substation)	Gujarat	400 kV	Line	D/c	50		Planned	2026-27
85	LILO of both circuits of 400 kV D/c Bhogat - Kalavad line at Babarzar substation	Gujarat	400 kV	Line	M/c	0.602		Planned	2025-26
86	LILO of both ckt. Of 220 kV Tharad - Thavar line at new 220 kV S/s near Thavar	Gujarat	220 kV	Line	M/c	30		Planned	2025-26
87	LILO of both circuits of 220 kV Nakhatrana-Varsana D/c line at Nagor S/s	Gujarat	220 kV	Line	D/c	30		Planned	2025-26
88	220 kV Munjpur - Mehsana D/c line by using existing 220 kV Sankhari - Mehsana & Veloda - Mehsana line	Gujarat	220 kV	Line	D/c	60		Planned	2025-26
89	220 kV Dhama - Munjpur D/c line (AL-59)	Gujarat	220 kV	Line	D/c	60		Planned	2025-26
90	LILO of both circuits of 220 kV GPPC-Otha D/c line at Mandan	Gujarat	220 kV	Line	D/c	25		Planned	2025-26
91	220 kV Sevalia - Mahudha D/c line & 220 kV Kheda (prop) - Mahudha D/c line	Gujarat	220 kV	Line	D/c	90		Planned	2025-26
92	LILO of both circuits of 220 kV Ranavav-Motipaneli D/c line at Kutiyana S/s	Gujarat	220 kV	Line	D/c	55		Planned	2025-26

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93	LILO of both circuits of 220 kV Kansari-Thavar D/c line at Khimat S/s	Gujarat	220 kV	Line	D/c	20		Planned	2025-26
94	220 kV Navsari (765 kV) - Khajod (proposed s/s) D/c line	Gujarat	220 kV	Line	D/c	10		Planned	2026-27
95	LILO of both ckt. of 220 kV Jamla - Kheralu D/c line at new 220 kV Jantral S/s	Gujarat	220 kV	Line	M/c	25		Planned	2025-26
96	LILO of 220 kV Babara-Shapar D/c line at Hathsani S/s	Gujarat	220 kV	Line	D/c	25		Planned	2025-26
97	LILO of 220 kV Akrimota-Nakhatrana S/c line and 220 kV Akrimota-Bhachunda S/c line at 220 kV Hajipir/Dhordo Substation—220 kV M/C line	Gujarat	220 kV	Line	D/c	123.5		Planned	2025-26
98	LILO of both ckt. of 220 kV Nakhatrana-Nanikhakhar D/c line at Gadhsisa S/s	Gujarat	220 kV	Line	M/c	85		Planned	2025-26
99	LILO of 220 kV Amreli-Botad & Dhasa-Botad line at Gadhada S/s	Gujarat	220 kV	Line	D/c	25		Planned	2025-26
100	LILO of 220 kV D/c Motipaneli-Sardargadh line at Dhank S/s	Gujarat	220 kV	Line	D/c	8		Planned	2025-26
101	220 kV LILO at Dhank S/s from existing 220 kV Motipaneli-Ranavav Line on D/c & M/C Towers. (D/c on Same M/C Towers : 4 km & on D/c Towers : 2 km)	Gujarat	220 kV	Line	D/c	12		Planned	2025-26
102	LILO of both circuits of 220 kV D/c Mansar-Sadla line at Bhalgamda S/s	Gujarat	220 kV	Line	M/c	30		Planned	2025-26
103	LILO of 220 kV Jamnagar-Hadala line at Bangavadi S/s	Gujarat	220 kV	Line	D/c	53		Planned	2025-26
104	LILO of one circuit of 220 kV D/c Ukai (Th) - Achhalia line (which is not to be LILOed at 220 kV Virpore) at 220 kV Balethi substation	Gujarat	220 kV	Line	D/c	30		Planned	2025-26
105	LILO of 220 kV S/c Navsari - Atul line at Chikhli substation	Gujarat	220 kV	Line	D/c	1		Planned	2024-25
106	LILO of 220 kV Talangpore (Sachin) - Navsari and 220 kV Talangpore (Sachin) -	Gujarat	220 kV	Line	D/c	28		Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Vav line at 765 kV Navsari (new) substation of ISTS								
107	220 kV D/c Navsari (765 kV) - Talangpore line	Gujarat	220 kV	Line	D/c	44		Under Construction	2025-26
108	Interconnection at LILO point of Vav-Navsari LILO at Talangpore for Vav - Popada 2nd circuit and Talangpore / 765 kV substation - Navsari 2nd circuit line	Gujarat	220 kV	Line	D/c	1		Planned	2024-25
109	LILO of both circuits of 220 kV D/c KAPP - Vapi line (ISTS line) at 400 kV Vapi - II substation of ISTS	Gujarat	220 kV	Line	M/c	10		Under Construction	2025-26
110	LILO of 220 kV S/c Chikhli - Vapi line at Atul substation	Gujarat	220 kV	Line	D/c	10		Under Construction	2024-25
111	400 kV D/c line for reconfigurations to have 400 kV D/c Chorania - Kosamba & 400 kV D/c Fedra - Sanand (Chharodi) line	Gujarat	400 kV	Line	D/c	50		Planned	2025-26
112	400 kV D/c Sanand (Chharodi) - Soja line (by using LILO portion of Halvad - Vadavi LILO at Sanand)	Gujarat	400 kV	Line	D/c	100		Planned	2025-26
113	Interconnection of 220 kV D/c Halvad-Sadla line & 220 kV D/c Hadala-Sartanpur Line	Gujarat	220 kV	Line	D/c	2		Planned	2024-25
114	400 kV D/c line for reconfigurations to have 400 kV D/c Chorania-kosamba & 400 kV D/c Fedra-Sanand(Chaarodi) line	Gujarat	400 kV	Line	D/c	50		Planned	2025-26
	Madhya Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	Super Corridore(Indore) 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Planned	2026-27
2	Guna 400 kV S/s	Madhya Pradesh	400/220/132 kV	S/s			1000	Commissioned	2022-23
3	Ashta 400 kV S/s (additional ICT)	Madhya Pradesh	400/220 kV	S/s			315	Commissioned	2022-23

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4	Bhind 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			320	Commissioned	2022-23
5	Begamganj 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			320	Commissioned	2024-25
6	Bisonikalan 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
7	Ajaygarh 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			320	Commissioned	2024-25
8	Mandideep 400 kV S/s	Madhya Pradesh	400/220/132/33 kV	S/s			1320	Under Construction	2024-25
9	Khargone 220 kV S/s	Madhya Pradesh	220/132/33 kV	S/s			320	Under Construction	2024-25
10	Bargawan 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
11	Shahpur 220 kV S/s	Madhya Pradesh	220/33 kV	S/s			100	Under Construction	2024-25
12	Manpur 220 kV S/s	Madhya Pradesh	220/33 kV	S/s			100	Commissioned	2023-24
13	1x500 MVA,400/220 kV ICT (3rd) augmentation at Mandsaur S/s	Madhya Pradesh	400/220 kV	S/s			500	Planned	2025-26
14	1x160 MVA, 220/132 kV ICT augmetation at Katni 400 kV	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
15	1x160 MVA, 220/132 kV ICT augmetation at Ganjabasoda 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
16	1x160 MVA, 220/132 kV ICT augmetation at Mugaliachhap 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
17	1x160 MVA, 220/132 kV ICT augmetation at Chichli 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
18	(500-315) MVA, 400/220 kV ICT augmetation at Bhopal 400 kV S/s	Madhya Pradesh	400/220 kV	S/s			500	Commissioned	2022-23
19	2x(500-315) MVA,400/220 kV ICT augmetation at Indore 400 kV S/s	Madhya Pradesh	400/220 kV	S/s			1000	Under Construction	2025-26
20	(1x160-3x40) MVA,220/132 kV ICT augmetation at Bina 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
21	(1x160-3x40) MVA,220/132 kV ICT augmetation at Indore-SZ 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
22	(1x160-3x40) MVA,220/132 kV ICT augmetation at Itarsi 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
23	(1x160-3x40) MVA,220/132 kV ICT augmetation at Jabalpur 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
24	1x160 MVA, 220/132 kV ICT augmetation at Pithampur - II 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2022-23
25	1x160MVA,220/132 kV ICT augmetation at Julwania 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			160	Commissioned	2023-24
26	1x(200-160) MVA,220/132 kV ICT augmetation at Mehgaon 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			40	Commissioned	2023-24
27	1x(200-160) MVA,220/132 kV ICT augmetation at Chegaon 400 kV	Madhya Pradesh	220/132 kV	S/s			40	Commissioned	2022-23
28	1x(200-160) MVA,220/132 kV ICT augmetation at Rewa 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			40	Commissioned	2022-23
29	1x(200-160) MVA,220/132 kV ICT augmetation at Bhopal 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			40	Commissioned	2022-23
30	1x(200-160) MVA,220/132 kV ICT augmetation at Damoh 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			40	Commissioned	2022-23
31	1x(200-125) 200MVA,220/132 kV ICT augmetation at Nagda 220 kV S/s	Madhya Pradesh	220/132 kV	S/s			75	Commissioned	2023-24
32	Jatara 220/132/33 kV S/s	Madhya Pradesh	220/132 kV	S/s			500	Planned	2026-27
33	Upgradation 132 kV Seondha on 220 kV with 2x200MVA,220/132 kV ICT	Madhya Pradesh	220/132 kV	S/s			400	Planned	2026-27
34	Installation of 1x100MVA 400/132 kV Transformer and 1x125MVAR Bus Reactor at Kirnapur	Madhya Pradesh	400/132 kV	S/s			100	Under Construction	2024-25
35	Julwaniya 400 kV, addl. 1x500 MVA X-mer	Madhya Pradesh	400/220 kV	S/s			500	Planned	2025-26
36	Bina 400 kV, addl. 1x500 MVA X-mer	Madhya Pradesh	400/220 kV	S/s			500	Planned	2025-26
37	Badnawar 400 kV, addl. 1x500 MVA X-mer	Madhya Pradesh	400/220 kV	S/s			500	Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
38	Upgradation (U/G) of Narsinghgarh 132 kV to 220 kV S/s with 2x200MVA, 220/132 kV ICT.	Madhya Pradesh	220/132/33 kV	S/s			400	Planned	2026-27
39	Sarni 220 kV S/s, installation of Addl 100MVA 220/132 kV CGL make Transformer Sr No- 24109	Madhya Pradesh	220/132 kV	S/s			100	Under Construction	2024-25
40	Mangliya 220/132 kV Ss, Additional X-mer 1x160 MVA X-mer (2nd)	Madhya Pradesh	220/132 kV	S/s			160	Planned	2025-26
(B)	**Transmission Lines**								
1	Ashta-Ujjain 400 kV D/c line	Madhya Pradesh	400 kV	Line	D/c	180		Commissioned	2022-23
2	Indore PG-Ujjain 400 kV D/c line	Madhya Pradesh	400 kV	Line	D/c	90.47		Commissioned	2022-23
3	LILO of Rajgarh 400 kV (PGCIL) - Khandwa 400 kV (PGCIL) 400 kV line at Chhegaon 400 kV S/s	Madhya Pradesh	400 kV	Line	D/c	3.78		Commissioned	2022-23
4	220 kV Pithampur-Super Corridor D/c line	Madhya Pradesh	220 kV	Line	D/c	100		Planned	2026-27
5	LILO of Bina 220 kV - Ganbasoda 220 kV line at Bina 400 kV (MP) S/s	Madhya Pradesh	220 kV	Line	D/c	####		Commissioned	2023-24
6	Chhatarpur-Tikamgarh 220 kV D/c (ACCC) line	Madhya Pradesh	220 kV	Line	D/c	110		Planned	2026-27
7	Rewa-Rewa 220 kV D/c (ACCC) line	Madhya Pradesh	220 kV	Line	D/c	64.67		Commissioned	2022-23
8	Rewa-Sidhi 220 kV D/c (ACCC) line	Madhya Pradesh	220 kV	Line	D/c	####		Commissioned	2023-24
9	Indore-IndoreSZ 220 kV D/c (HTLS) line	Madhya Pradesh	220 kV	Line	D/c	4		Commissioned	2024-25
10	Guna-Bina 400 kV D/c line	Madhya Pradesh	400 kV	Line	D/c	120		Commissioned	2022-23
11	Guna-Guna 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	15		Commissioned	2022-23
12	Guna-Shivpuri 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	100		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
13	Morena-Bhind 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	65		Commissioned	2022-23
14	Sagar-Begamganj 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	127		Commissioned	2024-25
15	Chhatarpur-Ajaygarh 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	7		Commissioned	2024-25
16	Satna-Ajaygarh 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	82		Commissioned	2024-25
17	Handiya-Bisonikalan 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	40		Under Construction	2024-25
18	Itarsi-Bisonikalan 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	55		Under Construction	2024-25
19	Satpura-Bisonikalan 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	127		Under Construction	2024-25
20	Bhopal-Mandideep 400 kV D/c line	Madhya Pradesh	400 kV	Line	D/c	40		Under Construction	2024-25
21	Itarsi-Mandideep 400 kV D/c line	Madhya Pradesh	400 kV	Line	D/c	75		Under Construction	2024-25
22	Hoshngabad-Mandideep 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	60		Under Construction	2024-25
23	Adampur-Mandideep 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	40		Under Construction	2024-25
24	Mandideep-Mandideep 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	15		Under Construction	2024-25
25	Sidhi-Bargawan 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	85		Under Construction	2024-25
26	Hindalco-Bargawan 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	10		Under Construction	2024-25
27	Nimrani-Khargone 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	45		Under Construction	2024-25
28	Chhegaon-Khargone 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	90		Under Construction	2024-25
29	Satna-Manpur 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	17.5		Commissioned	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	Birsinghpur-Manpur 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	20		Commissioned	2024-25
31	Satpura-Shahpur 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	25		Under Construction	2024-25
32	Itarsi-Shahpur 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	57		Under Construction	2024-25
33	Bhopal-Bairagar 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	3.817		Commissioned	2022-23
34	Ashta-Bairagar 220 kV D/c line	Madhya Pradesh	220 kV	Line	D/c	3.617		Commissioned	2022-23
35	LILO of one circuit of Damoh(PGCIL) - Bhopal 400 kV line at Sagar 400 kV S/s(2x45) S/s	Madhya Pradesh	400 kV	Line	D/c	37.73		Under Construction	2024-25
36	LILO of one ckt of Birsinghpur TPS - Katni 400 kV D/c line at ATPS New 400 kV Switchyard.	Madhya Pradesh	400 kV	Line	D/c	150		Planned	2026-27
37	Modification of 220 kV line (20) (Extension of LILO portion of Chapda 220 kV by joining 220 kV Ashta400-Indore-II line & normalizing the Ashta-Dewas line.)	Madhya Pradesh	220 kV	Line	D/c	20		Planned	2025-26
38	Extension of LILO portion of Datiya 220 kV - Bina400 kV line for Pichhore 220 kV upto Karera	Madhya Pradesh	220 kV	Line	D/c	70		Planned	2026-27
39	LILO of both circuit Bina - Datiya220 kV line at Karera765kV S/s (ISTS)	Madhya Pradesh	220 kV	Line	D/c	28		Planned	2026-27
40	Karera 765kV S/s (ISTS) - Seondha 220 kV 220 kV D/cDS line	Madhya Pradesh	220 kV	Line	D/c	230		Planned	2026-27
41	Ishanagar 765kV S/s (ISTS) - Jatara 220 kV D/cDS line	Madhya Pradesh	220 kV	Line	D/c	90		Planned	2026-27
42	LILO of both circuit of Chhatarpur - Tikamgarh 20kV D/cDS line at Ishanagar765kV S/s (ISTS)	Madhya Pradesh	220 kV	Line	D/c	40		Planned	2026-27
43	Charging of existing Shujalpur 220 kV to Narsinghgarh 132 kV(Posed U/G) line D/c line on 220 kV level (U/G on 220 kV)	Madhya Pradesh	220 kV	Line	D/c	57		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
44	Second circuiting of Shujalpur220 - Narsinghgarh(U/G on 220 kV) D/cSS line (with HTLS conductor from Shujalpur 220 kV S/s upto LILO location for Shujalpur 400 kV S/s)	Madhya Pradesh	220 kV	Line	D/c	28.5		Planned	2026-27
45	LILO of one(2nd) circuit of Shujalpur220 - Narsinghgarh(U/G on 220 kV) line at Shujalpur 400 kV S/s (with HTLS conductor on portion of Shujalpur400 kV to Shujalpur220 kV (circuit-III) upto LILO point for Shujalpur 400 kV S/s)	Madhya Pradesh	220 kV	Line	D/c	28.5		Planned	2026-27
46	LILO of both circuit of Bhopal - Shujalpur220 D/cDS line at 765kV S/s Kurawar (ISTS)	Madhya Pradesh	220 kV	Line	D/c	30		Planned	2026-27
47	LILO of both ckt of ATPS - Shahdol/Sidhi 220 kV line at Amarkantak(Annuppur).	Madhya Pradesh	220 kV	Line	D/c	30		Planned	2026-27
48	Re-routing of ATPS Annuppur interconnector and RTS feeder from ATPS switchyard to Amarkantak(Annuppur) 220 kV S/s.	Madhya Pradesh	220 kV	Line	D/c	20		Planned	2026-27
49	Re-routing of existing 220 kV lines outside the existing ATPS switchyard as per 220 kV bay positions/provisions.	Madhya Pradesh	220 kV	Line	D/c			Planned	2026-27
50	LILO of satna 220 kV - Katni 400 kV line at Maihar 220 kV S/s	Madhya Pradesh	220 kV	Line	D/c	3		Planned	2026-27
51	LILO of satna 220 kV - Maihar 220 kV line at Satna (PG) S/s	Madhya Pradesh	220 kV	Line	D/c	6		Planned	2026-27
52	Charging of 2nd circuit of Katni- Damoh 400 kV DCDS line(presently charged on 220 kV between Katni & Damoh 200kV S/s.) on 400 kV level between Katni-damoh(PG) S/s.	Madhya Pradesh	400 kV	Line	D/c	0		Planned	2025-26
53	LILO of 220 kV both circuits of Malanpur/Mehgaon - Auraiya (UP) D/c line at Bhind 220 kV S/s(TBCB)	Madhya Pradesh	220 kV	Line	D/c	25		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Chhattisgarh								
(A)	**New sub-stations / ICT augmentation**								
1	Khedamara (Bhilai) (Augmentation)	Chhattisgarh	400/220 kV	S/s			315	Commissioned	2022-23
2	Raita (Raipur) 400 kV S/s	Chhattisgarh	400/220 kV	S/s			315	Commissioned	2022-23
3	Dhardehi (Upgradation of existing 220/132 KV)	Chhattisgarh	400/220 kV	S/s			630	Under Construction	2024-25
4	Kurud(Dhamtari) (Capacity Augmentation i.e. additional 315 MVA)	Chhattisgarh	400/220 kV	S/s			630	Under Construction	2024-25
5	Patan (Upgradation of existing 132/33 KV S/s)	Chhattisgarh	220/132 kV	S/s			320	Commissioned	2024-25
6	Daldalseoni 220 kV S/s	Chhattisgarh	220/132/33 kV	S/s			320	Under Construction	2025-26
7	Ahiwara 220 kV S/s	Chhattisgarh	220/132/33 kV	S/s			320	Under Construction	2025-26
8	Semariya 220 kV S/s	Chhattisgarh	220/132/33 kV	S/s			320	Under Construction	2024-25
9	Rajim (Upgradation of existing 132/33 KV S/s)	Chhattisgarh	220/132 kV	S/s			320	Under Construction	2024-25
10	Dharamjaigarh (Hati) 220 kV S/s	Chhattisgarh	220/132 kV	S/s			320	Under Construction	2025-26
11	Kanker 220 kV S/s	Chhattisgarh	220/132 kV	S/s			320	Under Construction	2025-26
12	Kumhari 220 kV S/s	Chhattisgarh	220/132 kV	S/s			320	Planned	2025-26
13	Malda (Raigarh) 220 kV S/s	Chhattisgarh	220/132 kV	S/s			320	Planned	2025-26
14	Bacheli (Dantewada) 220 kV S/s	Chhattisgarh	220/132 kV	S/s			320	Planned	2025-26
(B)	**Transmission Lines**								
1	Dhardehi-Bilaspur pool (PGCIL Sipat) D/c line	Chhattisgarh	400 kV	Line	D/c	122		Under Construction	2025-26
2	LILO of Korba-Khedamara S/c line at Dhardehi S/s	Chhattisgarh	400 kV	Line	D/c	18		Under Construction	2024-25
3	LILO of 400 kV Raita-Jagdalpur S/c line at 400 kV Kurud (Dhamtari) S/s	Chhattisgarh	400 kV	Line	D/c	3		Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	Scheme to control fault level at Raipur (PGCIL Kumhari) & Bhilai (Khedamara) S/s (CSPTCL)	Chhattisgarh	400 kV	Line	D/c	6		Under Construction	2025-26
5	Kurud-Patan D/c line	Chhattisgarh	220 kV	Line	D/c	44.52		Under Construction	2024-25
6	Raita-Daldalseoni D/c line	Chhattisgarh	220 kV	Line	D/c	55.2		Under Construction	2025-26
7	LILO of Khedamara-Thelkadih S/c line at Semariya S/s	Chhattisgarh	220 kV	Line	D/c	5.9		Under Construction	2024-25
8	Kurud-Rajim line D/c line	Chhattisgarh	220 kV	Line	D/c	66		Under Construction	2024-25
9	Dharamjaigarh (PGCIL)-Chhuri D/c line	Chhattisgarh	220 kV	Line	D/c	76		Under Construction	2025-26
10	220 kV Kurud-Gurur D/c line	Chhattisgarh	220 kV	Line	D/c	74		Under Construction	2024-25
11	220 kV Raipur Pool (PGCIL Dhamdha)-Thelkadih (Rajnandgaon) D/c line	Chhattisgarh	220 kV	Line	D/c	82		Planned	2025-26
12	220 kV Raipur Pool (PGCIL Dhamdha)-Gendpur(Kawardha) D/c line	Chhattisgarh	220 kV	Line	D/c	130		Under Construction	2025-26
13	220 kV Raipur Pool (PGCIL Dhamdha)-Bemetara D/c line	Chhattisgarh	220 kV	Line	D/c	88		Planned	2025-26
14	LILO of 220 kV Urla-Siltara S/c line on Hybrid S/cheme at 765 kV Substation Raipur pool (PGCIL Dhamdha)	Chhattisgarh	220 kV	Line	D/c	74		Under Construction	2025-26
15	220 kV Dhardehi- Mungeli D/c line	Chhattisgarh	220 kV	Line	D/c	72		Planned	2026-27
16	220 kV Patan-Doma D/c line	Chhattisgarh	220 kV	Line	S/c	22		Planned	2026-27
17	Construction of 220 kV D/c Line for connectivity to Kumhari from 400 kV S/s Khedamara & 220 kV S/s Bhilai.	Chhattisgarh	220 kV	Line	D/c	20		Planned	2026-27
18	2nd circuiting of 220 Khedamara-Bemetara line from 220 kV s/s Ahiwara to 220 kV s/s Bemetara line	Chhattisgarh	220 kV	Line	S/c	38		Under Construction	2025-26
19	220 kV Dharamjaigarh PS (PGCIL Bhaisma) – Dharamjaigarh (Hati) CSPTCL D/cDS line & LILO of 220 kV DSPM-Suhela D/cDS line at proposed 220/132 kV S/s Dharamjaigarh (Hati) CSPTCL on MC	Chhattisgarh	220 kV	Line	M/c &D/c	175.8		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	tower (41.16 km on MC & 5.66 KM on D/c) .								
20	220 kV Bhatapara (PG)-Bhatapara D/cDS line	Chhattisgarh	220 kV	Line	D/c	16		Under Construction	2025-26
21	220 kV Khedamara-Bhilai D/cDS line	Chhattisgarh	220 kV	Line	D/c	1		Under Construction	2025-26
22	220 kV D/cDS Raigarh (PGCIL) - Malda/Sarangarh line.	Chhattisgarh	220 kV	Line	D/c	116		Planned	2026-27
23	LILO of 1 Ckt of 220 kV Saraipali - Raigarh line at proposed 220 kV S/s Malda/Sarangarh S/s	Chhattisgarh	220 kV	Line	D/c	50		Planned	2026-27
24	220 kV D/cDS Barsoor - Bacheli/Kirandul line along with feeder bays at Barsoor	Chhattisgarh	220 kV	Line	D/c	142		Planned	2026-27
	Goa								
(A)	**New sub-stations / ICT Augmentation**								
1	3x63 MVA, 220/33 kV ICT GIS SubStation at Saligao.	Goa	220/33 kV	S/s			189	Under Construction	2024-25
2	220/33 kV 63 MVA ICT at Tivim	Goa	220/33 kV	S/s			63	Planned	2024-25
3	220/33 kV, 63 MVA ICT at Xeldem S/s	Goa	220/33 kV	S/s			63	Planned	2025-26
4	220/33 kV, 63 MVA ICT at Cuncolim S/s	Goa	220/33 kV	S/s			63	Planned	2025-26
5	1 x (63-30) MVA, 220/33 kV at Ponda 220/110/33 S/s	Goa	220/33 kV	S/s			63	Under Construction	2024-25
6	1x(40-30) MVA,110/33 KV ICT at 220/110/33 KV Ponda S/s	Goa	110/33 kV	S/s			40	Planned	2026-27
7	1x(100-100) MVA,220/110 kV ICT at 220/110/33 kV Ponda S/s	Goa	220/110/33 kV	S/s			100	Planned	2026-27
(B)	**Transmission Lines**								
1	Renovation of existing 110 kV Supa-I and II EHV Lines and commissioning of new 110 kV D/C Tower lines frm Mollem to Kulem	Goa	110 kV	Line	D/c	7.5		Under construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
2	220 kV Mapusa - Saligao D/c line	Goa	220 kV	Line	D/c	18		Under construction	2024-25
3	220 kV Xeldem - Xeldam D/c line	Goa	220 kV	Line	D/c	22.06		Under Construction	2024-25
	KARNATAKA								
(A)	**New sub-stations / ICT Augmentation**								
1	Kalaburagi 400 kV S/s	Karnataka	400/220 kV	S/s			500	Commissioned	2022-23
2	Kalaburagi 400 kV S/s	Karnataka	400/220 kV	S/s			500	Commissioned	2023-24
3	Devanhalli Hardware Park 400 kV S/s	Karnataka	400/220 kV	S/s			500	Commissioned	2022-23
4	Channapatna 220 kV S/s	Karnataka	220/66 kV	S/s			100	Commissioned	2022-23
5	Ramasamudra 220 kV S/s	Karnataka	220/110 kV	S/s			200	Commissioned	2022-23
6	Nelamangala 220 kV S/s	Karnataka	220/66 kV	S/s			200	Planned	2025-26
7	Sira 220 kV S/s	Karnataka	220/66 kV	S/s			100	Commissioned	2023-24
8	Ganagapura 220 kV S/s	Karnataka	220/110 kV	S/s			200	Commissioned	2023-24
9	Sindagi 220 kV S/s	Karnataka	220/110 kV	S/s			200	Commissioned	2022-23
10	Yalwar 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2026-27
11	Banashankari 220 kV S/s	Karnataka	220/66 kV	S/s			300	Planned	2026-27
12	Kadakola 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2025-26
13	Hanagal 220 kV S/s	Karnataka	220/66 kV	S/s			200	Under Construction	2024-25
14	Mevundi 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2025-26
15	Muddebihal (Basarakod) 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
16	Keonics (Electronic City) 220 kV S/s	Karnataka	220/66 kV	S/s			300	Under Construction	2024-25
17	Mathikere 220 kV S/s	Karnataka	220/66 kV	S/s			300	Under Construction	2024-25
18	Nadamanchale 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2025-26
19	Shiggoan 220 kV S/s	Karnataka	220/110 kV	S/s			200	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
20	Srinivasapura 220 kV S/s	Karnataka	220/66 kV	S/s			200	Commissioned	2023-24
21	Kushtagi 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2025-26
22	Somasamudra 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
23	Hungund 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2026-27
24	Dudda 220 kV S/s	Karnataka	220/110/66 kV	S/s			300	Under Construction	2025-26
25	Santhpur 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
26	Nagarbhavi 220 kV S/s	Karnataka	220/66 kV	S/s			300	Under Construction	2024-25
27	Yelburga 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
28	Sirivara (Kodithimmanahalli) 220 kV S/s	Karnataka	220/66 kV	S/s			200	Planned	2026-27
29	Dommasandra 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2025-26
30	Bharamasagara 220 kV S/s	Karnataka	220/66 kV	S/s			200	Planned	2025-26
31	Arasapadavu (Kadandale) 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2025-26
32	Peenya 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Under Construction	2025-26
33	P.D Kote 220 kV S/s	Karnataka	220/66 kV	S/s			200	Under Construction	2024-25
34	Savalagi 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
35	Ron 220 kV S/S	Karnataka	220/110 kV	S/s			200	Under Construction	2025-26
36	White Field (Hadagur) 220 kV S/s	Karnataka	220/66 kV	S/s			300	Under Construction	2024-25
37	NRS Rajajinagar 220 kV S/s	Karnataka	220/66 kV	S/s			300	Under Construction	2024-25
38	Bilagi 220 kV S/s	Karnataka	220/110 kV	S/s			200	Under Construction	2024-25
39	Huliyurdurga 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Planned	2025-26
(B)	**Trasmission lines**								
1	Kadakola –Vajamangala, 220 kV D/c line	Karnataka	220 kV	Line	D/c	19.6		Under Construction	2024-25
2	LILO of Bidnal –Mahalingpur 220 kV S/c line at Sundatti S/s	Karnataka	220 kV	Line	D/c	121		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
3	Replacement of Drake conductor by HPC of Kolar -HVDC Kolar, 220 kV D/c line	Karnataka	220 kV	Line	D/c	6.7		Planned	2026-27
4	Replacement of AAAC conductor by HPC of Bidadi – Bidadi(PG), 220 kV D/c line	Karnataka	220 kV	Line	D/c	3.3		Planned	2026-27
5	Whitefield -Cessna(Exora), 220 kV S/c line	Karnataka	220 kV	Line	S/c	11.6		Under Construction	2024-25
6	Hoody- Whitefield, 220 kV S/c line	Karnataka	220 kV	Line	S/c	7.5		Under Construction	2024-25
7	Sindagi- Ganagapur, 220 kV D/c line	Karnataka	220 kV	Line	D/c	65		Under Construction	2024-25
8	Mylasandra –Dommasandra, 400 kV S/c line	Karnataka	400 kV	Line	S/c	15		Under Construction	2024-25
9	Kadavinkote- Kaniyar, 220 kV D/c line	Karnataka	220 kV	Line	D/c	30		Planned	2026-27
10	Chintamani- Mittemari, 220 kV D/c line	Karnataka	220 kV	Line	D/c	50.6		Commissioned	2023-24
11	Antharasanahalli –Nelamangala, 220 kV S/c line	Karnataka	220 kV	Line	S/c	42		Commissioned	2023-24
12	Peenya –NRS 220 kV D/c line	Karnataka	220 kV	Line	D/c	5.9		Under Construction	2026-27
13	Stringing of 2nd circuit on Hiriyur (PG)- Madhugiri 220 kV S/c line	Karnataka	220 kV	Line	S/c	75		Planned	2026-27
14	Replacement of Twin Moose S/c to Quad Moose D/c of BTPS- Guttur, 400 kV line	Karnataka	400 kV	Line	D/c	140		Planned	2026-27
15	Lingapur- Guttur, 220 kV D/c line (S/c to D/c)	Karnataka	220 kV	Line	D/c	109		Planned	2026-27
	KERALA								
(A)	**New sub-stations / ICT Augmentation**								
1	Chithirapuram 220 kV S/s	Kerala	220/66 kV	S/s			63	Commissioned	2022-23
2	Kunnamkulam 220 kV S/s	Kerala	220/110 kV	S/s			200	Commissioned	2022-23
3	Thalassery 220 kV S/s	Kerala	220/110 kV	S/s			200	Commissioned	2023-24
4	Ettumanoor 220 kV S/s	Kerala	220/110 kV	S/s			200	Commissioned	2022-23
5	Vizhinjam 220 kV S/s	Kerala	220/110 kV	S/s			200	Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
6	Kottayam 400 kV S/s	Kerala	400/220 kV	S/s			630	Commissioned	2023-24
7	Pathanamthitta 220 kV S/s	Kerala	220/110 kV	S/s			100	Under Construction	2024-25
8	Kakkad 220 kV S/s	Kerala	220/110 kV	S/s			100	Under Construction	2024-25
9	Tirur 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
10	Sasthamkotta 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
11	Thuravur 220 kV S/s	Kerala	220/110 kV	S/s			400	Planned	2026-27
12	Irinjalakuda 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
13	Palakkad 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
14	Nirmala City 220 kV S/s	Kerala	220/110 kV	S/s			100	Planned	2026-27
15	Wayanad 220 kV S/s	Kerala	400/220 kV	S/s			500	Planned	2026-27
16	Mannarkad 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
17	Kottathara/Agali 220 kV S/s	Kerala	220/33 kV	S/s			200	Planned	2026-27
18	Vidyanagar 220 kV S/s	Kerala	220/110 kV	S/s			200	Planned	2026-27
(B)	**Trasmission lines**								
1	Kanhirode- Mylatti, 220 kV D/c line	Kerala	220 kV	Line	D/c	177.5		Under Construction	2023-24
2	Mundayad –Thalasseri, 220 kV D/c line	Kerala	220 kV	Line	D/c	43.4		Commissioned	2022-23
3	Kodungallur- Irinjalakuda, 220 kV D/c line	Kerala	220 kV	Line	D/c	27.5		Commissioned	2022-23
4	Wadakkanchery -Kunnamkulam, 220 kV D/c line	Kerala	220 kV	Line	D/c	44.6		Commissioned	2022-23
5	Kottayam - Ettumanoor, 220 kV D/c line	Kerala	220 kV	Line	D/c	13		Commissioned	2022-23
6	Kottayam -Thuravoor, 220 kV D/c line	Kerala	220 kV	Line	D/c	53.1		Commissioned	2022-23
7	LILO of one ckts of Pallom – Ambalamugal, 220 kV D/c line at Kottayam S/s	Kerala	220 kV	Line	D/c	15.2		Commissioned	2022-23
8	Sabari Lines Package Pathanamthitta & Kakkad substations	Kerala	220 kV	Line	D/c	114		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
9	Kunnamkulam –Vengallur, 220 kV D/c line	Kerala	220 kV	Line	D/c	84		Under Construction	2024-25
10	Kallada- Sastamkotta, 220 kV D/c line	Kerala	220 kV	Line	D/c	13		Planned	2026-27
11	Aluva- Irinjalakuda 220 kV D/c line	Kerala	220 kV	Line	D/c	60.8		Planned	2026-27
12	Aluva –Chalakudy 220 kV D/c line	Kerala	220 kV	Line	D/c	54		Planned	2026-27
13	Irinjalakuda- Kunnamkulam 220 kV D/c line	Kerala	220 kV	Line	D/c	86		Planned	2026-27
14	Mannarkad- Palakkad 220 kV D/c line	Kerala	220 kV	Line	D/c	68		Planned	2026-27
15	LILO of one circuit of Elappully – Madakathara at Palakkad S/s	Kerala	220 kV	Line	D/c	15		Planned	2026-27
16	Kuyilimala -Nirmala City 220 kV D/c line	Kerala	220 kV	Line	D/c	40		Planned	2026-27
17	Wayanad – Kasargode, 400 kV D/c line	Kerala	400 kV	Line	D/c	248		Under Construction	2025-26
18	Vettathur –Kottathara, 220 kV D/c line	Kerala	220 kV	Line	D/c	116		Planned	2026-27
19	Kattakkada –Vizhinjam, 220 kV D/c line	Kerala	220 kV	Line	D/c	20		Commissioned	2022-23
20	Mylatty –Vidyanagar, 220 kV D/c line	Kerala	220 kV	Line	D/c	10		Under Construction	2025-26
	TELANGANA								
(A)	**New sub-stations / ICT Augmentation**								
1	Uddandapur 400 kV S/s	Telangana	400/11 kV	S/s			545	Under Construction	2024-25
2	Kokapet 220 kV GIS	Telangana	220/132/33 kV	S/s			480	Planned	2026-27
3	Narlapur S/S (Augmentation) 400 kV S/s	Telangana	400/11 kV	S/s			710	Under Construction	2024-25
4	Yedula S/S(Augmentation) 400 kV S/s	Telangana	400/11 kV	S/s			875	Under Construction	2024-25
5	Vattem S/S(Augmentation) 400 kV S/s	Telangana	400/11 kV	S/s			875	Under Construction	2024-25
6	Velgatoor 400 kV S/s	Telangana	400/11 kV	S/s			850	Under Construction	2024-25
7	Namapur 400 kV S/s	Telangana	400/11 kV	S/s			690	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
8	Kachapur Switching Station 400 kV S/s	Telangana	400 kV	S/s				Under Construction	2024-25
9	Veljipur 400 kV S/s	Telangana	400/11 kV	S/s			690	Under Construction	2024-25
10	Yellaipally 400 kV S/s	Telangana	400/220 kV	S/s			1000	Under Construction	2024-25
11	New Tukkapur 400 kV S/s	Telangana	400/11 kV	S/s			530	Under Construction	2024-25
12	Annaram 400 kV S/s	Telangana	400/220 kV	S/s			1500	Under Construction	2024-25
13	Manichippa 220 kV S/s	Telangana	220/11 kV	S/s			112	Under Construction	2024-25
14	Devannapet 220 kV S/s	Telangana	220/11 kV	S/s			170	Commissioned	2023-24
15	YacharamThanda 220 kV S/s.	Telangana	220/11 kV	S/s			120	Under Construction	2024-25
16	New Manichippa 220 kV S/s	Telangana	220/33 kV	S/s			16	Under Construction	2024-25
17	Chelmeda 220 kV S/s	Telangana	220/132/11 kV	S/s			200	Planned	2025-26
18	Borancha 220 kV S/s	Telangana	220/132/11 kV	S/s			320	Planned	2025-26
19	Pokkur 220 kV S/s	Telangana	220/11 kV	S/s			50	Planned	2025-26
20	B.G. Kothur	Telangana	220/11 kV	S/s	-	-	230	Commissioned	2022-23
21	V.K. Ramavaram	Telangana	220/11 kV	S/s	-	-	320	Commissioned	2023-24
22	Damaracherla 400 kV	Telangana	400/220 kV	S/s			1000	Commissioned	2022-23
23	Choutuppal 400 kV S/s	Telangana	400/220 kV	S/s			1000	Commissioned	2022-23
24		Telangana	220/132 kV				320	Commissioned	2023-24
25	KTPP (Bhoopalapally)	Telangana	400/220 kV	S/s			1000	Under Construction	2024-25
		Telangana	220/132 kV				320	Under Construction	2024-25
26	Veltoor 400 kV (Augmentation of 2 Nos. of 315 MVA ICT by 500 MVA ICT)	Telangana	400/220 kV	S/s			370	Commissioned	2023-24
27	Gajwel (Augmentation of 315 MVA by 500 MVA)	Telangana	400/220/132 kV	S/s			185	Commissioned	2022-23
28	Suryapet 400 kV S/s	Telangana	400/220/132 kV	S/s			500	Commissioned	2023-24
29	Dichpally 400 kV S/s	Telangana	400/220 kV	S/s			500	Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	Asupaka 400 kV S/s	Telangana	400/220 kV	S/s			315	Under Construction	2024-25
31	Kamalapuram 400 kV S/s	Telangana	400/220 kV	S/s			315	Commissioned	2024-25
(B)	**Transmission Lines**								
1	YTPP Switchyard - Choutuppal 400 kV D/c Line	Telangana	400 kV	Line	D/c	184.8		Under Construction	2024-25
2	YTPP Switchyard - Damaracherla 400 kV D/c Line	Telangana	400 kV	Line	D/c	9.864		Commissioned	2022-23
3	YTPP Switchyard - Jangaon 400 kV D/c Line	Telangana	400 kV	Line	D/c	278		Under Construction	2024-25
4	YTPP Switchyard - Dindi 400 kV D/c Line	Telangana	400 kV	Line	D/c	207.6		Commissioned	2024-25
5	LILO of both circuits of Khammam - Mamidipally 400 kV Line at Choutuppal S/s	Telangana	400 kV	Line	2 x D/c	33.38		Commissioned	2022-23
6	Yedula LI S/S - Narlapur LI SS, 400 kV D/c line	Telangana	400 kV	Line	D/c	55.47		Commissioned	2023-24
7	Yedula LI SS – Veltoor, 400 kV D/c line	Telangana	400 kV	Line	D/c	93.6		Under Construction	2024-25
8	Yedula LI SS – Dindi, 400 kV D/c line	Telangana	400 kV	Line	D/c	110.6		Commissioned	2023-24
9	Yedula LI SS - Vattem LI SS, 400 kV D/c line	Telangana	400 kV	Line	D/c	60.73		Under Construction	2024-25
10	Vattem LI SS- Uddandapur LI SS, 400 kV D/c line	Telangana	400 kV	Line	D/c	68.28		Under Construction	2024-25
11	Maheshwaram - Uddandapur LI SS, 400 kV D/c line	Telangana	400 kV	Line	D/c	120.5		Under Construction	2024-25
12	LILO of Kethireddypally -Shankarpally 220 kV S/c line at Kokapet GIS	Telangana	220 kV	Line	D/c	28		Planned	2026-27
13	LILO of Gachibowli -Rayadurg 220 kV S/c line at Kokapet GIS	Telangana	220 kV	Line	D/c	21		Planned	2026-27
14	LILO of Gachibowli – Shivarampally 220 kV S/c line at Rayadurg GIS	Telangana	220 kV	Line	D/c	10.32		Commissioned	2022-23
15	LILO of one circuit of KTPS-V - Lower Sileru-II 220 kV D/c line at B.G.Kothur LI S/s	Telangana	220 kV	Line	D/c	33.39		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
16	LILO of one circuit of KTPS-Manuguru 220kV D/c line at B.G.Kothur LI S/s	Telangana	220 kV	Line	D/c	1.028		Commissioned	2022-23
17	LILO of KTS - Asupaka (Lower Sileru-I) 220 kV S/c Line at V.K.Ramavaram LI S/s	Telangana	220 kV	Line	D/c	2.832		Commissioned	2023-24
18	Kamalapuram LI SS - V.K.Ramavaram LI SS 220 kV D/c Line	Telangana	220 kV	Line	D/c	28.32		Commissioned	2022-23
19	SCCL Jaipur- Annaram SS 400 kV D/c line	Telangana	400 kV	Line	D/c	40.2		Under Construction	2024-25
20	LILO of both ckts of Jaipur – Ramadugu 400 kV D/c line at Kachapur S/s	Telangana	400 kV	Line	2xD/c	14			2024-25
21	LILO of both ckts of Narsapur SS - NTPC 400 kV D/c line at Kachapur S/s	Telangana	400 kV	Line	2xD/c	10		Under Construction	2024-25
22	Kachapur Switching Station- to Gajwel 400 kV D/c line	Telangana	400 kV	Line	D/c	18			2024-25
23	Kachapur Switching Station-Namapur LI SS 400 kV D/c line	Telangana	400 kV	Line	D/c	38.6		Under Construction	2024-25
24	Velgatoor Switchyard - Namapur 400 kV D/c line	Telangana	400 kV	Line	D/c	45			2024-25
25	Kachapur Switching Station- Velgatoor 400 kV D/c line	Telangana	400 kV	Line	D/c	52		Under Construction	2024-25
26	Tippapur SS-Veljipur Switchyard 400 kV D/c line	Telangana	400 kV	Line	D/c	10.05			2024-25
27	Chandlapur SS- Yellaipally (Chinnagundavalli) 400 kV D/c line	Telangana	400 kV	Line	D/c	9.548		Under Construction	2024-25
28	Nizamabad SS - Chandlapur 400 kV D/c line	Telangana	400 kV	Line	D/c	94			2024-25
29	Jangaon –Devannapeta 220 kV D/c line	Telangana	220 kV	Line	D/c	110		Commissioned	2023-24
30	Dichpally- Yacharamthanda 220 kV D/c line	Telangana	220 kV	Line	D/c	26.5		Under Construction	2024-25
31	Dichpally- Manchippa LIS 220 kV D/c line	Telangana	220 kV	Line	D/c	46			2024-25
32	LILO of Mahaboobabad-Warangal 220 kV at Ammavaripet S/s	Telangana	220 kV	Line	D/c	62		Commissioned	2023-24
33	Gajwel-Siddipet 220 kV D/c line	Telangana	220 kV	Line	D/c	80		Commissioned	2022-23
34	Narsapur-Borampet 220 kV D/c line	Telangana	220 kV	Line	D/c	86		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
35	LILO of Pulukurthy-Bhimghanapur 220 kV line at KTPP S/s	Telangana	220 kV	Line	D/c	50		Commissioned	2023-24
36	LILO of Salivagu – Bheemghanpur 220 kV D/c line at KTPP S/s	Telangana	220 kV	Line	D/c	50		Commissioned	2023-24
37	KTPP-Manthani 220 kV D/c line	Telangana	220 kV	Line	D/c	98		Planned	2025-26
38	Damaracharla-Miryalaguda 220 kV D/c line	Telangana	220 kV	Line	D/c	100		Commissioned	2022-23
39	Damaracharla-Huzurnagar 220 kV D/c line	Telangana	220 kV	Line	D/c	90		Under Construction	2024-25
40	LILO of both ckts of Malkaram - Narketpally 220 kV D/c line at Choutuppal S/s	Telangana	220 kV	Line	2xD/c	60		Commissioned	2022-23
41	Janagaon –Husnabad 220 kV D/c line	Telangana	220 kV	Line	D/c	120		Under Construction	2024-25
42	Sadasivapet SS - Chelmeda Pump House 220 kV D/c line (12.5 km)	Telangana	220 kV	Line	D/c	25		Planned	2025-26
43	Replacement of existing 220 kV DC line (38.0 km) of single Moose conductor from 400/220kV Shankarpally SS to 220/132kV Sadasivapet SS with HTLS Conductor (520mm2 ACCC)	Telangana	220 kV	Line	D/c	76		Planned	2025-26
44	Narsapur SS - Borancha Pump House S/s 220 kV D/c line (70KM)	Telangana	220 kV	Line	D/c	140		Planned	2025-26
45	LILO of one ckt of Sundilla – Medigadda 220 kV D/c line, at proposed 220/11 kV Pokkur S/s	Telangana	220 kV	Line	D/c	6		Planned	2025-26
46	LILO of Shivarampally-Gachibowli 220 kV S/c line at proposed Nemalinagar GIS S/s (with UG cable)	Telangana	220 kV	Line	D/c	6		Planned	2025-26
47	LILO of Medaram - Dichpally S/c line to Kathalapur S/s	Telangana	220 kV	Line	D/c	3.7		Planned	2024-25
48	Narsapur S/s - Minpur S/s 220 kV D/c line	Telangana	220 kV	Line	D/c	65.00		Planned	2025-26
49	LILO of one circuit of existing 220 kV Gachibowli - Shankarpally D/c line at proposed 220/33 kV Kollur S/s	Telangana	220 kV	Line	D/c	3.00		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
50	Osmania University GIS S/s - Nagole S/s 220kV S/c line (XLPE UG Cable)	Telangana	220 kV	Line	S/c	14.00		Planned	2026-27
51	LILO of Shapurnagar – Moulali 220 kV S/c at Alwal (R.P. Nilayam) GIS	Telangana	220 kV	Line	D/c	1.00		Planned	2026-27
52	LILO of one circuit of Jagitial – Nirmal DC line at Nirmal S/s .	Telangana	220 kV	Line	D/c	10.00		Planned	2024-25
53	Upgradeation of Moulali-Gunrock 132 kV S/c line to 220 kV line duly making LILO at proposed Sainikpuri S/s (XLPE UG Cable)	Telangana	220 kV	Line	D/c	4.00		Planned	2026-27
	TAMIL NADU								
(A)	**New sub-stations / ICT Augmentation**								
1	Ariyalur 765 kV S/s	Tamil Nadu	765/400 kV	S/s			3000	Commissioned	2023-24
2	North Chennai Pooling Station (GIS) 765 kV S/s	Tamil Nadu	765/400 kV	S/s			4500	Commissioned	2023-24
3	Virudhunagar 765 kV S/s	Tamil Nadu	765/400 kV	S/s			3000	Under Construction	2024-25
4	Thervaigandigai 400 kV S/s	Tamil Nadu	400/230 kV	S/s			630	Under Construction	2024-25
5	Pulianthope (GIS) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			945	Commissioned	2022-23
6	Vellalaviduthi (Pudukkottai) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1030	Commissioned	2023-24
7	Guindy (GIS) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			630	Under Construction	2024-25
8	Korattur (GIS) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			630	Under Construction	2024-25
9	Edayarpalayam 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1600	Under Construction	2026-27
10	Tharamani (GIS) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1400	Under Construction	2024-25
11	Ottapidaram 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1400	Commissioned	2022-23
12	Samugarengapuram 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1400	Planned	2025-26
13	Parali 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1000	Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
14	Ariyalur 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1000	Planned	2026-27
15	Koyambedu (GIS) 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1000	Planned	2026-27
16	Cuddalore 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1400	Planned	2026-27
17	Manalmedu 400 kV S/s	Tamil Nadu	400/230 kV	S/s			1600	Planned	2026-27
18	Narimanam 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Planned	2025-26
19	Selvapuram (Puttuvikki) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
20	Poolavady 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Planned	2025-26
21	Erode GIS 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Commissioned	2022-23
22	Thiruvanmiyur (GIS) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
23	K.Pudur (GIS) 230 kV S/s	Tamil Nadu	230/33 kV	S/s			200	Planned	2025-26
24	Ennore (GIS) 230 kV S/s	Tamil Nadu	230/110/33 kV	S/s			332	Planned	2026-27
25	Ganesh Nagar (GIS) 230 kV S/s	Tamil Nadu	230/33 kV	S/s			200	Under Construction	2024-25
26	Durainallur (Panjetty) (GIS) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300		2024-25
27	Avadi 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
28	Karuppur (Jaggirammapalayam) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Commissioned	2023-24
29	Maraimalai Nagar 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
30	Pallavaram (GIS) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300	Planned	2026-27
31	Rajagopalapuram (GIS) 230 kV S/s	Tamil Nadu	230/33 kV	S/s			200	Planned	2026-27
32	K.K.Nagar GIS 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300	Planned	2026-27
33	Vembakkam 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300	Under Construction	2024-25
34	Mambakkam 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200		2024-25
35	Nanguneri 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
36	Thuckalay (GIS) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			320	Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
37	Sathumadurai 230 kV S/s	Tamil Nadu	230/110 kV	S/s			320	Under Construction	2024-25
38	Nallur (P.Velur) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200		2024-25
39	Kalivelampatty (Velampalayam) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Under Construction	2024-25
40	Muppandal 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300	Planned	2025-26
41	Saravanampatty (GIS) 230 kV S/s	Tamil Nadu	230/110 kV	S/s			300	Planned	2026-27
42	Kongal Nagaram 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Planned	2025-26
43	Kondagai 230 kV S/s	Tamil Nadu	230/110 kV	S/s			200	Planned	2026-27
44	Palani 230 kV S/s (Thumbalapatti)	Tamil Nadu	230/110 kV	S/s			200	Planned	2026-27
45	Keezhakuppam	Tamil Nadu	230/110 kV	S/s			320	Planned	2025-26
(B)	**Trasmission lines**								
1	Ariyalur - Thiruvalam (PGCIL), 765 kV D/c line	Tamil Nadu	765 kV	Line	D/c	347		Commissioned	2023-24
2	North Chennai Pooling station – Ariyalur, 765 kV D/c line	Tamil Nadu	765 kV	Line	D/c	273		Commissioned	2023-24
3	North Chennai Pooling station – Ariyalur, 765 kV D/c line	Tamil Nadu	765 kV	Line	D/c	273		Commissioned	2023-24
4	NCTPS - III switchyard - North Chennai Pooling Station, 765 kV D/c line	Tamil Nadu	765 kV	Line	D/c	13		Commissioned	2023-24
5	Virudhunagar – Coimbatore, 765 kV D/c line	Tamil Nadu	765 kV	Line	D/c	511		Under Construction	2024-25
6	Thervaikandikai – Korattur, 400 kV D/c line from Kovilpathagai Common point	Tamil Nadu	400 kV	Line	D/c	92		Planned	2026-27
7	OH and UG common point at Manjambakkam – Korattur, 400 kV UG Cable	Tamil Nadu	400 kV	Line	S/c	12		Under Construction	2024-25
8	LILO of Sunguvarchatram-Alamathy at Vellavedu (Guindy) upto Parivakkam S/s	Tamil Nadu	400 kV	Line	D/c	28			2024-25
9	Parivakkam – Guindy, 400 kV UG Cable	Tamil Nadu	400 kV	Line	D/c	32.4		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
10	Sholinganallur (Perumbakkam Jn) – Guindy, 400 kV UG Cable	Tamil Nadu	400 kV	Line	S/c	9			2024-25
11	Sholinganallur - Perumbakkam Jn towards Guindy, 400 kV S/c line	Tamil Nadu	400 kV	Line	S/c	14.7		Under Construction	2024-25
12	LILO of Sholinganallur-Guindy 400 kV Line at Tharamani (UG Cable) S/s	Tamil Nadu	400 kV	Line	D/c	7.86		Under Construction	2024-25
13	LILO of Thappagundu – Anaikadavu 400 kV S/c line at Udumalpet S/s	Tamil Nadu	400 kV	Line	D/c	40		Under Construction	2024-25
14	Manali – Pulianthoppe, 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	18.8		Commissioned	2022-23
15	LILO of both, Karaikudi - Pugalur 400 kV D/c line at Vellalaviduthi	Tamil Nadu	400 kV	Line	2xD/c	166		Commissioned	2023-24
16	LILO of both, Pugalur - Kalivanthapattu 400 kV D/c line at Ariyalur S/s	Tamil Nadu	400 kV	Line	2xD/c	14.5		Commissioned	2023-24
17	LILO of one ckt, NCTPS -II- Sunguvarchatram 400 kV D/c line at Koyambedu 400 kV S/s (UG cable)	Tamil Nadu	400 kV	Line	D/c	8		Planned	2026-27
18	Virudhunagar– Kayathar 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	140.4		Under Construction	2024-25
19	Udangudi Pooling Station - Kayathar Common Point 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	170		Planned	2026-27
20	2nd circuit stringing Kanarpatti - Abisekapatti 400 kV S/c line	Tamil Nadu	400 kV	Line	S/c	15		Under Construction	2024-25
21	Ottapidaram - Udangudi Power Project 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	141.4		Commissioned	2023-24
22	Ottapidaram - Kamudhi 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	143.3		Commissioned	2022-23
23	Samugarengapuram - Udangudi 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	80		Planned	2026-27
24	Kamuthi - common point near the proposed Virudhungar 400 kV D/c line and common point - Thappakundu 400 kV D/c line.	Tamil Nadu	400 kV	Line	D/c	312.4		Planned	2026-27
25	LILO of one ckt of the NCTPS Stage-II - Sunguvarchatram 400 kV D/c line from tower location no.176 at Murkanchery upto cable termination point at Koyembedu S/s	Tamil Nadu	400 kV	Line	D/c	60		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
26	Ennore SEZ - North Chennai Pooling Station, 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	30.5		Under Construction	2024-25
27	Ennore SEZ - ETPS Expansion, 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	34.5			2024-25
28	ETPS Expansion - North Chennai Pooling Station, 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	5.4		Under Construction	2024-25
29	Inter connection from Common Point AP 23 of SEZ-ETPS exp to NCTPS Stage-II and LILO of the existing NCTPS -II to Sunguvarchatram 400 kV MC Line between loc.21 and Loc.22	Tamil Nadu	400 kV	Line	D/c	2.5			2024-25
30	Ottiyambakkam - Omega 230 kV S/c line on D/c towers	Tamil Nadu	230 kV	Line	S/c	35		Commissioned	2023-24
31	Ottiyambakkam - Omega 2nd Ckt (Free arm stringing) 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	35		Commissioned	2023-24
32	Sholinganallur -KITS 230 kV D/c line	Tamil Nadu	230 kV	Line	D/c	24		Under Construction	2024-25
33	CMRL Cental Jail – Mambalam, 230 kV line (UG Cable)	Tamil Nadu	230 kV	Line	S/c	9		Under Construction	2024-25
34	Kilpauk - TNEB HQ, 230 kV S/c line (UG Cable)	Tamil Nadu	230 kV	Line	S/c	10		Under Construction	2024-25
35	Basin Bridge - TNEB Head Quarters, 230 kV (UG Cable) line	Tamil Nadu	230 kV	Line	S/c	7.2		Under Construction	2024-25
36	Basin Bridge - Pulianthope , 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	1.5		Commissioned	2022-23
37	LILO of Mylapore - Taramani 230 kV S/c line at Thiruvanmiyur GIS S/s (UG Cable)	Tamil Nadu	230 kV	Line	D/c	2		Under Construction	2024-25
38	Alamathy S/s -Avadi Police quarters point Stringing of 230 kV D/c line in the free arm of the existing MC towers	Tamil Nadu	230 kV	Line	D/c	19		Under Construction	2024-25
39	Avadi police quarters -Annanur tower point laying of 230 kV D/c UG cable	Tamil Nadu	230 kV	Line	D/c	9		Under Construction	2024-25
40	Annanur tower point - Koladi point, Stringing of 230 kV D/c line in the free arm of the existing MC tower	Tamil Nadu	230 kV	Line	D/c	7.7		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
41	LILO of Alamathy-Srperumbudur 230 kV S/c line at Avadi S/s (UG cable)	Tamil Nadu	230 kV	Line	D/c	1		Planned	2024-25
42	LILO of Korattur- Kilpauk water works 230 kV S/c line at Ganesh Nagar S/s	Tamil Nadu	230 kV	Line	D/c	3		Planned	2024-25
43	Palladam- Ingur 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	62		Under Construction	2024-25
44	LILO of Ingur-Palladam 230 kV S/c line at Kurukathi S/s	Tamil Nadu	230 kV	Line	D/c	62		Under Construction	2024-25
45	Ingur - Arasur (PGCIL) 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	54		Commissioned	2022-23
46	Strengthening of Singarapettai - Thiruvannamalai 230 kV S/c line (location 282 to 453)	Tamil Nadu	230 kV	Line	S/c	49.7		Planned	2025-26
47	Kinnimangalam - Samayanallur 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	20.4		Commissioned	2023-24
48	LILO of Paramathi - Alundur 230 kV S/c line at Valayapatty S/s	Tamil Nadu	230 kV	Line	D/c	59.7		Commissioned	2023-24
49	Shoolagiri - Uddanapally 230 kV D/c line	Tamil Nadu	230 kV	Line	D/c	2.3		Under Construction	2024-25
50	Palavadi - Thiruppathur 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	76			2024-25
51	Villupuram - Ulundurpet 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	55		Under Construction	2025-26
52	LILO of Myvady -Kurukathi– Pugalur 230 kV S/c line at Rasipalayam S/s	Tamil Nadu	230 kV	Line	D/c	45			2024-25
53	LILO of Ingur-Kurukathi- Palladam 230 kV S/c line feeder at Rasipalayam S/s	Tamil Nadu	230 kV	Line	D/c	27		Under Construction	2024-25
54	Vellalavidhuthi - Nemmeli Thippayakudy 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	23		Commissioned	2023-24
55	Vellalavidhuthi - Pudukottai 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	20		Commissioned	2023-24
56	Vellalaviduthi - Thuvakudy 230 kV S/c line.	Tamil Nadu	230 kV	Line	S/c	33		Commissioned	2023-24
57	Vellalaviduthi - Mondipatti 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	90		Commissioned	2023-24
58	N.T.gudi –Karaikudi 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	104		Commissioned	2023-24
59	Erection of 230 kV 4 circuits line on MC towers with Zebra conductor	Tamil Nadu	230 kV	Line	4xS/c	28		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	(i) ETPS _ Tondiarpet 230 kV S/c line, ii) ETPS _ Manali 230 kV S/c line, iii) NCTPS I - Kilpauk, 230 kV S/c line iv) NCTPS I –Tondiarpet 230 kV S/c line								
60	LILO of PP Nallur – Thiruvarur, 230 kV S/c line at the proposed Narimanam S/s	Tamil Nadu	230 kV	Line	D/c	31		Planned	2025-26
61	LILO the PP Nallur – Thanjavur, 230 kV line at the proposed Narimanam 230 kV S/s	Tamil Nadu	230 kV	Line	D/c	30		Planned	2025-26
62	LILO of MTPS – Salem, 230 kV S/c line at Karuppur S/s	Tamil Nadu	230 kV	Line	D/c	25		Commissioned	2023-24
63	Sembatty – Myvady (from loc 1 to 9) and Myvady - Kadamparai 230 kV D/c line	Tamil Nadu	230 kV	Line	D/c	4.6		Under Construction	2024-25
64	Sembatty - Myvady (Loc 9 to 262), 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	76			2024-25
65	Tiruchuli – Kamudhi, 230 kV D/c line	Tamil Nadu	230 kV	Line	S/c	32.5		Under Construction	2024-25
66	Strengthening of existing Kundah conductor by Zebra conductor in the existing Myvady - Othakkalmandapam feeder (1 to 29)	Tamil Nadu	230 kV	Line	D/c	17.5		Planned	2025-26
67	Strengthening of existing Kundah conductor by Zebra conductor from Loc 29 to Othakalmandapam (Myvady - Othakkalmandapam feeder) .	Tamil Nadu	230 kV	Line	S/c	46.8		Planned	2025-26
68	LILO of Othakalmandapam - Ponnapuram 230 kV S/c line at Edayarpalayam S/s	Tamil Nadu	230 kV	Line	D/c	20.5		Under Construction	2025-26
69	LILO of Ottiyambakkam - Omega Feeder II 230 S/c line at the proposed Mambakkam S/s.	Tamil Nadu	230 kV	Line	D/c	68			2024-25
70	LILO of S.P.Koil - Oragadam 230 S/c line at Maraimalai Nagar S/s	Tamil Nadu	230 kV	Line	D/c	16		Under Construction	2024-25
71	Strengthening of S.P.Koil - Oragadam line 230 kV S/c line from loc.4 to loc.63	Tamil Nadu	230 kV	Line	S/c	17.5			2024-25
72	LILO of existing Arni - Sriperumbudur 230 kV at Vembakkam 230 kV SS	Tamil Nadu	230 kV	Line	D/c	6		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
73	LILO of existing MAPS - Arni 230kV S/c line at Vembakkam S/s	Tamil Nadu	230 kV	Line	D/c	24			2025-26
74	Erection of 230 kV 4 circuits line on MC towers from the proposed Saravanampatty 230/110 kV SS - common point, 230 kV 2xD/c	Tamil Nadu	230 kV	Line	2xD/c	48		Planned	2026-27
75	Erection of 230 kV D/c line on D/c towers from common point to LILO location of existing 230 kV PUSHEP - Arasur feeder	Tamil Nadu	230 kV	Line	D/c	20		Planned	2026-27
76	Erection of 230 kV D/c line on D/c towers from common point up to the location 18 of the existing 230 kV Karamadai -Thudiyalur feeder	Tamil Nadu	230 kV	Line	D/c	58		Planned	2026-27
77	Stringing of 230 kV D/c line on the free arms of the existing multi-circuit towers of the existing 230 kV Karamadai - Thudiyalur feeder from location 18 upto Karamadai 400/230 kV SS	Tamil Nadu	230 kV	Line	D/c	8		Planned	2026-27
78	LILO of Abishekapatti - Udayathur 230 kV S/c line at proposed Nanguneri S/s	Tamil Nadu	230 kV	Line	D/c	41.7		Under Construction	2024-25
79	Samugarengapuram - Nanguneri 230 kV S/c line	Tamil Nadu	230 kV	Line	S/c	20.4			2025-26
80	LILO of Valuthur-Alagarkoil 230 kV S/c line at Uppur Super Critical Power Plant	Tamil Nadu	230 kV	Line	D/c	20.3		Under Construction	2024-25
81	S.R.Pudur-Samugarenpuram 230 kV D/c line	Tamil Nadu	230 kV	Line	D/c	120		Planned	2025-26
82	Muppandal -Samugarenpuram 230 kV D/c line	Tamil Nadu	230 kV	Line	D/c	80		Planned	2025-26
83	Muthuramalingapuram - K.Pudur, 230 kV D/c line (OH line-64km, XLPE UG cable-5Kms)	Tamil Nadu	230 kV	Line	D/c	138		Planned	2025-26
	ANDHRA PRADESH								
(A)	**New sub-stations / ICT Augmentation**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	Dharmavaram 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Under Construction	2024-25
2	Sunappurallapalli 220 kV SWS (To extend supply to Kadapa Steels)	Andhra Pradesh	220 kV	S/s			200	Planned	2025-26
3	Tiruvuru 220 kV S/s	Andhra Pradesh	220/132/33 kV	S/s			300	Under Construction	2024-25
4	Pedana 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2026-27
5	Koppaka 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2025-26
6	Koruprolu (Chandanada)220 kV S/s	Andhra Pradesh	220/132/33 kV	S/s			400	Under Construction	2024-25
7	Mutyal_Cheruvu 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Commissioned	2022-23
8	132KV Features at 220 KV Pallan-SWS S/s	Andhra Pradesh	220/132 kV	S/s			200	Commissioned	2023-24
9	Kakinada SEZ 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2025-26
10	Vijyanagram 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2026-27
11	Piduguralla 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	commissioned	2022-23
12	Thallaypalem 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			1000	Under Construction	2024-25
13	Guddigudem 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			630	commissioned	2023-24
14	Anavilli 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			630	Planned	2025-26
15	Achuthapuram 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			1500	Under Construction	2025-26
16	Kakinada SEZ 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			1000	Planned	2025-26
17	Chapalmadugu 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2025-26
18	Gudivada 400 kV S/s	Andhra Pradesh	400/220 kV	S/s			1000	Planned	2025-26
19	Dhone 220 kV S/s (Switching station)	Andhra Pradesh	220 kV	S/s				Commissioned	2023-24
20	Bethamcherala 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Under Construction	2024-25
21	Yemmiganur 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2025-26
22	Shree Cement 220 kV S/s	Andhra Pradesh	220/66 kV	S/s			60	Commissioned	2023-24
23	Vepakayaladibba 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			100	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
24	Gopavaram 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			100	Planned	2025-26
25	Punganur 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2024-25
26	Chinthuru 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			100	commissioned	2022-23
27	132 kV features at 220 kV SWS Somayajulapally	Andhra Pradesh	220/132 kV	S/S			200	Planned	2024-25
28	Penukonda 220 kV S/s	Andhra Pradesh	220/132/33 KV	S/s			320	Commissioned	2023-24
29	Achuthapuram 220 kV S/s	Andhra Pradesh	220/132/33 KV	S/s			200	Under Construction	2024-25
30	JNPC 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			100		2024-25
31	Inaparajupalli 220 kV Switching station (to extend supply to Shreecements)	Andhra Pradesh	220 kV	S/s				Commissioned	2023-24
32	Kothapatnam 220 kV Switching station	Andhra Pradesh	220 kV	S/s				Planned	2024-25
33	Racherla 220 kV S/s (Cherivi)	Andhra Pradesh	220/132 kV	S/s			320	Planned	2024-25
34	132 kV Features at 220 kV Settypally	Andhra Pradesh	220/132 kV	S/S			320	Planned	2024-25
35	Uppalapadu 220 kV Switching station (To extend supply to Jai Raj Supply)	Andhra Pradesh	220 kV	S/s				Planned	2024-25
36	220/132 kV ICT augmentation at 400KV SS,Gudivada	Andhra Pradesh	220/132 kV	S/s			320	Planned	2025-26
37	Sri Pavana Narasimha Swamy 220 kV Switching station	Andhra Pradesh	220 kV	S/s				Planned	2025-26
38	Kathaluru 220 KV Switching station	Andhra Pradesh	220 kV	S/s				Planned	2025-26
39	Upgradation of 132/33KV SS Tadepalli as 220 kV SS	Andhra Pradesh	220/132/33 kV	S/s			480	Planned	2026-27
40	Ramayapatnam 400 kV Switching station	Andhra Pradesh	400 kV	S/s				Planned	2026-27
41	Mutyalapadu 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2026-27
42	Gadivemula 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2026-27
(B)	**Trasmission lines**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	Atchuthapuram 220 kV GIS S/s – Actchuthapuram 400 kV S/s, 220 kV D/c UG cable	Andhra Pradesh	220 kV	Line	D/c	5		Under Construction	2025-26
2	Koruprolu - Atchuthapurm 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	60.2			2024-25
3	LILO of Gooty (PG) - Shapuram 220 kV S/c line at Dharmavram	Andhra Pradesh	220 kV	Line	S/c	10		Under Construction	2024-25
4	LILO of KTS – Nunna 220 kV S/c line at Tiruvuru	Andhra Pradesh	220 kV	Line	S/c	6.3			2024-25
5	Pallantala- Guddigudem 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	60		Commissioned	2023-24
6	Pattiseema - Guddigudem 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	44		Commissioned	2023-24
7	Kakinada SEZ- Krishnavaran 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	80		Planned	2025-26
8	Cherivi –Rachaguneri 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	107		Under Construction	2024-25
9	Cherivi - Sullurpet 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	39			2024-25
10	KV Kota - Bhimadole 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	44		Under Construction	2024-25
11	Penukonda - Hindupur S/s 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	70		Commissioned	2023-24
12	Pamanpurthanda -Hindupur 400 kV S/s ,220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	160		Commissioned	2023-24
13	Pamanpurthanda -Hindupur 400 kV S/s, 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	160		Under Construction	2024-25
14	LILO of Koruprolu –Kakinada S/S, 220 kV line at Kakinada SEZ 400 kV S/s	Andhra Pradesh	220 kV	Line	D/c	22		Planned	2025-26
15	Rampachodavaram -Lowersiler 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	65.6		Under Construction	2026-27
16	Bavojipet - Lowersiler 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	90.5		Under Construction	2026-27
17	Kakinada SEZ- Gail_Kknd 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	10		Planned	2025-26
18	LILO of Kalpaka-Khammam 400 kV S/c line at Atchuthapuram S/s	Andhra Pradesh	400 kV	Line	D/c	7		Under Construction	2025-26
19	KV Kota – Konasema 400 kV S/c line	Andhra Pradesh	400 kV	Line	S/c	88		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
20	KV Kota - Vemagiri 400 kV S/c line	Andhra Pradesh	400 kV	Line	S/c	197		Planned	2025-26
21	LILO of both circuits of VTS IV- Sattenpali, 400 kV D/c line at Thallaypalem S/s	Andhra Pradesh	400 kV	Line	2xD/c	6		Under Construction	2024-25
22	Polavaram -Guddigudem 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	50		Under Construction	2024-25
23	Guddigudem - KV Kota 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	100		Commissioned	2022-23
24	Muthyalachereuvu-Pulivendula 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	108		Commissioned	2022-23
25	Gudivada 400 kV S/s-Pedana 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	60		Planned	2026-27
26	Machilipattanam- Pedana 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	60		Planned	2026-27
27	LILO of both circuit of Gudivada – Akiveedu 220 kV D/c line at Gopavaram S/s	Andhra Pradesh	220 kV	Line	2xD/c	2		Planned	2025-26
28	LILO of Bhimadole- Nunna 220 kV S/c line at Koppaka S/s	Andhra Pradesh	220 kV	Line	D/c	1		Planned	2025-26
29	LILO of Somayajulapalli-Rangapuram 220 kV S/c line at Bethamcherela S/s	Andhra Pradesh	220 kV	Line	D/c	8		Planned	2024-25
30	LILO of Bavojipet-Bommur 220 kV S/c line at Vepakayaladibba S/s	Andhra Pradesh	220 kV	Line	D/c	0.8		Under Construction	2025-26
31	LILO of both circuits of Srisailam RB- Tallapali 220 kV D/c line at ChapalamaduguS/s	Andhra Pradesh	220 kV	Line	2xD/c	48.35		Planned	2025-26
32	LILO of both circuits Piduguralla-Talapalli 220 kV D/c line at Shreecement	Andhra Pradesh	220 kV	Line	2xD/c	12		Commissioned	2023-24
33	Shree Cement-Shree Cement Ltd 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	5		Commissioned	2023-24
34	Settipalli-Veldurthy RT 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	6.64		Commissioned	2023-24
35	Settipalli-AP Crabides 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	56		Under Construction	2024-25
36	Stringing 2nd circuit on Settipalli- Krisnagiri 220 kV DC/SC line	Andhra Pradesh	220 kV	Line	S/c	10.5			2024-25
37	Nansurala-Krisnagiri 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	25		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
38	LILO of Palamaneru-Madanapalli 220 kV S/c line at Punganur S/s	Andhra Pradesh	220 kV	Line	D/c	8			2024-25
39	LILO of Konasema-Vemagirli 400 kV S/c line at Ainavali	Andhra Pradesh	400 kV	Line	D/c	48		Planned	2025-26
40	LILO of Simdhiri-Vemagirli 400 kV S/c line at Kakinada SEZ	Andhra Pradesh	400 kV	Line	D/c	20		Planned	2025-26
41	LILO of Kalpaka- Vemagirli 400 kV S/c line at Kakinada SEZ	Andhra Pradesh	400 kV	Line	D/c	20		Planned	2025-26
42	LILO of JNPC- Anarak 220 kV S/c line at 400/220 kV Atchuthapuram	Andhra Pradesh	220 kV	Line	S/c	27		Planned	2025-26
43	Brandix–Achutapuram GIS 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	6.774		Under Construction	2024-25
44	LILO of 400KV HNPCL-KV Koata D/C Line at Kakinada SEZ and Guddigudem	Andhra Pradesh	400 kV	Line	D/c	20			2025-26
45	Making LILO of 220 kV VTPS–Tallapally-1 circuit at Rentachinthala S/s	Andhra Pradesh	220 kV	Line	S/c	2.8		Under Construction	2023-24
46	LILO of one circuit of Krishnhapatnam-Manubole QMDC 400 kV line at SEMBCORP-2	Andhra Pradesh	400 kV	Line	D/c	7.4		commissioned	2023-24
47	Hindupur 400 kV SS – Gollapuram 220 kV D/C line	Andhra Pradesh	220 kV	Line	D/C	52		Under Construction	2024-25
48	Hindupur - Bokshampally 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	42		Commissioned	2022-23
49	LILO of one circuit of Bobbili-Garividi 220 kV D/c line at Maradam S/s	Andhra Pradesh	220 kV	Line	S/C	9		Planned	2024-25
50	LILO of Parwada - Kakinada 220 kV line and Anrak -Kakinada 220 kV line at the proposed 220 kV SS at Koruprolu (Chandanada) S/s	Andhra Pradesh	220 kV	Line	2* S/C	52		Under Construction	2024-25
51	LILO of 220 kV Parawada-Anrak S/C line at 220/33 kV JNPC S/s.	Andhra Pradesh	220 kV	Line	S/C	0.24			2024-25
52	LILO of 220 kV Bommuru – Vijjeswaram Stage-I&II D/C line to 400 kV Vemagiri S/s	Andhra Pradesh	220 kV	Line	2xS/C	4		Under Construction	2024-25
53	LILO of 220 kV Racharalapadu – Ongole S/c line at Kandukur S/s	Andhra Pradesh	220 kV	Line	S/C	7			2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
54	LILO of Chinakampalli - Renigunta 220 kV S/c line at Rajampet S/s	Andhra Pradesh	220 kV	Line	S/C	6.4		Planned	2024-25
55	Interchange of existing 220 kV RTPP-Pulivendula D/c line and 220 kV Jammalamadugu-Chakrayapet DC Line to form (i) 220 kV Jammalamadugu-Pulivendula D/c line and (2) 220 kV RTPP-Chakrayapet D/c line at the crossing point of these Lines	Andhra Pradesh	220 kV	Line	2xD/C	314.4		Planned	2024-25
56	Jammalamadugu – Bethamcherla 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	136		Under Construction	2024-25
57	LILO of Nurnoor-Somayajulupalli 220 kV D/c line at Uppalapadu	Andhra Pradesh	220 kV	Line	2xD/c	8.4		Under Construction	2024-25
58	Uppalapadu SWS - M/s. Jai Raj Ispat Ltd, 220 kV DC/SC line	Andhra Pradesh	220 kV	Line	S/c	3.9		Under Construction	2024-25
59	2nd circuit stringing from Manubolu to Kothapatnam S/s	Andhra Pradesh	220 kV	Line	S/c	34.5		Planned	2024-25
60	LILO of Manubolu-SBQ steel DC/SC line at Kothapatnam S/s	Andhra Pradesh	220 kV	Line	S/c	34		Planned	2024-25
61	LILO of Kalpaka-Asupaka 400 kV S/c line at Atchuthapuram S/s	Andhra Pradesh	400 kV	Line	S/c	7		Under Construction	2025-26
62	LILO of Parwada - Koruprolu (Chandanada) 220 kV S/c line at 400/220 kV Atchuthapuram S/s	Andhra Pradesh	220 kV	Line	S/c	27		Planned	2025-26
63	LILO of Kalpaka-Simhachalam 220 kV S/c Line at Parawada S/s	Andhra Pradesh	220 kV	Line	D/c	6.4		Planned	2025-26
64	HNPCL-Kakinada SEZ 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	10		Planned	2025-26
65	Kakinada SEZ-Guddigudem 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	4.34		Commissioned	2022-23
66	2nd circuit stringing from proposed 220 kV Bavojipeta Switching Station to 220 kV S/s Rampachodavaram.	Andhra Pradesh	220 kV	Line	S/c	29.35		Planned	2025-26
67	LILO of Vemagiri – Sattenapalli 400 kV D/c line at proposed 400/220 kV Gudiwada SS.	Andhra Pradesh	400 kV	Line	M/c	124		Under Construction	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
68	LILO of both circuits of VTS – Tadikonda 220 kV D/c line at proposed 400/220 kV Tallayapalem S/s	Andhra Pradesh	220 kV	Line	2xD/c	16		Planned	2025-26
69	LILO of Podili (220 kV) S/s -Parchuru 220 kV D/c line at Podili (400 kV) S/s	Andhra Pradesh	220 kV	Line	M/c	32		Planned	2025-26
70	Talamanchipatnam (Jammalamadugu) - Switching Station at Sunnapurallapalli, 220 kV D/c line	Andhra Pradesh	220 KV	Line	D/c	44		Planned	2025-26
71	Making LILO of one circuit Jammalamadugu-Porumamilla 220 kV D/c Line at proposed 220 kV SWS M/s. Sri Pavana Narasimha	Andhra Pradesh	220 kV	Line	D/c	4		Planned	2025-26
72	LILO of Jammalamadugu-Chakrayapet 220 kV S/c at Kathaluru S/s	Andhra Pradesh	220 kV	Line	D/c	2		Planned	2025-26
73	LILO of Animala-Chakrayapet 220 kV S/c line at Kathaluru SS.	Andhra Pradesh	220 kV	Line	D/c	2		Planned	2025-26
74	RTPP – Jammalamadugu, 400 kV D/C line	Andhra Pradesh	400 kV	Line	D/c	80		Planned	2025-26
75	LILO of one circuit of Mythra - Nansuralla 220 kV D/c Line at the proposed Yemmiganur (Banavasi SS)	Andhra Pradesh	220 kV	Line	S/c	62		Planned	2025-26
76	LILO of both circuits of Maradam-Pendurthy 220 kV D/c at Vijayanagram	Andhra Pradesh	220 kV	Line	M/c	20		Planned	2026-27
77	Tallayapalem - Tadepalli 220 kV D/c line (10 km UG & 4.2 km OH)	Andhra Pradesh	220 kV	Line	D/c	28.4		Planned	2026-27
78	Krishnapathnam – Ramayapatnam SWS 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	192		Planned	2026-27
79	Podili - Ramayapatnam SWS 400 kV D/c Line	Andhra Pradesh	400 kV	Line	D/c	200		Planned	2026-27
80	LILO of one ckt of VTS-Manubolu 400 kV D/c Line at Podili SS.	Andhra Pradesh	400 kV	Line	D/c	5		Planned	2026-27
81	LILO of Nunna–Manubolu 400 kV S/c Line at Podili SS	Andhra Pradesh	400 kV	Line	S/c	5		Planned	2026-27
82	LILO of Jammalamadugu- Porumamilla 220 kV D/c line at Mydukur SS	Andhra Pradesh	220 kV	Line	D/c	16.4		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
83	LILO of Srisailam-Mydukur 220 kV S/c line at Mutyalapadu S/S	Andhra Pradesh	220 kV	Line	D/c	8		Planned	2026-27
84	LILO of Somayajulapalli –Srisailam 220 kV S/c Line at Gadivemula S/s	Andhra Pradesh	220 kV	Line	D/c	1.714		Planned	2026-27
85	Renew Power PS - Pampanur Tanda SWS 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	16		Under Construction	2024-25
86	220 kV DC/SC line from 400/220 kV SS Talaricheruvu to M/s. Sugna Sponge	Andhra Pradesh	220 kV	Line	S/c	10		Planned	2025-26
87	Kakinada-Anrak 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	118.1		Commissioned	2023-24
88	Kakinada-Parawad 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	145		Commissioned	2023-24
89	Samalkota- Kakinada 220 kV S/c line	Andhra Pradesh	220 kV	Line	S/c	47		Commissioned	2023-24
	Bihar								
(A)	**New sub-stations / ICT augmentation**								
1	Jakkanpur (New), Kuda Nawada, BGCIL 400 kV S/s	Bihar	400/220 kV	S/s			1000	Commissioned	2022-23
2	Bhusaula (New), BGCIL 220 kV S/s	Bihar	220/33 kV	S/s			200	Commissioned	2022-23
3	Chhapra, Saran 400 kV S/s	Bihar	400/220 kV	S/s			1000	Under Construction	2024-25
4	PMCH, Patna 132 kV Green GIS S/s	Bihar	132/33 kV	S/s			160	Under Construction	2026-27
5	Sarairanjan, Samastipur 132 kV S/s	Bihar	132/33 kV	S/s			100	Under Construction	2026-27
6	Chandi, Nalanda 132 kV S/s	Bihar	132/33 kV	S/s			100	Under Construction	2026-27
7	Maithi, Muzaffarpur 132 kV S/s	Bihar	132/33 kV	S/s			160	Under Construction	2026-27
(B)	**Transmission Line**								
1	LILO of 400 kV Barh-Motihari (DMTCL) D/c line at Chhapra (New)	Bihar	400 kV	Line	2xD/c	20		Under Construction	2025-26
2	LILO of Barh - Patna 400 kV D/c (Quad) line at Bakhtiyarpur (New)	Bihar	400 kV	Line	2xD/c	20		Commissioned	2022-23
3	Muzaffarpur (PG) – Goraul 220 kV D/c line	Bihar	220 kV	Line	D/c	40		Commissioned	2022-23
4	Goraul – Tajpur 220 kV D/c line	Bihar	220 kV	Line	D/c	90		Commissioned	2023-24

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
5	Kishanganj (New)–Thakurganj 220 kV D/c line	Bihar	220 kV	Line	D/c	104		Commissioned	2022-23
6	Samastipur (New) – Tajpur 220 kV D/c line	Bihar	220 kV	Line	D/c	60		Commissioned	2022-23
7	Amnour – Digha (New) GIS (River crossing) 220 kV D/c line	Bihar	220 kV	Line	D/c	96		Commissioned	2023-24
8	Biharshariff (BSPTCL) – Ashthawan 220 kV D/c line	Bihar	220 kV	Line	D/c	40		Commissioned	2022-23
9	Sheikhpur Sarai (BGCL) GIS – Ashthawan 220 kV D/c line	Bihar	220 kV	Line	D/c	35		Commissioned	2022-23
10	Raxaul (new) - Gopalganj 220 kV D/c line	Bihar	220 kV	Line	D/c	160		Commissioned	2022-23
11	Saharsa New- Begusarai 220 kV D/c line	Bihar	220 kV	Line	D/c	200		Commissioned	2022-23
12	Saharsa New- Khagaria New 220 kV D/c line	Bihar	220 kV	Line	D/c	160		Commissioned	2022-23
13	Bakhtiyarpur (New) - Fatuha (BSPTCL) 220 kV D/c line	Bihar	220 kV	Line	D/c	56		Under Construction	2024-25
14	Karmnasa (New) – Pusauli (BSPTCL) 220 kV D/c line	Bihar	220 kV	Line	D/c	80		Commissioned	2022-23
15	LILO of Purnea (PG) - Khagaria (New) D/c at Korha (New)	Bihar	220 kV	Line	2xD/c	28		Under Construction	2024-25
16	Muzaffarpur (PG) – Amnour Chhapra (New) 220 kV D/c line	Bihar	220 kV	Line	D/c	130		Commissioned	2022-23
17	Chhapra (New) - Amnour 220 kV D/c line	Bihar	220 kV	Line	D/c	40		Under Construction	2024-25
18	Chhapra (New) - Gopalganj 220 kV D/c line	Bihar	220 kV	Line	D/c	180		Under Construction	2024-25
19	Chhapra (New) - Mahrajganj 132 kV D/c line	Bihar	132 kV	Line	D/c	90		Under Construction	2024-25
20	Chhapra (New) - Raghumnath 132 kV D/c line	Bihar	132 kV	Line	D/c	160		Under Construction	2024-25
21	Digha (New) - PMCH 132 kV D/c line	Bihar	132 kV	Line	D/c	20		Under Construction	2026-27
22	Tajpur- Sarairanjan 132 kV D/c line	Bihar	132 kV	Line	D/c	50		Under Construction	2026-27
23	Asthawan - Chandi 132 kV D/c line	Bihar	132 kV	Line	D/c	80		Under Construction	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
24	Harnaut - Chandi 132 kV D/c line	Bihar	132 kV	Line	D/c	40		Under Construction	2026-27
25	LILO of SKMCH- Mushari 132 kV D/c (Panther) line at Maithi	Bihar	132 kV	Line	2xD/c	36		Under Construction	2026-27
	Odisha								
(A)	**New sub-stations / ICT augmentation**								
1	ICT augmentation (3rd) at New Duburi S/s	Odisha	400/220 kV	S/s			500	Under Construction	2024-25
2	Bhadrak 400 kV S/s (Relocated to Bhandaripokhor)	Odisha	400/220 kV	S/s			1000	Under Construction	2026-27
3	Paradeep 400 kV S/s	Odisha	400/220 kV	S/s			1000	Under Construction	2024-25
4	Narendrapur 400 kV S/s	Odisha	400/220 kV	S/s			1000	Under Construction	2026-27
5	Joda (new) 400 kV S/s	Odisha	400/220 kV	S/s			1500	Under Construction	2026-27
(B)	**Transmission Line**								
1	Paradeep -Pratapsasan 220 kV D/c line	Odisha	220 kV	Line	D/c	122.2		Under Construction	2024-25
2	New Duburi-Meramundali-B 400 kV D/c line	Odisha	400 kV	Line	D/c	340		Under Construction	2025-26
3	Kesinga-Baliguda 220 kV D/c line	Odisha	220 kV	Line	D/c	202		Under Construction	2024-25
4	LILO of Budhipadar- Tarkera 220 kV S/c line at Bamra S/s	Odisha	220 kV	Line	D/c	31.2		Commissioned	2023-24
5	LILO of Bhanjanagar-Meramundali 220 kV S/c line at Daspalla S/s	Odisha	220 kV	Line	D/c	59		Under Construction	2024-25
6	Pandiabili (PG) - Pratapsasan 220 kV D/c line	Odisha	220 kV	Line	D/c	61		Commissioned	2022-23
7	LILO of Duburi-Balasore ckt-I 220 kV S/c line at Balimunda (Dhamara) S/s	Odisha	220 kV	Line	D/c	70.44		Commissioned	2023-24
8	LILO of one circuit of Mendhasal - Bidanasi 220 kV D/c line at Godisahi S/s	Odisha	220 kV	Line	D/c	0.28		Commissioned	2022-23
9	Katapalli - Kiakata 220 kV D/c line	Odisha	220 kV	Line	D/c	255.7		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
10	LILO of one circuit of Budhipadar-Tarkera 220 kV D/c line at Kumarmunda S/s	Odisha	220 kV	Line	D/c	32.86		Commissioned	2022-23
11	LILO of one circuit of Theruvali-Narendrapur 220 kV D/c line at Aska S/s	Odisha	220 kV	Line	D/c	85.66		Commissioned	2023-24
12	LILO of one circuit of Cuttack - Pratapsasan 220 kV D/c line at Balianta S/s	Odisha	220 kV	Line	D/c	20.35		Under Construction	2024-25
13	LILO of one circuit of Mendhasal - Chandaka 220 kV D/c line at Kantabada S/s	Odisha	220 kV	Line	D/c	0.5		Commissioned	2023-24
14	LILO of one circuit of Joda - TTPS 220 kV D/c line at Keonjhar S/s	Odisha	220 kV	Line	D/c	26.82		Under Construction	2024-25
15	LILO of one ckt- of Duburi (New) - Paradeep 220 kV D/c line at Balichandrapur (Palei) S/s	Odisha	220 kV	Line	D/c	2.992		Under Construction	2024-25
16	New Duburi -Ersama 400 kV D/c line	Odisha	400 kV	Line	D/c	272		Under Construction	2024-25
17	Paradeep - Ersama 220 kV D/c line	Odisha	220 kV	Line	D/c	70		Under Construction	2024-25
18	Paratapsasan - Ersama 220 kV D/c line	Odisha	220 kV	Line	D/c	123		Under Construction	2024-25
19	LILO of Narendrapur - Jeypur 400 kV D/c line at Theruvali S/s	Odisha	400 kV	Line	2xD/c	300		Under Construction	2026-27
20	LILO of TTPS- Joda 220 kV D/c line at Joda (new) S/s	Odisha	220 kV	Line	2x D/c	35		Under Construction	2026-27
21	LILO of Keonjhar -Joda 220 kV D/c line at Joda (new) S/s	Odisha	220 kV	Line	2x D/c	32		Under Construction	2026-27
22	LILO of Kaniha-Bisra 400 kV D/c line at Joda/Barbil S/s	Odisha	220 kV	Line	2x D/c			Under Construction	2026-27
	Jharkhand								
(A)	**New sub-stations / ICT augmentation**								
1	Latehar 400 kV S/s	Jharkhand	400/220 kV	S/s			630	Under Construction	2024-25
2	Jainamore, Bokaro 220 kV S/s	Jharkhand	220/132 kV	S/s			300	Under Construction	2024-25
3	Lohardagga 220 kV S/s	Jharkhand	220/132 kV	S/s			300	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	Latehar 220 kV S/s	Jharkhand	220/132 kV	S/s			300	Under Construction	2024-25
(B)	**Transmission Line**								
1	Latehar-Patratu (400 kV GSS) 400 kV D/c line	Jharkhand	400 kV	Line	D/c	220.3		Under Construction	2024-25
2	Essar (Latehar)-Latehar 400 kV D/c line	Jharkhand	400 kV	Line	D/c	80.88		Under Construction	2024-25
3	Chatra-Pakribarwadih 220 kV D/c line	Jharkhand	220 kV	Line	D/c	117		Under Construction	2024-25
4	LILO of TTPS-Govindpur 220 kV D/c line at Jainamore S/s	Jharkhand	220 kV	Line	2xD/c	70		Under Construction	2024-25
5	Chaibasa-Gua 220 kV D/c line	Jharkhand	220 kV	Line	D/c	168.3		Under Construction	2024-25
	West Bengal								
(A)	**New sub-stations / ICT augmentation**								
1	Jangalpur 220 kV S/s	West Bengal	220/132 kV	S/s			320	Commissioned	2023-24
2	New Town AA-IIC 220 kV S/s	West Bengal	220/132 kV	S/s			320	Commissioned	2023-24
3	New Town AA-IIC 220 kV S/s	West Bengal	220/33 kV	S/s			200	Commissioned	2023-24
4	DPL AB Zone 220 kV S/s	West Bengal	220/132 kV	S/s			320	Under Construction	2024-25
5	Falakata 220 kV S/s	West Bengal	220/132 kV	S/s			320	Under Construction	2024-25
6	Food Park 220 kV S/s	West Bengal	220/132 kV	S/s			320	Under Construction	2024-25
7	Khanakul 220 kV S/s	West Bengal	220/33 kV	S/s			100	Under Construction	2024-25
8	Kotasur 220 kV S/s	West Bengal	220/132 kV	S/s			320	Planned	2026-27
9	Mahachanda 220 kV S/s	West Bengal	220/132 kV	S/s			320	Planned	2025-26
10	Mongalpur 220 kV S/s	West Bengal	220/33 kV	S/s			200	Commissioned	2023-24
11	Satgachia 400 kV (Upgradation) S/s	West Bengal	400/220 kV	S/s			1000	Under Construction	2024-25
12	Raghunathpur 220 kV S/s	West Bengal	220/132 kV	S/s			320	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
13	Gokarna 400 kV (Augmentation) S/s	West Bengal	400/220 kV	S/s			315	Commissioned	2023-24
14	Durgapur 400 kV (Augmentation) S/s	West Bengal	400/220 kV	S/s			315	Commissioned	2023-24
15	Jamuria 220/132/33 GIS	West Bengal	220/132 kV	S/S			320	Planned	2025-26
16	Kuilapur 220/33 kV GIS	West Bengal	220/33 kV	S/S			100	Planned	2025-26
17	Barjora 220 kV GIS (Upgradation)	West Bengal	220/132 kV	S/S			320	Planned	2025-26
18	BAPL 400/220 kV GIS	West Bengal	400/220 kV	S/S			630	Planned	2026-27
19	Panagarh 220/132/33 KV GIS	West Bengal	220/132 kV	S/S			320	Planned	2026-27
20	Dendua 220/33KV GIS	West Bengal	220/33 kV	S/S			100	Planned	2026-27
21	Nandanpur 220/132/33 KV GIS	West Bengal	220/132 kV	S/S			320	Planned	2026-27
22	Ashokenagar 220 kV (Upg)	West Bengal	220/132 kV	S/S			320	Planned	2026-27
(B)	**Transmission Line**								
1	Gokarna-Satgachia 400 kV D/c line	West Bengal	400 kV	Line	D/c	194		Under Construction	2024-25
2	Satgachia-N- Chanditala 400 kV D/c line	West Bengal	400 kV	Line	D/c	156		Under Construction	2024-25
3	Jeerat(new)-Subhasgram (PG) 400 kV S/c line	West Bengal	400 kV	Line	S/c	214		Commissioned	2022-23
4	Rajarhat (PG)-New Town AA-IIC 220 kV D/c line	West Bengal	220 kV	Line	D/c	44		Commissioned	2022-23
5	STPS-Raghunathpur 220 kV D/c line	West Bengal	220 kV	Line	D/c	100		Under Construction	2024-25
6	Jeerat-Krishnagar 220 kV D/c line	West Bengal	220 kV	Line	D/c	130		Commissioned	2022-23
7	KTPP-Food Park 220 kV D/c line	West Bengal	220 kV	Line	D/c	104		Under Construction	2024-25
8	Food Park-Jangalpur 220 kV D/c line	West Bengal	220 kV	Line	D/c	14		Commissioned	2023-24
9	Jangalpur-Howrah 220 kV D/c line	West Bengal	220 kV	Line	D/c	22		Commissioned	2022-23
10	STPS-Asansol 220 kV D/c line	West Bengal	220 kV	Line	D/c	68		Commissioned	2022-23
11	Asansol-JK Nagar (IPCL) 220 kV S/c line	West Bengal	220 kV	Line	S/c	80		Commissioned	2022-23
12	JK Nagar (IPCL)-Durgapur 220 kV S/c line	West Bengal	220 kV	Line	S/c	41		Commissioned	2022-23

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
13	Asansol-Mongalpur 220 kV S/c line	West Bengal	220 kV	Line	S/c	65		Commissioned	2022-23
14	Mongalpur-Durgapur 220 kV S/c line	West Bengal	220 kV	Line	S/c	27		Commissioned	2022-23
15	Durgapur-DPL AB Zone 220 kV D/c line	West Bengal	220 kV	Line	D/c	21		Under Construction	2024-25
16	DPL AB Zone-DPL 220 kV D/c line	West Bengal	220 kV	Line	D/c	3		Under Construction	2024-25
17	Alipurduar (PG)-Falakata 220 kV D/c line	West Bengal	220 kV	Line	D/c	68		Under Construction	2024-25
18	Falakata-Birpara (PG) 220 kV D/c line	West Bengal	220 kV	Line	D/c	62		Under Construction	2024-25
19	Subhasgram (PG)-KLC 220 kV S/c line	West Bengal	220 kV	Line	S/c	20		Planned	2025-26
20	KLC-New Town AA-III 220 kV S/c line	West Bengal	220 kV	Line	S/c	8		Commissioned	2022-23
21	Arambag-Khanakul 220 kV S/c line	West Bengal	220 kV	Line	S/c	31		Under Construction	2024-25
22	Khanakul-Domjur 220 kV S/c line	West Bengal	220 kV	Line	S/c	47		Under Construction	2024-25
23	Bakreswar TPP-Mahachanda 220 kV D/c line	West Bengal	220 kV	Line	D/c	183		Planned	2025-26
24	Mahachanda-Satgachia 220 kV D/c line	West Bengal	220 kV	Line	D/c	93		Planned	2025-26
25	Sadaipur-Kotasur 220 kV D/c line	West Bengal	220 kV	Line	D/c	87		Planned	2026-27
26	Kotasur-Gokarna 220 kV D/c line	West Bengal	220 kV	Line	D/c	85		Planned	2026-27
27	LILO of JK Nagar-Durgapur S/c line at Jamuria	West Bengal	220 kV	Line	D/c	30.40		Planned	2025-26
28	LILO of 220 kV Asansole-STPS D/c line at Kuilapur	West Bengal	220 kV	Line	2xD/c	3.25		Planned	2025-26
29	LILO of BKTPS - Satgachia 220 kV D/c line at Mahachanda	West Bengal	220 kV	Line	2xD/c	22.40		Planned	2025-26
30	DPL(Durgapur) - proposed Barjora 220 kV D/c line	West Bengal	220 kV	Line	D/c	38.40		Planned	2025-26
31	LILO of Subhasgram (PG) - New Town AA-III 220 kV Ckt at KLC	West Bengal	220 kV	Line	D/c	10.00		Planned	2025-26
32	Maithon-Asansol 220 kV D/c line	West Bengal	220 kV	Line	D/c	43.20		Planned	2025-26

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
33	LILO of one circuit of New PPSP-Durgapur 400 kV D/C line at BAPL	West Bengal	400 kV	Line	D/c	1.10		Planned	2026-27
34	220 kV BAPL - Jamuria D/C line	West Bengal	220 kV	Line	D/c	55.00		Planned	2026-27
35	LILO of Bakreswar-Durgapur 220 kV D/c line at Panagarh	West Bengal	220 kV	Line	2xD/c	99.64		Planned	2026-27
36	LILO of Maithon-Asansole 220 kV D/c line at Dendua	West Bengal	220 kV	Line	2xD/c	20.00		Planned	2026-27
37	BAPL-Nandanpur 220 kV D/c line	West Bengal	220 kV	Line	D/c	32.00		Planned	2026-27
38	220 kV D/C line from LILO point of Jeerat-Rajarhat D/C line (remaining portion) to proposed Ashokenagar 220 kV to establish Jeerat-Ashokenagar 220 kV D/C connectivity	West Bengal	220 kV	Line	D/c	25.00		Planned	2026-27
	DVC								
(A)	**New sub-stations / ICT augmentation**								
1	MTPS (DVC) 400/220 kV S/s	Jharkhand	400/220 kV	S/s			315	Under Construction	2024-25
2	RTPS (DVC) 400/220 kV S/s	Jharkhand	400/220 kV	S/s			630	Under Construction	2024-25
(B)	**Transmission Lines**								
1	Parulia (DVC) - Budwan 220 kV D/c line	West Bengal	220 kV	Line	D/c	204		Commissioned	2022-23
2	MTPS (DVC) - Ranchi (PG) 220 kV S/c line	West Bengal	220 kV	Line	S/c	232		Commissioned	2022-23
3	MTPS (DVC) - Ramgarh 220 kV S/c line	West Bengal	220 kV	Line	S/c	211		Commissioned	2022-23
4	LILO of one circuit of MTPS-A – Durgapur D/c line at Barjora	West Bengal	220 kV	Line	D/c	8.72		Commissioned	2023-24
5	LILO of MTPS-A - Barjora Line D/c line at MTPS-B	West Bengal	220 kV	Line	2xD/c	86		Commissioned	2023-24
6	Parulia - Burdwan 220 kV D/c line	West Bengal	220 kV	Line	D/c	207		Commissioned	2022-23
7	LILO of CTPS - Kalyaneswari line D/c at RTPS	Jharkhand	220 kV	Line	2xD/c	51.82		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Assam								
(A)	**New sub-stations / ICT augmentation**								
1	AIIMS 132/33 kV, 1x50 MVA S/s	Assam	132/33 kV	S/s			50	Commissioned	2022-23
2	Nathkuchi 132/33 kV, 2x50 MVA S/s	Assam	132/33 kV	S/s			100	Commissioned	2023-24
3	Hatsingimari 132/33 kV, 2x16 MVA S/s	Assam	132/33 kV	S/s			32	Commissioned	2023-24
4	Barpeta 132/33 kV, 2x25 MVA S/s	Assam	132/33 kV	S/s			50	Commissioned	2022-23
5	Tezpur 132/33 kV, 2x50 MVA S/s	Assam	132/33 kV	S/s			100	Commissioned	2022-23
6	Silapathar 132/33 kV, 2x31.5 MVA S/s	Assam	132/33 kV	S/s			63	Commissioned	2022-23
7	Sarupathar 132/33 kV, 2x31.5 MVA S/s	Assam	132/33 kV	S/s			63	Commissioned	2022-23
8	Tangla 132/33 kV, 2x31.5 MVA S/s	Assam	132/33 kV	S/s			63	Commissioned	2022-23
9	Hazo 132/33 kV, 2x31.5 MVA S/s	Assam	132/33 kV	S/s			63	Commissioned	2023-24
10	Paltanbazar GIS 132/33 kV, 2x50 MVA S/s	Assam	132/33 kV	S/s			100	Under Construction	2024-25
11	GMC GIS 132/33 kV, 2x50 MVA S/s	Assam	132/33 kV	S/s			100	Commissioned	2023-24
12	Amingaon GIS 220/132 kV, 2x160 MVA S/s	Assam	220/132 kV	S/s			320	Commissioned	2023-24
13	Behaiting 220/132 kV, 2x100 MVA S/s	Assam	220/132 kV	S/s			200	Commissioned	2023-24
14	Khumtai 220/132 kV, 2x160 MVA & 132/33 kV, 2x50 MVA S/s	Assam	220/132/33 kV	S/s			420	Under Construction	2025-26
15	Bihpuria 220/33 kV, 2x100 MVA S/s	Assam	220/33 kV	S/s			200	Under Construction	2025-26
16	Jakhlabandha GIS 220/33 kV, 2x100 MVA S/s	Assam	220/33 kV	S/s			200	Under Construction	2024-25
17	Chaygaon GIS 220/33 kV, 2x100 MVA S/s	Assam	220/33 kV	S/s			200	Under Construction	2024-25
18	Burhigaon GIS 132/33 kV, 2x50 MVA S/s	Assam	132/33 kV	S/s			100	Under Construction	2024-25
19	Nagaon-2 GIS 220/33 kV, 2x100 MVA S/s	Assam	220/33 kV	S/s			200	Under Construction	2024-25
20	Shankardevnagar GIS 220/132 kV, 2x160 MVA S/s	Assam	220/132 kV	S/s			320	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
21	Rowta 220/132 Kv,2x160 MVA GIS S/s	Assam	220/132 kV	S/s			320	Planned	2026-27
22	Boragaon (Jalukbari) 220/33 kV, 2x100 MVA GIS S/s	Assam	220/33 kV	S/s			200	Planned	2026-27
23	Panjabari 220/33 kV, 2x100 MVA GIS S/s	Assam	220/33 kV	S/s			200	Planned	2026-27
24	Lumding 132/33 kV, 2 X 50 MVA, GIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
25	Agamoni 132/33 kV, 2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
26	Serfanguri 132/33 kV 2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
27	Dhing 132/33 kV, 2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
28	Udarbond(silchar-2) 132/33 kV ,2 X 50 MVA), AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
29	Titabor 132/33 kV, 2 X 50 MVA, GIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
30	Chabua 132/33 kV, 2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
31	Marigaon 220/132/33 kV ,2 X160 MVA & 2x80 MVA, AIS Substation	Assam	132/33 kV	S/s			480	Planned	2026-27
32	Amayapur 132/33 kV ,2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
33	Dhupdhara 132/33 kV ,2 X 50 MVA, AIS Substation	Assam	132/33 kV	S/s			100	Planned	2026-27
(B)	**Transmission Lines**								
1	Amingaon -Aiims 132 kV S/c line	Assam	132 kV	Line	S/c	10		Commissioned	2022-23
2	Kahilpara - Aiims 132 kV S/c line	Assam	132 kV	Line	S/c	10		Commissioned	2022-23
3	LILO of Rangia-Barnagar 132 kV D/c line at Nathkuchi	Assam	132 kV	Line	2xD/c	1.4		Commissioned	2023-24
4	Agia-Hatsingimari 132 kV S/c line	Assam	132 kV	Line	S/c	108.2		Commissioned	2023-24
5	Salakati(BTPS)-APM(Jogigopa) 132 kV D/c line	Assam	132 kV	Line	S/c	42.48		Under Construction	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
6	LILO of Dhaligaon- Nalbari 132 kV D/c Line at Barpeta S/s	Assam	132 kV	Line	2xD/c	47.6		Commissioned	2022-23
7	Sonapur-Baghjhap 132 kV D/c line	Assam	132 kV	Line	D/c	54		Under Construction	2024-25
8	Tinsukia-Behaiting 220 kV D/c line	Assam	220 kV	Line	D/c	105.7		Commissioned	2023-24
9	Dhemaji-Silapathar 132 kV S/c line	Assam	132 kV	Line	S/c	35.88		Commissioned	2022-23
10	Rangia-Amingaon 220 kV D/c line	Assam	220 kV	Line	D/c	56.09		Under Construction	2024-25
11	LILO of Rangia-Rowta 132 kV S/c line at Tangla S/s	Assam	132 kV	Line	D/c	10.66		Commissioned	2022-23
12	LILO of Kamalpur-Sishugram 132 kV S/c line at Amingaon S/s	Assam	132 kV	Line	D/c	9.528		Commissioned	2022-23
13	LILO of Kamalpur-Kamakhya 132 kV S/c line at Amingaon S/s	Assam	132 kV	Line	D/c	9.528		Commissioned	2022-23
14	Sonabil-Tezpur 132 kV D/c line	Assam	132 kV	Line	D/c	31.98		Commissioned	2022-23
15	Kamakhya-PaltanBazar 132 kV S/c line	Assam	132 kV	Line	S/c	4.5		Under Construction	2024-25
16	Kahilpara-GMC 132 kV D/c line	Assam	132 kV	Line	D/c	12.8		Commissioned	2023-24
17	Amingaon-Hazo 132 kV D/c line	Assam	132 kV	Line	D/c	17.2		Commissioned	2023-24
18	LILO of 01st circuit of Samaguri-Mariani 220 kV D/c Line at Khumtai S/s	Assam	220 kV	Line	D/c	6		Under Construction	2025-26
19	LILO of 02nd circuit of Samaguri-Mariani 220 kV D/c Line at Khumtai S/s	Assam	220 kV	Line	D/c	5		Under Construction	2025-26
20	LILO of Jorhat(W)-Bokakhat 132 kV S/c line at Khumtai S/s	Assam	132 kV	Line	D/c	5		Under Construction	2025-26
21	Khumtai-Sarupathar 132 kV S/c line	Assam	132 kV	Line	S/c	60		Under Construction	2025-26
22	Sonabil-Bihpuria 220 kV D/c line	Assam	220 kV	Line	D/c	78		Under Construction	2024-25
23	LILO of one circuit of Samaguri-Khuntai 220 kV D/c line at Jakhalabandha S/s	Assam	220 kV	Line	D/c	10		Under Construction	2024-25
24	LILO of Sipajhar-Rowta 132 kV S/c line at Burhigaon S/s	Assam	132 kV	Line	D/c	15		Under Construction	2024-25
25	LILO of one ckt of Samaguri-Jwaharnagar 220 kV D/c line at Nagaon-2 S/s	Assam	220 kV	Line	S/c	1		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
26	LILO of Alipurduar-Bongaigaon 220 kV D/c line at Agomoni	Assam	220 kV	Line	2xD/c	6		Under Construction	2025-26
27	Shankardevnagar-Misa 220 kV D/c line	Assam	220 kV	Line	D/c	50		Under Construction	2025-26
28	Shankardevnagar-LKHEP 220 kV D/c line	Assam	220 kV	Line	D/c	100		Under Construction	2025-26
29	Rowta - Rangia(new) 220kV D/c Line	Assam	220 kV	Line	D/c	160		Planned	2026-27
30	Boragaon (Jalukbari) - Kukurmara 220 kV D/c line	Assam	220 kV	Line	D/c	42		Planned	2026-27
31	LILO of Sonapur-Sarusajai 220 kV S/c Line at Panjabari	Assam	220 kV	Line	D/c	6		Planned	2026-27
32	Shakardevnagar – Lumding 132 kV D/c Line	Assam	132 kV	Line	D/c	80		Planned	2026-27
33	Gossaigaon -Agaomoni 132 132 kV D/c line	Assam	132 kV	Line	D/c	50		Planned	2026-27
34	Serfanguri - Gossaigaon(New) 132kV D/c Line	Assam	132 kV	Line	D/c	36		Planned	2026-27
35	Dhing - Nagaon 132kV D/c Line	Assam	132 kV	Line	D/c	140		Planned	2026-27
36	Silchar (PGCIL)- Udarbond (AEGCL) 132kV D/c line	Assam	132 kV	Line	D/c	20		Planned	2026-27
37	Titabor - Mariani 132kV D/c Line	Assam	132 kV	Line	D/c	40		Planned	2026-27
38	LILO of Sarusajai-Karbi Langpi 220 kV D/c Line at Marigaon (Dharamtul) S/s	Assam	220 kV	Line	2xD/c	100		Planned	2026-27
39	Dhing- Marigaon (Dharamtul) 132 kV D/c Line	Assam	132 kV	Line	D/c	80		Planned	2026-27
40	Amayapur - Hajo 132kV D/c Line	Assam	132 kV	Line	D/c	50		Planned	2026-27
41	Dhupdhra - Boko 132kV D/c Line	Assam	132 kV	Line	D/c	50		Planned	2026-27
42	LILO of Dibrugarh - Tinsukia 132 kV S/c line	Assam	132 kV	Line	D/c	10		Planned	2026-27
	Arunachal Pradesh								
(A)	**New sub-stations / ICT augmentation**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	Seppa 132/33 kV S/s, 7x5 MVA (single phase-one spare)	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
2	Sagali 132/33 kV S/s, 7x5 MVA (single phase-one spare)	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
3	Naharlagun 132/33 kV, 2x31.5 MVA S/s	Arunachal Pradesh	132/33 kV	S/s			63	Under Construction	2024-25
4	Gerukamukh 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
5	Likabali 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
6	Niglok 132/33 kV, 2x31.5 MVA S/s	Arunachal Pradesh	132/33 kV	S/s			63	Under Construction	2024-25
7	Pasighat 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
8	Khonsa 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
9	Changlang 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
10	Jairampur 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
11	Miao 132/33 kV, 7x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
12	Halaipani 132/33 kV, 4x5 MVA (single phase-one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			15	Under Construction	2024-25
13	Banderdewa 132/33 kV, 2x25 MVA (one spare) S/s	Arunachal Pradesh	132/33 kV	S/s			50	Under Construction	2024-25
14	Palin 132/33 kV substation (7x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
15	Koloriang 132/33 kV Substation (7x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25
16	Basar 132/33 kV Substation (7x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			30	Commissioned	2022-23
17	Yingkiong 132/33 kV Substation (7x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			30	Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
18	Dambuk 132/33 kV Substation (4x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			15	Under Construction	2024-25
19	Seijosa 132/33 kV Substation (4x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			15	Under Construction	2024-25
20	Bameng 132/33 kV Substation (4x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			15	Under Construction	2024-25
21	Kambang 132/33 kV Substation (4x5 MVA single Phase)	Arunachal Pradesh	132/33 kV	S/s			15	Under Construction	2024-25
(B)	**Transmission Lines**								
1	Pasighat New (Napit)-Pasighat Old 132 kV D/c line	Arunachal Pradesh	132 kV	Line	D/c	4		Under Construction	2024-25
2	Chimpu (Itanagar)-Holongi 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	11		Under Construction	2024-25
3	LILO of Daporijo-Along 132 kV D/c line at Basar	Arunachal Pradesh	132 kV	Line	2xD/c	120		Commissioned	2022-23
4	Deomali – Khonsa 132 kV S/c line	Arunachal Pradesh	132 kV	Line	S/c	22		Under Construction	2024-25
5	Khonsa – Changlong 132 kV S/c line	Arunachal Pradesh	132 kV	Line	S/c	28		Under Construction	2024-25
6	Changlang – Jairampur 132 kV S/c line	Arunachal Pradesh	132 kV	Line	S/c	36		Under Construction	2024-25
7	Jairampur - Miao 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c	24		Under Construction	2024-25
8	Ziro - Palin 132 kV S/c line	Arunachal Pradesh	132 kV	Line	S/c	25		Under Construction	2024-25
9	Khupi - Seppa 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	40		Under Construction	2024-25
10	Sagali-Naharlagun 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	25		Under Construction	2024-25
11	Naharlagun-Gerukamukh 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	72		Under Construction	2024-25
12	Gerukamukh – Likabali 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	45		Under Construction	2024-25
13	Likabali – Niglok 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	50		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
14	Niglok-Pasighat 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	24		Under Construction	2024-25
15	Miao - Namsai (PG) 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	40		Under Construction	2024-25
16	Teju-Halaipani 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	45		Under Construction	2024-25
17	Naharlagun-Banderdewa132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	12		Under Construction	2024-25
18	Palin-Koloriang 132 kV S/c line	Arunachal Pradesh	132 kV	Line	S/c on D/c	35		Under Construction	2024-25
19	Along - Yingkiong 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	55		Under Construction	2024-25
20	Along – Kambang 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	120		Under Construction	2024-25
21	Yingkiong – Tuting 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	40		Under Construction	2024-25
22	Ziro (PG) - Ziro (New) 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	5		Under Construction	2024-25
23	Roing (PG) – Dambuk 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	35		Under Construction	2024-25
24	Rilo – Seijosa 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	200		Under Construction	2024-25
25	Seppa – Bameng 132 kV S/c line on D/c tower	Arunachal Pradesh	132 kV	Line	S/c on D/c	45		Under Construction	2024-25
	Manipur								
(A)	**Transmission Lines**								
1	2nd circuit stringing of Thoubal -Moreh 132 kV D/c line	Manipur	132 kV	Line	S/c	70		Under construction	2026-27
2	2nd circuit stringing of Ningthoukhong – Yurembam 132 kV D/c line	Manipur	132 kV	Line	S/c	32.25		Under construction	2024-25
	Nagaland								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(A)	**New sub-stations / ICT augmentation**								
1	Tsitrongse 220/132/33 kV S/s	Nagaland	220/132/33 kV	S/s			300	Under construction	2026-27
2	Zhadima/New Kohima 220/132/33 kV S/s	Nagaland	220/132/33 kV	S/s			100	Under construction	2024-25
3	Doyang(NH-61), Wokha 132/33 kV S/s	Nagaland	132/33 kV	S/s			10	Under construction	2024-25
4	Nagarjan 132/66/33 kV S/s	Nagaland	132/66 kV	S/s			150	Under construction	2025-26
5	Cheiphobozou 132/33 kV S/s	Nagaland	132/33 kV	S/s			12.5	Commissioned	2022-23
6	Longnak 132/33 kV S/s	Nagaland	132/33 kV	S/s			50	Commissioned	2022-23
7	Longleng 132/33 kV S/s	Nagaland	132/33 kV	S/s			20	Under construction	2024-25
8	New Secretariat Complex Kohima 132/33 kV S/s	Nagaland	132/33 kV	S/s			50	Under construction	2024-25
9	Pfutsero 132/33 kV S/s	Nagaland	132/33 kV	S/s			50	Under construction	2024-25
10	Zunheboto 132/33 kV S/s	Nagaland	132/33 kV	S/s			50	Under construction	2024-25
11	Tuensang 132/33 kV S/s	Nagaland	132/33 kV	S/s			20	Under construction	2024-25
(B)	**Transmission Lines**								
1	Dimapur-Zhadima/New Kohima 220 kV D/c line	Nagaland	220 kV	Line	D/c	120		Under construction	2024-25
2	Zhadima/New Kohima-Mokokchung(PG) 220 kV D/c line	Nagaland	220 kV	Line	S/c	87.06		Under construction	2024-25
3	220 kV Zhadima (Kalpataru) - Zhadima D/c line	Nagaland	220 kV	Line	D/c	5		Under construction	2024-25
4	LILO of Misa (PG) -Zhadima (Nagaland) 220kV S/c line at Tsitrongse (Dimapur)	Nagaland	220 kV	Line	D/c	1.5		Under construction	2026-27
5	Tsitrongse (Nagaland)-Nagarjan/Dimapur(Nagaland) 132kV D/c line	Nagaland	132 kV	Line	D/c	16		Under construction	2026-27
6	Tuensang-Longleng 132 kV D/c line	Nagaland	132 kV	Line	D/c	72		Under construction	2024-25
7	Zhadima/New Kohima-New Secretariat 132 kV D/c line	Nagaland	132 kV	Line	D/c	28.78		Under Construction	2024-25

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
8	LILO of Kohima-Wokha 132 kV D/c line at Zhadima/New Kohima	Nagaland	132 kV	Line	2xD/c	18.5		Under Construction	2024-25
9	LILO of Kohima-Meluri 132 kV D/c line at Pfutsero	Nagaland	132 kV	Line	2xD/c	5.44		Under construction	2024-25
10	LILO of Mokokchung-Mariani 132 kV D/c line at Longnak	Nagaland	132 kV	Line	2xD/c	0.8		Commissioned	2022-23
11	Wokha-Mokochung 132 kV D/c line via Zunheboto	Nagaland	132 kV	Line	D/c	51.6		Under construction	2024-25
	Meghalaya								
(A)	**New sub-stations / ICT augmentation**								
1	New Shillong 220 kV S/s	Meghalaya	220/132 kV	S/s			320	Commissioned	2023-24
2	New Shillong 132 kV S/s	Meghalaya	132/33 kV	S/s			100	Commissioned	2023-24
3	Mynkre 132 kV S/s	Meghalaya	132/33 kV	S/s			100	Under construction	2024-25
4	Phulbari 132 kV S/s	Meghalaya	132/33 kV	S/s			100	Commissioned	2023-24
5	ICT Augmentation at Mawlai – 132/33 kV S/s	Meghalaya	132/33 kV	S/s			150	Under construction	2026-27
6	Praharinagar 132 kV S/s	Meghalaya	132/33 kV	S/s			25	Under construction	2026-27
(B)	**Transmission Lines**								
1	Killing-Mawngap 220 kV D/c line	Meghalaya	220 kV	Line	D/c	172.5		Commissioned	2023-24
2	Mawngap-New Shillong 220 kV D/c line	Meghalaya	220 kV	Line	D/c	85.8		Commissioned	2023-24
3	LILO of Myntdu-Leshka P/S - Khliehriat S/s 132 kV D/c line at Mynkre	Meghalaya	132 kV	Line	2xD/c	51.66		Under Construction	2024-25
4	Ampati-Phulbari 132 kV D/c line	Meghalaya	132 kV	Line	D/c	99.38		Commissioned	2023-24
5	LILO of Rongkhon-Ampati 132 kV D/c line at Praharinagar	Meghalaya	132 kV	Line	2xD/c	20		Under construction	2024-25
6	Nangalbibra-Nangalbibra (MePTCL) 132 kV D/c line	Meghalaya	132 kV	Line	D/c	20		Under construction	2024-25
7	New Shillong-Nangalbibra 220 kV D/c line	Meghalaya	220 kV	Line	D/c	400		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
8	New Shillong-IIM 132 kV S/c line	Meghalaya	132 kV	Line	S/c	10		Planned	2026-27
9	Rongkhon-Ganol SHEP 132 kV S/c line	Meghalaya	132 kV	Line	S/c	10		Commissioned	2022-23
	Mizoram								
(A)	**New sub-stations / ICT augmentation**								
1	Luangmual 1x12.5 & 2x25 MVA, 132/33 kV S/s	Mizoram	132/33 kV	S/s			62.5	Commissioned	2023-24
2	Champai 2x12.5 MVA, 132/33 kV S/s	Mizoram	132/33 kV	S/s			25	Commissioned	2023-24
3	Lawngtlai 2x12.5 MVA, 132/33 kV S/s	Mizoram	132/33 kV	S/s			25	Under construction	2026-27
4	Hnanthial 2x12.5 MVA, 132/33 kV S/s	Mizoram	132/33 kV	S/s			25	Planned	2026-27
5	Khawiva 1x25MVA & 1x12.5MVA, 132/33 kV S/s	Mizoram	132/33 kV	S/s			37.5	Commissioned	2023-24
6	Bawktlang S/s 132/33kV, 2x25 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			50	Planned	2026-27
7	Saitual S/s ,132/33kV, 2x12.5 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			25	Planned	2026-27
8	Melriat S/s 132/33kV, 2x25 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			50	Planned	2026-27
9	Khawzawl S/s 132/33kV, 2x12.5 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			25	Planned	2026-27
10	Champhai S/s 132/33kV, 2x12.5 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			25	Planned	2026-27
11	Serchhip S/s 132/33kV, 1x25 MVA & 1x12.5 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			37.5	Planned	2026-27
12	E.Lungdar S/s 132/33kV, 1x6.3 & 1x12.5 MVA S/s (Aug)	Mizoram	132/33 kV	S/s			18.8	Planned	2026-27
(B)	**Transmission Lines**								
1	Saiha to Lawngtlai 132 kV S/c line on D/c tower	Mizoram	132 kV	Line	S/c	43.65		Planned	2026-27
2	Hnathial to Bukpui 132 kV D/c line	Mizoram	132 kV	Line	D/c	110		Planned	2026-27

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
3	S. Bungtlang to Lawngtlai 132 kV S/c line on D/c tower	Mizoram	132 kV	Line	S/c	60		Planned	2026-27
4	Marpara to Thenhlum 132 kV S/c line	Mizoram	132 kV	Line	S/c	26		Planned	2026-27
5	Lungsen - Chawngte 132 kV S/c line (charged at 33kV)	Mizoram	132 kV	Line	S/c	62		Commissioned	2023-24
6	Chawngte - S. Bungtlang 132 kV S/c line (charged at 33 kV)	Mizoram	132 kV	Line	S/c	55		Commissioned	2023-24
7	W. Phaileng – Marpara 132 kV S/c line on D/c tower	Mizoram	132 kV	Line	S/c	85		Under construction	2024-25
	Tripura								
(A)	**New sub-stations / ICT augmentation**								
1	Manu (New) 132 kV S/s	Tripura	132/33 kV	S/s			100	Commissioned	2022-23
2	Amarpur (New) 132 kV S/s	Tripura	132/33 kV	S/s			63	Under Construction	2024-25
(B)	**Transmission Lines**								
1	Udaipur-Bagafa 132 kV D/c line	Tripura	132 kV	Line	D/c	63.89		Commissioned	2022-23
2	Bagafa-Satchand 132 kV S/c line	Tripura	132 kV	Line	S/c	29.54		Under construction	2024-25
3	Rabindranagar-Rokhia 132 kV D/c line	Tripura	132 kV	Line	D/c	44.06		Commissioned	2022-23
4	Rabindranagar-Belonia 132 kV D/c line	Tripura	132 kV	Line	D/c	127.2		Commissioned	2023-24
5	Belonia-Sabroom 132 kV D/c line	Tripura	132 kV	Line	D/c	77.24		Commissioned	2022-23
6	Kailasahar-Dharamnagar 132 kV D/c line	Tripura	132 kV	Line	D/c	43.48		Commissioned	2022-23
7	Surjamaninagar-Monarchak 132 kV D/c line	Tripura	132 kV	Line	D/c	86.24		Under construction	2024-25
8	Surjamaninagar-Rokhia 132 kV D/c line	Tripura	132 kV	Line	D/c	42.81		Under construction	2024-25
9	Gamaitilla-Dhalabill 132 kV S/c line	Tripura	132 kV	Line	S/c	30.4		Under construction	2024-25

Annex – 7.3

Inter-regional Transmission Links and Capacity (MW) till 2026 -27

	Inter Regional transmission Capacity as on 31.03.2022 (MW)	Addition likely during the period 2022-27 (MW)	Inter Regional Transmission Capacity likely by the end of 2026-27 (31.03.2027) (MW)
EAST-NORTH			
Dehri-Sahupuri 220 kV S/c line	130		130
Muzaffarpur-Gorakhpur 400 kV D/c line (with Series Cap+TCSC)	2000		2000
Patna – Balia 400 kV D/c (Quad) line	1600		1600
Biharshariff – Balia 400 kV D/c (Quad) line	1600		1600
Barh – Patna – Balia 400 kV D/c (Quad) line	1600		1600
Gaya – Balia 765 kV S/c line	2100		2100
Sasaram – Allahabad/Varanasi 400 kV D/c line (Sasaram HVDC back to back has been bypassed)	1000		1000
Sasaram - Fatehpur 765 kV S/c line	2100		2100
Barh-II-Gorakhpur 400 kV D/c (Quad) line	1600		1600
Gaya-Varanasi 765 kV 2xS/c line	4200		4200
Biharsharif-Varanasi 400 kV D/c (Quad) line	1600		1600
LILO of Biswanath Chariali - Agra +/- 800 kV, 3000 MW HVDC Bi-pole at new pooling station in Alipurduar and addition of second 3000 MW module	3000		3000
Sub-total	**22530**	**0**	**22530**
EAST-WEST			
Raigarh-Budhipadar 220 kV S/c line	130		130
Budhipadar-Korba 220 kV 2xS/c line	260		260
Rourkela-Raipur 400 kV D/c line with series comp.+TCSC	1400		1400
Ranchi –Sipat 400 kV D/c line with series comp.	1200		1200
Rourkela-Raipur 400 kV D/c (2nd) line with series comp.	1400		1400
Ranchi - Dharamjayagarh - WR Pooiling Station 765 kV S/c line	2100		2100
Ranchi - Dharamjaygarh 765 kV 2nd S/c line	2100		2100
Jharsuguda-Dharamjaygarh 765 kV D/c line	4200		4200
Jharsuguda-Dharamjaygarh 765 kV 2nd D/c line	4200		4200
Jharsuguda - Raipur Pool 765 kV D/c line	4200		4200
Jeypore-Jagdalpur 400 kV D/c line (Under Construction)		1600	1600
Sub-total	**21190**	**1600**	**22790**
WEST- NORTH			
Bhanpura-Ranpur 220 kV S/c line	130		130
Bhanpura-Modak 220 kV S/c line	130		130
Auriya (UP)-Malanpur 220 kV S/c line	130		130
Auriya (UP) – Bhind 220 kV S/c line	130		130
Vindhyachal HVDC back-to-back	500		500
Gwalior-Agra 765 kV 2 x S/c line	4200		4200
Zerda-Kankroli 400 kV D/c line	1000		1000
Gwalior-Jaipur 765 kV 2xS/c lines	4200		4200
Adani (Mundra) - Mahendranagar +/- 500 kV, HVDC Bi-pole	2500		2500

	Inter Regional transmission Capacity as on 31.03.2022 (MW)	Addition likely during the period 2022-27 (MW)	Inter Regional Transmission Capacity likely by the end of 2026-27 (31.03.2027) (MW)
RAPP-Sujalpur 400 kV D/c line	1000		1000
Champa Pool- Kurukshetra +/- 800 kV, HVDC Bi-pole	6000		6000
Jabalpur - Orai 765 kV D/c line	4200		4200
LILO of Satna - Gwalior 765 kV S/c line at Orai	4200		4200
Banaskantha/Rishabhdeo-Chittorgarh 765 kV D/c line	4200		4200
Vindhyachal-Varanasi 765 kV D/c line	4200		4200
Neemuch PS – Chhittorgarh 400 kV D/c line (Commissioned)		1600	1600
Beawar – Mandasaur 765 kV D/c line (Under Bidding)		4200	4200
Rishabhdeo – Mandasaur 765 kV D/c line (Under Bidding)		4200	4200
Sirohi - Mandasaur 765 kV D/c line (Planned)		4200	4200
Sasan – Prayagraj 765 kV D/c line (Planned)		4200	4200
Fsiliguri Sub-total	**36720**	**18400**	**55120**
EAST- SOUTH			
Balimela-Upper Sileru 220 kV S/c line	130		130
Gazuwaka HVDC back-to-back	1000		1000
Talcher-Kolar HVDC bipole	2000		2000
Upgradation of Talcher-Kolar HVDC Bipole	500		500
Angul – Srikakulum 765 kV D/c line	4200		4200
Sub-total	**7830**		**7830**
WEST- SOUTH			
Chandrapur HVDC back-to-back	1000		1000
Kolhaphur (Talandage)-Chikkodi 220 kV S/c line	130		130
Ponda-Ambewadi 220 kV S/c line	130		130
Xeldem-Ambewadi 220 kV S/c line	130		130
Kolhaphur (Mudshingi)-Chikkodi 220 kV S/c line	130		130
Raichur - Sholapur 765 kV S/c line (PG)	2100		2100
Raichur - Sholapur 765 kV S/c line (Pvt. Sector)	2100		2100
Narendra - Kolhapur 765 kV D/c (ch at 400 kV) line	2200		2200
Wardha - Nizamabad 765 kV D/c line	4200		4200
Warora Pool - Warangal (New) 765 kV D/c line (Commissioned)		4200	4200
Raigarh-Pugulur +/- 800 kV, HVDC Bi-pole	6000		6000
LILO of Narendra-Narendra (New) 400 kV (quad) line at Xeldam (Goa) (Under Construction)		1600	1600
Narendra – Pune 765 kV D/c line (Under Construction)		4200	4200
Sub-total	**18120**	**10000**	**28120**
EAST- NORTH EAST			
Alipur - Salakati 220 kV D/c line	260	90	350
Siliguri - Bongaigaon 400 kV D/c line	1000	600	1600
Alipurduar - Bongaigaon 400 kV D/c (Quad) line	1600		1600
Sub-total	**2860**	**690**	**3550**
NORTH EAST-NORTH			
Biswanath Chariali - Agra +/- 800 kV, HVDC Bi-pole	3000		3000
Sub-total	**3000**		**3000**
TOTAL	**112,250**	**30,690**	**142,940**

Note: (i) The transmission capacity between two regions as mentioned above is the aggregate of capacity of *individual transmission lines between the two regions. The ability of a single transmission line to transfer power, when operated as part of the interconnected network is a function of the physical relationship of that line to the other elements of the transmission network and the prevalent load –generation scenario. Hence, the actual power transfer capacity between two regions may be less than the aggregated capacity of the individual transmission lines.*

(ii) It is to mention that the inter-regional transmission capacity in one direction may not be same as the inter-regional capacity in other direction. For instance, the maximum capacity of HVDC Raigarh-Pugalur is 6000 MW in WR-SR direction whereas the capacity in reverse direction (i.e. SR-WR) is limited to only 3000 MW. Similarly, the Champa – Kurukshetra HVDC link cannot be operated in reverse direction.

Annex – 7.4

Details of Dynamic Compensation devices (Existing, under construction and planned)

Sl. No.	Location	Dynamic Compensation (STATCOM)	Dynamic Compensation (SVC)	Mechanically Switched (MVAR)		Status
				Reactor	Capacitor	
	Northern Region					
1	Nalagarh	± 200 MVAR		2x125	2x125	Commissioned
	New Lucknow	± 300 MVAR		2x125	1x125	Commissioned
	New Wanpoh		(+)300 / (-)200 MVAR			Commissioned
4	Kankroli		(+)400 / (-)300 MVAR			Commissioned
5	Ludhiana		(+)600 / (-)400 MVAR			Commissioned
6	Fatehgarh-II	± 2x300 MVAR		2x125	4x125	Commissioned
7	Bhadla-II	± 2x300 MVAR		2x125	4x125	Commissioned
8	Bikaner-II	± 300 MVAR		1x125	2x125	Commissioned
9	Fatehgarh-III	± 2x300 MVAR		2x125	4x125	Under Implementation
10	Ramgarh	± 2x300 MVAR		2x125	4x125	Under Implementation
11	Bikaner-IV	± 2x300 MVAR		2x125	4x125	Under Implementation
12	Siwani	± 2x300 MVAR		2x125	4x125	Under Implementation
13	Barmer-I	± 2x300 MVAR		2x125	4x125	Under Implementation
	Western Region					
14	Solapur	± 300 MVAR		2x125	1x125	Commissioned
15	Gwalior	± 200 MVAR		2x125	1x125	Commissioned
16	Satna	± 300 MVAR		2x125	1x125	Commissioned
17	Aurangabad (PG)	± 300 MVAR		2x125	1x125	Commissioned
18	Navsari New	± 300 MVAR		1x125	3x125	Under Implementation
19	Khavda PS-I Bus Section-I	± 300 MVAR		2x125	1x125	Under Implementation
20	Khavda PS-I Bus Section-II	± 300 MVAR		2x125	1x125	Under Implementation
21	Khavda PS-III Bus Section-I	± 300 MVAR		2x125	1x125	Under Implementation
22	Khavda PS-III Bus Section-II	± 300 MVAR		2x125	1x125	Under Implementation
23	Boisar-II Bus Section-I	± 200 MVAR		1x125	2x125	Under Implementation
24	Boisar-II Bus Section-II	± 200 MVAR		1x125	2x125	Under Implementation
25	Jamnagar	± 400 MVAR		2x125	3x125	Under Implementation
	Southern Region					
28	Hyderabad (PG)	± 200 MVAR		2x125	1x125	Commissioned
29	Udumalpet	± 200 MVAR		2x125	1x125	Commissioned
30	Trichy	± 200 MVAR		2x125	1x125	Commissioned
31	NP Kunta	± 100 MVAR		-	-	Commissioned

Sl. No.	Location	Dynamic Compensation (STATCOM)	Dynamic Compensation (SVC)	Mechanically Switched (MVAR)		Status
				Reactor	Capacitor	
32	Kurnool-IV	± 300 MVAR		2x125	-	Planned
33	Ananthpur-II	± 300 MVAR		2x125	-	Planned
	Eastern Region					
34	Rourkela	± 300 MVAR		2x125	-	Commissioned
35	Kishanganj	± 200 MVAR		2x125	-	Commissioned
36	Ranchi (New)	± 300 MVAR		2x125	-	Commissioned
37	Jeypore	± 200 MVAR		2x125	2x125	Commissioned

Annex-8.1

Generation dispatch factors and Load - Generation Balance for nine scenarios in 2031-32

As per the revised 20th Electric Power Survey (EPS) Report (draft), all-India peak electricity demand is expected to increase to about 388 GW in 2031-32. Transmission system has been planned for delivery of power to all the green hydrogen/green ammonia production hubs in the country as per initial estimates provided by MNRE. The region wise installed generation capacity, and peak electricity demand considering additional electricity demand on account of green hydrogen/green ammonia production by the year 2031-32 is given below.

Installed Generation Capacity and Peak Electricity Demand likely by 2031-32

(Figures in MW)

Region	Coal	Gas	Hydro	PSP	Nuclear	Wind	Solar[1]	Biomass	Small Hydro	Total	BESS	Peak Electricity Demand[2]
Northern	60610	5781	29303	12500	6520	23327	156037	4758	1867	**300703**	25995	129562
Western	105906	10806	5952	6340	3940	66604	122289	4569	742	**327148**	10000	151770
Southern	58395	6492	11064	14856	9220	74628	104711	5407	2129	**286902**	11249	133775
Eastern	58142	100	6765	1900	0	0	1033	743	386	**69069**	0	64429
North Eastern	750	1644	9704	0	0	0	1083	23	326	**13530**	0	5870
all-India	**283803**	**24823**	**62788**	**35596**	**19680**	**164559**	**385153**	**15500**	**5450**	**997352**	**47244**	**458200**

[1] Includes 60,207 MW of solar rooftop capacity

[2] Includes additional demand on account of green hydrogen/green ammonia production

- Power exchange with neighbouring countries considered for the year 2031-32 include 7,500 MW import from Bhutan and Nepal, 3,600 MW export to Bangladesh, 500 MW export to Myanmar and 500 MW export to Sri Lanka.
- MNRE is in the process of reassessing the electricity demand on account of green hydrogen/green ammonia production by 2031-32.

Annex-8.1a: Generation dispatch factors and Load - Generation Balance for February Evening Peak Electricity Demand

Generation dispatch factors for February Evening Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	50%	90%	0%	15%	50%	59%
Western	80%	10%	80%	60%	90%	0%	20%	60%	59%
Southern	80%	10%	80%	40%	90%	0%	30%	40%	59%
Eastern	80%	0%		70%	90%	0%	0%	70%	59%
North Eastern	80%	60%		60%	90%	0%	0%	60%	59%

Load- Generation Balance for February Evening Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
NR	40984	1156	5216	14652	11250	0	3499	933	15207	92897	80634	12263
WR	74032	1081	3152	3571	5706	0	13321	445	5850	107158	118825	-11667
SR	37688	649	7376	4426	13370	0	22388	852	6581	93330	92052	1278
ER	38056	0	0	4735	1710	0	0	271	0	44772	42579	2193
NER	600	986	0	5822	0	0	0	195	0	7604	4271	3333
All India	191360	3872	15744	33206	32036	0	39208	2696	27638	345761	338361	7400
Bhutan											800	-800
Nepal											2000	-2000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	191360	3872	15744	33206	32036	0	39208	2696	27638	345761	345761	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,38,900 MW)

Annex-8.1b: Generation dispatch factors and Load- Generation Balance for February Night Off-Peak Electricity Demand

Generation dispatch factors for February Night Off-Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	10%	80%	20%	90%	0%	25%	20%	42%
Western	80%	5%	80%	10%	90%	0%	25%	10%	42%
Southern	80%	5%	80%	20%	90%	0%	15%	20%	42%
Eastern	80%	0%		5%	90%	0%	0%	5%	42%
North Eastern	80%	60%		10%	90%	0%	0%	10%	42%

Load- Generation Balance for February Night Off-Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	40984	578	5216	5861	11250	0	5832	373	10788	80882	60705	20177
Western	74032	540	3152	595	5706	0	16651	74	4150	104901	100927	3974
Southern	37688	325	7376	2213	13370	0	11194	426	4668	77260	96425	-19165
Eastern	38036	0	0	338	1710	0	0	19	0	40104	37872	2231
North Eastern	600	986	0	970	0	0	0	33	0	2589	2407	183
All- India	191340	2429	15744	9977	32036	0	33677	925	19606	305735	298336	7400
Bhutan											800	-800
Nepal											2000	-2000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	191340	2429	15744	9977	32036	0	33677	925	19606	305735	305736	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,38,900 MW)

Annex-8.1c: Generation dispatch factors and Load -Generation Balance for February Solar Peak Generation

Generation dispatch factors for February Solar Peak Generation

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	63%	0%	70%	20%	-110%	95%	10%	20%	-100%
Western	63%	0%	80%	30%	-110%	90%	10%	30%	-100%
Southern	63%	0%	80%	20%	-110%	90%	20%	20%	-100%
Eastern	63%	0%		10%	-110%	80%	0%	10%	-100%
North Eastern	63%	0%		10%	-110%	80%	0%	10%	-100%

Load -Generation Balance for February Solar Peak Generation: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[2]	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
NR	32421	0	4564	5861	-13750	126599	2333	373	-25995	132406	92098	40307
WR	58565	0	3152	1786	-6974	92876	6660	223	-10000	146287	139327	6960
SR	29814	0	7376	2213	-16341	77866	14926	426	-11249	105030	125568	-20538
ER	30168	0	0	676	-2090	404	0	39	0	29197	47375	-18178
NER	475	0	0	970	0	800	0	33	0	2278	3430	-1152
All India	151443	0	15092	11506	-39155	298545	23919	1093	-47244	415198	407798	7400
Bhutan											800	-800
Nepal											2000	-2000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	151443	0	15092	11506	-39155	298545	23919	1093	-47244	415198	415198	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,38,900 MW)
[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.
(-) sign indicates pumping mode operation of PSP/ charging of BESS

Annex-8.1d: Generation dispatch factors and Load- Generation Balance for June Evening Peak Electricity Demand

Generation dispatch factors for June Evening Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	77%	30%	80%	80%	90%	0%	60%	80%	10%
Western	77%	30%	80%	60%	90%	0%	70%	60%	0%
Southern	77%	10%	80%	60%	90%	0%	70%	60%	0%
Eastern	77%	0%		90%	90%	0%	0%	90%	0%
North Eastern	77%	60%		70%	90%	0%	0%	70%	0%

Load- Generation Balance for June Evening Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	28589	1734	5216	23442	11250	0	13996	1493	2600	88321	105091	-16771
Western	57147	3242	3152	3571	5706	0	46623	445	0	119886	105950	13936
Southern	24591	649	7376	6639	13370	0	52240	1277	0	106142	95025	11117
Eastern	27645	0	0	6088	1710	0	0	348	0	35791	50132	-14340
North Eastern	576	986	0	6793	0	0	0	228	0	8583	5426	3158
all -India	138548	6612	15744	46533	32036	0	112859	3792	2600	358723	361624	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	138548	6612	15744	54033	32036	0	112859	3792	2600	366223	366224	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,80,485 MW)

Annex-8.1e: Generation dispatch factors and Load -Generation Balance for June Night Off-Peak Electricity Demand

Generation dispatch factors for June Night Off-Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	60%	90%	0%	80%	60%	84%
Western	80%	15%	80%	20%	90%	0%	40%	20%	100%
Southern	80%	5%	80%	20%	90%	0%	50%	20%	100%
Eastern	80%	0%		80%	90%	0%	0%	80%	100%
North Eastern	80%	50%		35%	90%	0%	0%	35%	100%

Load -Generation Balance for June Night Off-Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	29780	1156	5216	17582	11250	0	18662	1120	21794	106560	103352	3208
Western	59528	1621	3152	1190	5706	0	26642	148	10000	107987	104275	3712
Southern	25616	325	7376	2213	13370	0	37314	426	11249	97888	93612	4277
Eastern	28793	0	0	5412	1710	0	0	309	0	36224	50843	-14619
North Eastern	600	822	0	3396	0	0	0	114	0	4932	4410	522
All- India	144317	3924	15744	29793	32036	0	82617	2118	43043	353592	356492	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	144317	3924	15744	37293	32036	0	82617	2118	43043	361092	361092	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,80,485 MW)

Annex-8.1f: Generation dispatch factors and Load- Generation Balance for June Solar Peak Generation

June Night Off-Peak Electricity Demand Generation dispatch factors for June Solar Peak Generation

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar[4]	Wind	Small Hydro	BESS
Northern	69%	0%	80%	60%	-110%	85%	50%	60%	-100%
Western	69%	0%	80%	20%	-110%	75%	50%	20%	-100%
Southern	69%	0%	80%	20%	-110%	80%	40%	20%	-100%
Eastern	69%	0%		70%	-110%	75%	0%	70%	-100%
North Eastern	69%	0%		35%	-110%	75%	0%	35%	-100%

Load -Generation Balance for June Solar Peak Generation: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[4]	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	25595	0	5216	17582	-13750	113273	11664	1120	-25995	134704	111042	23662
Western	51163	0	3152	1190	-6974	77396	33302	148	-10000	149378	133566	15812
Southern	22016	0	7376	2213	-16341	69214	29851	426	-11249	103506	116056	-12550
Eastern	24747	0	0	4735	-2090	379	0	271	0	28042	58164	-30123
North Eastern	516	0	0	3396	0	750	0	114	0	4776	4478	298
all India	124037	0	15744	29117	-39155	261012	74817	2079	-47244	420406	423306	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	124037	0	15744	36617	-39155	261012	74817	2079	-47244	427906	427906	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 1,80,485 MW)
[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.
(-) sign indicates pumping mode operation of PSP/ charging of BESS

Annex-8.1g: Generation dispatch factors and Load Generation Balance for August Evening Peak Electricity Demand

Generation dispatch factors for August Evening Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	30%	80%	80%	90%	0%	40%	80%	46%
Western	80%	30%	80%	70%	90%	0%	40%	70%	46%
Southern	80%	20%	80%	50%	90%	0%	60%	50%	46%
Eastern	80%	0%		90%	90%	0%	0%	90%	46%
North Eastern	80%	70%		90%	90%	0%	0%	90%	46%

Load -Generation Balance for August Evening Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	36180	1734	5216	23442	11250	0	9331	1493	11958	100605	110108	-9504
Western	64832	3242	3152	4166	5706	0	26642	519	4600	112859	112830	29
Southern	35992	1298	7376	5532	13370	0	44777	1064	5175	114584	99068	15516
Eastern	31137	0	0	6088	1710	0	0	348	0	39283	53617	-14334
North Eastern	600	1151	0	8734	0	0	0	293	0	10778	5385	5392
All- India	168741	7425	15744	47963	32036	0	80749	3718	21732	378109	381009	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	168741	7425	15744	55463	32036	0	80749	3718	21732	385609	385609	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,10,885 MW)

Annex-8.1h: Generation dispatch factors and Load Generation Balance for August Night Off-Peak Electricity Demand

Generation dispatch factors for August Night Off-Peak Electricity Demand

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	80%	20%	80%	70%	90%	0%	40%	70%	54%
Western	80%	15%	80%	50%	90%	0%	40%	50%	54%
Southern	80%	10%	80%	30%	90%	0%	50%	30%	54%
Eastern	80%	0%		80%	90%	0%	0%	80%	54%
North Eastern	80%	60%		70%	90%	0%	0%	70%	54%

Load -Generation Balance for August Night Off-Peak Electricity Demand: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	36180	1156	5216	20512	11250	0	9331	1307	14037	98989	109204	-10215
Western	64832	1621	3152	2976	5706	0	26642	371	5400	110700	103944	6756
Southern	35992	649	7376	3319	13370	0	37314	639	6074	104734	96207	8527
Eastern	30886	0	0	5412	1710	0	0	309	0	38317	50333	-12016
North Eastern	600	986	0	6793	0	0	0	228	0	8607	4559	4049
All- India	168490	4413	15744	39012	32036	0	73286	2854	25512	361347	364246	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	168490	4413	15744	46512	32036	0	73286	2854	25512	368847	368846	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,10,885 MW)

Annex-8.1i: Generation dispatch factors and Load -Generation Balance for August Solar Peak Generation

Generation dispatch factors for August Solar Peak Generation

Regions	Coal	Gas	Nuclear	Hydro	PSP	Solar	Wind	Small Hydro	BESS
Northern	70%	0%	80%	70%	-110%	80%	50%	70%	-100%
Western	70%	0%	80%	40%	-110%	70%	55%	40%	-100%
Southern	70%	0%	80%	40%	-110%	70%	55%	40%	-100%
Eastern	70%	0%		70%	-110%	70%	0%	70%	-100%
North Eastern	70%	0%		70%	-110%	70%	0%	70%	-100%

Load -Generation Balance for August Solar Peak Generation: 2031-32 (in MW)

Region	Coal[1]	Gas	Nuclear	Hydro	PSP	Solar[2]	Wind	Small Hydro	BESS	Total Availability	Demand	Surplus/ Deficit
Northern	31432	0	5216	20512	-13750	106610	11664	1307	-25995	136995	118971	18024
Western	56324	0	3152	2381	-6974	72237	36632	297	-10000	154048	140872	13176
Southern	31269	0	7376	4426	-16341	60563	41045	852	-11249	117940	127932	-9992
Eastern	27051	0	0	4735	-2090	354	0	271	0	30320	58391	-28071
North Eastern	521	0	0	6793	0	700	0	228	0	8242	4279	3963
All- India	146597	0	15744	38847	-39155	240462	89341	2954	-47244	447546	450446	-2900
Bhutan				4500						4500		4500
Nepal				3000						3000		3000
Bangladesh											3600	-3600
Myanmar											500	-500
Sri Lanka											500	-500
Total	146597	0	15744	46347	-39155	240462	89341	2954	-47244	455046	455046	0

[1] Dispatch has been considered from the coal based generating units operating in the scenario (Coal based capacity on bar: 2,10,885 MW)
[2] Dispatch has been considered from solar projects connected to transmission system. Roof top solar would meet the demand locally.
(-) sign indicates pumping mode operation of PSP/ charging of BESS

Annex-8.2

ISTS schemes planned during the period 2027-32

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
NR-1	**Transmission System for evacuation of additional RE power from Ramgarh (6 GW solar, 3 GW wind, 3 GW BESS)**									
	Augmentation by 4x1500 MVA, 765/400 kV ICTs at Ramgarh PS	765/400 kV	S/s			6000		Planned	2029-30	Rajasthan
	Augmentation by 400/220 kV, 6x500 MVA ICTs at Ramgarh PS	400/220 kV	S/s			3000		Planned	2029-30	Rajasthan
	Establishment of 2x1500 MVA, 765/400 kV S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor near Hanumangarh in Rajasthan	765/400 kV	S/s			3000		Planned	2029-30	Rajasthan
	Establishment of 3x1500 MVA, 765/400 kV S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor near Sangrur in Punjab	765/400 kV	S/s			4500		Planned	2029-30	Punjab
	Ramgarh PS- Bhadla-III PS 765 kV D/c line (2nd) along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	400			Planned	2029-30	Rajasthan
	Bhadla-III PS – Hanumangarh 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	600			Planned	2029-30	Rajasthan
	Hanumangarh - Sangrur 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	765 kV	Line	D/c	400			Planned	2029-30	Rajasthan, Punjab
	Hanumangarh – Fatehabad 400 kV D/c line along with 80 MVAr switchable line reactor for each	400 kV	Line	D/c	260			Planned	2029-30	Rajasthan, Haryana

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	circuit at Hanumangarh end (Quad Moose equivalent)									
	LILO of both circuits of Patiala-Patran 400 kV D/c line at Sangrur S/s	400 kV	Line	D/c	160			Planned	2029-30	Punjab
	LILO of Kurukshetra – Jallandhar/Dhanansu 400 kV D/c line at Sangrur S/s	400 kV	Line	D/c	80			Planned	2029-30	Haryana, Punjab
NR-2	**Transmission System for evacuation of power from 20 GW RZ Zones in Rajasthan (Phase III Part I) (6 GW)**									
	Augmentation by 3x500 MVA, 400/220 kV ICT at Bhadla III	400/220 kV	S/s			1500		Planned	2028-29	Rajasthan
	Establishment of 6000 MW, ± 800 kV Bhadla (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near Bhadla-III substation	800 kV	S/s				TBCB	Under Bidding	2028-29	Rajasthan
	Establishment of 6000 MW, ±800 kV Fatehpur (HVDC) [LCC] terminal station (4x1500 MW) at suitable location near Fatehpur (UP)	800 kV	S/s				TBCB	Under Bidding	2028-29	Uttar Pradesh
	±800 kV HVDC line between Bhadla (HVDC) & Fatehpur (HVDC)	800 kV	Line	D/c	1900		TBCB	Under Bidding	2028-29	Rajasthan, Uttar Pradesh
	Bhadla-III – Bhadla (HVDC) 400 kV 2xD/c line	400 kV	Line	D/c	8		TBCB	Under Bidding	2028-29	Rajasthan
	5x1500 MVA, 765/400 kV ICTs at Fatehpur	765/400 kV	S/s			7500	TBCB	Under Bidding	2028-29	Uttar Pradesh
	LILO of both ckts of 765 kV Varanasi – Kanpur (GIS) D/c line at Fatehpur	765 kV	Line	D/c	120		TBCB	Under Bidding	2028-29	Uttar Pradesh
NR-3	**Transmission System for evacuation of additional RE power from Fatehgarh IV (1 GW solar, 4 GW Wind, 2.5 GW BESS)**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 1x1500 MVA, 765/400 kV ICT & 1x500 MVA, 400/220 kV ICT at Fatehgarh- IV (Section-2) Pooling Station	765/400/220 kV	S/s			2000		Planned	2027-28	Rajasthan
NR-4	**Transmission System for evacuation of additional RE power from Barmer-I (1 GW Wind, 2 GW BESS)**									
	Augmentation by 500 MVA, 400/220 kV ICT at Barmer-I as per connectivity to RE developers	400/220 kV	S/s			500		Planned	2027-28	Rajasthan
NR-5	**Transmission System for evacuation of additional RE power from Jalore (3 GW Solar & 1 GW BESS), Sirohi (1 GW Solar & 1 GW BESS), Sanchore (3 GW Solar & 1 GW BESS) and Pali (3 GW Solar & 1 GW BESS)**									
	Establishment of 3x500 MVA, 400/220 kV Jalore Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor	400/220 kV	S/s			1500		Planned	2028-29	Rajasthan
	Establishment of 3x500 MVA, 400/220 kV Sanchore Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor	400/220 kV	S/s			1500		Planned	2028-29	Rajasthan
	Establishment of 3x500 MVA, 400/220 kV Pali Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor	400/220 kV	S/s			1500		Planned	2028-29	Rajasthan
	Sanchore – Sirohi 400 kV D/c Line (Quad Moose equivalent)	400 kV	Line	D/c	260			Planned	2028-29	Rajasthan
	Jalore- Sirohi 400 kV D/c line (Quad Moose equivalent)	400 kV	Line	D/c	160			Planned	2028-29	Rajasthan

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Pali – Beawar 400 kV D/c line (Quad Moose equivalent)	400 kV	Line	D/c	220			Planned	2028-29	Rajasthan
NR-6	**Transmission System for evacuation of additional RE power from Ajmer (2 GW Solar, 1 GW BESS)**									
	Establishment of 3x500 MVA, 400/220 kV Ajmer Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor	400/220 kV	S/s			1500		Planned	2027-28	Rajasthan
	Ajmer (New) – Merta II 400 kV D/c line (Quad Moose equivalent)	400 kV	Line	D/c	160			Planned	2027-28	Rajasthan
NR-7	**Bhadla-IV: (2 GW Wind, 3 GW Solar & 2 GW BESS), Bikaner-V: (4 GW Solar)**									
	Establishment of 765/400/220 kV Bikaner-V PS with 3x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV ICTs along with 2x125 MVAr (420 kV) & 2x240 MVAr (765 kV) bus reactors	765/400/220 kV	S/s			7000		Planned	2029-30	Rajasthan
	Establishment of 765/400/220 kV pooling station at suitable location near Bhadla (Bhadla-IV PS) with 3x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV ICTs along with 2x125 MVAr (420 kV) & 2x240 MVAr (765 kV) bus reactors	765/400/220 kV	S/s			7000		Planned	2029-30	Rajasthan
	LILO of both ckts of Bikaner-II PS-Khetri 400 kV D/c line at Bikaner-V PS	400 kV	Line	D/c	80			Planned	2029-30	Rajasthan
	Bhadla-IV PS – Bikaner-V 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at Bhadla-IV PS end	765 kV	Line	D/c	300			Planned	2029-30	Rajasthan
	Bhadla-IV PS – Bhadla-III PS 400 kV D/c line (Quad)	400 kV	Line	D/c	60			Planned	2029-30	Rajasthan
	Establishment of 6000 MW, ± 800 kV Bikaner-V (HVDC) [LCC] terminal	800 kV	S/s					Planned	2029-30	Rajasthan

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	station (4x1500 MW) at suitable location near Bikaner									
	Establishment of 6000 MW, ±800 kV Begunia (HVDC) [LCC] terminal station (4x1500 MW) at Begunia (Distt. Khordha), Odisha	800 kV	S/s					Planned	2029-30	Odisha
	±800 kV HVDC line between Bikaner-V (HVDC) & Begunia (HVDC) Station	800 kV	Line	D/c	3800			Planned	2029-30	Rajasthan, Odisha
	Establishment of 765/400 kV, 5x1500 MVA S/s substation station at Begunia along with 2x125 MVAr (420 kV) & 2x240 MVAr (765 kV) bus reactor	765/400 kV	S/s			7500		Planned	2029-30	Odisha
	Begunia - Paradeep (ISTS) 765 kV D/c line	765 kV	Line	D/c	240			Planned	2029-30	Odisha
	Begunia – Gopalpur (ISTS) 765 kV D/c line with 240 MVAr switchable line reactor for each circuit at Begunia end.	765 kV	Line	D/c	300			Planned	2029-30	Odisha
	Begunia – Khuntuni (OPTCL) 765 kV D/c line	765 kV	Line	D/c	140			Planned	2029-30	Odisha
NR-8	**Transmission System for evacuation of additional RE power from Barmer-II (6 GW Solar)**									
	Establishment of 7x500 MVA, 400/220 kV S/s at suitable location near Barmer (Barmer-II Substation) along with 2x125 MVAr bus reactor	400/220 kV	S/s			3500		Planned	2029-30	Rajasthan
	LILO of both ckts of 400 kV Fatehgarh-IV PS - Barmer-I PS D/c line at Barmer-II PS	400 kV	Line	D/c	80			Planned	2029-30	Rajasthan
	Barmer-II -Barmer-II (HVDC) 400 kV 2xD/c line (Quad Moose equivalent)	400 kV	Line	D/c	80			Planned	2029-30	Rajasthan
	Establishment of 6000 MW, ± 800 kV Barmer-II (HVDC) terminal station (4x1500 MW) at a suitable location near Barmer-II substation	800 kV	S/s					Planned	2029-30	Rajasthan

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 6000 MW, ± 800 kV South Kalamb S/s (HVDC) terminal station (4x1500 MW) at a suitable location near South of Kalamb	800 kV	S/s					Planned	2029-30	Maharashtra
	±800 kV HVDC line between Barmer-II (HVDC) & South Kalamb (HVDC) (with Dedicated Metallic Return)	800 kV	Line	D/c	2000			Planned	2029-30	Maharashtra, Rajasthan
	Establishment 2x1500 MVA, 765/400 kV Substation near South of Kalamb with 2x330 MVAR (765 kV) bus reactor and 2x125 MVAR (420 kV) bus reactor	765/400 kV	S/s			3000		Planned	2029-30	Maharashtra
	LILO of Pune-III – Boisar-II 765 kV D/c line at South Kalamb S/s along with 1x240 MVAr switchable line reactor on each ckt at South Kalamb end of Boisar-II – South Kalamb 765 kV D/c line formed after LILO	765 kV	Line	D/c	200			Planned	2029-30	Maharashtra
NR-9	**Transmission system for evacuation of power from PSP projects near Robertsganj in Uttar Pradesh**									
	Establishment of 5x1500 MVA 765/400 kV Robertsganj PS near Robertsganj area in Sonbhadra Distt. (Uttar Pradesh) along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			7500		Planned	2027-28	Uttar Pradesh
	LILO of both circuits of 765 kV Varanasi- Gaya 2xS/c line at Robertsganj PS	765 kV	Line	D/c	200			Planned	2027-28	Uttar Pradesh, Bihar
	Robertsganj PS – Prayagraj S/s 765 kV D/c line along with 240 MVAr line reactor on each circuit at both ends	765 kV	Line	D/c	400			Planned	2027-28	Uttar Pradesh
NR-10	**Transmission system for evacuation of power from Gorakhpur Nuclear power project in Haryana**									
	NPCIL- Patran 400 kV D/c line	400 kV	Line	D/c	200			Planned	2027-28	Haryana, Punjab

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	NPCIL- Narwana (HVPNL) / Fatehabad (proposed) 400 kV D/c line	400 kV	Line	D/c	120			Planned	2027-28	Haryana
NR-11	**Transmission system for evacuation of power from Mahi Banswara Nulcear power project in Rajasthan**									
	Mahi Banswara- Mandsaur (765 kV) 400 kV D/c line	400 kV	Line	D/c	220			Planned	2030-31	Rajasthan, Madhya Pradesh
	Mahi Banswara- Nagda 400 kV D/c line	400 kV	Line	D/c	220			Planned	2030-31	Rajasthan, Madhya Pradesh
NR-12	**Transmission system for evacuation of power from Uri-I (Stage II) HEP (240 MW)**									
	LILO of one circuit of Uri-I Stage-I – Amargarh 400 kV D/c line at Uri-I Stage-II	400 kV	Line	D/c	2			Planned	2030-31	Jammu & Kashmir
NR-13	**Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal HVDC system)**									
	400 kV PS-1 - Pang D/C (quad moose) line – 7 km	400 kV	Line	D/c	14			Under Construction	2029-30	Ladakh
	400 kV PS-2 -Pang D/C (quad moose) line – 27 km	400 kV	Line	D/c	54			Under Construction	2029-30	Ladakh
	400 kV PS-3 -Pang D/C (quad moose) line – 41 km	400 kV	Line	D/c	82			Under Construction	2029-30	Ladakh
	Pooling point in Pang (Leh): ±350 kV, 2 x 2500 MW HVDC terminal	350 kV	S/s					Under Construction	2029-30	Ladakh
	Pooling point in Kaithal (Haryana): ±350 kV, 2x 2500 MW HVDC terminal	350 kV	S/s					Under Construction	2029-30	Haryana
	2x315 MVA, 400/220/33 kV ICT at Pang	400/220 kV	S/s			630		Under Construction	2029-30	Ladakh
	3x1500 MVA, 765/400/33 kV MVA ICTs at Kaithal	765/400 kV	S/s			4500		Under Construction	2029-30	Haryana
	±350 kV HVDC line (OH line and UG Cable) between Pang & Kaithal PS (combination of 465 km overhead	350 kV	Line	D/c	960			Under Construction	2029-30	Haryana, Ladakh

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	line (Quad) and 15 km underground cable)									
	220 kV Pang – Leh (Phyang) (PG) S/c line (Deer conductor) (S/C line on D/c tower) (158 km)	220 kV	Line	S/c	158			Under Construction	2029-30	Ladakh
	Kaithal – Bahadurgarh (PG) 400 kV D/c line (Twin HTLS)	400 kV	Line	D/c	340			Planned	2029-30	Haryana
	Kaithal – Modipuram (Meerut) (UPPTCL) 765kV D/c line along with 1x240 MVAr switchable line reactor on each circuit at Kaithal end	765 kV	Line	D/c	420			Planned	2029-30	Haryana, Uttar Pradesh
NR-14	**Transmission system for evacuation of power from Singrauli STPP Stage III (2x800 MW)**									
	LILO of both circuits of Tie line (Vindhyachal Stage-IV to Vindhyachal Stage-V 400kV D/C Twin Moose line) at Singrauli Stage-III	400 kV	Line	2xD/c	20			Planned	2030-31	Uttar Pradesh
	Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/c TM line (formed after above proposed LILO) with HTLS conductor	400 kV	Line	D/c				Planned	2030-31	Uttar Pradesh
	Singrauli-III–Rihand-III 400 kV D/c line	400 kV	Line	D/c	60			Planned	2030-31	Uttar Pradesh
WR-1	**Transmission System for evacuation of additional 8 GW of RE power from Khavda RE Park Phase-V**									
	Establishment of 6000 MW, ± 800 kV KPS2 (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400 kV HVAC Switchyard	800 kV	S/s				TBCB	Under Bidding	2028-29	Gujarat
	Establishment of 6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station (4x1500 MW) along with	800 kV	S/s				TBCB	Under Bidding	2028-29	Maharashtra

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	associated interconnections with 400 kV HVAC Switchyard									
	±800 kV HVDC Bipole line (Hexa lapwing) between KPS2 (HVDC) and Nagpur (HVDC) (with Dedicated Metallic Return) (capable to evacuate 6000 MW with overload as specified)	800 kV	Line	D/c	2400		TBCB	Under Bidding	2028-29	Gujarat, Maharashtra
	Establishment of 6x1500 MVA, 765/400 kV ICTs at Nagpur S/s along with 2x330 MVAR (765 kV) & 2x125 MVAR, 420 kV bus reactors along with associated interconnections with HVDC Switchyard.	765/400 kV	S/s			9000	TBCB	Under Bidding	2028-29	Maharashtra
	LILO of Wardha – Raipur 765 kV one D/c line (out of 2xD/c lines) at Nagpur along with 240 MVAR switchable line reactor on each circuit at Nagpur end	765 kV	Line	D/c	120		TBCB	Under Bidding	2028-29	Maharashtra
	Establishment of 2500 MW, ± 500 kV KPS3 (HVDC) [VSC] terminal station (2x1250 MW) at a suitable location near KPS3 substation with associated interconnections with 400 kV HVAC Switchyard	500 kV	S/s				TBCB	Under Bidding	2028-29	Gujarat
	Establishment of 2500 MW, ± 500 kV South Olpad (HVDC) [VSC] terminal station (2x1250 MW) along with associated interconnections with 400 kV HVAC Switchyard of South Olpad S/s	500 kV	S/s				TBCB	Under Bidding	2028-29	Gujarat
	Establishment of KPS3 (HVDC) S/s along with 2x125 MVAR, 420 kV bus reactors along with associated interconnections with HVDC Switchyard.	500 kV	S/s			100	TBCB	Under Bidding	2028-29	Gujarat
	KPS3 – KPS3 (HVDC) 400 kV 2xD/c line	400 kV	Line	D/c	4		TBCB	Under Bidding	2028-29	Gujarat
	±500 kV HVDC Bipole line between KPS3 (HVDC) and South Olpad	500 kV	Line	D/c	1900		TBCB	Under Bidding	2028-29	Gujarat

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	(HVDC) (with Dedicated Metallic Return)									
WR-2	**Transmission System for Offshore Wind Zone Phase-I (500 MW VGF on coast of Gujarat for Subzone B3)**									
	Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman S/s along with 1x125 MVAr (420 kV) Bus Reactor	765/400 kV	S/s			3000		Planned	2028-29	Gujarat
	Mahuva Onshore PS (GIS) – Vataman 400 kV D/c line (Quad Moose) with 63 MVAr & 50MVAr, 420 kV switchable line reactors on each ckt at Mahuva and Vataman ends respectively	400 kV	Line	D/c	380			Planned	2028-29	Gujarat
	Establishment of 2x500 MVA, 400/220 kV Mahuva Onshore Pooling Station (GIS) (Mahuva PS) alongwith 1x125 MVAr (420 kV) bus reactor (with space provision for upgradation to 765 kV level to cater to future Offshore Wind Projects adjacent to B3, B4, B5 pockets)	400/220 kV	S/s			1000		Planned	2028-29	Gujarat
	2 Nos. of 220 kV line bays at Mahuva PS (GIS) for termination of B3-OSS-1 – Mahuva Onshore PS 220 kV 2xS/c (3 core) cables	220 kV	S/s					Planned	2028-29	Gujarat
	± 300 MVAr STATCOM at 220 kV level of Mahuva PS (GIS)	220 kV	S/s					Planned	2028-29	Gujarat
	220 kV, 1x125 MVAR Variable Bus Shunt Reactor (with control range between 25 – 125 MVAr for each VSR) with 1 No. of 220 kV bay	220 kV	S/s					Planned	2028-29	Gujarat
	Establishment of 2x315 MVA, 220/66 kV Gujarat Offshore B3 Sub-Station Station-1 (B3-OSS-1) with 66 kV line bays – 10 Nos. for RE Interconnection (66 kV bus shall be established in two sections with	220/66 kV	S/s			630		Planned	2028-29	Gujarat

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	1x315 MVA ICT & 5 Nos. 66 kV bays on each 66 kV section)									
	B3-OSS-1 – Mahuva Onshore PS (GIS) 220 kV 2xS/c (3 core) cables (35 km- undersea cable of about 25 km and underground cable of about 10 km) alongwith associated line bays at both ends (with capacity of 300 MVA/ckt at nominal voltage) with 1x50 MVAr switchable line reactors at B3-OSS-1 end on each cable	220 kV	Cable	S/c	70			Planned	2028-29	Gujarat
WR-3	**Transmission System for Offshore Wind Zone Phase-II (B3 Pocket: 0.5 GW, B4 Pocket: 1.11 GW & B5 Pocket: 1.59 GW)**									
	Augmentation by 7x500 MVA, 400/220 kV ICTs at Mahuva Onshore Pooling Station (Mahuva PS)	400/220 kV	S/s			3500		Planned	2030-31	Gujarat
	Augmentation by 2x315 MVA, 220/66 kV ICTs at Gujarat Offshore B3 Sub-Station Station-1 (B3-OSS-1)	220/66 kV	S/s			630		Planned	2030-31	Gujarat
	Establishment of 4x315 MVA, 220/66 kV Gujarat Offshore B4 Sub-Station Station-1	220/66 kV	S/s			1260		Planned	2030-31	Gujarat
	Off Shore Sub-Station (OSS) B4 – Mahuva Onshore PS 220 kV 3xS/c cables	220 kV	Cable	S/c	132			Planned	2030-31	Gujarat
	Establishment of 6x315 MVA, 220/66 kV Gujarat Offshore B5 Sub-Station Station	220 kV	S/s			1890		Planned	2030-31	Gujarat
	Off Shore Sub-Station (OSS) B5 – Mahuva Onshore PS 220 kV 4xS/c cables	220 kV	Cable	S/c	180			Planned	2030-31	Gujarat
	Mahuva Onshore PS – Vataman 400 kV S/c line with 63 MVAr & 50 MVAr, 420 kV switchable line reactors on each ckt at Mahuva & Vataman ends respectively	400 kV	Line	S/c	190			Planned	2030-31	Gujarat

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Augmentation by 2x1500 MVA, 765/400 kV ICTs at Vataman S/s along with 1x125 MVAr (420 kV) Bus Reactor	765/400 kV	S/s			3000		Planned	2030-31	Gujarat
WR-4	**Transmission System for Offshore Wind Zone Phase-III (1.24 GW - B6 Pocket)**									
	Establishment of 4x500 MVA, 400/220 kV Ubhrat Onshore Pooling Station (Ubhrat PS) (with space provision for upgradation to 765 kV level so as to cater to future Offshore Wind Projects adjacent to B6 pocket)	400/220 kV	S/s			2000		Planned	2031-32	Gujarat
	Establishment of 5x315MVA, 220/66kV Gujarat Offshore B6 Sub-Station Station	220 kV	S/s			1575		Planned	2031-32	Gujarat
	Off Shore Sub-Station (OSS) B6 – Ubhrat Onshore PS 220 kV 3xS/c cables	220 kV	Cable	S/c	165			Planned	2031-32	Gujarat
	Ubhrat Onshore PS – Navsari New 400 kV D/c line	400 kV	Line	D/c	20			Planned	2031-32	Gujarat
WR-5	**Network Expansion scheme in Western Region to cater to Pumped storage potential near Talegaon (Pune)**									
	Establishment 2x1500 MVA, 765/400 kV Substation near South of Kalamb with 2x330 MVAR (765 kV) bus reactor and 2x125 MVAR (420 kV) bus reactor	765/400 kV	S/s			3000		Planned	2027-28	Maharashtra
	LILO of Pune-III – Boisar-II 765 kV D/c line at South Kalamb S/s, with 240 MVAr line reactor on each ckt at South Kalamb end of Boisar-II – South Kalamb 765 kV D/c line (formed after above LILO)	765 kV	Line	D/c	160			Planned	2027-28	Maharashtra
WR-6	**Transmission System (Phase-VI) for evacuation of additional 10 GW of**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	RE power from Khavda RE Park along with 7 GW BESS									
	Establishment of 6x1500 MVA, 765/400 kV KPS4 PS with 2x330 MVAr (765 kV) and 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			9000		Planned	2029-30	Gujarat
	KPS4-KPS2 765 kV D/c line	765 kV	Line	D/c	30			Planned	2029-30	Gujarat
	KPS4-KPS3 765 kV D/c line	765 kV	Line	D/c	20			Planned	2029-30	Gujarat
	Establishment of 5x1500 MVA, 765/400 kV KPS5 PS with 2x330 MVAr (765 kV) and 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			7500		Planned	2029-30	Gujarat
	KPS4-KPS5 765 kV D/c line	765 kV	Line	D/c	44			Planned	2029-30	Gujarat
	KPS5-Halvad 765 kV D/c line	765 kV	Line	D/c	460			Planned	2029-30	Gujarat
WR-8	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub in Mundra, Gujarat, Phase-II (6 GW at Navinal S/s)**									
	Augmentation by 5x1500 MVA, 765/400 kV ICT at Navinal (Mundra) GIS S/s along with 2x330 MVAr (765 kV) & 1x125 MVAr (420 kV) Bus reactor in Section-II	765/400 kV	S/s			7500		Planned	2027-28	Gujarat
	Navinal(Mundra) Section-II – Bhuj 765 kV D/c line	765 kV	Line	D/c	140			Planned	2027-28	Gujarat
	Navinal(Mundra) Section-II – Bhuj-II 765 kV D/c line	765 kV	Line	D/c	180			Planned	2027-28	Gujarat
WR-9	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub in Mundra, Gujarat, under Phase-III (6 GW at Navinal-II S/s)**									
	Establishment of 5x1500 MVA, 765/400 kV Navinal-II S/s (GIS) along	765/400 kV	S/s			7500		Planned	2028-29	Gujarat

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	with 2x330 MVAr (765 kV) & 1x125 MVAr (400 kV) Bus reactors									
	LILO of KPS3 – Lakadia 765 kV D/c line at Navinal-II S/s	765 kV	Line	D/c	240			Planned	2028-29	Gujarat
WR-10	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub in Mundra, Gujarat, under Phase-IV (6 GW at Navinal-II S/s)**									
	Augmentation by 5x1500 MVA, 765/400 kV ICT at Navinal-II (Mundra) GIS S/s along with 2x330 MVAr (765 kV) & 1x125 MVAr (420 kV) Bus reactor in Section-II	765/400 kV	S/s			7500		Planned	2029-30	Gujarat
	LILO of KPS2 – Lakadia 765 kV D/c line at Navinal-II	765 kV	Line	D/c	240			Planned	2029-30	Gujarat
WR-11	**Transmission System for evacuation of Green Hydrogen/Ammonia potential in Kandla area of Gujarat (Phase-II: 3 GW) and 1.5 GW RE power evacuation from Raghanesda Phase-II**									
	Augmentation of transformation capacity by 2x1500 MVA, 765/400 kV ICTs at Kandla S/s along with 1x330 MVAr (765 kV) & 1x125 MVAr (400 kV) Bus reactor	765/400 kV	S/s			3000		Planned	2028-29	Gujarat
	Augmentation of Transformation capacity by 1x1500MVA, 765/400kV ICT at Raghanesda PS (Raghanesda-I)	765/400 kV	S/s			1500		Planned	2028-29	Gujarat
	Radhanesda-I - Kandla-I 765 kV D/c line	765 kV	Line	D/c	400			Planned	2028-29	Gujarat
WR-12	**Transmission System for evacuation of Green Hydrogen/Ammonia potential in Kandla area of Gujarat (Phase-III: 7.5 GW) and 6 GW RE power evacuation from Raghanesda Phase-III**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 6x1500 MVA, 765/400 kV Kandla-II S/s along with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) Bus reactor	765/400 kV	S/s			9000		Planned	2029-30	Gujarat
	Establishment of 5x1500MVA, 765/400kV Raghanesda-II S/s along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) Bus reactor	765/400 kV	S/s			7500		Planned	2029-30	Gujarat
	LILO of KPS5 – Halvad 765 kV D/c line at Kandla-II	765 kV	Line	D/c	280			Planned	2029-30	Gujarat
	Radhanesda-II - Kandla-II 765 kV D/c line	765 kV	Line	D/c	400			Planned	2029-30	Gujarat
	Radhanesda-I - Radhanesda-II 765 kV D/c line	765 kV	Line	D/c	40			Planned	2029-30	Gujarat
	Kandla-I - Kandla-II 765 kV D/c line	765 kV	Line	D/c	40			Planned	2029-30	Gujarat
	Ahmedabad – Indore 765 kV D/c line	765 kV	Line	D/c	800			Planned	2029-30	Gujarat, Madhya Pradesh
WR-13	**Transmission System for evacuation of power from Sipat-III TPS (800 MW)**									
	Augmentation by 1x1500 MVA, 765/400 kV ICTs at Sipat switchyard	765/400 kV	S/s			1500		Planned	2027-32	Madhya Pradesh
WR-14	**Common Transmission System for evacuation of power from Godna TPS (2x800 MW), Lanco Amarkantak U-3&4 TPS (2x660 MW), Raigarh TPS (2x800 MW) & Akaltara TPS (3x600 MW)**									
	Establishment of Champa-II S/s with two 765 kV sections with 4x1500 MVA, 765 kV ICTs along with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) Bus reactor at Section-I and 4x1500 MVA, 765 kV ICTs along with 2x330 MVAr (765 kV) & 2x125	765/400 kV	S/s			12000		Planned	2027-32	Chhattisgarh

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	MVAr (420 kV) Bus reactor at Section-II									
	Champa-II(Sec-I)-Rajnandgaon 765 kV D/c line	765 kV	Line	D/c	500			Planned	2027-32	Chhattisgarh
	Rajnandgaon-Warora 765kV D/c line (2nd)	765 kV	Line	D/c	400			Planned	2027-32	Chhattisgarh
	LILO of Dhamjaygarh-Jharsuguda 765 kV D/c line at Champa-II (Sec-II)	765 kV	Line	D/c	496			Planned	2027-32	Chhattisgarh
WR-15	**Transmission System for evacuation of power from SKS Binjkote TPS (2x300 MW)**									
	Augmentation by 1x1500 MVA, 765/400 kV ICTs at Champa PS	765/400 kV	S/s			1500		Planned	2027-32	Chhattisgarh
WR-16	**Transmission System for evacuation of power from Raipur Energen TPS (2x800 MW)**									
	Augmentation by 1x1500 MVA, 765/400 kV ICTs at Raipur Pool	765/400 kV	S/s			1500		Planned	2027-32	Chhattisgarh
WR-17	**Transmission System for evacuation of power from Gadarwara Stage-II TPS (2x800 MW)**									
	Gadarwara Stage II - Nagpur 765 kV D/c line	765 kV	Line	D/c	480			Planned	2027-32	Chhattisgarh
WR-18	**Transmission System for evacuation of power from Lara Stage-II TPS (2x800 MW)**									
	Reconductoring of Lara- Raigarh Pool 400 kV D/c line	400 kV	Line	D/c				Planned	2027-28	Chhattisgarh
WR-19	**Transmission Schemes for evacuation of power from 1.4 GW REZ from Morena REZ (Ph-II)**									
	Augmentation of transformation capacity at Morena PS by 3x500MVA, 400/220 kV ICTs (7th,	400 kV	S/s			1500		Planned	2029-30	Madhya Pradesh

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	8th & 9th) alongwith1x125 MVAr, 400 kV reactor									
	Morena PS - Morena 400 kV D/c line	400 kV	Line	D/c	100			Planned	2029-30	Madhya Pradesh
WR-20	**Transmission Schemes for evacuation of power from 1.5 GW REZ from Sagar REZ**									
	Establishment of 4x500 MVA, 400/220 kV Pooling Station along with 1x125 MVAr (400 kV) Bus Reactor near Sagar	400 kV	S/s			2000		Planned	2029-30	Madhya Pradesh
	Sagar -Damoh 400 kV D/c line	400 kV	Line	D/c	160			Planned	2029-30	Madhya Pradesh
SR-1	**Transmission Schemes for evacuation of additional 4 GW RE power (Wind and Solar) from Kurnool REZ-I, Andhra Pradesh**									
	Integration of additional 4 GW RE (Wind and Solar) with installation of 3 GW BESS at Kurnool IV with the transmission scheme mentioned as SR-13 in Annex-7.1.	400 kV	S/s					Planned	2027-28	Andhra Pradesh
SR-2	**Transmission Schemes for evacuation of power from Kurnool REZ-II, Andhra Pradesh**									
	Phase-I Transmission System for integration of Kurnool REZ-II (4.5 GW Solar, 1 GW Wind)									
	Establishment of 765/400/220 kV (4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV ICTs) Kurnool-V Pooling Station near Kurnool, Andhra Pradesh with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400/220 kV	S/s			8500		Planned	2027-28	Andhra Pradesh

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Kurnool-V – Kurnool-IV 765 kV D/c line	765 kV	Line	D/c	200			Planned	2027-28	Andhra Pradesh
	Augmentation by 2x1500 MVA, 765/400 kV ICTs at Maheshwaram substation	765/400 kV	S/s			3000		Planned	2027-28	Andhra Pradesh
	Phase- II Transmission System for integration of Kurnool REZ-II (3 GW Solar, 3 GW Wind, 2 GW BESS)									
	Augmentation by 2x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV ICTs at Kurnool -V	765/400/220 kV	S/s			4000		Planned	2028-29	Andhra Pradesh
	Kurnool-V – Chilakaluripeta 765 kV D/c line with 330 MVAr SLR on each circuit at Kurnool V PS end	765 kV	Line	D/c	420			Planned	2028-29	Andhra Pradesh
	Chilakaluripeta - Podili 400 kV D/c line	400 kV	Line	D/c	200			Planned	2028-29	Andhra Pradesh
	Augmentation by 2x1500 MVA, 765/400 kV ICTs at Chilakaluripeta Sub-station	765/400 kV	S/s			3000		Planned	2028-29	Andhra Pradesh
SR-3	**Phase –II Transmission System for integration of Anantapur REZ, 12 GW (6 GW Solar, 6 GW Wind, 4 GW BESS)**									
	Augmentation by 2x1500 MVA 765/400 kV and 6x500 MVA, 400/220 kV ICTs at Anantapur-II Pooling Station near Kurnool, Andhra Pradesh	765/400/220 kV	S/s			6000		Planned	2027-28	Andhra Pradesh
	Establishment of 3x1500 MVA, 765/400 kV CN'Halli Sub-station along with 2x330 MVAr (765 kV) bus reactors	765/400 kV	S/s			4500		Planned	2027-28	Andhra Pradesh
	Anantapur-II – CN'Halli 765 kV D/c line with 330 MVAR SLR on both circuits at Anantapur -II end	765 kV	Line	D/c	360			Planned	2027-28	Andhra Pradesh, Karnataka

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	CN'Halli - CN'Halli (KPTCL) 400 kV (quad) D/c line (about 10km)	400 kV	Line	D/c	20			Planned	2027-28	Karnataka
SR-4	**Transmission System for integration of Kadapa REZ (8 GW Solar, 2.5 GW BESS)**									
	Phase I: Transmission System for integration of Kadapa REZ (4 GW Solar, 1.5 BESS)									
	Establishment of 765/400/220 kV (3x1500 MVA, 765/400 kV & 4x500 MVA, 400/220 kV ICTs) Pooling Station near Kadapa (Kadapa II PS), Andhra Pradesh (2.5 GW injection at 220 kV level and 2.5 GW injection at 400 kV level) with 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors at Kadapa-II PS	765/400/220 kV	S/s			6500		Planned	2028-29	Andhra Pradesh
	LILO of both circuits of Anantapur-II – Cuddapah 765 kV D/c line at Kadapa-II PS	765 kV	Line	D/c	40			Planned	2028-29	Andhra Pradesh
	Phase II: Transmission System for integration of Kadapa REZ (4 GW Solar, 1 BESS)									
	Augmentation by 1x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV ICTs at Kadapa-II PS	765/400/220 kV	S/S			2500		Planned	2029-30	Andhra Pradesh
	Kadapa-II PS-Thiruvalam 765 kV D/c line with 240 MVAr SLR on each circuit at both ends	765 kV	Line	D/c	500			Planned	2029-30	Andhra Pradesh, Tamilnadu
SR-5	**Transmission System for integration of Davanagere / Chitradurga REZ (2 GW Wind, 2 GW Solar)**									
	Phase II									
	Augmentation by 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220	765/400/220 kV	S/s			4000		Planned	2027-28	Karnataka

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	kV Pooling Station near Davanagere / Chitradurga,									
SR-6	**Transmission System for integration of Nizamabad REZ (1 GW Wind, 2.5 GW Solar**									
	Phase I: Transmission System for integration of Nizamabad REZ (1 GW Wind, 1 GW Solar)									
	Establishment of 765/400/220 kV (4x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV ICTs) Pooling Station near Nizamabad (Nizamabad-II) with 2x330 MVAr (765 kV) & 2x125MVAr (420 kV) bus reactors	765/400/220 kV	S/s			7000		Planned	2028-29	Telangana
	Nizamabad-II PS – Nizamabad (PG) 765kV 2x D/c line	765 kV	Line	D/c	120			Planned	2028-29	Telangana
	Phase II: Transmission System for integration of Nizamabad REZ (1.5 GW Solar)									
	Augmentation by, 2x1500 MVA, 765/400kV ICTs and 4x500 MVA, 400/220kV ICTs at Nizamabad-II PS (0.5 GW injection at 220 kV level)	765/400 kV	S/s			5000		Planned	2028-29	Telangana
	Augmentation by 1x1500 MVA, 765/400 kV ICT at Nizamabad (PG) S/s	765/400 kV	S/s			1500		Planned	2028-29	Telangana
	Nizamabad-II PS – Warangal (New) 765kV D/c line with 330 MVAr SLR on both circuit at Nizamabad-II PS end (~180 km)	765 kV	Line	D/c	360			Planned	2028-29	Telangana
SR-7	**Transmission System for integration of Medak REZ (1 GW Wind, 2.5 GW Solar)**									
	Phase-I: Transmission System for integration of Medak REZ (1 GW Wind, 0.5 GW Solar)									
	Establishment of 2x500 MVA, 400/220kV Pooling Station near	400/220 kV	S/s			1000		Planned	2028-29	Telangana

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Medak (Medak PS) with 2x125 MVAr (420 kV) bus reactors									
	Medak PS – Nizamabad-II 400kV D/c line	400 kV	Line	D/c	120			Planned	2028-29	Telangana
	Phase II: Transmission System for integration of Medak REZ (2 GW Solar)									
	Augmentation by 400/220 kV, 4x500 MVA ICTs at Medak PS (0.5 GW injection at 220 kV level)	400/220 kV	S/s			2000		Planned	2029-30	Telangana
SR-8	**Transmission System for integration of Rangareddy REZ (1 GW Wind, 2.5 GW Solar)**									
	Phase I: Transmission System for integration of Rangareddy REZ (1 GW Wind, 0.5 GW Solar)									
	Establishment of 2x500 MVA, 400/220 kV Pooling Station near Rangareddy (Rangareddy PS) with 2x125 MVAr (420 kV) bus reactors	400/220 kV	S/s			1000		Planned	2028-29	Telangana
	Rangareddy PS – Nizamabad-II 400 kV D/c line with 80 MVAr SLR at Rangareddy PS	400 kV	Line	D/c	310			Planned	2028-29	Telangana
	Phase II: Transmission System for integration of Rangareddy REZ (2 GW Solar)									
	Augmentation by 400/220 kV, 4x500 MVA ICTs at Rangareddy PS (0.5 GW injection at 220 kV level)	400/220 kV	S/s			2000		Planned	2028-29	Telangana
SR-9	**Transmission System for integration of Karimnagar REZ (2.5 GW Solar)**									
	Phase II: Transmission System for integration of Karimnagar REZ (2 GW Solar)									
	Establishment of 3x500 MVA, 400/220 kV ICTs at Pooling Station near Karimnagar (Karimnagar PS)	400/220 kV	S/s			1500		Planned	2028-29	Telangana

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	with 2x125 MVar (420 kV) bus reactor (1.5 GW injection at 220 kV level and 1 GW injection at 400 kV level)									
	Karimnagar PS – Nizamabad-II 400kV (Quad) D/c line	400 kV	Line	D/c	200			Planned	2028-29	Telangana
	Phase II: Transmission System for integration of Karimnagar REZ (0.5 GW Solar)									
	Augmentation by 400/220 kV, 1x500 MVA ICT at Rangareddy PS	400 kV	S/s			500		Planned	2029-30	Telangana
SR-10	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Tuticorin (upto 7015 MW)**									
	Augmentation by 3x1500 MVA, 765/400 kV ICTs at Tuticorin (GH) S/s	765/400 kV	S/s			4500		Planned	2029-30	Tamil Nadu
	Tuticorin (GH)-Avaraikulam 400 kV D/c line	765 kV	Line	D/c	200			Planned	2029-30	Tamil Nadu
	LILO of both circuits of Tuticorin PS – Tuticorin-II D/c line at Tuticorin (GH) S/s	400 kV	Line	D/c	100			Planned	2029-30	Tamil Nadu
SR-11	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Mangalore (2250 MW)**									
	Establishment of 765/400 kV, 3x1500 MVA S/s near Mangalore with 2x330 MVAr (765 kV) & 2x125MVAr (420 kV) bus reactors	765/400 kV	S/s			4500		Planned	2028-29	Karnataka
	Davanagere / Chitradurga - Mangalore 765 kV D/c line with 240 MVAR line reactor on each circuit at each end.	765 kV	Line	D/c	560			Planned	2028-29	Karnataka
	C. N. Halli - Mangalore 400 kV D/C line	400 kV	Line	D/c	400			Planned	2028-29	Karnataka
SR-12	**Transmission System for supply of power to Green Hydrogen/ Green**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Ammonia manufacturing hub at Kakinada (upto 6000 MW)									
	Augmentation by 3x1500 MVA, 765/400 kV ICTs at Kakinda (GH) S/s	765/400 kV	S/s			4500		Planned	2028-29	Andhra Pradesh
	Angul – Srikakulam 765 kV 2nd D/c line with 240 MVAr line reactor on each circuit at each end	765 kV	Line	D/c	560			Planned	2028-29	Andhra Pradesh
	Kakinda -Vizag-II/Ankapalli 765 kV D/c line	765 kV	Line	D/c	200			Planned	2028-29	Andhra Pradesh
	Kakinda GH-Vizag Pool 400 kV D/C line	400 kV	Line	D/c	200			Planned	2028-29	Andhra Pradesh
SR-13	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Pudimadka (Vizag) (5000 MW)**									
	Establishment of Jagdalpur (Jagdalpur-II) S/s with 765/400 kV, 3x1500 MVA ICTs and 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			4500		Planned	2029-30	Chhattisgarh
	Raipur-Jagdalpur -II 765 D/c line with 240 MVAr line reactor on each circuit at both end	765 kV	Line	D/c	600			Planned	2029-30	Chhattisgarh
	Establishment of 765/400 kV Vizag-II (GH)/Ankapalli S/s with 5x1500 MVA ICT and 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			7500		Planned	2029-30	Andhra Pradesh
	Jagdalpur-II -Vizag-II/Ankapalli 765 kV D/c line with 330 MVAr line reactor on each circuit at Vizag-II end	765 kV	Line	D/c	400			Planned	2029-30	Andhra Pradesh
	Srikakulam -Vizag-II/Ankapalli 765 kV D/c line with 240 MVAr line reactor on each circuit at both ends.	765 kV	Line	D/c	500			Planned	2029-30	Andhra Pradesh
	Vemagiri -Vizag-II/Ankapalli 765 kV D/c line with 330 MVAr line reactor on each circuit at Vizag -II end	765 kV	Line	D/c	300			Planned	2029-30	Andhra Pradesh

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 765/400 kV Khammam II substation with 2x1500 MVA ICTs and 2x330 MVAr (765 kV) & 2x125MVAr (420 kV) bus reactors	765/400 kV	S/s			3000		Planned	2029-30	Telangana
	Warangal New – Khammam-II 765 kV D/c line	765 kV	Line	D/c	220			Planned	2029-30	Telangana
	Khammam-II – Vemagiri 765 kV D/c line with 330 MVAr line reactor on each circuit at Khammam II end	765 kV			430			Planned	2029-30	Telangana, Andhra Pradesh
SR-14	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Ramayapatnam (4000 MW)**									
	Establishment of 765/400 kV Ramayapatnam (GH) S/S with 4x1500 MVA ICTs and 2x330 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactors	765/400 kV	S/s			6000		Planned	2029-30	Andhra Pradesh
	Ramayapatnam - Kurnool-V 765 kV D/c line with 240 MVAr reactor on each circuit at both ends	765 kV	Line	D/c	500			Planned	2029-30	Andhra Pradesh
	Ramayapatnam - Ramayapatnam (AP) 400 kV D/c line	400 kV	Line	D/c	60			Planned	2029-30	Andhra Pradesh
SR-15	**Inter-Regional links between NEW-Grid & SR-Grid and ISTS network strengthening in SR to facilitate import of power**									
	Parli New – Bidar 765 kV D/c line	765 kV	Line	D/c	300			Planned	2027-28	Maharashtra, Karnataka
SR-16	**Transmission System under ISTS for evacuation of power from Kudankulam Unit - 5 & 6 (2x1000 MW)**									
	Interconnection of KNPP-3&4 and KNPP-5&6 switchyards with 400 kV quad D/c line	400 kV	S/s					Planned	2027-28	Tamilnadu

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Shifting of KNPP-3&4 – Tuticorin-II GIS 400 kV (quad) D/c line to KNPP-5&6 to form KNPP-5&6 – Tuticorin-II GIS 400 kV (quad) D/c line and with provision of SLR at terminating bays of KNPP-5&6	400 kV	S/s					Planned	2027-28	Tamilnadu
	KNPP-5&6 – Virudhanagar (TN) 400 kV (quad) D/c line with 80 MVAR SLR in each circuit at KNPP-5&6	400 kV	Line	D/c	340			Planned	2027-28	Tamilnadu
SR-17	**Transmission System for 5 GW Offshore wind farm (Sub Zone B1 to B4 & G1 to G3) in Tamil Nadu**									
	Phase I (500 MW)									
	A. Onshore pooling station and Transmission System from Onshore Pooling Station									
	Establishment of 2x500 MVA, 400/230 kV Onshore Pooling Station near Avaraikulam, Tirunelveli District in Tamil Nadu	400/220 kV	S/s			1000		Planned	2029-30	Tamil Nadu
	Avaraikulam Onshore PS – Tuticorin PS 400 kV D/c quad line	400 kV	Line	D/c	200			Planned	2029-30	Tamil Nadu
	± 300 MVAr STATCOM along with 2x125 MVAr MSR	400 kV	S/s					Planned	2029-30	Tamil Nadu
	B. Transmission System for integration of Offshore Wind Farms with Onshore PS									
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 1 No. with 10 Nos. of 66 kV line bays for RE integration	230/66 kV	S/s			630		Planned	2029-30	Tamil Nadu
	Offshore substation 1 (OSS-1) – Avaraikulam Onshore PS 2 Nos. 230 kV (at least 300 MVA capacity) Submarine cables (~35 - 40 km) with	230 kV	Cable	S/c	70			Planned	2029-30	Tamil Nadu

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	2x50 MVAr switchable line reactors at OSS-1 end									
	Phase II (4500 MW)									
	Augmentation by 9x500 MVA, 400/230 kV ICTs at the Onshore Pooling Station near Avaraikulam, Tirunelveli, District in Tamil Nadu	400/230 kV	S/s			4500		Planned	2031-32	Tamil Nadu
	Avaraikulam Onshore PS – Pugalur (HVDC) 400 kV D/c line (Quad Moose equivalent) with 125 MVAr switchable reactors on each circuit at both ends	400 kV	Line	D/c	600			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 2 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 2 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	80			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 3 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 3 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	80			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 4 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 4 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	80			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 5 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 5– Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	80			Planned	2031-32	Tamil Nadu

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 6 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 6 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	70			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 7 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 7 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	70			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 8 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 8 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	70			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 9 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 9 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	72			Planned	2031-32	Tamil Nadu
	Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 10 No. with 10 Nos. of 66 kV line bays for RE integration.	230/66 kV	S/s			630		Planned	2031-32	Tamil Nadu
	OSS 10– Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable	230 kV	Cable	S/c	70			Planned	2031-32	Tamil Nadu
SR-18	**India - Srilanka 500 MW HVDC link**									
	Madurai - Madurai New 400 kV D/c line	400 kV	Line	D/c	98			Planned	2031-32	Tamil Nadu

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Establishment of new HVDC station at Madurai New with 500 MW VSC HVDC terminal	320 kV	HVDC	S/s				Planned	2031-32	Tamil Nadu
	Madurai New - Mannar 500 MW VSC HVDC line along with terminals at both ends (Indian Portion)	320 kV	HVDC	Line	172			Planned	2031-32	Tamil Nadu
ER-1	**Eastern Region Generation Scheme-I (ERGS-I)**									
	LILO of both circuits of Angul – Sundargarh (Jharsuguda) 765 kV 2xS/c lines at NLC Talabira generation switchyard	765 kV	Line	D/c	100		TBCB	UC	Mar-28	Odisha
ER-2	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Goplapur (upto 6 GW)**									
	Augmentation by 3x1500, 765/400 kV ICTs at Gopalpur S/s	765/400 kV	S/s			4500		Planned	2029-30	Odisha
	Begunia (HVDC) - Gopalpur 765 kV D/c line	765 kV	Line	D/c	300			Planned	2029-30	Odisha
ER-3	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Paradeep (upto 3.2 GW) and Kendrapada (1.5 GW)**									
	Augmentation by 3x1500, 765/400 kV ICTs at Paradeep S/s	765/400 kV	S/s			4500		Planned	2029-30	Odisha
	Begunia (HVDC) - Paradeep 765 kV D/c line	765 kV	Line	D/c	240			Planned	2029-30	Odisha
ER-4	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Malkangiri (1.8 GW)**									
	Establishment of 5x500 MVA, 400/220 kV ICTs Malkangiri S/s	400/220 kV	S/s			2500		Planned	2029-30	Odisha

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	alongwith 420 kV, 1x125 MVA Bus Reactor									
	Jeypore - Malkangiri 400 kV D/c line	400 kV	Line	D/c	240			Planned	2029-30	Odisha
ER-5	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Rayagada (1.1 GW)**									
	Establishment of Rayagada S/s with 4x500 MVA, 400/220 kV ICTs alongwith 1x125 MVA (420 kV) Bus Reactor	400/220 kV	S/s			2000		Planned	2029-30	Odisha
	Srikakulam Pool - Rayagada 400 kV D/c line	400 kV	Line	D/c	260			Planned	2029-30	Odisha
ER-6	**Transmission System for supply of power to Green Hydrogen/ Green Ammonia manufacturing hub at Shyama Prasad Mukherjee Port (1 GW)**									
	Establishment of S/s with 3x500 MVA, 400/220 kV ICTs alongwith 1x125 MVAr (420 kV) Bus Reactor, near Shyama Prasad Mukherjee Port	400/220 kV	S/s			1500		Planned	2029-30	Odisha
	Subhasgram - Shyama Prasad Mukeerjee Port S/s 400 kV D/c line	400 kV	Line	D/c	90			Planned	2029-30	Odisha
ER-7	**Transmission System for evacuation of power from New Nabinagar Ph-II TPS (3x800MW)**									
	New Nabinagar - Gaya 765 kV D/c line	765 kV	Line	D/c	220			Planned	2029-30	Odisha
ER-8	**Transmission System for evacuation of power from Mahanadi Basin Power TPS (2x800 MW)**									
	Mahanadi Basin Power - Angul 765 kV D/c line	765 kV	Line	D/c	134			Planned	2029-30	Odisha
ER-9	**Transmission System for evacuation of power from Sundargarh TPS (3x800 MW)**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Sundargarh TPS - Jharsuguda 765 kV D/c line	765 kV	Line	D/c	50			Planned	2029-30	Odisha
ER-10	**Paradeep-Andaman HVDC link**									
	Establishment of 320 kV, 250 MW VSC based HVDC terminal (Pole 1) at Paradeep, Odisha	320 kV	S/s					Planned	2031-32	Odisha
	Establishment of 320 kV, 250 MW VSC based HVDC terminal (Pole 1) at Port Blair, Andaman & Nicobar Islands	320 kV	S/s					Planned	2031-32	A&N Islands
	Paradeep (HVDC) - Port Blair, Andaman &Nicobar Island ±320 kV, 500 MW HVDC bipole link (land and undersea cable) along with Dedicated Metallic Return (DMR) (about 1150 km route lngth)	320 kV	Line		2300			Planned	2031-32	Odisha, A&N Islands
	Paradeep 765/400kV (ISTS) – Paradeep (HVDC) 400 kV D/c line	400 kV	Line		24			Planned	2031-32	Odisha
ER-11	**India - Bangladesh 765 kV D/c link**									
	Establishment of 2x1500 MVA, 765/400 kV Katihar S/s	765/400 kV	S/s			3000		Planned	2031-32	Bihar
	Establishment of 2x1500 MVA, 765/400 kV Bornagar S/s	765/400 kV	S/s			3000		Planned	2031-32	Assam
	Katihar-Parbotipur-Bornagar 765 kV d/c line (Indian Portion)	765 kV	Line	D/c	685			Planned	2031-32	Bihar, Assam
NER-1	**Transmission system for providing Connectivity to Dibang HEP**									
	Dibang - Gogamukh 400 kV 2xD/c line	400 kV	Line	D/c	860			Planned	2031-32	Arunachal Pradesh, Assam
NER-2	**Transmission system for power evacuation from Dibang HEP**									

S. No.	Scheme /details	Voltage level	Type of Work	No. of Circuits	Total ckm	Total MVA	Mode of Implementation	Present Status	Anticipated Commissioning	State
	Gogamukh- Lower Subansiri 400 kV D/c line alongwith 80 MVAr line reactor in each circuit at Lower Subansiri end	400 kV	Line	D/c	350			Planned	2031-32	Arunachal Pradesh, Assam
NER-3	**North Eastern Region Expansion Scheme-XXV (NERES-XXV)**									
	Establishment of new 400 kV Bornagar (ISTS) switching station in Assam	400 kV	Sw/s					Planned	2028-29	Assam
	LILO of both circuits of existing Bongaigaon (POWERGRID) – Balipara (POWERGRID) 400 kV D/c (Quad) line at Bornagar (ISTS)	400 kV	Line	D/c	100			Planned	2028-29	Assam
	Installation of 420 kV, 1x80 MVAr switchable line reactor at Bornagar (ISTS) end in each circuit of Alipurduar (PG) – Bornagar 400 kV D/c line formed after shifting of Alipurduar (PG) – Bongaigaon (PG) 400 kV D/c line from Bongaigaon (PG) end to Bornagar (ISTS) S/s	400 kV	S/s					Planned	2028-29	West Bengal, Assam
NER-4	**Indian - Myanmar 400 kV D/c link**									
	Imphal - India Border 400 kV D/c line	400 kV	S/s	D/c	190			Planned	2028-29	Meghalaya

Note:

1. The transmission schemes would be reviewed based on actual growth in electricity generation and electricity demand.

2. For the HVDC transmission schemes planned during 2027-32 (other than under bidding and under construction HVDC schemes), the technology (LCC or VSC), voltage level, take-off/ landing points etc. would be further reviewed depending upon the connectivity applications from RE generation developers, growth in electricity demand etc.

Annex-8.3

Summary of Intra-State transmission schemes planned during 2027-32 (220 kV & above)

State/UT	Transmission lines (ckm)	Transformation Capacity (MVA)	Likely Investment (Rs. Cr)
Delhi	0	0	0
Haryana	369	3500	1291
Himachal Pradesh	370	320	354
Jammu & Kashmir	0	0	0
Ladakh	0	0	0
Punjab	0	0	0
Uttar Pradesh	4230	23250	16114
Uttarakhand	347	2430	797
Rajasthan	1857	15160	8914
Maharashtra	179	2370	826
Gujarat	15870	90430	49494
Madhya Pradesh	1369	6190	3008
Chhattisgarh	1210	3460	2590
Goa	0	0	0
DNH & DD	0	0	0
Tamil Nadu	864	3000	3641
Karnataka	121	2300	470
Andhra Pradesh	2704	14300	5624
Kerala	20	1000	239
Telangana	0	0	0
Bihar	0	0	0
West Bengal	904	3390	618
Jharkhand	0	0	0
DVC	605	2480	582

State/UT	Transmission lines (ckm)	Transformation Capacity (MVA)	Likely Investment (Rs. Cr)
Odisha	1625	7000	3998
Arunachal Pradesh	0	0	0
Assam	618	1360	543
Meghalaya	200	0	191
Nagaland	0	0	0
Manipur	0	0	0
Tripura	0	0	0
Mizoram	0	0	0
Sikkim	0	0	0
Total (Intra-state)	**33462**	**181940**	**99296**

Summary of Intra-State transmission schemes planned during 2027-32 (132 kV) in North Eastern Region

State	ckm	MVA
Arunachal Pradesh	208	60
Assam	844	840
Meghalaya	210	240
Nagaland	533	360
Manipur	159	150
Tripura	187	470
Mizoram	0	0
Total	**2141**	**2120**

Intra-State transmission schemes planned during 2027-32

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Himachal Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	220/132/ 33 kV Oachghat Substation.	Himachal Pradesh	220/132 kV	S/s			320	Planned	2031-32
2	220 kV Switching station near Bhabanagar .	Himachal Pradesh	220 kV	S/s				Planned	2031-32
(B)	**Transmission Lines**								
1	220 kV line from 400/220 kV Substation PGCIL Kala Amb to Solan (Oachghat).	Himachal Pradesh	220 kV	Line	D/c	120		Planned	2031-32
2	HTLS reconductoring of Bhabanagar to Kunihar 220 kV D/c line.	Himachal Pradesh	220 kV	Line	D/c	250		Planned	2031-32
	Haryana								
(A)	**New sub-stations / ICT augmentation**								
	Creation of 3x500 + 2x100 MVA, 400/220/33 kV substation at Munak with 125 MVAr bus reactor	Haryana	400/220/33 kV	S/s			1700	Planned	2029-30
(B)	**Transmission Lines**								
	DCRTPP Yamunanagar - Munak 400 kV D/c line	Haryana	400 kV	Line	D/c	198		Planned	2029-30
	LILO of one ckt of Kaithal - Bagpat 400 kV D/c line at Munak	Haryana	400 kV	Line	D/c	20		Planned	2029-30
	LILO of both ckts of PTPS – Nissing 220 kV D/c line at Munak	Haryana	220 kV	Line	2xD/c	20		Planned	2029-30
	LILO of PTPS - Karnal 220 kV S/c line at Munak	Haryana	220 kV	Line	D/c	30		Planned	2029-30
	LILO of 1 ckt of Bastara - Saifidon 220 kV D/c line at Munak	Haryana	220 kV	Line	D/c	10		Planned	2029-30
	Munak - IOCL-I 220 kV D/c line	Haryana	220 kV	Line	D/c	40		Planned	2029-30
	Munak - IOCL-II 220 kV D/c line	Haryana	220 kV	Line	D/c	40		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Uttar Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	G.Noida-II 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
2	Moradabad II 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
3	Nehtaur New 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
4	Jaunpur - II 220 kV S/s	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
5	400 kV 2x500+2x200 MVA Sitapur	Uttar Pradesh	400/220/132 kV	S/s			1400	Planned	2027-28
6	220/132/33 kV Deviganj (between Ramsnehi Ghat-Haidardarh)	Uttar Pradesh	220/132/33 kV	S/s			320	Planned	2027-28
7	220 kV Robertganj-II	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
8	220 kV Akbarpur	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
9	220 kV Simbholi-II	Uttar Pradesh	220/33 kV	S/s			180	Planned	2027-28
10	220 kV Bisauli (Badaun-II)	Uttar Pradesh	220/33 kV	S/s			120	Planned	2027-28
11	220 kV Agra-II	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
12	220 kV Nehtaur-II	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
13	220 kV Moradabad-II	Uttar Pradesh	220/132 kV	S/s			320	Planned	2027-28
14	220 kV Jaunpur-II	Uttar Pradesh	220/132 kV	S/s			400	Planned	2027-28
15	400 kV Daud Nagar, Nagram Road S/s (Lucknow)	Uttar Pradesh	400/220 kV	S/s			630	Planned	2028-29
16	400 kV Bhathna	Uttar Pradesh	400/220/132 kV	S/s			1320	Planned	2028-29
17	400 kV Mirzapur	Uttar Pradesh	400/220 kV	S/s			1000	Planned	2028-29
18	400 kV Ghazipur	Uttar Pradesh	400/220 kV	S/s			1000	Planned	2028-29
19	765/400 kV Obra D	Uttar Pradesh	765/400 kV	S/s			3000	Planned	2028-29
20	765/400 kV Anpara E	Uttar Pradesh	765/400 kV	S/s			3000	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
21	765 kV Amethi/Pratapgarh/Sultanpur	Uttar Pradesh	765/400/220 kV	S/s			4000	Planned	2028-29
22	765/400 kV Shahjahanpur/ Hardoi/Sitapur	Uttar Pradesh	765/400/220 kV	S/s			4000	Planned	2028-29
(B)	**Transmission Lines**								
1	LILO of Sultanpur(400 kV)-Pratapgarh (220 kV) line at Jaunpur - II	Uttar Pradesh	220 kV	Line	D/c	40		Planned	2027-28
2	LILO of 400 kV Shahjahanpur PG (400 kV)- Lucknow PG (400 kV) at Sitapur (400 kV)	Uttar Pradesh	400 kV	Line	D/c	60		Planned	2027-28
3	220 kV Sitapur- Sitapur (400 kV) S/C line	Uttar Pradesh	220 kV	Line	S/c	5		Planned	2027-28
4	220 kV Sitapur (400 kV)- Kundani(220 kV) S/C line	Uttar Pradesh	220 kV	Line	S/c	30		Planned	2027-28
5	220 kV DC Deviganj – Sohawal (PG) line	Uttar Pradesh	220 kV	Line	D/c	100		Planned	2027-28
6	LILO of 220 kV Robertganj(220 kV)-Churk (220 kV) line at Robertsganj II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
7	LILO of 220 kV New Tanda II (220 kV)-Sultanpur line (400 kV) at Tanda II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
8	LILO of 220 kV Simbhaoli (220 kV) - Simbhaoli (400 kV) line at Simbhaoli II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
9	LILO 220 kV Chandausi (220 kV) - Badaun (400 kV) line at Badaun II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
10	LILO of 220 kV Sikandra(400 kV)- Agra (220 kV) line at Agra II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
11	LILO of 220 kV Amroha(220 kV)-Moradabad (400 kV) line at Moradabad-II	Uttar Pradesh	220 kV	Line	D/c	80		Planned	2027-28
12	LILO of 220 kV Moradabad(400 kV)-Sambhal (220 kV) line at Moradabad-II	Uttar Pradesh	220 kV	Line	D/c	10		Planned	2027-28
13	LILO of 220 kV Sultanpur(400 kV)-Pratapgarh (220 kV) line at Pratapgarh (765 kV)	Uttar Pradesh	220 kV	Line	D/c	40		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
14	LILO of 400kV Lucknow PG(765)-Sarojni Nagar line at Daud Nagar*	Uttar Pradesh	400 kV	Line	D/c	40		Planned	2028-29
15	LILO of one ckt of Auraiya(400 kV) - Agra PG (765 kV) 400 kV DC line at Bharthana	Uttar Pradesh	400 kV	Line	D/c	20		Planned	2028-29
16	LILO of 220 kV Saifai(220 kV)-Bharthna (220 kV) line at Bharthana (400 kV)	Uttar Pradesh	220 kV	Line	D/c	30		Planned	2028-29
17	400 kV Obra D- Mirzapur D/C line	Uttar Pradesh	400 kV	Line	D/c	240		Planned	2028-29
18	220 kV Mirzapur- Bhadohi D/C line	Uttar Pradesh	400 kV	Line	D/c	120		Planned	2028-29
19	220 kV Mirzapur- Chunaar (Planned) D/C line	Uttar Pradesh	400 kV	Line	D/c	100		Planned	2028-29
20	220 kV Mirzapur- Mirzapur SC line	Uttar Pradesh	400 kV	Line	S/c	30		Planned	2028-29
21	LILO of 220 kV Phulpur- Pratapgarh SC line at Mirzapur (400)	Uttar Pradesh	400 kV	Line	S/c	70		Planned	2028-29
22	400kV Ghazipur-Obra D D/C line	Uttar Pradesh	400 kV	Line	D/c	430		Planned	2028-29
23	LILO of 400 kV Gorakhpur-Azamgarh S/C line at Ghazipur	Uttar Pradesh	400 kV	Line	S/c	35		Planned	2028-29
24	220 kV Ghazipur – Ranipur D/C line	Uttar Pradesh	220 kV	Line	D/c	80		Planned	2028-29
25	765 kV Obra D- Anpara E S/C line	Uttar Pradesh	765 kV	Line	S/c	50		Planned	2028-29
26	765 kV Obra D- Pratapgarh/Sultanpur S/C line	Uttar Pradesh	765 kV	Line	S/c	300		Planned	2028-29
27	765 kV Anpara E- Paratpgarh/Sultanpur S/C line	Uttar Pradesh	765 kV	Line	S/c	350		Planned	2028-29
28	765 kV Paratpgarh/Sultanpur – Rampur S/C line-	Uttar Pradesh	765 kV	Line	S/c	400		Planned	2028-29
29	400 kV Paratpgarh/Sultanpur (765 kV)-Raibareilly D/C line	Uttar Pradesh	400 kV	Line	D/c	120		Planned	2028-29
30	765 kV Meja II-Shahjahanpur/Hardoi/Sitapur S/C line	Uttar Pradesh	765 kV	Line	S/c	280		Planned	2028-29
31	765 kV Shahjahanpur/Hardoi/Sitapuri-Rampur S/C line	Uttar Pradesh	765 kV	Line	S/c	260		Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
32	765kV Shahjahanpur/Hardoi/Sitapur-Aurai/Robertsganj S/C line	Uttar Pradesh	765 kV	Line	S/c	290		Planned	2028-29
33	765kV Shahjahanpur/Hardoi/Sitapur-Raebareilly D/C line	Uttar Pradesh	765 kV	Line	D/c	140		Planned	2028-29
	Uttarakhand								
(A)	**New sub-stations / ICT augmentation**								
1	400/220/132 kV Substation at Khurpiya Farm, Kichha, Udhamsingh Nagar	Uttarakhand	400/220/132 kV	S/s			1000	Planned	2027-28
2	220/132/33kV substation , Banbasa,Udhamsingh Nagar	Uttarakhand	220/132/33 kV	S/s			320	Planned	2027-28
3	400 kV Khurpiya Farm	Uttarakhand	400 kV	S/s				Planned	2029-30
4	220 kV Thal Nachani	Uttarakhand	220/33 kV	S/s			50	Planned	2029-30
5	220 kV Almora	Uttarakhand	220/132 kV	S/s			200	Planned	2029-30
6	220 kV S/S, Raipur(Bhagwanpur), Roorkee	Uttarakhand	220/132 kV	S/s			320	Planned	2029-30
7	220 kV GIS Majra	Uttarakhand	220/132 kV	S/s			320	Planned	2031-32
8	220 kV Naugaon	Uttarakhand	220/33 kV	S/s			60	Planned	2031-32
9	220 kV Substation Pantnagar (from 2x160 MVA to 3x160 MVA)	Uttarakhand	220/132 kV	S/s			160	Planned	2031-32
(B)	**Transmission Lines**								
1	LILO of 400 kV Bareilly- Kashipur line at proposed 400/220/132/33kV substation Khurpiyafarm	Uttarakhand	400 kV	Line	D/c	44		Planned	2027-28
2	LILO of 220KV Bareilly-Pantnagar Line at proposed substation Khurpiyafarm	Uttarakhand	220 kV	Line	D/c	8		Planned	2027-28
3	LILO of 220KV Tanakpur(NHPC)-CB Ganj Line at proposed substation Banbasa	Uttarakhand	220 kV	Line	D/c	2		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	LILO of 220 kV Jhajra-Harrawala Line at proposed 220 kV Substation Majra Dehradun with Under Ground Cable	Uttarakhand	220 kV	Line	D/c	1		Planned	2031-32
5	220 kV Nachani associated Line	Uttarakhand	220 kV	Line	D/c	100		Planned	2029-30
6	220 kV Almora associated Line	Uttarakhand	220 kV	Line	D/c	150		Planned	2029-30
7	220kV D/C Puhana-Raipur (Bhagwanpur) associated Line	Uttarakhand	220 kV	Line	D/c	22		Planned	2029-30
8	220 kV Naugaon associated Line	Uttarakhand	220 kV	Line	D/c	20		Planned	2029-30
	Rajasthan								
(A)	**New sub-stations / ICT augmentation**								
1	3x1500 MVA, 765/400 kV Substation at Anta (New Location), 240 MVAR, 765 Kv Bus Reactor, 125MVAR, 420kV Bus Reactor.	Rajasthan	765/400 kV	S/s			4500	Planned	2027-28
2	2x1500 MVA, 765/400 kV Substation, using GIS Technology, at Hindaun by upgrading the existing 400 kV GSS Hindaun to 765 kV GSS, 240 MVAR, 765 kV Bus Reactor.	Rajasthan	765/400 kV	S/s			3000	Planned	2027-28
3	3x1500 MVA, 765/400 kV Transformer, 2x500MVA, 400/220 kV Transformer at proposed 765/400/220 kV GSS at Ajarka (Alwar) (New Location), 240 MVAR, 765 kV Bus Reactor, 125MVAR, 420 kV Bus Reactor.	Rajasthan	765/400/220 kV	S/s			5500	Planned	2027-28
4	2x500 MVA, 400/220 kV Transforrmer at proposed 400/220 kV GSS at	Rajasthan	400/220 kV	S/s			1000	Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	Kushkhera/Bhiwadi (New Location), 125MVAR, 420kV Bus Reactor								
5	2x500 MVA, 400/220 kV Transformer at Kumher (New Location), 125 MVAR, 420 kV switchable bus Reactor	Rajasthan	400/220 kV	S/s			1000	Planned	2027-28
6	1x160 MVA, 220/132 kV Transformer at Proposed 220 kV GSS Chiruni (New Location).	Rajasthan	220/132 kV	S/s			160	Planned	2027-28
(B)	**Transmission Lines**								
1	Anta-2-Hindaun 765 kV D/c line using Hexa Zebra conductor, 2x240MVAR, 765 kV switchable line reactors at Anta end of line and 2x240MVAR, 765 kV switchable line reactors at Hindaun end of line	Rajasthan	765 kV	Line	D/c	540		Planned	2027-28
2	Anta (New Location)-Anta (Existing) 765 kV D/c line using Hexa Zebra conductor line.	Rajasthan	765 kV	Line	D/c	50		Planned	2027-28
3	Supercritical Chhabra TPP (Unit#7&8)-Anta (New Location) 400 kV D/c line using Twin HTLS conductor.	Rajasthan	400 kV	Line	D/c	158		Planned	2027-28
4	Kalisindh TPP (Unit#3)-Anta (New Location) line using Twin HTLS conductor	Rajasthan	400 kV	Line	D/c	168		Planned	2027-28
5	765 kV D/c Ajarka (Alwar)-Hindaun 400 kV D/c line using Hexa end Zebra	Rajasthan	765 kV	Line	D/c	320		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	conductor, 2x240MVAR switchable line reactors at Hindaun end.								
6	LILO of one circuit of PGCIL's Sikar-Aligarh 765 kV D/c line at proposed 765 kV GSS Ajarka (Alwar) with 2x240MVAR, 765 kV switchable line reactors at Alwar end of line.	Rajasthan	765 kV	Line	D/c	36		Planned	2027-28
7	Ajarka (Alwar)-Alwar (400 kV GSS) (PPP) 400 kV D/c line (Twin moose conductor).	Rajasthan	400 kV	Line	D/c	200		Planned	2027-28
8	LILO of Neemrana-Kotputli 220 kV S/c line at 765 kV Ajarka (Alwar)	Rajasthan	220 kV	Line	D/c	40		Planned	2027-28
9	LILO of Neemrana-Behror 220 kV S/c line at 765 kV Ajarka (Alwar)	Rajasthan	220 kV	Line	D/c	40		Planned	2027-28
10	Ajarka(765kV GSS Alwar)-Kushkhera/Bhiwadi 400 kV D/c line (Twin HTLS).	Rajasthan	400 kV	Line	D/c	68		Planned	2027-28
11	LILO of PGCIL's Bassi-Bhiwadi 400 kV S/c Line at proposed 400 kV GSS Kushkhera/Bhiwadi, 50 MVAR, 420 kV switchable line reactor on Bassi circuit.	Rajasthan	400 kV	Line	D/c	44		Planned	2027-28
12	LILO of Alwar-Karoli 220 kV S/c line at 400 kV GSS Kushkhera/ Bhiwadi	Rajasthan	220 kV	Line	D/c	10		Planned	2027-28
13	LILO of K G Bas-Kushkhera 220 kV S/c line at 400 kV GSS kushkhera/ Bhiwadi	Rajasthan	220 kV	Line	D/c	10		Planned	2027-28
14	Ajarka (765 kV GSS Alwar)-Chiruni 220 kV D/c line	Rajasthan	220 kV	Line	D/c	40		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
15	LlLO of one circuit of PGCIL's Sikar-Agra (Quad Moose) 400 kV D/c line at 400 kV GSS Kumhcr with 50 MVAR, 420 kV switchable line reactor on 400 kV S/c Sikar-Kumher line at Kumher end.	Rajasthan	400 kV	Line	D/c	13		Planned	2027-28
16	LILO of Hindaun-Alwar 400 kV S/c line (Twin Moose) line at 400 kV GSS Kumhcr	Rajasthan	400 kV	Line	D/c	90		Planned	2027-28
17	LILO of Nadbai-Bharatpur 220 kV S/c line at 400 kV GSS Kumher.	Rajasthan	220 kV	Line	D/c	10		Planned	2027-28
18	LILO of Sikri-Bharatpur 220 kV S/c line at 400 kV GSS Kumher.	Rajasthan	220 kV	Line	D/c	20		Planned	2027-28
	Maharashtra								
(A)	**New sub-stations / ICT augmentation**								
1	220/33 kV GIS EHV Station at Airport	Maharashtra	220/33 kV	S/s			250	Planned	2028-29
2	220 kV Scheme at Tilak Nagar/ Sidharth Nagar (New Scheme)	Maharashtra	220/33 kV	S/s			250	Planned	2027-28
3	220/33 kV GIS EHV S/S at Malad	Maharashtra	220/33 kV	S/s			250	Planned	2028-29
4	220/33 kV Underground GIS EHV S/S at Khardanda	Maharashtra	220/33 kV	S/s			250	Planned	2027-28
5	220/33 kV Worli S/S	Maharashtra	220/33 kV	S/s			120	Planned	2027-28
6	220/33 kV Goregaon S/S	Maharashtra	220/33 kV	S/s			250	Planned	2030-31
7	220/33 kV New Dharavi	Maharashtra	220/33 kV	S/s			250	Planned	2028-29
8	220/33 kV MbPT S/S	Maharashtra	220/33 kV	S/s			250	Planned	2029-30
9	Borivali 2 x 250 MVA, 220 kV / 110 kV / 22 kV ICT 1 & 2	Maharashtra	220/110 kV	S/s			500	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
10	220 kV, 1 x 125 MVAR Reactor at Borivali	Maharashtra	220 kV	S/s				Planned	2028-29
(B)	**Transmission Lines**								
1	Aarey- TPC Saki S/C Cable	Maharashtra	220 kV	Line	S/c	3.6		Planned	2027-28
2	LILO of AEML Aarey-Borivali OH 220 kV line at Malad by laying 220 kV D/c Underground Cable	Maharashtra	220 kV	Line	D/c	2		Planned	2028-29
3	LILO of AEML Dahanu - Versova 220 kV S/c line at Uttan	Maharashtra	220 kV	Line	D/c	5		Planned	2028-29
4	LILO of Aarey- BKC 220 kV S/c line at Airport	Maharashtra	220 kV	Line	D/c	8		Planned	2028-29
5	LILO of TPC Dharavi –Salsette 220 kV D/c Line at Tilak Nagar / Sidhartha Nagar EHV S/s	Maharashtra	220 kV	Line	D/c	4		Planned	2027-28
6	LILO of Dharavi-Mahalaxmi 220 kV U/G cable at Worli	Maharashtra	220 kV	Line	D/c	2		Planned	2027-28
7	Tata-Borivali RS - Goregaon RS 220 kV S/c line	Maharashtra	220 kV	Line	S/c	8		Planned	2030-31
8	Sahar RS - Goregaon RS 220 kV S/c line	Maharashtra	220 kV	Line	S/c	8		Planned	2030-31
9	LILO of Trombay - Dharavi 220 kV D/c Line at New Dharavi RS	Maharashtra	220 kV	Line	D/c	1		Planned	2028-29
10	LILO of Trombay-Carnac 220 kV D/c line at MbPT	Maharashtra	220 kV	Line	D/c	4		Planned	2029-30
11	AEML-T BKC - AEML-T Aarey 220 kV D/c cable	Maharashtra	220 kV	Line	D/c	35		Planned	2028-29
12	Dahisar EHV Station – AEML-T Borivali 220 kV D/c cable	Maharashtra	220 kV	Line	D/c	12		Planned	2027-28
13	Aarey - Chandivali 220 kV D/c cable	Maharashtra	220 kV	Line	D/c	7		Planned	2027-28
14	TPC Sahar - AEML Airport 220 kV S/c Cable	Maharashtra	220 kV	Line	S/c	3.5		Planned	2028-29
15	Replacement of Trombay-Carnac -5 and 6 Oil Filled cable by 220 kV XLPE cable- 8 km each	Maharashtra	220 kV	Line	D/c	16		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
16	220 kV Waghivali Dharavi 7 and 8 HTLS upgradation	Maharashtra	220 kV	Line	D/c	54		Planned	2028-29
17	Replacement of 220- kV Trombay-Dharavi 5, 6 Underground section by U/G cable - (3 km each)	Maharashtra	220 kV	Line	D/c	6		Planned	2030-31
	Gujarat								
(A)	**New sub-stations / ICT augmentation**								
1	Upgradation of 400 kV Saykha substation to 765 kV level	Gujarat	765/400 kV	S/s			3000	Planned	2027-28
2	Upgradation of 220 kV Keshod substation to 400 kV level	Gujarat	400/220 kV	S/s			1000	Planned	2027-28
3	400 kV Nagalpar, Dist. Rajkot	Gujarat	400/220 kV	S/s			1320	Planned	2027-28
4	400 kV Sevasi, Dist. Vadodara	Gujarat	400/220 kV	S/s			1320	Planned	2027-28
5	220/66 kV Paldi Kankaj, Dist. Ahmedabad	Gujarat	220/132 kV	S/s			320	Planned	2027-28
6	220/66 kV Kharach (Ankleshwar), Dist. Bharuch	Gujarat	220/132 kV	S/s			320	Planned	2027-28
7	220/66 kV Adalaj (Bhat), Dist. Gandhinagar	Gujarat	220/132 kV	S/s			320	Planned	2027-28
8	220/66 kV Randheja, Dist. Gandhinagar	Gujarat	220/132 kV	S/s			320	Planned	2027-28
9	Upgradation of 132 kV Dhrol substation to 220 kV, Dist. Jamnagar	Gujarat	220/132 kV	S/s			300	Planned	2027-28
10	220/66 kV Chikada, Dist. Narmada	Gujarat	220/132 kV	S/s			320	Planned	2027-28
11	220/66 kV Vansda (Limzar), Dist. Navsari	Gujarat	220/132 kV	S/s			320	Planned	2027-28
12	765 kV Kutch (PS)-1, Dist Kutch	Gujarat	765/400 kV	S/s			6000	Planned	2027-28
13	765 kV Kutch (PS)-2, Dist Kutch	Gujarat	765/400 kV	S/s			3000	Planned	2027-28
14	Umarpada 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2027-28
15	220 kV Vansi / Borsi Textile Park GIS	Gujarat	220/66 kV	S/s			320	Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
16	Upgradation of 132kV Ankleshwar S/S to 220kV level	Gujarat	220/66 kV	S/s			320	Planned	2027-28
17	765 kV Bagodara (PS), Dist. Surendranagar	Gujarat	765/400 kV	S/s			3000	Planned	2027-28
18	400/220 kV Amreli (PS), Dist. Amreli	Gujarat	400/220 kV	S/s			1000	Planned	2027-28
19	Upgradation of 220 kV Gadhsisa substation to 400 kV level, Dist. Kutch	Gujarat	400/220 kV	S/s			1000	Planned	2027-28
20	400/220 kV South Gujarat (PS), Dist. Surat	Gujarat	400/220 kV	S/s			1000	Planned	2027-28
21	Upgradation of 220 kV Radhanesda-II (PS) substation to 400 kV level, Dist. Banaskantha	Gujarat	400/220 kV	S/s			2000	Planned	2027-28
22	220 kV Kutch (PS)-2, Dist. Kutch	Gujarat	220/132 kV	S/s			320	Planned	2027-28
23	220 kV Patan (PS), Dist. Banaskantha	Gujarat	220/132 kV	S/s			320	Planned	2027-28
24	Keshod 400 kV S/s	Gujarat	400/220 kV	S/s			1000	Planned	2027-28
25	Makansar 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2027-28
26	Vansda (Limzer) 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2028-29
27	Upgradation of 132 kV Manjusar to 220 kV AIS	Gujarat	220/66 kV	S/s			320	Planned	2028-29
28	220 kV Kakwadi Sea Food Park GIS	Gujarat	220/66 kV	S/s			320	Planned	2028-29
29	220 kV Jambusar Drug Park GIS	Gujarat	220/66 kV	S/s			480	Planned	2028-29
30	765 kV Near Palanpur, Dist. Palanpur	Gujarat	765/400 kV	S/s			3000	Planned	2028-29
31	220/66 kV Abhepar, Dist. Rajkot	Gujarat	220/132 kV	S/s			320	Planned	2028-29
32	220/66 kV Vehlal (Ahmedabad), Dist. Ahmedabad	Gujarat	220/132 kV	S/s			320	Planned	2028-29
33	Pipavav 400 kV S/s	Gujarat	400/220 kV	S/s			1000	Planned	2028-29
34	220/66 kV Godadara, Dist. Surat	Gujarat	220/132 kV	S/s			320	Planned	2028-29
35	220/66 kV New Agiyol, Dist. Sabarkantha	Gujarat	220/132 kV	S/s			320	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
36	132/66 kV Subhanpura, Dist. Vadodara	Gujarat	132/66 kV	S/s			320	Planned	2028-29
37	765 kV Near Morbi, Dist. Morbi	Gujarat	765/400 kV	S/s			3000	Planned	2028-29
38	Upgradation of 400 kV Radhanesda-II (PS) substation to 765 kV level, Dist. Banaskantha	Gujarat	765/400 kV	S/s			6000	Planned	2028-29
39	765/400 kV Near Vadodara (PS), Dist. Vadodara	Gujarat	765/400 kV	S/s			3000	Planned	2028-29
40	400/220 kV Bharuch (PS), Dist. Bharuch	Gujarat	400/220 kV	S/s			1500	Planned	2028-29
41	220 kV Kutch (PS)-3, Dist. Kutch	Gujarat	220/132 kV	S/s			320	Planned	2028-29
42	Gomta 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2028-29
43	Sarvala 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2028-29
44	400 kV Deodar, Dist. Banaskantha	Gujarat	400/220 kV	S/s			1000	Planned	2029-30
45	220/66 kV Desar, Dist. Panchmahal	Gujarat	220/132 kV	S/s			320	Planned	2029-30
46	220/66 kV Khirsara, Dist. Rajkot	Gujarat	220/132 kV	S/s			320	Planned	2029-30
47	220/66 kV Near Visnagar, Dist. Mehsana	Gujarat	220/132 kV	S/s			320	Planned	2029-30
48	400/220 kV Botad (PS), Dist. Botad	Gujarat	400/220 kV	S/s			2000	Planned	2029-30
49	400/220 kV Dahod (PS), Dist. Dahod	Gujarat	400/220 kV	S/s			1500	Planned	2029-30
50	400/220 kV Surendranagar (PS), Dist. Surendranagar	Gujarat	400/220 kV	S/s			1500	Planned	2029-30
51	220 kV Botad (PS), Dist. Botad	Gujarat	220/132 kV	S/s			320	Planned	2029-30
52	220 kV Panchmahal (PS), Dist. Panchmahal	Gujarat	220/132 kV	S/s			320	Planned	2029-30
53	220 kV Surendranagar (PS)-2, Dist. Surendranagar	Gujarat	220/132 kV	S/s			320	Planned	2029-30
54	400 kV Paneli, Dist. Morbi	Gujarat	400/220 kV	S/s			1320	Planned	2030-31
55	220/66 kV Maliya, Dist. Morbi	Gujarat	220/132 kV	S/s			320	Planned	2030-31
56	220/66 kV Palsana, Dist. Surat	Gujarat	220/132 kV	S/s			320	Planned	2030-31

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
57	220/66 kV Near Mehsana, Dist. Mehsana	Gujarat	220/132 kV	S/s			320	Planned	2030-31
58	220/66 kV Near Patan, Dist. Patan	Gujarat	220/132 kV	S/s			320	Planned	2030-31
59	765/400 kV Jamnagar (PS), Dist. Jamnagar	Gujarat	765/400 kV	S/s			6000	Planned	2030-31
60	765/400 kV Near Surat (PS), Dist. Surat	Gujarat	765/400 kV	S/s			6000	Planned	2030-31
61	400/220 kV Dwarka PS, Dist. Devbhumi Dwarka	Gujarat	400/220 kV	S/s			2000	Planned	2030-31
62	Upgradation of 220 kV Hajipir substation to 400 kV level, Dist. Kutch	Gujarat	400/220 kV	S/s			2000	Planned	2030-31
63	220 kV Dahod (PS), Dist. Dahod	Gujarat	220/132 kV	S/s			320	Planned	2030-31
64	220 kV Dwarka (PS), Dist. Devbhumi Dwarka	Gujarat	220/132 kV	S/s			320	Planned	2030-31
65	220 kV Banaskantha (PS), Dist. Banaskantha	Gujarat	220/132 kV	S/s			320	Planned	2030-31
66	400 kV Mujpur, Dist. Patan	Gujarat	400/220 kV	S/s			1000	Planned	2031-32
67	220/66 kV Near Rajkot, Dist. Rajkot	Gujarat	220/132 kV	S/s			320	Planned	2031-32
68	220/66 kV Near Zekda, Dist. Ahmedabad	Gujarat	220/132 kV	S/s			320	Planned	2031-32
69	Mandali 220 kV S/s	Gujarat	220/66 kV	S/s			320	Planned	2031-32
70	400/220 kV Banaskantha PS, Dist. Banaskantha	Gujarat	400/220 kV	S/s			1500	Planned	2031-32
71	765/400 kV Amreli (PS), Dist. Amreli	Gujarat	765/400 kV	S/s			4500	Planned	2031-32
72	400/220 kV Bhavnagar PS, Dist. Bhavnagar	Gujarat	400/220 kV	S/s			2000	Planned	2031-32
73	400/220 kV Jamnagar PS, Dist. Jamnagar	Gujarat	400/220 kV	S/s			1500	Planned	2031-32
74	Chiloda 220 kV S/s	Gujarat	220/66 kV	S/s			620	Planned	2031-32
75	220 kV Bhavnagar (PS)-2, Dist. Bhavnagar	Gujarat	220/132 kV	S/s			320	Planned	2031-32
76	220 kV Bharuch (PS)-2, Dist. Bharuch	Gujarat	220/132 kV	S/s			320	Planned	2031-32

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(B)	**Transmission Lines**								
1	LILO of both circuits of EPGL - Amreli 400 kV D/C line at Keshod	Gujarat	400 kV	Line	M/C	320		Planned	2027-28
2	Kasor - Amreli 400 kV D/c line	Gujarat	400 kV	Line	D/c	460		Under Construction	2027-28
3	Adani - Zerda 400 kV D/c line	Gujarat	400 kV	Line	D/c	640		Under Construction	2027-28
4	Kalavad - Keshod 400 kV D/c line	Gujarat	400 kV	Line	D/c	240		Planned	2027-28
5	LILO of both circuits of Hadala – Chorania 400 kV D/C line at Nagalpar	Gujarat	400 kV	Line	M/C	40		Planned	2027-28
6	LILO of Kosamba – Ichchhapore 220 kV S/c line at GSEG along with other miscellaneous work (High Ampacity Conductor)	Gujarat	220 kV	Line	D/c	16		Planned	2027-28
7	Nagalpar - Ghiyavad 220 kV D/C line	Gujarat	220 kV	Line	D/C	40		Planned	2027-28
8	LILO of both circuits of Kosamba - Chorania 400 kV D/C line at Sevasi	Gujarat	400 kV	Line	M/C	60		Planned	2027-28
9	Sevasi - Mobha (Gavasad) 220 kV D/C line	Gujarat	220 kV	Line	D/C	40		Planned	2027-28
10	LILO of both circuits of Pirana – Barejadi 220 kV D/C line at Paldi Kankaj	Gujarat	220 kV	Line	M/C	60		Planned	2027-28
11	LILO of both circuits of Kawas - Haldarwa 220 kV D/C line at Kharach	Gujarat	220 kV	Line	M/C	40		Planned	2027-28
12	Vadavi – Adalaj 220 kV D/C line	Gujarat	220 kV	Line	D/C	50		Planned	2027-28
13	LILO of both circuits of Gandhinagar TPL – Soja 220 kV D/C line at Randheja	Gujarat	220 kV	Line	M/C	40		Planned	2027-28
14	LILO of both circuit of Ukai (Hy) - Achhalia 220 kV D/c line at 220 kV Umarpada (Chikda)	Gujarat	220 kV	Line	2xD/c	60		Planned	2027-28
15	LILO of both circuits of Rupavati - Jamnagar 220 kV D/C line at Dhrol	Gujarat	220 kV	Line	M/C	60		Planned	2027-28
16	LILO of both circuits of Ukai Hydro – Achhalia 220 kV D/C line at Chikada	Gujarat	220 kV	Line	M/C	100		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
17	LILO of both ckts of Kawas - Haldarwa 220kV D/c line at Ankleshwar by using existing RoW of 132kV D/C Ankleshwar - Bharuch line (4 x 10 =40Ckm)	Gujarat	220 kV	Line	M/c	40		Planned	2027-28
18	LILO of both circuit of planned Navsari (New) (under construction POWERGRID substation) - Khajod 220 kV D/C lines at 220 kV Vansi / Borsi substation	Gujarat	220 kV	Line	M/c	60		Planned	2027-28
19	LILO of both circuits of Navsari - Nasik 220 kV D/C line at Vansda	Gujarat	220 kV	Line	M/C	100		Planned	2027-28
20	Near Palanpur - Near Kheralu 400 kV D/C line	Gujarat	400 kV	Line	D/C	80		Planned	2028-29
21	LILO of one circuit of Ukai (Hydro) - Umarpada (Chikda) 220 kV D/c line at 220 kV Sarvala with AL-59 conductor	Gujarat	220 kV	Line	D/c	70		Planned	2028-29
22	Babara - Gondal-II 220 kV D/c line	Gujarat	220 kV	Line	D/c	160		Planned	2028-29
23	Pipavav - Rajula 220 kV D/c line	Gujarat	220 kV	Line	D/c	12		Planned	2028-29
24	Pipavav - Otha 220 kV D/c line	Gujarat	220 kV	Line	D/c	130		Planned	2028-29
25	LILO of Navsari-Nasik 220 kV D/c line at Vansda (Limzer) s/s	Gujarat	220 kV	Line	2xD/c	120		Planned	2028-29
26	Near Palanpur – Prantij 400 kV D/c line	Gujarat	400 kV	Line	D/c	100		Planned	2028-29
27	LILO of both circuits of Kalavad – Siddheshwar 220 kV D/c line at Abhepar	Gujarat	220 kV	Line	M/C	80		Planned	2028-29
28	LILO of both ckt of Asoj - Mogar 220 kV D/c line at Manjusar with UG Cable	Gujarat	220 kV	Line	M/c	6		Planned	2028-29
29	LILO of existing Navsari-Atul and Chikli - Vapi 220 kV lines (after complete planned scheme LILO of both circuit of 220 kV D/C Chikhli - Atul line) at 220 kV Kankwadi / Danti substation (220 kV M/C line - AL-59 conductor with OPGW)	Gujarat	220 kV	Line	D/c	60		Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	LILO of both circuit of Amod-Gavasad 220 kV D/c line at 220 kV Jambusar Drug Park substation (220 kV M/C line - AL-59 conductor with OPGW)	Gujarat	220 kV	Line	M/c	80		Planned	2028-29
31	Saykha-Jambusar 220 kV D/c line (AL-59 conductor)	Gujarat	220 kV	Line	D/c	60		Planned	2028-29
32	LILO of both circuits of 2 Khanpur - Nicol 220 kV D/c line at Vehlal	Gujarat	220 kV	Line	M/C	100		Planned	2028-29
33	LILO of both circuits of Vav - Popda (Bhestan) 220 kV D/c line at Godadara	Gujarat	220 kV	Line	M/C	80		Planned	2028-29
34	Agiyol - New Agiyol 220 kV D/C line	Gujarat	220 kV	Line	D/C	70		Planned	2028-29
35	LILO of both circuits of Gotri - Fertilizernagar132 kV D/C line at Subhanpura	Gujarat	132 kV	Line	M/C	20		Planned	2028-29
36	Morbi - Bagodara 765 kV D/C line	Gujarat	765 kV	Line	D/C	400		Planned	2028-29
37	Morbi (765 kV) – Nagalpar 400 kV D/C line	Gujarat	400 kV	Line	D/C	140		Planned	2028-29
38	Pipavav - Amreli 400 kV D/c line	Gujarat	400 kV	Line	D/c	190		Planned	2028-29
39	Moti gop - Gondal-II 220 kV D/c line	Gujarat	220 kV	Line	D/c	220		Planned	2028-29
40	LILO of both circuits of 400 kV D/C Charanka - Zerda (Kansari) line at Deodar	Gujarat	400 kV	Line	M/C	80		Planned	2029-30
41	Shivlakha - Veloda 400 kV D/c line	Gujarat	400 kV	Line	D/c	490		Planned	2029-30
42	Bhachunda - Shivlakha 400 kV D/c line	Gujarat	400 kV	Line	D/c	420		Planned	2029-30
43	LILO of Asoj – Sevalia 220 kV S/c line at Desar	Gujarat	220 kV	Line	D/C	50		Planned	2029-30
44	LILO of Jarod – Sevalia 220 kV S/c line at Desar	Gujarat	220 kV	Line	D/C	50		Planned	2029-30
45	LILO of both circuits of Kalavad - Nyara (Rajkot) 220 kV D/C line at Khirsara	Gujarat	220 kV	Line	M/C	80		Planned	2029-30
46	LILO of both circuits of Jamla - Near Kheralu (400kv) 220 kV D/C line at Near Visnagar	Gujarat	220 kV	Line	M/C	80		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
47	Morbi (765 kV) - Paneli 400 kV D/C line	Gujarat	400 kV	Line	D/C	50		Planned	2030-31
48	LILO of both circuits of Gandhinagar TPS - Ranasan 220 kV D/c line at Bhat substation by using existing RoW of 66 kV Ranasan-Bhat OR Ranasan-PRL 132 kV line	Gujarat	220 kV	Line	2xD/c	128		Planned	2030-31
49	Paneli (400 kV) - Maliya 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2030-31
50	LILO of both circuits of Navsari (PG) - Popda (Bhestan) 220 kV D/C line at Palsana	Gujarat	220 kV	Line	M/C	40		Planned	2030-31
51	220 kV D/C Near Kheralu (400 kV) - Near Mehsana line	Gujarat	220 kV	Line	D/C	100		Planned	2030-31
52	Veloda - Patan 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2030-31
53	Sami (ISTS) – Mujpur 400 kV D/C line	Gujarat	400 kV	Line	D/C	50		Planned	2031-32
54	220 kV D/C Nagalpar - Near Rajkot line	Gujarat	220 kV	Line	D/C	80		Planned	2031-32
55	LILO of Mitha - Soja 220 kV S/c line at 220 kV Mandali	Gujarat	220 kV	Line	D/c	30		Planned	2031-32
56	Chharodi - Mandali 220 kV D/c line	Gujarat	220 kV	Line	D/c	120		Planned	2031-32
57	LILO of one circuit of Ukai (Th) – Achhalia 220 kV D/c line at 220 kV Balethi substation	Gujarat	220 kV	Line	D/c	30		Planned	2031-32
58	GPEC - Achhalia 220 kV D/c line	Gujarat	220 kV	Line	D/c	180		Planned	2031-32
59	Achhalia - Haldarwa 220 kV D/c line	Gujarat	220 kV	Line	D/c	180		Planned	2031-32
60	Suva - Achhalia 220 kV D/c line	Gujarat	220 kV	Line	D/c	140		Planned	2031-32
61	LILO of both circuits of Gandhinagar TPS - Soja/Ranasan 220 kV D/c line at Chiloda	Gujarat	220 kV	Line	2xD/c	60		Planned	2031-32
62	LILO of both circuits of Sanand (Chharodi) - Bhat 220 kV D/C line at Near Zekda	Gujarat	220 kV	Line	M/C	100		Planned	2031-32

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
63	Kutch (PS)-1 - Kutch (PS)-2 765 kV D/C line	Gujarat	765 kV	Line	D/C	48		Planned	2027-28
64	Kutch (PS)-2 - Bagodara (PS) 765 kV D/C line	Gujarat	765 kV	Line	D/C	650		Planned	2027-28
65	LILO of both circuits of Shivlakha (Mevasa) – Charanka 400 kV D/C line at Kutch (PS)-2 (765 kV)	Gujarat	400 kV	Line	M/C	80		Planned	2027-28
66	Bagodara (PS) - Sayakha 765 kV D/C line	Gujarat	765 kV	Line	D/C	440		Planned	2027-28
67	LILO of both circuits of Pachchham (Fedra) - Sanand (Chharodi) 400 kV D/C line at Bagodara (PS) (765 kV)	Gujarat	400 kV	Line	M/C	120		Planned	2027-28
68	Amreli (PS) - Saurashtra (Ghela Somnath) 400 kV D/C line	Gujarat	400 kV	Line	D/C	150		Planned	2027-28
69	LILO of both circuits of CGPL - Bhuj Pool 400 kV D/C line at Gadhsisa	Gujarat	400 kV	Line	M/C	200		Planned	2027-28
70	LILO of Kosamva - Vav 400 kV S/C line at South Gujarat (PS)	Gujarat	400 kV	Line	D/C	80		Planned	2027-28
71	Radhanesda-II – Zerda 400 kV D/C line	Gujarat	400 kV	Line	D/C	200		Planned	2027-28
72	Kutch (PS)-2 - Gadhsisa 220 kV D/C line	Gujarat	220 kV	Line	D/C	50		Planned	2027-28
73	Patan (PS) - Radhanesda-II 220 kV D/C line	Gujarat	220 kV	Line	D/C	40		Planned	2027-28
74	Radhanesda-II - Near Palanpur 765 kV D/C line	Gujarat	765 kV	Line	D/C	480		Planned	2028-29
75	Near Palanpur - Near Vadodara 765 kV D/C line	Gujarat	765 kV	Line	D/C	520		Planned	2028-29
76	400 kV D/C Near Vadodara - Balethi line	Gujarat	400 kV	Line	D/C	220		Planned	2028-29
77	Bharuch (PS) - Saykha 400 kV D/C line	Gujarat	400 kV	Line	D/C	200		Planned	2028-29
78	Saykha - South Olpad 765 kV D/C line	Gujarat	765 kV	Line	D/C	200		Planned	2028-29
79	LILO of both circuits of Charanka - Zerda (Kansari) 400 kV D/C line at Banaskantha PS	Gujarat	400 kV	Line	M/C	80		Planned	2031-32

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
80	Kutch (PS)-2 – Hajipur 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2028-29
81	Botad (PS) - Pachchham (Fedra) 400 kV D/C line	Gujarat	400 kV	Line	D/C	200		Planned	2029-30
82	LILO of both circuits of Kasor – Rajgarh 400 kV D/C line at Dahod (PS)	Gujarat	400 kV	Line	M/C	200		Planned	2029-30
83	Dahod (PS) - Zalod 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2029-30
84	Surendranagar (PS) - Bagodara PS (765kV Ss) 400 kV D/C line	Gujarat	400 kV	Line	D/C	200		Planned	2029-30
85	Bagodara PS - Near Vadodara line	Gujarat	765 kV	Line	D/C	400		Planned	2029-30
86	Botad (PS) - Botad (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2029-30
87	Panchmahal (PS) - Dahod (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	140		Planned	2029-30
88	Surendranagar (PS)-2 - Surendranagar (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	100		Planned	2029-30
89	Jamnagar (PS) - Morbi 765 kV D/C line	Gujarat	765 kV	Line	D/C	400		Planned	2030-31
90	Jamnagar (PS) - Saurashtra 765 kV D/C line	Gujarat	765 kV	Line	D/C	340		Planned	2030-31
91	Near Vadodara (PS) - Near Surat PS 765 kV D/C line	Gujarat	765 kV	Line	D/C	400		Planned	2030-31
92	LILO of both circuits of Ukai - Nana Pondha 400 kV D/C line at Near Surat (PS)	Gujarat	400 kV	Line	M/C	160		Planned	2030-31
93	Dwraka PS - Jamnagar (PS) 400 kV D/C line	Gujarat	400 kV	Line	D/C	300		Planned	2030-31
94	Hajipir - Bhuj-II (ISTS) 400 kV D/C line	Gujarat	400 kV	Line	D/C	100		Planned	2030-31
95	Dahod (PS) - Dahod (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	100		Planned	2030-31
96	Dwarka (PS) - Dwarka (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	100		Planned	2030-31
97	Banaskantha (PS) - Veloda 220 kV D/C line	Gujarat	220 kV	Line	D/C	70		Planned	2030-31

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
98	Amreli (PS) - Bagodara PS 765 kV D/C line	Gujarat	765 kV	Line	D/C	500		Planned	2031-32
99	Bhavnagar PS - Amreli (PS) (765kV SS) 400 kV D/C line	Gujarat	400 kV	Line	D/C	200		Planned	2031-32
100	Jamnagar PS - Jamnagar (PS) (765kV SS) 400 kV D/C line	Gujarat	400 kV	Line	D/C	160		Planned	2031-32
101	Bhavnagar (PS)-2 - Bhavnagar (PS) (400 kV) 220 kV D/C line	Gujarat	220 kV	Line	D/C	80		Planned	2031-32
102	Bharuch (PS)-2 - Bharuch (PS) (400kV SS) 220 kV D/C line	Gujarat	220 kV	Line	D/C	100		Planned	2031-32
103	Pipavav - Bagasara 220 kV D/c line	Gujarat	220 kV	Line	D/c	150		Planned	2031-32
104	Ukai TPS (Unit-7 switchyard) – Near Surat Pooling Station 400 kV D/C line with Twin AL-59 conductor	Gujarat	400 kV	Line	D/c	100		Planned	2031-32
105	400 kV D/C Near Surat Pooling Station – Vav line with Quad conductor	Gujarat	400 kV	Line	D/c	50		Planned	2031-32
	Madhya Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	Laxmani(Alirajpur) 400/220/132 kV S/s (New) with 2x500MVA, 400/220kV, 2x200MVA 220/132kV, +1x50MVA , 132/33kV X-mer & 1x125 MVAR 400kV rated bus reactor.	MP	400/220/132 kV	S/s			1450	Planned	2028-29
2	Installation of Addl 500MVA 400/220kV Transformer (3rd) at 400kV S/s Ujjain.	MP	400/220 kV	S/s			500	Planned	2028-29
3	Sandla(Meghnagar) 220/132 kV S/s (New) with 2x160/200 MVA ICTs	MP	220/132 kV	S/s			320	Planned	2028-29
4	Sheopur Kalan 220/132KV Ss, Additional X-mer 1x160 MVA X-mer (3rd)	MP	220/132 kV	S/s			160	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
5	Indore(NZ) 220/132 kV Ss, Augmentatio of 2x160MVA X-mer by 2x200MVA X-mer	MP	220/132 kV	S/s			80	Planned	2028-29
6	Chhanera 220/132 kV Ss, Additional X-mer 1x160 MVA X-mer (3rd)	MP	220/132 kV	S/s			160	Planned	2028-29
7	Datiya 220/132 kV Ss, Additional X-mer 1x160 MVA X-mer (3rd)	MP	220/132 kV	S/s			160	Planned	2028-29
8	Nagda 220/132 kV Ss, Augmentatio of 160MVA (II) X-mer by 200MVA X-mer	MP	220/132 kV	S/s			40	Planned	2028-29
9	Sidhi 220/132 kV Ss, Additional X-mer 1x160 MVA X-mer (3rd)	MP	220/132 kV	S/s			160	Planned	2028-29
10	Sabalgarh 220/132 kV Ss, Additional X-mer 1x160 MVA X-mer (3rd)	MP	220/132 kV	S/s			160	Planned	2028-29
11	Installation of 1x500MVA, 400/220kV ICT at new Genarating Switchyard of MPPGCL at Sarni. Further, power from upcoming 660MW unit will be evacuated through existing interconnections at 400kV level.	MP	400/220 kV	S/s			500	Planned	2031-32
12	Establishment of 3x500 MVA, 400/220 kV Rewa Sagra substation	MP	400/220 kV	S/s			1500	Planned	2027-28
13	Establishment of 2x500 MVA, 400/220 kV Amar Patan substation	MP	400/220 kV	S/s			1000	Planned	2027-28
(B)	**Transmission Lines**								
1	LILO of one ckt of 400 kV lines from Sardar Sarovar 400kV S/s - Rajgarh(PGCIL) 400kV S/s at New Laxmani(Alirajpur) 400/220/132 kV S/s	MP	400 kV	Line	D/c	10		Planned	2028-29
2	LILO of both circuit of Narsinghpur - Jabalpur (MP) 220kV D/c line at Jabalpur Pool (PGCIL)	MP	220 kV	Line	D/c	22		Planned	2027-28
3	220 kV D/C line from Badnawar 400kV S/s to Sandla(Meghnagar) 220kV S/s	MP	220 kV	Line	D/c	140		Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	220 kV D/C line from Rajgarh220 kV S/s to Laxmani (Alirajpur) 400 kV S/s	MP	220 kV	Line	D/c	110		Planned	2028-29
5	LILO of both circuit of Julwaniya - Kukshi 220kV DCDS line at 400 kV S/s Laxmani(Alirajpur)	MP	220 kV	Line	D/c	100		Planned	2028-29
6	LILO of one ckt of Birsinghpur – Katni 400kV D/c line at ATPS New Switchyard	MP	400 kV	Line	D/c	147		Planned	2031-32
7	Charging of 2nd ckt of Katni – Damoh 400kV D/c line (presently charged at 220kV level) on 400kV level	MP	400 kV	Line	D/c	0		Planned	2031-32
8	LILO of both circuits of ATPS-Shahdol-Sidhi 220kV line at Amarkantak (Anuppur) 220kV S/s	MP	220 kV	Line	D/c	120		Planned	2031-32
9	Mahan- Rewa Sagra 400 kV D/c line	MP	400 kV	Line	D/c	300		Planned	2027-28
10	Rewa Sagra- Amar Patan 400 kV D/c line	MP	400 kV	Line	D/c	120		Planned	2027-28
11	Rewa Sagra- Rewa 220 kV D/c line	MP	220 kV	Line	D/c	20		Planned	2027-28
12	Rewa Sagra- Kotar 220 kV D/c line	MP	220 kV	Line	D/c	90		Planned	2027-28
13	LILO of Rewa –Sirmour 220 kV S/c line at Rewa Sagra	MP	220 kV	Line	D/c	30		Planned	2027-28
14	Amar Patan – Satna PG 220 kV D/c line	MP	220 kV	Line	D/c	100		Planned	2027-28
15	Amar Patan – Maihar 220 kV D/c line	MP	220 kV	Line	D/c	60		Planned	2027-28
	Chhattisgarh								
(A)	**New sub-stations / ICT augmentation**								
1	Ambikapur	Chhattisgarh	400/220 KV	S/s			1320	Planned	2028-29
2	Pithora	Chhattisgarh	400/220 KV	S/s			1320	Planned	2028-29
3	220/132 KV S/s Murethi/ Parastarai (Distt.-Raipur) (GIS) Upgradable to 400 KV/220kv/132kv	Chhattisgarh	220/132 KV	S/s			320	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	Installation of additional 1x500 MVA, 400/220 KV ICT at 400 KV S/s of existing Korba West TPP	Chhattisgarh	400/220 kV	S/s			500	Planned	2030-31
(B)	**Transmission Lines**	Chhattisgarh							
1	LILO of 400 kV Korba (W) - Madwa/ 400 kV DCDS TM line from Madwa PH	Chhattisgarh	400 kV	Line	D/C	400		Planned	2028-29
2	LILO of 220 kV Churri-Vishrampur Ckt.- I	Chhattisgarh	220 KV	Line	D/C	80		Planned	2028-29
3	400 KV LILO of both circuit Raipur (PGCIL) - JPL 400 kV DCDS line at proposed 400/220 KV S/s Pithora	Chhattisgarh	400 kV	Line	D/C	260		Planned	2030-31
4	220 kV DCDS Pithora - Saraipali line	Chhattisgarh	220 KV	Line	D/C	102		Planned	2028-29
5	220 kV DCDS Pithora- Paraswani line	Chhattisgarh	220 KV	Line	D/C	130		Planned	2028-29
6	220 kV DCDS Raita-Murethi/Parastarai line	Chhattisgarh	220 KV	Line	D/C	30		Planned	2028-29
7	LILO of 220 kV Bhilai - Bhatapara line at proposed 220 kV s/s Murethi/ Prasatari.	Chhattisgarh	220 KV	Line	D/C	20		Planned	2028-29
8	Construction of 400 kV D/C line from 2x660 MW (400 kV S/s) to 400/200 kV S/s Dhardehi (Bilaspur) substation of CSPTCL	Chhattisgarh	400 kV	Line	D/C	180		Planned	2028-29
9	LILO of existing 400 kV D/C Korba West - Khedamara & Korba West - Madwa line at 400 KV S/s of new proposed 2x660 MW plant	Chhattisgarh	400 kV	Line	D/C	8		Planned	2028-29
	KARNATAKA								
(A)	**Sub-station**								
1	Navalgund 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2027-28
2	Tekkalkote 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2027-28
3	Holalkere 220 kV S/s	Karnataka	220/66 kV	S/s			200	Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
4	Chiduva limits 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2028-29
5	Chadchan 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2027-28
6	A-station (Indiranagara) 400 kV S/s	Karnataka	400/220 kV	S/s			1000	Planned	2028-29
7	Deodurga 220 kV S/s	Karnataka	220/110 kV	S/s			100	Planned	2027-28
8	Divagi (Manki) 220 kV S/s	Karnataka	220/110 kV	S/s			200	Planned	2028-29
(B)	**Lines**							Planned	
1	Replacement of Drake conductor by HPC of Bidnal –Harthi, 220 kV D/c line	Karnataka	220 kV	Line	D/c	46		Planned	2027-28
2	Replacement of Drake conductor by HPC of SRS Hubli- Bidanal, 220 kV D/c line	Karnataka	220 kV	Line	D/c	3.9		Planned	2027-28
3	Hootaglli -T.K Halli, 220 kV D/c line (S/c to D/c)	Karnataka	220 kV	Line	D/c	71		Planned	2027-28
	Other sub-stations like CN Halli (765 kV), Yalwar (765 kV) S/s along with associated lines are under planning by KPTCL								
	KERALA								
(A)	**Sub-station**								
1	Edamon 400 kV S/s	Kerala	400/220 kV	S/s			1000	Planned	2027-28
(B)	**Lines**								
1	Charging of Tirunelveli - Edmon D/c line to its rated voltage 400 kV presentaly charged at 220 kV	Kerala	400 kV	S/s				Planned	2027-28
2	LILO of one circuit of Tirunelveli - Cochin 400 kV D/c line at Edmon	Kerala	400 kV	S/s	D/c	20		Planned	2027-28
	TAMIL NADU								
(A)	**Sub-station**								
1	Coimbatore 765 kV S/s	Tamil Nadu	765/400 kV	S/s			3000	Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(B)	**Lines**								
1	Ariyalur - Coiambatore, 765 kV D/c line	Tamil Nadu	765 KV	Line	D/c	650		Under implementation	2027-28
2	Coimbatore - Edayarpalayam 400 kV D/c line	Tamil Nadu	400 kV	Line	D/c	94		Planned	2027-28
3	LILO of both ckts of Rasipalayam - Palavady 400 kV D/c line at Coimbatore S/s	Tamil Nadu	400 kV	Line	2xD/c	120		Planned	2027-28
	ANDHRA PRADESH								
(A)	**Sub-station**								
1	Sarubujili 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2028-29
2	Goppili 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2028-29
3	Bheemili 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2028-29
4	Kavali 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2031-32
5	TB.Vara 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2029-30
6	Narsapuram 220 kV S/s	Andhra Pradesh	220/132 KV	S/s				Planned	2027-28
7	Koyalagudem 220 kV S/s	Andhra Pradesh	220/33 KV	S/s			100	Planned	2028-29
8	Upgradation of 132 kV SS Nakkavanipalem 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2027-28
9	Upgradation of 132 kV Narsipatnam S/s to 220/132 kV	Andhra Pradesh	220/132 KV	S/s			320	Planned	2027-28
10	Satyavedu 220/33 kV S/s	Andhra Pradesh	220/132 kV	S/s			100	Planned	2027-28
11	Palasa 400 kV S/s	Andhra Pradesh	400/220 KV	S/s			1000	Planned	2028-29
12	Tirupati 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
13	SriKalahasti 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			320	Planned	2028-29
14	Aspiri 400 kV S/s	Andhra Pradesh	400/220/132	S/s			1320	Planned	2028-29
15	Maddikera 400 kV S/s	Andhra Pradesh	400 kV	SWS				Planned	2028-29
16	Nandikotkur 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2029-30
17	Srikakulam 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2029-30
18	Proddatur 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2029-30
19	Nagarjuna University 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2029-30
20	Banaganapalli 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2029-30
21	Gunadala Extn 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2029-30
22	Sakhamuru 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			240	Planned	2029-30
23	Atmakur (KNL) 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2030-31
24	Guntakal 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2030-31
25	Autonagar/NSTL 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2030-31
26	Gurramkonda 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2030-31
27	Sambepalli 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2030-31
28	Mandadam 220 kV S/s	Andhra Pradesh	220/33 kV	S/s			240	Planned	2030-31
29	Palakonda 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2030-31

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
30	Bapatla 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			200	Planned	2030-31
31	Srikalahasti 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2031-32
32	Nowluru 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			240	Planned	2031-32
33	Kuragallu 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			240	Planned	2031-32
34	Kavali 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2031-32
35	Giddalur 220 kV S/s	Andhra Pradesh	220/132 kV	S/s			300	Planned	2031-32
36	Venkatapalem	Andhra Pradesh	220/132 kV	S/s			240	Planned	2031-32
37	Vizag - 2 400 kV S/s	Andhra Pradesh	400 kV	S/s			1000	Planned	2029-30
38	Gangavaram port	Andhra Pradesh	400 kV	S/s			1000	Planned	2030-31
39	GVK Bus extension for 400 kV S/s	Andhra Pradesh	400 kV	S/s			1000	Planned	2030-31
40	Rayadurgam 400 kV S/s	Andhra Pradesh	400 kV	S/s			1000	Planned	2031-32
(B)	**Lines**								
1	220KV Dairy Farm - Nakkavanipalem SS	Andhra Pradesh	220 kV	Line	D/c	6.4		Planned	2027-28
2	LILO of both circuits of Maradam-Pendurthy at Vijayanagram and Bheemili	Andhra Pradesh	220 kV	Line	D/c	80		Planned	2028-29
3	Goppili - Tekkali 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	60		Planned	2028-29
4	Goppili -Sarubujili 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	130		Planned	2028-29
5	220kV DC line from 220kV SS Vizianagaram to Proposed 220kV SS T.B Vara in Vizianagaram District	Andhra Pradesh	220 kV	Line	D/c	67		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
6	Uppersileru- Kakinada SEZ 400 kV D/c line	Andhra Pradesh	400 kV	Line	D/c	320		Planned	2027-28
7	Koyalagudem-Guddigudem 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	30		Planned	2028-29
8	Narsapuram (Rustumbada)-Bhimavaram (Undi) 220 kV D/c line	Andhra Pradesh	220 kV	Line	D/c	60		Planned	2027-28
9	LILO of 220kV Upper Sileru-Pendurthy Line at Narsipatnam	Andhra Pradesh	220 kV	Line	D/c	2		Planned	2027-28
10	LILO of 220kV Srisailam-Podili Line at 220kV SS,Markapur	Andhra Pradesh	220 kV	Line	D/c	28		Planned	2027-28
11	LILO of 220 kV Prathipadu (Guntur)-Ongole S/C Line at 220KV SS Parchur	Andhra Pradesh	220 kV	Line	S/c	8		Planned	2027-28
12	LILO line 220 kV Sullurpur-Gummidipundi S/C line at the proposed Satyavedu SS	Andhra Pradesh	220 kV	Line	S/c	4		Planned	2027-28
13	220 kV Garividi - Tekkali SS line to the proposed 220/132/33 kV Sarubujjili SS.	Andhra Pradesh	220 kV	Line	S/c	30		Planned	2028-29
14	220 kV D/c Line from proposed 220/132/33 kV Sarubujili SS -400/220 KV Maradam	Andhra Pradesh	220 kV	Line	D/c	140		Planned	2028-29
15	LILO of both circuits of Vizianagaram-Pendurthy at Bheemili	Andhra Pradesh	220 kV	Line	D/c	88		Planned	2028-29
16	220KV DC Line from 400KV SS Rachagunneri to the proposed 220 kV SS at Tirupati	Andhra Pradesh	220 kV	Line	D/c	80		Planned	2028-29
17	220 kV DC line from 400 kV SS Rachagunneru to Proposed 220 kV SS Srikalahasti	Andhra Pradesh	220 kV	Line	D/c	40		Planned	2028-29
18	Single LILO of 400 kV Uravakonada-Veltoor QMDC line at the proposed 400KV SS, Maddikera.	Andhra Pradesh	400 kV	Line	S/c	2		Planned	2028-29
19	220kV DC line from 400 kV SS Nannur to Proposed 220kV SS Nandukotkur in Kurnool District	Andhra Pradesh	220 kV	Line	D/c	60		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
20	220 kV DC line from 220 kV SS Paydibhimavarm to Proposed 220 kV SS Srikakulam in Srikakulam District	Andhra Pradesh	220 kV	Line	D/c	65		Planned	2029-30
21	220kV DC line from 400kV SS Talamanchipatnam to Proposed 220kV SS Proddatur in Y.S.R Kadapa District	Andhra Pradesh	220 kV	Line	D/c	92		Planned	2029-30
22	220kV DC line from 220 kV SS Guntur to proposed 220 kV SS Nagarjuna University in Guntur District	Andhra Pradesh	220 kV	Line	D/c	28		Planned	2029-30
23	Panyam (Gani) 400 kV SS To proposed Banaganapalli 220 kV SS	Andhra Pradesh	220 kV	Line	D/c	82		Planned	2029-30
24	Gunadala 220 kV SS To proposed Gunadala Extn 220 kV	Andhra Pradesh	220 kV	Line	D/c	20		Planned	2029-30
25	220kV DC line from proposed 400/220 kV SS Tallayapalem to proposed 220/33 kV SS Sakhamuru	Andhra Pradesh	220 kV	Line	D/c	34		Planned	2029-30
26	220kV DC line from 220kV SS Nandyala to Proposed 220kV SS Atmakur in Kurnool District	Andhra Pradesh	220 kV	Line	D/c	100		Planned	2030-31
27	220kV DC line from 400kV SS Uravakonda to Proposed 220kV SS Guntakal in Anantapur District	Andhra Pradesh	220 kV	Line	D/c	70		Planned	2030-31
28	220kV DC line from 400kV SS Kalpaka to Proposed 220kV SS Autonagar (NSTL) in Visakhapatnam District	Andhra Pradesh	220 kV	Line	D/c	50		Planned	2030-31
29	220kV DC line from 400kV SS Kalikiri to Proposed 220kV SS Gurramkonda Chittoor District	Andhra Pradesh	220 kV	Line	D/c	90		Planned	2030-31
30	220kV DC line from 400kV Kalikiri to proposed 220kV SS Sambepalli	Andhra Pradesh	220 kV	Line	D/c	80		Planned	2030-31
31	220kV DC from proposed 400/220 kV SS Tallayapalem to proposed 220/33kV SS Mandadam	Andhra Pradesh	220 kV	Line	D/c	12		Planned	2030-31
32	Chilakaluripeta 400 kV SS To proposed Bapatla SS	Andhra Pradesh	220 kV	Line	D/c	160		Planned	2030-31

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
33	Bobbili to proposed Palakonda SS	Andhra Pradesh	220 kV	Line	D/c	146		Planned	2030-31
34	220kV DC line from 400kV SS Rachagunneru to Proposed 220kV SS Srikalahasti in Chittoor District	Andhra Pradesh	220 kV	Line	D/c	30		Planned	2031-32
35	220kV DC from proposed 220 kV SS Mandadam to proposed 220/33 kV SS Nowluru	Andhra Pradesh	220 kV	Line	D/c	14		Planned	2031-32
36	220kV DC Line from proposed220/33 kV SS Nowlur to proposed 220/33 kV SS Kuragallu	Andhra Pradesh	220 kV	Line	D/c	7		Planned	2031-32
37	220kV DC line from 400kV SS Maradam to Proposed 220kV SS Palakonda in Srikakulam District	Andhra Pradesh	220 kV	Line	D/c	79		Planned	2031-32
38	220kV DC line from 220kV SS Porumamilla to Proposed 220kV SS Giddalur in Prakasam District	Andhra Pradesh	220 kV	Line	D/c	120		Planned	2031-32
39	220kV DC from proposed 400/220 kV SS Tallayapalem to proposed 220/33 kV SS Venkatapalem	Andhra Pradesh	220 kV	Line	D/c	6		Planned	2031-32
40	LILO of 220KV Kundukur -220 KV Racharla Padu at 220 KV Kavali SS	Andhra Pradesh	220 kV	Line	S/c	10		Planned	2031-32
41	LILO of 400kV Maradam - Kalpaka QMDC Line to Vizag - 2 SS	Andhra Pradesh	400 kV	Line	D/c	40		Planned	2029-30
42	400 KV line from Kalpaka to 400 KV Gangavaram Port	Andhra Pradesh	400 kV	Line	D/c	32		Planned	2030-31
43	400 KV line from Rayadurgam to 400 KV Uravakonda	Andhra Pradesh	400 kV	Line	D/c	102		Planned	2031-32
	Odisha								
(A)	**New sub-stations / ICT augmentation**								
1	Neulapoi 400/220/33kV S/s	Odisha	400/220 kV	S/s			1000	Planned	2028-29
2	Kolabira 765/400 kV S/s	Odisha	765/400 kV	S/s			3000	Planned	2028-29
3	Duburi 765/400 kV S/s	Odisha	765/400 kV	S/s			3000	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
(B)	**Transmission Line**								
1	Kolabira-Jharsuguda (B) 765 kV D/c line	Odisha	765 kV	Line	D/c	25		Planned	2028-29
2	Kolabira-Duburi 765 kV D/c line	Odisha	765 kV	Line	D/c	400		Planned	2028-29
3	LILO of both circuits of Angul - Paradeep 765 kV D/c line at Duburi	Odisha	765 kV	Line	D/c	280		Planned	2028-29
	Duburi (765) - Duburi 400 kV D/c line	Odisha	400 kV	Line	D/c	20		Planned	2028-29
4	Kolabira-Shyam steel 400 kV D/c line	Odisha	400 kV	Line	D/c	70		Planned	2028-29
5	Kolabira-OPGC (5 & 6)400 kV D/c line	Odisha	400 kV	Line	D/c	80		Planned	2028-29
6	Angul-Jharsuguda D/c LILO at NLC	Odisha	765 kV	Line	D/c	300		Planned	2028-29
7	NLC-Lapanga 400 kV D/c line	Odisha	400 kV	Line	D/c	10		Planned	2028-29
8	TTPS -Meramundali (B) 400 kV D/c line	Odisha	400 kV	Line	D/c	40		Planned	2028-29
9	TTPS - Pandiabili 400 kV D/c line	Odisha	400 kV	Line	D/c	240		Planned	2028-29
10	LILO of both ckt of 400kV Meramundali-B to Duburi New DC line at Neulapoi	Odisha	400 kV	Line	D/c	80		Planned	2028-29
11	LILO of both ckt of 400kV Meramundali-A to Mendhasal DC line at Neulapoi	Odisha	400 kV	Line	D/c	80		Planned	2028-29
	West Bengal								
(A)	**New sub-stations / ICT augmentation**								
1	Sarbari 220/132/33	West Bengal	220/132 kV	S/s			320	Planned	2027-28
2	BTPS (Bandel) 220 kV GIS	West Bengal	220/132 kV	S/s			320	Planned	2027-28
3	Farakka 220 kV GIS	West Bengal	220/132 kV	S/s			320	Planned	2028-29
4	NT Silicon Hub GIS 132 Upg. To 220KV	West Bengal	220/132 kV	S/s			320	Planned	2028-29
5	Lalbagh GIS 220	West Bengal	220/132 kV	S/s			320	Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
6	C.K.Road 220 kV S/s	West Bengal	220/132 kV	S/s			320	Planned	2028-29
7	Deganga 220 kV S/s	West Bengal	220/132 kV	S/s			320	Planned	2028-29
8	Jagadishpur 220 kV S/s	West Bengal	220/132 kV	S/s			320	Planned	2028-29
9	N. Lakshmikantapur 400 kV S/s	West Bengal	400/220 kV	S/s			630	Planned	2027-28
10	New PPSP 400 kV S/s (132 kV System addition)	West Bengal	400/132 kV	S/s			200	Planned	2027-28
(B)	**Transmission Line**								
1	LILO of one circuit of 400 kV Subhasgram(PG)-Jeerat D/C at N. Laksmikantapur	West Bengal	400 kV	Line	S/c	90		Planned	2027-28
2	D/c LILO of Asansol (poposed Kuilapur)-STPS at Sarbari	West Bengal	220 kV	Line	D/c	12		Planned	2027-28
3	S/c LILO of 220KV Rishra-Dharampur S/C at proposed BTPS 220KV SS	West Bengal	220 kV	Line	S/c	10		Planned	2027-28
4	Proposed Ashokenagar to Deganga D/C	West Bengal	220 kV	Line	D/c	10		Planned	2028-29
5	New Town-IIC -Silicon Valley 220KV D/C (UG Cable)	West Bengal	220 kV	Line	D/c	6		Planned	2028-29
6	Sagardighi-Lalbag 220KV D/C	West Bengal	220 kV	Line	D/c	50		Planned	2028-29
7	220KV D/C from Farakka TPS to proposed Farakka 220KV SS	West Bengal	220 kV	Line	D/c	6		Planned	2028-29
8	Haldia Energy Ltd.-N. Laxmikantapur 400 kV D/c line	West Bengal	400 kV	Line	D/c	100.00		Planned	2027-28
9	N. Laxmikantapur-Subhasgram (PG) 400 kV D/c line	West Bengal	400 kV	Line	D/c	80.00		Planned	2027-28
10	N. Chanditala-Jagadishpur 220 kV D/c line	West Bengal	220 kV	Line	D/c	40		Planned	2028-29
11	Jeerat-Deganga 220 kV D/c line	West Bengal	220 kV	Line	D/c	52		Planned	2028-29
12	Arambag-CK Road 220 kV D/c line	West Bengal	220 kV	Line	D/c	110		Planned	2028-29
13	Purulia (DVC)-Budwan 220 kV D/c line	West Bengal	220 kV	Line	D/c	204			
14	CK Road-Midnapur 220 kV D/c line	West Bengal	220 kV	Line	D/c	134		Planned	2028-29

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
	DVC								
(A)	**New sub-stations / ICT augmentation**								
1	Ramkanali (B)400/220/132 kV S/s	West Bengal	400/220/132 kV	S/s			1000	Planned	2027-28
2	Gola (B)) 400/220/132 kV S/s	Jharkhand	400/220/132 KV	S/s			1000	Planned	2027-28
3	Ramgarh(B) 220/33 kV S/s	Jharkhand	220/33 kV	S/s			320	Planned	2027-28
4	panagarh 220/33 kV S/s at	West Bengal	220/33 kV	S/s			160	Planned	2027-28
(B)	**Transmission Line**								
1	LILO of 400 kV D/c DSTPS-RTPS Line.(Twin Moose) at Ramkanali (B)	West Bengal	400 kV	Line		38.00		Planned	2027-28
2	LILO of 220 kV S/c MTPS A- Gola B(Proposed) Line (Original 220 kV MTPS Ranchi Line) at Ramkanali (B)	Jharkhand, West Bengal	220 kV	Line		56		Planned	2027-28
3	LILO of 220 kV S/c MTPS A- Gola B(Proposed) Line (Original 220 kV MTPS – Ramgarh Line) at Ramkanali (B)	Jharkhand, West Bengal	220 kV	Line		56		Planned	2027-28
4	LILO of 132 kV D/c Ramkanali-CTPS A Line with HTLS at Ramkanali (B)	Jharkhand, West Bengal	132 kV	Line		58		Planned	2027-28
5	LILO of 400 kV D/c Quad Moose RTPS Ranchi (PG) Line at Gola (B))	Jharkhand, West Bengal	400 kV	Line		82.00		Planned	2027-28
6	LILO of 220 kV S/c Ramgarh 2B (Proposed) Ranchi Line (Presently Ramgarh – Ranchi Line) at Gola (B))	Jharkhand	220 kV	Line		16		Planned	2027-28
7	LILO of 220 kV S/c Ramkanali B (Proposed) Ramgarh 2B Line (Presently MTPS- Ramgarh Line) at Gola (B))	Jharkhand, West Bengal	220 kV	Line		16		Planned	2027-28

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
8	LILO of 220 KV S/c Ranchi-Ramkanali_B (Proposed) Line (Presently Ranchi MTPS Line) at Gola (B))	Jharkhand, West Bengal	220 kV	Line		16		Planned	2027-28
9	LILO of 132 kV D/c Gola-CTPS A Line at Gola-B	Jharkhand	132 kV	Line		20		Planned	2027-28
10	220 kV D/c LILO of Ramgarh – Gola B at Ramgarh(B)	Jharkhand	220 kV	Line		100		Planned	2027-28
11	LILO of 220 kV S/c Burdwan – Parulia Line at Panagarh	West Bengal	220 kV	Line		225		Planned	2027-28
	Assam								
(A)	**New sub-stations / ICT augmentation**								
1	Diphu (New), 220/132kV 2x160 MVA S/s	Assam	220/132 kV	S/s			320	Planned	2029-30
2	Barnagar , 220/132 kV, 2x200 MVA S/s	Assam	220/132 kV	S/s			400	Planned	2029-30
3	Digboi 220/132kV, 2x160 MVA S/s	Assam	220/132 kV	S/s			320	Planned	2029-30
4	Jonai, 132/33kV, 2x80 MV S/s	Assam	132/33 kV	S/s			160	Planned	2029-30
5	Ghilamora 132/33kV 2x80 MVA S/s	Assam	132/33 kV	S/s			160	Planned	2029-30
6	Bartari 132/33 kV, 2 x50 MVA	Assam	132/33 kV	S/s			160	Planned	2029-30
7	Tikrikilla 132/33 kV, 2 X 50 MVA S/s	Assam	132/33 kV	S/s			100	Planned	2029-30
8	Modertoli (Kampur) 132/33 kV , 2 X 50 MVA S/s	Assam	132/33 kV	S/s			100	Planned	2029-30
9	Ishabheel, 132/33kV 2x80 MVA S/s	Assam	132/33 kV	S/s			160	Planned	2029-30
10	New Dhaligaon, 220/132/33 kV	Assma	220/132/33	S/s			520	Planned	2029-30
(B)	**Transmission Lines**								
1	New Mariani (PGCIL-existing)- Diphu (AEGCL-New) 220kV D/c Line (Single zebra)	Assam	220 kV	Line	D/c	310		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
2	Sankardevnagar (AEGCL-New)-Diphu (AEGCL-New) 220kV D/c Line (Single zebra)	Assam	220 kV	Line	D/c	162		Planned	2029-30
3	Diphu - Bokajan 132kV D/c (Single panther)	Assam	132 kV	Line	D/c	90		Planned	2029-30
4	Barnagar (ISTS)- Barnagar (New) 220kV D/c Line Twin Moose	Assam	220 kV	Line	D/c	60		Planned	2029-30
5	Barnagar (AEGCL-New) - Barnagar (Existing) 132kV D/c line (Twin Moose)	Assam	132 kV	Line	D/c	1		Planned	2029-30
6	Tinsukia-Digboi (New) 220 kV D/c Line (Single zebra)	Assam	220 kV	Line	D/c	70		Planned	2029-30
7	Silapathar-Dhemaji 2nd Ckt Stringing (Single Panther)	Assam	132 kV	Line	S/c	72		Planned	2029-30
8	Silapathar-Jonai 132kV D/c line (Single Panther)	Assam	132 kV	Line	D/c	150		Planned	2029-30
9	North Lakhimpur to Gogamukh 132kV D/c with one circuit LILO at Ghilamora (Single Panther)	Assam	132 kV	Line	D/c	80		Planned	2029-30
10	Majuli-Ghilamora 132kV S/c line on D/c tower (Single panther)	Assam	132 kV	Line	D/c	120		Planned	2029-30
11	Gogamukh-Dhemaji 132kV D/c line (Single Moose)	Assam	132 kV	Line	D/c	60		Planned	2029-30
12	Barnagar (New)-Bartari 132kV D/c Line (Single panther)	Assam	132 kV	Line	D/c	70		Planned	2029-30
13	2nd Circuit stringing of Agia-Hatsingimari 132kV S/c on D/c (Single panther)	Assam	132 kV	Line	S/c	110		Planned	2029-30
14	LILO of Agia-Hatsingimari D/c line at Tikrikilla (Single panther)	Assam	132 kV	Line	D/c	30		Planned	2029-30
15	LILO of both circuits of Samaguri - Sankardevanagr 132kV D/c Line at Modertoli (Kampur) (Single panther)	Assam	132 kV	Line	D/c	30		Planned	2029-30
16	LILO of both circuits of 132kV Karimganj - Kumarghat D/c Line at (HTLS)	Assam	132 kV	Line	D/c	30		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
17	LILO of Rangia- Salakati 220 kV S/c line at New Dhaligaon	Assam	220 kV	Line	D/c	16		Planned	2029-30
18	New Dhaligaon - Dhaligaon 132 kV D/c line	Assam	132 kV	Line	D/c	1		Planned	2029-30
	Arunachal Pradesh								
(A)	**New sub-stations / ICT augmentation**								
1	Kimin (Papum Pare) 132/33kV, 2x10 MVA S/s	Arunachal Pradesh	132/33 kV	S/s			20	Planned	2029-30
2	Raga, (Kamle) 132/33kV,2x10MVA S/s	Arunachal Pradesh	132/33 kV	S/s			20	Planned	2029-30
3	Tato (Shi Yomi), 132/33 kV, 2x10 MVA S/s	Arunachal Pradesh	132/33 kV	S/s			20	Planned	2029-30
(B)	**Transmission Lines**								
1	LILO of Yupia - Gerukamukh 132 kV D/c line at Kimin S/s	Arunachal Pradesh	132 kV	Line	D/c	15		Planned	2029-30
2	LILO of Ziro-Daporijo 132 kV S/c line at Raga (Kamle)(HTLS 1000A)	Arunachal Pradesh	132 kV	Line	D/c	13		Planned	2029-30
3	LILO of Kambang- Mechuka 132 kV S/c line at Tato (Shi Yomi).	Arunachal Pradesh	132 kV	Line	D/c	5		Planned	2029-30
4	Likabali-Basar 132kV S/c line	Arunachal Pradesh	132 kV	Line	S/c	80		Planned	2029-30
5	2nd Circuit stringing of Gerukamukh-Likabali 132kV line	Arunachal Pradesh	132 kV	Line	S/c	60		Planned	2029-30
6	2nd Circuit stringing of Likabali-Niglok 132kV line	Arunachal Pradesh	132 kV	Line	S/c	25.6		Planned	2029-30
7	2nd Circuit stringing of Niglok-Pasighat 132kV line	Arunachal Pradesh	132 kV	Line	S/c	9.3		Planned	2029-30
	Manipur								
(A)	**New sub-stations / ICT augmentation**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	Awang Potsangbam 132/33 kV, 2x 50 MVA S/s	Manipur	132/33 kV	S/s			100	Planned	2029-30
2	Namrei 132/33 kV 2x25 MVA S/s	Manipur	132/33 kV	S/s			50	Planned	2029-30
(B)	**Transmission Lines**								
1	Tamenglong-Karong 132 kV S/c line	Manipur	132 kV	Line	S/c	70		Planned	2029-30
2	Rengpang-Khoupum 132 kV S/c line	Manipur	132 kV	Line	S/c	10		Planned	2029-30
3	Hundung-Kamjong 132 kV S/c line	Manipur	132 kV	Line	S/c	55		Planned	2029-30
4	Karong –Maram 132 kV S/c line	Manipur	132 kV	Line	S/c	4		Planned	2029-30
5	LILO of Yurembam-Yaingangpokpi 132 kV D/c line at Awang Potsangbam	Manipur	132 kV	Line	D/c	10		Planned	2029-30
6	Hundung to Namrei 132kV D/c line	Manipur	132 kV	Line	D/c	10		Planned	2029-30
	Nagaland								
(A)	**New sub-stations / ICT augmentation**								
1	Mon 132/33 kV, 2x25MVA S/s	Nagaland	132/33 kV	S/s			50	Planned	2029-30
2	Tuli 132/33 kV, 2x50MVA S/s	Nagaland	132/33 kV	S/s			100	Planned	2029-30
3	Naginimora 132/33kV, 2x10MVA S/s	Nagaland	132/33 kV	S/s			20	Planned	2029-30
4	Tizit 132/33kV, 2x10MVA S/s	Nagaland	132/33 kV	S/s			20	Planned	2029-30
5	Niuland 132/33 kV, 2x25MVA S/s	Nagaland	132/33 kV	S/s			50	Planned	2029-30
6	Champang 132/33kV, 2x10MVA S/s	Nagaland	132/33 kV	S/s			20	Planned	2029-30
7	Old TPS 7^{th} Mile Dimapur 132/33 kV, 2x50MVA S/s	Nagaland	132/33 kV	S/s			100	Planned	2029-30
(B)	**Transmission Lines**								
1	Longleng to Mon 132kV S/c Line on D/C tower	Nagaland	132 kV	Line	D/c	44		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
2	Mokokchung PG SS to Tuli132kV D/c line	Nagaland	132 kV	Line	D/c	112		Planned	2029-30
3	Tuli to Naginimora 132kV S/c line on D/c tower.	Nagaland	132 kV	Line	S/c	34		Planned	2029-30
4	Longleng to Tuli 132kV S/c line on D/c tower	Nagaland	132 kV	Line	S/c	50		Planned	2029-30
5	Naginimora to Tizit 132kV S/c line on D/c tower	Nagaland	132 kV	Line	S/c	44		Planned	2029-30
6	Tizit to Mon 132kV S/c line on D/c tower	Nagaland	132 kV	Line	S/c	30		Planned	2029-30
7	Zhadima to Niuland 132kV D/c line (Zebra conductor)	Nagaland	132 kV	Line	D/c	54		Planned	2029-30
8	Niuland – Champhang 132kV S/c line	Nagaland	132 kV	Line	S/c	50		Planned	2029-30
9	Niuland to Champang 132kV S/c line on D/c tower	Nagaland	132 kV	Line	S/c	25		Planned	2029-30
10	Champang to Longnak 132kV S/c line on D/c tower	Nagaland	132 kV	Line	S/c	64		Planned	2029-30
11	Tsitrongse to Old TPS 7th Mile Dimapur132kV D/c line	Nagaland	132 kV	Line	D/c	26		Planned	2029-30
	Meghalaya								
(A)	**New sub-stations / ICT augmentation**								
1	Pongtung 132/33 kV S/s	Meghalaya	132/33 kV	S/s			50	Planned	2027-28
2	Nongpoh 132/33 kV S/s	Meghalaya	132/33 kV	S/s			50	Planned	2027-28
3	Baghmara 132/33 kV S/s	Meghalaya	132/33 kV	S/s			50	Planned	2027-28
4	Killing 132/33 kV S/s	Meghalaya	132/33 kV	S/s			40	Planned	2027-28
5	Mawkhanu 132/33 kV S/s	Meghalaya	132/33 kV	S/s			50	Planned	2027-28
(B)	**Transmission Lines**								

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
1	MLHEP II-New Shillong 220 kV D/C line	Meghalaya	220 kV	Line	D/c	160		Planned	2029-30
2	Sohra-Pongtung 132 kV D/c line	Meghalaya	132 kV	Line	D/c	60		Planned	2027-28
3	LILO of Umiam Stage-III P/S - Umtru P/S 132 kV D/c line at Nongpoh	Meghalaya	132 kV	Line	D/c	20		Planned	2027-28
4	Killing-Killing (New) 132 KV D/c line	Meghalaya	132 kV	Line	D/c	10		Planned	2029-30
5	New Shillong-Mawkhanu D/C line	Meghalaya	220 kV	Line	D/c	40		Planned	2029-30
6	Nangalbibra-Baghmara 132 kV D/c line	Meghalaya	132 kV	Line	D/c	120		Planned	2027-28
(A)	**New sub-stations / ICT augmentation**								
1	Badharghat GIS S/S, 132/33 kV, 2x80 MVA S/s	Tripura	132/33 kV	S/s			160	Planned	2029-30
2	Ompi AIS S/s, 132/33 kV, 2x25 MVA S/s	Tripura	132/33 kV	S/s			50	Planned	2029-30
3	Jatanbari S/s, 132/33 kV, 2x25 MVA S/s	Tripura	132/33 kV	S/s			50	Planned	2029-30
4	Boxanagar S/s, 132/33 kV 2x25 MVA S/s	Tripura	132/33 kV	S/s			50	Planned	2029-30
5	Aralia GIS S/s, 132/33 kV 2x80 MVA S/s	Tripura	132/33 kV	S/s			160	Planned	2029-30
(B)	**Transmission Lines**								
1	LILO of both circuit of 79 Tilla Grid-Rokhia 132 kV D/c line at Badharghat (HTLS)	Tripura	132 kV	Line	D/c	10		Planned	2029-30
2	Surajmaninagar (ISTS) – Badharghat 132kV D/c line	Tripura	132 kV	Line	D/c	30		Planned	2029-30
3	Gamaitilla - Ompi (ACSR Panther) 132 kV S/c on D/c line with associated bays	Tripura	132 kV	Line	S/c	22		Planned	2029-30
4	Ompi - Amarpur (ACSR Panther) 132 kV S/c on D/c line with associated bays	Tripura	132 kV	Line	S/c	21		Planned	2029-30
5	Amarpur - Jatanbari (ACSR Panther) 132 kV D/c line with associated bays	Tripura	132 kV	Line	D/c	40		Planned	2029-30

Sl. No.	Scheme /details	State	Voltage (kV)	Type of Work	No. of circuits	ckm	MVA	Status (Commissioned/Under Construction/ Planned)	Date of Commissioning/ Anticipated date of Commissioning)
6	LILO of both circuit of Rokhia–Rabindranagar 132 kV D/c line at Boxanagar (ACSR Panther)	Tripura	132 kV	Line	D/c	30		Planned	2029-30
7	Palatana - Udaipur 132 kV 2nd S/c line (HTLS) with associated bays	Tripura	132 kV	Line	S/c	12		Planned	2029-30
8	LILO of 2nd circuit of Surajmaninagar (TSECL)-Bodhjungnagar 132 kV D/c line with HTLS at Surajmaninagar (ISTS) 400/132 kV S/s	Tripura	132 kV	Line	D/c	14		Planned	2029-30
9	LILO of both circuit of 79 Tilla Grid – Surjamaninagar 132 kV D/c line (HTLS) at Aralia	Tripura	132 kV	Line	D/c	8		Planned	2029-30

Note: Some states have planned only sub-stations and associated transmission lines are being planned.

Transmission system associated with Thermal Power Projects planned during 2027-32

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
1	Singrauli STPP-III	Central	NTPC	1600 (2x800)	Uttar Pradesh	Pit Head	(i)LILO of both circuits of (Vindhyachal Stage-IV to Vindhyachal Stage-V 400 kV D/C line at Singrauli Stage-III (ii) Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/c line (formed after above proposed LILO) with HTLS onductor (iii) Singrauli-III–Rihand-III 400 kV D/c line
2	Meja-II	Central	NTPC-UP-JV	2400 (3x800)	Uttar Pradesh	Non Pithead	(i)Establishment of 2x1500 MVA +2x 500 MVA 765/400/220 kV Shahjahanpur / Hardoi/Sitapur substation (ii) Meja II-Shahjahanpur/Hardoi/Sitapur 765 kV S/c line (iii) Shahjahanpur/Hardoi/Sitapur- Aurai /Robertsganj 765 kV S/c line (iv) Shahjahanpur/Hardoi/Sitapur- Raebareilly 765 kV D/c line
3	Obra Extn	Central	NTPC-UP-JV	1600 (2x800)	Uttar Pradesh	Non Pit Head	(i) Establishment of 2x1500 MVA, 765/400 kV Obra D substation (ii) Establishment of 2x1500 MVA, 765/400 kV Anpara E substation (iii) Establishment of 2x1500 MVA +2x 500 MVA 765/400/220 kV Amethi/ Pratapgarh / Sultanpur substation (iv)Obra D- Anpara E 765 kV S/c line (v) Anpara E- Paratpgarh/Sultanpur 765 kV S/c line (v) Obra D- Pratapgarh/Sultanpur 765 kV S/c line (vi) Paratpgarh/Sultanpur – Rampur 765 kV S/c line (vii) Paratpgarh/Sultanpur (765 kV)- Raibareilly 400 kV D/c line (viii)Obra D- Mirzapur 400 kV D/c line (ix) Ghazipur-Obra D 400 kV D/c line
4	Anpara E	Central	NTPC-UP-JV	1600 (2x800)	Uttar Pradesh	Pit Head	

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
5	Chhabra #7	State	RRVUNL	660 (1x660)	Rajasthan	Non Pithead	**Common System for Chhabra U-7&8 (2x660 MW) and Kalisindh (1x800 MW)** (i) Establishment of 3x1500 MVA, 765/400 kV Substation at Anta (New Location) with 240 MVAR(765 kV) and 125MVAR (420 kV) Bus Reactors. (ii) Establishment of 2x1500 MVA, 765/400 kV (GIS) Substation at Hindaun by upgrading the existing 400 kV GSS Hindaun to 765 kV GSS with 240 MVAR, 765 kV Bus Reactor. (iii) Establishment of 3x1500 MVA + 2x500 MVA, 765/400/220 kV Sustation at Ajarka (Alwar) (New Location) with 240 MVAR (765 kV) and 125 MVAR (420 kV) Bus Reactors. (iv) Supercritical Chhabra TPP (Unit#7&8)-Anta (New Location) 400 kV D/c line using Twin HTLS conductor. (v) Kalisindh TPP (Unit#3)-Anta (New Location) 400 kV D/c line using Twin HTLS conductor (vi) Anta (New) - Anta (Existing) 765 kV D/c line (vii) Anta (New) - Hindaun 765 kV D/c line, 2x240 MVAR, 765 kV switchable line reactors in both circuit at each end (viii) Ajarka (Alwar)-Hindaun 765 kV D/c line with 240 MVAR switchable line reactors on each circuit at Hindaun end (ix) LILO of one circuit of PGCIL's 765 kV D/c Sikar-Aligarh line at proposed 765 kV GSS Ajarka (Alwar) with 240 MVAR switchable line reactors on each circuit at Alwar end. (x) Ajarka (Alwar)-Alwar (400 kV GSS) 400 kV D/c line
6	Yamuna Nagar TPP U#3	State	HPGCL	800 (1x800)	Haryana	Non Pithead	(i) Creation of 3x500 + 2x100 MVA, 400/220/33 kV substation at Munak (ii) LILO of one ckt of Kaithal - Bagpat 400 kV D/c line at Munak (iii) DCRTPP Yamunanagar - Munak 400 kV D/c line
	Sub-total (NR)			**8660**			
1	Sipat-III	Central	NTPC	800 (1x800)	Chhattisgarh	Pit Head	Augmentation of 765/400 kV ICT (by 1500 MVA) at Sipat Switchyard

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
2	Super Critical TPP, Korba (W)	State	CSPGCL	1320 (2x660)	Chhattisgarh	Pit Head	•Installation of additional 1x500 MVA, 400/220 kV ICT at 400 kV S/s of existing Korba West TPP •400 kV D/C line from 2x660 MW (400 kV S/s) to 400/200 kV S/s Dhardehi (Bilaspur) substation of CSPTCL •LILO of existing 400 kV D/C Korba West - Khedamara & Korba West - Madwa line at 400 kV S/s of new proposed 2x660 MW TPP
3	Amarkantak TPS	State	MPPGCL	660 (1x660)	Madhya Pradesh	Non Pithead	(i) LILO of one ckt of Birsinghpur – Katni 400 kV line at ATPS New Switchyard. (ii) Charging of 2nd ckt of Katni – Damoh 400 kV D/c line (presently charged at 220 kV level) at 400 kV level. (iii) LILO of both circuits of ATPS-Shahdol-Sidhi 220kV line at Amarkantak (Anuppur) 220 kV S/s.
4	Satpura TPP (Sarni)	State	MPPGCL	660 (1x660)	Madhya Pradesh	Non Pithead	Installation of 1x500 MVA, 400/220 kV ICT at new Genarating Switchyard of MPPGCL at Sarni. Further, power from upcoming 660 MW unit will be evacuated through existing interconnections at 400 kV level.
5	Koradi Replacement TPP	State	MAHAGENCO	1320 (2x660)	Maharashtra	Non Pithead	Power to be evacuated with existing transmission system
6	Chandrapur TPP	State	MAHAGENCO	660 (1x660)	Maharashtra	Non Pithead	Power to be evacuated with existing transmission system
7	Ukai TPP	State	GSECL	1320 (2x660)	Gujarat	Non Pithead	•400 kV D/C Ukai TPS (Unit-7 switchyard) – Near Surat Pooling Station line with Twin AL-59 conductor (2 x 50 km) •400 kV D/C Near Surat Pooling Station – Vav line with Quad conductor
8	Godna TPS	State	KPCL	1600 (2x800)	Chhattisgarh	Pit Head	•Establishment of Champa-II S/s with two 765 kV sections •Champa-II(Sec-I)-Rajnandgaon 765 kV D/c line; Rajnandgaon-Warora 2nd 765 kV D/c line. •LILO of Dhamjaygarh - Jharsuguda 765 kV D/c line at Champa-II (Sec-II) Power from Godna TPS can be evacuated from Section-I of Champa-II PS.
9	SKS Power Binjkote	Private	under NCLT	600 (2x300)	Chhattisgarh	Non Pithead	• Champa PS (Existing) with 765/400 kV ICT Augmentation at Champa PS (if required)

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
10	Lanco Amarkantak U3 & 4	Private		1320 (2x660)	Madhya Pradesh		•Establishment of Champa-II S/s with two 765 kV sections •Champa-II(Sec-I)-Rajnandgaon 765 kV D/c line; Rajnandgaon-Warora 2nd 765 kV D/c line. • LILO of Dhamjaygarh-Jharsuguda 765 kV D/c line at Champa-II (Sec-II) Power from Lanco TPS can be evacuated from Section-II of Champa-II PS.
11	Raipur Extn.	Private	Adani	1600 (2x800)	Chhattisgarh	Pit Head	Raipur PS (Existing) with 765/400kV ICT Augmentation at Raipur PS
12	Raigarh Extn.	Private	Adani	1600 (2x800)	Chhattisgarh	Pit Head	•Establishment of Champa-II with two 765 kV sections •Champa-II(Sec-I)-Rajnandgaon 765 kV D/c line; Rajnandgaon-Warora 2nd 765 kV D/c line. • LILO of Dhamjaygarh-Jharsuguda 765 kV D/c line at Champa-II (Sec-II) Power from Raigarh Extn TPS can be evacuated from Section-I of Champa-II PS.
13	Akaltara	Private	under NCLT	1800	Chhattisgarh	Pit Head	•Establishment of Champa-II with two 765 kV sections •Champa-II (Sec-I)-Rajnandgaon 765 kV D/c line; Rajnandgaon-Warora 2nd 765 kV D/c line. • LILO of Dhamjaygarh-Jharsuguda 765 kV D/c line at Champa-II (Sec-II) Power from Akaltara TPS can be evacuated from Section-II of Champa-II PS.
14	Athena	Private	Vedanta	1200	Chhattisgarh	Non Pithead	Athena – Raigarh (PG) 400 kV D/c line using existing Raigarh(Kotra) - Raigarh PG 400 kV D/c line
15	Gadarwara Stage II	Central	NTPC	1600	Madhya Pradesh	Non Pit Head	•Gadarwara Stage II - Nagpur 765 kV D/c line
16	Lara STPP Stage-II	Central	NTPC	1600	Chhattisgarh	Pit Head	Reconductoring of Lara- Raigarh Pool 400 kV D/c line
17	Mahan USTPP,St-II (Unit-2)	State	Adani	800	Madhya Pradesh	Pit Head	Under Intra-state
	Sub-total (WR)			**20460**			

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
1	TPS-II 2nd Expansion	Central	NLCIL	1320	Tamil Nadu	Pit Head	• Re-storing of Neyveli TS-II / Neyveli TS-I Expn – Trichy 400 kV D/c line through suitable arrangement of bypassing the LILOs at Nagapattinam and utilization of LILO sections for making Neyveli TPS-II 2nd Expn – Nagapattinam 400 kV, 2xD/c lines along with the line bays at generation switchyard • 2x125 MVAr bus reactors at generation switchyard (NLC TPS-II 2nd Expn)
2	Singrani U#3	State	SCCL	800	Telangana	Non Pithead	• 400 kV QMDC line from Singareni TPP switchyard to 400kV Sundilla LI SS (existing). • 400 kV QMDC line from Singareni TPP switchyard, Jaipur to 400 kV Annaram LI SS (under execution) • 400 kV QMDC line from Singareni TPP switchyard, Jaipur to 400 kV Kachapur Switching Station (under execution)
3	Thamninapatnam (Meenaxi)	Private	Vedanta	700	Andhra Pradesh	Non Pit Head	Power to be evacuated through existing system
	Sub-total (SR)			**2820**			
1	Darlipalli-II	Central	NTPC	800	Odisha	Pit Head	Power to be evacuated through existing system
2	NLC Talabira STPS	Central	NLCIL	2400 (3x800)	Odisha	Pit Head	LILO of both circuits of Angul – Sundargarh (Jharsuguda) 765 kV 2xS/c lines at NLC-Talabira generation switchyard
3	NLC Talabira STPS Ext	Central	NLCIL	800 (1x800)	Odisha	Pit Head	
3	Raghunathpur TPS, PH-II	Central	DVC	1320 (2x660)	West Bengal	Non Pithead	LILO of 400 kV D/c DSTPS-RTPS Line.(Twin Moose) at Ramkanali (B) further through existing System
4	Durgapaur TPS	Central	DVC	800 (1x800)	West Bengal	Non Pithead	
5	Koderma TPS	Central	DVC	1600 (2x800)	Jharkhand	Non Pithead	Power to be evacuated through existing system
6	Buxar TPP-II	Central	SJVN	660 (1x660)	Bihar	Non Pithead	Power to be evacuated through existing system
7	New Nabi Nagar	Central	NTPC	2400 (3x800)	Bihar	Non Pit Head	New Nabinagar - Gaya 765 kV D/c line
8	Patratu Stage II	Central	NTPC	800 (1x800)	Jharkhand	Non Pit Head	Power to be evacuated through existing system

Sl. No.	Name of Thermal Power Project	Sector	Developer	Capacity (MW)	State	Pit Head/Non Pithead	Broad Transmission System
9	Mahanadi Basin Power	Central	MCL	1600 (2x800)	Odisha	Pit Head	Mahanadi Basin Power - Angul 765 kV D/c line
10	Ind Barath Utkal	Private	JSW Energy	350	Odisha	Pit Head	Power to be evacuated through existing system
11	Sundargarh	-	-	1600	Odisha	Pit Head	Sundargarh TPS - Jharsuguda 765 kV D/c line
12	Talcher TPP St-III (NTPC) (Unit-2)	Central	NTPC	660	Odisha	Pit Head	Power to be evacuated through existing system
	Sub-total (ER)			**15790**			
	Grand-total (MW)			**47730**			

Annex-8.5

Transmission system associated with Nuclear Power Projects planned during 2027-32

Nuclear Power Plant	State	Capacity (MW)	Commissioning Schedule	Broad Transmission System
Chutka U 1	MP	700	2031-32	Dedicated line to Jabalpur Pool
Gorakhpur U 1	Haryana	700	2028-29	(i) Gorakhpur (NPCIL) - Patran 400 kV D/c line (ii) Gorakhpur (NPCIL)- Narwana (HVPNL) / Fatehabad (proposed) 400 kV D/c line
Gorakhpur U 2	Haryana	700	2029-30	
Gorakhpur U 3	Haryana	700	2031-32	
Kaiga U 5	Karnataka	700	2029-30	• Re-conductoring of Kaiga – Narendra 400 D/c line with high capacity conductors • Re-conductoring of Kaiga – Guttur (Davangere) 400 kV D/c line with high capacity conductors
Kaiga U 6	Karnataka	700	2030-31	
Kudankulam U 5	TN	1000	2027-28	• Interconnection of KNPP U-3&4 and KNPP U-5&6 switchyards with 400 kV quad D/c line • Shifting of KNPP U-3&4 – Tuticorin-II GIS 400 kV (quad) D/c line to KNPP U-5&6 to form KNPP U-5&6 – Tuticorin-II GIS 400 kV (quad) D/c line and with provision of SLR at terminating bays of KNPP-5&6 • KNPP-5&6 – Virudhanagar (TN) 400 kV (quad) D/c line with 80 MVAR SLR in each circuit at KNPP U-5&6 end • Upgradation of Tuticorin PS to its rated voltage of 765 kV level along with 3x1500 MVA, 765/400 kV ICTs • Upgradation of Dharmapuri (Salem New) PS to its rated voltage of 765 kV level along with 3x1500 MVA, 765/400 kV ICTs • Upgradation of Tuticorin PS-Salem 765 kV D/c line to its rated voltage (presently charged at 400 kV) [upgradation work of Tuticorin PS and Salem S/S is considered with the transmission system of Green Hydrogen load at Tuticorin]
Kudankulam U 6	TN	1000	2027-28	
Mahi Banswara U 1	Rajasthan	700	2030-31	(i) Mahi Banswara- Mandsaur (765 kV) 400 kV D/c line (ii) Mahi Banswara- Nagda 400 kV D/c line
Mahi Banswara U 2	Rajasthan	700	2031-32	
Total (MW)		**7600**		

Annex-8.6

Inter-regional Transmission Links and Capacity (MW) likely by 2031-32			
	Inter-Regional transmission Capacity as on 31.03.2027 (MW)	**Addition likely during the period 2027-32 (MW)**	**Inter-Regional Transmission Capacity likely by the end of 2031-32 (31.03.2032) (MW)**
EAST-NORTH			
Dehri-Sahupuri 220 kV S/c line	130		130
Muzaffarpur-Gorakhpur 400 kV D/c line (with Series Cap+TCSC)	2000		2000
Patna – Balia 400 kV D/c (Quad) line	1600		1600
Biharshariff – Balia 400 kV D/c (Quad) line	1600		1600
Barh – Patna – Balia 400 kV D/c (Quad) line	1600		1600
Gaya – Balia 765 kV S/c line	2100		2100
Sasaram – Allahabad/Varanasi 400 kV D/c line (Sasaram HVDC back to back has been bypassed)	1000		1000
Sasaram - Fatehpur 765 kV S/c line	2100		2100
Barh-II-Gorakhpur 400 kV D/c (Quad) line	1600		1600
Gaya-Varanasi 765 kV 2xS/c line	4200		4200
Biharsharif-Varanasi 400 kV D/c (Quad) line	1600		1600
LILO of Biswanath Chariali - Agra +/- 800 kV, 3000 MW HVDC Bi-pole at new pooling station in Alipurduar and addition of second 3000 MW module	3000		3000
Bikaner-V – Begunia $\pm$ 800 kV, HVDC Bi-pole link		6000	6000
Sub-total	**22530**	**6000**	**28530**
EAST-WEST			
Raigarh-Budhipadar 220 kV S/c line	130		130
Budhipadar-Korba 220 kV 2xS/c line	260		260
Rourkela-Raipur 400 kV D/c line with series comp.+TCSC	1400		1400
Ranchi –Sipat 400 kV D/c line with series comp.	1200		1200
Rourkela-Raipur 400 kV D/c (2nd) line with series comp.	1400		1400
Ranchi - Dharamjayagarh - WR Pooiling Station 765 kV S/c line	2100		2100
Ranchi - Dharamjaygarh 765 kV 2nd S/c line	2100		2100
Jharsuguda-Dharamjaygarh 765 kV D/c line	4200		4200

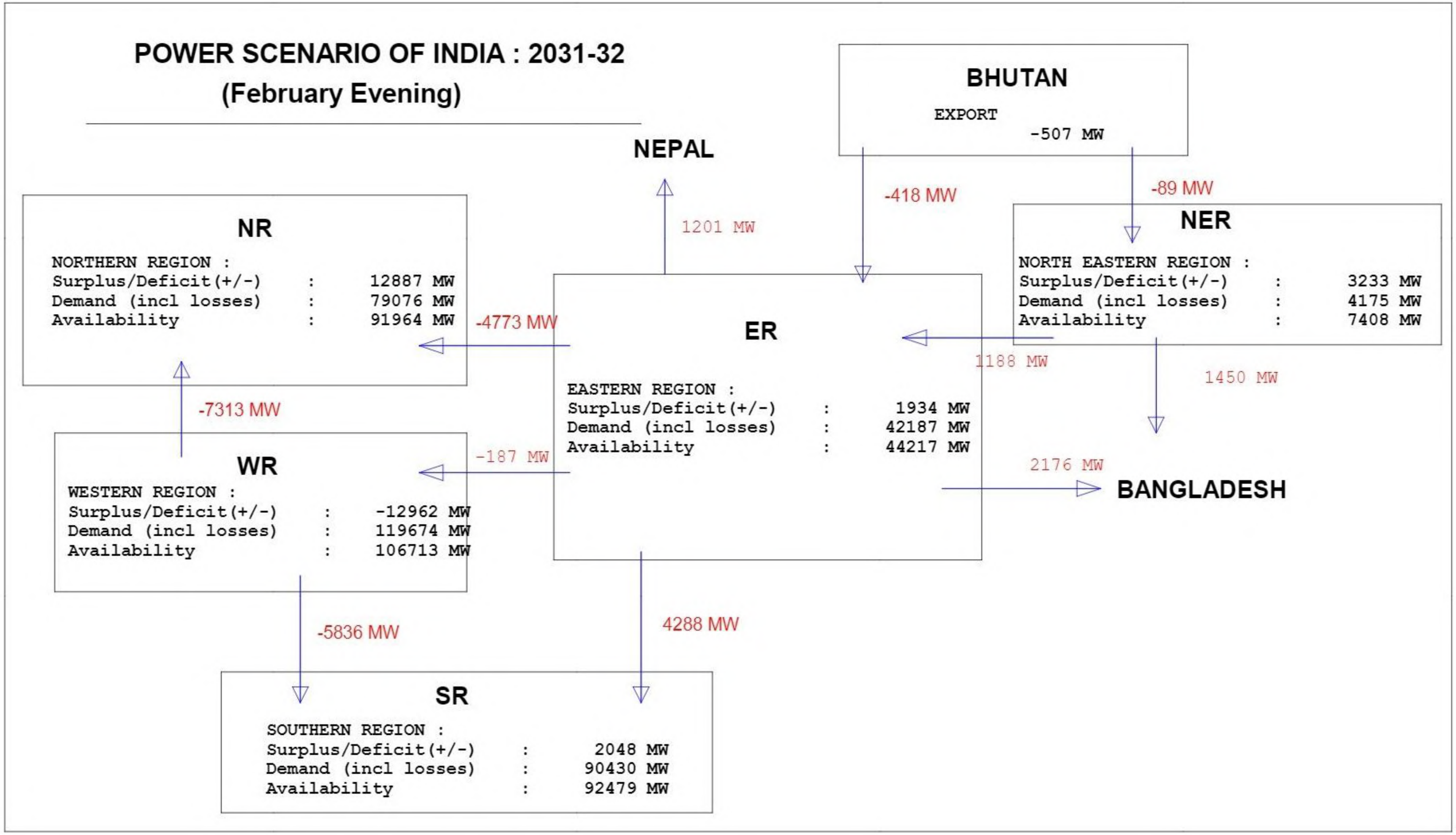
Inter-regional Transmission Links and Capacity (MW) likely by 2031-32			
	Inter-Regional transmission Capacity as on 31.03.2027 (MW)	**Addition likely during the period 2027-32 (MW)**	**Inter-Regional Transmission Capacity likely by the end of 2031-32 (31.03.2032) (MW)**
Jharsuguda-Dharamjaygarh 765 kV 2nd D/c line	4200		4200
Jharsuguda - Raipur Pool 765 kV D/c line	4200		4200
Jeypore-Jagdalpur 400 kV D/c line	1600		1600
Sub-total	**22790**		**22790**
WEST- NORTH			
Bhanpura-Ranpur 220 kV S/c line	130		130
Bhanpura-Modak 220 kV S/c line	130		130
Auriya (UP)-Malanpur 220 kV S/c line	130		130
Auriya (UP) – Bhind 220 kV S/c line	130		130
Vindhyachal HVDC back-to-back	500		500
Gwalior-Agra 765 kV 2 x S/c line	4200		4200
Zerda-Kankroli 400 kV D/c line	1000		1000
Gwalior-Jaipur 765 kV 2xS/c lines	4200		4200
Adani (Mundra) - Mahendranagar +/- 500 kV, HVDC Bi-pole	2500		2500
RAPP-Sujalpur 400 kV D/c line	1000		1000
Champa Pool- Kurukshetra +/- 800 kV, HVDC Bi-pole	6000		6000
Jabalpur - Orai 765 kV D/c line	4200		4200
LILO of Satna - Gwalior 765 kV S/c line at Orai	4200		4200
Banaskantha/Rishabhdeo-Chittorgarh 765 kV D/c line	4200		4200
Vindhyachal-Varanasi 765 kV D/c line	4200		4200
Neemuch PS – Chhittorgarh 400 kV D/c line	1600		1600
Beawar – Mandasaur 765 kV D/c line	4200		4200
Rishabhdeo – Mandasaur 765 kV D/c line	4200		4200
Sirohi - Mandasaur 765 kV D/c line	4200		4200
Sasan – Prayagraj 765 kV D/c line	4200		4200
Barmer-II – Kalamb ± 800 kV, HVDC Bi-pole link		6000	6000
Sub-total	**55120**	**6000**	**61120**
EAST- SOUTH			
Balimela-Upper Sileru 220 kV S/c line	130		130
Gazuwaka HVDC back-to-back	1000		1000
Talcher-Kolar HVDC bipole	2000		2000
Upgradation of Talcher-Kolar HVDC Bipole	500		500
Angul – Srikakulum 765 kV D/c line	4200		4200

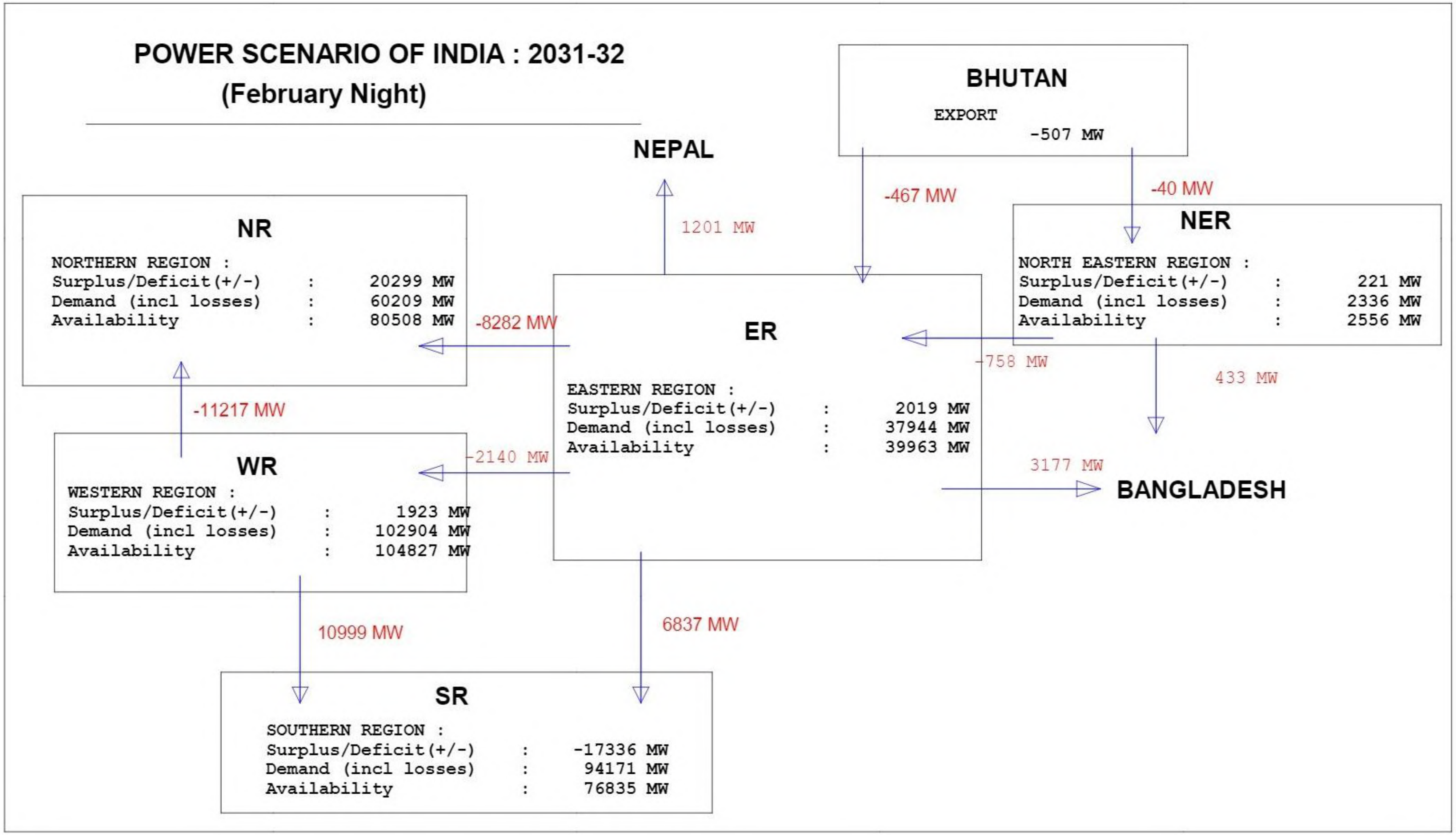
Inter-regional Transmission Links and Capacity (MW) likely by 2031-32			
	Inter-Regional transmission Capacity as on 31.03.2027 (MW)	**Addition likely during the period 2027-32 (MW)**	**Inter-Regional Transmission Capacity likely by the end of 2031-32 (31.03.2032) (MW)**
Angul – Srikakulum 765 kV D/c line (2nd)		4200	4200
Sub-total	**7830**	**4200**	**12030**
WEST- SOUTH			
Chandrapur HVDC back-to-back	1000		1000
Kolhaphur (Talandage)-Chikkodi 220 kV S/c line	130		130
Ponda-Ambewadi 220 kV S/c line	130		130
Xeldem-Ambewadi 220 kV S/c line	130		130
Kolhaphur(Mudshingi)-Chikkodi 220 kV S/c line	130		130
Raichur - Sholapur 765 kV S/c line (PG)	2100		2100
Raichur - Sholapur 765 kV S/c line (Pvt. Sector)	2100		2100
Narendra - Kolhapur 765 kV D/c (ch at 400 kV) line	2200		2200
Wardha - Nizamabad 765 kV D/c line	4200		4200
Warora Pool - Warangal (New) 765 kV D/c line	4200		4200
Raigarh-Pugulur +/- 800 kV, HVDC Bi-pole	6000		6000
LILO of Narendra-Narendra (New) 400 kV (quad) line at Xeldam (Goa)	1600		1600
Narendra – Pune 765 kV D/c line	4200		4200
Parli-Bidar 765 kV line		4200	4200
Jagdalpur - Vizag-II 765 kV D/c line		4200	4200
Sub-total	**28120**	**8400**	**36520**
EAST- NORTH EAST			
Birpara - Salakati 220 kV D/c line	350		350
Siliguri - Bongaigaon 400 kV D/c line	1600		1600
Alipurduar - Bongaigaon 400 kV D/c (Quad) line	1600		1600
Sub-total	**3550**		**3550**
NORTH EAST-NORTH			
Biswanath Chariali - Agra +/- 800 kV, HVDC Bi-pole	3000		3000
Sub-total	**3000**		**3000**
TOTAL	**142,940**	**24,600**	**167,540**

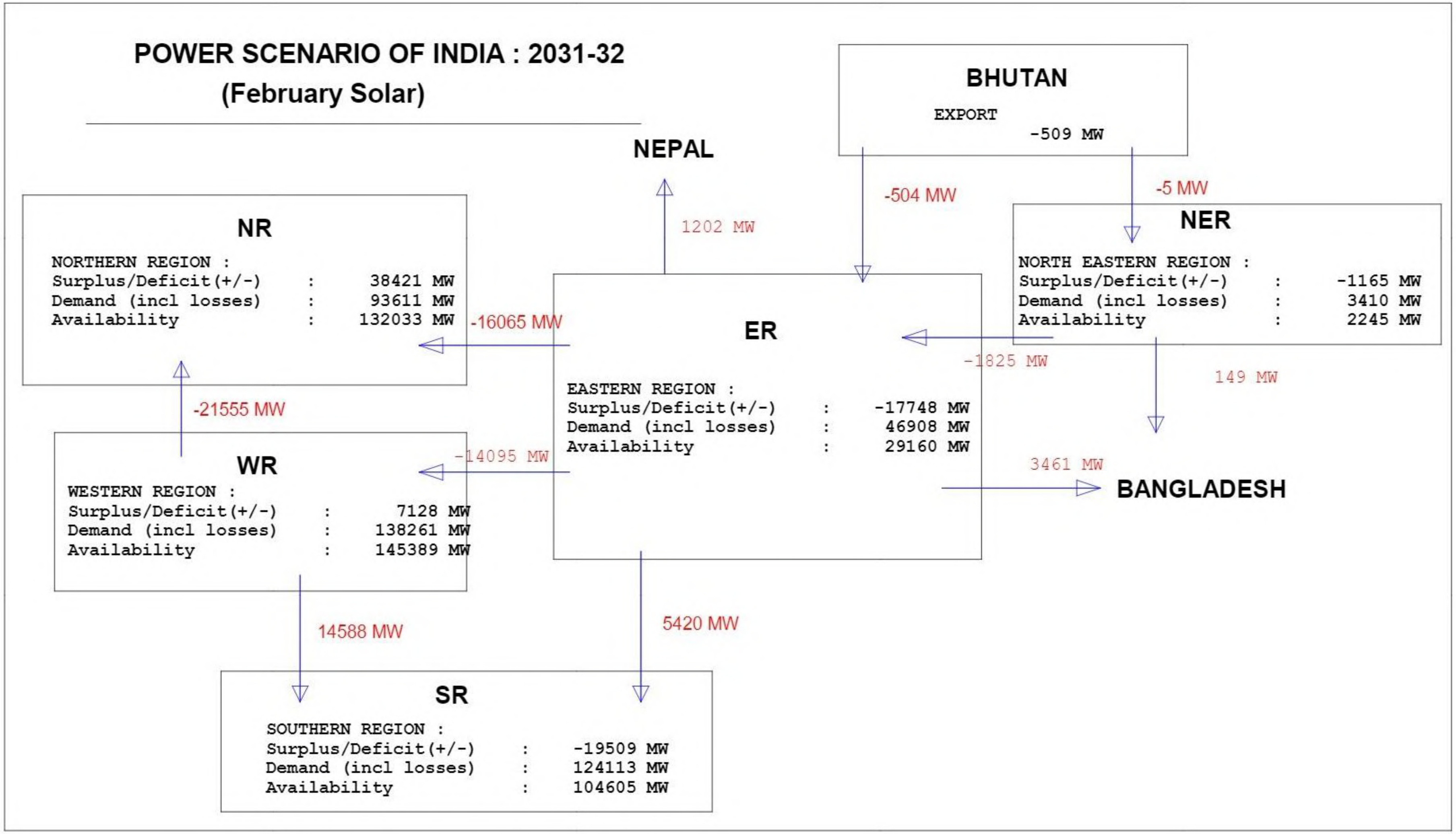
Note: For the HVDC transmission schemes planned during 2027-32 (other than under bidding and under construction HVDC schemes), the technology (LCC or VSC), voltage level, take-off/ landing points etc. would be further reviewed depending upon the connectivity applications from RE generation developers, growth in electricity demand etc.

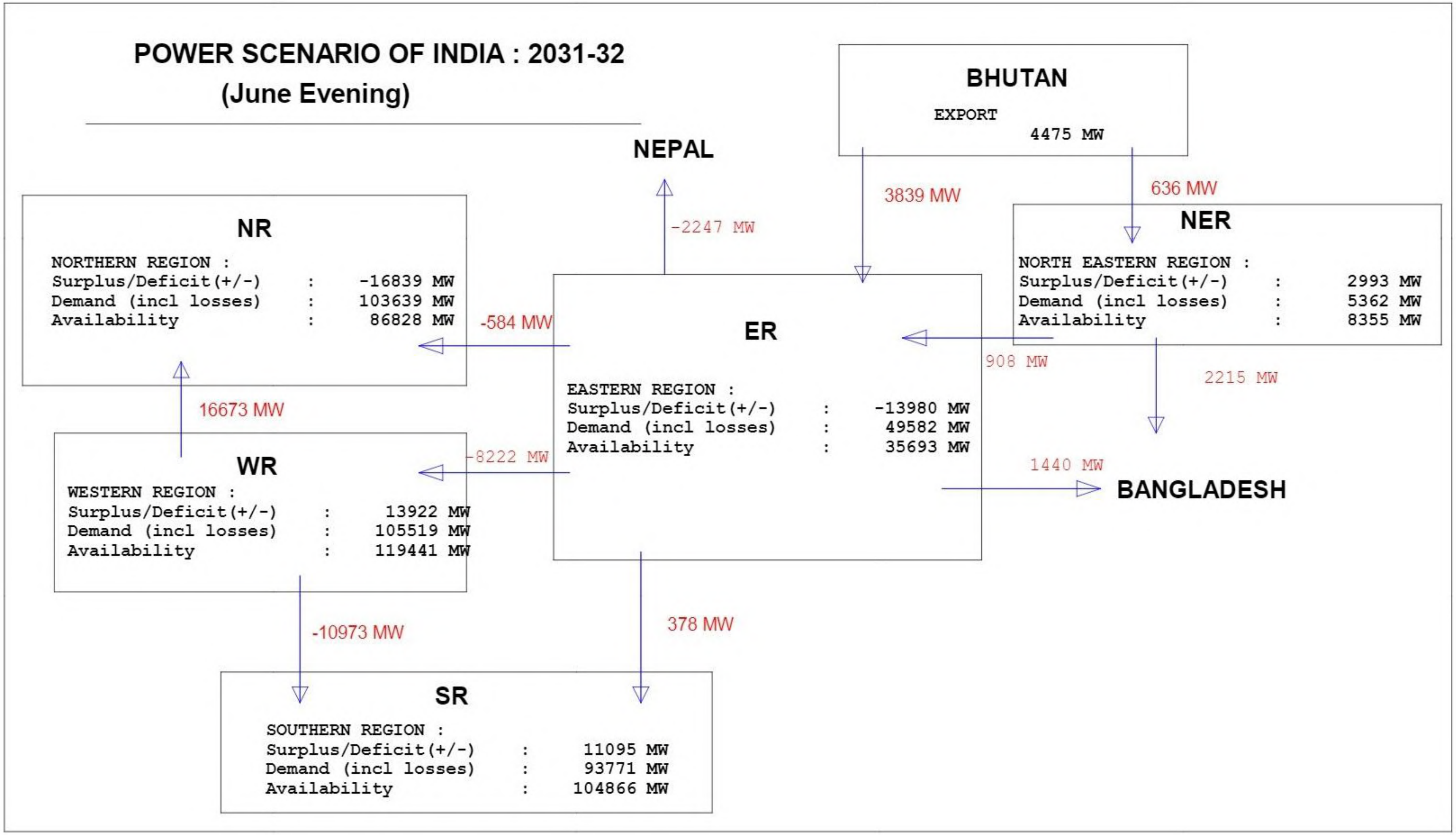
Inter-regional power flow in different scenarios in 2031-32

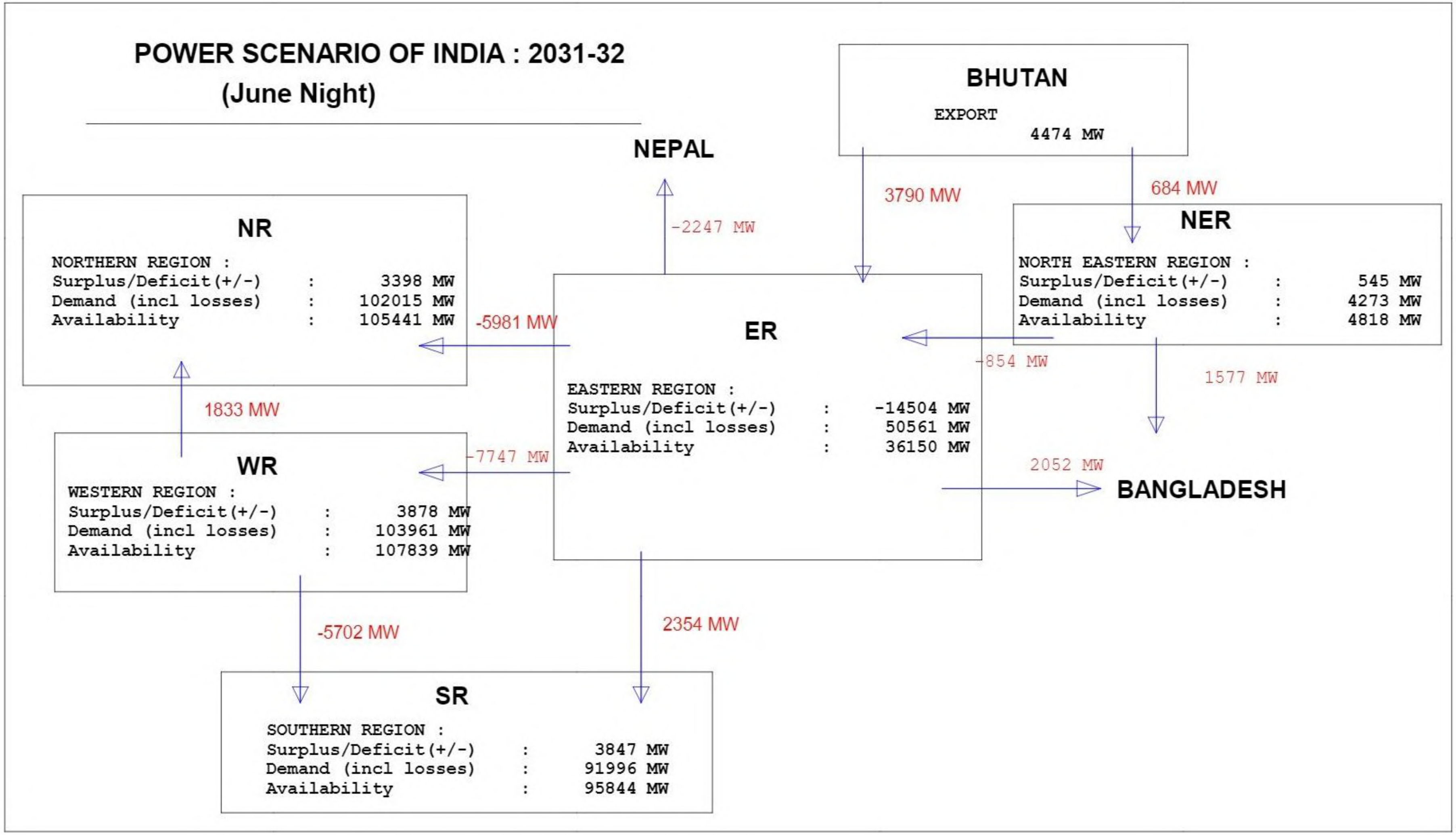
February Evening **ANNEX: 8.7a**

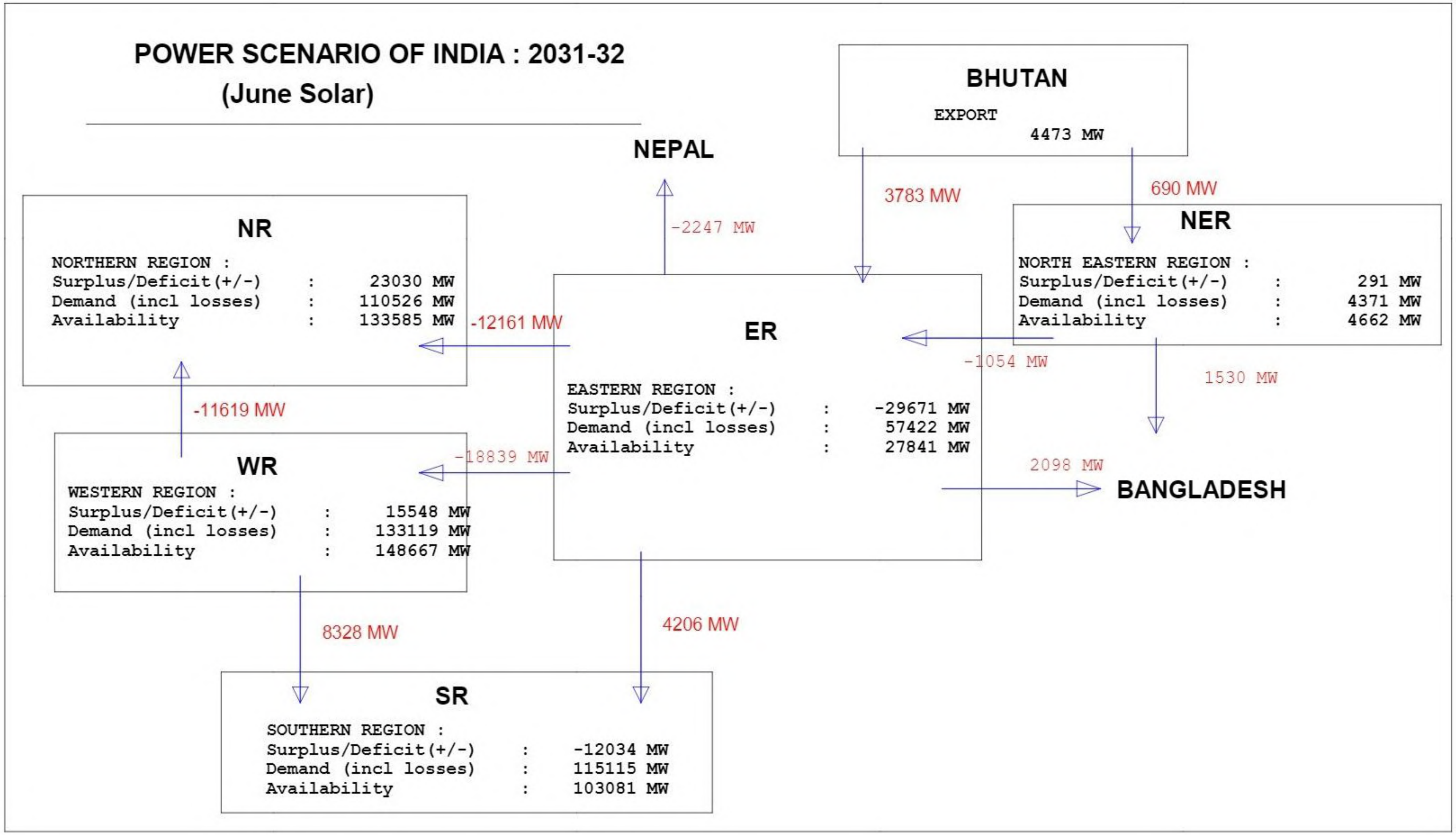


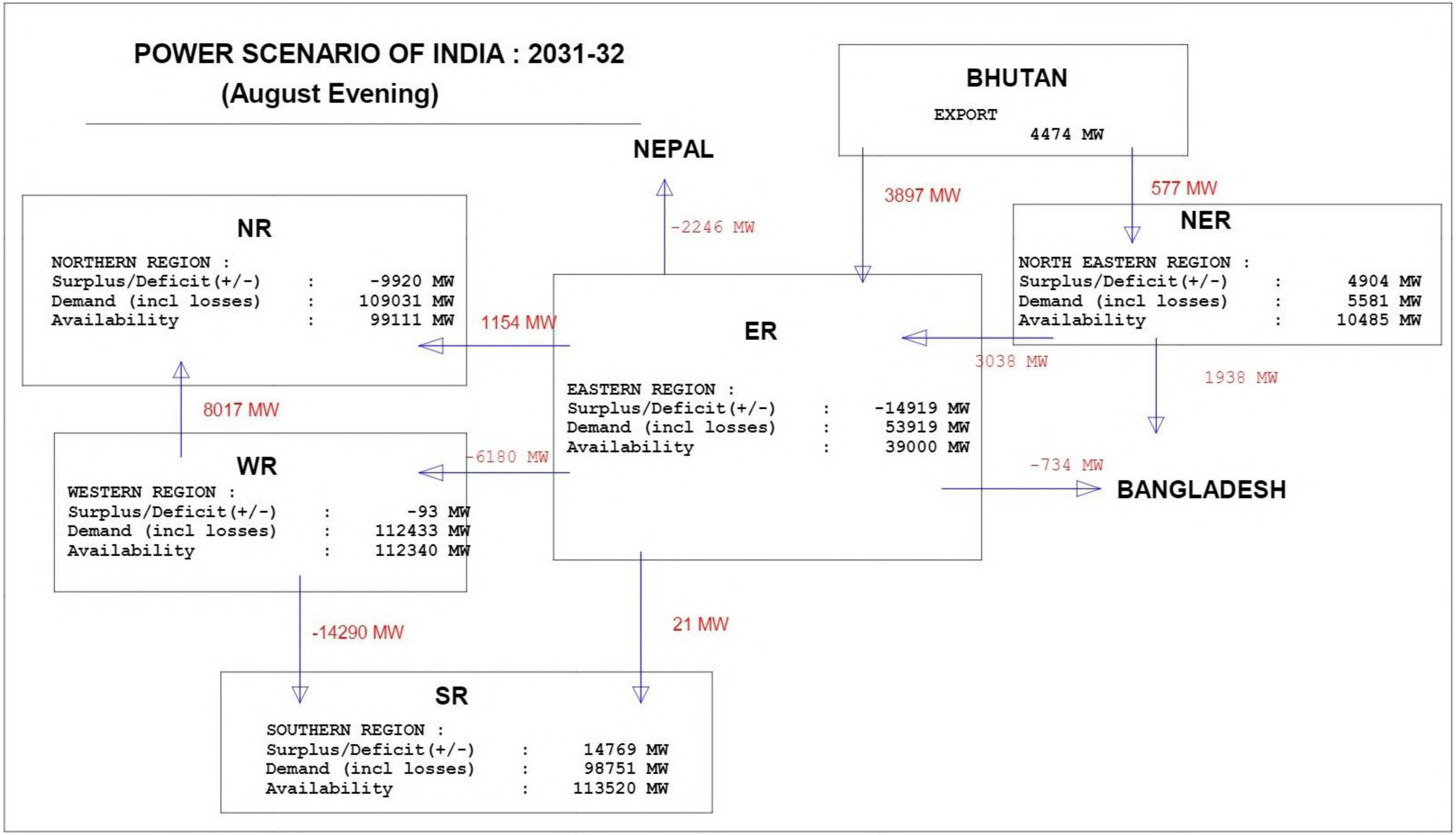

POWER SCENARIO OF INDIA : 2031-32
(February Night)
BHUTAN
EXPORT
-507 MW
NEPAL
-467 MW
-40 MW
1201 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 20299 MW
Demand (incl losses) : 60209 MW
Availability : 80508 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 221 MW
Demand (incl losses) : 2336 MW
Availability : 2556 MW
-8282 MW
ER
-758 MW
433 MW
EASTERN REGION :
Surplus/Deficit(+/-) : 2019 MW
Demand (incl losses) : 37944 MW
Availability : 39963 MW
-11217 MW
-2140 MW
3177 MW
BANGLADESH
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 1923 MW
Demand (incl losses) : 102904 MW
Availability : 104827 MW
10999 MW
6837 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -17336 MW
Demand (incl losses) : 94171 MW
Availability : 76835 MW

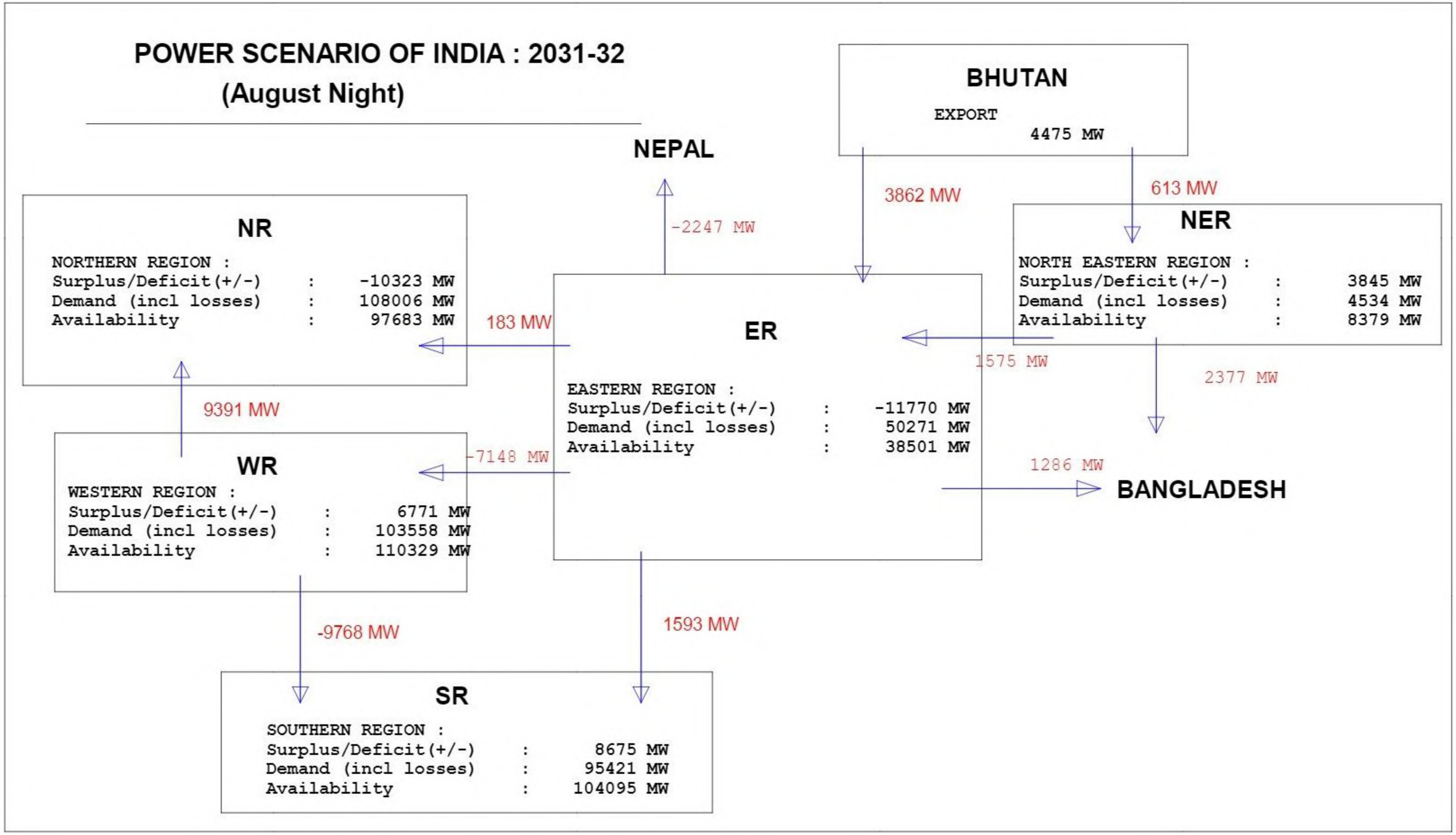

POWER SCENARIO OF INDIA : 2031-32
(February Solar)
BHUTAN
EXPORT
-509 MW
NEPAL
-504 MW
-5 MW
1202 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 38421 MW
Demand (incl losses) : 93611 MW
Availability : 132033 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : -1165 MW
Demand (incl losses) : 3410 MW
Availability : 2245 MW
-16065 MW
ER
-1825 MW
149 MW
-21555 MW
EASTERN REGION :
Surplus/Deficit(+/-) : -17748 MW
Demand (incl losses) : 46908 MW
Availability : 29160 MW
WR
-14095 MW
3461 MW
BANGLADESH
WESTERN REGION :
Surplus/Deficit(+/-) : 7128 MW
Demand (incl losses) : 138261 MW
Availability : 145389 MW
14588 MW
5420 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -19509 MW
Demand (incl losses) : 124113 MW
Availability : 104605 MW

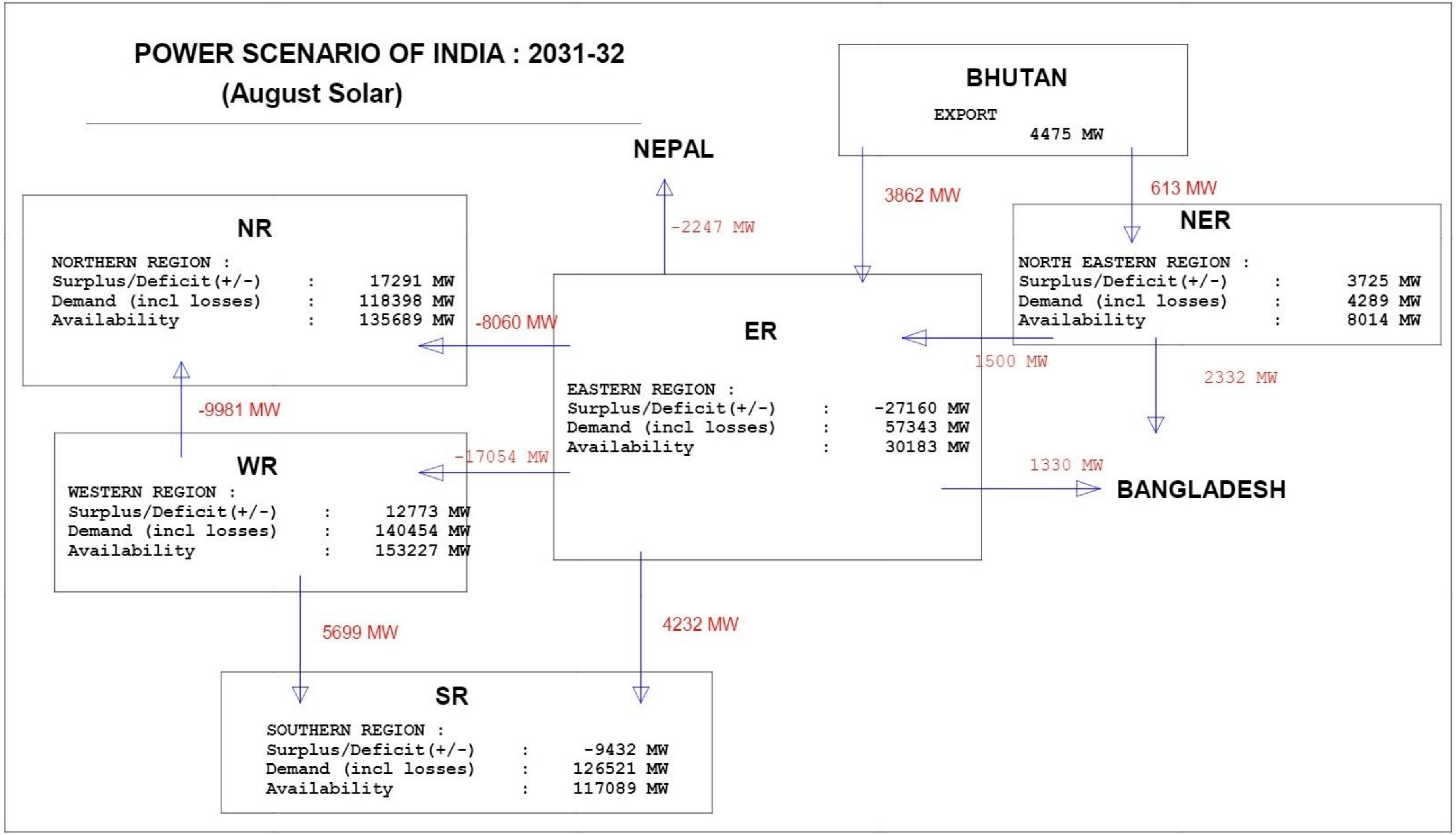

POWER SCENARIO OF INDIA : 2031-32
(June Evening)
BHUTAN
EXPORT
4475 MW
NEPAL
-2247 MW
3839 MW
636 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -16839 MW
Demand (incl losses) : 103639 MW
Availability : 86828 MW
-584 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : -13980 MW
Demand (incl losses) : 49582 MW
Availability : 35693 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 2993 MW
Demand (incl losses) : 5362 MW
Availability : 8355 MW
908 MW
2215 MW
16673 MW
-8222 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 13922 MW
Demand (incl losses) : 105519 MW
Availability : 119441 MW
1440 MW
BANGLADESH
-10973 MW
378 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : 11095 MW
Demand (incl losses) : 93771 MW
Availability : 104866 MW


POWER SCENARIO OF INDIA : 2031-32
(June Night)
NEPAL
BHUTAN
EXPORT
4474 MW
3790 MW
684 MW
-2247 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 3398 MW
Demand (incl losses) : 102015 MW
Availability : 105441 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 545 MW
Demand (incl losses) : 4273 MW
Availability : 4818 MW
-5981 MW
ER
-854 MW
1577 MW
EASTERN REGION :
Surplus/Deficit(+/-) : -14504 MW
Demand (incl losses) : 50561 MW
Availability : 36150 MW
1833 MW
-7747 MW
2052 MW
BANGLADESH
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 3878 MW
Demand (incl losses) : 103961 MW
Availability : 107839 MW
-5702 MW
2354 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : 3847 MW
Demand (incl losses) : 91996 MW
Availability : 95844 MW


POWER SCENARIO OF INDIA : 2031-32
(June Solar)
BHUTAN
EXPORT
4473 MW
NEPAL
3783 MW
690 MW
-2247 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 23030 MW
Demand (incl losses) : 110526 MW
Availability : 133585 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 291 MW
Demand (incl losses) : 4371 MW
Availability : 4662 MW
-12161 MW
ER
-1054 MW
1530 MW
EASTERN REGION :
Surplus/Deficit(+/-) : -29671 MW
Demand (incl losses) : 57422 MW
Availability : 27841 MW
-11619 MW
-18839 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 15548 MW
Demand (incl losses) : 133119 MW
Availability : 148667 MW
2098 MW
BANGLADESH
8328 MW
4206 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -12034 MW
Demand (incl losses) : 115115 MW
Availability : 103081 MW


POWER SCENARIO OF INDIA : 2031-32
(August Evening)
BHUTAN
EXPORT
4474 MW
NEPAL
-2246 MW
3897 MW
577 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -9920 MW
Demand (incl losses) : 109031 MW
Availability : 99111 MW
1154 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : -14919 MW
Demand (incl losses) : 53919 MW
Availability : 39000 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 4904 MW
Demand (incl losses) : 5581 MW
Availability : 10485 MW
3038 MW
1938 MW
8017 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : -93 MW
Demand (incl losses) : 112433 MW
Availability : 112340 MW
-6180 MW
-734 MW
BANGLADESH
-14290 MW
21 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : 14769 MW
Demand (incl losses) : 98751 MW
Availability : 113520 MW


POWER SCENARIO OF INDIA : 2031-32
(August Night)
BHUTAN
EXPORT
4475 MW
NEPAL
-2247 MW
3862 MW
613 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : -10323 MW
Demand (incl losses) : 108006 MW
Availability : 97683 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 3845 MW
Demand (incl losses) : 4534 MW
Availability : 8379 MW
183 MW
ER
1575 MW
2377 MW
EASTERN REGION :
Surplus/Deficit(+/-) : -11770 MW
Demand (incl losses) : 50271 MW
Availability : 38501 MW
9391 MW
-7148 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 6771 MW
Demand (incl losses) : 103558 MW
Availability : 110329 MW
1286 MW
BANGLADESH
-9768 MW
1593 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : 8675 MW
Demand (incl losses) : 95421 MW
Availability : 104095 MW


POWER SCENARIO OF INDIA : 2031-32
(August Solar)
NEPAL
BHUTAN
EXPORT
4475 MW
3862 MW
613 MW
-2247 MW
NR
NORTHERN REGION :
Surplus/Deficit(+/-) : 17291 MW
Demand (incl losses) : 118398 MW
Availability : 135689 MW
-8060 MW
ER
EASTERN REGION :
Surplus/Deficit(+/-) : -27160 MW
Demand (incl losses) : 57343 MW
Availability : 30183 MW
NER
NORTH EASTERN REGION :
Surplus/Deficit(+/-) : 3725 MW
Demand (incl losses) : 4289 MW
Availability : 8014 MW
1500 MW
2332 MW
-9981 MW
-17054 MW
WR
WESTERN REGION :
Surplus/Deficit(+/-) : 12773 MW
Demand (incl losses) : 140454 MW
Availability : 153227 MW
1330 MW
BANGLADESH
5699 MW
4232 MW
SR
SOUTHERN REGION :
Surplus/Deficit(+/-) : -9432 MW
Demand (incl losses) : 126521 MW
Availability : 117089 MW

Annex 10.1

Details of the transmission schemes for integration of RE along with broad scope of works

(A) Northern Region

A. <u>Rajasthan</u>

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission schemes under implementation	
1.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part B	Fatehgarh-II PS – Bhadla-II PS 765 kV D/c line (2nd)
		1x240 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla-II 765 kV D/c line (2nd)
2.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B1	Augmentation with 765/400kV, 1x1500MVA transformer (6th) at Fatehgarh-II PS
		Augmentation with 400/220kV, 4x500MVA Transformer (6th to 9th) at Fatehgarh-II PS with suitable Bus sectionalisation at 400 and 220 kV level.
		Augmentation with 400/220kV, 3x500MVA Transformer (6th to 8th) at Bhadla-II PS with suitable Bus sectionalisation at 400 and 220 kV level
		Augmentation with 765/400 kV, 1x1500 MVA transformer (4th) at Bhadla-II PS.
		STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Fatehgarh-II S/s
		STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Bhadla–II S/s
3.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part C	Establishment of 765/400 kV, 2x1500 MVA Sikar – II S/s
		Bhadla-II PS – Sikar-II 765 kV D/c line
		1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
		1x240MVAr switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
		Sikar-II – Neemrana 400 kV D/c line
4.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part D	Sikar-II – Aligarh 765 kV D/c line along with 1x330 MVAr switchable line reactor for each circuit at each end.
5.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part E	Bhadla-II PS – Sikar-II 765 kV D/c line (2nd)
		1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
		1x240 MVAr switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
6.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part G	1x330 MVAr switchable line reactor for each circuit at Sikar-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
		1x240 MVAr switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765 kV D/c line
		LILO of 765 kV Meerut-Bhiwani S/c line at Narela
7.	Transmission Scheme for evacuation of power from Solar Energy Zones (SEZs) in Rajasthan (8.1 GW) under Phase-II-Part G1	Removal of LILO of Bawana – Mandola 400 kV D/c (Quad) line at Maharani Bagh /Gopalpur S/s. Extension of above LILO section from Maharani Bagh / Gopalpur upto Narela S/s so as to form Maharanibagh – Narela 400 kV D/c (Quad) and Maharanibagh - Gopalpur - Narela 400 kV D/c (Quad) lines

Sl. No.	Transmission scheme	Broad Transmission System
8.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part A1	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-IV
		Fatehgarh-IV - Fatehgarh-III 400 kV D/c line
9.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part A2	Augmentation by 3x500 MVA, 400/220 kV ICT's at Fatehgarh-IV
10.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part A3	Fatehgarh-III- Bhadla-III 400 kV D/c line along with 50 MVAr Switchable line reactor for each circuit at both ends.
11.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part B1	Establishment of 2x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV pooling station at Bhadla-III
		Bhadla-III – Sikar-II 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end.
12.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part B2	Augmentation by 5x500 MVA, 400/220 kV ICT's at Bhadla-III
13.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part C1	Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV pooling station at Ramgarh
		Ramgarh – Bhadla-III, 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at Ramgarh end
		2x ±300 MVAr, STATCOM at Ramgarh with 4x125 MVAr MSC, 2x125 MVAr MSR
14.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part D- Phase-I	Sikar-II – Khetri 765 kV D/c line
		Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end.
15.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part D- Phase-II	Jhatikara – Dwarka 400 kV D/c line (Quad)
16.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part E1 *(0.5 GW BESS planned at Fatehgarh –III PS)*	Establishment of 3x1500 MVA, 765/400 kV & 3x500 MVA 400/220 kV pooling station at Fatehgarh-III (new section)
17.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part E2	Augmentation by 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV ICT's at Fatehgarh-III (new section)
18.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part E3	Fatehgarh-III S/s: STATCOM: 2x ±300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
19.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part F	Establishment of 2x1500 MVA, 765/400 kV Sub-station at suitable location near Beawar
		LILO of both circuits of Ajmer-Chittorgarh 765 kV D/c line at Beawar
		LILO of 400 kV Kota – Merta line at Beawar
		Fatehgarh-III – Beawar 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end.
20.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part G	Fatehgarh-III – Beawar 765 kV D/c (2^{nd}) line along with 330 MVAr Switchable line reactor for each circuit at each end.
21.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III Part H	Establishment of 2x1500 MVA, 765/400 kV substation at suitable location near Dausa
		LILO of both circuits of Jaipur (Phagi)-Gwalior 765 kV

Sl. No.	Transmission scheme	Broad Transmission System
		D/c line at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end.
		LILO of both circuits of Agra – Jaipur (South) 400 kV D/c line at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end.
		Beawar – Dausa 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end
22.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part J	Augmentation by 1x500 MVA, 400/220 kV ICT (10^{th} ICT) at Fatehgarh-II PS
		Augmentation by 1x1500 MVA, 765/400 kV ICT (5^{th}) at Bhadla-II PS
		Augmentation by 1x1500 MVA, 765/400 kV ICT (3^{rd}) at Bikaner (PG)
		Augmentation by 1x1500 MVA, 765/400 kV ICT (3^{rd}) at Jhatikara Substation (Bamnoli/Dwarka section)
23.	Augmentation by 1x1500 MVA, 765/400 kV ICT at Kanpur (GIS) substation	Augmentation by 1x1500 MVA, 765/400 kV ICT at Kanpur (GIS) substation
24.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1: Bikaner Complex)-Part-A *(1 GW BESS planned at Bikaner-II and 2 GW BESS planned at Bikaner-III)*	Establishment of 6x1500 MVA, 765/400 kV &5x500 MVA 400/220 kV Bikaner-III Pooling Station along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor at a suitable location near Bikaner
		LILO of both ckts of 400 kV Bikaner (PG)-Bikaner-II D/c line (Quad) at Bikaner-III PS
		Bikaner-II PS – Bikaner-III PS 400 kV D/c line (Quad)
		Bikaner-III - Neemrana-II 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end.
25.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1: Bikaner Complex)-Part-B	Establishment of 765/400 kV, 4x1500 MVA Neemrana-II S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor at a suitable location near Neemrana
		Neemrana-II -Kotputli 400 kV D/c line (Quad)
		LILO of both ckts of 400 kV Gurgaon (PG) - Sohna Road (GPTL) D/c line (Quad) at Neemrana-II S/s
26.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1: Bikaner Complex)-Part-C	Bikaner-III - Neemrana-II 765 kV D/c line (2nd) along with 330 MVAr switchable line reactor for each circuit at each end
27.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1: Bikaner Complex)-Part-D	Neemrana-II- Bareilly (PG) 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end
28.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex)-Part-E	Augmentation by 400/220 kV, 1x500 MVA (3rd) ICT at Kotputli (PG)
		Augmentation by 400/220 kV, 5x500 MVA ICT at Bikaner -II PS
		Augmentation by 765/400 kV, 1x1500MVA ICT (4th) at Bikaner (PG)
	Transmission schemes under Bidding	
29.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III - Part I	Establishment of 6000 MW, ± 800 kV Bhadla (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near Bhadla-III substation
		Establishment of 6000 MW, ±800 kV Fatehpur (HVDC) [LCC] terminal station (4x1500 MW) at suitable location near Fatehpur (UP)
		Bhadla-III – Bhadla (HVDC) 400 kV 2xD/c line

Sl. No.	Transmission scheme	Broad Transmission System
		±800 kV HVDC line between Bhadla (HVDC) & Fatehpur (HVDC)
		5x1500 MVA, 765/400 kV ICTs at Fatehpur
		LILO of both ckts of 765 kV Varanasi – Kanpur (GIS) D/c line at Fatehpur
30.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part A	Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Fatehgarh-IV (Section-2) Pooling Station along with 2x240 MVAR (765 kV) Bus Reactor & 2x125 MVAR (420 kV) Bus Reactor
		Fatehgarh-IV (Section-2) PS – Bhinmal (PG) 400 kV D/c line (Twin HTLS) along with 50 MVAR switchable line reactor on each circuit at each end
		LILO of both ckts of 765 kV Fatehgarh III- Beawar D/c line at Fatehgarh-IV (Section-2) PS along with 330 MVAR switchable line reactor at Fatehgarh-IV PS end of each ckt of 765 kV Fatehgarh-IV- Beawar D/c line (formed after LILO)
31.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part B	Establishment of 2x1500 MVA, 765/400 kV Substation at suitable location near Sirohi along with 2x240 MVAR (765 kV) & 2x125 MVAR (420 kV) Bus Reactor
		Fatehgarh-IV (Section-2) PS – Sirohi PS 765 kV D/c line along with 240 MVAR switchable line reactor for each circuit at each end
		Sirohi PS-Chittorgarh (PG) 400 kV D/c line (Quad) along with 80 MVAR switchable line reactor for each circuit at Sirohi PS end
32.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part C	Establishment of 3x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Mandsaur Pooling Station along with 2x330 MVAR (765 kV) Bus Reactor & 2x125 MVAR, 420 kV Bus Reactor
		Mandsaur PS – Indore (PG) 765 kV D/c Line along with 1x330 MVAR switchable line reactor on each circuit at Mandsaur end.
33.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part D	Beawar- Mandsaur PS 765 kV D/c line along with 240 MVAR switchable line reactor for each circuit at each end.
34.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part E	Establishment of 765 kV Substation at suitable location near Rishabdeo (Distt. Udaipur) along with 2x240 MVAR (765 kV) Bus Reactor
		Sirohi PS- Rishabdeo 765 kV D/c line along with 330 MVAR switchable line reactor for each circuit at Sirohi end
		Rishabdeo - Mandsaur PS 765 kV D/c line along with 240 MVAR switchable line reactor for each circuit at Rishabdeo end
		LILO of one circuit of 765 kV Chittorgarh- Banaskanta D/c line at Rishabdeo S/s
35.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part F	Establishment of 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Barmer-I Pooling Station along with 2x240 MVAR (765 kV) Bus Reactor & 2x125 MVAR (420 kV) Bus Reactor
		Fatehgarh-III (Section-2) PS – Barmer-I PS 400 kV D/c line (Quad)
		Barmer-I PS– Sirohi PS 765 kV D/c line along with 240 MVAR switchable line reactor for each circuit at each

Sl. No.	Transmission scheme	Broad Transmission System
		end
36.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part H1	Establishment of 2x1500 MVA, 765/400 kV; 2x500 MVA, 400/220 kV & 3x200 MVA, 220/132 kV Kurawar S/s with 2x330 MVAR 765 kV bus reactor and 1x125 MVAR, 420 kV bus reactor Mandsaur – Kurawar 765 kV D/c line along with 240 MVAR switchable line reactors on each ckt at both ends. LILO of Indore – Bhopal 765 kV S/c line at Kurawar Kurawar – Ashtha 400 kV D/c line LILO of one circuit of Indore – Itarsi 400 kV D/c line at Astha Shujalpur – Kurawar 400 kV D/c line
37.	Transmission system strengthening for interconnections of Bhadla-III & Bikaner-III complex	Bhadla-III – Bikaner-III 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at Bhadla-III end
38.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-3: 6 GW) [Bikaner complex] : Part A *(2 GW BESS planned at Bikaner-IV PS)*	Establishment of 6x1500 MVA, 765/400 kV & 6x500 MVA, 400/220 kV Bikaner-IV Pooling Station along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) Bus Reactors STATCOM (2x ±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Bikaner-IV PS LILO of both ckts of Bikaner II PS- Bikaner III PS 400 kV (quad) line at Bikaner-IV PS Bikaner-IV PS – Siwani 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end Siwani– Fatehabad (PG) 400 kV D/c line (Quad) Siwani – Patran (Indi Grid) 400 kV D/c line (Quad) along with 80 MVAr switchable line reactor for each circuit at Siwani S/s end
39.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-3: 6 GW) [Bikaner complex] : Part B	Establishment of 765/400kV, 6x1500 MVA S/s at suitable location near Siwani (Distt. Bhiwani) along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor Bikaner-IV PS – Siwani 765 kV D/c (2^{nd}) line along with 240 MVAr switchable line reactor for each circuit at each end STATCOM (2x ±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) at Siwani S/s Siwani – Sonipat (PG) 400 kV D/c line (Quad) along with 63 MVAr switchable line reactor for each circuit at Siwani S/s end Siwani – Jind (PG) 400 kV D/c line (Quad)
40.	Additional Transmission system for evacuation of power from Bhadla-III PS as part of Rajasthan REZ Phase-III scheme (20 GW)	Augmentation by 2x500 MVA (4th & 5th), 400/220 kV ICTs at Bhadla-III PS Augmentation by 2x1500 MVA, 765/400 kV (3rd & 4th) ICTs at Bhadla-III PS
41.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part A *[Fatehgarh-IV: 1 GW (Solar), Barmer-I: 2.5 GW (Solar), Merta: 1 GW (Solar)]*	Augmentation by 2x1500 MVA, 765/400 kV ICT (4th & 5th) at Barmer-I PS Augmentation by 5x500 MVA (5th to 9th), 400/220 kV ICTs at Barmer-I PS STATCOM (2x ±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400 kV D/c line (Quad)

Sl. No.	Transmission scheme	Broad Transmission System
		Establishment of 2x1500 MVA, 765/400 kV S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactor at Ghiror S/s (UP)
		Dausa - Ghiror 765 kV D/c line along with 330 MVAr switchable line reactor at Ghiror end and 240 MVAr switchable line reactor at Dausa end
		LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line at Ghiror S/s along with 240 MVAr switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror -Orai (PG) D/c line
		LILO of one ckt of 765 kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror along with 240 MVAr switchable line reactor at Ghiror end of 765 kV Ghiror -Fatehpur (PG) line
		400 kV Ghiror-Firozabad (UPPTCL) D/c line (Quad)
42.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part B *[Fatehgarh-IV: 1 GW (Solar), Barmer-I: 2.5 GW (Solar), Merta: 1 GW (Solar)]*	Establishment of 2x1500 MVA, 765/400 kV S/s at suitable location near Merta (Merta-II Substation) along with 2x240 MVAr (765 kV) & 2x125 MVAr (420 kV) bus reactor at Merta-II S/s
		Barmer-I PS – Merta-II 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end.
		Merta-II – Beawar 400 kV D/c line (Quad)
		Merta-II – Dausa 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end.
43.	Transmission system strengthening to facilitate evacuation of power from Bhadla/ Bikaner complex	Bareilly (765/400 kV) – Bareilly (PG) 400 kV D/c line (Quad) (2nd)
		Augmentation with 1500 MVA, 765/400 kV ICT (3rd) at Bareilly (765/400 kV) S/s
44.	ICT augmentation at Bhiwani (PG)	Augmentation with 1500 MVA, 765/400 kV ICT at Bhiwani S/s (4th)
	Planned transmission schemes	
45.	**Ajmer (2 GW Solar) & Nagaur/Merta (1 GW Solar and 1 GW BESS)*:** • Augmentation by 3x500 MVA, 400/220 kV ICTs at Merta-II Pooling Station • Ajmer (New) – Merta II 400 kV D/c line (Quad Moose equivalent) **Transmission scheme is partially under bidding*	
46.	**Ramgarh (4 GW Wind, 6 GW Solar & 3 GW BESS):** • Augmentation by 4x1500 MVA, 765/400 kV ICTs at Ramgarh PS • Augmentation by 400/220 kV, 6x500 MVA ICTs at Ramgarh PS • Establishment of 2x1500 MVA, 765/400 kV S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor near Hanumangarh in Rajasthan • Establishment of 3x1500 MVA, 765/400 kV S/s along with 2x330 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor near Sangrur in Punjab • Ramgarh PS- Bhadla-III PS 765 kV D/c line (2nd) along with 240 MVAr switchable line reactor for each circuit at each end (~200 km) • Bhadla-III PS – Hamumangarh 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at each end (~300 km) • Hamumangarh - Sangrur 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end (~200 km) • Hanumangarh – Fatehabad 400 kV D/c line along with 80 MVAr switchable line reactor for each circuit at Hanumangarh end (Quad Moose equivalent) (~130 km)	

Sl. No.	Transmission scheme	Broad Transmission System
	• LILO of both circuits of Patiala- Patran 400 kV D/c line at Sangrur S/s (~40 km) • LILO of Kurukshetra – Jallandhar/Dhanansu 400 kV line at Sangrur S/s (~40 km) *Already planned capacity at Ramgarh PS: 3x1500 MVA, 765/400 kV, 2x500 MVA, 400/220 kV with 1 GW injection at 220 kV level and about 1.9 GW injection at 400 kV level) along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (420 kV) Bus Reactor	
47.	**Fatehgarh-IV (6 GW Wind, 5 GW Solar & 2.5 GW BESS)*:** • Augmentation be 1x1500 MVA, 765/400 kV ICT & 1x500 MVA, 400/220 kV at Fatehgarh-IV (Section-2) Pooling Station **Transmission scheme is partially under bidding*	
48.	**Barmer-I (3 GW, 2 GW BESS)*:** • 500 MVA, 400/220 kV ICT Augmentation at Barmer-I as per connectivity to RE developers **Transmission scheme is partially under bidding*	
49.	**Barmer-II (6 GW Solar):** • Establishment of 7x500MVA, 400/220kV S/s at suitable location near Barmer (Barmer-II Substation) along with 2x125 MVAr bus reactor • LILO of both ckts of 400kV Fatehgarh-IV PS - Barmer-I PS at Barmer-II PS (20km) • Barmer-II -Barmer-II (HVDC) 400 kV 2xD/c line (Quad Moose equivalent) (~20 km) • Establishment of 6000 MW, ± 800 kV Barmer-II (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near Barmer-II substation • Establishment of 6000 MW, ± 800 kV South Kalamb S/s (HVDC) [LCC] terminal station (4x1500 MW) at a suitable location near South of Kalamb • Establishment 2x1500MVA, 765/400kV Substation near South of Kalamb with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor • LILO of Pune-III – Boisar-II 765kV D/c line at South Kalamb with associated bays at South Kalamb S/s • Installation of 1x240 MVAr switchable line reactor on each ckt at South Kalamb end of Boisar-II – South Kalamb 765 kV D/c line (formed after above LILO) • ±800 kV HVDC line between Barmer-II (HVDC) & South Kalamb (HVDC) (with Dedicated Metallic Return) (1000kms)	
50.	**Bhadla-IV: (2 GW Wind, 3 GW Solar & 2 GW BESS), Bikaner-V: 4 GW (Solar)** • Establishment of 765/400kV, 3x1500 MVA S/s & 400/220kV, 5x500 MVA pooling station at suitable location near Bikaner (Bikaner-V PS) along with 2x125 MVAr & 2x240 MVAr bus reactor • Establishment of 765/400 kV, 3x1500 MVA S/s & 400/220 kV 5x500 MVA pooling station at suitable location near Bhadla (Bhadla-IV PS) along with 2x125 MVAr & 2x240 MVAr bus reactor • LILO of both ckts of 400 kV Bikaner-II PS- Khetri D/c line at Bikaner-V PS (20km) • Bhadla-IV PS – Bikaner-V 765 kV D/c line (~ 150 kms) along with 240 MVAr switchable line reactor for each circuit at Bhadla-IV PS end of Bhadla-IV PS – Bikaner-V PS 765 kV D/c line • Bhadla-IV PS – Bhadla-III PS 400 kV D/c line (Quad) (~30 kms) **Common HVDC System:** • Establishment of 6000 MW, ± 800 kV Bikaner-V (HVDC) [LCC] terminal station (4x1500 MW) at suitable location near Bikaner • Establishment of 6000 MW, ±800 kV HVDC [LCC] terminal station (4x1500 MW) at any suitable location in WR/ER (location to be finalized) • ±800 kV HVDC line between Bikaner-V (HVDC) & other HVDC terminal at any suitable location in WR/ ER (location to be finalized)	

Sl. No.	Transmission scheme	Broad Transmission System
51.	**Jalore (3 GW Solar & 1 GW BESS), Sirohi (3 GW Solar & 1 GW BESS), Sanchore (3 GW Solar & 1 GW BESS) and Pali (3 GW Solar & 1 GW BESS):** • Establishment of 3x500 MVA, 400/220 kV Pooling Station near Jalore along with 2x125 MVAr (420 kV) Bus Reactor • Establishment of 3x500 MVA, 400/220 kV Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor near Sanchore • Establishment of 3x500 MVA, 400/220 kV Pali Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor • Sirohi- Mandsaur 765 kV (D/c line) (~320 km) • Sanchore – Sirohi 400 kV D/c Line (Quad Moose equivalent) (~130 km) • Jalore- Sirohi 400 kV D/c line (Quad Moose equivalent) (~80 km) • Pali – Beawar 400 kV D/c line (Quad Moose equivalent) (~110 km) • Rishabhdeo – Chittorgarh 765 kV S/c line (~120 km) • Rishabhdeo – Banaskantha 765 kV S/c line along with 330 MVAr switchable line reactor for each circuit at each end (220 km) • Mandsaur- Khandwa 765 kV (D/c line) (~230 km)	
	Note: For the planned transmission schemes in Northern Region, compensation requirement would be reviewed based on the detailed reactive power planning studies and the Short Circuit Ratios (SCRs) at different locations. Requirement of Synchronous condensers based on inertia considerations will also be assessed based on detailed studies.	

B. <u>Ladakh</u>

Sl. No.	Transmission Scheme	Broad Transmission System
	Transmission scheme under Implementation	
1.	Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh - Kaithal transmission corridor) (*9 GW solar + 4 GW wind + 6 GW / 12 GWh Storage*) (HVDC system being implemented by Powergrid under RTM. AC system beyond Kaithal to be implemented under TBCB route in matching timeframe of the HVDC system)	**HVDC system (under RTM)-** • ISTS system for RE interconnection at Pang i. 400 kV PS-1 - Pang D/C (quad) line – 7 km ii. 400 kV PS-2 -Pang D/C (quad) line – 27 km iii. 400 kV PS-3 -Pang D/C (quad) line – 41 km • Pooling point in Pang (Leh): ±350 kV, 2 Nos. of 2500 MW HVDC terminal • Pooling point in Kaithal (Haryana): ±350 kV, 2 Nos. of 2500 MW HVDC terminal • 2 nos. of 400/220/33 kV, 315 MVA transformers at Pang • 3 nos. of 765/400/33 kV, 1500 MVA transformers at Kaithal • DC GIS/ AIS i. DC GIS / AIS at Pang and DC AIS at Kaithal ii. 4 Nos. of transition stations with DC GIS/ AIS • HVDC Line (OHL and UG Cable): 480 km of ±350 kV HVDC line between Pang & Kaithal PS (465 km overhead line+ 15 km underground cable) • ISTS system to provide reliable power supply to Ladakh: 220 kV Pang – Leh (Phyang) (PG) S/C line (S/C line on D/c tower) along with 220 kV line bay each at Pang & Leh (Phyang) for line termination (151 km overhead line+ 7 km underground cable)
		EHVAC System beyond Kaithal (under TBCB)- • Kaithal - Bahadurgarh (PG) 400 kV D/C line

Sl. No.	Transmission Scheme	Broad Transmission System
		• Kaithal - Modipuram (Meerut) (UPPTCL) 765 kV D/C line along with 1x240 MVAr switchable line reactor on each circuit at Kaithal end

(B) Western Region

A. <u>Gujarat</u>

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission schemes under Implementation	
1.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park	Establishment of 4 x1500 MVA, 765/400 kV, KPS-2
2.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park	Establishment of 3 x1500 MVA, 765/400 kV, KPS-3
		KPS3- KPS2 765 kV D/c line
3.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)	Augmentation of KPS1 by 4x1500 MVA ICTs
		KPS1-KPS2 765 kV D/C line
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end
5.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B	Lakadia PS – Ahmedabad 765 kV D/c line with 240 MVAR switchable line reactors for each circuit at both ends
6.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	Ahmedabad – South Gujarat/Navsari (New) 765 kV D/c line with 240 MVAr switchable line reactor for each circuit at both ends
7.	Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda Potential RE zone	Banaskantha – Ahmedabad 765 kV D/c line with 330 MVAr, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
8.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D	LILO of Pirana (PG) – Pirana (T) 400 kV D/c line at Ahmedabad S/s with twin HTLS conductor along with reconductoring of Pirana (PG) – Pirana(T) line with twin HTLS conductor
9.	Transmission system for evacuation of additional 7 GW RE power from Khavda RE park under Phase-III Part A	Establishment of 765 kV switching station at Halvad
		KPS2- Halvad 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end
		LILO of both circuits of Lakadia – Ahmedabad 765 kV D/c line at Halvad
10.	Transmission system for evacuation of additional 7 GW RE power from Khavda RE park under Phase-III Part B	Establishment of 765 kV switching station near Vataman
		Halvad – Vataman 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at Vataman end
		LILO of both circuits of Lakadia – Vadodara 765 kV D/c line at Vataman 765 kV switching station
		240 MVAr 765 kV switchable line reactor on each ckt at Vataman end of Lakadia – Vataman 765 kV D/c line with NGR bypassing arrangement
		Vataman switching station – Navsari (New) 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Navsari end
11.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E1	Augmentation of transformation capacity at KPS1 (GIS) by 1x1500 MVA, 765/400 kV ICT (8th) on bus section-I

Sl. No.	Transmission scheme	Broad Transmission System
12.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E3	Augmentation of transformation capacity at KPS3 (GIS) by 1x1500 MVA, 765/400 kV ICT (7th) on Bus section-I
13.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E4	Augmentation of transformation capacity at Padghe (PG) (GIS) by 765/400 kV ,1x1500 MVA (4th) ICT
14.	Augmentation of transformation capacity at 765/400 kV Lakadia S/s (WRSS XXI (A) Transco Ltd) in Gujarat	Creation of 220 kV switchyard at Lakadia 765/400 kV S/s along with 220 kV line bays for RE Interconnection
		Installation of 2x500 MVA, 400/220 kV ICTs (1st & 2nd) at Lakadia PS along with associated ICT bays
15.	Augmentation of transformation capacity at Bachau S/s	Augmentation of transformation capacity at 400/220 kV Bachau S/s by 1x500 MVA (3rd) ICT
16.	Augmentation of transformation capacity at Magarwada S/s	Augmentation of transformation capacity at 400/220 kV Magarwada S/s by 1x500 MVA (3rd) ICT
17.	Augmentation of transformation capacity at Boisar S/s	Augmentation of transformation capacity at 400/220 kV Boisar S/s by 1x500 MVA (5th) ICT
18.	Augmentation of Transformation Capacity at 765/400/220 kV Vadodara (GIS) S/s in Gujarat by 400/220 kV, 1x500MVA ICT (3rd)	Augmentation of transformation capacity at 400/220 kV Vadodara S/s by 1x500 MVA (3rd) ICT
	Transmission schemes under Bidding	
19.	Provision of Dynamic Reactive Compensation at KPSI and KP53	± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS1 400 kV Bus section-1
		± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS1 400 kV Bus section-2
		± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400 kV Bus section-1
20.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part A	Creation of 765 kV bus section-II at KPS3 (GIS) along with 765 kV Bus Sectionaliser & 1x330 MVAr, 765 kV Bus Reactors on Bus Section-II (Bus section – II shall be created at 765 kV & 400 kV level both with 3x1500 MVA, 765/400 kV ICTs at Bus Section-II)
		Creation of 400 kV bus section-II at KPS3 (GIS) along with 400 kV Bus Sectionaliser & 1x125 MVAr, 400 kV Bus Reactors on Bus Section-II
		KPS3 (GIS) – Lakadia 765 kV D/c line along with 330 MVAR switchable line reactors at KPS3 end of KPS3 (GIS) – Lakadia 765 kV D/c line (with NGR bypass arrangement)
		± 300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400 kV Bus section-2
		KPS1 – Bhuj 765 kV 2nd D/c line
21.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part B	Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV GIS S/s at a suitable location South of Olpad (between Olpad and Ichhapore) with 2x330 MVAR, 765 kV & 1x125 MVAR, 420 kV bus reactors
		Vadodara (GIS) – South Olpad (GIS) 765 kV D/c line along with 240 MVAR switchable line reactors on each ckt at Vadodara (GIS) end
		LILO of Gandhar – Hazira 400 kV D/c line at South Olpad (GIS)
		Ahmedabad – South Olpad (GIS) 765 kV D/c line along with 240 MVAR switchable line reactors on each ckt at both ends
22.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda	Establishment of 765/400/220 kV Boisar-II (GIS) S/s (4x1500, 765/400 kV & 2x500MVA, 400/220 kV) with

Sl. No.	Transmission scheme	Broad Transmission System
	area of Gujarat under Phase-IV (7 GW): Part C	2x330 MVAr 765 kV and 2x125 MVAr 420 kV bus reactors
		South Olpad (GIS) – Boisar-II (GIS) 765 kV D/c line along with 240 MVAR switchable line reactors on each ckt at both ends
		LILO of Navsari (New) – Padghe (PG) 765 kV D/c line at Boisar-II
		Boisar-II – Velgaon(MH) 400 kV D/c line
		LILO of Babhaleswar – Padghe (M) 400 kV D/c line at Boisar-II along with 80 MVAR switchable line reactors at Boisar-II end of Boisar-II – Babhaleswar 400 kV D/c line (with NGR bypass arrangement)
		± 200 MVAR STATCOM with 2x125 MVAR MSC, 1x125 MVAR MSR at 400 kV bus section-I of Boisar-II and ± 200 MVAR STATCOM with 2x125 MVAR MSC, 1x125 MVAR MSR at 400 kV bus section-II of Boisar-II
		± 300 MVAR STATCOM with 3x125 MVAR MSC, 1x125 MVAR MSR at 400 kV level of Navsari (New)(PG) S/s
23.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part D	Establishment of 765/400/220 kV Pune-III (GIS) S/s (2x1500, 765/400 kV & 3x500 MVA, 400/220 kV) with 2x330MVAr 765 kV and 2x125 MVAr 420 kV bus reactors
		Boisar-II – Pune-III 765 kV D/c line along with 330 MVAR switchable line reactors at Pune-III end (with NGR bypass arrangement)
		LILO of Narendra (New) – Pune (GIS) 765 kV D/c line at Pune-III along with 330 MVAR switchable line reactors at Pune-III end of Narendra (New) – Pune-III(GIS) 765 kV D/c line (with NGR bypass arrangement)
		Inter tripping scheme on 330 MVAr SW LR at Pune (GIS) end of Pune(GIS) – Pune-III(GIS) 765 kV D/c line
		LILO of Hinjewadi- Koyna 400 kV S/c line at Pune-III (GIS) S/s along with 80MVAr, 420 kV switchable Line Reactors on each ckt at Pune-III(GIS) end of Pune-III(GIS) – Koyna 400 kV line
24.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E2	Augmentation of transformation capacity at KPS2 (GIS) by 2x1500 MVA, 765/400 kV ICT on Bus section-I (5th& 6th) & 2x1500 MVA, 765/400 kV ICT on Bus section-II (7th & 8th)
25.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part A	Establishment of 6000 MW, ± 800 kV KPS2 (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400 kV HVAC Switchyard
		Establishment of 6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400 kV HVAC Switchyard
		±800 kV HVDC Bipole line (Hexa lapwing) between KPS2 (HVDC) and Nagpur (HVDC) (1200 km) (with Dedicated Metallic Return) (capable to evacuate 6000 MW with overload as specified)
		Establishment of 6x1500 MVA, 765/400 kV ICTs at Nagpur S/s along with 2x330 MVAR (765 kV) & 2x125

Sl. No.	Transmission scheme	Broad Transmission System
		MVAR, 420 kV bus reactors along with associated interconnections with HVDC Switchyard. The 400 kV bus shall be established in two sections through 1 set of 400 kV bus sectionaliser so that 3x1500 MVA ICTs are placed in each section. The bus sectionaliser shall be normally closed and may be opened based on Grid requirement
		LILO of Wardha – Raipur 765 kV one D/c line (out of 2xD/c lines) at Nagpur along with 240 MVAR switchable line reactor at Nagpur end on each ckt of Nagpur – Raipur 765 kV D/c line
26.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part C	Establishment of 2500 MW, ± 500 kV KPS3 (HVDC) [VSC] terminal station (2x1250 MW) at a suitable location near KPS3 substation with associated interconnections with 400 kV HVAC Switchyard
		Establishment of 2500 MW, ± 500 kV South Olpad (HVDC) [VSC] terminal station (2x1250 MW) along with associated interconnections with 400 kV HVAC Switchyard of South Olpad S/s
		Establishment of KPS3 (HVDC) S/s along with 2x125 MVAR, 420 kV bus reactors along with associated interconnections with HVDC Switchyard. The 400 kV bus shall be established in 2 sections through 1 set of 400 kV bus sectionaliser to be kept normally OPEN (400/33 kV, 2x50 MVA transformers for exclusively supplying auxiliary power to HVDC terminal.)
		KPS3 - KPS3 (HVDC) 400 kV 2xD/c line
		±500 kV HVDC Bipole line between KPS3 (HVDC) and South Olpad (HVDC) (with Dedicated Metallic Return) (capable to evacuate 2500 MW)
27.	Augmentation of transformation capacity at Bhuj-II PS	Augmentation of transformation capacity at Bhuj-II PS (GIS) by 2x500 MVA, 400/220 kV ICT (5th & 6th) and by 1x1500 MVA, 765/400 kV ICT (3rd)
28.	Augmentation of transformation capacity at Jam Khambhaliya PS	Creation of New 220 kV Bus Section-II at Jam Khambhaliya PS
		Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 2x500 MVA, 400/220 kV ICT (5th & 6th) on Bus Section –II (terminated on New 220 kV bus section-II)
		Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 1x500MVA, 400/220kV ICT (7th) (terminated on New 220 kV bus section-II)
		Creation of New 220 kV Bus Section at Jam Khambhaliya PS (Section III)
		Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 1x500MVA, 400/220kV ICT (8th) (terminated on New 220kV bus section-III)
		Augmentation of transformation capacity at Jam Khambhaliya PS (GIS) by 1x500MVA, 400/220kV (9th) ICT terminated on New 220kV bus section-III
	Planned transmission schemes	
29.	Augmentation of transformation capacity at 765/400kV Lakadia S/s (WRSS XXI(A) Transco Ltd) in Gujarat – Part B	Installation of 2x500 MVA, 400/220 kV ICTs (3rd & 4th) at Lakadia PS along with associated ICT bays
		Augmentation of transformation capacity at Lakadia PS by 4x500 MVA, 400/220 kV ICTs (5th, 6th ,7th & 8th) terminated on new 220 kV Bus Section-II

Sl. No.	Transmission scheme	Broad Transmission System
		Augmentation of transformation capacity at Lakadia PS by 1x1500 MVA, 765/400 kV ICTs (3rd)
30.	Augmentation of transformation capacity at Lakadia PS for providing connectivity to RE projects (2000 MW)	Establishment of 4x500 MVA, 400/220 kV ICTs at Lakadia PS (GIS)
31.	Provision of ICT Augmentation & Bus Reactor at Bhuj-II PS	Augmentation of transformation capacity at Bhuj-II PS (GIS) by 3x500 MVA, 400/220 kV ICT (7th, 8th & 9th)
		Augmentation of transformation capacity at Bhuj-II PS (GIS) by 1x1500 MVA, 765/400 kV ICT (4th)
32.	Transmission System for evacuation of additional 10 GW of RE power from Khavda RE Park under Phase-VI, along with 7 GW BESS	Establishment of 6x1500 MVA, 765/400 kV KPS4 PS with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor
		KPS4 - KPS2 765 kV D/c line
		KPS4 - KPS3 765 kV D/c line
		Establishment of 5x1500 MVA, 765/400 kV KPS5 PS with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor
		KPS4 - KPS5 765 kV D/c line
		KPS5 - Halvad 765 kV D/c line
33.	Transmission System for evacuation of RE power from Radhanesda area of Gujarat – 3 GW under Phase-I	Establishment 3x1500 MVA, 765/400 kV Substation near Radhanesda (GIS) with 2x330 MVAR, 765 kV bus reactor and 2x125 MVAR, 420 kV bus reactor
		Radhanesda (GIS) – Banaskantha (PG) 765 kV D/c line
34.	Transmission system for evacuation of 7.5 GW RE power from Radhanesda along with 3 GW BESS	Augmentation of transformation capacity at Radhanesda by 1x1500 MVA, 765/400 kV ICTs (4^{th})
		Radhanesda - Kandla 765 kV D/c line
		Establishment of 5x1500 MVA, 765/400 kV Radhanesda-II S/s along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) Bus reactor
		Establishment of 7x1500 MVA, 765/400kV Kandla-II S/s along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) Bus reactor
		Radhanesda - Radhanesda II 765 kV D/c line
		Radhanesda II - Kandla II 765 kV D/c line
35.	**Transmission schemes planned for 5 GW Off shore Wind**	
	For 0.5 GW (B3 Pocket- 0.5 GW) **Offshore Pooling Station** 1. Establishment of 2x315 MVA, 220/66 kV Gujarat Offshore B3 Sub-Station Station-1 (B3-OSS-1) with 66 kV line bays – 10 Nos. for RE Interconnection (66 kV bus shall be established in two sections with 1x315 MVA ICT & 5 Nos. 66 kV bays on each 66 kV section) 2. B3-OSS-1 – Mahuva Onshore PS (GIS) 220 kV two (3 core) cables (45 km- under sea cable of about 35 km & underground cable of about 10 km) along with associated line bays at both ends (with capacity of 300 MVA/ckt at nominal voltage) with 1x50 MVAr switchable line reactors at B3-OSS-1 end on each cable **Onshore Pooling Station**	

<table>
<tr><th>Sl. No.</th><th>Transmission scheme</th><th>Broad Transmission System</th></tr>
<tr><td></td><td colspan="2">1. Establishment of 2x500 MVA, 400/220 kV Mahuva Onshore Pooling Station (GIS) (Mahuva PS) along with 1x125 MVAR, 420 kV bus reactor (with space provision for upgradation to 765 kV level to cater to future Offshore Wind Projects adjacent to B3, B4, B5 pockets in future)
2. 2 Nos. of 220 kV line bays at Mahuva PS (GIS) for termination of B3-OSS-1 – Mahuva Onshore PS 220 kV 2xS/c (3 core) cables
3. ± 300 MVAr STATCOM at 220 kV level of Mahuva PS (GIS) with 1 No. of 220 kV bay
4. 420 kV, 1x125 MVAR Variable Bus Shunt Reactor with OLTC (control range between 50 – 125 MVAr for VSR) with 1 No. of 400 kV bay
5. 245 kV, 3x50 MVAr Bus Reactors at 220 kV level of Mahuva PS (GIS)

Note:
1. The no. of 220 kV Submarine Cables has been considered assuming capacity of one three core cable as 300 MVA.
2. Reactive compensation has been worked considering MVAr generation of about 3 MVAr/km by 220 kV Submarine Cable.
*3. * Distance indicated is beeline length, however, it may change based on actual survey*

Onwards Transmission System from Onshore Pooling Station
1. Installation of 2x1500 MVA, 765/400 kV ICTs at Vataman along with 2x125 MVAr (420 kV) Bus Reactor
2. Mahuva Onshore PS (GIS) – Vataman 400 kV D/c line (190 km) (Quad Moose) with 63 MVAr & 50 MVAr, 420 kV switchable line reactors on each ckt at Mahuva & Vataman ends respectively.

Vataman switching S/s has been planned through LILO of Lakadia-Vadodara 765 kV D/c line at Vataman under Khavda Ph-III (7 GW) and is presently under implementation by POWERGRID (under TBCB) with implementation schedule of Dec’25.

<u>For 3.2 GW (B3 Pocket: 0.5 GW, B4 Pocket: 1.11 GW & B5 Pocket: 1.59 GW)</u>
• Augmentation of transformation capacity by 7x500 MVA, 400/220 kV Mahuva Onshore Pooling Station (Mahuva PS) (with space provision for upgradation to 765 kV level so as to cater to future Offshore Wind Projects adjacent to B3, B4, B5 pockets in future)
• Off Shore Sub-Station (OSS) B4 – Mahuva Onshore PS 220 kV 3xS/c cables (~44 km)
• Off Shore Sub-Station (OSS) B5 – Mahuva Onshore PS 220 kV 4xS/c cables (~45 km)
• Mahuva Onshore PS – Vataman 400 kV S/c line (with 63MVAr & 50MVAr, 420 kV switchable line reactors at Mahuva & Vataman ends
• Installation of 2x1500MVA, 765/400 kV ICTs at Vataman
• Suitable Static Compensation / Dynamic Compensation with Mechanical Switched Reactor (MSR)

<u>For 1.24 GW (B6 Pocket)</u>
• Establishment of 4x500 MVA, 400/220 kV Ubhrat Onshore Pooling Station (Ubhrat PS) (with space provision for upgradation to 765 kV level so as to cater to future Offshore Wind Projects adjacent to B6 pocket)
• Off Shore Sub-Station (OSS) B6 – Ubhrat Onshore PS 220 kV 3xS/c cables (~55 km)
• Ubhrat Onshore PS – Vapi 400 kV D/c line (100km) (Quad Moose) with 50MVAr, 420 kV switchable line reactors on each ckt at Ubhrat Onshore PS end
• Suitable Static Compensation / Dynamic Compensation with MSR
<u>Note</u>:
1. The no. of 220 kV Submarine Cables has been considered assuming capacity of one three phase cable as 500 MW. However, the requirement of cables (single phase or three phase and its voltage class) would be further firmed up while detailing the scheme.

Exact Reactive compensation to be worked out based on data being received from submarine cable manufactures pertaining to MVAr generation from the cables</td></tr>
</table>

B. Maharashtra

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission Schemes under Implementation	
1.	1 GW at Kallam	• Augmentation of Kallam Pooling Station by 2x500 MVA, 400/220 kV ICT along with 1x125 MVAr bus reactor (2nd) at Kallam PS
2.	Kallam/Parli	0.3 GW at Parli: Direct interconnection at 220 kV level of 400/220 kV Parli (PG) S/s 0.7 GW at Parli (New): Direct interconnection at 400 kV level of 765/400 kV Parli (New) S/s
3.	Solapur (2 GW Solar)	Direct interconnection at 400 kV Solapur (PG) S/s
4.	Transmission system for evacuation of power from RE projects in Solapur (1500 MW) SEZ in Maharashtra	Establishment of 4x500 MVA, 400/220 kV ICTs at Solapur PS
		Solapur PS - Solapur (PG) 400 kV D/c line (twin HTLS) (with minimum capacity of 2100 MVA/ckt at nominal voltage)
5.	Transmission scheme for evacuation of power from Dhule 2 GW REZ	Establishment of 4x500 MVA, 400/220 kV Pooling Station near Dhule
		Dhule PS – Dhule (BDTCL) 400 kV D/c line
6.	Western Region Network Expansion scheme in Kallam area of Maharashtra	LILO of both circuits of Parli(M) – Karjat(M)/ Lonikand-II (M) 400 kV D/c line (twin moose) at Kallam PS along with 63 MVAR, 420 kV switchable line reactor (with NGR bypassing arrangement) on each ckt at Kallam PS end of Karjat – Kallam 400 kV D/c line

C. Madhya Pradesh

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission Schemes under Implementation	
1.	Transmission System for Evacuation of Power from RE Projects in Rajgarh 1000 MW SEZ in Madhya Pradesh Phase-II	400/220 kV, 3x500 MVA ICT augmentation (4th 5th and 6th) at Pachora PS
		Pachora PS – Ujjain (MPPTCL) 400 kV D/c line (Quad ACSR/AAAC/AL59 Moose equivalent)
	Transmission Schemes under Bidding	
2.	Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW)	Establishment of 3x500 MVA, 400/220 kV Pooling Station at Chhatarpur
		LILO of Satna - Bina 400 kV (1st) D/c line at Chhatarpur PS
3.	Neemuch (Mandsaur): 2 GW Wind	Integrated at 765 kV Mandsaur S/s (already covered in transmission schemes of Northern Region)
	Planned Transmission schemes	
4.	**Sagar: 1.5 GW Solar** • Establishment of 4x500 MVA, 400/220 kV Sagar PS along with 2x125 MVAr (420 kV) Bus Reactor • Sagar – Damoh (PG) 400 kV D/c (quad moose) line (~80km)	
5.	**Morena: 3.9 GW Solar** • Establishment of 9x500 MVA, 400/220 kV Pooling Station along with 2x125 MVAr (420 kV) Bus Reactor near Morena • Morena PS – Morena (TBCB) 400 kV D/c (quad) line (~50 km) • Morena PS – South Gwalior (near Datia)* 400 kV D/c (quad moose) line (~100 km) with 50	

Sl. No.	Transmission scheme	Broad Transmission System
	MVAr switchable line reactors on each ckt at Morena PS end **A new 765/400/220 kV S/s is being planned south of Gwalior so as to cater to increase in demand in the area. The same is proposed to be utilized for evacuation of power from Morena (3.9 GW) Solar Park*	
6.	**Rajgarh-II (Pachora): 1.5 GW Solar** • Augmentation of transformation capacity by 3x500 MVA, 400/220 kV (7th, 8th and 9th) at Pachora PS • Pachora PS- Rajgarh 400 kV D/c line	
	Note: For the planned transmission schemes in Western Region, compensation requirement would be identified separately based on the detailed reactive power planning studies and the Short Circuit Ratio (SCR) at different locations. Requirement of Synchronous condensers based on inertia considerations will also be assessed based on detailed studies.	

(C) Southern Region

A. <u>Andhra Pradesh</u>

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission Schemes under Implementation	
1.	Transmission scheme for Solar Energy Zone in Anantapur (2500 MW) and Kurnool (1000 MW), Andhra Pradesh	Establishment of 400/220 kV, 7x500 MVA pooling station at suitable border location between Anantapur & Kurnool Distt
		Anantapur PS - Kurnool-III PS 400 kV D/c line
		Anantapur PS - Cuddapah 400 kV D/c Line
2.	Transmission Scheme for evacuation of power from RE sources in Kurnool Wind Energy Zone (3000 MW)/Solar Energy Zone (AP) (1500MW) - Part-A & B	Establishment of 765/400/220 kV 3x1500 MVA, 9x500 MVA Pooling station at suitable location in Kurnool Distt (Kurnool-III)
		Kurnool –III PS – Kurnool (New) 765 kV D/c line
		Kurnool –III PS – Maheshwaram (PG) 765 kV D/c Line
	Planned Transmission system for 50 GW REZ	
3.	**Transmission system strengthening at Kurnool-III PS for integration of additional RE generation projects (1.5 GW)** • Augmentation of transformation capacity by 3x1500 MVA, 765/400 kV ICTs at Kurnool-III PS • Kurnool-III PS – Chilakaluripeta 765 kV D/c line with 240 MVAr switchable line reactors at both ends • Augmentation of 1x1500 MVA 765/400 kV ICT (7th) at Kurnool-II PS	
4.	**Transmission System for integration of Kurnool REZ-I (7.5 GW Solar, 4 GW Wind, 3 GW BESS)** • Establishment of 6x1500 MVA, 765/400 & 10x500 MVA, 400/220 kV Kurnool-IV Pooling Station near Kurnool, Andhra Pradesh along with 2x330 MVAr (765 kV) bus reactors at Kurnool-IV PS • $\pm$ 300 MVAR STATCOM at Kurnool-IV, 2x125 MVAr MSR • Kurnool-IV – Bidar 765kV D/c line (about 330 kms) with 330 MVAR SLR at both end on both circuits • Kurnool-IV – Kurnool-III PS 765 kV D/c line (about 150 kms) with 240 MVAR SLR at Kurnool-IV end on both circuits • Augmentation with 1x1500 MVA, 765/400 kV ICT at C'Peta • Establishment of 3x1500 MVA, 765/400 kV Veltoor-II Station with 2x330 MVAr (765 kV) bus reactors • LILO of Kurnool-IV – Bidar 765kV D/c line at Veltoor-II • Veltoor-II– Veltoor TS 400 kV (quad) D/c line • Veltoor-II– Udandpur 400 kV (quad) D/c line • LILO of Vijayawada-Nellore 400 kV D/c line at C'Peta	
5.	**Transmission System for integration of Kurnool REZ-II (7.5 GW Solar, 4 GW Wind, 2 GW BESS)**	

Sl. No.	Transmission scheme	Broad Transmission System
	• Establishment of 6x1500 MVA, 765/400 kV & 7x500 MVA, 400/220 kV Kurnool-V Pooling Station near Kurnool, Andhra Pradesh along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) bus reactors at Kurnool-V PS • Kurnool-V-Kurnool –IV 765 kV D/c line (100 km) • Kurnool-V – Chilakaluripeta 765 kV D/c line with 330 MVAr SLR at Kurnool-V PS end (~210 km) • Chilakaluripeta – Podili 400 kV (quad) D/c line (~100 km) • Augmentation by 2x1500 MVA, 765/400 kV ICTs at Chilakaluripeta (CPeta) 765/400 kV substation • Augmentation by 2x1500 MVA, 765/400 kV ICTs at Maheshwaram 765/400 kV substation	
6.	**Transmission System for integration of Anantapur REZ (8 GW Solar, 8 GW Wind, 4 GW BESS)** • Establishment of 6x1500 MVA, 765/400 kV & 10x500 MVA, 400/220 kV Anantapur- II Pooling Station near Kurnool, Andhra Pradesh along with 2x330 MVAr (765 kV) bus reactors at Anantapur-II PS • ± 300 MVAR STATCOM at Ananthpur-II, 2x125 MVAr MSR • Establishment of 3x1500 MVA, 765/400 kV CN'Halli Station 765/400 along with 2x330 MVAr (765 kV) bus reactors • Anantapur-II – Davangere 765kV D/c line with 240 MVAR SLR at Anantpur-II end on both circuits • Anantapur-II – Cuddapah 765kV D/c line with 330 MVAR SLR at Anantpur-II end on both circuits • Anantapur-II – CN Halli 765kV D/c line with 330 MVAR SLR at Anantpur-II end on both circuits • CN Halli – CN Halli (KPTCL) 400 kV (quad) D/c line	
7.	**Transmission System for integration of Anantapur REZ (1 GW Solar, 0.5 GW Wind)** • Augmentation by 3x500 MVA, 400/220 kV ICTs at Anantapur PS	
8.	**Transmission System for integration of Kadapa REZ (8 GW Solar, 2.5 GW BESS)** • Establishment of 4x1500 MVA, 765/400 kV & 6x500 MVA, 400/220 kV Pooling Station near Kadapa (Kadapa II PS), Andhra Pradesh along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) bus reactors at Kadapa-II PS • LILO of both circuits of Anantapur-II – Cuddapah 765 kV D/c line at Kadapa-II PS • Kadapa-II PS – Thiruvalam 765 kV D/c line with 240 MVAr SLR at both ends	

B. Karnataka

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission schemes under Implementation	
1.	Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka- Phase-I (1000 MW)	Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station
		Gadag PS- Narendra (New) 400 kV D/C line
2.	Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka	Establishment of 3x1500 MVA, 765/400 kV & 5x500 MVA 400/220 kV station at suitable location near Bidar
		Bidar PS – Maheshwaram (PG) 765 kV D/C line along with 1x240 MVAR Switchable Line Reactor for each circuit at Bidar PS end & Maheshwaram (PG) end.
3.	Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka: Phase-II (1500 MW)	400/220 kV, 3x500 MVA ICT Augmentation at Gadag Pooling Station
		Gadag PS - Koppal PS 400 kV D/c line
4.	Transmission Scheme for integration of Renewable Energy Zone in Koppal-II (Phase-A & B) and Gadag-II (Phase- A) in Karnataka	**Phase A**
		Establishment of 765/400 kV 2x1500 MVA, 400/220 kV 2x500 MVA Koppal-II (Phase A) Pooling Station
		Koppal-II PS – Narendra (New) 765 kV D/c line
		Establishment of 400/220 kV, 2x500 MVA Gadag-II (Phase A) Pooling Station
		Gadag-II PS – Koppal-II PS 400 kV (Quad Moose) D/c

Sl. No.	Transmission scheme	Broad Transmission System
		line
		Phase B
		Koppal-II PS – Raichur 765 kV D/c line with 330 MVAr SLR at Koppal-II PS end (~190 km)
		Augmentation by 2x1500MVA, 765/400 kV ICTs at Koppal-II PS
		Augmentation by 2x500 MVA, 400/220 kV ICTs at Koppal-II PS.
	Transmission schemes under Bidding	
5.	ISTS Network Expansion scheme "Transmission Scheme for integration of Renewable Energy Zone in Tumkur area of Karnataka"	Establishment of 400/220 kV, 4x500 MVA Pooling Station near Tumkur, Karnataka
		Tumkur-II – Tumkur (Pavagada) 400 kV (Quad ACSR moose) D/c line
6.	Transmission Scheme for integration of Davanagere / Chitradurga and Bellary REZ in Karnataka	Establishment of 765/400 kV, 4x1500 MVA, 400/220 kV 4x500 MVA Pooling Station near Davanagere / Chitradurga, Karnataka
		LILO of Narendra New – Madhugiri 765kV D/c line at Davanagere / Chitradurga 765/400 kV PS
		Upgradation of Narendra New – Madhugiri 765 kV D/c line (presently charged at 400 kV level) to its rated 765 kV level
		Upgradation of Madhugiri S/s [Tumkur (Vasantnarsapura)] to its rated voltage of 765 kV level
		Establishment of 4x500 MVA, 400/220 kV Pooling Station near Bellary area (Bellary PS), Karnataka
		Bellary PS – Davanagere / Chitradurga 400 kV (Quad ACSR moose) D/c line
7.	Transmission Scheme for integration of Bijapur REZ in Karnataka	Establishment of 400/220 kV, 5x500 MVA Pooling Station near Bijapur (Vijayapura), Karnataka
		Bijapur PS – Raichur New 400 kV (Quad ACSR moose) D/c line
8.	System strengthening at Koppal-II and GadagII for integration of RE generation projects	Augmentation with 3x1500 MVA, 765/400 kV ICTs (5th, 6th & 7th) at Koppal-II PS
		Augmentation with 5x500 MVA, 400/220 kV ICTs (5th, 6th, 7th, 8th & 9th) at Koppal-II PS
		Augmentation with 7x500 MVA, 400/220 kV ICTs (3rd, 4th, 5th, 6th, 7th, 8th & 9 th) at Gadag-II PS
		Gadag-II PS – Koppal-II PS 400 kV (Quad) 2nd D/c line
	Planned Transmission schemes	
9.	**Bijapur- 2.5 GW** • Augmentation of 5x500 MVA 400/220 kV ICTs at Bijapur • Bijapur PS – Raichur New 400kV (Quad ACSR moose) D/c line (2nd ckt)	
10.	ICT Augmentation at Davanagere / Chitradurga, as per requirement for 2 GW identified potential.	

C. Tamil Nadu

Sl. No.	Transmission Scheme	Broad Transmission System
	Planned Transmission schemes	
1.	Augmentation by 500 MVA, 400/230 kV ICT at Karur PS	
2.	**Transmission System for 5 GW Offshore wind farm (Sub Zone B1 to B4 & G1 to G3) in Tamil Nadu**	
	Phase I (500 MW)	

<table>
<tr><th>Sl. No.</th><th>Transmission Scheme</th><th>Broad Transmission System</th></tr>
<tr><td rowspan="9"></td><td rowspan="3">A. Onshore pooling station and Transmission System from Onshore Pooling Station</td><td>Establishment of 2x500 MVA, 400/230 kV Onshore Pooling Station near Avaraikulam, Tirunelveli District in Tamil Nadu</td></tr>
<tr><td>Avaraikulam Onshore PS – Tuticorin PS 400 kV D/c quad line</td></tr>
<tr><td>± 300 MVAr STATCOM along with 2x125 MVAr MSR</td></tr>
<tr><td rowspan="2">B. Transmission System for integration of Offshore Wind Farms with Onshore PS</td><td>Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 1 No. with 10 Nos. of 66 kV line bays for RE integration</td></tr>
<tr><td>Offshore substation 1 (OSS-1) – Avaraikulam Onshore PS 2 Nos. 230 kV (at least 300 MVA capacity) Submarine cables (~35 - 40 km) with 2x50 MVAr switchable line reactors at OSS-1 end</td></tr>
<tr><td colspan="2">Phase II (4500 MW)</td></tr>
<tr><td colspan="2">
Augmentation by 9x500 MVA, 400/230 kV ICTs at the Onshore Pooling Station near Avaraikulam, Tirunelveli, District in Tamil Nadu
Avaraikulam Onshore PS – Pugalur (HVDC) 400 kV D/c line (Quad Moose equivalent) with 125 MVAr switchable reactors on each circuit at both ends
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 2 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 2 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 3 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 3 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 4 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 4 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 5 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 5– Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 6 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 6 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 7 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 7 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 8 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 8 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 9 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 9 – Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
Establishment of 2x315 MVA, 230/66 kV Off-Shore Substation- 10 No. with 10 Nos. of 66 kV line bays for RE integration.
OSS 10– Avaraikulam Onshore PS 230 kV 2xS/c Submarine cable
</td></tr>
<tr><td colspan="2"><u>Note</u>:
The number of 230 kV submarine Cables has been considered assuming capacity of one three phase cable as 500 MW. However, the requirement of cables (single phase or three phase and its voltage class) would be further firmed up while detailing the scheme.</td></tr>
</table>

Sl. No.	Transmission Scheme	Broad Transmission System
	Reactive compensation to be worked out based on data being received from submarine cable manufactures pertaining to MVAr generation from the cables. *For the planned transmission schemes in Southern Region, compensation requirement would be identified separately based on the detailed reactive power planning studies and the Short Circuit Ratio (SCR) at different locations. Requirement of Synchronous condensers based on inertia considerations will also be assessed based on detailed studies.*	

D. <u>Telangana</u>

Sl. No.	Transmission scheme with Broad Scope of Works
	Planned Transmission schemes
	Transmission System planned for 13 GW REZ (3 GW Wind & 10 GW Solar) in Telangana
1.	**Transmission System for integration of Nizamabad REZ (1 GW Wind, 2.5 GW Solar)** • Establishment of 6x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV Pooling Station near Nizamabad (Nizamabad-II) along with 2x330 MVAr (765 kV) & 2x125 MVAr (400 kV) bus reactors at Nizamabad-II PS • Augmentation by 1x1500 MVA, 765/400 kV ICT at Nizamabad (PG) S/s • Nizamabad-II PS – Nizamabad (PG) 765 kV 2x D/c line (~30 km) • Nizamabad-II PS – Warangal (New) 765 kV D/c line with 330 MVAr SLR at Nizamabad-II PS (~180 km)
2.	**Transmission System for integration of Medak REZ (1 GW Wind, 2.5 GW Solar)** • Establishment of 3x500 MVA, 400/220 kV Pooling Station near Medak (Medak PS) along with 2x125 MVAr bus reactors at Medak PS • Medak PS – Nizamabad-II 400 kV (Quad Moose equivalent) D/c line (~60 km)
3.	**Transmission System for integration of Rangareddy REZ (1 GW Wind, 2.5 GW Solar)** • Establishment of 3x500 MVA, 400/220 kV Rangareddy Pooling Station near Rangareddy along with 2x125 MVAr bus reactors at Rangareddy PS • Rangareddy PS – Nizamabad-II 400 kV (Quad Moose equivalent) D/c line with 80 MVAr SLR at Rangareddy PS (~155 km)
4.	**Transmission System for integration of Karimnagar REZ (2.5 GW Solar)** • Establishment of 4x500 MVA, 400/220 kV Pooling Station near Karimnagar (Karimnagar PS) along with 2x125 MVAr bus reactors at Karimnagar PS • Karimnagar PS – Nizamabad-II 400 kV (Quad) D/c line (~100 km)

(D) North Eastern Region

A. <u>Assam</u>

Sl. No.	Transmission scheme	Broad Transmission System
	Transmission Schemes under Bidding	
1.	Transmission System for evacuation of power from 1000 MW Solar Park at Karbi Anglong, Bokajan, Assam	Establishment of 400 kV switching station at Bokajan in Assam with 2x80 MVAr bus reactors.
		LILO of both circuits of Misa (PG) – New Mariani (PG) 400 kV D/c line at Bokajan

Annex 10.2

Intra-state Transmission System under Green Energy Corridor Phase-II scheme

(A) **Gujarat**

Package No.	Package name and details
1A	765/400 kV, GIS substation in Saurashtra - a) 2 Nos. of 765 kV feeder bays b) 6 Nos. of 400 kV feeder bays c) 765 kV, 1×330 MVAR Reactor bay d) 400 kV, 1×125 MVAR Reactor bay
1B	765/400 kV, GIS substation in Saurashtra - a) 765/400 kV, 2×1500 MVA transformers b) 765 kV, 1×330 MVAR Reactor c) 765 kV, 2×240 MVAR Reactor d) 400 kV, 1×125 MVAR Reactor
2A	400 kV Kalavad GIS substation (Dist. Jamnagar) - (220/66 kV scheme is already approved under GEC-I) a) 400/220 kV, 3×500 MVA transformer bays b) 8 Nos. of 400 kV feeder bays c) 400 kV, 1×125 MVAR Reactor bay
2B	400 kV Kalavad GIS substation (Dist. Jamnagar) - a) 400/220 kV, 3×500 MVA transformers b) 400 kV, 1×125 MVAR Reactor
3A	400/220/66 kV Shivlakha GIS substation (Dist. Kutch)- a) 400/220 kV, 2×500 MVA transformer bays b) 220/66 kV, 2×160 MVA transformer bays c) 4 Nos. of 400 kV feeder bays d) 400 kV, 1×125 MVAR Reactor bay e) 6 Nos. of 220 kV feeder bays and 8 nos. of 66 kV feeder bays
3B	400/220/66 kV Shivlakha GIS substation (Dist. Kutch)- a) 400/220 kV, 2×500 MVA transformers b) 220/66 kV, 2×160 MVA transformers c) 400 kV, 1×125 MVAR Reactor
4A	400 kV Babarzar GIS substation (Dist. Jamnagar) - a) 400/220 kV, 2×500 MVA transformer bays b) 4 Nos. of 400 kV feeder bays c) 400 kV, 1×125 MVAR Reactor bay
4B	400 kV Babarzar GIS substation (Dist. Jamnagar) - a) 400/220 kV, 2×500 MVA transformer b) 400 kV, 1×125 MVAR Reactor
5A	220 kV Dhama substation (Dist. Surendranagar) - a) 220/66 kV, 2×160 MVA transformer bays b) 4 Nos. of 220 kV feeder bays
5B	220 kV Dhama substation (Dist. Surendranagar) - a) 220/66 kV, 2×160 MVA transformers
6A	220 kV Munjpur Substation (Dist. Patan) – a) 220/66 kV, 2 × 160 MVA transformer bays b) 6 Nos. of 220 KV feeder bays
6B	220 kV Munjpur Substation (Dist. Patan) – a) 220/66 kV, 2 × 160 MVA transformers
7.	765 kV, 2x240 MVAR Line Reactors in 765 kV Vataman Substation

Package No.	Package name and details
8.	400 kV, 2x50 MVAR Line Reactors in 400 kV Paccham Substation
9.	765 kV, 2x240 MVAR Line Reactors in 765 kV Saykha Substation
10.	765 kV D/c Saurashtra - Vataman line (200 km)
11.	765 kV D/c Pachchham (Fedra) - Sayakha line (765 kV line initially charged at 400 kV level) (160 km)
12.	400 kV D/c Kalavad - Saurashtra line (Twin AL-59) (120 km)
13.	LILO of both circuits of 400 kV D/c CGPL - Jetpur line at Saurashtra S/s (M/c line) (25 km)
14.	400 kV D/c Shapar - Chharodi line (Twin AL-59) (115 km)
15.	LILO of both circuits of 400 kV D/c Mundra - Zerda line at Shivlakha S/s (25 RKM M/c line) (25 km)
16.	400 kV D/c Sayakha - Jhanor (NTPC) line or LILO of 400 kV S/c Jhanor - Sugen (TPGL) line at 400 kV Sayakha S/s (25 km)
17.	400 kV D/c line for reconfigurations to have 400 kV D/c Chorania - Kosamba & 400 kV D/c Fedra - Sanand (Chharodi) line (25 km)
18.	400 kV D/c Sanand (Chharodi) - Soja line (by using LILO portion of Halvad - Vadavi LILO at Sanand) (50 km)
19.	LILO of both circuits of 400 kV D/c Bhogat - Kalavad line at Babarzar s/s (5 km)
20.	LILO of both circuits of 220 kV D/c Tappar - Shivlakha line at Shivlakha (400 kV) S/s (M/c tower AL-59) (20 km)
21.	LILO of both circuits of 220 kV D/c Shapar - Babara line at 220 kV Kamlapur S/s (AL-59) (20 km)
22.	LILO of both circuits of 220 kV D/c Sagapara - Talaja line at Maglana S/s (M/c tower AL-59) (35 km)
23.	220 kV D/c Munjpur - Mehsana by reconfigurations of existing 220 kV S/c Sankhari - Mehsana & 220 kV S/c Velodha – Sankhari (30 km)
24.	220 kV D/c Dhama - Munjpur line (AL-59) (30 km)
25.	LILO of both circuits of 220 kV D/c Jambuva - Karamsad line at Dhuvaran CCPP (by using existing LILO portions through 220 kV D/c Pachham - Kasor line) (20 km)
26.	220 kV D/c Maglana - Pachchham line (AL-59) on M/c line to have reconfigurations to establish 220 kV D/c Botad - Kasod line (90 km)
27.	Augmentation of Existing S/s: a) 400/220 kV, 3x500 MVA transformers- 2 Nos. at Charankha and 1 nos. at Amreli S/s b) 220/66 kV, 7x160 MVA transformers- 1 no. each at Amreli, Mesanka, Savarkundla, Otha, Sagarpara, Talaja & Charankha S/s

(B) <u>Himachal Pradesh</u>

Package No.	Package name and details
1.	Establishment of 132 kV GIS Pooling Substation at Darkunda (10 nos. of 132kV bays: 4 nos. for LILO of Krthla – Bathri D/c line, 2 nos. each for D/c line to Mazra, Chanju-I & Chanju-III)
	LILO of both ckt of 132 kV Kurthla - Bathri D/c line at Darkunda (5 kms) with OPGW
	11kV D/c line on Double pole structure to Darkunda from nearest HPSEBL S/s for electrification (5 kms)
2.	Darkunda - Mazra 132 kV D/c line (28 kms) with OPGW
	2 nos. of 132 kV GIS bays at Mazra
3.	Establishment of 132/33 kV, 2x31.5 MVA GIS Substation at Baijnath (2 nos. of 132 kV and 4 nos. of 33kV line bays)
	LILO of Dehan (Patti) - Bassi 132 kV S/c line at Baijnath (7 kms) with OPGW
4.	Upgradation of existing 132 kV S/c line from 132/33 kV Bathri substation to 220/132 kV Jassore substation to 132 kV D/c HTLS transmission line and HTLS re-conductoring of 132 kV D/c Mazra – Bathri line
5.	Establishment of 132/33 kV, 2x31.5 MVA GIS Substation near Dharamshala (2 nos. of 132 kV and 4 nos.

Package No.	Package name and details
	of 33 kV line bays)
	132 kV D/c line from Dehan (Patti) to Proposed substation near Dharamshala (30 kms) with OPGW
	2 nos. of 132 kV GIS line bays at Dehan (Patti)
6.	50/63 MVA, 220/33 kV (3 phase) Additional ICT at Karian Substation (GIS)
7.	80/100 MVA, 220/132 kV (3 x 1ph + 1 spare) Additional ICT at Charor Substation (GIS)
8.	50/63 MVA, 132/33 kV, Additional ICT Kurthala Substation (AIS)
9.	Construction of 220 kV D/c (Twin Zebra) line from 220/132 kV Nehrian substation to proposed 220/132kV substation nearby Una – 37 kms; along with 220kV Additional Bays at Nehrian with 220kV bus bar extension.

(C) **<u>Karnataka</u>**

Package No.	Package name and details
1.	2x100 MVA, 220/110/11 kV sub-station at Savalagi in Bagalkot district.
	220 kV D/c LILO Line from 220 kV Kudgi-Vajramatti D/c line toSavalgi substation (16.3 km)
	LILO of Todalbagi-Mamadapura 110 kV S/C line at 220/110 kV Savalagi sub-station (2.414 km)
	LILO of 110 kV Mamadapura - Babaleshwara SC line at Savalagi sub-station (15.889 km)
2.	220/66/11 kV sub-station at P.D.Kote in Chitradurga District with 2x100 MVA, 220/66 kV power transformer and lx12.5MVA, 66/11 kV power transformer
	LILO of 220 kV Hiriyur (PGCIL) to Gowribidanur D/c line at 220/66 kV P.D. Kote (34.338 km)
	LILO of 66 kV Hiriyur - Kalamaranahalli -P.R.Pura line at 220/66 kV P.D. Kote (12.332 km)
	LILO of 66 kV P.D. Kote - Hariyabbe DC line at 220/66kV P.D.Kote (5.099 km)
3.	2x100 MVA, 220/110/11 kV sub-station at Ron in Gadag district
	2 nos. of 220 kV Terminal Bays at 400 kV Gadag (Doni) S/s
	220 kV D/c line from 400kV Doni S/s to 220/110 kV Ron S/s (43.577 km)
	LILO of 110 kV Gadag-Naragal-Ron D/c line at 220/110 kV Ron S/s (7.515 km)
	LILO of 110 kV Ron-Gajendragad D/c line at 220/110 kV Ron S/s (0.991 km)
4.	2x100 MVA, 220/l10 kV sub-station at Santhpur in Bidar district
	220 kV Halabarga-Santhpur D/c Line (28.276 km)
	2 nos. of 220 kV Terminal Bays at 220 kV Halabarga S/s
	LILO of existing Halabarga - Santhpur 110 kV S/c line at proposed 220 /110 kV Santhpur sub-station (1.357 km)
	LILO of existing Santhpur-Dongargaon 110 kV S/c line at proposed 220/110 kV Santhpur sub-station (3.361 km)
	LILO of existing Santhpur-Janwad 110 kV D/c line at proposed 220/110 kV Santhpur sub - station (2.750 km)
5.	2x100 MVA, 220/66 kV, 1x12.5 MVA, 66/11 kV sub-station at Hangal in, Chitradurga district
	220 kV Hiremallanahole (Jagalur)-Hangal D/c Line (36.304 km)
	2 nos of 220 kV Terminal Bays at 400/220 kV Hiremallanahole (Jagalur) S/s
	LILO of existing Hangal - Gudikote 66 kV S/c line at proposed 220/66kV Hangal substation with Drake conductor (4.070 km)
	LILO of existing Hangal - Nagasamudra (Ramapura) 66 kV D/C line at proposed 220/66 kV Hangal sub-station with Coyote conductor (5.895 km)
	66 kV Konasagara - Hangal S/C Line with Coyote conductor (11.536 km)
	1 No. of 66 kV Terminal Bay at 66/11 kV Konasagara S/s
6.	2x100 MVA, 220/110 kV sub-station at Yelburga in Koppal district
	LILO of 220 kV Doni-Ron D/c Lines at proposed 220/110/11 kV sub-station at Yelburga (18.524 km)
	220 kV Kushtagi-Yelburga D/c lines (28.333 km)
	2 nos. of 220 kV Terminal Bays at 220/110 kV Kushtagi S/s
	110 kV Yelburga (old)-Yelburga D/C lines (3.54 km)
	110 kV Bevor-Yelburga D/c lines (22.54 km)

Package No.	Package name and details
	2 nos. of 110 kV Terminal Bays at existing 110/33 kV Yelburga (old) S/s
	2 nos. of 110 kV Terminal Bays at existing 110/33 kV Bevor S/s

(D) Kerala

Package No.	Package name and details
1.	220 kV D/c line from Vettathur tap to Mannarkad (28 km)
	220 kV D/c line from Mannarkad to Agali (30 km)
2.	2x100 MVA, 220/110 kV substation at Mannarkad
3.	2x100 MVA, 220/33 kV substation at Agali
4.	110 kV D/c line from Anakkaramedu to Nedumkandam substation (9 km)
	20 km, 220/110 kV MCMV line from Kuyilimala to Nirmala City and 5 km 110 kV D/c line from Nirmala City to Kattappana along ROW of existing 66 kV S/c line.
5.	100 MVA, 220/110 kV substation at Nirmala City (near Katta pana) with 4 nos. of 220 kV feeder bays and 6 no. of 110 kV feeders.
	2 nos. of 110 kV bays at Nedumkandam substation
	Upgradation of Vazhathope substation - Construction of 2 nos. 110 kV feeder bays
	2x60 MVA 33/110 kV GIS substation at Pushpakandam (near Anakkaramedu)

(E) Rajasthan

Package No.	Package name and details
1.	Construction of 2x500 MVA, 400/220 kV GSS at Hanumangarh along with 400 kV, lx125 MVAR Bus Reactor, 1x25 MVAR, 220 kV Bus reactor & lx50 MVAR, 400 kV Line Reactor and Bay work at 220 kV GSS Rawatsar & Udhyog Vihar, 132 kV GSS Sriganganagar.
	LILO of one circuit of 400 kV STPS - Bikaner line (Twin Moose) at proposed 400/220 kV GSS Hanumangarh (85 km)
	LILO of 220 kV S/c Hanumangarh (220 kV GSS) - Udyog vihar (220 kV GSS) line at proposed 400 kV GSS at proposed 400/220 kV GSS Hanumangarh (with OPGW) (6 km)
	LILO of 220kV S/C Suratgarh (220 kV GSS) -Padampur (220 kV GSS) line at proposed 400 kV GSS Hanumangarh [with OPGW] (55 km)
	220 kV S/c proposed 400kV GSS Hanumangarh- Rawatsar (220 kV GSS) line [with OPGW] (80 km)
	132 kV S/c Udhyog Vihar (220kV GSS)- Sriganganagar (132 kV GSS) line [with OPGW] (18 km)
2.	Establishment of 400/220 kV, 2x500 MVA Udaipur substation with 125 MVAR 420 kV switchable bus reactor
	LILO of one circuit of 400 kV D/c Chhitorgarh- Bhilwara line at Udaipur GSS with 2x50 MVAR switchable line reactors at both ends. (LILO length: 90 km)
	LILO of 220 kV S/c Debari-Amberi line at Udaipur GSS (LILO length: 2.5 km)
	LILO of 220 kV S/c Madri- Banswara line at Udaipur GSS (LILO length: 11 km)
3.	Establishment of 220/132 kV, 1x160 MVA and 132/33 kV 1x31.5 MVA Dungarpur substation
	220 kV D/C Udaipur (400 kV GSS) – Dungarpur line (102 km)
	LILO of one circuit of proposed 220 kV D/C Udaipur (400 kV GSS)- Dungarpur line at 220 kV GSS Aspur. (LILO length: 15km)
	LILO of 132 kV S/C Dungarpur (132 kV GSS)- Sagwara line at proposed 220 kV GSS Dungarpur (LILO length: 14 km)
	132 kV D/C line from Dungarpur (220 kV GSS) to Diversion point (for Bicchiwara and Seemalwara). (14 km)
	132 kV S/C line form Diversion point (for Bicchiwara and Seemalwara) to 132 kV GSS Bicchiwara. (26 km)
	132 kV S/C line from Diversion point (for Bicchiwara and Seemalwara) to 132 kV GSS Seemalwara. (30 km)

Package No.	Package name and details
	2x220 kV feeder bays at 220 kV GSS Aspur
	1x132 kV feeder bay at 132 kV GSS Bicchiwara
	1x132 kV feeder bay at 132 kV GSS Seemalwara

(F) <u>Tamil Nadu</u>

Package No.	Package name and details
1.	Establishment of 400/230 kV, 2x500 MVA, & 2x200 MVA 230/110 kV Samugarengapuram substation
2.	400 kV D/c quad line on DC Towers from Udangudi switchyard to 400 kV Samugarengapuram Substation (40 km)
3.	230 kV D/c line from S.R Pudur Substation to Samugarengapuram substation (60 km)
	230 kV D/c line from Muppandal Substation to Samugarengapuram substation (60 km)
	110 kV SC line on D/c tower from Kottaikarungulam substation to Samugarengapuram substation (5 km)
	110 kV S/c line on D/c tower from Kudangulam substation to Samugarengapuram substation (17 km)
	110 kV S/c line on D/c tower from Thandayarkulam substation to Samugarengapuram substation (20 km)
	110 kV S/c line on D/c tower from Vadakankulam substation to Samugarengapuram substation (28 km)
	110 kV S/c line on D/c tower from Navaladi substation to Samugarengapuram substation (25 km)
	110 kV line from existing Samugarengapuram substation to 400 kV Samugarengapuram substation
4.	230/110 kV, 200 MVA Digital substation at Poolavady
5.	230 kV D/c line from 400/230 kV Anaikadavu substation to Poolavady substation (15 km)
	LILO of 230 kV D/c line Palladam — Tirupur at Poolavady substation (35 km)
	Conversion of existing 110 kV S/c line on S/c towers in the 110 kV Poolavady spur — line of 110 kV Udumalpet - Gudimangalam feeder into 110 kV D/c line on D/c towers (6.15 km)
	Conversion of existing 110 kV S/c line on S/c towers from 110 kV Poolavady substation to 110 KV Kethanur substation into 110 kV D/c line on D/c towers for a distance of 26 km The second circuit will be connected from Poolavady to 110 kV Sultanpet substation
	110 kV D/c line from proposed 230 kV Poolavady substation to existing 110 kV Poolavady substation (1 km)
6.	200 MVA, 230/110 kV Muppandal Substation
7.	230 kV D/c line from 230/110 kV Muppandal substation to new Muppandal Substation (40 km)
	110 kV S/c line on D/c tower from 230/110 kV Muppandal Substation to 110 /11 kV Muppandal substation (1 km)
	110 kV S/c line on D/c tower to 110/11 kV Aralvaimozhi substation to Muppandal substation (4 km)
	110 kV S/c line on D/c tower 110/11 kV Kannanallur substation to Muppandal substation (5 km)
	l10 kV S/c line on D/c tower 110/33/11 kV Pazhavoor Muppandal substation (8km)
8.	300 MVA, 230/110 kV substation at Kongalnagaram
9.	LILO of 110 kV O.K.Mandapam- Myvadi D/c line at Kongalnagaram substation (2 km)
	LILO of 230 kV O.K.Mandapam- Ponnapuram D/c line at- Kongalnagaram substation (9 km)
	LILO of 110 kV O.K.Mandapam-Udumalpet-I D/c line at Kongalnagaram substation (2 km)
	LILO of 110 kV O.K.Mandapam- Udumalpet-II D/c line at Kongalnagaram substation (2 km)
	LILO of 110 kV Udumalpet -Kongalnagaram D/c line at Kongalnagaram substation (2 km)
	110 kV D/c line from 230 kV Kongalanagarain substation to 110 kV Kongalnagaram substation (5km)
	Stringing of new 110 kV S/c line in the free arm of the existing D/c towers from 110 kV Kongalnagaram Substation to 230 kV Kongalanagaram substation (5 km)
	400 kV Quad D/c Lines for making LILO of both circuits of Karaikudi- Pugalur 400 kV D/c Quad Line at Pudukottai (210 km)

(G) <u>Uttar Pradesh</u>

Package No.	Package Name and Details
1.	Creation of 400/220 kV, 3x500 MVA Garautha (Jhansi) S/s with 1x125 MVAR 400 kV Bus Reactor at Garautha (Jhansi) with 06 Nos. 400 kV feeders, 5 Nos. 220 kV feeders
	33 kV line for station supply (20 km)
	LILO of both circuits of Orai (PG)- Orai (UPPTCL) 400 kV D/c line (Quad Moose) at Garautha (Jhansi) (53 km)
2.	Creation of 765/400/220 kV Talbehat substation having 1x1500 MVA (765/400/33 kV) ICT and 2x500 MVA (400/220 kV) ICT, 1 No. 330 MVAR 765 kV bus reactor, 1 No. 125 MVAR 420 kV bus reactor, 2 Nos. 765 kV feeders, 02 Nos. 400 kV feeders & 2 Nos. 220 kV feeders, Shifting of 765 kV 330 MVAR line Reactor from Lalitpur (TPS) to Talbehat
	LILO of one circuit of 765 kV Lalitpur TPS – Agra D/c line at Talbehat (18.5 km)
	Talbehat - Garautha (Jhansi) 400 kV D/c line (Quad Moose) (130 km)
	Talbehat – Lalitpur TPS 220 kV D/c line (HTLS) (36 km)
	2 Nos. 220 kV feeder bays at Lalitpur TPS
3.	Creation of 400/220/132kV, (2x500 + 2x160) MVA Maheba (Jalaun) with 125 MVAR 400 kV bus reactor, 4 Nos. 400 kV feeders and 3 Nos 220 kV feeders at Maheba (Jalaun)
	Construction of 33 kV line for Auxiliary supply (20 km)
	Shifting of 11 kV line from proposed land for Maheba substation
	LILO of one ckt of Banda - Orai (UPPTCL) 400 kV D/c line (Quad Moose) at Maheba (Jalaun) (20 km)
	220 kV Maheba – Hamirpur (Sarila) D/c line with Moose conductor (104 km)
	220 kV Bay at Hamirpur (Sarila) – 02 Nos.
4.	Creation of 132 kV Voltage level at Banda substation with 220/132 kV 2x160 MVA ICT at Banda substation with 5 Nos. 132 kV feeder bays
	LILO of 132 kV Banda (220) – Kabrai (220) S/c line at Banda (400) (LILO length: 1.5 km) along with replacement of existing earth wire of Banda- Kabrai 132 kV S/c line with OPGW (30 km)
5.	Creation of 220/132 kV, (2x160+2x40) MVA Hamirpur (Sarila) substation with 3 Nos. 220 kV and 2 Nos. 132 kV feeders
	LILO of Mahoba- Banda 220 kV S/c line at Hamirpur (Sarila) (35 km)
	LILO of Bharua Sumerpur – Sarila 132 kV S/c line at Hamirpur (Sarila) (4 km)
6.	Creation of 220/132 kV, (1x160 + 1x40) MVA Charkhari (Mahoba) with 4 Nos. 220 kV feeders and 3 Nos. 132 kV feeders
	Charkhari (Mahoba) - Garotha (Jhansi) 220 kV D/c line with Moose conductor (67 km)
	LILO of one circuit of Mahoba (220) – Panwari 132 kV D/c line at Charkhari (Mahoba) (25 km)
7.	Creation of 220/132/33 kV, (1x60+1x40) MVA Jaitpur (Mahoba) with 1 No. 220 kV feeder and 1 No. 132 kV feeder
	Jaitpur (Mahoba) – Charkhari (Mahoba) 220 kV S/c line on D/c tower (40 km)
8.	Creation of 132/33 kV, 2x40 MVA Baberu (Banda) with 2 Nos. 132 kV feeders
	Baberu (Banda) - Pailani 132 kV D/c line (40 km)
	132 kV Bay at Pailani – 02 Nos.
9.	Creation of 132/33 kV, 2x40 MVA Muskara (Hamirpur) with 2 Nos. 132 kV feeders
	LILO of Bharuwa Sumerpur –Sarila 132 kV S/c line at Muskara (Hamirpur) (8 km)
10.	Creation of 220/132/33 kV, 1x160 + 1x40 MVA Birdha (Lalitpur) with 1 No. 220 kV feeder
	Birdha (Lalitpur) – Lalitpur (220) 220 kV S/c line on D/c tower (30 km)
	1 No. 220 kV bay at Lalitpur
11.	Creation of 220/132/33 kV, 1x160+1x40 MVA Mandawra (Lalitpur) with 1 No. 220 kV feeder and 1 No. 132 kV feeder
	Mandawra (Lalitpur) - Lalitpur (220) 220 kV S/c line on D/c tower (55 km)
	1 No. 220 kV bay at Lalitpur
12.	Creation of 220/132/33 kV, 1x160+1x40 MVA Dakaur (Jalaun) with 1 No. 220 kV feeder
	Dakaur- Maheba (400) 220 kV S/c line on D/c tower (42 km)

13.	Creation of 220/132/33 kV, 1x160+1x40 MVA Bamaur (Jhansi) with 1 No. 220 kV feeder
	Bamaur(Jhansi) - Garautha (Jhansi) 220 kV S/c line on D/c tower (34 km)
14.	Creation of 220/132/33 kV, 1x160+1x40 MVA Bangra (Jhansi) with 1 No. 220 kV feeder
	Bangra (Jhansi) - Garautha (Jhansi) 220 kV S/c line on D/c tower (45 km)
15.	Creation of 220/132/33kV, 1x160+1x40 MVA Kabrai (Mahoba) with 1 No. 220 kV feeder
	Kabrai (Mahoba) – Charkhari (Mahoba) 220 kV S/c line on D/c tower (40 km)
16.	Creation of 132/33 kV, 2x40MVA Kadaura (Jalaun) with 1 No. 132 kV feeder
	Kadaura-Hamirpur (Patara) 132 kV S/c line on D/c tower (32 km)
	1 No. 132 kV bay at Hamirpur (Patara)
17.	Creation of 132/33 kV, 2x40MVA Kuthond (Jalaun) with 1 No. 132 kV feeder
	Kuthond (Jalaun) - Madhogarh 132 kV S/c line on D/c tower (36 km)
	1 No. 132 kV bay at Madhogarh
18.	Creation of 132/33 kV, 2x40MVA Gohand (Hamirpur) with 2 Nos. 132 kV feeder
	LILO of one circuit of Panwari- Sarila 132 kV D/c line at Gohand (Hamirpur) (20 km)
19.	Creation of 132/33 kV, 2x40MVA Mehrauni (Lalitpur) with 1 No. 132 kV feeder
	Mehrauni (Lalitpur) – Mandawara (Lalitpur) 132 kV S/c line on D/c tower (30 km)
20.	Creation of 400/220/132 kV 2x500 MVA +2x160 MVA Farrukhabad substation with 125 MVAR 400 kV bus reactor, 4 Nos. 400 kV feeders, 2 Nos. 220 kV feeders at Farrukhabad
	Maheba (Jalaun) - Farrukhabad 400 kV D/c line (Twin Moose) (158 km)
	Farrukhabad - Badaun 400 kV D/c line (Twin Moose) (90 km)
	LILO of 220 kV Chhibramau- Farrukhabad (220 kV) line at Farrukhabad (400 kV) LILO length (31 km)
21.	Creation of 400/220 kV, 2x500 MVA Chitrakoot S/s with 125 MVAR Bus Reactor, 2 Nos of 400 kV line bays, 4 Nos. of 220 kV line bays
	Construction of 33 kV line for station supply
	Banda- Chitrakoot 400 kV D/c line (130 km)
	2 Nos. of 400 kV line bays at Banda S/s

Annex 10.3

Broad Transmission system of Hydroelectric Projects/ Pumped Storage Projects likely by 2032

Sl. No.	Name of Hydro Project	Capacity (MW)	Broad transmission system
	Andhra Pradesh		
1.	Chitravathi PSP (NREDCAP)	500	Chitravathi PSP - Kurnool PS III S/s 400 kV D/c line (twin)
2.	Gandikota PSP (NREDCAP)	1000	Gandikota PSP - Kurnool-III PS S/s 400 kV D/c line (quad)
3.	Lower Sileru Extension (APGENCO)	230	Transmission System under Intra State
4.	OWK PSP (NREDCAP)	800	Transmission System under Intra State
5.	Paidipalem East PSP (NREDCAP)	1200	Paidipalem East PSP - Nandipadu (PGCIL) 400 kV D/c line (quad)
6.	Paidipalem North PSP (NREDCAP)	1000	Paidipalem North PSP- Nandipadu (PGCIL) 400 kV D/c line (quad)
7.	Pinnapuram PSP (Greenko AP01 IREP Private Limited)	1200	Greenko AP01 IREP Pvt. Ltd. – Kurnool (New) 400 kV (quad) D/c line.
8.	Polavaram (APGENCO/ Irrigation Dept.)	960	Transmission System under Intra State
9.	Singanamala PSP (NREDCAP)	800	Singanamala PSP - Gooty (PGCIL) Substation 400 kV D/c line (quad)
10.	Somasila PSP (NREDCAP)	900	Transmission System under Intra State
11.	Upper Sileru PSP (APGENCO)	1350	Transmission System under Intra State
	Arunachal Pradesh		
12.	Demwe Lower (ADPL)	1750	Transmission System under Intra State
13.	Dibang (Multipurpose) (NHPC)	2880	Dibang HEP – Gogamukh 400 kV 2xD/c line
14.	Nafra (SEW Energy)	120	Transmission System under Intra State
15.	Subansiri Lower (NHPC)	2000	Lower Subansiri - Biswanath Chariali 400 kV 2xD/c line
16.	Talong Londa (GMR)	225	Talong Londa- Biswanath Chariali 400 kV D/c line
17.	Tato-I (SHPPL)	186	Tato-I HEP – Naying 220 kV D/c line
	Assam		
18.	Lower Kopli (APGCL)	120	Transmission System under Intra State
	Himachal Pradesh		
19.	Chanju III (HPPCL)	48	Transmission System under Intra State
20.	Dhaulasidh (SJVN)	66	Transmission System under Intra State
21.	Dugar HEP (NHPC)	500	*Interim Arrangement*: Kishtwar to Dugar Section of Kishtwar PS – Tindi PS 400 kV D/c to be taken up for implementation and to be terminated at Dugar HEP switchyard. *Final Arrangement*: After completion of the section from Dugar to Tindi, one circuit of Dugar-Kishtwar D/c line would be connected directly to one circuit of Dugar to Tindi 400 kV D/c line thus forming Kistwar- Dugar-Tindi 400 kV S/c line and Kishtwar- Tindi 400 kV S/c line **Common system:**

Sl. No.	Name of Hydro Project	Capacity (MW)	Broad transmission system
			1. 400 kV Pooling/Switching Station (GIS) at Tindi and Barangal. 2. 1x125 MVAR 420 kV bus reactor each at Tindi and Barangal. 3. LILO of Chamera-I – Chamera –II 400 kV line at Barangal PS.
22.	Kutehr (JSW Energy Ltd)	240	Transmission System under Intra State
23.	Luhri Stage -I (SJVN)	210	**Common System:** 1. Establishment of 7x105 MVA, 400/220 kV Nange GIS Pooling Station. 2. Nange (GIS) Pooling Station – Koldam 400 kV D/c line. 3. Bypassing one ckt of Koldam – Ropar/ Ludhiana 400 kV D/c line at Koldam and connecting it with one of the circuit of Nange- Koldam 400 kV D/c line, thus forming Nange- Ropar/ Ludhiana 400 kV S/c line. **Under the scope of generation developer:** Luhri Stage-I – Nange Pooling Station 220 kV D/c line. (The transmission system is under review)
24.	Parbati St. II (NHPC)	800	Parbati-II - Parbati Pooling Station 400 kV D/c line
25.	Shongtong Karcham (HPPCL)	450	1. LILO of one circuit of Jhangi PS - Wangtoo (HPPTCL) 400 kV D/c (Quad) line at generation switchyard of Shongtong HEP. 2. Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c (Twin HTLS) Line along with 80 MVAr switchable line reactor at Panchkula end at each circuit.
26.	Sunni Dam HEP (SJVN)	382	**Common System:** 1. Establishment of 7x105 MVA, 400/220 kV Nange GIS Pooling Station. 2. Nange (GIS) Pooling Station – Koldam 400 kV D/c line. 3. Bypassing one ckt of Koldam – Ropar/ Ludhiana 400 kV D/c line at Koldam and connecting it with one of the circuit of Nange- Koldam 400 kV D/c line, thus forming Nange- Ropar/ Ludhiana 400 kV S/c line. **Under the scope of generation developer:** Sunni Dam – Nange Pooling Station 220 kV D/c line. (The transmission system is under review)
27.	Tangnu Romai (NSL Renewable Power Private Limited)	44	Transmission System under Intra State
28.	Thana Plaun (HPPCL)	191	Transmission System under Intra State
29.	Tidong-I (Statkraft IPL)	150	1. Establishment of 2x315 MVA (7x105 MVA 1-ph units) 220/400 kV GIS Pooling Station at Jhangi. 2. 400 kV Jhangi PS – Wangtoo (Quad) D/c line. 3. 420 kV Bus reactor -1 No. (4x 41.66 MVA 1-ph units including one spare unit) **Under the scope of generation developer:** Tidong HEP - Jhangi PS 220 kV D/c line
30.	Uhl-III (BVPCL)	100	Transmission System under Intra State

Sl. No.	Name of Hydro Project	Capacity (MW)	Broad transmission system
	Jammu & Kashmir		
31.	Dulhasti Stage-II (NHPC)	260	Dulhasti Stage-II HEP- Kishtwar PS 220 kV D/c line
32.	Lower Kalnai (JKSPDC)	48	Transmission System under Intra State
33.	Kirthai-II (JKSPDC)	930	To be connected to Kishtwar PS
34.	Kiru (CVPPL)	624	**Common System:** 1. Establishment of 2x200 MVA, 400/132 kV Kishtwar Pooling station by LILO of one circuit of Kishenpur – Dulhasti 400 kV D/c line 2. Stringing of 2nd circuit of Kishenpur – Dulhasti 400 kV D/c (Quad) line from Kishtwar to Kishenpur. **Under the scope of generation developer:** Implementation of Kiru –Kwar – Pakal Dul - Kishtwar 400 kV D/C line
35.	Kwar (CVPPPL)	540	**Common System:** 1. Establishment of 2x200 MVA, 400/132 kV Kishtwar Pooling station by LILO of one circuit of Kishenpur – Dulhasti 400 kV D/c line 2. Stringing of 2nd circuit of Kishenpur – Dulhasti 400 kV D/c (Quad) line from Kishtwar to Kishenpur. **Under the scope of generation developer:** Implementation of Kiru –Kwar – Pakal Dul - Kishtwar 400 kV D/C line.
36.	Pakal Dul (CVPPL)	1000	**Common System:** 1. Establishment of 2x200 MVA, 400/132 kV Kishtwar Pooling Station by LILO of one circuit of Kishenpur – Dulhasti 400 kV D/c line 2. Stringing of 2nd circuit of Kishenpur – Dulhasti 400 kV D/c (Quad) line from Kishtwar to Kishenpur. **Under the scope of generation developer:** Implementation of Kiru –Kwar –Pakal Dul - Kishtwar 400 kV D/C line.
37.	Parnai (JKSPDC)	37.50	Transmission System under Intra State
38.	Ratle (RHEPPL / NHPC)	850	**Common System:** 1. LILO of 400 kV Kishenpur- Dulhasti line (Twin) at Kishtwar S/s 400 kV Kishenpur-Samba D/c line (Quad) 2. 400 kV Kishenpur-Samba D/c line (Quad) 3. Bypassing of one ckt of 400kV Kishtwar – Kishenpur 400kV D/c line (Quad) at Kishenpur and connecting it with one of the circuit of Kishenpur-Samba 400kV D/c line(Quad), thus forming 400kV Kishtwar - Samba (Quad) direct line (one ckt) 4. Bypassing both ckts of 400kV Kishenpur – Samba D/c line (Twin) & 400 kV Samba – Jalandhar D/c line (Twin) at Samba and connecting them together to form 400kV Kishenpur– Jalandhar D/c direct line (Twin) 5. 400 kV Samba- Jalandhar D/c line(Quad) 6. Bypassing 400kV Jalandhar – Nakodar line (Quad) at Jalandhar and connecting it with one of the circuit of Samba-Jalandhar 400kV D/c line(Quad Moose), thus forming 400kV Samba –Nakodar line

Sl. No.	Name of Hydro Project	Capacity (MW)	Broad transmission system
			Under the scope of generation developer: Ratle HEP - Kishtwar PS 400 kV D/c line
39.	Uri-I Stage-II (NHPC)	240	LILO of one circuit of Uri-I Stage-I – Amargarh 400 kV D/c line at Uri-I Stage-II
	Karnataka		
40.	Saundatti PSP (Greenko Solar Energy Private Limited)	1600	• Saundatti PSP - Gadag II S/s 400 kV D/c line (quad) • Saundatti PSP - Dhoni S/s (KPTCL) 400 kV D/c line
41.	Sharavathy PSP (KPCL)	2000	Transmission System under Intra State
	Kerala		
42.	Mankulam (KSEB)	40	Transmission System under Intra State
43.	Pallivasal (KSEB)	60	Transmission System under Intra State
44.	Thottiyar (KSEB)	40	Transmission System under Intra State
	Madhya Pradesh		
45.	Maheshwar (SMHPCL)	400	Transmission System under Intra State
46.	MP 30 Gandhi Sagar PSP (Greenko MP01 IREP Private Limited)	1920	MP 30 PSP - Mandsaur PS 400 kV D/c line (quad)
	Maharashtra		
47.	Bhavali PSP (JSW Energy PSP Two Limited)	1500	Bhavali PSP- Boisar-II S/s 400 kV D/c line (quad)
48.	Bhivpuri PSP (Tata Power Company Limited)	1000	Bhivpuri PSP- South Kalamb S/s 400 kV D/c line (Twin HLTS)
49.	Koyna Left Bank PSP (WRD, Maharashtra)	80	Transmission System under Intra State
	Meghalaya		
50.	Myntdu Leshka Stage-II (MePGCL)	210	Transmission System under Intra State
	Nagaland		
51.	Dikhu (Manu Energy Systems)	186	Dikhu HEP – Mokokchung 220 kV D/c line
	Punjab		
52.	Shahpur Kandi (PSPCL/ Irrigation Deptt., Punjab)	206	Transmission System under Intra State
	Rajasthan		
53.	Shahpur PSP (Greenko Energies Private Limited)	1800	LILO of one circuit of Gwalior- Bina 765 kV D/c line at Shahpur PSP
54.	Sirohi PSP (JSW Neo Energy Limited)	1200	Sirohi PSP- Sirohi (ISTS) 400 kV D/c line (quad)
55.	Sukhpura PSP (Greenko Energies Private Limited)	2560	LILO of one circuit of Beawar- Mandsaur 765 kV D/c line at Sukhpura PSP
	Sikkim		
56.	Bhasmey (Gati Infrastructure)	51	Bhasmey HEP – Rangpo 132 kV S/c line
57.	Panan (Himagiri)	300	Panan HEP – Mangan 400 kV D/c line

Sl. No.	Name of Hydro Project	Capacity (MW)	Broad transmission system
58.	Rangit-II (Sikkim Hydro)	66	Transmission System under Intra State
59.	Rangit-IV (NHPC)	120	Rangit IV - New Melli 220 kV D/c line
60.	Teesta St-IV (NHPC)	520	Teesta IV HEP – Mangan 400 kV D/c line
61.	Teesta St. VI (NHPC)	500	Teesta VI - Rangpo 220 kV (Twin Moose) D/c line
	Tamil Nadu		
62.	Kundah PSP (TANGEDCO)	500	Transmission System under Intra State
	Uttar Pradesh		
63.	Kandhaura PSP (JSW Neo Energy Limited)	1680	Kandhaura PSP- Robertsganj (PGCIL) 400 kV D/c line (quad)
64.	Musakhand PSP (ACME Urja Two Pvt. Ltd.)	600	Musakhand PSP- Robertsganj (PGCIL) 400 kV D/c line
65.	UP01 PSP (GREENKO Energies Private Limited)	3660	UP01 PSP- Robertsganj (PGCIL) 400 kV 2xD/c line (quad)
	Uttarakhand		
66.	Lakhwar (UJVNL)	300	Transmission System under Intra State
67.	Lata Tapovan (NTPC)	171	Lata Tapovan – Joshimath 220 kV D/c line
68.	Naitwar Mori (SJVN)	60	Transmission System under Intra State
69.	Phata Bhyung (LANCO)	76	Transmission System under Intra State
70.	Sirkari Bhyol Rupsiabagar (UJVNL)	120	Transmission System under Intra State
71.	Tapovan Vishnugad (NTPC)	520	1. Establishment of 400 kV Pipalkoti switching station. 2. Tapovan Vishnugad HEP – Pipalkoti 400 kV S/s 400 kV D/c line. 3. Pipalkoti 400 kV S/s - Srinagar 400 kV D/c (Quad Moose) line. 4. Srinagar- Kashipur 400 kV D/c (Quad) line
72.	Tehri PSP (THDC)	1000	Tehri PSP - Tehri PS 400 kV D/c line
73.	Vishnugad Pipalkoti (THDC)	444	1. Establishment of 400 kV Pipalkoti switching station. 2. Pipalkoti HEP– 400 kV Pipalkoti switching station 400 kV D/c (Twin Moose) line. 3. Pipalkoti 400 kV S/s- Srinagar 400 kV D/c (Quad Moose) line. 4. Srinagar- Kashipur 400 kV D/c (Quad) line
74.	Vyasi (UJVNL)	120	• Vyasi HEP – Sherpur, Dehradun (PGCIL) 220 kV S/c line • Vyasi HEP -Jhajhra (PTCUL) 220 kV S/c line
	West Bengal		
75.	Rammam-III (NTPC)	120	Transmission System under Intra State
76.	Turga PSP (WBSEDCL)	1000	Transmission System under Intra State
	Total (MW)	**51661.5**	

Note: Transmission system for some PSPs is tentative and may undergo change depending on the connectivity sought by the PSP Developers to either ISTS or Intra State Transmission System.

Transmission system for evacuation of power from PSPs planned during 2022-32

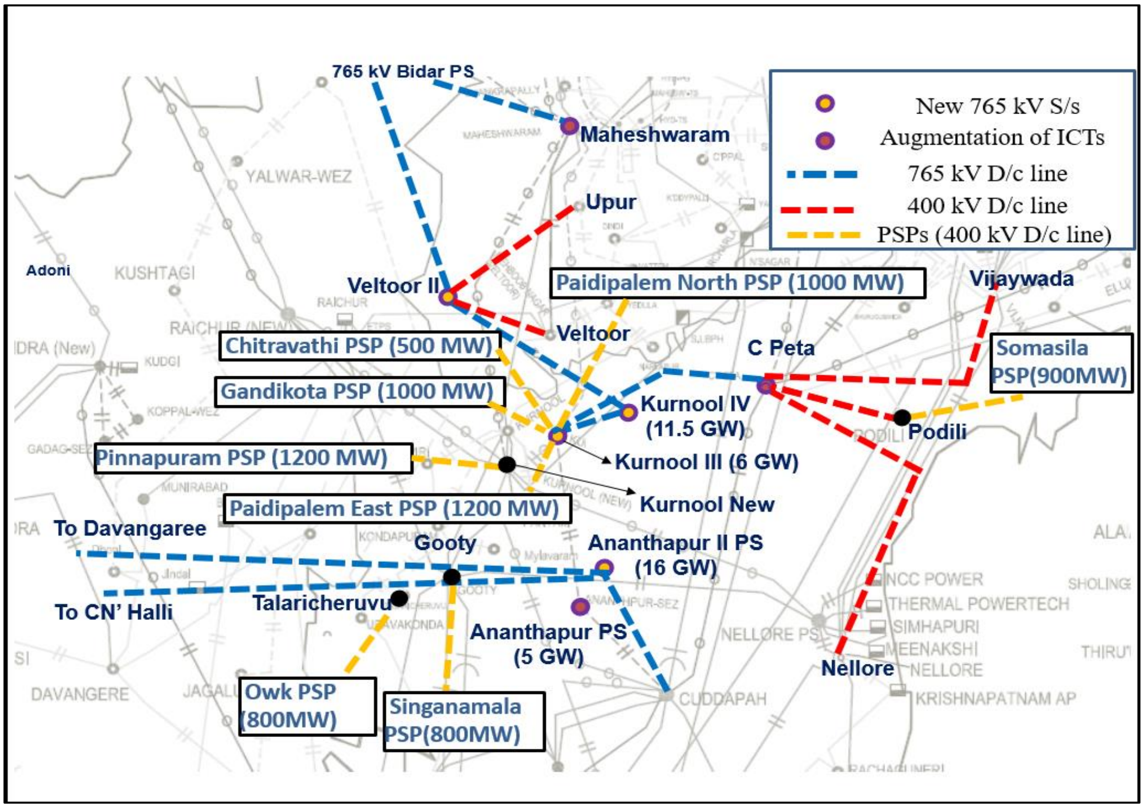


Fig. 1: Transmission system for evacuation of power from Pumped Storage Projects in Andhra Pradesh

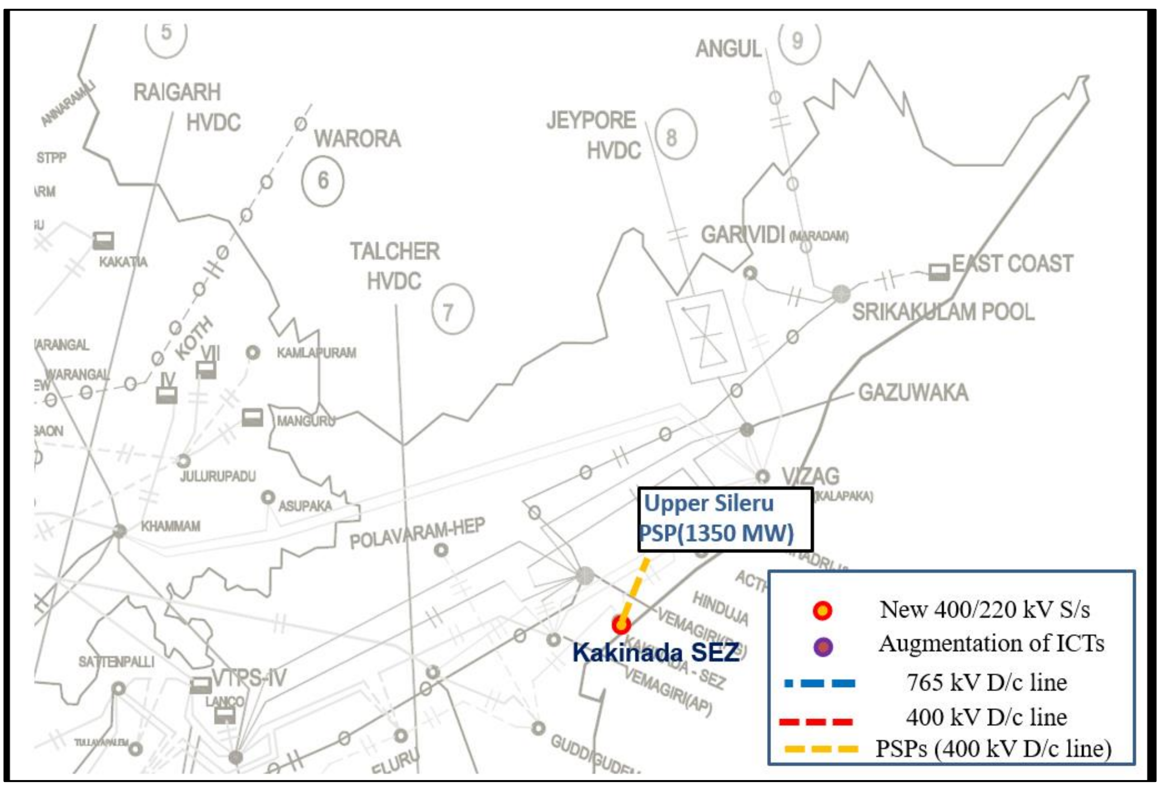


Fig 2: Transmission system for evacuation of Upper Sileru PSP in Andhra Pradesh

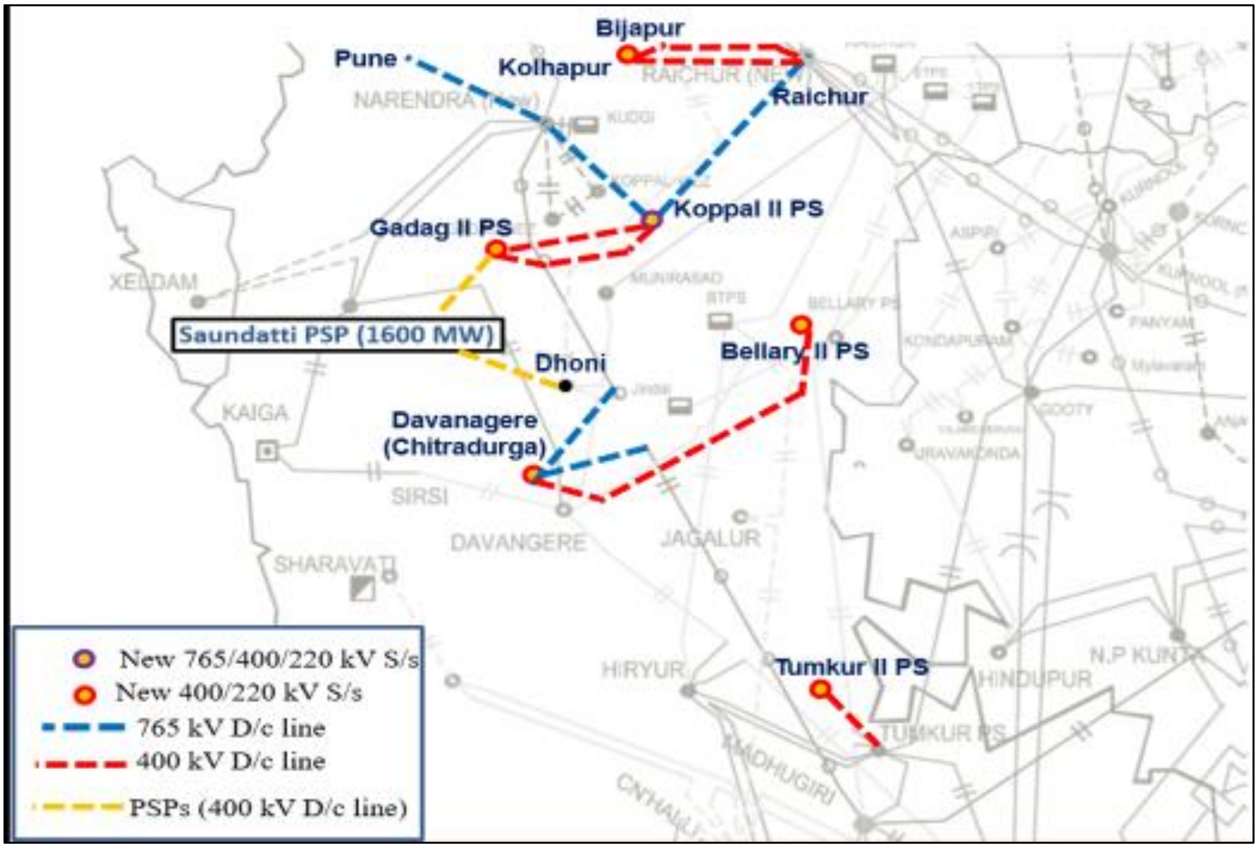


Fig. 3: Transmission system for evacuation of Saundatti PSP in Karnataka

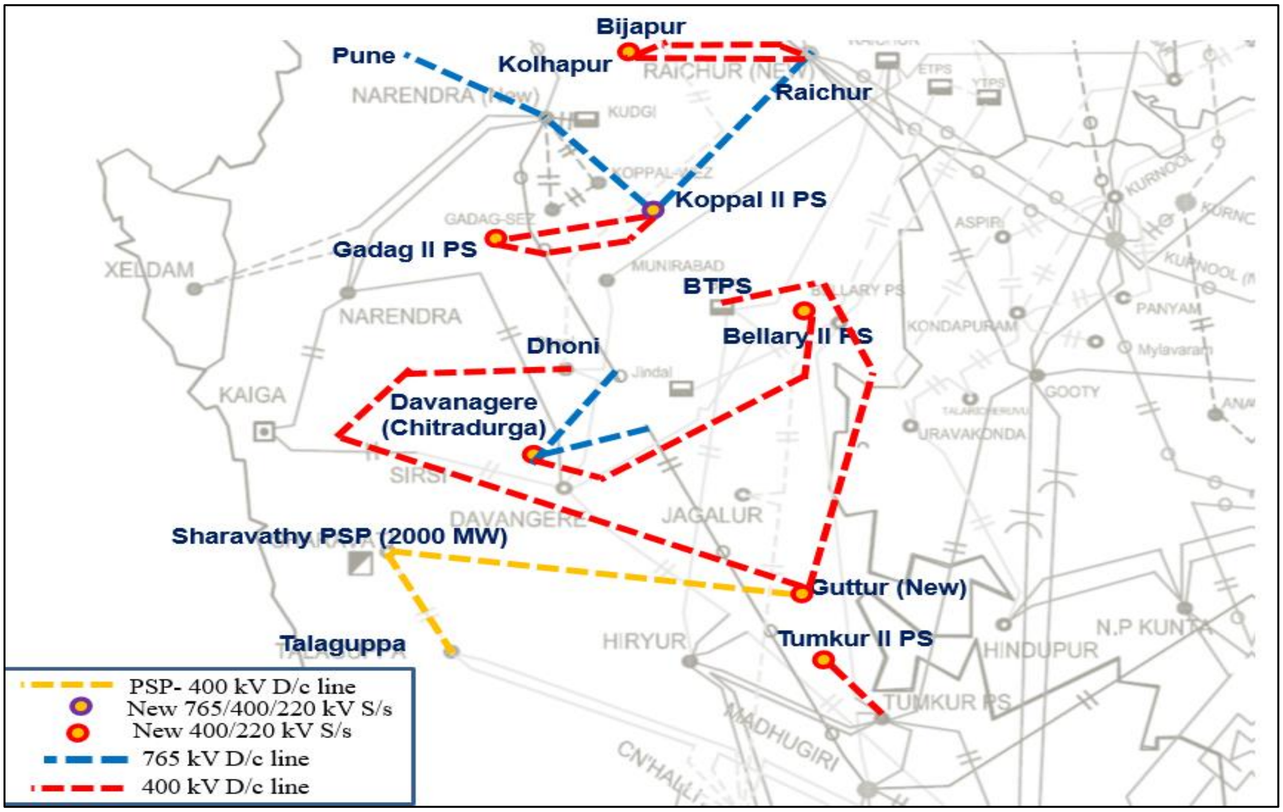


Fig. 4: Transmission system for evacuation of Sharavathy PSP in Karnataka

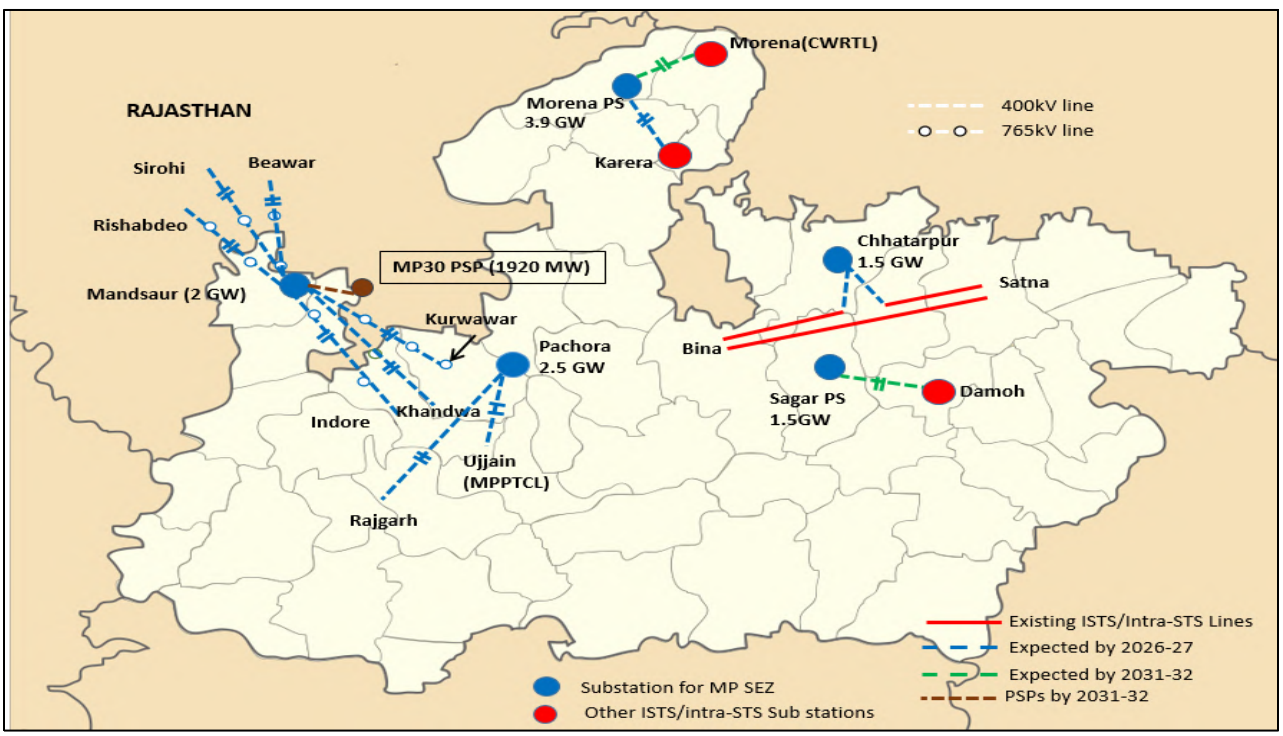


Fig. 5: Transmission system for evacuation of MP30 PSP in Madhya Pradesh

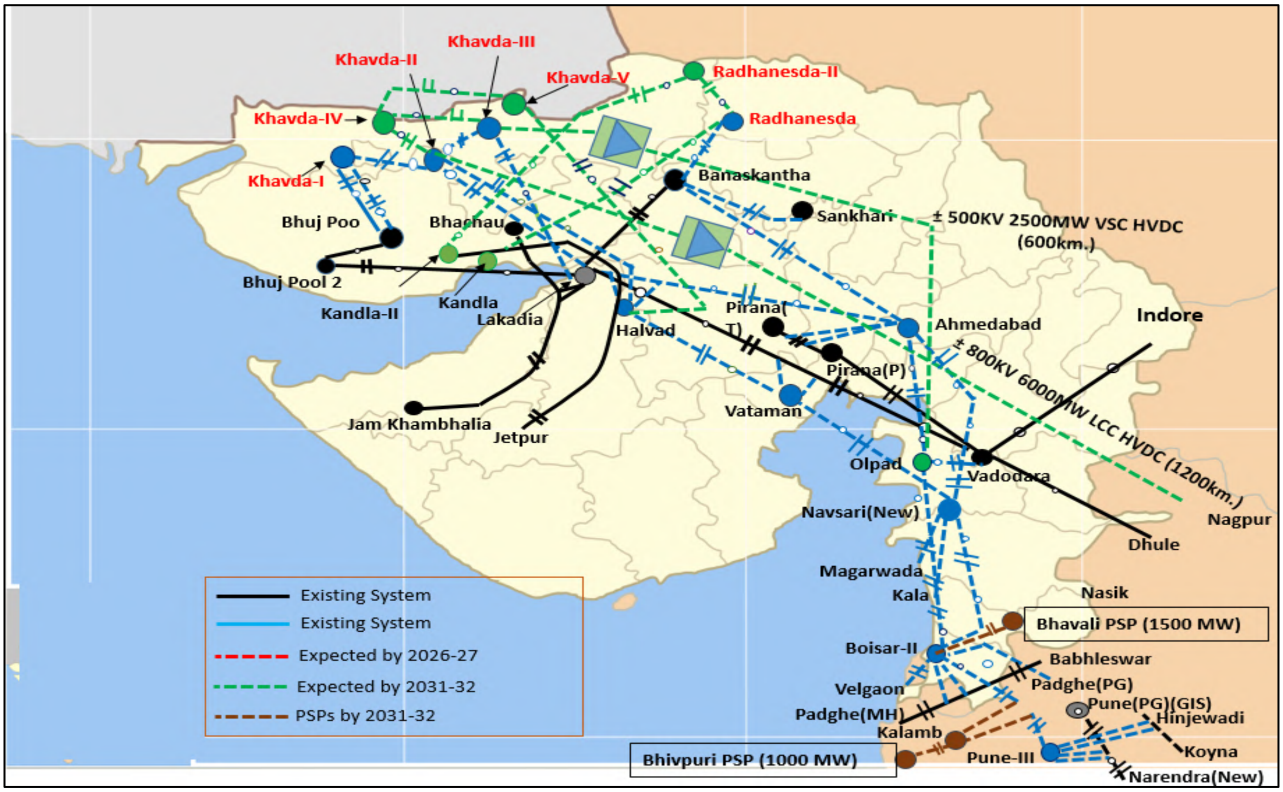


Fig. 6: Transmission system for evacuation of power from Bhivpuri and Bhavali PSPs in Maharashtra

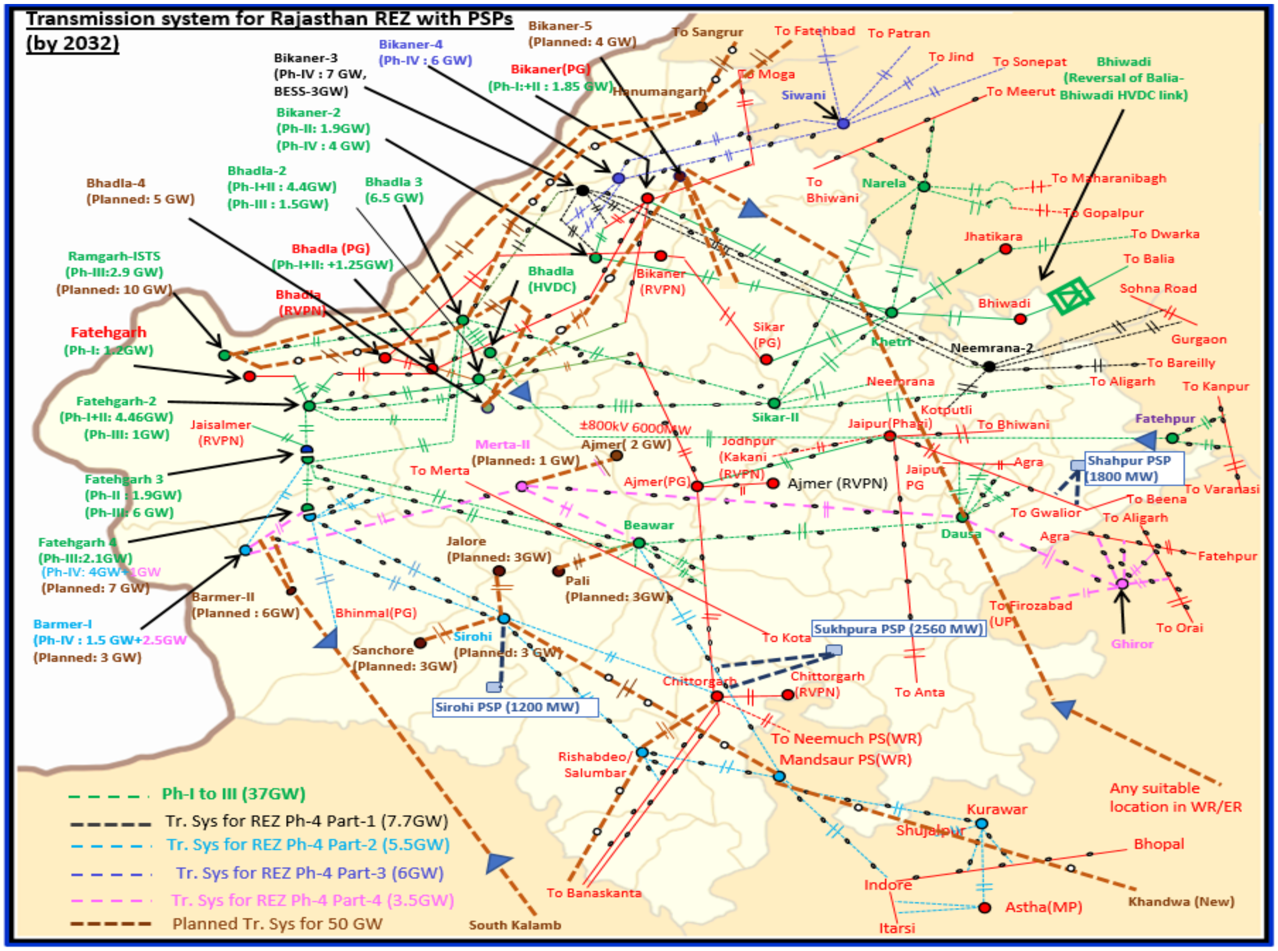


Fig. 7: Transmission system for evacuation of power from Sirohi, Sukhpura and Shahpur PSPs in Rajasthan

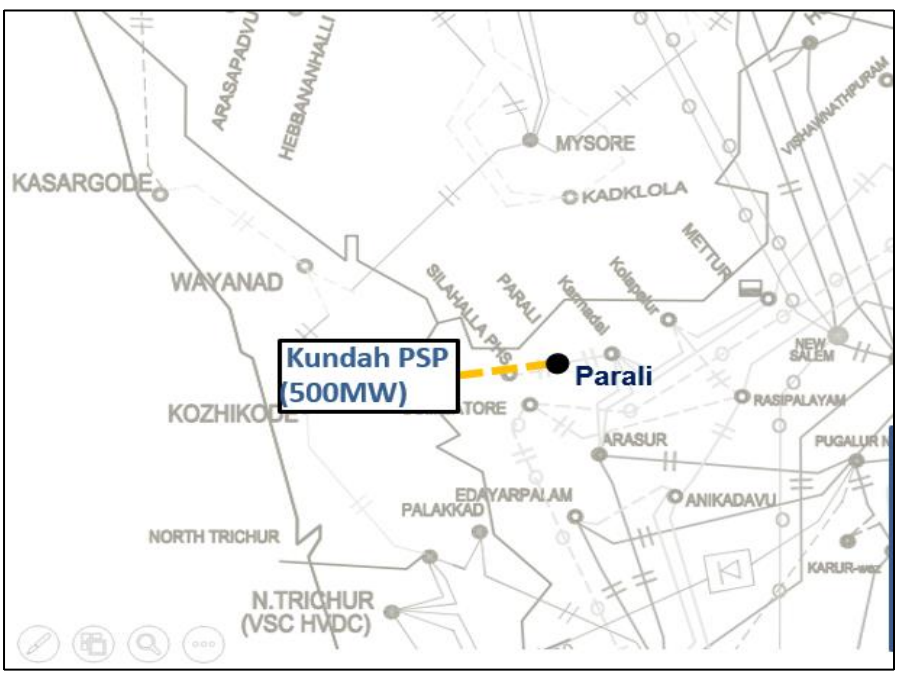


Fig. 8: Transmission system for evacuation of power from Kundah PSP in Tamil Nadu

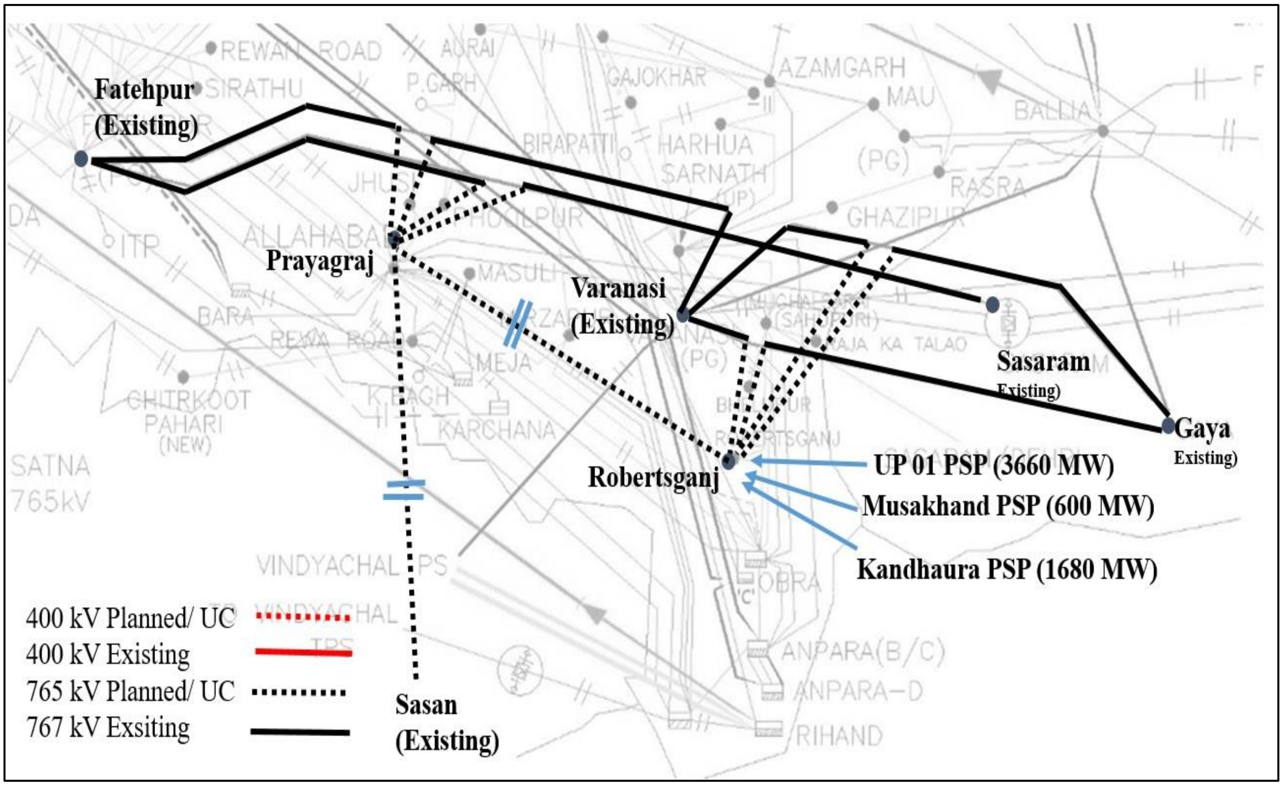


Fig. 9: Transmission system for evacuation of power from UP01, Musakhand and Kandhaura PSPs in Uttar Pradesh

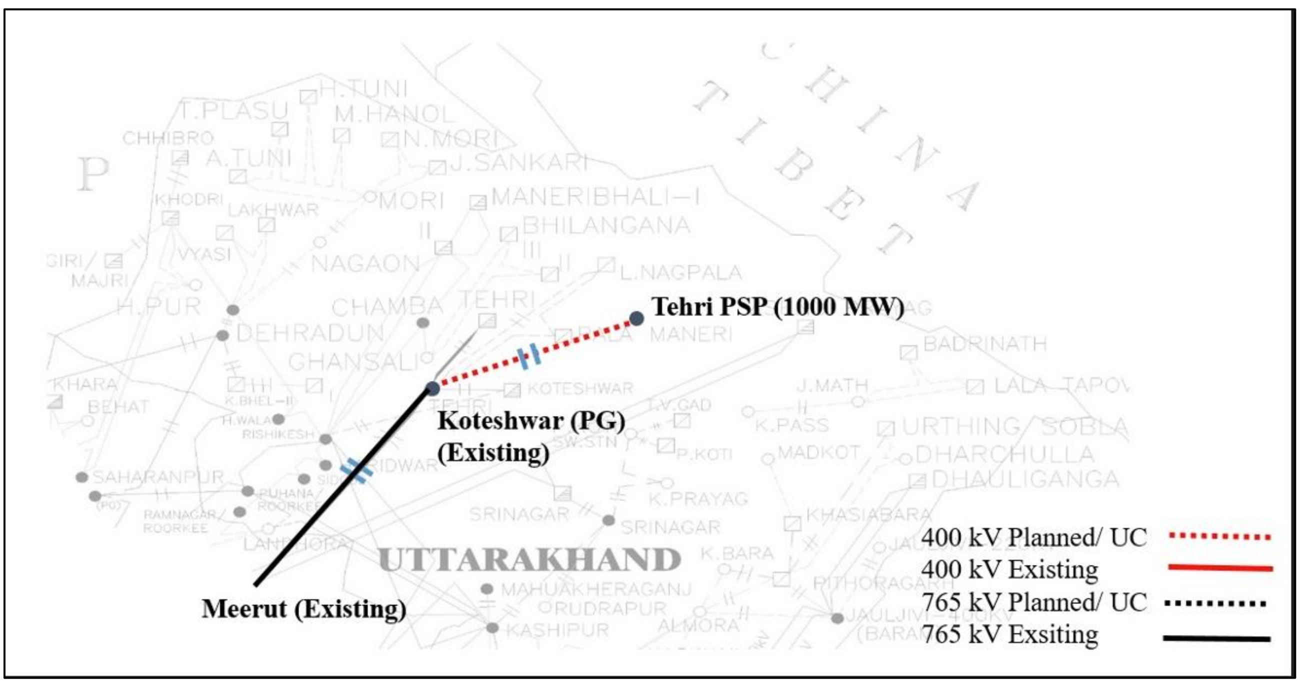


Fig. 10: Transmission system for evacuation of power from Tehri PSP in Uttarakhand

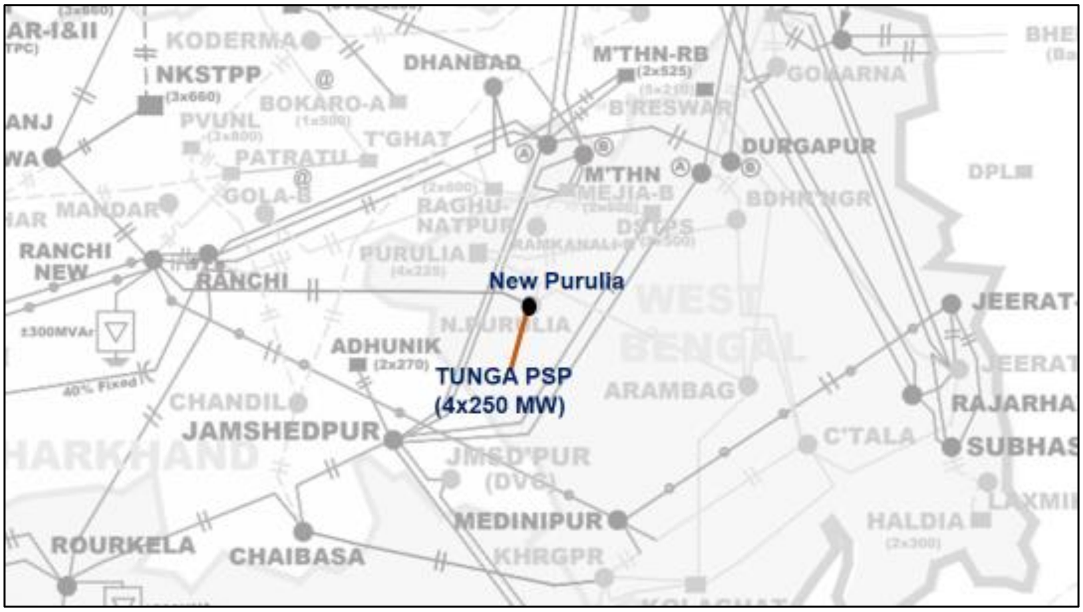


Fig. 11: Transmission system for evacuation of Turga PSP in West Bengal

Annex-11.1

ISTS schemes commissioned through TBCB route (till 31st March, 2024)

Sl. No.	Transmission Scheme	Date of Award	Date of Commissioning	Parent Company
1.	Transmission system associated with IPPs of Nagapattinam/ Cuddalore Area- Package A	March 2012	January 2019	PGCIL
2.	Transmission system for Strengthening in SR for Import of Power from ER.	August 2013	September 2016	PGCIL
3.	ATS of Unchahar TPS	March 2014	December 2016	PGCIL
4.	NR System strengthening Scheme- NRSS-XXXI(Part-A)	May 2014	July 2017	PGCIL
5.	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-A)	April 2015	July 2018	PGCIL
6.	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-B)	April 2015	June 2018	PGCIL
7.	Transmission System Strengthening associated with Vindhyachal – V	February 2015	December 2018	PGCIL
8.	Strengthening of Transmission system beyond Vemagiri	December 2015	January 2020	PGCIL
9.	Transmission system associated with LTA applications from Rajasthan SEZ Part-A	October 2019	May 2021	PGCIL
10.	New WR-NR 765 kV Inter- Regional Corridor	March 2018	July 2021	PGCIL
11.	Transmission system associated with LTA applications from Rajasthan SEZ Part-B	October 2019	August 2021	PGCIL
12.	Transmission system associated with LTA applications from Rajasthan SEZ Part-C	August 2019	October 2021	PGCIL
13.	System Strengthening Scheme in Eastern Region ERSS XXI	January 2018	October 2021	PGCIL
14.	765 kV System Strengthening Scheme in Eastern Region ERSSXVIII	March 2017	August 2022	PGCIL
15.	Transmission System for providing connectivity to RE Projects at Bhuj-II (2000 MW) in Gujarat	October 2019	November 2022	PGCIL
16.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under "Phase-II Part-F	March 2021	July 2023	PGCIL
17.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A	March 2021	December 2023	PGCIL
18.	Transmission system for evacuation of power from Neemuch SEZ (1000 MW)	August 2022	March 2024	PGCIL

Sl. No.	Transmission Scheme	Date of Award	Date of Commissioning	Parent Company
19.	System strengthening for WR	March 2011	January 2015	Sterlite Power TL
20.	System strengthening common for WR and NR	March 2011	September 2015	Sterlite Power TL
21.	Scheme for enabling import of NER/ER surplus by NR	March 2010	November 2014	Sterlite Power TL
22.	Part ATS for RAPP U-7&8 in Rajasthan	March 2014	November 2016	Sterlite Power TL
23.	Eastern Region System Strengthening Scheme-VII	December 2013	January 2017	Sterlite Power TL
24.	Northern Regional System Strengthening Scheme, NRSS-XXIX	August 2014	August 2018	Sterlite Power TL
25.	Connectivity lines for Maheshwaram 765/400 kV S/S	August 2015	December 2017	Sterlite Power TL
26.	Common Transmission system for phase-II generation projects in Orissa and immediate evacuation system for OPGC project (Orissa)	April 2016	December 2018	Sterlite Power TL
27.	Creation of new 400 kV GIS substations in Gurgaon area and Palwal as a part of ISTS	July 2016	March 2020	Sterlite Power TL
28.	NER System Strengthening Scheme II	March 2017	March 2021	Sterlite Power TL
29.	Connectivity system for Khargone TPP (2x660MW)	August 2016	December 2021	Sterlite Power TL
30.	WRSS – 21 Part – B – Transmission System Strengthening for Relieving Over Loadings Observed in Gujarat Intra-State System Due to RE injections in Bhuj PS	November 2019	January 2023	Sterlite Power TL
31.	Eastern Region System Strengthening Scheme-VI	December 2013	August 2017	Essel Infra
32.	Northern Region System Strengthening Scheme, NRSS-XXXI (Part-B)	May 2014	April 2017	Essel Infra
33.	Western Region System Strengthening – II under Project – B (Maharashtra)	November 2007	January 2014	Adani TL
34.	Western Region System Strengthening – II under Project – C (Gujarat)	November 2007	December 2015	Adani TL
35.	Additional system strengthening for Sipat STPS	November 2015	March 2019	Adani TL
36.	Additional system strengthening for Chhattisgarh (B)	November 2015	March 2019	Adani TL
37.	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	November 2015	August 2019	Adani TL

Sl. No.	Transmission Scheme	Date of Award	Date of Commissioning	Parent Company
38.	Transmission System for Ultra Mega Solar Park in Fatehgarh, Distt. Jaisalmer Rajasthan	March 2018	July 2021	Adani TL
39.	Transmission System Associated with LTA applications from Rajasthan SEZ Part-D	September 2019	September 2021	Adani TL
40.	Transmission System for Western Region Strengthening Scheme – 21 (WRSS – 21) Part – A – Transmission System Strengthening for Relieving Over Loadings Observed in Gujarat Intra-State System Due to Re-injections in Bhuj PS	October 2019	October 2022	Adani TL
41.	Transmission System for Transmission System Associated with RE Generations at Bhuj-II, Dwarka & Lakadia	November 2019	October 2022	Adani TL
42.	Transmission System for Jam Khambaliya Pooling Station and Interconnection of Jam Khambaliya Pooling Station for Providing Connectivity to RE Projects (1500 MW) in Dwarka (Gujarat) and Installation of 400/220 kV ICT along with associated bays at CGPL switchyard	November 2019	November 2022	Adani TL
43.	Additional inter- Regional AC link for import into Southern Region i.e Warora - Warangal and Chilakaluripeta Hyderabad-Kurnool 765 kV link	July 2016	October 2023	Adani TL
44.	Transmission Scheme for Evacuation of power from RE sources in Karur/Tirrupur Wind Energy Zone (Tamil Nadu) (1000 MW) - Phase I	January 2022	October 2023	Adani TL
45.	Transmission scheme for evacuation of 3 GW RE injection at Khavda Pooling Station 1 (KPS 1) under Phase I	January 2022	February 2024	Adani TL
46.	Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Ltd.	August 2013	September 2016	L&T
47.	Transmission System for Patran 400 kV S/S	November 2013	June 2016	Techno Electric
48.	Transmission System Associated with Krishnapattnam UMPP - Synchronous interconnection between SR and WR (Part-B)	July 2011	June 2014	RSTCL
49.	Transmission system strengthening in Indian system for transfer of power from new HEP's in Bhutan	January 2016	March 2019	Kalpataru
50.	North Eastern Region Strengthening Scheme (NERSS-VI)	March 2017	October 2022	Kalpataru
51.	Evacuation of Power from RE Sources in Koppal Wind Energy Zone (Karnataka) (2500 MW)	December 2021	January 2024	ReNew Transmission Ventures Pvt. Ltd.
52.	Transmission system for evacuation of power from RE projects in Rajgarh (1500 MW) SEZ in Madhya Pradesh: Phase-I	May 2022	March 2024	G R Infra Projects Limited
53.	Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra	December 2021	March 2024	Indi Grid Limited

ISTS Schemes under implementation through TBCB route

Sl. No.	Transmission Scheme	Parent Company
1.	Immediate evacuation for North Karanpura (3x660 MW) generation project of NTPC alongwith creation of 400/220 kV sub-station at Dhanbad (ERSS-XIX)	Adani TL
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	Adani TL
3.	ISTS Network Expansion scheme in Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region (Narendra –Pune 765 kV D/c line and associated works)	Adani TL
4.	Transmission System for evacuation of additional 7 GW RE Power from Khavda RE Park under Phase-III: Part A	Adani TL
5.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III Part A1	Apraava Energy Private Limited
6.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III Part A3	Apraava Energy Private Limited
7.	Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part B (Establishment of 765/400/220 kV Karera S/s (near Datiya) alongwith associated transmission lines)	Apraava Energy Private Limited
8.	400 kV Khandukhal (Srinagar) - Rampura (Kashipur) D/c line	Megha Engineering & Infrastructures Limited
9.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)	Megha Engineering & Infrastructures Limited
10.	System Strengthening Scheme for Eastern and North Eastern Regions: A. Eastern Region Strengthening Scheme-XXV (ERSS-XXV) B. North Eastern Region Strengthening Scheme-XV (NERSS-XV)	PGCIL
11.	Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B	PGCIL
12.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part C	PGCIL
13.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part D	PGCIL
14.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part G	PGCIL
15.	Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone	PGCIL
16.	Establishment of Khavda Pooling Station-2 (KPS 2) in Khavda RE Park	PGCIL
17.	Establishment of Khavda Pooling Station-3 (KPS 3) in Khavda RE Park	PGCIL
18.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III Part B1	PGCIL
19.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	PGCIL
20.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B	PGCIL
21.	Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh	PGCIL
22.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part E	PGCIL
23.	Western Region Expansion Scheme XXVII (Raipur Pool – Dhamtari 400 kV D/c line)	PGCIL
24.	Western Region Expansion Scheme XXVIII & XXIX (Creation of 220 kV level (GIS) at 765/400 kV Raipur Pool S/s & Creation of 220 kV level at 765/400 kV Dharamjaigarh S/s)	PGCIL
25.	Inter-regional ER-WR Interconnection (Jeypore- Jagdalpur 400 kV D/c line)	PGCIL

Sl. No.	Transmission Scheme	Parent Company
26.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III: Part C1	PGCIL
27.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III: Part H	PGCIL
28.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III: Part D	PGCIL
29.	Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka	PGCIL
30.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex)- Part-A	PGCIL
31.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex)- Part-D	PGCIL
32.	Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-A & B) and Gadag-II (Phase- A) in Karnataka	PGCIL
33.	Transmission System for evacuation of additional 7 GW RE Power from Khavda RE Park under Phase-III: Part B	PGCIL
34.	Transmission Scheme for Solar Energy Zone in Gadag (1000 MW), Karnataka-Phase-I	ReNew Transmission Ventures Ltd
35.	Transmission Scheme for Solar Energy Zone in Gadag (1500 MW), Karnataka: Phase-II	ReNew Transmission Ventures Ltd
36.	System Strengthening Scheme in Northern Region (NRSS-XXXVI)" along with LILO of Sikar-Neemrana 400 kV D/C line at Babai (RRVPNL)	Resurgent Power Ventures Pvt. Ltd
37.	Transmission system for evacuation power from Pakal Dul HEP in Chenab Valley HEPs - Connectivity System	Sterlite Power TL
38.	Establishment of new 220/132 kV substation at Nangalbibra	Sterlite Power TL
39.	Transmission System for 400 kV Udupi (UPCL) – Kasargode D/C Line	Sterlite Power TL
40.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III: Part F	Sterlite Power TL
41.	Western Region Strengthening Scheme-XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme-IX (NERSS-IX) (LILO of 2nd circuit of Zerda-Ranchodpura 400 kV D/c line at Banaskantha, Establishment of 400/220 kV Vapi-II S/s, Padghe-Khargar 400 kV D/c line, Pare HEP – North Lakhimpur 132 kV d/c line)	Sterlite Power TL
42.	Additional 400 kV feed to Goa and additional system for power evacuation from generation projects pooled at Raigarh (Tamnar) Pool	Sterlite Power TL
43.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase- III: Part G	Sterlite Power TL
44.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 1) (Bikaner Complex)- Part B	Sterlite Power TL
45.	Transmission System for Evacuation of Power from RE Projects in Rajgarh 1000 MW SEZ in Madhya Pradesh Phase-II	G R infra projects
46.	Transmission scheme for evacuation of power from Dhule 2 GW REZ	Indi Grid Limited
47.	Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part C (Establishment of 765/400/220 kV Ishanagar (New) S/s along with associated transmission lines)	Indi Grid Limited
48.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part1) (Bikaner Complex)- Part-C	Tata Power Limited
49.	Transmission system for evacuation of power from RE projects in Solapur (1500 MW) SEZ in Maharashtra	Torrent Power

ISTS Schemes under Bidding

Sl. No.	Transmission Schemes
1.	Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir
2.	Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW)
3.	Transmission system for evacuation of power from Luhri Stage-I HEP
4.	North Eastern Region Expansion Scheme-XVI (NERES-XVI) [Establishment of Gogamukh 400/220/132 kV substation and other associated works]
5.	Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III: Part I
6.	Transmission system for evacuation of power from Shongtong Karcham HEP (450 MW) and Tidong HEP (150 MW)
7.	Provision of Dynamic Reactive Compensation at KPS1 and KPS3
8.	Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV) [Establishment of 765/400 kV, 2x1500 MVA GIS substation at Paradeep along with associated lines]
9.	Western Region Network Expansion scheme in Kallam area of Maharashtra
10.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part A
11.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part B
12.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part C
13.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part D
14.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E2
15.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part A
16.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part C
17.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part A
18.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part B
19.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part C
20.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part D
21.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part E
22.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part F
23.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part H1

Sl. No.	Transmission Schemes
24.	Transmission Scheme for integration of Renewable Energy Zone in Tumkur area of Karnataka
25.	Transmission system strengthening for interconnection of Bhadla-III and Bikaner III complex
26.	Network Expansion scheme in Gujarat for drawl of about 3.6 GW load under Phase-I in Jamnagar area
27.	North Eastern Region Generation Scheme-I (NERGS-I) [Establishment of 400 kV switching station at Bokajan in Assam]
28.	Augmentation of transformation capacity at Bhuj-II PS
29.	Eastern Region Expansion Scheme-XXXIX (ERES-XXXIX) [Establishment of 765/400 kV, 2x1500 MVA GIS substation at Gopalpur along with associated lines]
30.	Eastern Region Generation Scheme-I (ERGS-I) [LILO of both circuits of Angul –Sundargarh (Jharsuguda) 765 kV 2xS/c lines at NLC Talabira generation switchyard]
31.	Network Expansion Scheme in Navinal (Mundra) area of Gujarat for drawal of power in the area
32.	Additional Transmission system for evacuation of power from Bhadla-III PS as part of Rajasthan REZ Phase-III scheme (20 GW)
33.	Transmission Scheme for integration of Davanagere / Chitradurga and Bellary REZ in Karnataka
34.	Transmission Scheme for integration of Bijapur REZ in Karnataka
35.	Transmission System under ISTS for evacuation of power from Kudankulam Unit - 3 & 4 (2x1000 MW)
36.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 3: 6GW) (Bikaner Complex) :Part A
37.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part 3: 6GW) (Bikaner Complex) :Part B
38.	Augmentation of transformation capacity at Jam Khambhaliya PS

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